Appendix 5

# Air Quality Project Variants Analysis

RAMBOLL

ENVIRONMENT
& HEALTH

# DRAFT MEMORANDUM

Date: February 20, 2022

To: Eric Harrison, Signature Development Group

From: Michael Keinath
Sarah Manzano

Subject: **Air Quality, Greenhouse Gas, and Energy Analysis of the Willow Village Project Variants**

Ramboll
2200 Powell Street
Suite 700
Emeryville, CA 94608
USA

T +1 510 655 7400
F +1 510 655 9517
www.ramboll.com

## 1. PURPOSE OF MEMORANDUM

As a supplemental analysis to the CEQA Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report prepared for the construction and operation of the proposed mixed-use development at Willow Village in Menlo Park, California (referred to hereafter as "the Project"), Ramboll evaluated potential criteria air pollutant (CAP) emissions, greenhouse gas (GHG) emissions, and health impacts associated with the Project variants at the maximally exposed individual receptor (MEIR) as described below. Variants are elements that may or may not be proposed as part of the Project for particular reasons.

## 2. PROJECT VARIANTS

### 2.1 Increased Residential Density Variant

The Increased Residential Density Variant would increase the number of residential dwelling units by approximately 200 units, to a total of up to 1,930 residential units. These additional dwelling units would be included in Parcel 4, which is one of the last buildings to be built. No other changes to the Project would occur under this Variant. Updates to the land use summary can be found in **Table 1V**.

An analysis consistent with the Project analysis was performed to evaluate the potential impacts associated with the increase in dwelling units. Table references included herein correspond to the similar tables in the Technical Report that would be replaced by the changes associated with the Increased Residential Density Variant.

#### 2.1.1 *Construction Emissions and Health Risk Assessment*

This Variant results in additional construction activity to build the additional 200 dwelling units. The Project Applicant indicated that there would be no change to the foundations or excavation necessary to accommodate the additional dwelling units. However, the core and shell phase for Parcel 4 would be increased by one month and tenant improvements would increase by three months. Both phases would use the same equipment information for the extended construction period. This increased activity

would result in additional emissions, which are shown in **Table 12V**[1] for construction architectural coating off-gassing emissions, **Table 13V** for unmitigated criteria air pollutant emissions, **Table 14V** for mitigated criteria air pollutant emissions and **Table 15V** for GHG emissions. As shown in these tables, emissions would increase slightly, but conclusions would not change.

The increase in emissions would also affect health impacts. A health risk assessment was performed using the same methodology as was used in the Technical Report with these additional emissions. Results are shown in **Tables 59V**, **60V** and **61V**. Additional discussion on findings is in **Section 2.1.3.**

### 2.1.2 *Operational Emissions and Health Risk Assessment*

Increasing the density of the residential area by 200 units, or roughly 12% compared to the original 1,730 units, would be expected to increase the residential emissions associated with consumer products, architectural coatings, water use, and energy use by approximately the same margin. Landscaping and generator emissions are not expected to change because the additional units would be installed by increasing the height of existing apartment buildings, leaving landscaping and generator requirements the same. The impacted building operational capacity can be found in **Table 16V**.

The Transportation Engineer provided increased traffic associated with this Variant, which increases the daily average residential trip rate and VMT from 7,359 trips and 69,910 miles to 8,210 trips and 77,992 miles, respectively.

The emissions due to increased traffic and operational emissions associated with this Variant can be found in **Tables 17V**, **18V**, **21aV**, **21bV**, **22V**, **23V**, **24aV**, **24bV**, **25aV**, **25bV**, **28V**, **30V-36V**, **38V**, and **39V**. A summary of increased emissions can be found in **Tables 40V**, **41V**, and **42V**.

The total construction and operations emissions increase from this Variant can be found in **Tables 43V** and **44V**. As shown in **Table 44V**, an additional 200 DU is not expected to change significance findings compared to the Project.

The increase in dwelling units would also increase the traffic volumes on certain roadways. Analysis comparing volumes by roadways at the MEIR from the Technical Report was performed to determine the impact of the additional traffic. **Table 47V** shows how traffic volumes scale by segment. As shown in **Table 59V**, operational emissions due to this Variant would increase the operational only lifetime excess cancer risk from 3.3 in a million to 3.4 in a million for the On-Site MEIR and from 3.4 to 3.6 in a million for the Off-Site MEIR. Based on these results, the increase in cancer risk associated with this Variant is minor and remains below the Bay Area Air Quality Management District cancer risk threshold of 10 in a million.

The potential for exposure to the increased traffic volumes to result in adverse chronic noncancer effects and excess $PM_{2.5}$ concentrations were evaluated by conservatively scaling the Project operations chronic noncancer hazard index and excess $PM_{2.5}$ concentrations by the maximum change in traffic volumes for any segment. The impact from the Increased Residential Density Variant remains below threshold.

[1] Table numbers referenced herein correspond to the similar table in the Air Quality, Greenhouse Gas, and Health Risk Assessment Technical Report.

### 2.1.3 *Combined Construction and Operational Health Impacts*

Similar to the analysis for the Project, health impacts from Increased Residential Variant construction and operations were added together to estimate the combined health impacts of construction activities and operation. A breakdown of excess lifetime cancer risk from construction, operational generators, and operational traffic at the Project MEIR is shown in **Table 59V**. The table also shows the Scenario for which the maximum was identified. Similar breakdowns for chronic HI and $PM_{2.5}$ concentration are shown in **Table 60V** and **Table 61V**, respectively. These tables also show the Scenario for which the maximums were identified, as well as the year for which the maximum occurred since chronic HI and $PM_{2.5}$ concentrations are annual impacts.

All health impacts remain below thresholds, except **Table 59V** shows a maximum cancer risk of 10.6 in a million for the new on-site residents, which exceeds the BAAQMD threshold of significance for cancer risk of 10 in a million.

Building code requires new residences to be equipped with MERV-13 filtration. Filters that meet MERV-13 rating filter particulates at a rate of 80-90%.[2] Estimated health impacts conservatively do not incorporate this filtration. Therefore, residents would be exposed to lower concentrations of diesel particulate matter than used to estimate health impacts. The filtration associated with the MERV-13 filters are expected to reduce health impacts to the new on-site residents to less than the BAAQMD threshold of significance.

### 2.1.4 *Other Air Impacts*

This Variant also would not change conclusions of the odor, carbon monoxide and cumulative assessments. This Variant would not substantially change emissions of odor and would not increase traffic volumes to above the screening levels discussed in the carbon monoxide assessment in the Technical Report. This Variant also would not change the MEIR, so the cumulative assessment would not change, and cumulative health impacts would remain below thresholds.

### 2.1.5 *Energy*

This Variant would increase energy use associated with construction and operations. However, increases in energy use would be minor, similar to the increase in emissions, and significance findings would not change.

## 2.2 No Hamilton Avenue Realignment Variant

The No Hamilton Avenue Realignment Variant assumes that no changes would occur to the existing land uses on the Hamilton Avenue Parcels and that the intersection of Willow Road and Hamilton Avenue would remain in the existing location. This would alter the circulation network east of Willow Road to accommodate retaining the Willow Road and Hamilton Avenue intersection in its current alignment. This Variant would result from forces outside of the Project's control, such as not receiving approval from Caltrans or affected property owners.

### 2.2.1 *Construction Emissions and Health Risk Assessment*

This Variant results in less construction activity due to the lack of construction of the Hamilton Avenue Realignment and lack of increase in retail and relocation of the service station at the

[2] United States Environmental Protection Agency. 2009. Residential Air Cleaners, A Summary of Available Information. EPA 402-F-09-002. August. Available online at: https://19january2017snapshot.epa.gov/indoor-air-quality-iaq/residential-air-cleaners-second-edition-summary-available-information_.html

Hamilton Avenue Parcels North and South. Therefore, construction emissions would be reduced. However, emissions would not be reduced to a level that would change significance findings of construction criteria air pollutant emissions since construction associated with these parcels were relatively minor.

As a result of the emissions reduction due to the reduction in equipment activity, health impacts would also be reduced. However, the reduction in emissions is far from the MEIR reported in our Technical Report. Therefore, the reduction in construction activity would not have a substantial change in health impacts reported in the Technical Report due to the dispersion of the emissions at the MEIR. The reduction also would not substantially reduce required mitigation of construction equipment.

### 2.2.2 *Operational Emissions and Health Risk Assessment*

Operational emissions would be reduced as a result of the reduction in additional retail associated with the Hamilton Avenue Parcels North and South. Emissions from architectural coatings, consumer products, landscaping, mobile, energy use, water, waste and emergency generators would be reduced as a result of the reduction in additional retail with this Variant. For context, the Hamilton Avenue Parcels North and South account for only 0.7% of daily trips and 0.4% of daily vehicle miles traveled of the Project at Full Buildout. This Variant would decrease Project traffic emissions by a similarly insubstantial margin. Therefore, the change in emissions associated with this Variant would be minimal and would not change significance findings.

The overall effect on the operational health impacts of the Project is expected to be negligible. Considering both the relatively small decrease in emissions and the Hamilton Avenue Parcels being approximately 0.25 miles to the onsite MEIR and 0.5 miles to offsite MEIR, it is unlikely that this Variant would produce a meaningful reduction to the health impacts associated with the Project.

### 2.2.3 *Other Air Impacts*

This Variant also would not change conclusions of the odor, carbon monoxide and cumulative assessments. This Variant would not substantially change emissions of odor and would not increase traffic volumes to above the screening levels discussed in the carbon monoxide assessment in the Technical Report. This Variant also would not change the MEIR, so the cumulative assessment would not change, and cumulative health impacts would remain below thresholds.

### 2.2.4 *Energy*

This Variant would not have an appreciable effect on energy use compared to the Project. As mentioned above, construction activity would be reduced with this Variant due to the reduction in activity at the Hamilton Avenue Parcels North and South. Therefore, construction fuel use would be minorly reduced. However, the reduction in fuel use would not change any significance findings due to the minor reduction.

Project building related energy use would also be minorly reduced due to the reduction in new retail space. The minor change in traffic patterns associated with this Variant would have a negligible impact on energy use associated with vehicle travel. These changes would not change any significance findings due to the minor changes.

## 2.3 No Willow Road Tunnel Variant

The No Willow Road Tunnel Variant assumes the tunnel from the northwest corner of the Project site to the southeast corner of the Bayfront campus would not be constructed, resulting from

forces outside of the Project's control. With this Variant, the trams would continue to operate, but would use Willow Road instead of the tunnel. Pedestrians and bicyclists would use the sidewalk and on-street bike lanes to move along the Willow Road corridor.

### 2.3.1 *Construction Emissions and Health Risk Assessment*

This Variant results in less construction activity due to the lack of construction of the Willow Road Tunnel. Therefore, construction emissions will be reduced. However, emissions would not be reduced to a level that would change significance findings of construction criteria air pollutant emissions.

As a result of the emissions reduction due to the reduction in equipment activity, health impacts would also be reduced. However, the reduction in emissions is far from the MEIR reported in our Technical Report. Therefore, the reduction in construction activity would not have a substantial change in health impacts reported in the Technical Report due to the dispersion of the emissions at the MEIR. The reduction also would not substantially reduce required mitigation of construction equipment.

### 2.3.2 *Operational Emissions and Health Risk Assessment*

Emissions from architectural coatings, consumer products, energy use, and emergency generators would not be affected by this Variant. Landscaping emissions may change slightly due to the change in landscape in this area. However, the parameters used to estimate emissions from landscaping, as prescribed in CalEEMod, would not change. Therefore, any change in landscaping emissions would be small.

This Variant would move trams, pedestrians and bicyclists from the tunnel to Willow Road. Pedestrians and bicyclists do not release emissions. The tram and shuttle schedule would not be affected by the lack of tunnel under Willow Road. The slight change in distance traveled by the trams and shuttles would be negligible and would not change emissions associated with their travel.

The change in travel patterns for the trams and shuttles also would not affect the health impacts from traffic reported in the Technical Report. The onsite and offsite MEIR is far from where this change in location of emissions would occur and the change in location of emissions is small. Therefore, this Variant would have a negligible change on reported health impacts. Furthermore, without the Project, the trams and shuttles would travel on this segment of Willow Road. Therefore, the change in health impacts to sensitive receptors near the tunnel with this Variant would be negligible.

### 2.3.3 *Other Air Impacts*

This Variant also would not change conclusions of the odor, carbon monoxide and cumulative assessments. This Variant would not substantially change emissions of odor and would not increase traffic volumes to above the screening levels discussed in the carbon monoxide assessment in the Technical Report. This Variant also would not change the MEIR, so the cumulative assessment would not change, and cumulative health impacts would remain below thresholds.

### 2.3.4 *Energy*

This Variant would not have an appreciable effect on energy use compared to the Project. As mentioned above, construction activity would be reduced with this Variant. Therefore, construction fuel use would be minorly reduced. However, the reduction in fuel use would not change any significance findings due to the minor reduction. Building related energy use would not be affected

by this Variant. The minor change in traffic patterns associated with this Variant would have a negligible impact on energy use associated with vehicle travel.

## 2.4 On-site Recycled Water Variant

The On-Site Recycled Water Variant would provide recycled water to Willow Village through the on-site treatment of wastewater. The on-site treatment and production of recycled water would capture wastewater supplies, including blackwater, from all Willow Village buildings by providing four water reuse facilities. The recycled water would be utilized for irrigation, toilet flushing and cooling. This Variant would be included in the Project if the West Bay Sanitary District does not construct its proposed Bayfront Recycled Water Plant and associated improvements to convey recycled water to the Project Site.

### 2.4.1 *Construction Emissions and Health Risk Assessment*

This Variant results in very little change in construction activity. Any equipment to be used to install the water treatment facility would already be on-site for the other components of construction and any activity associated with the installation would be encompassed in the existing schedule. Therefore, construction emissions would not be expected to change as a result of the On-site Recycled Water Variant.

Since emissions are not expected to change, health impacts are also not expected to change as a result of the On-site Recycled Water Variant.

### 2.4.2 *Operational Emissions and Health Risk Assessment*

Emissions from architectural coatings, consumer products, landscaping, mobile, waste and emergency generators would not be affected by this Variant. Any increase in on-site energy use associated with the on-site treatment would be offset by the reduction in energy to pump the water to a central treatment facility and energy the central treatment facility would use to treat the water. As a result, this Variant would not alter emissions as compared to the Project.

Similarly, health impacts of operations would not change as a result of this Variant.

### 2.4.3 *Other Air Impacts*

This Variant also would not change conclusions of the odor, carbon monoxide and cumulative assessments. Recycled water systems that employ biological treatment are capable of removing odor causing organic compounds and sulfides. These odorous compounds are oxidized to carbon dioxide, sulfates and water by microorganisms in the biological reactor in the presence of dissolved oxygen. Any remaining compounds that might volatilize are quickly diluted by the surrounding air. Therefore, this Variant would not change odor impacts. This Variant would not change traffic volumes, so the carbon monoxide assessment would not change. This Variant also would not change the MEIR, so the cumulative assessment would not change, and cumulative health impacts would remain below thresholds.

### 2.4.4 *Energy*

This Variant would not have an appreciable effect on energy use compared to the Project. Any increase in on-site energy use due to the water treatment would be offset by the reduction in energy use at a central treatment plant and the energy to pump the water to the treatment plant.

# TABLES

**Table 1V**
**Land Use Summary**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Land Use[1] | CalEEMod® Land Use | Size | Units[2] | Square Footage |
|---|---|---|---|---|
| **Existing Conditions (2019)** | | | | |
| Office | General Office Building | 252 | ksf | 251,530 |
| R&D | Research and Development | 124 | ksf | 123,870 |
| Warehouse | Unrefrigerated Warehouse-No Rail | 501 | ksf | 500,780 |
| Lab & Manufacture | Manufacturing | 24 | ksf | 23,570 |
| Health Center | Health Club | 24 | ksf | 24,060 |
| Former Fire Department Building | General Light Industry | 80 | ksf | 80,100 |
| Parking | Enclosed Parking with Elevator | 2,300 | Spaces | 920,000 |

| **Partial Buildout by Year[3]** | | | |
|---|---|---|---|
| **Land Use Type[4]** | **Percent Operational by Year** | | |
| | **Year 4** | **Year 5** | **Year 6** |
| Office | 3.1% | 58% | 95% |
| Retail | 10% | 59% | 98% |
| Residential | 0% | 16% | 64% |
| Hotel | 0% | 41% | 100% |
| Parking | 53% | 75% | 96% |
| Park | 89% | 95% | 100% |

| **Full Buildout** | | | |
|---|---|---|---|
| **Land Use Type[4]** | **Size** | **Units[2]** | **Square Footage** |
| Office | 1,600 | ksf | 1,600,000 |
| Retail | 208 | ksf | 207,690 |
| Residential | 1,930 | DU | 1,892,043 |
| Hotel | 193 | Rooms | 172,000 |
| Parking | 1,869 | ksf | 1,869,240 |
| Park | 404 | ksf | 403,837 |

**Notes:**

1. Land uses analyzed based on information provided by the Project Applicant, as found in the Project Description. "Office" land use mapped to General Office Building and Research and Development; "Office/Lab" mapped to General Office Building, Research and Development, Health Club, and Manufacturing; "Warehouse" mapped to Unrefrigerated Warehouse-No Rail and General Light Industry, and "Warehouse/Office" mapped to Unrefrigerated Warehouse-No Rail and Research and Development CalEEMod land use types on a building-by-building basis.
2. The Project Applicant provided Project land uses in units of square footage, hotel rooms, and dwelling units. For the existing parking land use, each parking space is assumed to be 400 sqft. This assumption is based on CalEEMod defaults.
3. Partial buildout for Year 4, Year 5, and Year 6 were calculated based on the portion of building area for each land use type that becomes operational each year, based on the construction schedule, as shown in Table 2.
4. For Hamilton Avenue Parcels North and South, only net new square footage was included in the analysis. This is under the conservative assumption that the existing retail area and the retail land use that will replace it have similar operational emissions.

**Abbreviations:**

DU - dwelling unit
ksf - 1,000 square feet
sqft - square foot
CalEEMod® - California Emissions Estimator Model

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

Table 12V
Project Construction Architectural Coating Off-Gassing Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

| Coating Category | Unmitigated Interior | Mitigated Interior | Exterior |
|---|---|---|---|
| VOC Content (g/L)[1,2] | 100 | 10 | 150 |
| Emission Factor (lb/ft$^2$)[3] | 0.0046 | 0.00046 | 0.0070 |
| Land Use | Fraction of Surface Area Painted[3] (%) | | Painted Area Multiplier[3] |
| | Interior | Exterior | |
| Residential | 75% | 25% | 2.7 |
| Non-Residential | 75% | 25% | 2 |
| Parking | 0% | 6% | -- |

| Building or Parcel | Land Use[4] | Start Year | End Year | Building Square Footage[5] | | | Painted Surface Area | | Unmitigated ROG Emissions | Mitigated ROG Emissions |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Residential Area | Non-Residential Area | Parking Area | Interior | Exterior | | |
| | | | | ft$^2$ | ft$^2$ | ft$^2$ | ft$^2$ | ft$^2$ | tons | tons |
| Parcel 2 | Residential | Year 4 | Year 5 | 320,569 | -- | -- | 649,152 | 216,384 | 2.3 | 0.90 |
| | Non-Residential | | | -- | 40,000 | -- | 60,000 | 20,000 | 0.21 | 0.083 |
| | Parking | | | -- | -- | 216,862 | -- | 13,012 | 0.045 | 0.045 |
| Parcel 3 | Residential | Year 4 | Year 5 | 410,760 | -- | -- | 831,788 | 277,263 | 2.9 | 1.2 |
| | Non-Residential | | | -- | 55,000 | -- | 82,500 | 27,500 | 0.29 | 0.11 |
| | Parking | | | -- | -- | 233,000 | -- | 13,980 | 0.049 | 0.049 |
| North Garage | Parking | Year 2 | Year 3 | -- | -- | 840,056 | -- | 50,403 | 0.18 | 0.18 |
| Office Building 4 | Non-Residential | Year 4 | | -- | 269,934 | -- | 404,902 | 134,967 | 1.4 | 0.56 |
| Meeting, Collaboration, Park | Non-Residential | Year 5 | Year 6 | -- | 454,563 | -- | 681,844 | 227,281 | 2.4 | 0.95 |
| Hotel | Non-Residential | Year 5 | | -- | 172,000 | -- | 258,000 | 86,000 | 0.90 | 0.36 |
| Other | Non-Residential | Year 4 | | -- | 6,085 | -- | 9,127 | 3,042 | 0.032 | 0.013 |
| | Parking | | | -- | -- | 13,600 | -- | 816 | 2.8E-03 | 2.8E-03 |
| Parcel 7 | Residential | Year 4 | Year 5 | 117,640 | -- | -- | 238,221 | 79,407 | 0.83 | 0.33 |
| | Parking | | | -- | -- | 9,547 | -- | 573 | 2.0E-03 | 2.0E-03 |
| Parcel 6 | Residential | Year 5 | | 174,499 | -- | -- | 353,361 | 117,787 | 1.2 | 0.49 |
| | Parking | | | -- | -- | 26,809 | -- | 1,609 | 5.6E-03 | 5.6E-03 |
| South Garage | Parking | Year 3 | Year 4 | -- | -- | 446,830 | -- | 26,810 | 0.093 | 0.093 |
| Office Building 3 | Non-Residential | Year 4 | Year 5 | -- | 212,805 | -- | 319,207 | 106,402 | 1.1 | 0.44 |
| Office Building 1 | Non-Residential | Year 4 | | -- | 134,237 | -- | 201,355 | 67,118 | 0.70 | 0.28 |
| Office Building 2 | Non-Residential | Year 4 | Year 5 | -- | 164,078 | -- | 246,118 | 82,039 | 0.86 | 0.34 |
| Office Building 5 | Non-Residential | Year 4 | Year 5 | -- | 236,320 | -- | 354,481 | 118,160 | 1.2 | 0.49 |
| Office Building 6 | Non-Residential | Year 4 | Year 5 | -- | 221,978 | -- | 332,967 | 110,989 | 1.2 | 0.46 |
| Parcels 4 + 5 | Residential | Year 5 | Year 6 | 868,575 | -- | -- | 1,758,864 | 586,288 | 6.1 | 2.4 |
| | Non-Residential | | | -- | 5,000 | -- | 7,500 | 2,500 | 0.026 | 0.010 |
| | Parking | | | -- | -- | 82,536 | -- | 4,952 | 0.017 | 0.017 |
| Hamilton Avenues Parcels North and South | Non-Residential | Year 5 | | -- | 7,690 | -- | 11,535 | 3,845 | 0.040 | 0.016 |
| | | | | | | | | Total Year 2[6] | 0.025 | 0.025 |
| | | | | | | | | Total Year 3[6] | 0.20 | 0.20 |
| | | | | | | | | Total Year 4[6] | 7.5 | 3.1 |
| | | | | | | | | Total Year 5[6] | 9.9 | 4.0 |
| | | | | | | | | Total Year 6[6] | 6.4 | 2.6 |

Table 12V
Project Construction Architectural Coating Off-Gassing Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

Notes:

1. VOC content of paint is assumed to be consistent with BAAQMD Regulation 8, Rule 3 for flat and nonflat coatings. VOC is assumed to be equivalent to ROG for these purposes.
2. Paint VOC content is consistent with or more stringent than BAAQMD Regulation 8 Rule 3 (Architectural Coatings). Emissions are estimated assuming that indoor painting will utilize "super-compliant" VOC architectural coatings that meet the more stringent limits in South Coast Air Quality Management District Rule 1113. For outdoor paint, assumes use of coatings with VOC content of 150 g/L, consistent with BAAQMD requirements. VOC is assumed to be equivalent to ROG for these purposes.
3. The emission factor is calculated using CalEEMod default architectural coating emissions parameters. The default assumptions account for the painting surface area relative to the floor square footage assuming 1 gallon of paint covers 180 sqft of surface area.
4. Consistent with CalEEMod Appendix A, recreational areas were excluded from the floor square footage in calculating VOC emissions due to architectural coatings.
5. Project square footage by land use was provided by the Project Applicant.
6. ROG emissions are allocated to each year based on the construction schedule for each building or parcel.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CalEEMod - California Emissions Estimator MODel
CEQA - California Environmental Quality Act
$ft^2$ - square feet
g - gram
gal - gallons
L - liters
lb - pounds
ROG - reactive organic gas
sqft - square feet
VOC - volatile organic compound

References:

BAAQMD. 2009. Regulation 8 Rule 3 Architectural Coatings. Accessed November 2020. Available at: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rg0803_0709.pdf?la=en.

California Air Pollution Control Officers Association (CAPCOA). 2016. Appendix A. Available at: http://www.caleemod.com

Table 13V
Summary of Unmitigated Project Construction Criteria Air Pollutant Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

Off-Road Emissions[1,2]

| Construction Area[3] | Construction Subphase | Year | Unmitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 1 | Demolition | Year 1 | 34 | 376 | 15 | 14 |
| | | Year 2 | 196 | 2,133 | 82 | 76 |
| | Grading and Utilities | Year 2 | 436 | 4,632 | 159 | 146 |
| Parcel 2 Foundations | | Year 3 | 285 | 2,758 | 163 | 150 |
| Parcel 2 Core and Shell | | Year 3 | 31 | 296 | 16 | 15 |
| | | Year 4 | 57 | 451 | 25 | 23 |
| Parcel 2 Tenant Improvements | | Year 4 | 52 | 371 | 24 | 22 |
| | | Year 5 | 32 | 302 | 18 | 16 |
| Parcel 2 Landscaping | | Year 5 | 134 | 896 | 70 | 65 |
| Parcel 3 Foundations | | Year 3 | 373 | 3,494 | 219 | 202 |
| | | Year 4 | 2.4 | 21 | 1.3 | 1.2 |
| Parcel 3 Core and Shell | | Year 4 | 128 | 938 | 54 | 50 |
| Parcel 3 Tenant Improvements | | Year 4 | 30 | 235 | 13 | 12.2 |
| | | Year 5 | 52 | 531 | 28 | 25 |
| Parcel 3 Landscaping | | Year 5 | 160 | 1,093 | 87 | 80 |
| North Garage | | Year 2 | 62 | 644 | 20 | 19 |
| | | Year 3 | 152 | 1,615 | 62 | 57 |
| Office Building 4 | | Year 3 | 132 | 1,355 | 54 | 50 |
| | | Year 4 | 17 | 227 | 7.3 | 6.8 |
| Meeting, Collaboration, Park | | Year 2 | 102 | 992 | 31 | 29 |
| | | Year 3 | 433 | 4,090 | 159 | 147 |
| | | Year 4 | 96 | 1,075 | 24 | 22 |
| | | Year 5 | 81 | 842 | 18 | 17 |
| | | Year 6 | 26 | 229 | 8.0 | 7.4 |
| Hotel Excavation | | Year 2 | 99 | 995 | 34 | 31 |
| | | Year 3 | 421 | 4,048 | 173 | 160 |
| Hotel Construction | | Year 4 | 94 | 1,011 | 27 | 25 |
| | | Year 5 | 71 | 845 | 18 | 16 |
| Town Square | | Year 3 | 608 | 5,208 | 301 | 277 |
| | | Year 4 | 256 | 2,207 | 120 | 111 |
| | | Year 5 | 26 | 218 | 3.7 | 3.4 |
| Area 2 | Demolition | Year 2 | 112 | 1,219 | 47 | 43 |
| | Grading and Utilities | Year 2 | 198 | 2,106 | 72 | 67 |
| | | Year 3 | 289 | 2,620 | 132 | 122 |
| Parcel 7 Foundations | | Year 4 | 200 | 1,666 | 113 | 104 |
| Parcel 7 Core and Shell | | Year 4 | 63 | 482 | 28 | 26 |
| Parcel 7 Tenant Improvements | | Year 4 | 6.0 | 41 | 2.7 | 2.5 |
| | | Year 5 | 48 | 438 | 26 | 24 |
| Parcel 7 Landscaping | | Year 5 | 110 | 704 | 55 | 51 |
| Parcel 6 Foundations | | Year 4 | 202 | 1,728 | 113 | 104 |
| Parcel 6 Core and Shell | | Year 4 | 58 | 410 | 24 | 22 |
| | | Year 5 | 27 | 256 | 14 | 13 |
| Parcel 6 Tenant Improvements | | Year 5 | 54 | 538 | 29 | 27 |
| Parcel 6 Landscaping | | Year 5 | 64 | 426 | 34 | 32 |
| | | Year 6 | 74 | 488 | 40 | 37 |
| South Garage | | Year 3 | 188 | 1,854 | 77 | 71 |
| | | Year 4 | 83 | 889 | 32 | 29 |
| Office Building 3 | | Year 3 | 168 | 1,611 | 72 | 66 |
| | | Year 4 | 35 | 442 | 13 | 12 |
| | | Year 5 | 3.9 | 58 | 1.6 | 1.5 |
| Office Building 1 | | Year 3 | 147 | 1,427 | 62 | 57 |
| | | Year 4 | 33 | 411 | 13 | 12 |
| Office Building 2 | | Year 3 | 142 | 1,366 | 60 | 56 |
| | | Year 4 | 36 | 448 | 14 | 13 |
| | | Year 5 | 0.44 | 6.4 | 0.18 | 0.17 |
| Office Building 5 | | Year 3 | 197 | 1,875 | 84 | 78 |
| | | Year 4 | 33 | 418 | 13 | 12 |
| | | Year 5 | 3.6 | 52 | 1.5 | 1.4 |

Table 13V
Summary of Unmitigated Project Construction Criteria Air Pollutant Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

| Construction Area[3] | Construction Subphase | Year | Unmitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Office Building 6 | | Year 3 | 189 | 1,775 | 82 | 75 |
| | | Year 4 | 39 | 476 | 14 | 13 |
| | | Year 5 | 7.6 | 112 | 3.2 | 3.0 |
| Area 3 | Grading and Utilities | Year 3 | 49 | 443 | 22 | 21 |
| | Tunnel Construction | Year 3 | 145 | 1,476 | 68 | 63 |
| | | Year 4 | 71 | 710 | 33 | 31 |
| | Foundations | Year 4 | 86 | 725 | 47 | 43 |
| | | Year 5 | 333 | 2,939 | 190 | 174 |
| | Core and Shell | Year 5 | 174 | 1,563 | 82 | 75 |
| | Tenant Improvements | Year 5 | 17 | 157 | 7.5 | 6.9 |
| | | Year 6 | 113 | 1,065 | 50 | 46 |
| | Landscaping | Year 6 | 210 | 1,522 | 119 | 110 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 42 | 428 | 23 | 21 |
| | Grading and Utilities | Year 4 | 2.1 | 20 | 1.2 | 1.1 |
| | | Year 5 | 45 | 441 | 25 | 23 |
| | Foundations | Year 5 | 35 | 309 | 20 | 18 |
| | Core and Shell | Year 5 | 18 | 189 | 7.9 | 7.3 |
| | Tenant Improvements | Year 5 | 14 | 141 | 7.1 | 6.5 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 223 | 1,749 | 142 | 131 |
| Feeder Line | PG&E Offsite Work | Year 3 | 180 | 1,438 | 99 | 91 |
| | Surface Improvements | Year 3 | 20 | 186 | 11 | 10 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 8.4 | 66 | 5.3 | 4.9 |
| | Adams and O'Brien | Year 3 | 5.6 | 44 | 3.6 | 3.3 |
| | Willow Road and Ivy Drive | Year 3 | 5.6 | 44 | 3.6 | 3.3 |

On-Road and Paving[1]

| Construction Area[3] | Construction Subphase | Year | Unmitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 1 | Demolition | Year 1 | 10 | 513 | 4.6 | 4.4 |
| | | Year 2 | 56 | 3,017 | 23 | 22 |
| | Grading and Utilities | Year 2 | 132 | 2,549 | 17 | 17 |
| Area 1 Town Square and Residential/Shopping District | Foundations | Year 3 | 1.6 | 90 | 0.92 | 0.88 |
| | | Year 4 | 0.0064 | 0.38 | 3.8E-03 | 3.7E-03 |
| | Core and Shell | Year 3 | 0.45 | 26 | 0.26 | 0.25 |
| | | Year 4 | 1.2 | 68 | 0.69 | 0.66 |
| | Tenant Improvements | Year 4 | 0.95 | 56 | 0.56 | 0.54 |
| | | Year 5 | 1.0 | 64 | 0.63 | 0.61 |
| | Landscaping | Year 5 | 0.72 | 44 | 0.44 | 0.42 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 3 | 300 | 219 | 3.9 | 3.6 |
| | | Year 4 | 328 | 230 | 4.4 | 4.1 |
| | | Year 5 | 210 | 142 | 2.9 | 2.6 |
| | Landscaping Worker Mobile Trips | Year 5 | 39 | 26 | 0.53 | 0.49 |
| Campus District | Foundations + Core and Shell | Year 2 | 2.3 | 111 | 1.1 | 1.0 |
| | | Year 3 | 10 | 576 | 5.9 | 5.6 |
| | | Year 4 | 9.3 | 548 | 5.5 | 5.3 |
| | | Year 5 | 8.4 | 515 | 5.1 | 4.9 |
| | Tenant Improvements | Year 4 | 3.8 | 223 | 2.2 | 2.1 |
| | | Year 5 | 4.6 | 281 | 2.8 | 2.7 |
| | | Year 6 | 0.74 | 47 | 0.46 | 0.44 |
| | O4 and NG Worker Mobile Trips | Year 2 | 53 | 41 | 0.69 | 0.64 |
| | | Year 3 | 309 | 226 | 4.1 | 3.7 |
| | | Year 4 | 230 | 162 | 3.1 | 2.8 |
| | MCS Worker Mobile Trips | Year 2 | 40 | 31 | 0.52 | 0.48 |
| | | Year 3 | 232 | 169 | 3.1 | 2.8 |
| | | Year 4 | 219 | 153 | 2.9 | 2.7 |
| | | Year 5 | 205 | 139 | 2.8 | 2.6 |
| | | Year 6 | 34 | 22 | 0.47 | 0.43 |
| Area 2 | Demolition | Year 2 | 58 | 3,480 | 27 | 25 |
| | Grading and Utilities | Year 2 | 48 | 1,273 | 8.7 | 8.3 |
| | | Year 3 | 43 | 1,129 | 8.3 | 7.9 |
| Area 2 Town Square and Residential/Shopping District | Foundations | Year 4 | 1.2 | 68 | 0.69 | 0.66 |
| | Core and Shell | Year 4 | 1.4 | 83 | 0.83 | 0.79 |
| | | Year 5 | 0.42 | 26 | 0.26 | 0.25 |

Table 13V
Summary of Unmitigated Project Construction Criteria Air Pollutant Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

| Construction Area[3] | Construction Subphase | Year | Unmitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 2 Town Square and Residential/Shopping District | Tenant Improvements | Year 4 | 0.16 | 10 | 0.10 | 0.093 |
| | | Year 5 | 2.1 | 126 | 1.3 | 1.2 |
| | Landscaping | Year 5 | 0.54 | 33 | 0.32 | 0.31 |
| | | Year 6 | 0.17 | 11 | 0.11 | 0.10 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 4 | 326 | 228 | 4.4 | 4.0 |
| | | Year 5 | 277 | 187 | 3.8 | 3.5 |
| | Landscaping Worker Mobile Trips | Year 5 | 29 | 19 | 0.39 | 0.36 |
| | | Year 6 | 10 | 6.2 | 0.13 | 0.12 |
| Campus District | Foundations + Core and Shell | Year 3 | 7.8 | 447 | 4.5 | 4.3 |
| | | Year 4 | 8.2 | 486 | 4.9 | 4.7 |
| | Tenant Improvements | Year 4 | 7.0 | 410 | 4.1 | 3.9 |
| | | Year 5 | 5.0 | 306 | 3.0 | 2.9 |
| | Worker Mobile Trips | Year 3 | 516 | 377 | 6.8 | 6.3 |
| | | Year 4 | 627 | 440 | 8.4 | 7.7 |
| | | Year 5 | 275 | 186 | 3.8 | 3.5 |
| Area 3 | Grading and Utilities | Year 3 | 45 | 196 | 1.7 | 1.6 |
| | Tunnel Construction | Year 3 | 686 | 779 | 12 | 11 |
| | | Year 4 | 319 | 355 | 5.6 | 5.2 |
| | Foundations | Year 4 | 88 | 107 | 1.6 | 1.5 |
| | | Year 5 | 343 | 407 | 6.4 | 6.0 |
| | Core and Shell | Year 5 | 556 | 716 | 11 | 10 |
| | Tenant Improvements | Year 5 | 115 | 148 | 2.3 | 2.1 |
| | | Year 6 | 758 | 960 | 15 | 14 |
| | Landscaping | Year 6 | 10 | 71 | 0.77 | 0.73 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 2.1 | 66.3 | 0.58 | 0.55 |
| | Grading and Utilities | Year 4 | 0.077 | 1.3 | 0.010 | 9.2E-03 |
| | | Year 5 | 5.0 | 27 | 0.21 | 0.20 |
| | Foundations | Year 5 | 0.80 | 49 | 0.49 | 0.47 |
| | Core and Shell | Year 5 | 0.72 | 44 | 0.44 | 0.42 |
| | Tenant Improvements | Year 5 | 0.90 | 55 | 0.55 | 0.52 |
| | Worker Mobile Trips | Year 5 | 72 | 48 | 1.0 | 0.90 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 5.5 | 24 | 0.27 | 0.26 |
| Feeder Line | PG&E Offsite Work | Year 3 | 15 | 56 | 0.65 | 0.62 |
| | Surface Improvements | Year 3 | 4.3 | 5.4 | 0.063 | 0.059 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 1.0 | 10 | 0.11 | 0.10 |
| | Adams and O'Brien | Year 3 | 0.83 | 10 | 0.11 | 0.10 |
| | Willow Road and Ivy Drive | Year 3 | 0.83 | 10 | 0.11 | 0.10 |

| Summary of Project Construction Unmitigated Annual CAP Emissions by Year | | | | |
|---|---|---|---|---|
| Year | Emissions[4] | | | |
| | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | ton/year | | | |
| Year 1 | 0.022 | 0.44 | 0.010 | 9.0E-03 |
| Year 2 | 0.82 | 12 | 0.26 | 0.24 |
| Year 3 | 3.5 | 23 | 1.06 | 0.98 |
| Year 4 | 9.5 | 9.8 | 0.41 | 0.38 |
| Year 5 | 12 | 8.3 | 0.40 | 0.37 |
| Year 6 | 7.0 | 2.2 | 0.12 | 0.11 |
| Total | 33 | 55 | 2.3 | 2.1 |

| Summary of Project Construction Unmitigated Daily CAP Emissions by Year | | | | |
|---|---|---|---|---|
| Year | Emissions | | | |
| | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | lb/day | | | |
| Year 1 | 2.8 | 56 | 1.2 | 1.1 |
| Year 2 | 4.5 | 64 | 1.4 | 1.3 |
| Year 3 | 19 | 124 | 5.8 | 5.4 |
| Year 4 | 52 | 53 | 2.3 | 2.1 |
| Year 5 | 64 | 46 | 2.2 | 2.0 |
| Year 6 | 43 | 14 | 0.72 | 0.67 |
| Threshold[5] | 54 | 54 | 82 | 54 |

Notes:

1. Construction emissions were estimated with methodology equivalent to CalEEMod 2020.4.0. Emissions were estimated using on-road emissions factors from EMFAC2021 and off-road construction equipment emission factors from OFFROAD2017. Onroad trips and offroad construction equipment use were provided by the Project Applicant.

2. Unmitigated construction emissions from offroad equipment are calculated using fleet-average emission factors.

Table 13V
Summary of Unmitigated Project Construction Criteria Air Pollutant Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

[3] Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.

[4] The mass emissions shown above are converted from pound per year to gram per second for the health risk assessment. The conversion is based on 365 days per year and 11 hours per day, consistent with the modeled hours from 7 AM - 6 PM.

[5] Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. Bolded values indicate threshold exceedances. Fugitive emissions sources are excluded from comparison to this threshold.

Abbreviations:

CAP - criteria air pollutant
CalEEMod - California Emissions Estimate Model
ROG - reactive organic gases
$NO_X$ - nitrous oxide

Table 14V
Summary of Mitigated Project Construction Criteria Air Pollutant Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

Off-Road Emissions[1,2]

| Construction Area[3] | Construction Subphase | Year | Mitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 1 | Demolition | Year 1 | 13 | 168 | 2.4 | 2.4 |
| | | Year 2 | 79 | 1,045 | 15 | 15 |
| | Grading and Utilities | Year 2 | 189 | 2,033 | 36 | 35 |
| Parcel 2 Foundations | | Year 3 | 48 | 933 | 8.4 | 8.4 |
| Parcel 2 Core and Shell | | Year 3 | 7.3 | 81 | 1.4 | 1.4 |
| | | Year 4 | 13 | 143 | 2.5 | 2.4 |
| Parcel 2 Tenant Improvements | | Year 4 | 9.3 | 133 | 1.8 | 1.7 |
| | | Year 5 | 6.8 | 95 | 1.1 | 1.0 |
| Parcel 2 Landscaping | | Year 5 | 10 | 165 | 1.3 | 1.3 |
| Parcel 3 Foundations | | Year 3 | 53 | 1,008 | 9.5 | 9.4 |
| | | Year 4 | 0.33 | 6.2 | 0.059 | 0.058 |
| Parcel 3 Core and Shell | | Year 4 | 24 | 333 | 4.3 | 4.2 |
| Parcel 3 Tenant Improvements | | Year 4 | 6.1 | 102 | 1.11 | 1.09 |
| | | Year 5 | 13 | 207 | 1.9 | 1.9 |
| Parcel 3 Landscaping | | Year 5 | 11 | 215 | 1.3 | 1.3 |
| North Garage | | Year 2 | 31 | 310 | 5.7 | 5.7 |
| | | Year 3 | 57 | 568 | 11 | 11.0 |
| Office Building 4 | | Year 3 | 46 | 562 | 8.4 | 8.4 |
| | | Year 4 | 7.0 | 138 | 1.2 | 1.2 |
| Meeting, Collaboration, Park | | Year 2 | 50 | 453 | 9.3 | 9.3 |
| | | Year 3 | 172 | 1,532 | 32 | 32 |
| | | Year 4 | 55 | 818 | 10 | 10 |
| | | Year 5 | 50 | 561 | 7.2 | 7.2 |
| | | Year 6 | 12 | 69 | 1.8 | 1.8 |
| Hotel Excavation | | Year 2 | 50 | 441 | 10 | 9 |
| | | Year 3 | 160 | 1,462 | 32 | 32 |
| Hotel Construction | | Year 4 | 63 | 814 | 13 | 13 |
| | | Year 5 | 42 | 643 | 6.1 | 6.1 |
| Town Square | | Year 3 | 141 | 1,493 | 27 | 27 |
| | | Year 4 | 67 | 676 | 13 | 13 |
| | | Year 5 | 21 | 147 | 3.4 | 3.4 |
| Area 2 | Demolition | Year 2 | 45 | 597 | 8.7 | 8.6 |
| | Grading and Utilities | Year 2 | 86 | 924 | 16 | 16 |
| | | Year 3 | 83 | 886 | 16 | 16 |
| Parcel 7 Foundations | | Year 4 | 25 | 412 | 4.4 | 4.4 |
| Parcel 7 Core and Shell | | Year 4 | 14 | 139 | 2.7 | 2.7 |
| Parcel 7 Tenant Improvements | | Year 4 | 1.1 | 14 | 0.21 | 0.20 |
| | | Year 5 | 10 | 126 | 1.6 | 1.6 |
| Parcel 7 Landscaping | | Year 5 | 8.6 | 153 | 1.1 | 1.1 |
| Parcel 6 Foundations | | Year 4 | 27 | 474 | 4.7 | 4.6 |
| Parcel 6 Core and Shell | | Year 4 | 11 | 138 | 1.9 | 1.9 |
| | | Year 5 | 6.1 | 75 | 0.91 | 0.89 |
| Parcel 6 Tenant Improvements | | Year 5 | 13 | 198 | 2.0 | 2.0 |
| Parcel 6 Landscaping | | Year 5 | 4.6 | 96 | 0.54 | 0.54 |
| | | Year 6 | 5.4 | 112 | 0.63 | 0.63 |
| South Garage | | Year 3 | 68 | 674 | 13 | 13 |
| | | Year 4 | 34 | 372 | 6.5 | 6.5 |
| Office Building 3 | | Year 3 | 55 | 532 | 10 | 10 |
| | | Year 4 | 14 | 289 | 2.4 | 2.4 |
| | | Year 5 | 1.8 | 35 | 0.25 | 0.25 |
| Office Building 1 | | Year 3 | 48 | 492 | 9.2 | 9.1 |
| | | Year 4 | 13 | 269 | 2.2 | 2.2 |
| Office Building 2 | | Year 3 | 46 | 454 | 8.8 | 8.8 |
| | | Year 4 | 14 | 293 | 2.5 | 2.4 |
| | | Year 5 | 0.20 | 3.8 | 0.029 | 0.028 |
| Office Building 5 | | Year 3 | 63 | 617 | 12 | 12 |
| | | Year 4 | 13 | 271 | 2.3 | 2.3 |
| | | Year 5 | 1.7 | 31 | 0.23 | 0.23 |

Table 14V
Summary of Mitigated Project Construction Criteria Air Pollutant Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

| Construction Area[3] | Construction Subphase | Year | Mitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Office Building 6 | | Year 3 | 60 | 540 | 11 | 11 |
| | | Year 4 | 16 | 316 | 2.7 | 2.7 |
| | | Year 5 | 3.6 | 67 | 0.50 | 0.49 |
| Area 3 | Grading and Utilities | Year 3 | 14 | 150 | 2.7 | 2.7 |
| | Tunnel Construction | Year 3 | 43 | 557 | 7.6 | 7.5 |
| | | Year 4 | 21 | 275 | 3.7 | 3.7 |
| | Foundations | Year 4 | 12 | 208 | 2.2 | 2.1 |
| | | Year 5 | 49 | 796 | 6.5 | 6.5 |
| | Core and Shell | Year 5 | 47 | 512 | 6.8 | 6.7 |
| | Tenant Improvements | Year 5 | 5.6 | 70 | 0.81 | 0.79 |
| | | Year 6 | 38 | 479 | 5.5 | 5.4 |
| | Landscaping | Year 6 | 18 | 336 | 2.2 | 2.2 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 9.0 | 200 | 1.5 | 1.5 |
| | Grading and Utilities | Year 4 | 0.34 | 6.8 | 0.062 | 0.061 |
| | | Year 5 | 7.2 | 138 | 1.1 | 1.1 |
| | Foundations | Year 5 | 5.4 | 97 | 0.78 | 0.78 |
| | Core and Shell | Year 5 | 8.1 | 117 | 1.4 | 1.4 |
| | Tenant Improvements | Year 5 | 3.6 | 54 | 0.51 | 0.50 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 10 | 68 | 2.4 | 2.4 |
| Feeder Line | PG&E Offsite Work | Year 3 | 30 | 207 | 6.5 | 6.5 |
| | Surface Improvements | Year 3 | 3.3 | 22 | 0.66 | 0.65 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 0.36 | 2.6 | 0.091 | 0.091 |
| | Adams and O'Brien | Year 3 | 0.24 | 1.7 | 0.061 | 0.061 |
| | Willow Road and Ivy Drive | Year 3 | 0.24 | 1.7 | 0.061 | 0.061 |

On-Road and Paving[1]

| Construction Area[3] | Construction Subphase | Year | Mitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 1 | Demolition | Year 1 | 10 | 513 | 4.6 | 4.4 |
| | | Year 2 | 56 | 3,017 | 23 | 22 |
| | Grading and Utilities | Year 2 | 132 | 2,549 | 17 | 17 |
| Area 1 Town Square and Residential/Shopping District | Foundations | Year 3 | 1.6 | 90 | 0.92 | 0.88 |
| | | Year 4 | 6.4E-03 | 0.38 | 3.8E-03 | 3.7E-03 |
| | Core and Shell | Year 3 | 0.45 | 26 | 0.26 | 0.25 |
| | | Year 4 | 1.2 | 68 | 0.69 | 0.66 |
| | Tenant Improvements | Year 4 | 0.95 | 56 | 0.56 | 0.54 |
| | | Year 5 | 1.0 | 64 | 0.63 | 0.61 |
| | Landscaping | Year 5 | 0.72 | 44 | 0.44 | 0.42 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 3 | 300 | 219 | 3.9 | 3.6 |
| | | Year 4 | 328 | 230 | 4.4 | 4.1 |
| | | Year 5 | 210 | 142 | 2.9 | 2.6 |
| | Landscaping Worker Mobile Trips | Year 5 | 39 | 26 | 0.53 | 0.49 |
| Area 1 Campus District | Foundations + Core and Shell | Year 2 | 2.3 | 111 | 1.1 | 1.0 |
| | | Year 3 | 10 | 576 | 5.9 | 5.6 |
| | | Year 4 | 9.3 | 548 | 5.5 | 5.3 |
| | | Year 5 | 8.4 | 515 | 5.1 | 4.9 |
| | Tenant Improvements | Year 4 | 3.8 | 223 | 2.2 | 2.1 |
| | | Year 5 | 4.6 | 281 | 2.8 | 2.7 |
| | | Year 6 | 0.74 | 47 | 0.46 | 0.44 |
| | O4 and NG Worker Mobile Trips | Year 2 | 53 | 41 | 0.69 | 0.64 |
| | | Year 3 | 309 | 226 | 4.1 | 3.7 |
| | | Year 4 | 230 | 162 | 3.1 | 2.8 |
| | MCS Worker Mobile Trips | Year 2 | 40 | 31 | 0.52 | 0.48 |
| | | Year 3 | 232 | 169 | 3.1 | 2.8 |
| | | Year 4 | 219 | 153 | 2.9 | 2.7 |
| | | Year 5 | 205 | 139 | 2.8 | 2.6 |
| | | Year 6 | 34 | 22 | 0.47 | 0.43 |
| Area 2 | Demolition | Year 2 | 58 | 3,480 | 27 | 25 |
| | Grading and Utilities | Year 2 | 48 | 1,273 | 8.7 | 8.3 |
| | | Year 3 | 43 | 1,129 | 8.3 | 7.9 |
| Area 2 Town Square and Residential/Shopping District | Foundations | Year 4 | 1.2 | 68 | 0.69 | 0.66 |
| | Core and Shell | Year 4 | 1.4 | 83 | 0.83 | 0.79 |
| | | Year 5 | 0.42 | 26 | 0.26 | 0.25 |

Table 14V
Summary of Mitigated Project Construction Criteria Air Pollutant Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

| Construction Area[3] | Construction Subphase | Year | Mitigated Construction CAP Emissions | | | |
|---|---|---|---|---|---|---|
| | | | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | | | lb/year | | | |
| Area 2 Town Square and Residential/Shopping District | Tenant Improvements | Year 4 | 0.16 | 10 | 0.10 | 0.093 |
| | | Year 5 | 2.1 | 126 | 1.3 | 1.2 |
| | Landscaping | Year 5 | 0.54 | 33 | 0.3 | 0.31 |
| | | Year 6 | 0.17 | 11 | 0.11 | 0.10 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 4 | 326 | 228 | 4.4 | 4.0 |
| | | Year 5 | 277 | 187 | 3.8 | 3.5 |
| | Landscaping Worker Mobile Trips | Year 5 | 29 | 19 | 0.39 | 0.36 |
| | | Year 6 | 10 | 6.2 | 0.13 | 0.12 |
| Campus District | Foundations + Core and Shell | Year 3 | 7.8 | 447 | 4.5 | 4.3 |
| | | Year 4 | 8.2 | 486 | 4.9 | 4.7 |
| | Tenant Improvements | Year 4 | 7.0 | 410 | 4.1 | 3.9 |
| | | Year 5 | 5.0 | 306 | 3.0 | 2.9 |
| | Worker Mobile Trips | Year 3 | 516 | 377 | 6.8 | 6.3 |
| | | Year 4 | 627 | 440 | 8.4 | 7.7 |
| | | Year 5 | 275 | 186 | 3.8 | 3.5 |
| Area 3 | Grading and Utilities | Year 3 | 45 | 196 | 1.7 | 1.6 |
| | Tunnel Construction | Year 3 | 686 | 779 | 12 | 11 |
| | | Year 4 | 319 | 355 | 5.6 | 5.2 |
| | Foundations | Year 4 | 88 | 107 | 1.6 | 1.5 |
| | | Year 5 | 343 | 407 | 6.4 | 6.0 |
| | Core and Shell | Year 5 | 556 | 716 | 11 | 10 |
| | Tenant Improvements | Year 5 | 115 | 148 | 2.3 | 2.1 |
| | | Year 6 | 758 | 960 | 15 | 14 |
| | Landscaping | Year 6 | 10 | 71 | 0.77 | 0.73 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 2.1 | 66.3 | 0.58 | 0.55 |
| | Grading and Utilities | Year 4 | 0.077 | 1.3 | 0.010 | 9.2E-03 |
| | | Year 5 | 5.0 | 27 | 0.21 | 0.20 |
| | Foundations | Year 5 | 0.80 | 49 | 0.49 | 0.47 |
| | Core and Shell | Year 5 | 0.72 | 44 | 0.44 | 0.42 |
| | Tenant Improvements | Year 5 | 0.90 | 55 | 0.55 | 0.52 |
| | Worker Mobile Trips | Year 5 | 72 | 48 | 0.98 | 0.90 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 5.5 | 24 | 0.27 | 0.26 |
| Feeder Line | PG&E Offsite Work | Year 3 | 15 | 56 | 0.65 | 0.62 |
| | Surface Improvements | Year 3 | 4.3 | 5.4 | 0.063 | 0.059 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 1.0 | 10 | 0.11 | 0.10 |
| | Adams and O'Brien | Year 3 | 0.83 | 10 | 0.11 | 0.10 |
| | Willow Road and Ivy Drive | Year 3 | 0.83 | 10 | 0.11 | 0.10 |

| Summary of Project Construction Mitigated Annual CAP Emissions by Year | | | | |
|---|---|---|---|---|
| Year | Emissions[4] | | | |
| | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | ton/year | | | |
| Year 1 | 0.012 | 0.34 | 3.5E-03 | 3.4E-03 |
| Year 2 | 0.48 | 8.2 | 0.089 | 0.087 |
| Year 3 | 1.9 | 8.6 | 0.142 | 0.140 |
| Year 4 | 4.4 | 5.3 | 0.069 | 0.067 |
| Year 5 | 5.2 | 4.1 | 0.049 | 0.047 |
| Year 6 | 3.0 | 1.06 | 0.014 | 0.013 |
| Total | 15 | 28 | 0.37 | 0.36 |

| Summary of Project Construction Mitigated Daily CAP Emissions by Year | | | | |
|---|---|---|---|---|
| Year | Emissions | | | |
| | ROG | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ |
| | lb/day | | | |
| Year 1 | 1.5 | 43 | 0.44 | 0.42 |
| Year 2 | 2.7 | 45 | 0.49 | 0.48 |
| Year 3 | 10 | 47 | 0.78 | 0.77 |
| Year 4 | 24 | 29 | 0.38 | 0.37 |
| Year 5 | 29 | 22 | 0.27 | 0.26 |
| Year 6 | 19 | 6.5 | 0.084 | 0.080 |
| Threshold[5] | 54 | 54 | 82 | 54 |

Notes:

1. Construction emissions were estimated with methodology equivalent to CalEEMod® 2020.4.0. Emissions were estimated using on-road emissions factors from EMFAC2021 and off-road construction equipment emission factors from OFFROAD. Onroad trips and offroad construction equipment use were provided by the Project Applicant.
2. Mitigated construction emissions from offroad equipment are calculated using Tier 4 Final emission factors for 95 percent of the equipment before residents move on-site in Year 5 and 98 percent of the equipment after residents move on-site in Year 5. The other 5 percent and 2 percent (before and after on-site residents, repspectively) of non-Tier 4 equipment are assumed to be Tier 2.
3. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
4. The mass emissions shown above are converted from pound per year to gram per second for the health risk assessment. The conversion is based on 365 days per year and 11 hours per day, consistent with the modeled hours from 7 AM - 6 PM.
5. Thresholds are from BAAQMD California Environmental Quality Act (CEQA) Guidelines. Fugitive emissions sources are excluded from comparison to this threshold.

Abbreviations:

Table 14V
Summary of Mitigated Project Construction Criteria Air Pollutant Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

CAP - criteria air pollutant
CalEEMod® - California Emissions Estimate Model
ROG - reactive organic gases
$NO_X$ - nitrous oxide

Table 15V
Summary of Project Construction Greenhouse Gas Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

Off-Road Emissions[1]

| Construction Area[2] | Construction Subphase | Year | Construction GHG Emissions[3] | | | |
|---|---|---|---|---|---|---|
| | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | MT/year | | | |
| Area 1 | Demolition | Year 1 | 45 | 8.0E-03 | 2.3E-03 | 46 |
| | | Year 2 | 287 | 5.2E-02 | 1.5E-02 | 292 |
| | Grading and Utilities | Year 2 | 705 | 1.5E-01 | 2.5E-02 | 716 |
| Parcel 2 Foundations | | Year 3 | 179 | 2.3E-02 | 1.3E-02 | 184 |
| Parcel 2 Core and Shell | | Year 3 | 24 | 4.7E-03 | 1.0E-03 | 24 |
| | | Year 4 | 43 | 8.5E-03 | 1.8E-03 | 44 |
| Parcel 2 Tenant Improvements | | Year 4 | 29 | 4.5E-03 | 1.9E-03 | 30 |
| | | Year 5 | 22 | 3.5E-03 | 1.5E-03 | 23 |
| Parcel 2 Landscaping | | Year 5 | 32 | 6.0E-03 | 1.6E-03 | 32 |
| Parcel 3 Foundations | | Year 3 | 200 | 2.7E-02 | 1.4E-02 | 205 |
| | | Year 4 | 1.2 | 1.7E-04 | 8.5E-05 | 1.3 |
| Parcel 3 Core and Shell | | Year 4 | 83 | 1.5E-02 | 4.2E-03 | 84 |
| Parcel 3 Tenant Improvements | | Year 4 | 21 | 2.6E-03 | 1.8E-03 | 22 |
| | | Year 5 | 45 | 5.5E-03 | 3.7E-03 | 46 |
| Parcel 3 Landscaping | | Year 5 | 32 | 6.1E-03 | 1.6E-03 | 32 |
| North Garage | | Year 2 | 118 | 2.9E-02 | 2.6E-03 | 119 |
| | | Year 3 | 206 | 4.9E-02 | 3.9E-03 | 208 |
| Office Building 4 | | Year 3 | 162 | 3.8E-02 | 4.0E-03 | 164 |
| | | Year 4 | 29 | 3.7E-03 | 2.3E-03 | 29.7 |
| Meeting, Collaboration, Park | | Year 2 | 192 | 4.9E-02 | 2.9E-03 | 194 |
| | | Year 3 | 640 | 1.7E-01 | 8.6E-03 | 647 |
| | | Year 4 | 190 | 4.3E-02 | 5.8E-03 | 193 |
| | | Year 5 | 185 | 4.3E-02 | 5.0E-03 | 187 |
| | | Year 6 | 45 | 1.2E-02 | 3.4E-04 | 45 |
| Hotel Excavation | | Year 2 | 185 | 4.8E-02 | 2.6E-03 | 187 |
| | | Year 3 | 529 | 1.2E-01 | 8.1E-03 | 535 |
| Hotel Construction | | Year 4 | 193 | 3.5E-02 | 4.2E-03 | 195 |
| | | Year 5 | 156 | 2.9E-02 | 6.4E-03 | 158 |
| Town Square | | Year 3 | 545 | 1.3E-01 | 1.4E-02 | 553 |
| | | Year 4 | 261 | 6.3E-02 | 6.0E-03 | 264 |
| | | Year 5 | 83 | 2.2E-02 | 1.2E-03 | 84 |
| Area 2 | Demolition | Year 2 | 164 | 3.0E-02 | 8.4E-03 | 167 |
| | Grading and Utilities | Year 2 | 320 | 7.0E-02 | 1.1E-02 | 326 |
| | | Year 3 | 319 | 7.0E-02 | 1.1E-02 | 324 |
| Parcel 7 Foundations | | Year 4 | 87 | 1.6E-02 | 4.4E-03 | 88 |
| Parcel 7 Core and Shell | | Year 4 | 48 | 9.5E-03 | 2.0E-03 | 48 |
| Parcel 7 Tenant Improvements | | Year 4 | 3.3 | 5.2E-04 | 2.2E-04 | 3.4 |
| | | Year 5 | 33 | 5.3E-03 | 2.2E-03 | 34 |
| Parcel 7 Landscaping | | Year 5 | 28 | 5.0E-03 | 1.6E-03 | 28 |
| Parcel 6 Foundations | | Year 4 | 97 | 1.6E-02 | 5.7E-03 | 99 |
| Parcel 6 Core and Shell | | Year 4 | 36 | 6.5E-03 | 1.9E-03 | 37 |
| | | Year 5 | 21 | 3.9E-03 | 1.1E-03 | 22 |
| Parcel 6 Tenant Improvements | | Year 5 | 47 | 5.8E-03 | 3.9E-03 | 48 |
| Parcel 6 Landscaping | | Year 5 | 13 | 2.4E-03 | 7.2E-04 | 13 |
| | | Year 6 | 15 | 2.8E-03 | 8.4E-04 | 16 |
| South Garage | | Year 3 | 255 | 6.2E-02 | 5.3E-03 | 258 |
| | | Year 4 | 120 | 2.7E-02 | 2.5E-03 | 122 |
| Office Building 3 | | Year 3 | 201 | 5.1E-02 | 3.5E-03 | 204 |
| | | Year 4 | 49 | 7.7E-03 | 3.0E-03 | 50 |
| | | Year 5 | 8.4 | 9.4E-04 | 7.4E-04 | 8.6 |
| Office Building 1 | | Year 3 | 178 | 4.4E-02 | 3.4E-03 | 180 |
| | | Year 4 | 45 | 7.2E-03 | 2.8E-03 | 46 |
| Office Building 2 | | Year 3 | 171 | 4.3E-02 | 3.1E-03 | 173 |
| | | Year 4 | 49 | 8.0E-03 | 3.0E-03 | 50 |
| | | Year 5 | 0.94 | 1.1E-04 | 8.3E-05 | 0.97 |
| Office Building 5 | | Year 3 | 234 | 5.9E-02 | 4.0E-03 | 237 |
| | | Year 4 | 47 | 7.4E-03 | 3.0E-03 | 48 |
| | | Year 5 | 7.7 | 8.6E-04 | 6.8E-04 | 7.9 |

Table 15V
Summary of Project Construction Greenhouse Gas Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

Off-Road Emissions[1]

| Phase | Construction Subphase | Year | Construction GHG Emissions[3] | | | |
|---|---|---|---|---|---|---|
| | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | MT/year | | | |
| Office Building 6 | | Year 3 | 224 | 5.8E-02 | 3.2E-03 | 226 |
| | | Year 4 | 52 | 8.5E-03 | 2.9E-03 | 53 |
| | | Year 5 | 16 | 1.8E-03 | 1.5E-03 | 17 |
| Area 3 | Grading and Utilities | Year 3 | 56 | 1.2E-02 | 2.1E-03 | 57 |
| | Tunnel Construction | Year 3 | 156 | 2.6E-02 | 9.4E-03 | 159 |
| | | Year 4 | 77 | 1.3E-02 | 4.6E-03 | 79 |
| | Foundations | Year 4 | 40 | 7.0E-03 | 2.1E-03 | 41 |
| | | Year 5 | 163 | 2.9E-02 | 8.4E-03 | 167 |
| | Core and Shell | Year 5 | 139 | 2.7E-02 | 6.1E-03 | 142 |
| | Tenant Improvements | Year 5 | 16 | 2.2E-03 | 1.1E-03 | 16 |
| | | Year 6 | 107 | 1.5E-02 | 7.6E-03 | 110 |
| | Landscaping | Year 6 | 54 | 9.6E-03 | 3.1E-03 | 55 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 35 | 3.8E-03 | 2.9E-03 | 36 |
| | Grading and Utilities | Year 4 | 1.6 | 2.0E-04 | 1.3E-04 | 1.7 |
| | | Year 5 | 35 | 4.4E-03 | 2.9E-03 | 36 |
| | Foundations | Year 5 | 17 | 2.1E-03 | 1.1E-03 | 18 |
| | Core and Shell | Year 5 | 24 | 2.2E-03 | 1.4E-03 | 24 |
| | Tenant Improvements | Year 5 | 12 | 2.0E-03 | 6.6E-04 | 12 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 34 | 9.8E-03 | 0 | 34 |
| Feeder Line | PG&E Offsite Work | Year 3 | 108 | 3.1E-02 | 0 | 109 |
| | Surface Improvements | Year 3 | 12 | 2.3E-03 | 0 | 12 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 1.3 | 3.7E-04 | 0 | 1.3 |
| | Adams and O'Brien | Year 3 | 0.85 | 2.5E-04 | 0 | 0.85 |
| | Willow Road and Ivy Drive | Year 3 | 0.85 | 2.5E-04 | 0 | 0.85 |

On-Road Emissions[1]

| Phase[2] | Construction Subphase | Year | Construction GHG Emissions[3] | | | |
|---|---|---|---|---|---|---|
| | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | MT/year | | | |
| Area 1 | Demolition | Year 1 | 112 | 2.5E-04 | 1.7E-02 | 117 |
| | | Year 2 | 717 | 1.4E-03 | 1.1E-01 | 750 |
| | Grading and Utilities | Year 2 | 585 | 3.1E-03 | 8.5E-02 | 610 |
| Area 1 Town Square and Residential/Shopping District | Foundations | Year 3 | 27 | 3.3E-05 | 4.3E-03 | 28 |
| | | Year 4 | 0.12 | 1.4E-07 | 1.9E-05 | 0.13 |
| | Core and Shell | Year 3 | 7.7 | 9.5E-06 | 1.2E-03 | 8.1 |
| | | Year 4 | 22 | 2.4E-05 | 3.4E-03 | 23 |
| | Tenant Improvements | Year 4 | 18 | 2.0E-05 | 2.8E-03 | 18 |
| | | Year 5 | 21 | 2.2E-05 | 3.3E-03 | 22 |
| | Landscaping | Year 5 | 15 | 1.5E-05 | 2.3E-03 | 15 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 3 | 340 | 1.1E-02 | 9.6E-03 | 344 |
| | | Year 4 | 391 | 1.2E-02 | 1.0E-02 | 395 |
| | | Year 5 | 261 | 7.7E-03 | 6.7E-03 | 263 |
| | Landscaping Worker Mobile Trips | Year 5 | 48 | 1.4E-03 | 1.2E-03 | 49 |
| Campus District | Foundations + Core and Shell | Year 2 | 28 | 4.8E-05 | 4.5E-03 | 30 |
| | | Year 3 | 173 | 2.1E-04 | 2.7E-02 | 181 |
| | | Year 4 | 172 | 2.0E-04 | 2.7E-02 | 180 |
| | | Year 5 | 170 | 1.8E-04 | 2.7E-02 | 177 |
| | Tenant Improvements | Year 4 | 70 | 7.9E-05 | 1.1E-02 | 73 |
| | | Year 5 | 92 | 9.7E-05 | 1.5E-02 | 97 |
| | | Year 6 | 16 | 1.6E-05 | 2.5E-03 | 17 |
| | O4 and NG Worker Mobile Trips | Year 2 | 58 | 2.1E-03 | 1.7E-03 | 58 |
| | | Year 3 | 351 | 1.2E-02 | 9.9E-03 | 355 |
| | | Year 4 | 275 | 8.6E-03 | 7.3E-03 | 277 |
| | MCS Worker Mobile Trips | Year 2 | 43 | 1.6E-03 | 1.3E-03 | 44 |
| | | Year 3 | 263 | 8.9E-03 | 7.4E-03 | 266 |
| | | Year 4 | 261 | 8.2E-03 | 7.0E-03 | 263 |
| | | Year 5 | 255 | 7.5E-03 | 6.5E-03 | 257 |
| | | Year 6 | 44 | 1.2E-03 | 1.1E-03 | 45 |

Table 15V
Summary of Project Construction Greenhouse Gas Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, CA

On-Road Emissions[1]

| Phase[2] | Construction Subphase | Year | Construction GHG Emissions[3] | | | |
|---|---|---|---|---|---|---|
| | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | MT/year | | | |
| Area 2 | Demolition | Year 2 | 821 | 1.3E-03 | 1.3E-01 | 859 |
| | Grading and Utilities | Year 2 | 290 | 1.5E-03 | 4.2E-02 | 302 |
| | | Year 3 | 286 | 1.3E-03 | 4.2E-02 | 298 |
| Area 2 Town Square and Residential/Shopping District | Foundations | Year 4 | 22 | 2.4E-05 | 3.4E-03 | 23 |
| | Core and Shell | Year 4 | 26 | 3.0E-05 | 4.1E-03 | 27 |
| | | Year 5 | 8.5 | 8.9E-06 | 1.3E-03 | 8.9 |
| | Tenant Improvements | Year 4 | 3.1 | 3.5E-06 | 4.8E-04 | 3.2 |
| | | Year 5 | 42 | 4.4E-05 | 6.6E-03 | 44 |
| | Landscaping | Year 5 | 11 | 1.1E-05 | 1.7E-03 | 11 |
| | | Year 6 | 3.7 | 3.6E-06 | 5.9E-04 | 3.9 |
| | Town Square and Residential/Shopping District Worker Mobile Trips | Year 4 | 388 | 1.2E-02 | 1.0E-02 | 392 |
| | | Year 5 | 345 | 1.0E-02 | 8.8E-03 | 348 |
| | Landscaping Worker Mobile Trips | Year 5 | 36 | 1.0E-03 | 9.1E-04 | 36 |
| | | Year 6 | 12 | 3.4E-04 | 3.0E-04 | 12 |
| Campus District | Foundations + Core and Shell | Year 3 | 134 | 1.7E-04 | 2.1E-02 | 141 |
| | | Year 4 | 153 | 1.7E-04 | 2.4E-02 | 160 |
| | Tenant Improvements | Year 4 | 129 | 1.5E-04 | 2.0E-02 | 135 |
| | | Year 5 | 101 | 1.1E-04 | 1.6E-02 | 106 |
| | Worker Mobile Trips | Year 3 | 587 | 2.0E-02 | 1.6E-02 | 592 |
| | | Year 4 | 748 | 2.4E-02 | 2.0E-02 | 754 |
| | | Year 5 | 342 | 1.0E-02 | 8.8E-03 | 345 |
| Area 3 | Grading and Utilities | Year 3 | 83 | 1.5E-03 | 7.4E-03 | 85 |
| | Tunnel Construction | Year 3 | 859 | 2.6E-02 | 3.5E-02 | 870 |
| | | Year 4 | 420 | 1.2E-02 | 1.7E-02 | 425 |
| | Foundations | Year 4 | 119 | 3.3E-03 | 5.1E-03 | 120 |
| | | Year 5 | 481 | 1.3E-02 | 2.0E-02 | 487 |
| | Core and Shell | Year 5 | 797 | 2.0E-02 | 3.5E-02 | 808 |
| | Tenant Improvements | Year 5 | 165 | 4.2E-03 | 7.3E-03 | 167 |
| | | Year 6 | 1130 | 2.7E-02 | 4.9E-02 | 1145 |
| | Landscaping | Year 6 | 34 | 3.4E-04 | 3.8E-03 | 35 |
| Hamilton Avenue Parcels North and South | Demolition | Year 4 | 19 | 6.4E-05 | 2.9E-03 | 20 |
| | Grading and Utilities | Year 4 | 0.36 | 2.5E-06 | 4.7E-05 | 0.37 |
| | | Year 5 | 7.7 | 5.2E-05 | 1.0E-03 | 8.0 |
| | Foundations | Year 5 | 16 | 1.7E-05 | 2.5E-03 | 17 |
| | Core and Shell | Year 5 | 14 | 1.5E-05 | 2.3E-03 | 15 |
| | Tenant Improvements | Year 5 | 18 | 1.9E-05 | 2.8E-03 | 19 |
| | Worker Mobile Trips | Year 5 | 89 | 2.6E-03 | 2.3E-03 | 90 |
| Substation Upgrade | PG&E Substation Work | Year 3 | 12 | 2.1E-04 | 1.1E-03 | 12 |
| Feeder Line | PG&E Offsite Work | Year 3 | 30 | 5.6E-04 | 2.6E-03 | 31 |
| | Surface Improvements | Year 3 | 2.9 | 5.4E-05 | 2.5E-04 | 3.0 |
| Intersection Improvements | O'Brien and Kavanaugh | Year 3 | 3.6 | 2.4E-05 | 4.9E-04 | 3.8 |
| | Adams and O'Brien | Year 3 | 3.4 | 1.7E-05 | 4.9E-04 | 3.6 |
| | Willow Road and Ivy Drive | Year 3 | 3.4 | 1.7E-05 | 4.9E-04 | 3.6 |

| Summary of Project Construction Annual GHG Emissions by Year | | | | |
|---|---|---|---|---|
| Year | Emissions[4,5] | | | |
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | MT/year | | | |
| Year 1 | 157 | 0.0083 | 0.020 | 163 |
| Year 2 | 4,514 | 0.44 | 0.44 | 4,657 |
| Year 3 | 7,605 | 1.1 | 0.30 | 7,722 |
| Year 4 | 4,871 | 0.40 | 0.25 | 4,954 |
| Year 5 | 4,471 | 0.29 | 0.23 | 4,548 |
| Year 6 | 1,462 | 0.069 | 0.070 | 1,484 |
| | | | Total | 23,528 |

Notes:

1. Emissions were estimated using onroad emissions factors from EMFAC2021 and offroad construction equipment emission factors from OFFROAD. Onroad trips and offroad construction equipment use were provided by the Project Applicant.
2. Area 1 includes Parcel 2, Parcel 3, North Garage, Office Building 4, Hotel, Town Square, and Meeting, Collaboration, Park. Area 2 includes Parcel 6, Parcel 7, South Garage, Office Building 1, Office Building 2, Office Building 3, Office Building 5, and Office Building 6. Area 3 includes Parcel 4 and Parcel 5, along with the Tunnel Construction.
3. Carbon dioxide equivalent emissions were determined using IPCC 5th Assessment Report Global Warming Potentials for $CH_4$ and $N_2O$.
4. The Summary of Project Construction Annual GHG Emissions by Year is the sum of the values represented above as well as Construction Water Use Emissions, shown in Table 10.
5. The BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions.

Abbreviations:

CalEEMod® - California Emissions Estimate Model
GHG - greenhouse gases
$CH_4$ - methane
$CO_2$ - carbon dioxide
$N_2O$ - nitrous oxide
$CO_2e$ - carbon dioxide equivalent
MT - metric ton
IPCC - Intergovernmental Panel on Climate Change

**Table 16V**
**Building Operational Capacity For Emissions Scaling**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Building or Parcel[1] | | Percent Breakdown of Land Use Type by Building | | | | | | Percent of Year Building is Operational[2] | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Office | Retail | Residential | Hotel | Parking | Park | Year 4 | Year 5 | Year 6 |
| North Garage | | -- | -- | -- | -- | 45% | -- | 100% | 100% | 100% |
| Office Building 4 | | 11% | 48% | -- | -- | -- | -- | 21% | 100% | 100% |
| Meeting, Collaboration, Park | | 28% | -- | -- | -- | -- | -- | 0% | 0% | 82% |
| Hotel Construction | | -- | -- | -- | 100% | -- | -- | 0% | 41% | 100% |
| Town Square | | -- | -- | -- | -- | -- | 14% | 0% | 58% | 100% |
| Parcel 2 | | -- | 19% | 17% | -- | 12% | -- | 0% | 34% | 100% |
| Parcel 3 | | -- | 26% | 22% | -- | 12% | -- | 0% | 10% | 100% |
| Other | | 0.38% | -- | -- | -- | 0.73% | 86% | 100% | 100% | 100% |
| South Garage | | -- | -- | -- | -- | 23.9% | -- | 29% | 100% | 100% |
| Office Building 3 | | 13% | -- | -- | -- | -- | -- | 0% | 76% | 100% |
| Office Building 1 | | 8.4% | -- | -- | -- | -- | -- | 5% | 100% | 100% |
| Office Building 2 | | 10% | -- | -- | -- | -- | -- | 0% | 98% | 100% |
| Office Building 5 | | 15% | -- | -- | -- | -- | -- | 0% | 78% | 100% |
| Office Building 6 | | 14% | -- | -- | -- | -- | -- | 0% | 53% | 100% |
| Parcel 6 | | -- | -- | 9% | -- | 1.4% | -- | 0% | 0% | 88% |
| Parcel 7 | | -- | -- | 6.2% | -- | 0.5% | -- | 0% | 99% | 100% |
| Parcels 4 + 5 | | -- | 2.4% | 46% | -- | 4.4% | -- | 0% | 0% | 11% |
| Hamilton Avenue Parcels North and South | | -- | 3.7% | -- | -- | -- | -- | 0% | 54% | 100% |
| **Partial Buildout by Year and Land Use Type[3]** | **Year 4** | 3.1% | 10% | 0% | 0% | 53% | 86% | | | |
| | **Year 5** | 58% | 59% | 14% | 41% | 75% | 94% | | | |
| | **Year 6** | 95% | 98% | 58% | 100% | 96% | 100% | | | |

**Notes:**

1. Construction area/subphasing information and full buildout square footage by building provided by Project Applicant.
2. The percentage of year that each building is operational is calculated using the last day of construction for each building. For each partial year of construction, the building is assumed to be operational during the fraction of the year between the last day of construction and the end of that year. The building is assumed to be 0% operational for each full year of construction and 100% operational for each year full year after the end of construction.
3. Partial buildout for Year 4, Year 5, and Year 6 were calculated based on the portion of building area that becomes operational each year over the total building area for each land use type.

**Abbreviations:**

% - percent

**Table 17V**
**Traffic Data Provided by the Transportation Engineer**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Daily Trips Rates and VMT**

| Land Use | Fleet Type / Land Use | Trip Rate Units[1] | Weekday Trips per Day per Unit[1] | Weekday daily VMT[2] |
|---|---|---|---|---|
| | | | TOTAL | TOTAL |
| Main Project Site - Existing Conditions | Cars | per 1,000 s.f. | 9.19 | 110,860 |
| | Trucks | per 1,000 s.f. | 0.22 | 2,640 |
| | Shuttles | per 1,000 s.f. | 0.66 | 21,088 |
| | On-Demand | per 1,000 s.f. | 0.66 | 7,919 |
| Campus District - Full Buildout | Cars | per 1,000 s.f. | 10.05 | 178,766 |
| | Trucks | per 1,000 s.f. | 0.23 | 4,056 |
| | Shuttles | per 1,000 s.f. | 0.44 | 21,088 |
| | On-Demand | per 1,000 s.f. | 0.68 | 12,168 |
| Town Square and the Residential/Shopping District - Full Buildout | Residential | per d.u. | 4.35 | 79,792 |
| | Retail[3] | per 1,000 s.f. | 25.07 | 33,594 |
| | Hamilton Avenue Parcels North and South[3] | per 1,000 s.f. | 28.31 | 1,461 |
| | Park | per acre | 42.80 | 1,147 |
| | Hotel | per room | 6.69 | 14,814 |

**Notes:**

1. Daily project trip rates were provided by the Transportation Engineer in terms of trip rates per land use amount.
2. Daily Project VMT provided by the Transportation Engineer include reductions for pass-by and diverted trips. Daily VMT is given in VMT per day. For the increased residential variant, the residential trips and VMT are based on an increasing the residential dwelling units by 200, to a total of 1930 residential dwelling units.
3. The trip rates and VMT for Hamilton Avenue Parcels North and South were provided separately and added to retail totals in calculations.

**Abbreviations:**

VMT - Vehicle miles traveled
s.f. - Square feet
d.u. - Dwelling unit

**Table 18V**
**Trip Rates and VMT for Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Project Area[1] | Land Use | Fleet Type[2] | Total Weekday Daily VMT[3] | Total Weekday Daily Trips[3] | Total Average Daily VMT[4] | Total Average Daily Trips[4] | Total Annual VMT[5] | Total Annual Trips[5] |
|---|---|---|---|---|---|---|---|---|
| | | | VMT/day | trips/day | VMT/day | trips/day | VMT/year | trips/year |
| Existing Conditions | Campus District | Cars | 110,860 | 9,221 | 84,225 | 7,006 | 30,742,244 | 2,557,040 |
| | | Trucks | 2,640 | 220 | 2,005 | 167 | 731,958 | 60,882 |
| | | Shuttles | 21,088 | 659 | 15,063 | 470 | 3,916,358 | 122,319 |
| | | On-Demand | 7,919 | 659 | 5,656 | 470 | 1,470,590 | 122,319 |
| Year 4 | Campus District | Cars | 5,480 | 493 | 4,079 | 367 | 1,488,677 | 133,874 |
| | | Trucks | 124 | 11 | 93 | 8.3 | 33,776 | 3,037 |
| | | Shuttles | 646 | 22 | 462 | 15 | 120,048 | 3,996 |
| | | On-Demand | 373 | 34 | 266 | 24 | 69,267 | 6,229 |
| | Residential | San Mateo | 0 | 0 | 0 | 0 | 0 | 0 |
| | Retail | San Mateo | 3,563 | 510 | 3,442 | 492 | 1,256,238 | 179,684 |
| | Park | San Mateo | 987 | 147 | 3,652 | 545 | 1,332,917 | 198,943 |
| | Hotel | San Mateo | 0 | 0 | 0 | 0 | 0 | 0 |
| Year 5 | Campus District | Cars | 104,523 | 9,400 | 77,797 | 6,996 | 28,395,923 | 2,553,590 |
| | | Trucks | 2,371 | 213 | 1,765 | 159 | 644,259 | 57,937 |
| | | Shuttles | 12,330 | 410 | 8,807 | 293 | 2,289,859 | 76,227 |
| | | On-Demand | 7,114 | 640 | 5,082 | 457 | 1,321,238 | 118,816 |
| | Residential | San Mateo | 11,209 | 1,180 | 10,956 | 1,153 | 3,999,096 | 420,957 |
| | Retail | San Mateo | 20,794 | 2,974 | 20,085 | 2,873 | 7,331,178 | 1,048,602 |
| | Park | San Mateo | 1,080 | 161 | 3,993 | 596 | 1,457,557 | 217,546 |
| | Hotel | San Mateo | 6,049 | 527 | 5,816 | 507 | 2,122,939 | 184,925 |
| Year 6 | Campus District | Cars | 169,737 | 15,264 | 126,336 | 11,361 | 46,112,784 | 4,146,833 |
| | | Trucks | 3,851 | 346 | 2,866 | 258 | 1,046,226 | 94,085 |
| | | Shuttles | 20,023 | 667 | 14,302 | 476 | 3,718,554 | 123,787 |
| | | On-Demand | 11,553 | 1,039 | 8,252 | 742 | 2,145,589 | 192,949 |
| | Residential | San Mateo | 46,475 | 4,892 | 45,427 | 4,782 | 16,580,889 | 1,745,357 |
| | Retail | San Mateo | 34,307 | 4,907 | 33,137 | 4,740 | 12,095,154 | 1,730,009 |
| | Park | San Mateo | 1,147 | 171 | 4,243 | 633 | 1,548,641 | 231,140 |
| | Hotel | San Mateo | 14,814 | 1,290 | 14,244 | 1,241 | 5,199,035 | 452,878 |
| Full Buildout | Campus District | Cars | 178,766 | 16,076 | 133,057 | 11,966 | 48,565,689 | 4,367,418 |
| | | Trucks | 4,056 | 365 | 3,019 | 271 | 1,101,879 | 99,090 |
| | | Shuttles | 21,088 | 702 | 15,063 | 501 | 3,916,358 | 130,371 |
| | | On-Demand | 12,168 | 1,094 | 8,691 | 782 | 2,259,721 | 203,212 |
| | Residential | San Mateo | 79,792 | 8,399 | 77,992 | 8,210 | 28,467,226 | 2,996,550 |
| | Retail | San Mateo | 35,055 | 5,014 | 33,860 | 4,843 | 12,358,799 | 1,767,718 |
| | Park | San Mateo | 1,147 | 171 | 4,243 | 633 | 1,548,641 | 231,140 |
| | Hotel | San Mateo | 14,814 | 1,290 | 14,244 | 1,241 | 5,199,035 | 452,878 |

**Table 18V**
**Trip Rates and VMT for Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Notes:**

1. Partial years are scaled from the full buildout based on the portion of each land use that becomes operational for each year of construction. See VariantTable 16 for more details.
2. The fleet type for each land use was provided by the Transportation Engineer. The Campus District will have various fleets for specific uses. Town Square and the Residential/Shopping District land uses (Residential, Retail, Park, and Hotel) are analyzed assuming a default San Mateo fleet. Hamilton Avenue Parcels North and South are combined with retail land uses. See AQTR Table 19 for more information.
3. Daily VMT and trip rates were provided by the Transportation Engineer on October 5, 2021. Total trip rates are calculated using land uses in AQTR Table 1.
4. Weekday VMT and trip rates provided by the Transportation Engineer were scaled to average trip rates using the ratio between CalEEMod® weekday and weekend one-way trip rates.
5. Annual trips and VMT are calculated by multiplying daily values by 365 for all fleets with the exception of shuttles and on-demand, which are multiplied by 260 days/year.

**Abbreviations:**

VMT - vehicle miles traveled

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

**Table 21aV**
**Mobile CAP Emissions Before EV Reductions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Year | Land Use[1] | Fleet Type | Annual Trips[2] | Annual VMT[2] | CAP Emissions[3,4] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ROG | NOX | $PM_{10}$ | $PM_{2.5}$ | ROG | NOX | $PM_{10}$ | $PM_{2.5}$ |
| | | | trips/year | VMT/year | tons/year | | | | lb/day | | | |
| **Existing Conditions** | Campus District | Cars | 2,557,040 | 30,742,244 | 4.9 | 4.1 | 3.1 | 0.59 | 27 | 22 | 17 | 3.3 |
| | | Trucks | 60,882 | 731,958 | 0.18 | 2.0 | 0.17 | 0.068 | 1.0 | 11 | 0.92 | 0.37 |
| | | Shuttles | 122,319 | 3,916,358 | 0.027 | 1.8 | 0.59 | 0.15 | 0.15 | 10 | 3.3 | 0.80 |
| | | On-Demand | 122,319 | 1,470,590 | 0.19 | 0.15 | 0.15 | 0.028 | 1.1 | 0.85 | 0.81 | 0.15 |
| | | | **2,862,559** | **36,861,150** | **5.3** | **8.0** | **4.0** | **0.84** | **29** | **44** | **22** | **4.6** |
| **Partial Buildout - Year 4** | Campus District | Cars | 133,874 | 1,488,677 | 0.19 | 0.12 | 0.15 | 0.028 | 1.1 | 0.65 | 0.82 | 0.15 |
| | | Trucks | 3,037 | 33,776 | 0.0041 | 0.035 | 0.0065 | 0.0020 | 0.023 | 0.19 | 0.036 | 0.011 |
| | | Shuttles | 3,996 | 120,048 | 0.0011 | 0.071 | 0.018 | 0.0046 | 0.0058 | 0.39 | 0.10 | 0.025 |
| | | On-Demand | 6,229 | 69,267 | 0.0077 | 0.0046 | 0.0069 | 0.0013 | 0.042 | 0.025 | 0.038 | 0.0071 |
| | Residential | San Mateo | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Retail | San Mateo | 179,684 | 1,256,238 | 0.19 | 0.21 | 0.13 | 0.027 | 1.1 | 1.2 | 0.74 | 0.15 |
| | Park | San Mateo | 198,943 | 1,332,917 | 0.21 | 0.23 | 0.14 | 0.029 | 1.2 | 1.2 | 0.78 | 0.16 |
| | Hotel | San Mateo | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | **525,763** | **4,300,922** | **0.61** | **0.67** | **0.46** | **0.092** | **3.4** | **3.7** | **2.5** | **0.50** |
| **Partial Buildout - Year 5** | Campus District | Cars | 2,553,590 | 28,395,923 | 3.6 | 2.1 | 2.9 | 0.53 | 20 | 11 | 16 | 2.9 |
| | | Trucks | 57,937 | 644,259 | 0.073 | 0.60 | 0.12 | 0.037 | 0.40 | 3.3 | 0.68 | 0.20 |
| | | Shuttles | 76,227 | 2,289,859 | 0.021 | 1.4 | 0.35 | 0.089 | 0.11 | 7.4 | 1.9 | 0.49 |
| | | On-Demand | 118,816 | 1,321,238 | 0.14 | 0.081 | 0.13 | 0.025 | 0.78 | 0.45 | 0.72 | 0.13 |
| | Residential | San Mateo | 420,957 | 3,999,096 | 0.49 | 0.57 | 0.43 | 0.085 | 2.7 | 3.1 | 2.3 | 0.47 |
| | Retail | San Mateo | 1,048,602 | 7,331,178 | 1.1 | 1.1 | 0.78 | 0.16 | 5.9 | 6.3 | 4.3 | 0.86 |
| | Park | San Mateo | 217,546 | 1,457,557 | 0.22 | 0.23 | 0.16 | 0.031 | 1.2 | 1.3 | 0.85 | 0.17 |
| | Hotel | San Mateo | 184,925 | 2,122,939 | 0.23 | 0.29 | 0.23 | 0.045 | 1.3 | 1.6 | 1.2 | 0.25 |
| | | | **4,678,601** | **47,562,050** | **5.8** | **6.3** | **5.1** | **1.0** | **32** | **35** | **28** | **5.5** |
| **Partial Buildout - Year 6** | Campus District | Cars | 4,146,833 | 46,112,784 | 5.6 | 3.1 | 4.6 | 0.86 | 31 | 17 | 25 | 4.7 |
| | | Trucks | 94,085 | 1,046,226 | 0.11 | 0.89 | 0.20 | 0.059 | 0.62 | 4.9 | 1.1 | 0.33 |
| | | Shuttles | 123,787 | 3,718,554 | 0.034 | 2.2 | 0.57 | 0.15 | 0.19 | 12 | 3.1 | 0.80 |
| | | On-Demand | 192,949 | 2,145,589 | 0.22 | 0.12 | 0.21 | 0.040 | 1.2 | 0.68 | 1.2 | 0.22 |
| | Residential | San Mateo | 1,745,357 | 16,580,889 | 1.9 | 2.2 | 1.8 | 0.35 | 11 | 12 | 9.7 | 1.9 |
| | Retail | San Mateo | 1,730,009 | 12,095,154 | 1.7 | 1.8 | 1.3 | 0.26 | 9.3 | 10 | 7.1 | 1.4 |
| | Park | San Mateo | 231,140 | 1,548,641 | 0.22 | 0.23 | 0.17 | 0.033 | 1.2 | 1.3 | 0.91 | 0.18 |
| | Hotel | San Mateo | 452,878 | 5,199,035 | 0.55 | 0.65 | 0.55 | 0.11 | 3.0 | 3.6 | 3.0 | 0.60 |
| | | | **8,717,037** | **88,446,872** | **10** | **11** | **9.4** | **1.9** | **57** | **61** | **52** | **10** |
| **Full Buildout** | Campus District | Cars | 4,367,418 | 48,565,689 | 5.9 | 3.3 | 4.9 | 0.91 | 32 | 18 | 27 | 5.0 |
| | | Trucks | 99,090 | 1,101,879 | 0.12 | 0.94 | 0.21 | 0.062 | 0.65 | 5.2 | 1.2 | 0.34 |
| | | Shuttles | 130,371 | 3,916,358 | 0.036 | 2.3 | 0.61 | 0.15 | 0.20 | 13 | 3.3 | 0.84 |
| | | On-Demand | 203,212 | 2,259,721 | 0.23 | 0.13 | 0.23 | 0.042 | 1.3 | 0.71 | 1.2 | 0.23 |
| | Residential | San Mateo | 2,996,550 | 28,467,226 | 3.3 | 3.7 | 3.0 | 0.60 | 18 | 21 | 17 | 3.3 |
| | Retail | San Mateo | 1,767,718 | 12,358,799 | 1.7 | 1.8 | 1.3 | 0.26 | 9.5 | 10 | 7.2 | 1.4 |
| | Park | San Mateo | 231,140 | 1,548,641 | 0.22 | 0.23 | 0.17 | 0.033 | 1.2 | 1.3 | 0.91 | 0.18 |
| | Hotel | San Mateo | 452,878 | 5,199,035 | 0.55 | 0.65 | 0.55 | 0.11 | 3.0 | 3.6 | 3.0 | 0.60 |
| | | | **10,248,378** | **103,417,346** | **12** | **13** | **11** | **2.2** | **66** | **72** | **60** | **12** |

**Table 21aV**
**Mobile CAP Emissions Before EV Reductions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Notes:**

1. Hamilton Avenue Parcels North and South were provided separately and added to the retail land use totals.
2. Trip counts and VMTs by land use type were broken out by year using a scaling factor representing the percent of each fleet that is operational in a given year leading up to full buildout. This percent was determined based on the square footage of the land use associated with each fleet that is operational in a given year relative to that land use's full buildout square footage. See Table 16 for more details on scaling. See Table 18 for Project Trip Rates and VMT.
3. Criteria air pollutants are calculated by year using emission factors for the associated year and fleet from EMFAC2021. Electric vehicles are not included in the emission factors for Campus District fleets (all fleet types except San Mateo Fleet), as reductions associated with EVs are considered separately. Project emission factors are shown in AQTR Table 20a.
4. Full buildout emissions are conservatively calculated using 2026 emission factors.

**Abbreviations:**

EV - electric vehicle
lb - pound
$NO_x$ - nitrogen oxides
VMT- vehicle miles traveled
$PM_{10}$ - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
ROG - reactive organic gases

**References:**

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 21bV**
**Summary of Mobile GHG Emissions Before EV Reductions**
**Willow Village**
**Menlo Park, California - Increased Residential Variant Analysis**

| Year | Land Use[1] | Fleet Type | Annual Trips[2] | Annual VMT[2] | GHGs Emissions[3,4] | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| | | | trips/year | VMT/year | MT/year | | | |
| **Existing Conditions** | Campus District | Cars | 2,557,040 | 30,742,244 | 9,997 | 0.41 | 0.32 | 10,104 |
| | | Trucks | 60,882 | 731,958 | 834 | 0.043 | 0.082 | 859 |
| | | Shuttles | 122,319 | 3,916,358 | 4,965 | 0.019 | 0.78 | 5,199 |
| | | On-Demand | 122,319 | 1,470,590 | 444 | 0.017 | 0.014 | 448 |
| | | | **2,862,559** | **36,861,150** | **16,240** | **0.48** | **1.2** | **16,610** |
| **Full Buildout** | Campus District | Cars | 4,367,418 | 48,565,689 | 14,353 | 0.41 | 0.34 | 14,465 |
| | | Trucks | 99,090 | 1,101,879 | 1,086 | 0.040 | 0.11 | 1,119 |
| | | Shuttles | 130,371 | 3,916,358 | 4,772 | 0.0037 | 0.75 | 4,996 |
| | | On-Demand | 203,212 | 2,259,721 | 611 | 0.016 | 0.015 | 616 |
| | Residential | San Mateo | 2,996,550 | 28,467,226 | 9,942 | 0.33 | 0.40 | 10,069 |
| | Retail | San Mateo | 1,767,718 | 12,358,799 | 4,351 | 0.17 | 0.19 | 4,411 |
| | Park | San Mateo | 231,140 | 1,548,641 | 546 | 0.022 | 0.024 | 554 |
| | Hotel | San Mateo | 452,878 | 5,199,035 | 1,809 | 0.055 | 0.070 | 1,831 |
| | | | **10,248,378** | **103,417,346** | **37,469** | **1.0** | **1.9** | **38,060** |

**Notes:**
1. Hamilton Avenue Parcels North and South were provided separately and added to the retail land use totals.
2. VMT and trip rates for the increased residential variant were provided by the Transportation Engineer on February 9, 2022, and are summarized in Table 1
3. Greenhouse Gases are calculated by year using emission factors for the associated year and fleet from EMFAC2021. Electric vehicles are not included in the emission factors for Campus District fleets (all fleet types except San Mateo Fleet), as reductions associated with EVs are considered separately. Project emission factors are shown in AQTR Table 20b.
4. Full buildout emissions are conservatively calculated using 2026 emission factors.

**Abbreviations:**

GHG - Greenhouse Gas
$CO_2$ - carbon dioxide
$CH_4$ - methane
$N_2O$ - Nitrous Oxide
$CO_2e$ - Carbon dioxide equivalent
EV - electric vehicle
MT - Metric Ton
VMT- vehicle miles traveled

**References:**

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 22V**
**EV Assumptions for Campus District**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Campus District EV Parameters**

| Description | Units | Value |
|---|---|---|
| Electricity required per mile charged[1] | kWh/mi | 0.30 |
| Total Charging Energy of Meta Campuses[2] | kWh/year | 3,791,856 |
| Total Area of Meta Campuses[2] | sqf | 4,753,594 |
| Total Meta Campus Energy per Area[2] | kWh/sqf | 0.80 |
| Existing Conditions Fleet eVMT per Total VMT[3] | Percent | 5.5% |
| Full Buildout Fleet MSS eVMT per Total VMT[4] | Percent | 14% |
| Electricity Loss Factor[5] | Percent | 10% |
| Existing Conditions Charging Energy Usage[6] | kWh/year | 534,955 |
| Full Buildout Charging Energy Usage[7] | kWh/year | 2,925,608 |

**eVMTs from Project Chargers at the proposed Campus District**

| Year | Land Use Category[8] | Project Increase in Annual eVMTs[9] |
|---|---|---|
| | | eVMT/year |
| **Existing Conditions** | Campus District | 1,783,182 |
| **Partial Buildout - Year 4** | | 298,927 |
| **Partial Buildout - Year 5** | | 5,701,922 |
| **Partial Buildout - Year 6** | | 9,259,481 |
| **Full Buildout** | | 9,752,026 |

**Notes:**

1. An average EV fuel economy of 0.30 kWh per mile was used. The fuel economy is based on electric fleet data from fueleconomy.gov. Available at: https://www.fueleconomy.gov/.
2. Meta provided energy usage and areas for EV charging at their existing campuses: Classic, Bayfront, Chilco, Willow, Gateway. The provided data was used to evaluate an average ratio of EV charging energy usage per campus area.
3. The percent eVMT for existing conditions is calculated by dividing the eVMT in existing conditions by the annual VMT from the 'Car' and 'On-Demand' vehicle types in existing conditions. For existing conditions VMT, see Variant Table 18.
4. ARB is currently preparing its 2020 Mobile Source Strategy (MSS) update to the ARB VISION Model (version 2.1) estimating future fleet characteristics. The Mobile Source Strategy projects eVMTs reflecting the aspirational target identified in EO N-79-20, assuming 100% of passenger vehicle sales in California are ZEV or PHEV, and GHG emissions assumed to have reduced by 2.0% per year from 2026 to 2035. The increase in annual eVMTs charged by the Campus District is scaled from the increase in fleet eVMT from existing conditions to full buildout.
5. A 10% Loss Factor was applied to the annual project energy uses to account for expected losses. Source available at: https://www.fueleconomy.gov/
6. The EV charging energy consumption for existing conditions was based on existing charger energy usage data for Willow Village for 2019 provided by the Project applicant. The total energy usage was reduced assuming a 10% loss factor.

**Table 22V**
**EV Assumptions for Campus District**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

7. The EV charging energy consumption for the Project at full buildout was determined using an average ratio of existing charging sites kWh/sqf and multiplying it by the Campus District land use area at full buildout (1.6 million sqf). This number was scaled by the increase in fleet eVMT from existing conditions to full buildout based on the MSS scenario of the VISION model. A 10% loss factor was applied to the total energy usage per year. All relevant data sources were provided by the Project applicant.
8. Meta offers an EV charging program to its workers. Charging on campus is free and valets move cars into chargers to maximize charging time. Therefore, the EV charging annual electricity for the Campus District was provided based on studies from Meta's existing campuses in the area. The electricity for EV charging at the Project would be supplied with 100% renewable energy.
9. For years where the Campus District is only operational a proportion of the year, the annual kWh is multiplied by a scaling fraction for the Campus District land use, found in Table 16.

**Abbreviations:**

EV - Electric vehicle (includes battery electric or plug-in hybrid technology)
eVMT- Electric vehicle miles traveled
kWh - Kilowatt hour
sqf- Square foot
MSS - Mobile Source Strategy

**References:**

City of Menlo Park Nonresidential EV Charging Requirements. Published July 17, 2019. Available at: https://www.menlopark.org/DocumentCenter/View/22382/Nonresidential-EV-Charging-Requirements

California Air Resources Board. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning

CalEEMod Appendix D. Available at: http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-d2020-4-0-full-merge.pdf?sfvrsn=12

**Table 23V**
**EV Assumptions for Town Square and the Residential/Shopping District**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, CA**

**EV Assumptions**

| Description | Units | Input |
|---|---|---|
| Miles Charged per Hour Charged[1] | (miles/hr) | 21 |
| Scenario1[2] | - | Reference |
| Scenario 2[2] | - | MSS |
| Number of Chargers[3] | Total # | 249 |
| Average Daily Hours for Charging per Charger[4] | hr | 10 |
| Annual Days of Charger Activity[4] | days/yr | 365 |

**eVMTs from Project Chargers - Reference Scenario**

| Year | Total Annual Project Trips[5,6] | Total Annual Project VMT[5,6] | % of total Fleet using Electric Fuel[2] | Annual Project EV Trips[6] | Annual Project Electric VMT[6] | Number of Project EV Chargers Available[7] | Total Annual EV Charge Hours Available from Project Chargers[8] | Number of EV Annual VMT Available from Project Chargers[8] | Project Chargers at Capacity Relative to Project Electric VMT[9] | Total Annual eVMTs Charged by Project[9] |
|---|---|---|---|---|---|---|---|---|---|---|
| | trips/year | VMT/year | | trips/year | eVMT/year | | hours/year | eVMT/year | | |
| **Partial Buildout - Year 4** | 378,626 | 2,589,154 | **4.7%** | 17,714 | 121,137 | 131 | 477,218 | 10,021,583 | Under Capacity | **121,137** |
| **Partial Buildout - Year 5** | 1,872,030 | 14,910,770 | **5.2%** | 97,457 | 776,244 | 187 | 683,944 | 14,362,828 | Under Capacity | **776,244** |
| **Partial Buildout - Year 6** | 4,159,383 | 35,423,719 | **5.6%** | 231,865 | 1,974,696 | 239 | 871,770 | 18,307,160 | Under Capacity | **1,974,696** |
| **Full Buildout** | 5,448,287 | 47,573,700 | **5.9%** | 322,805 | 2,818,688 | 249 | 908,850 | 19,085,850 | Under Capacity | **2,818,688** |

**eVMTs from Project Chargers - Mobile Source Strategy (MSS) Scenario**

| Year | Total Annual Project Trips[5,6] | Total Annual Project VMT[5,6] | % of total Fleet using Electric Fuel[2] | Annual Project EV Trips[6] | Annual Project Electric VMT[6] | Number of Project EV Chargers Available[7] | Total Annual EV Charge Hours Available from Project Chargers[8] | Number of EV Annual VMT Available from Project Chargers[8] | Project Chargers at Capacity Relative to Project Electric VMT[9] | Total Annual eVMTs Charged by Project[9] |
|---|---|---|---|---|---|---|---|---|---|---|
| | trips/year | VMT/year | | trips/year | eVMT/year | | hours/year | eVMT/year | | |
| **Partial Buildout - Year 4** | 378,626 | 2,589,154 | **8.3%** | 31,482 | 215,280 | 131 | 477,218 | 10,021,583 | Under Capacity | **215,280** |
| **Partial Buildout - Year 5** | 1,872,030 | 14,910,770 | **10.6%** | 198,125 | 1,578,074 | 187 | 683,944 | 14,362,828 | Under Capacity | **1,578,074** |
| **Partial Buildout - Year 6** | 4,159,383 | 35,423,719 | **13.1%** | 543,454 | 4,628,372 | 239 | 871,770 | 18,307,160 | Under Capacity | **4,628,372** |
| **Full Buildout** | 5,448,287 | 47,573,700 | **15.8%** | 860,576 | 7,514,434 | 249 | 908850 | 19,085,850 | Under Capacity | **7,514,434** |

**Notes:**

1. The miles charged per hour charged is representative of a typical charge rate for an EV of 6.25 kWh per hour and a fuel economy of 0.30 kWh per mile. The charge rate is based on capability of existing battery-electric vehicles and Level 2 charging stations. Reference: Chargepoint. 2017. Level Up Your EV Charging Knowledge. Available at: https://www.chargepoint.com/blog/level-your-ev-charging-knowledge/. The fuel economy is based on electric fleet data from fueleconomy.gov. Available at: https://www.fueleconomy.gov/.
2. The two scenarios analyzed are the Reference and the Mobile Source Strategy scenarios. ARB is currently preparing its 2020 Mobile Source Strategy (MSS) update to the ARB VISION Model (version 2.1). The 2020 MSS uses "scenario planning to take an integrated approach to identifying the technology trajectories and programmatic concepts" to model projected years of electric vehicle miles for assessed scenarios. The Mobile Source Strategy projects eVMTs reflecting the aspirational target identified in EO N-79-20, assuming 100% of passenger vehicle sales in California are ZEV or PHEV, and GHG emissions assumed to have reduced by 2.0% per year from 2026 to 2035. The 2020 update only considers passenger vehicles (LDA, LDT1, LDT2, and MDV). To determine the eVMT percent of the passenger vehicle fleets, the 2020 MSS update was downloaded in July 13, 2021. The increase in annual eVMTs charged by the Project from the Reference Scenario to the MSS Scenario is used to determine the eVMTs the Project can take credit for based on providing additional charging infrastructure for the state to reach aspirational EV fleet penetration.
3. The number of chargers in the Town Square and the Residential/Shopping District was provided by the Project Applicant in the Willow Village Mixed Use Development Concept Level Energy Use Summary, dated June 14, 2021, detailing chargers available for all mixed-use traffic. 249 EV Charging Stations are available to serve the 1,694 residential spaces and 500 commercial spaces.
4. Meta offers a valet service to charge EVs from 7am to 7pm, average daily hours of availability for charging per charger is conservatively assumed to be 10 hours per day. When demand is met, the full 10 hours will be used for charging, with each vehicle cycling out of the charging spot before or as the car reaches full charge. The number of chargers are available for all Town Square and the Residential/Shopping District land uses, and it is expected that there will be 10 hours a day of active charging taking place due to the frequency of turnover associated with retail, restaurant, hotel, and park land uses. Town Square and the Residential/Shopping District land uses are assumed to operate 365 days per year. Any charging inefficiencies associated with cars remaining plugged in after reaching full charge is assumed to balance out due the likelihood of more than 10 hours of activity a day associated with Town Square and the Residential/Shopping District activity.
5. Town Square and the Residential/Shopping District Total VMT and trips includes all proposed Project residential, retail, park, and hotel land uses, consistent with Table 18. Retail land uses include Hamilton Parcels North and South and are added to total VMT and trips.
6. EV Annual Trips and EV Annual VMT are determined based on Project trips and VMTs and the VISION Reference Scenario percent of Electric Fleet. These eVMTs (electric vehicle miles traveled) represents the number of project VMTs that are driven by electric vehicles.
7. 249 EV Charging Stations are proposed for the full buildout. To reflect the EV charging stations that will come online during construction in the partial years leading up to full buildout, a scaling factor was applied based on the ratio of square feet of the parking land use that is built out in a given year to the total square feet that will be built. The scaling factor for a given year was applied to the 249 chargers at full buildout. To see scaling factors used, refer to the parking land use from Table 16.
8. Total annual charge hours available from the project are determined by multiplying the average daily hours of charging per charger (10 hours) by the annual days of charger activity (365 days). The annual charge hours available from the project are then multiplied by 25 miles charged per charge hour to determine the number of eVMT available from the project.
9. The Project EV chargers for Town Square and the Residential/Shopping District land uses are determined to be at capacity, meaning used fully for all available charge hours per day, when the electric vehicle miles associated with the Project are in excess of the maximum electric vehicle miles the Project chargers can charge. If there is a surplus of chargers relative to EVs coming to the site, then the Project chargers are under-capacity, and only a fraction of chargers will be used as the number of EVs coming to the site are fewer than the total number of charger capacity. If there is a surplus of EVs coming to the site relative to the chargers at the site, all chargers will be used and the site will be at capacity. In the scenario when the chargers are at capacity, the full capacity of VMTs the site can charge are assumed to be charged.

**Abbreviations:**

EV - electric vehicle (includes battery electric or plug-in hybrid technology)
Hr - hour
TDM - Transportation Demand Management
VMT - vehicle miles travelled
eVMT - electric vehicle mile traveled

**References:**

U.S. Census. 2019. Factfinder. Available at: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk
California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2016.3.2. Available online at http://www.caleemod.com/
California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/
California Air Resources Board. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning

**Table 24aV**
**EV CAP Emissions Reductions Summary**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Town Square and the Residential/Shopping District**

| Year | Scenario | Miles Charged by Project Chargers[1] | EV Trips Charged by Project Chargers[1] | eVMT from Additional Project Chargers[2] | Trip Counts from additional Project Chargers[2] | Electric VMT CAP Emissions Reduction (lb/year)[3,4] | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | eVMT/year | trips/year | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ |
| Existing Conditions | Reference | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | MSS | 0 | 0 | | | | | | |
| Year 4 | Reference | 121,137 | 17,714 | 94,143 | 13,767 | -33 | -18 | -0.34 | -0.31 |
| | MSS | 215,280 | 31,482 | | | | | | |
| Year 5 | Reference | 776,244 | 97,457 | 801,830 | 100,669 | -246 | -133 | -2.7 | -2.5 |
| | MSS | 1,578,074 | 198,125 | | | | | | |
| Year 6 | Reference | 1,974,696 | 231,865 | 2,653,676 | 311,589 | -752 | -400 | -8.4 | -7.7 |
| | MSS | 4,628,372 | 543,454 | | | | | | |
| Full Buildout | Reference | 2,818,688 | 322,805 | 4,695,746 | 537,771 | -1,311 | -700 | -15 | -14 |
| | MSS | 7,514,434 | 860,576 | | | | | | |

**Campus District**

| Year | eVMT from Additional Project Chargers[5] | Trip Counts from additional Project Chargers[5,6] | Electric VMT CAP Emissions Reduction (lb/year)[3,4] | | | |
|---|---|---|---|---|---|---|
| | eVMT/year | trips/year | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ |
| Existing Conditions | 1,783,182 | 148,319 | -564 | -472 | -7.6 | -7.0 |
| Year 4 | 298,927 | 26,882 | -78 | -47 | -1.0 | -0.91 |
| Year 5 | 5,701,922 | 512,763 | -1,432 | -833 | -18 | -17 |
| Year 6 | 9,259,481 | 832,687 | -2,249 | -1,262 | -28 | -26 |
| Full Buildout | 9,752,026 | 876,981 | -2,369 | -1,329 | -30 | -27 |

| Year | Electric VMT CAP Emissions Reduction (lb/year) | | | |
|---|---|---|---|---|
| | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ |
| Existing Conditions | -564 | -472 | -7.6 | -7.0 |
| Partial Buildout- Year 4 | -111 | -65 | -1.3 | -1.2 |
| Partial Buildout- Year 5 | -1,677 | -966 | -21 | -19 |
| Partial Buildout- Year 6 | -3,002 | -1,662 | -37 | -34 |
| Full Buildout | -3,680 | -2,030 | -45 | -41 |

**Notes:**

1. Expected eVMT and trips charged by the Project chargers in Town Square and the Residential/Shopping District land uses are calculated based on the San Mateo Fleet, charger usage assumptions, ARB's Vision Model, and traffic data provided by the Transportation Engineer. For calculation details, see Table 23.
2. Emissions reductions from EV charging represent the decrease in emissions from increases in electric vehicle use due to the installation of EV chargers throughout the site. For Town Square and the Residential/Shopping District land uses, the eVMT and trips from additional Project chargers is calculated based on the difference between the MSS scenario and the baseline scenario, representing the additional eVMT due to the installation of additional chargers.
3. Emissions reductions use emission factors developed in EMFAC2021 that represent passenger vehicles (LDA, LDT1, LDT2, MCY). The eVMTs determined for Town Square and the Residential/Shopping District are based on ARB's VISION Model, which includes expected electric vehicle fleet % for passenger vehicles only (LDA, LDT1, LDT2, MCY).
4. EVs emit particulate matter brake wear and tire wear, therefore those emissions are not considered in the reductions.
5. Expected eVMT charged by additional Project chargers is measured based on anticipated charging energy usage provided by the Project Applicant. For calculation details see Variant Table 22.
6. Trip counts from Project chargers were calculated by dividing the increased eVMTs from project chargers by the average VMTs per trip for the passenger vehicles (Cars) in a given year, based on traffic data provided by the Transportation Engineer.

**Abbreviations:**

eVMT - electric vehicle miles traveled
lb - pound
EV - electric vehicle
ROG - reactive organic gases
NOx - nitrogen oxides
$PM_{10}$ - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter

**References:**

California Air Resources Board. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning

**Table 24bV**
**EV GHG Emissions Reductions Summary**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Town Square and the Residential/Shopping District**

| Year | Scenario | Miles Charged by Project Chargers[1] | EV Trips Charged by Project Chargers[1] | eVMT from Additional Project Chargers[2] | Trip Counts from additional Project Chargers[2] | Electric VMT GHG Emissions Reduction (MT/year)[3,4] | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | eVMT/year | trips/year | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Full Buildout | Reference | 2,818,688 | 322,805 | 4,695,746 | 537,771 | -1,396 | -0.047 | -0.037 | -1,408 |
| | MSS | 7,514,434 | 860,576 | | | | | | |

**Campus District**

| Year | eVMT from Additional Project Chargers[4] | Trip Counts from additional Project Chargers[4,5] | Electric VMT GHG Emissions Reduction (MT/year)[3] | | | |
|---|---|---|---|---|---|---|
| | eVMT/year | trips/year | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Existing Conditions | 1,783,182 | 148,319 | -580 | -0.024 | -0.019 | -586 |
| Full Buildout | 9,752,026 | 876,981 | -2,882 | -0.082 | -0.069 | -2,905 |

| Year | Electric VMT GHG Emissions Reduction (MT/year) | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| Existing Conditions | -580 | -0.024 | -0.019 | -586 |
| Full Buildout | -4,278 | -0.13 | -0.11 | -4,313 |

**Notes:**

1. Expected eVMT and trips charged by the Project chargers in Town Square and the Residential/Shopping District land uses are calculated based on the San Mateo Fleet, charger usage assumptions, ARB's Vision Model, and traffic data provided by the Transportation Engineer. For calculation details, see Table 23.

2. Emissions reductions from EV charging represent the decrease in emissions from increases in electric vehicle use due to the installation of EV chargers throughout the site. For Town Square and the Residential/Shopping District land uses, the eVMT and trips from additional Project chargers is calculated based on the difference between the MSS scenario and the baseline scenario, representing the additional eVMT due to the installation of additional chargers.
3. Emissions reductions use emission factors developed in EMFAC2021 that represent passenger vehicles (LDA, LDT1, LDT2, MCY). The eVMTs determined for Town Square and the Residential/Shopping District are based on ARB's VISION Model, which includes expected electric vehicle fleet % for passenger vehicles only (LDA, LDT1, LDT2, MCY).
4. Expected eVMT charged by additional Project chargers is measured based on anticipated charging energy usage provided by the Project Applicant. For calculation details see Table 22.
5. Trip counts from Project chargers were calculated by dividing the increased eVMTs from project chargers by the average VMTs per trip for the passenger vehicles (Cars) in a given year, based on traffic data provided by the Transportation Engineer.

**Abbreviations:**

GHG - Greenhouse Gas
$CO_2$ - carbon dioxide
$CH_4$ - methane
$N_2O$ - Nitrous Oxide
$CO_2e$ - Carbon dioxide equivalent
eVMT - electric vehicle miles traveled
MT - metric ton
EV - electric vehicle

**References:**

California Air Resources Board. Vision Scenario Planning. Available at: https://ww2.arb.ca.gov/resources/documents/vision-scenario-planning

**Table 25aV**
**Summary of Mobile CAP Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Total Emissions Before Reductions:[1]**

| Year | CAP Emissions without Reductions (ton/year) | | | |
|---|---|---|---|---|
| | ROG | $NO_x$ | $PM_{10}$[2] | $PM_{2.5}$[2] |
| **Total Emissions by Year** | | | | |
| Existing Conditions[3] | 5.0 | 8.0 | 4.0 | 0.84 |
| Year 4 | 0.61 | 0.67 | 0.46 | 0.092 |
| Year 5 | 5.8 | 6.3 | 5.1 | 1.0 |
| Year 6 | 10 | 11 | 9.4 | 1.9 |
| **Full Buildout** | 12 | 13 | 11 | 2.2 |
| **Net Emissions by Year** | | | | |
| **Full Buildout** | **7.1** | **5.1** | **7.0** | **1.3** |

**Total Emissions with Reductions:[4]**

| Year | CAP Emissions with Reductions (ton/year) | | | |
|---|---|---|---|---|
| | ROG | $NO_x$ | $PM_{10}$[2] | $PM_{2.5}$[2] |
| **Total Emissions by Year** | | | | |
| Existing Conditions[3] | 5.0 | 8.0 | 4.0 | 0.84 |
| Year 4 | 0.56 | 0.64 | 0.46 | 0.091 |
| Year 5 | 5.0 | 5.9 | 5.1 | 1.0 |
| Year 6 | 8.9 | 10 | 9.4 | 1.8 |
| **Full Buildout** | **10** | **12** | **11** | **2.2** |
| **Net Emissions by Year** | | | | |
| **Full Buildout** | **5.3** | **4.1** | **7.0** | **1.3** |

**Notes:**

1. Calculations of CAP emissions before reductions are shown in detail in Table 21a. Net emissions subtract the emissions from the existing conditions in 2019.
2. PM10 and PM2.5 emissions include exhaust, tire wear, brake wear, and fugitive dust. Fugitive dust emissions factors are calculated in AQTR Table 8.
3. The Existing Conditions includes EV reductions associated with existing Project Site chargers.
4. CAP Emissions after reductions account for the reductions associated with EVs as shown in Table 24a. The emissions reductions are subtracted from the total Project emissions.

**Abbreviations:**

lb - pound
MT - metric ton
EV - electric vehicle
ROG - reactive organic gases
NOx - nitrogen oxides
$PM_{10}$ - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter

**References:**

California ARB. 2021. Miscellaneous Processes Methodologies - Paved Entrained Road Dust. Available online at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 25bV**
**Summary of Mobile GHG Emissions**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

**Total Emissions Before Reductions:[1]**

| Year | GHG Emissions without Reductions (MT/year) | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| **Total Emissions by Year** | | | | |
| Existing Conditions[2] | 15,660 | 0.46 | 1.2 | 16,024 |
| **Full Buildout** | 37,469 | 1.0 | 1.9 | 38,060 |
| **Net Emissions** | | | | |
| **Full Buildout** | **21,809** | **0.58** | **0.71** | **22,035** |

**Total Emissions with Reductions:[3]**

| Year | GHG Emissions with Reductions (MT/year) | | | |
|---|---|---|---|---|
| | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| **Total Emissions by Year** | | | | |
| Existing Conditions[2] | 15,660 | 0.46 | 1.2 | 16,024 |
| **Full Buildout** | 33,191 | 0.92 | 1.8 | 33,747 |
| **Net Emissions** | | | | |
| **Full Buildout** | **17,531** | **0.45** | **0.61** | **17,723** |

**Notes:**

1. Calculations of GHG emissions before reductions are shown in detail in AQTR Table 21b. Net emissions subtract the emissions from the existing conditions in 2019.
2. The Existing Conditions includes EV reductions associated with existing Project Site chargers.
3. GHG Emissions after reductions account for the reductions associated with EVs as shown in Table 24b. The emissions reductions are subtracted from the total Project emissions.

**Abbreviations:**

GHG - Greenhouse Gas
$CO_2$ - carbon dioxide
$CH_4$ - methane
$N_2O$ - Nitrous Oxide
$CO_2e$ - Carbon dioxide equivalent
MT - metric ton
EV - electric vehicle

**References:**

California ARB. 2021. Miscellaneous Processes Methodologies - Paved Entrained Road Dust. Available online at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf

California Air Resources Board. EMFAC2021. Available at: https://arb.ca.gov/emfac/

**Table 28V**
**Energy Usage for Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Land Use | Floor Area (sqft) (DU - Residential) | Annual Electricity Use (MWh/yr) | Annual Natural Gas Use (MMBtu/yr) |
|---|---|---|---|
| **Existing Conditions (2019)[1]** | | | |
| All | 1,923,910 | 12,050 | 30,039 |
| **Total Existing Energy Usage** | | **12,050** | **30,039** |
| **Full Buildout[2,3]** | | | |
| Office | 1,600,000 | 23,828 | 0 |
| Retail | 207,690 | 4,517 | 2,195 |
| Residential | 1,930 | 18,804 | 0 |
| Hotel | 172,000 | 2,528 | 0 |
| Parking | 1,869,240 | 32,183 | 0 |
| Park | 403,837 | 38 | 0 |
| **Total Full Buildout Energy Usage** | | **81,898** | **2,195** |

**Notes:**

1. Energy use rates for existing conditions were provided for 2019 by the Project Applicant via email on August 10, 2021.
2. Electricity and natural gas usage rates for the retail, residential, and parking land uses were provided by PAE in the June 14, 2021 memorandum. Electricity usage rates for Office, Hotel, and Park were provided by Hines on June 21, 2021. The hotel and office do not use natural gas. The electricity usage includes 27,986 MWh/year of electricity use associated with the Campus District EV charging stations, which is summarized in the parking land use category. Electricity and energy use rates for the Willow Road Retail were calculated based on the CalEEMod defaults the retail land use type in Climate Zone 5.
3. Natural gas for the project is only used for Hamilton Avenue Parcels North and South and the supermarket and restaurant land uses, which are summarized in the retail category.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
DU - dwelling unit
kBTU - thousand British Thermal Units
kWh - kilowatt-hour
MMBTU - million British Thermal Units
MWh - Megawatt-hour
sqft - square feet
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2020.4.0. Available online at http://www.caleemod.com

**Table 30V**
**Energy Usage Emissions from Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Location | Natural Gas Emissions[1,2] | | | | | Electricity Emissions[1,2] |
|---|---|---|---|---|---|---|
| | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ | $CO_2e$ | |
| | (tons/yr) | | | | (MT/yr) | |
| **Existing Conditions (2019)** | | | | | | |
| All | 0.16 | 1.5 | 0.11 | 0.11 | 1,613 | 0 |
| **Total Existing Emissions** | **0.16** | **1.5** | **0.11** | **0.11** | **1,613** | **0** |
| **Full Buildout** | | | | | | |
| Retail | 0.012 | 0.11 | 8.2E-03 | 8.2E-03 | 118 | 0 |
| **Total Full Buildout Emissions** | **0.012** | **0.11** | **8.2E-03** | **8.2E-03** | **118** | **0** |
| **Partial Buildout[3]** | | | | | | |
| Total Year 4 Emissions | 0.0012 | 0.011 | 8.3E-04 | 8.3E-04 | 12 | 0 |
| Total Year 5 Emissions | 0.0070 | 0.064 | 4.9E-03 | 4.9E-03 | 70 | 0 |
| Total Year 6 Emissions | 0.012 | 0.11 | 8.0E-03 | 8.0E-03 | 115 | 0 |

**Notes:**

1. CAP emissions result from the combustion of natural gas. As a result, CAP emissions were only calculated for natural gas usage. In compliance with the City of Menlo Park Municipal Code, natural gas usage for the Project will be offset; however, since the carbon intensity of the offset production is not known at this time, GHG emissions from natural gas were conservatively included alongside electricity GHG emissions.
2. Emissions were calculated based on energy use, shown in Table 28, and energy emission factors, shown in AQTR Table 29. Existing electricity is sourced from PCE. Project electricity will be sourced from 100% renewable sources; as such, emissions from Project electricity use are expected to be zero. Project natural gas will only be used in retail land uses for commercial cooking equipment.
3. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

CAP - Criteria Air Pollutants
$CO_2e$ - carbon dioxide equivalents
GHG - Greenhouse Gas
MT - metric ton(s)
NOx - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2020.4.0. Available online at http://www.caleemod.com

# Table 31V
## Water Usage for Existing Conditions and Project Operations
## Willow Village - Increased Residential Variant Analysis
## Menlo Park, California

**Water Usage**

| Land Use | CalEEMod® Land Use Subtype | Size | Size Metric | Indoor Water (million gal/year) | Outdoor Water (million gal/year) |
|---|---|---|---|---|---|
| **Existing Conditions (2019)[1]** | | | | | |
| Office | General Office Building | 251,530 | sqft | 45 | 27 |
| Commercial | Research and Development | 123,870 | sqft | 61 | 0 |
| Industrial - Warehouse | Unrefrigerated Warehouse-No Rail | 500,780 | sqft | 116 | 0 |
| Industrial - Manufacturing | Manufacturing | 23,570 | sqft | 5.5 | 0 |
| Recreational | Health Club | 24,060 | sqft | 1.4 | 0.87 |
| Light Industrial | General Light Industry | 80,100 | sqft | 19 | 0 |
| Parking | Enclosed Parking with Elevator | 920,000 | sqft | 0 | 0 |
| **Full Buildout[2]** | | | | | |
| Office | | 1,600,000 | sqft | 35 | 10 |
| Retail | | 207,690 | sqft | 4.2 | 0.36 |
| Residential | | 1,892,043 | sqft | 75 | 7.0 |
| Hotel | | 172,000 | sqft | 7.6 | 2.5 |
| Parking | | 1,869,240 | sqft | 0 | 1.4 |
| Park | | 403,837 | sqft | 0 | 14 |
| **Partial Buildout[3]** | | | | | |
| | | | Total Year 4 Usage[3] | 1.5 | 13 |
| | | | Total Year 5 Usage[3] | 37 | 23 |
| | | | Total Year 6 Usage[3] | 89 | 32 |

**Notes:**

1. Existing water use was calculated using the CalEEMod default water consumption profile for each land use.
2. Project indoor water use rates and outdoor water use for all parcels except Willow Road Retail were provided by the Project Applicant on June 14, 2021. Indoor and outdoor water use rates for Willow Road Retail were calculated using the CalEEMod default water consumption profile for the retail land use type.
3. Partial buildout usage rates were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model

gal - gallon

kWh - kilowatt-hours

ksf - thousand square feet

sqft - square feet

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

**Table 32V**
**Water Usage and Wastewater Emissions from Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Land Use | Electricity Indirect Emissions[1,2] (MT $CO_2e$/yr) | Septic Tank Direct Emissions[1,2] (MT $CO_2e$/yr) | Aerobic Direct Emissions[1,2] (MT $CO_2e$/yr) | Facultative Lagoon Direct Emissions[1,2] (MT $CO_2e$/yr) | Total Emissions (MT CO2e/yr) |
|---|---|---|---|---|---|
| **Existing Conditions (2019)** | | | | | |
| Office | 37 | 27 | 24 | 10 | 98 |
| Commercial | 36 | 37 | 33 | 13.1 | 119 |
| Industrial - Warehouse | 68 | 71 | 62 | 25 | 226 |
| Industrial - Manufacturing | 3.2 | 3.3 | 2.9 | 1.2 | 10.6 |
| Recreational | 1.2 | 0.87 | 0.76 | 0.30 | 3.1 |
| Light Industrial | 11 | 11.3 | 9.9 | 4.0 | 36 |
| Parking | 0 | 0 | 0 | 0 | 0 |
| **Total Existing Emissions** | **156** | **151** | **132** | **53** | **492** |
| **Full Buildout** | | | | | |
| Office | 19 | 21 | 19 | 7.5 | 67 |
| Retail | 2.0 | 2.6 | 2.3 | 0.91 | 7.8 |
| Residential | 36 | 46 | 40 | 16 | 138 |
| Hotel | 4.1 | 4.6 | 4.1 | 1.6 | 14 |
| Parking | 0.42 | 0 | 0 | 0 | 0.42 |
| Park | 4.2 | 0 | 0 | 0 | 4.2 |
| **Total Full Buildout Emissions** | **65** | **74** | **65** | **26** | **231** |
| **Partial Buildout[3]** | | | | | |
| Total Year 4 Emissions[3] | 5.0 | 0.92 | 0.81 | 0.32 | 7.1 |
| Total Year 5 Emissions[3] | 24 | 22 | 20 | 7.9 | 74 |
| Total Year 6 Emissions[3] | 49 | 54 | 48 | 19 | 170 |

**Notes:**

1. Emissions shown in this table were calculated using default values and methods from CalEEMod Version 2020.4.0. The Water Electricity Intensity, Water Treatment Types, and Wastewater Treatment Direct Emission Factors used in the calculation can be found in Tables 9.2, 9.3 and 9.4 of Appendix D of the CalEEMod user guide, respectively. These calculations were performed using water use rates, shown in Table 31, and energy emission factors, shown in AQTR Table 29.
2. Consistent with CalEEMod, indoor water use was assumed to be processed as wastewater and outdoor water use was assumed to not be processed as wastewater.
3. Partial buildout direct emissions from Septic Tank, Aerobic, and Facultative Lagoon wastewater treatment were calculated from full buildout using scaling factors by land use type and year, as shown in Table 1. For partial buildout indirect electricity emissions from water usage and wastewater treatment, usage rates rather than emission were scaled to account for year specific energy emission factors from PG&E, as shown in AQTR Table 29.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
$CO_2e$ - carbon dioxide equivalents
MT - metric ton
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

# Table 33V
## Solid Waste Generation for Existing Conditions and Project Operations
## Willow Village - Increased Residential Variant Analysis
## Menlo Park, California

**Solid Waste Generation[1]**

| Land Use | Size | Units | Solid Waste Disposal Rate (ton/year) |
|---|---|---|---|
| **Existing Conditions (2019)** | | | |
| Office | 251,530 | sqft | 42 |
| Commercial | 123,870 | sqft | 10 |
| Industrial - Warehouse | 500,780 | sqft | 471 |
| Industrial - Manufacturing | 23,570 | sqft | 29 |
| Recreational | 24,060 | sqft | 137 |
| Light Industrial | 80,100 | sqft | 99 |
| Parking | 920,000 | sqft | 0 |
| **Full Buildout Conditions** | | | |
| Office | 1,600,000 | sqft | 268 |
| Retail | 207,690 | sqft | 218 |
| Residential | 1,930 | DU | 888 |
| Hotel | 193 | Rooms | 106 |
| Parking | 1,869,240 | sqft | 0 |
| Park | 403,837 | sqft | 0.83 |

**Notes:**

1. Solid Waste Generation Rates are from Table 10.1 of Appendix D of the CalEEMod User's Guide. An 82% diversion rate, provided by the Project Applicant via email communication dated August 2, 2021, is applied to default solid waste generation rates for the existing and project office land use to account for recycling and composting. The diversion rate is generated using data from Recology with the assumption that all bins are at 100% capacity and 0% contamination.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model

DU - dwelling unit

sqft - square feet

**References**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

# Table 34V
## Solid Waste Emissions from Existing Conditions and Project Operations
## Willow Village - Increased Residential Variant Analysis
## Menlo Park, California

**Solid Waste Emissions[1]**

| Location | CalEEMod® Land Use Subtype | $CO_2$ (MT/year) | $CH_4$ (MT/year) | $CO_2e$ (MT/year) |
|---|---|---|---|---|
| **Existing Conditions (2019)** | | | | |
| Office | General Office Building | 8.5 | 0.51 | 21 |
| Commercial | Research and Development | 2.0 | 0.12 | 5.0 |
| Industrial - Warehouse | Unrefrigerated Warehouse-No Rail | 96 | 5.6 | 237 |
| Industrial - Manufacturing | Manufacturing | 5.9 | 0.35 | 15 |
| Recreational | Health Club | 28 | 1.6 | 69 |
| Light Industrial | General Light Industry | 20 | 1.2 | 50 |
| Parking | Enclosed Parking with Elevator | 0 | 0 | 0 |
| **Total Existing Emissions** | | **160** | **9.5** | **397** |
| **Full Buildout Conditions** | | | | |
| Office | | 54 | 3.2 | 135 |
| Retail | | 44 | 2.6 | 110 |
| Residential | | 180 | 10.7 | 446 |
| Hotel | | 22 | 1.3 | 53 |
| Parking | | 0 | 0 | 0 |
| Park | | 0.17 | 0.010 | 0.42 |
| **Total Full Buildout Emissions** | | **301** | **18** | **745** |
| **Partial Buildout[2]** | | | | |
| Total Year 4 Emissions[2] | | 6.3 | 0.37 | 16 |
| Total Year 5 Emissions[2] | | 92 | 5.5 | 229 |
| Total Year 6 Emissions[2] | | 222 | 13 | 549 |

**Notes:**

1. Emissions shown in this table were calculated using default values and methods from CalEEMod Version 2020.4.0. These calculations were performed using default waste use rates by land use type and an 82% diversion rate for office land use types provided by the Project Applicant, shown in Table 33, and default solid waste landfill gas emission factors from Table 10.2 of CalEEMod User's Guide Appendix D.
2. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
$CH_4$ - methane
$CO_2$ - carbon dioxide
$CO_2e$ - carbon dioxide equivalents
LFG - Landfill Gas
MT - metric ton

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

**Table 35V**
**Unmitigated Architectural Coating Emissions from Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Land Use | Floor Area | Building Surface Area[1] | Application Rate[2] | Indoor Paint VOC EF[3] | Outdoor Paint VOC EF[3] | Architectural Coating VOC Emissions[4] |
|---|---|---|---|---|---|---|
| | (sqft) | (sqft) | | (g/L) | (g/L) | (lb/yr) |
| **Existing Conditions (2019)** | | | | | | |
| Office | 251,530 | 503,060 | 10% | 100 | 150 | 262 |
| Commercial | 123,870 | 247,740 | 10% | 100 | 150 | 129 |
| Industrial - Warehouse | 500,780 | 1,001,560 | 10% | 100 | 150 | 522 |
| Industrial - Manufacturing | 23,570 | 47,140 | 10% | 100 | 150 | 25 |
| Recreational | 24,060 | 48,120 | 10% | 100 | 150 | 25 |
| Light Industrial | 80,100 | 160,200 | 10% | 100 | 150 | 84 |
| Parking | 920,000 | 55,200 | 10% | 0 | 150 | 9.6 |
| **Total Existing Conditions Emissions** | | | | | | **1,057** |
| **Full Buildout** | | | | | | |
| Office | 1,600,000 | 3,200,000 | 10% | 100 | 150 | 1,669 |
| Retail | 207,690 | 415,380 | 10% | 100 | 150 | 217 |
| Residential | 1,892,043 | 5,108,515 | 10% | 100 | 150 | 2,664 |
| Hotel | 172,000 | 344,000 | 10% | 100 | 150 | 179 |
| Parking | 1,869,240 | 112,154 | 10% | 0 | 150 | 19 |
| Park | 403,837 | 0 | 10% | 0 | 0 | 0 |
| **Total Full Buildout Emissions** | | | | | | **4,749** |
| **Partial Buildout[5]** | | | | | | |
| Total Year 4 Emissions[5] | | | | | | 83 |
| Total Year 5 Emissions[5] | | | | | | 1,567 |
| Total Year 6 Emissions[5] | | | | | | 3,547 |

**Notes:**

1. Consistent with CalEEMod Appendix A, residential building surface area was assumed to be 2.7 times the floor area, and non-residential 2 times the floor area. Also consistent with CalEEMod Appendix E, the parking painted area was assumed to be 6% of the total surface area for surface lots.
2. Consistent with CalEEMod Appendix A, 10% of all surfaces were assumed to be coated each year.
3. Consistent with CalEEMod Appendix D Table 6.1, which is based on BAAQMD Regulation 8 Rule 3 paint VOC regulations, use VOC EF of 100 g/L for flat paints, generally used indoors, and 150 g/L for all other architectural coatings.
4. Uses CalEEMod Appendix A assumption that 1 gallon of paint covers 180 square feet. Building surface area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod Appendix A. Parking garages are assumed to have no indoor surfaces.
5. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CalEEMod - California Emissions Estimator Model
EF - emission factor
g - grams
L - liters
lb - pound
sqft - square feet
VOC - volatile organic compound
yr - year

**References:**

BAAQMD. 2009. Regulation 8 Rule 3 Architectural Coatings. Accessed November 2020. Available at: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rg0803_0709.pdf?la=en.

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

## Table 36V
## Mitigated Architectural Coating Emissions from Existing Conditions and Project Operations
## Willow Village - Increased Residential Variant Analysis
## Menlo Park, California

| Land Use | Floor Area | Building Surface Area[1] | Application Rate[2] | Indoor Paint VOC EF[3] | Outdoor Paint VOC EF[3] | Architectural Coating VOC Emissions[4] |
|---|---|---|---|---|---|---|
| | (sqft) | (sqft) | | (g/L) | (g/L) | (lb/yr) |
| **Full Buildout** | | | | | | |
| Office | 1,600,000 | 3,200,000 | 10% | 10 | 150 | 668 |
| Retail | 207,690 | 415,380 | 10% | 10 | 150 | 87 |
| Residential | 1,892,043 | 5,108,515 | 10% | 10 | 150 | 1,066 |
| Hotel | 172,000 | 344,000 | 10% | 10 | 150 | 72 |
| Parking | 1,869,240 | 112,154 | 10% | 0 | 150 | 19 |
| Park | 403,837 | 0 | 10% | 0 | 0 | 0 |
| **Total Full Buildout Emissions** | | | | | | **1,911** |
| **Partial Buildout[5]** | | | | | | |
| Total Year 4 Emissions[5] | | | | | | 40 |
| Total Year 5 Emissions[5] | | | | | | 635 |
| Total Year 6 Emissions[5] | | | | | | 1,430 |

**Notes:**

1. Consistent with CalEEMod Appendix A, residential building surface area was assumed to be 2.7 times the floor area, and non-residential 2 times the floor area. Also consistent with CalEEMod Appendix E, the parking painted area was assumed to be 6% of the total surface area for surface lots.
2. Consistent with CalEEMod Appendix A, 10% of all surfaces were assumed to be coated each year.
3. Paint VOC content is consistent with or more stringent than BAAQMD Regulation 8 Rule 3 (Architectural Coatings). Emissions were estimated assuming that indoor painting will utilize "super-compliant" VOC architectural coatings that meet the more stringent limits in South Coast Air Quality Management District Rule 1113. For outdoor paint, assumed use of coatings with VOC content of 150 g/L, consistent with BAAQMD requirements. VOC was assumed to be equivalent to ROG for these purposes.
4. Uses CalEEMod Appendix A assumption that 1 gallon of paint covers 180 square feet. Building surface area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod Appendix A. Parking garages are assumed to have no indoor surfaces.
5. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

BAAQMD - Bay Area Air Quality Management District
CalEEMod - California Emissions Estimator Model
EF - emission factor
g - grams
L - liters
lb - pound
sqft - square feet
VOC - volatile organic compound
yr - year

**References:**

BAAQMD. 2009. Regulation 8 Rule 3 Architectural Coatings. Accessed November 2020. Available at: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rg0803_0709.pdf?la=en.

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

South Coast Air Quality Management District. Super Compliant Architectural Coatings per Rule 1113. Accessed July 2021. Available at: http://www.aqmd.gov/home/programs/business/business-detail?title=super-compliant-coatings&parent=other-low-voc-products.

**Table 38V**
**Consumer Product Emissions from Existing Conditions and Project Operations**
**Willow Village**
**Menlo Park, California**

| Land Use | Building Area (sqft) | Consumer Products VOC EF[1,2] (lb/sqft/day) | Days per Year | Consumer Products VOC emissions (lb/yr) |
|---|---|---|---|---|
| **Existing Conditions (2019)** | | | | |
| Office | 251,530 | 1.8E-05 | 365 | 1,670 |
| Commercial | 123,870 | 1.8E-05 | 365 | 822 |
| Industrial - Warehouse | 500,780 | 1.8E-05 | 365 | 3,324 |
| Industrial - Manufacturing | 23,570 | 1.8E-05 | 365 | 156 |
| Recreational | 24,060 | 1.8E-05 | 365 | 160 |
| Light Industrial | 80,100 | 1.8E-05 | 365 | 532 |
| Parking | 920,000 | 3.5E-07 | 365 | 119 |
| **Existing Conditions Emissions** | | | | **6,783** |
| **Full Buildout** | | | | |
| Office | 1,600,000 | 1.8E-05 | 365 | 10,621 |
| Retail | 207,690 | 1.8E-05 | 365 | 1,379 |
| Residential | 1,892,043 | 1.8E-05 | 365 | 12,560 |
| Hotel | 172,000 | 1.8E-05 | 365 | 1,142 |
| Parking | 1,869,240 | 3.5E-07 | 365 | 242 |
| Park | 403,837 | 5.2E-08 | 365 | 7.6 |
| **Total Full Buildout Emissions** | | | | **25,950** |
| **Partial Buildout[3]** | | | | |
| Total Year 4 Emissions[3] | | | | 599 |
| Total Year 5 Emissions[3] | | | | 9,447 |
| Total Year 6 Emissions[3] | | | | 20,130 |

**Notes:**

1. The consumer products VOC EF for office, retail, and residential land uses was derived using methodology consistent with CalEEMod with adjusted parameters for San Mateo County, as described in AQTR Table 37. The default emissions factor assumes 2020 consumer products VOC inventory for San Mateo County. The default building square footage used is from 2010, which was updated to 2020 using population growth of San Mateo County, as shown in AQTR Table 37.
2. Consumer product VOC EFs for parking and open space were taken from CalEEMod 2020.4.0. These defaults take into account pesticide and fertilizer use in city parks and degreaser use in parking areas.
3. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.

**Abbreviations:**

ARB - Air Resources Board
CalEEMod - California Emissions Estimator Model
EF - emission factor
lb - pound
sqft - square feet
VOC - volatile organic compound
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com/

**Table 39V**
**Landscaping Emissions from Existing Conditions and Project Operations**
**Willow Village - Increased Residential Variant Analysis**
**Menlo Park, California**

| Year[2] | Emissions from Landscaping Equipment[1] | | | | |
|---|---|---|---|---|---|
| | ROG | NOx | $PM_{10}$ | $PM_{2.5}$ | $CO_2e$ |
| | (tons/yr) | | | | (MT/yr) |
| Existing Conditions | 2.9E-03 | 2.8E-04 | 1.1E-04 | 1.1E-04 | 0.063 |
| Year 4 | 0.37 | 0.14 | 0.068 | 0.068 | 21 |
| Year 5 | 0.41 | 0.16 | 0.075 | 0.075 | 23 |
| Year 6 | 0.43 | 0.17 | 0.079 | 0.079 | 24 |
| Full Buildout | **0.43** | **0.17** | **0.079** | **0.079** | **24** |

**Notes:**

1. Landscape emissions calculated using CalEEMod 2020.4.0 based on information regarding building square footage and acreage, shown in Appendix D.
2. Emissions in partial years were calculated by scaling full buildout emissions by the maximum percentage of land uses operational during that year.

**Abbreviations:**

CalEEMod - California Emissions Estimator Model
$CO_2e$ - carbon dioxide equivalents
MT - metric ton(s)
$NO_x$ - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

**References:**

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod®), Version 2020.4.0. Available online at http://www.caleemod.com

Table 40V
Summary of Unmitigated Operational CAP Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, California

| Emissions Source | CAP Emissions[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (ton/year) | | | | (lb/day)[2] | | | |
| | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Existing Conditions (2019)[3] | | | | | | | | |
| Architectural Coating | 0.53 | -- | -- | -- | 2.9 | -- | -- | -- |
| Consumer Products | 3.4 | -- | -- | -- | 19 | -- | -- | -- |
| Landscaping | 2.9E-03 | 2.8E-04 | 1.1E-04 | 1.1E-04 | 0.016 | 1.5E-03 | 6.0E-04 | 6.0E-04 |
| Natural Gas Use | 0.16 | 1.5 | 0.11 | 0.11 | 0.89 | 8.1 | 0.61 | 0.61 |
| Mobile | 5.0 | 8.0 | 4.0 | 0.84 | 27 | 44 | 22 | 4.6 |
| Emergency Generators | 2.9E-03 | 0.051 | 2.7E-03 | 2.7E-03 | 0.016 | 0.28 | 0.015 | 0.015 |
| Total Emissions | 9.1 | 10 | 4.1 | 0.95 | 50 | 52 | 23 | 5.2 |
| Full Buildout Conditions[4] | | | | | | | | |
| Architectural Coating | 2.4 | -- | -- | -- | 13 | -- | -- | -- |
| Consumer Products | 13 | -- | -- | -- | 71 | -- | -- | -- |
| Landscaping | 0.43 | 0.17 | 0.079 | 0.079 | 2.4 | 0.90 | 0.44 | 0.44 |
| Natural Gas Use[5] | 0.012 | 0.11 | 8.2E-03 | 8.2E-03 | 0.065 | 0.59 | 0.045 | 0.045 |
| Mobile | 10 | 12 | 11 | 2.2 | 56 | 66 | 60 | 12 |
| Emergency Generators | 0.15 | 1.3 | 0.047 | 0.047 | 0.79 | 7.0 | 0.26 | 0.26 |
| Total Emissions | 26 | 14 | 11 | 2.3 | 144 | 75 | 61 | 13 |
| Partial Buildout Emissions[6] | | | | | | | | |
| Total Year 4 Emissions | 1.3 | 1.1 | 0.54 | 0.17 | 7.2 | 6.0 | 2.9 | 0.94 |
| Total Year 5 Emissions | 11 | 6.7 | 5.2 | 1.1 | 60 | 37 | 28 | 6.0 |
| Total Year 6 Emissions | 21 | 12 | 9.5 | 2.0 | 117 | 63 | 52 | 11 |
| Net Emissions[7] | | | | | | | | |
| Net Year 4 Emissions | -7.8 | -8.4 | -3.6 | -0.78 | -43 | -46 | -20 | -4.3 |
| Net Year 5 Emissions | 1.9 | -2.8 | 1.0 | 0.15 | 11 | -15 | 5.6 | 0.81 |
| Net Year 6 Emissions | 12 | 2.0 | 5.4 | 1.0 | 67 | 11 | 29 | 5.6 |
| Net Full Buildout Emissions | 17 | 4.1 | 7.0 | 1.3 | 94 | 23 | 38 | 7.4 |

Notes:

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0.
2. Operational emissions shown represent activity and emissions across 365 days per year.
3. Operational emissions from existing conditions were calculated using CalEEMod® default data and emission factors based on the existing land use type and energy use rates provided by the Project Applicant.
4. Full buildout operational emissions are based on electricity, natural gas, and water usage rates provided by the Project Applicant alongside CalEEMod® defaults for architectural coating, consumer product, landscaping, and waste emissions. Net emissions were calculated as the difference between full buildout emissions and existing condition emissions.
5. Natural gas usage for the project would be used exclusively for supermarket and commercial cooking.
6. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.
7. Net emissions were calculated as the difference between partial buildout emissions for each year and existing condition emissions.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model
CAP - Criteria Air Pollutant
$CO_2e$ - carbon dioxide equivalent
GHG - greenhouse gas
lb - pounds
MT - metric ton
NOx - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
PM - particulate matter
ROG - reactive organic gases
yr - year

References:

CalEEMod® Version 2020.4.0 Available Online at: http://www.caleemod.com

Table 41V
Summary of Mitigated Operational CAP Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, California

| Emissions Source | CAP Emissions[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (ton/year) | | | | (lb/day)[2] | | | |
| | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Existing Conditions (2019)[3] | | | | | | | | |
| Architectural Coating | 0.53 | -- | -- | -- | 2.9 | -- | -- | -- |
| Consumer Products | 3.4 | -- | -- | -- | 19 | -- | -- | -- |
| Landscaping | 2.9E-03 | 2.8E-04 | 1.1E-04 | 1.1E-04 | 0.016 | 1.5E-03 | 6.0E-04 | 6.0E-04 |
| Natural Gas Use | 0.16 | 1.5 | 0.11 | 0.11 | 0.89 | 8.1 | 0.61 | 0.61 |
| Mobile | 5.0 | 8.0 | 4.0 | 0.84 | 27 | 44 | 22 | 4.6 |
| Emergency Generators | 2.9E-03 | 0.051 | 2.7E-03 | 2.7E-03 | 0.016 | 0.28 | 0.015 | 0.015 |
| Total Emissions | 9.1 | 9.5 | 4.1 | 0.95 | 50 | 52 | 23 | 5.2 |
| Full Buildout Conditions[4] | | | | | | | | |
| Architectural Coating | 0.96 | -- | -- | -- | 5.2 | -- | -- | -- |
| Consumer Products | 13 | -- | -- | -- | 71 | -- | -- | -- |
| Landscaping | 0.43 | 0.17 | 0.079 | 0.079 | 2.4 | 0.90 | 0.44 | 0.44 |
| Natural Gas Use[5] | 0.012 | 0.11 | 8.2E-03 | 8.2E-03 | 0.065 | 0.59 | 0.045 | 0.045 |
| Mobile | 10 | 12 | 11 | 2.2 | 56 | 66 | 60 | 12 |
| Emergency Generators | 0.15 | 1.3 | 0.047 | 0.047 | 0.79 | 7.0 | 0.26 | 0.26 |
| Total Emissions | 25 | 14 | 11 | 2.3 | 136 | 75 | 61 | 13 |
| Partial Buildout Emissions[6] | | | | | | | | |
| Total Year 4 Emissions | 1.3 | 1.1 | 0.54 | 0.17 | 7.1 | 6.0 | 2.9 | 0.94 |
| Total Year 5 Emissions | 10.5 | 6.7 | 5.2 | 1.1 | 58 | 37 | 28 | 6.0 |
| Total Year 6 Emissions | 20 | 11.6 | 9.5 | 2.0 | 111 | 63 | 52 | 11 |
| Net Emissions[7] | | | | | | | | |
| Net Year 4 Emissions | -7.8 | -8.4 | -3.6 | -0.78 | -43 | -46 | -20 | -4.3 |
| Net Year 5 Emissions | 1.5 | -2.8 | 1.0 | 0.15 | 8.0 | -15 | 5.6 | 0.81 |
| Net Year 6 Emissions | 11.1 | 2.0 | 5.4 | 1.0 | 61 | 11.1 | 29 | 5.6 |
| Net Full Buildout Emissions | 16 | 4.1 | 7.0 | 1.3 | 86 | 23 | 38 | 7.4 |

Notes:

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0. The mitigated scenario for the Project is equivalent to the unmitigated scenario for all sources except Architectural Coating, as shown in Table 36.
2. Operational emissions shown represent activity and emissions across 365 days per year.
3. Operational emissions from existing conditions were calculated using CalEEMod® default data and emission factors based on the existing land use type and energy use rates provided by the Project Applicant.
4. Full buildout operational emissions are based on electricity, natural gas, and water usage rates provided by the Project Applicant alongside CalEEMod® defaults for architectural coating, consumer product, landscaping, and waste emissions.
5. Natural gas usage for the project would be used exclusively for supermarket and commercial cooking.
6. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and year, as shown in Table 16.
7. Net emissions were calculated as the difference between partial buildout emissions for each year and existing condition emissions.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model
CAP - Criteria Air Pollutant
$CO_2e$ - carbon dioxide equivalent
GHG - greenhouse gas
lb - pounds
MT - metric ton
NOx - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
PM - particulate matter
ROG - reactive organic gases
yr - year

References:

CalEEMod Version 2020.4.0 Available Online at: http://www.caleemod.com

Table 42V
Summary of Operational GHG Emissions
Willow Village - Increased Residential Variant Analysis
Menlo Park, California

| Emissions Source | GHG Emissions[1] (MT/yr) $CO_2e$ | |
|---|---|---|
| | Existing Conditions (2019)[2] | Full Buildout Conditions[3] |
| Landscaping | 0.063 | 24 |
| Electricity Use | 0 | 0 |
| Natural Gas Use[4] | 1,613 | 118 |
| Water Use | 492 | 231 |
| Waste Disposed | 397 | 745 |
| Emergency Generators | 8.5 | 399 |
| Total Emissions | 2,509 | 1,516 |
| Net Emissions[5] | | -993 |

Notes:

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0.
2. Operational emissions from existing conditions were calculated using CalEEMod® default data and emission factors based on the existing land use type and energy use rates provided by the Project Applicant.
3. Full buildout operational emissions are based on electricity, natural gas, and water usage rates provided by the Project Applicant alongside CalEEMod® defaults for architectural coating, consumer product, landscaping, and waste emissions.
4. Natural gas usage for the project would be used exclusively for supermarket and commercial cooking.
5. Net emissions were calculated as the difference between partial buildout emissions for each year and existing condition emissions.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
$CO_2e$ - carbon dioxide equivalent
GHG - greenhouse gas
MT - metric ton
yr - year

References:

CalEEMod® Version 2020.4.0 Available Online at: http://www.caleemod.com

Table 43V
Unmitigated Construction and Net New Operational CAP Emissions by Year
Willow Village - Increased Residential Variant Analysis
Menlo Park, California

| Year | Average Daily CAP Emissions[1,2] (lb/day) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Construction Emissions Only | | | | Net Operational Emissions[3] | | | | Construction and Net Operational Emissions[3] | | | |
| | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Year 1 | 0.12 | 2.4 | 0.053 | 0.050 | -50 | -52 | -23 | -5.2 | -50 | -50 | -23 | -5.2 |
| Year 2 | 4.5 | 64 | 1.4 | 1.3 | -50 | -52 | -23 | -5.2 | -45 | 11 | -21 | -3.9 |
| Year 3 | 19 | 124 | 5.8 | 5.4 | -50 | -52 | -23 | -5.2 | -31 | 72 | -17 | 0.15 |
| Year 4 | 52 | 53 | 2.3 | 2.1 | -43 | -46 | -20 | -4.3 | 9.5 | 7.2 | -17 | -2.2 |
| Year 5 | 64 | 46 | 2.2 | 2.0 | 11 | -15 | 5.6 | 0.81 | 75 | 30 | 7.8 | 2.8 |
| Year 6 | 43 | 14 | 0.72 | 0.67 | 67 | 11 | 29 | 5.6 | 110 | 25 | 30 | 6.3 |
| Full Buildout | -- | -- | -- | -- | 94 | 23 | 38 | 7.4 | 94 | 23 | 38 | 7.4 |
| BAAQMD Significance Threshold | | | | | | | | | 54 | 54 | 82 | 54 |

Notes:

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0.
2. Net new operational emissions are scaled for partial years of phased operations by the percent that each parcel is operational for each year relative to full buildout, as shown in Table 16.
3. Unmitigated construction emissions can be found in Table 13. Net unmitigated operational emissions were calculated by subtracting the emissions from the existing conditions from the project emissions, as reported in Table 42.

Abbreviations:

CalEEMod - California Emissions Estimator Model
CAP - Criteria Air Pollutant
lb - pounds
$NO_x$ - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

References:

CalEEMod Version 2020.4.0 Available Online at: http://www.caleemod.com

Table 44V
Mitigated Construction and Net New Operational CAP Emissions by Year
Willow Village - Increased Residential Variant Analysis
Menlo Park, California

| Year | Average Daily CAP Emissions[1,2] (lb/day) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Construction Emissions Only[3] | | | | Net Operational Emissions Only[3] | | | | Construction and Net Operational Emissions[3] | | | |
| | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | ROG | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| Year 1 | 0.064 | 1.9 | 0.019 | 0.019 | -50 | -52 | -23 | -5.2 | -50 | -50 | -23 | -5.2 |
| Year 2 | 2.7 | 45 | 0.49 | 0.48 | -50 | -52 | -23 | -5.2 | -47 | -7.6 | -22 | -4.7 |
| Year 3 | 10 | 47 | 0.78 | 0.77 | -50 | -52 | -23 | -5.2 | -40 | -5.1 | -22 | -4.4 |
| Year 4 | 24 | 29 | 0.38 | 0.37 | -43 | -46 | -20 | -4.3 | -19 | -17 | -19 | -3.9 |
| Year 5 | 29 | 22 | 0.27 | 0.26 | 8 | -15 | 5.6 | 0.81 | 37 | 7.0 | 5.8 | 1.1 |
| Year 6 | 19 | 6.5 | 0.084 | 0.080 | 61 | 11.1 | 29 | 5.6 | 80 | 18 | 30 | 5.7 |
| Full Buildout | -- | -- | -- | -- | 86 | 22.6 | 38 | 7.4 | 86 | 23 | 38 | 7.4 |
| BAAQMD Significance Threshold | | | | | | | | | 54 | 54 | 82 | 54 |

Notes:

1. Emissions estimated using methods consistent with CalEEMod® version 2020.4.0.
2. Net new operational emissions are scaled for partial years of phased operations by the percent that each parcel is operational for each year relative to full buildout, as shown in Table 16.
3. Mitigated construction emissions can be found in Table 14. Net mitigated operational emissions were calculated by subtracting the emissions from the existing conditions from the project emissions, as reported in Table 43.

Abbreviations:

CalEEMod - California Emissions Estimator Model
CAP - Criteria Air Pollutant
lb - pounds
$NO_x$ - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - PM less than 2.5 microns in diameter
$PM_{10}$ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

References:

CalEEMod Version 2020.4.0 Available Online at: http://www.caleemod.com

DRAFT

**Table 47V**
**Summary of Full Buildout Traffic Volumes by Roadway Segment**
**Willow Village**
**Menlo Park, CA**

**Offsite Roadways[1]**

| Source Group Name | Distance (m) | Facebook Campus District | | | | | | Project + Variant Town Square and Residential/Shopping District[2] | | Total Project + Variant Volume and VMT[2] | | Total Project Volume and VMT[2] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cars | | On-Demand | | Trucks | | San Mateo Default Fleet | | San Mateo Default Fleet | | San Mateo Default Fleet | |
| | | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) | Volume (vehicles/day) | VMT (mi/day) |
| ADAMS_CT | 223 | 62 | 8.6 | 4.2 | 0.58 | 1.4 | 0.19 | 88 | 12 | 156 | 22 | 155 | 21 |
| ADAMSD01 | 57 | 0 | 0 | 0 | 0 | 0 | 0 | 81 | 2.9 | 81 | 2.9 | 80 | 2.9 |
| ADAMSD02 | 160 | 0 | 0 | 0 | 0 | 0 | 0 | 81 | 8.1 | 81 | 8.1 | 80 | 8.0 |
| ADAMSD03 | 76 | 66 | 3.1 | 4.5 | 0.21 | 1.5 | 0.071 | 7.9 | 0.37 | 80 | 3.8 | 80 | 3.8 |
| ADAMSD04 | 83 | 66 | 3.4 | 4.5 | 0.23 | 1.5 | 0.077 | 7.9 | 0.40 | 80 | 4.1 | 80 | 4.1 |
| ADAMSD05 | 147 | 66 | 6.0 | 4.5 | 0.41 | 1.5 | 0.14 | 7.9 | 0.71 | 80 | 7.3 | 80 | 7.3 |
| ADAMSD06 | 81 | 66 | 3.3 | 4.5 | 0.23 | 1.5 | 0.076 | 7.9 | 0.40 | 80 | 4.1 | 80 | 4.0 |
| BAY_EAST | 1,185 | 657 | 484 | 45 | 33 | 15 | 11 | 1,598 | 1,177 | 2,315 | 1,705 | 2,252 | 1,658 |
| BAY_EFB | 718 | 0 | 0 | 0 | 0 | 0 | 0 | 1,709 | 762 | 1,709 | 762 | 1,566 | 698 |
| BAY_M01 | 110 | 525 | 36 | 36 | 2.4 | 12 | 0.81 | 1,650 | 113 | 2,223 | 152 | 2,130 | 146 |
| BAY_M02 | 135 | 525 | 44 | 36 | 3.0 | 12 | 1.0 | 1,650 | 138 | 2,223 | 186 | 2,130 | 179 |
| BAY_M03 | 117 | 525 | 38 | 36 | 2.6 | 12 | 0.86 | 1,650 | 119 | 2,223 | 161 | 2,130 | 154 |
| BAY_M04 | 143 | 525 | 47 | 36 | 3.2 | 12 | 1.1 | 1,650 | 146 | 2,223 | 197 | 2,130 | 189 |
| BAY_M05 | 350 | 525 | 114 | 36 | 7.8 | 12 | 2.6 | 1,650 | 358 | 2,223 | 483 | 2,130 | 463 |
| BAY_WFB1 | 419 | 0 | 0 | 0 | 0 | 0 | 0 | 1,401 | 365 | 1,401 | 365 | 1,284 | 334 |
| BAY_WFB2 | 210 | 0 | 0 | 0 | 0 | 0 | 0 | 1,401 | 183 | 1,401 | 183 | 1,284 | 168 |
| BAY_WFB3 | 124 | 0 | 0 | 0 | 0 | 0 | 0 | 1,401 | 108 | 1,401 | 108 | 1,284 | 99 |
| BAY_WFB4 | 328 | 0 | 0 | 0 | 0 | 0 | 0 | 1,401 | 286 | 1,401 | 286 | 1,284 | 262 |
| BAY_WFB5 | 113 | 0 | 0 | 0 | 0 | 0 | 0 | 1,709 | 120 | 1,709 | 120 | 1,566 | 110 |
| BAY_WFB6 | 542 | 0 | 0 | 0 | 0 | 0 | 0 | 1,709 | 576 | 1,709 | 576 | 1,566 | 527 |
| BAY_WFB7 | 136 | 0 | 0 | 0 | 0 | 0 | 0 | 1,709 | 144 | 1,709 | 144 | 1,566 | 132 |
| OBRIEN01 | 320 | 1,480 | 294 | 101 | 20 | 34 | 6.7 | 1,032 | 205 | 2,646 | 526 | 2,605 | 518 |
| OBRIEN02 | 138 | 1,480 | 127 | 101 | 8.7 | 34 | 2.9 | 1,032 | 89 | 2,646 | 227 | 2,605 | 224 |
| OBRIEN03 | 35 | 1,480 | 33 | 101 | 2.2 | 34 | 0.74 | 1,032 | 23 | 2,646 | 58 | 2,605 | 57 |
| OBRIEN04 | 29 | 1,480 | 27 | 101 | 1.8 | 34 | 0.61 | 1,032 | 19 | 2,646 | 48 | 2,605 | 47 |
| OBRIEN05 | 28 | 1,480 | 26 | 101 | 1.8 | 34 | 0.59 | 1,032 | 18 | 2,646 | 46 | 2,605 | 46 |
| OBRIEN06 | 52 | 1,480 | 48 | 101 | 3.3 | 34 | 1.1 | 1,032 | 33 | 2,646 | 85 | 2,605 | 84 |
| OBRIEN07 | 43 | 3,842 | 103 | 262 | 7.0 | 87 | 2.3 | 2,568 | 69 | 6,759 | 181 | 6,589 | 176 |
| OBRIEN08 | 20 | 3,842 | 49 | 262 | 3.3 | 87 | 1.1 | 2,568 | 32 | 6,759 | 85 | 6,589 | 83 |
| OBRIEN09 | 20 | 3,842 | 47 | 262 | 3.2 | 87 | 1.1 | 2,568 | 32 | 6,759 | 83 | 6,589 | 81 |
| OBRIEN10 | 21 | 3,842 | 50 | 262 | 3.4 | 87 | 1.1 | 2,568 | 33 | 6,759 | 87 | 6,589 | 85 |
| OBRIEN11 | 44 | 3,842 | 105 | 262 | 7.2 | 87 | 2.4 | 2,568 | 70 | 6,759 | 185 | 6,589 | 180 |
| OBRIEN12 | 102 | 3,842 | 243 | 262 | 17 | 87 | 5.5 | 2,568 | 162 | 6,759 | 427 | 6,589 | 416 |
| OBRIEN13 | 32 | 3,842 | 76 | 262 | 5.2 | 87 | 1.7 | 2,568 | 51 | 6,759 | 133 | 6,589 | 130 |
| OBRIEN14 | 112 | 3,842 | 268 | 262 | 18 | 87 | 6.1 | 2,568 | 179 | 6,759 | 471 | 6,589 | 459 |
| OBRIEN15 | 242 | 3,870 | 581 | 263 | 40 | 88 | 13 | 2,494 | 374 | 6,715 | 1,008 | 6,546 | 983 |
| OBRIEN16 | 48 | 3,870 | 115 | 263 | 7.8 | 88 | 2.6 | 2,494 | 74 | 6,715 | 200 | 6,546 | 195 |
| OBRIEN17 | 54 | 3,870 | 130 | 263 | 8.8 | 88 | 2.9 | 2,494 | 84 | 6,715 | 225 | 6,546 | 219 |
| UNIV_01 | 110 | 339 | 23 | 23 | 1.6 | 7.7 | 0.53 | 355 | 24 | 725 | 50 | 679 | 46 |
| UNIV_02 | 91 | 339 | 19 | 23 | 1.3 | 7.7 | 0.43 | 355 | 20 | 725 | 41 | 679 | 38 |
| UNIV_03 | 222 | 339 | 47 | 23 | 3.2 | 7.7 | 1.1 | 355 | 49 | 725 | 100 | 679 | 94 |
| UNIV_04 | 121 | 339 | 26 | 23 | 1.7 | 7.7 | 0.58 | 355 | 27 | 725 | 55 | 679 | 51 |
| UNIV_05 | 80 | 339 | 17 | 23 | 1.2 | 7.7 | 0.38 | 355 | 18 | 725 | 36 | 679 | 34 |
| UNIV_06 | 69 | 339 | 15 | 23 | 1.0 | 7.7 | 0.33 | 355 | 15 | 725 | 31 | 679 | 29 |
| UNIV_07 | 258 | 339 | 54 | 23 | 3.7 | 7.7 | 1.2 | 355 | 57 | 725 | 116 | 679 | 109 |
| UNIV_08 | 185 | 410 | 47 | 28 | 3.2 | 9.3 | 1.1 | 560 | 64 | 1,007 | 116 | 963 | 110 |
| UNIV_09 | 142 | 3,255 | 287 | 222 | 20 | 74 | 6.5 | 1,826 | 161 | 5,377 | 473 | 5,258 | 463 |
| UNIV_10 | 310 | 3,243 | 624 | 221 | 42 | 74 | 14 | 1,845 | 355 | 5,382 | 1,036 | 5,275 | 1,015 |
| UNIV_11 | 115 | 3,243 | 232 | 221 | 16 | 74 | 5.3 | 1,845 | 132 | 5,382 | 384 | 5,275 | 377 |
| UNIV_12 | 63 | 3,243 | 128 | 221 | 8.7 | 74 | 2.9 | 1,845 | 73 | 5,382 | 212 | 5,275 | 208 |
| UNIV_13 | 128 | 3,243 | 258 | 221 | 18 | 74 | 5.8 | 1,845 | 147 | 5,382 | 427 | 5,275 | 419 |
| UNIV_14 | 201 | 3,243 | 405 | 221 | 28 | 74 | 9.2 | 1,845 | 230 | 5,382 | 672 | 5,275 | 659 |
| UNIV_15 | 647 | 3,243 | 1,304 | 221 | 89 | 74 | 30 | 1,845 | 742 | 5,382 | 2,164 | 5,275 | 2,121 |
| WILLOW01 | 97 | 89 | 5.3 | 6.0 | 0.36 | 2.0 | 0.12 | 3,143 | 189 | 3,240 | 194 | 3,073 | 184 |
| WILLOW02 | 174 | 89 | 10 | 6.0 | 0.65 | 2.0 | 0.22 | 3,143 | 339 | 3,240 | 350 | 3,073 | 332 |
| WILLOW03 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WILLOW04 | 185 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WILLOW05 | 201 | 0 | 0 | 0 | 0 | 0 | 0 | 6,780 | 848 | 6,780 | 848 | 6,362 | 796 |
| WILLOW06 | 110 | 0 | 0 | 0 | 0 | 0 | 0 | 6,780 | 465 | 6,780 | 465 | 6,362 | 436 |
| WILLOW07 | 281 | 580 | 101 | 39 | 6.9 | 13 | 2.3 | 7,304 | 1,276 | 7,937 | 1,387 | 7,508 | 1,312 |
| WILLOW08 | 93 | 580 | 33 | 39 | 2.3 | 13 | 0.76 | 7,304 | 422 | 7,937 | 459 | 7,508 | 434 |
| WILLOW09 | 39 | 580 | 14 | 39 | 0.95 | 13 | 0.32 | 7,304 | 176 | 7,937 | 191 | 7,508 | 181 |
| WILLOW10 | 31 | 580 | 11 | 39 | 0.76 | 13 | 0.25 | 7,304 | 141 | 7,937 | 153 | 7,508 | 145 |
| WILLOW11 | 180 | 580 | 65 | 39 | 4.4 | 13 | 1.5 | 7,304 | 818 | 7,937 | 889 | 7,508 | 841 |
| WILLOW12 | 256 | 580 | 92 | 39 | 6.3 | 13 | 2.1 | 7,304 | 1,162 | 7,937 | 1,262 | 7,508 | 1,194 |
| WILLOW13 | 216 | 580 | 78 | 39 | 5.3 | 13 | 1.8 | 7,304 | 980 | 7,937 | 1,065 | 7,508 | 1,007 |

**Onsite Roadways[3]**

| Source Group Name | Distance (m) | Volume (vehicles/day) | VMT (mi/day) |
|---|---|---|---|
| ONSITE - Project | 2570 | 10,782 | 17,217 |
| ONSITE - Project + Variant | 2570 | 11,219 | 17,915 |

**Intercampus Shuttles[4]**

| Source Group Name | Distance (m) | Volume (vehicles/day) | VMT (mi/day) |
|---|---|---|---|
| SHUTTLES | 7278 | 361 | 1,633 |

**Notes:**

1. Net new offsite traffic volumes for both the Campus District and the Town Square were provided by Hexagon in the data request received in February 2022. Offsite traffic for the Campus District was modeled using a percent breakdown of the fleet (88% cars, 6% on-demand, 2% trucks), provided by Hexagon. Offsite traffic for the Town Square and Residential/Shopping District was modeled as the default San Mateo fleet. A summary of fleet mix categories can be found in AQTR Table 19. Modeled offsite roadway segments can be found in AQTR Figure 8.

2. The increased residential variant increases the traffic for the Town Square and Residential/Shopping District. Total traffic volumes and VMT are calculated by summing the Facebook Campus District fleets with the Town Square and Residential/Shopping District fleet. The total Project volume and VMT without contributions from the variant are shown for comparison purposes.

3. Net new onsite traffic volumes were provided by Hexagon in the data request received in February 2022 which include the increased traffic volumes due to the residential variant. Onsite traffic volumes were taken as the sum of all net new onsite traffic volumes divided by two to account for round trips. Onsite traffic was modeled exclusively as the cars fleet type. A summary of the cars fleet mix can be found in Table 19. Modeled onsite roadway segments can be found in AQTR Figure 7.

4. Shuttle traffic volumes, which account for the remaining 4% of the offsite fleet mix, were conservatively modeled as the sum of all inbound and outbound vehicle trips across all regions and routes, divided by two to account for round trips. Inbound and outbound vehicle trips were provided by the Project Applicant in June 2021. A summary of the shuttles fleet mix can be found in AQTR Table 19. Modeled shuttle roadway segments can be found in AQTR Figure 9.

**Abbreviations:**
VMT - Vehicle Miles Traveled m - meter mi - mile

RAMBOLL

Table 59V
Project Cancer Risk at Off-Site and On-Site MEIR
Willow Village - Increased Residential Variant Analysis
Menlo Park, California

| Source Category | Lifetime Excess Cancer Risk[1] (in a million) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| Project Contribution | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] | On-Site MEIR[3,5] | Off-Site MEIR[4,5] |
| | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 4 |
| Construction | 172 | 57 | 8.06 | 7.6 | -- | -- |
| Operational Generators | 1.6 | 0.65 | 1.40 | 0.65 | 1.4 | 0.55 |
| Operational Traffic | 1.2 | 0.93 | 1.16 | 0.93 | 2.0 | 3.0 |
| Total Project Contribution | 175 | 58 | 10.6 | 9.2 | 3.4 | 3.6 |

Notes:

1. Excess lifetime cancer risk from construction and operations are combined since cancer risk is evaluated over a 30-year lifetime. Thus, the risk takes into account exposure to Project emissions beginning during construction and continuing through operations. Off-site receptors are exposed to all Project construction and subsequent Project operations. On-site receptors are exposed to overlapping construction emissions and subsequent Project operations.

   The cancer risks were estimated using the following equation:

   Riskinh = Ci x CF x IFinh x CPFi x ASF
   Where:
   Riskinh = Cancer Risk for the Inhalation Pathway (unitless)
   Ci = Annual Average Air Concentration for Chemical "i" (µg/m3)
   CF = Conversion Factor (mg/µg)
   IFinh = Intake Factor for Inhalation (m3/kg-day)
   CPFi = Cancer Potency Factor for Chemical "i" (mg/kg-day)-1

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.

3. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project.

4. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum total cancer risk attributed to the emissions associated with the Project.

5. On-site and off-site MEIR locations are documented below:

Table 59V
Project Cancer Risk at Off-Site and On-Site MEIR
Willow Village - Increased Residential Variant Analysis
Menlo Park, California

| MEIR by Scenario | MEIR Location[6] | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 2 | Scenario 3 | Scenario 4 |
| UTMx (m) | 575,225 | 575,500 | 575,245 | 575,500 | 575,275 | 574,840 |
| UTMy (m) | 4,148,065 | 4,147,960 | 4,148,135 | 4,147,960 | 4,148,145 | 4,147,800 |
| Receptor Height (m) | 4.8 | 1.8 | 4.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | Residential | Residential | Residential | Residential | Residential |

6. Three exposure scenarios were modeled. Scenario 1 evaluates off-site receptors and begins at the start of construction. Scenario 2 evaluates off-site receptors and begins at the start of Area 2 Grading and Utilities construction. Scenario 3 evaluates on-site receptors and begins at the conclusion of Town Center and Residential/Shopping District construction when Area 1 residents move in.

Abbreviations:

kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
mg - miligram
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate
ug - microgram

References:

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

Table 60V
Project Chronic Hazard Index at Off-Site and On-Site MEIR
Willow Village - Increased Residential Variant Analysis
Menlo Park, California

| Source Category | Lifetime Excess Chronic Hazard Index[1] (unitless) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| Project Contribution | On-Site MEIR[4,6] | Off-Site MEIR[5,6] | On-Site MEIR[4,6] | Off-Site MEIR[5,6] | On-Site MEIR[4,6] | Off-Site MEIR[5,6] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| Construction | 0.23 | 0.11 | 9.1E-03 | 0.011 | -- | -- |
| Operational Generators | 4.0E-04 | 6.6E-04 | 4.0E-04 | 2.1E-04 | 3.3E-04 | 3.0E-03 |
| Operational Traffic[3] | 2.1E-03 | 1.4E-03 | 2.1E-03 | 3.3E-03 | 6.0E-03 | 1.3E-03 |
| Total Project Contribution | 0.23 | 0.11 | 0.012 | 0.014 | 6.3E-03 | 4.3E-03 |

Notes:

1. The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) from construction and operations to the non-cancer chronic REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient or HQ. To evaluate the potential for adverse chronic non-cancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index or HI.

   The chronic HI for each receptor was estimated using the following equation:

   HIinh =Ci / cREL
   Where:
   HIinh = Chronic HI for the Inhalation Pathway (unitless)
   Ci = Annual Average Air Concentration for Chemical "i" (µg/m3)
   cREL = Chronic Reference Exposure Level (µg/m3)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.

3. The operational traffic analysis reflects impacts from the Project. If traffic risks are conservatively scaled by the maximum change in vehicle miles traveled due to the Residential Increase Variant, chronic risks remain significantly below threshold.

4. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.

5. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.

6. On-site and off-site MEIR locations are documented below:

Table 60V
Project Chronic Hazard Index at Off-Site and On-Site MEIR
Willow Village - Increased Residential Variant Analysis
Menlo Park, California

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,235 | 575,400 | 575,385 | 574,980 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,065 | 4,148,040 | 4,148,085 | 4,148,040 |
| Receptor Height (m) | 4.8 | 1.8 | 4.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Elementary School | Recreational | High School |
| Year | Year 5 | Year 4 | Year 5 | Year 3 | Year l | Year l |

Abbreviations:

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

References:

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at:

Table 61V
Project $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR
Willow Village - Increased Residential Variant Analysis
Menlo Park, California

| Source Category | Excess $PM_{2.5}$ Concentration[1] (µg/m3) | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | Unmitigated[2] | | Mitigated[2] | | | |
| Project Contribution | On-Site MEIR[4,6] | Off-Site MEIR[5,6] | On-Site MEIR[4,6] | Off-Site MEIR[5,6] | On-Site MEIR[4,6] | Off-Site MEIR[5,6] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| Construction | 1.1 | 0.52 | 0.040 | 0.063 | -- | -- |
| Operational Generators | 2.0E-03 | 3.3E-03 | 1.7E-03 | 1.3E-03 | 1.6E-03 | 1.3E-03 |
| Operational Traffic | 0.040 | 0.030 | 0.092 | 0.12 | 0.11 | 0.12 |
| Total Project Contribution | 1.1 | 0.56 | 0.13 | 0.18 | 0.11 | 0.12 |

Notes:

1. PM2.5 concentrations at off-site receptors include contributions from multiple phases of Project construction and subsequent Project operations. PM2.5 concentrations at on-site receptors include contributions from overlapping construction emissions and subsequent Project operations.

   The PM2.5 concentration at each receptor was estimated using the following equation:

   Ci =E x Di
   Where:
   C = Concentration of PM2.5 at receptor "i" (µg/m3)
   Di = Dispersion factor associated with unit emissions at receptor "i" (µg/m3)/(g/s)
   E = Emission Rate (g/s)

2. The Unmitigated Project reflects default construction off-road equipment fleet. The Mitigated Project reflects use of 95 percent Tier 4 construction off-road equipment before residents move on-site and 98 percent Tier 4 construction off-road equipment after residents move on-site. The other 5 percent and 2 percent (before and after on-site residents, respectively) are assumed to have Tier 2 engines. Unmitigated emissions are estimated to be much larger than mitigated emissions as a result of two assumptions made during the calculations: 1) the emission factor for Tractors/Loaders/Backhoes with low HP ratings is significantly higher than that of subsequently higher HP ranges and many construction equipment fall under this classification; and 2) many pieces of construction equipment such as Bobcats were conservatively classified as Tractors/Loaders/Backhoes rather than other equipment types with lower emission factors.

3. The operational traffic analysis reflects excess $PM_{2.5}$ concentration from the Project. If traffic concentrations are conservatively scaled by the maximum change in vehicle miles traveled due to the Residential Increase Variant, $PM_{2.5}$ concentrations remain significantly below threshold.

4. On-site Project MEIR was identified as the on-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.

5. Off-site Project MEIR was identified as the off-site sensitive receptor location with the maximum chronic HI attributed to the emissions associated with the Project.

6. On-site and off-site MEIR locations are documented below:

Table 61V
Project $PM_{2.5}$ Concentration at Off-Site and On-Site MEIR
Willow Village - Increased Residential Variant Analysis
Menlo Park, California

| MEIR by Scenario | MEIR Location | | | | | |
|---|---|---|---|---|---|---|
| | Construction + Operations | | | | Operations Only | |
| | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] | On-Site MEIR[3] | Off-Site MEIR[4] |
| | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 | Scenario 3 | Scenario 1 |
| UTMx (m) | 575,235 | 575,160 | 575,265 | 575,420 | 575,385 | 575,420 |
| UTMy (m) | 4,148,065 | 4,148,040 | 4,148,115 | 4,147,980 | 4,148,085 | 4,147,980 |
| Receptor Height (m) | 4.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| Receptor Type | Residential | High School | Residential | Daycare Child (18 months +) | Recreational | Daycare Child (18 months +) |

Abbreviations:

µg - microgram
kg - kilogram
m - meter
MEIR - maximally exposed individual receptor
TRU - Transportation Refrigeration Unit
UTMx - Universal Transverse Mercator x-coordinate
UTMy - Universal Transverse Mercator y-coordinate

References:

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf