CITY OF MENLO PARK

JUNE 2019

GREEN INFRASTRUCTURE PLAN

Acknowledgements

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Table of Contents

Definitions

Bay-Friendly Landscaping	A holistic approach to landscaping that works in harmony with the natural conditions of the San Francisco Bay Watershed. Bay-Friendly practices foster soil health, improve water quality, and conserve water and other valuable resources while reducing waste and preventing pollution.
Bioretention	The process of reducing peak runoff rates and providing stormwater treatment by directing stormwater runoff into a depressed landscaped area. Bioretention facilities containing plants and specified soil media to retain runoff that would otherwise flow quickly into storm drains.
Green Infrastructure (GI)	Stormwater treatment devices that utilize vegetation, soils, and natural processes to retain and manage runoff via infiltration or bio-treatment.
Green Streets	Public ROW projects which integrate Green Infrastructure (GI) as part of the proposed roadway to address traffic safety and/or stormwater treatment.
Hydromodification	Changes in the natural watershed caused by urbanization or other land use changes that result increased stream flows and sediment.
Municipal Regional Stormwater Permit (MRP)	The National Pollutant Discharge Elimination System (NPDES) permit for managing municipal stormwater discharges in the Bay Area, under which the City of Menlo Park is a permittee. Provision C.3 of the MRP contains requirements for stormwater treatment via GI.
C.3	Provision of the MRP that requires municipalities to control stormwater pollutant discharge (via GI) for projects exceeding certain thresholds (Regulated Projects). Provision C.3 also requires municipalities to develop Green Infrastructure Plans, thereby expanding the applicability of the provision to public projects.
C.3.d. Amount	Criteria within Provision C.3 for sizing GI with the intent to capture and treat 80% of the contributing annual runoff. Refer to Chapter 3 of this Plan for more information.
Regulated Projects	With a few noted exemptions for public ROW per the MRP, these are typically private development projects mandated for stormwater treatment as defined below: • Projects that impacting 10,000 sf or more of impervious surface • Restaurants, retail gasoline outlets, auto service facilities, and uncovered parking lots that create and/or replace 5,000 sf of impervious surface.
Stormwater Treatment Measure	Engineered systems designed to remove pollutants through physical, biological, or chemical processes (including filtration, settling, and absorption). Stormwater treatment measures are sometimes called treatment control, treatment control measures, or treatment control BMPs.

Acronyms

ABAG	Association of Bay Area Governments
BASMAA	Bay Area Stormwater Management Agencies Association
Caltrans	California Department of Transportation
CASQA	California Stormwater Quality Association
C/CAG	City/County Association of Governments
CIP	Capital Improvement Program
DMA	Drainage Management Area
EPA	Environmental Protection Agency
FY	Fiscal Year
GI	Green Infrastructure
GIS	Geographic Information System
LID	Low Impact Development
MRP	Municipal Regional Stormwater NPDES Permit
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
PDA	Priority Development Area
PCBs	Polychlorinated Biphenyls
RAA	Reasonable Assurance Analysis
ROW	Right-of-Way
RWQCB	San Francisco Bay Regional Water Quality Control Board
SMCWPPP	San Mateo Countywide Water Pollution Prevention Program
SRP	Stormwater Resource Plan
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load

List of Figures

List of Tables

List of Appendices

Executive Summary

As cities grow, natural landscapes are replaced with impervious surfaces and storm drain systems. These features increase the rate of runoff and pollutants to local waterbodies, such as the San Francisco Bay, and harm our eco-system.

To address this concern the Municipal Regional Stormwater Permit (MRP) has mandated Bay Area governments to gradually shift traditional storm drain networks to green infrastructure systems. Green Infrastructure (GI) utilizes plants and soils to mimic natural watershed processes and advance a host of benefits including stormwater treatment, flood attenuation, and groundwater recharge. Implementing GI reduces runoff and pollutants flowing to downstream waterbodies while synergizing with related environmental, transportation, and capital improvement initiatives.

This Plan is catered to Menlo Park's prioritization, implementation, and tracking of green infrastructure projects by assessing **"no missed opportunities"** for GI across City development proposals and policies. Consequently, the following chapters will detail Menlo Park's GI strategy with respect to these parameters.

A critical component of this study describes how GI opportunities are prioritized to address pollutant reduction metrics set by the MRP. This is a collaborative process which aligns various County-wide studies to meet the idiosyncrasies of the City and maximize a project's cost-benefit efficiency.

The Plan also serves as a technical guidance for advancing green infrastructure projects from inception through post-construction by referencing standard details, specifications, maintenance procedures, and tracking tools. These design templates will be instrumental in aiding current and future GI project endeavors.

Lastly, the Plan outlines existing and potential legal mechanisms for implementing green infrastructure projects. This includes a comprehensive evaluation of related City plans and policies for integration with GI. Additionally, the Plan assessed current and proposed funding resources in an effort to bolster avenues for project subsidies.

To date, the City has constructed GI facilities along Chilco Street and Independence Drive and will use this Plan as a resource for sustainable development moving forward. In this fashion Menlo Park can continue to be in the vanguard for an environmentally conscious and sustainable horizon.

1.0 Introduction

Natural landscapes are replaced with impervious surfaces and storm drain systems as cities grow. These features increase the amount of stormwater runoff and pollutants that flow into downstream waterbodies, such as the San Francisco Bay, and carry a large environmental impact to our local eco-system. Green infrastructure (GI) mitigates these impacts by using plants and soils to mimic natural watershed processes, capture stormwater, increase infiltration, and create healthier environments. Consequently, Bay Area cities and counties are required by state and regional regulatory agencies to gradually shift from traditional (gray) stormwater conveyance systems to GI systems over time.

This GI Plan serves as an implementation guide for the City of Menlo Park (City) to incorporate GI projects across all development in an effort to promote sustainability and outreach. The contents of the GI Plan are structured as follows:

Chapter 1
Provides the introduction and historical background to green infrastructure. Additionally, this chapter outlines an overview of the regulatory and technical components of the GI Plan from its inception to full development.

Chapter 2
Describes the relationship of the GI Plan to other planning documents and provides recommendations and updates where applicable. Additionally, this chapter outlines a work plan and schedule associated with the updates for future reference.

Chapter 3
Outlines guidelines being developed by the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) and the City to provide typical details, specifications and standards in the design, construction, and operation and maintenance of GI facilities.

Chapter 4
Presents the methodology and results for identifying and prioritizing areas for potential GI projects.

Chapter 5
Outlines the City's strategy for prioritizing GI opportunities within the next ten years and through 2040. This chapter describes the methodology for estimating the amounts of impervious surface to be "retrofitted" as part of public and private projects by 2020, 2030, and 2040.

Chapter 6
Discusses the variety of mechanisms to be employed by the City in order to implement the GI Plan, including future planning, tracking, and funding.

1.1 Background

1.1.1 City Description

Menlo Park, incorporated in 1874, is located on the San Francisco Peninsula, in southeastern San Mateo County, between San Francisco and San Jose. It is approximately 17 square miles in area and spans a wide array of land use designations. Its topography spans from Bayfront tidelands and marshes on its northeast to the flanks of the Pacific Coast Range on its southwest. Much of the City's southern boundary is formed by San Francisquito Creek which drains to the San Francisco Bay. Menlo Park is

bounded on the north by the Town of Atherton, Redwood City, and the unincorporated area of North Fair Oaks. Atherton Channel runs along the boundary between Redwood City and Menlo Park and joins the Bayfront Canal a few hundred feet west of Marsh Road. The City's neighbors to the south are the cities of Palo Alto and East Palo Alto[1]. San Francisco Bay and adjacent wetlands comprise about 12 square miles or two-thirds of Menlo Park's total area.[2]

Menlo Park is comprised of residential neighborhoods, a lively downtown served by a Caltrain station, and industrial and technology areas near the Bayfront. It is traversed by several major thoroughfares including Highway 101, El Camino Real and Alameda de las Pulgas. Caltrain tracks also span central Menlo Park, bringing residents and visitors to the downtown area, but creating a barrier to north-south travel across the city.

Menlo Park's many residential neighborhoods are distinguished by a wide array of characteristics including architectural styles, streetscapes, topography, lot sizes, and landscaping amongst others. More than half of the developable land in Menlo Park is residential, of which, over three quarters is classified as single-family homes.[3] The Belle Haven neighborhood, one of the City's densest, is the only residential neighborhood east of the Highway.[4]

The latest and ongoing economic expansion of Silicon Valley has brought new growth and real estate demand to Menlo Park. The bayside campus that once hosted Sun Microsystems is now the international headquarters of Facebook, one of the world's leading tech firms, which continues to grow and build additional office facilities.[5] A number of large employers in Menlo Park are generally concentrated in several clusters: the M2 area fronting the Bay, the Veterans Administration Medical Center, central/downtown Menlo Park, and the venture capital corridor along Sand Hill Road.[6]

Just under 10% of the City's land use is allocated to Parks and Recreation. The City has fairly well distributed parks and recreation facilities. Menlo Park's many natural features include the Bedwell Bayfront Park and Don Edwards National Wildlife Refuge. There are a total of 17 parks and open spaces which cover 222 acres.[7]

[1] City of Menlo Park Parks and Recreation Facilities Master Plan Update (February 2019)
[2] City of Menlo Park General Plan (November 29, 2016)
[3] Ibid.
[4] City of Menlo Park Parks and Recreation Facilities Master Plan Update (February 2019)
[5] City of Menlo Park General Plan (November 29, 2016)
[6] Ibid.
[7] Ibid.

1.1.2 GI Regulatory Context

Federal and State Regulations and Initiatives

The U.S. Environmental Protection Agency (EPA) has authority under the Clean Water Act to promulgate and enforce stormwater related regulations. For the State of California, the EPA has delegated this authority to the State Water Resources and Regional Quality Control Boards.

Consequently, the San Francisco Bay Regional Water Board issues a Municipal Regional Stormwater Permit (MRP) to regulate and promote cleaner runoff in the San Francisco Bay Region. This MRP allows stormwater to discharge from municipal separate storm sewer systems (MS4s) to local water bodies so far as they meet defined water quality standards.

Since the early 2000's, the EPA has recognized the benefits of using GI in protecting drinking water supplies while promoting public health and reducing stormwater pollution. Furthermore, it has encouraged the use of GI by municipal agencies as a prominent component of their MS4 programs.

The State and Regional Water Boards have followed suit in recognizing both the water quality benefits of GI and its opportunity to augment local water supplies in response to drought and climate change. This is reflected in directives such as the 2014 California Water Action Plan and the State Water Board's "Strategy to Optimize Resource Management of Stormwater".

These Federal and State initiatives have influenced approaches in the Bay Area MRP, relative to the GI Plan, as described in the following sections.

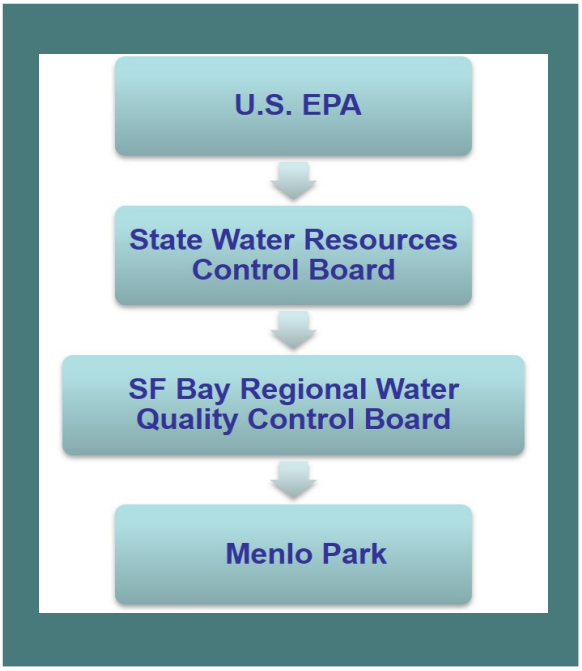


Figure 1-1: Stormwater regulatory hierarchy

MRP – GI Plan Requirement

The MRP applies to 76 municipalities and flood control agencies, collectively known as permittees, which discharge stormwater to the San Francisco Bay. Since 2005, permits such as Provision C.3 of the MRP, require development projects exceeding certain size thresholds ("regulated projects") to mitigate impacts on water quality by incorporating "Low Impact Development" (LID).

These LID measures have since included provisions for green infrastructure facilities in addition to measures such as pollutant source control, flow control, and rainwater harvesting and use as appropriate.

In 2016, the MRP was updated to include Provision C.3.j (Order R2-2015-0049) which requires the City to develop a GI Plan to promote green infrastructure and ensure "no missed opportunities" beyond regulated projects. The GI Plan presents a gradual paradigm shift from traditional stormwater infrastructure to a sustainable alternative that integrates with related City

transportation, environmental, and Capital Improvement Program (CIP) initiatives. This Plan was required to be completed and submitted to the Regional Water Board by September 30, 2019.

While the MRP defines GI systems on both private and public property, the focus of the GI Plan is on public parcels and rights-of-way. The GI Plan may also establish opportunities to include GI facilities in conjunction with private development as negotiated with a project's frontage improvement. In this fashion, opportunities to implement GI's water quality benefits can be maximized at all levels.

The GI Plan elements required by Provision C.3.j.i.ii of the MRP relative to this document are summarized in Table 1-1.

MRP – Pollutant Load Reduction Requirement

In addition to mandating the GI Plan, The 2016 MRP also establishes pollutant reduction metrics to be addressed through GI by 2020, 2030 and 2040. Consequently, San Mateo County (County) conducted a Reasonable Assurance Analysis (RAA) to evaluate pollutant load reduction targets with respect to a projects cost-benefit ratio.

Furthermore, permittees in the County must document all planned and implemented GI projects to show progress towards this goal. As such permittees will include estimated targets for the amounts of impervious surface to be retrofitted through public and private GI facilities relative to the benchmark years as part of a Countywide tracking program.

The City began to spearhead this effort by evaluating CIP projects for GI opportunities since January 2016. A detailed analysis of the pollutant reduction requirement described herein is furnished in Chapters 4, 5, and 6 of this Plan.

Table 1-1 Summary of GI Plan Elements required by Provision C.3.j.i of the MRP

MRP Provision	GI Plan Elements	GI Plan Section
C.3.j.i.(2)(a)	Project Identification and Prioritization Mechanism	Chapter 4
C.3.j.i.(2)(b)	Prioritized Project Locations	Section 4.4.3
C.3.j.i.(2)(c)	Impervious Surface Targets	Section 5.7
C.3.j.i.(2)(d)	Completed Project Tracking System	Section 6.4
C.3.j.i.(2)(e,f)	Guidelines and Specifications	Chapter 3
C.3.j.i.(2)(g)	Alternative Sizing Requirements for Green Street Projects	Section 3.2.2
C.3.j.i.(2)(h,i)	Integration with Other Municipal Plans	Chapter 2
C.3.j.i.(2)(j)	Workplan to Complete Prioritized Projects	Section 6.1
C.3.j.i.(2)(k)	Evaluation of Funding Options	Section 6.2.2
C.3.j.i.(3)	Legal and Implementation Mechanisms	Section 6.2.1

1.2 Purpose and Goals of the Plan

The purpose of this GI Plan is to demonstrate the City's commitment to gradually transform its traditional "gray" storm drainage infrastructure to include green stormwater infrastructure. The GI Plan will guide the identification, prioritization, implementation, tracking, and reporting of green stormwater infrastructure projects within the City. The GI Plan will be coordinated with other City plans, to maximize synergies with related initiatives and achieve multiple potential benefits to the community. Such benefits may include: improved water and air quality, flood mitigation, increased water supply, traffic calming, safer pedestrian and bicycle facilities, climate resiliency, improved wildlife habitat, and a more pleasant urban environment.

Specific goals of the GI Plan are to:

- Align the City's goals, policies and implementation strategies for GI with the General Plan and other related planning documents;
- Identify and prioritize GI opportunities throughout the City;
- Establish targets for the extent of City area to be addressed by GI over certain timeframes;
- Provide a workplan and legal and funding mechanisms to implement prioritized projects; and
- Establish a process for tracking, mapping, and reporting completed projects.

1.3 What is Green Infrastructure?

1.3.1 Why is it Needed?

In natural landscapes, most of the rainwater soaks into the soil or is taken up by plants and trees. However, in urban areas, building footprints and paved surfaces such as driveways, sidewalks, and streets, prevent rain from soaking into the ground. As rainwater flows over these impervious surfaces, this stormwater "runoff" picks up pollutants such as motor oil, metals, sediment, pesticides, pet waste, and litter. It then carries these pollutants into the City's storm drains, which ultimately flow to local creeks and the San Francisco Bay untreated. Stormwater runoff is therefore a major contributor to water pollution in urban areas, which endangers the local eco-system while constituting a threat to public safety.

Additionally, as urban areas develop, increased impervious surface results in higher peak flows of runoff from rain events. Traditional "gray" stormwater infrastructure, like most of the City's existing storm drain system, is designed to convey stormwater flows quickly away from urban areas which exacerbates erosion, flooding, and habitat degradation to downstream discharge points such as the Bay.

1.3.2 How it Works

GI is a prominent solution for mitigating development impacts on stormwater. GI uses vegetation, soils, and other elements and practices to capture, treat, infiltrate and slow urban runoff, thereby restoring some of the natural processes required to manage water and create healthier urban environments. GI facilities can also be designed to capture stormwater for uses such as irrigation and toilet flushing.

GI integrates building and roadway design, complete streets, drainage infrastructure, urban forestry, soil conservation and sustainable landscaping practices to achieve multiple benefits. At the city or county scale, GI is a patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the neighborhood or site scale, GI comprises

stormwater management systems that mimic nature and retain stormwater.[8]

1.3.3 Benefits of Green Infrastructure

GI can provide multiple benefits beyond just managing rainfall and runoff. These benefits include environmental, economic, and social improvements. Additionally, GI can be an important way to increase a community's resilience to climate change.

For example, GI measures can mitigate localized flooding and reduce erosive flows of pollutants being discharged to local creeks and the San Francisco Bay. Vegetated GI systems can beautify public places and help improve air quality by filtering airborne contaminants from vehicle and industrial sources. Trees that treat stormwater runoff can also reduce urban heat island effects by providing shade and absorbing heat better than paved surfaces while providing habitat for local wildlife. Pervious pavement can be quieter than conventional pavement and promotes vehicular safety by reducing hydroplaning. Furthermore, GI facilities may integrate with traffic calming improvements, such as curb extensions at intersections, to help increase pedestrian and bicycle safety. This in turn can result in improved human health and reduced carbon emissions. GI facilities designed with extra storage can capture stormwater for later use as irrigation water or non-potable uses such as toilet flushing and cooling tower supply, thus conserving potable water supplies.

Widespread implementation of GI potentially offers significant economic benefits by deferring or eliminating certain gray infrastructure projects. For example, GI can help reduce the costs of conveying and pumping stormwater by providing more retention storage within the watershed. When cost-benefit life cycle analyses are performed, GI is often the preferred alternative due to the multiple benefits provided compared to conventional infrastructure.

1.3.4 Types of Green Infrastructure

Integrating GI into public spaces typically involves construction of stormwater treatment measures in public streets, parks, and parking lots or as part of public buildings. Types of GI measures that can be constructed in public spaces generally include the following facilities described below:

Bioretention Areas

Bioretention areas are depressed landscaped areas that consist of a ponding zone underlain by planting, biotreatment soil media, drain rock and an underdrain, if required. Bioretention is designed to retain and filter stormwater runoff and promote infiltration or retention prior to discharging into the public storm drain. This facility can be of any shape and is adaptable for use on a building or parking lot site or in the street right-of-way.

Bioretention systems in the streetscape have specific names including stormwater curb extensions, stormwater planters, and stormwater tree well filters. Each of these facilities are described below:

A **stormwater curb extension** (Figure 1-2) is a bioretention system that extends into the roadway and involves modification of the curb line and gutter. Stormwater curb extensions may be installed midblock or at an intersection. Curb bulb-outs and curb extensions installed as part of transportation projects can also provide opportunities for siting bioretention facilities. Parking lots can accommodate bioretention areas of any shape in medians, corners, and pockets of space unavailable for parking.

[8]https://www.epa.gov/green-infrastructure/what-green-infrastructure

Figure 1-2: Stormwater curb extension example

Stormwater planters (Figure 1-3 and 1-4) are linear bioretention facilities in public right-of-way within the street or landscape strip between the street and sidewalk. They are typically designed with vertical (concrete) sides. However, they can also have naturally sloped sides depending on the amount of space that is available. Stormwater planters provide an aesthetic component to public frontages and integrate with green street and traffic safety initatives. Stormwater planters may also be incorporated into parcel projects such as public parking lots.

Figure 1-3: Stormwater planter at Independence Drive, Menlo Park

Figure 1-4 Stormwater planter at Chilco Street, Menlo Park

A **stormwater tree well filter** (Figure 1-5) is a type of bioretention system consisting of an excavated pit or vault that is filled with biotreatment soil media, planted with a tree and other vegetation, and underlain with drain rock and an underdrain, if needed. Stormwater tree well filters can be constructed in series and linked via a subsurface trench or underdrain. A stormwater tree well filter can require less dedicated space than other types of bioretention areas.

Suspended pavement systems may be used to provide increased underground treatment area and soil volume for tree well filters. These are structural systems designed to provide support for pavement while preserving large volumes of uncompacted soil for tree roots. Suspended pavement systems may be any engineered system of structural supports or commercially available proprietary structural systems.

Stormwater tree well filters and suspended pavements systems are especially useful in settings between existing sidewalk elements where available space is at a premium. They can also be used in curb extensions or bulb-outs, medians, or parking lots if surrounding grades allow for drainage to those areas. The systems can be designed to receive runoff through curb cuts or catch basins or allow runoff to enter through pervious pavers on top of the structural support.

Figure 1-5 Stormwater tree well filter example

Pervious Pavement

Pervious pavement (Figure 1-6) is hardscape that allows water to pass through its surface and into a gravel storage area prior to infiltrating into underlying soils. Types of pervious pavement include permeable interlocking concrete pavers, pervious concrete, porous asphalt, and grid pavement. Pervious pavement is often used in parking areas or on streets where bioretention is not feasible due to space or parking constraints. Pervious pavement does not require a dedicated surface area for treatment and allows a site to maintain its existing impervious footprint.

Figure 1-6 Permeable pavers Allston Way, Berkeley

There are two types of pervious pavers: Permeable Interlocking Concrete Pavers (PICP) and Permeable Pavers (PP). PICP allows water to pass through the joint spacing between solid pavers, and PP allows water to pass through the paver itself and therefore can have tighter joints. Porous asphalt and pervious concrete are similar to traditional asphalt and concrete, but do not include fine aggregates in the mixture, allowing water to pass through the surface. Reinforced grass and gravel grid systems also allow rainwater to soak into open pore spaces in the soil medium. All types are supported by several layers of different sizes of gravel to provide structural support and water storage.

Infiltration Facilities

Where soil conditions permit, infiltration facilities can be used to capture stormwater and infiltrate it into native soils. The two primary types are infiltration trenches and subsurface infiltration systems.

An **infiltration trench** (Figure 1-7) is an excavated trench backfilled with stone aggregate and lined with a filter fabric. Infiltration trenches collect and detain runoff in the void spaces of the aggregate, allowing it to infiltrate to the underlying soil. Infiltration trenches can be used at roadways, alleyways, and parking lots. Infiltration trenches may be surfaced with gravel, landscaping or pervious pavement.

Figure 1-7 Infiltration trench, San Jose

Subsurface infiltration systems (Figure 1-8) are another type of GI measure that may be used beneath parking lots or parks to infiltrate larger quantities of runoff. These systems are underground vaults or pipes that store and infiltrate stormwater while preserving the uses of the land surface above. Storage can take the form of large-diameter perforated metal or plastic pipe, or concrete arches, concrete vaults, plastic chambers or crates with open bottoms. Prefabricated, modular infiltration galleries are available in a variety of shapes, sizes, and material types that are strong enough for heavy vehicle loads.

Figure 1-8 Subsurface Infiltration System example

Green Roofs

Green roofs are vegetated roof systems that filter and retain the rain that falls upon them. Green roof systems are comprised of a vegetated planting media underlain by other structural components including waterproof membranes, synthetic insulation, geofabrics, and underdrains. A green roof can be either "extensive" or "intensive". Extensive green roofs are comprised of 3 to 7 inches of lightweight planting media and low-profile, low-maintenance plants. The intensive option includes thicker (8 to 48 inches) media, more varied plantings, and a more garden-like appearance. Green roofs can provide high rates of rainfall retention via plant uptake and evapotranspiration and can decrease peak flow rates in storm drain systems because of the storage that occurs in the planting media during rain events.

Figure 1-9 Green Roof, Facebook, Menlo Park

Rainwater Harvesting and Use

Rainwater harvesting is the process of collecting rainwater from impervious surfaces and storing it for later use. Storage facilities that can be used to capture stormwater include: rain barrels, above-ground or below-ground cisterns, open storage reservoirs (e.g., ponds), and various underground storage devices (tanks, vaults, pipes, and proprietary storage systems). The captured water is then fed into irrigation systems or non-potable water plumbing systems, either by pumping or by gravity flow. Uses of captured water may include irrigation, vehicle washing, and indoor non-potable use such as toilet flushing, heating and cooling, or industrial processing.

The two most common applications of rainwater harvesting are 1) collection of roof runoff from buildings; and 2) collection of

Figure 1-10 Rainwater harvesting cistern, Environmental Innovation Center, San José

runoff from at-grade surfaces or diversion of water from storm drains into large underground storage facilities below parking lots or parks. Therefore, this type of facility is most applicable for parcels. Rooftop runoff usually contains lower quantities of pollutants than at-grade surface runoff and can be collected via gravity flow. Underground storage systems typically include pre-treatment facilities to remove pollutants from stormwater prior to storage and use.

1.4 Overview of the GI Plan

1.4.1 GI Plan Development Process

GI Plan Workplan Development and Adoption

The GI Plan development process began with the preparation of a Workplan describing the City's goals, approach, tasks, and schedule needed to complete the GI Plan. Development of the Workplan was a regulatory requirement (Provision C.3.j.i(1) of the MRP) to demonstrate the City's commitment to completing the GI Plan by September 30, 2019. The City Council adopted a resolution approving the completed Workplan on May 23, 2017.

The overall approach to developing the GI Plan consisted of three main components:

1. Identifying the type, location, and priority of potential GI measures to meet pollutant reduction targets;

2. Reviewing City planning, policy, and ordinance documents for adequacy and consistency with GI Plan language, and updating them if needed to facilitate Plan implementation; and

3. Incorporating technical guidance and information on funding, tracking, and maintenance mechanisms to facilitate GI implementation.

Regional and Internal Collaboration

The City worked with other SMCWPPP member agencies throughout the development of the GI Plan to review, approve, and fund GI related products.

The City is a member of the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), a program of the City/County Association of Governments of San Mateo County (C/CAG). C/CAG is a Joint Powers Authority (JPA) that addresses issues of regional importance to San Mateo County jurisdictions such as congestion management and water quality. SMCWPPP's 22 member agencies include 15 cities, five towns, the County of San Mateo and the San Mateo County Flood Control District.

SMCWPPP has developed guidance and templates to assist member agencies with developing their GI Plans while promoting coordination and collaboration on regional GI Projects. For example, SMCWPPP provided a GI Plan Workplan template, the Stormwater Resource Plan (SRP) for San Mateo County, and the San Mateo Countywide Green Infrastructure Design Guide. These documents are discussed in detail through the following chapters of this Plan.

City Staff actively participated SMCWPPP sponsored forums including the Stormwater Committee, New Development and Construction Subcommittee (NDS) and Green Infrastructure Technical Advisory Committee (GI TAC). The City, through SMCWPPP, also participated in the Bay Area Stormwater Management Agencies Association (BASMAA) on regional GI guidance. BASMAA members include other countywide stormwater programs in Alameda, Contra Costa, and Santa Clara Counties, and area-wide programs in the Vallejo and Fairfield-Suisun portions of Solano County.

GI Plan Adoption and Outreach

The City established a GI Work Group consisting of staff from the City's Public Works, Sustainability, and Planning Divisions.

The GI Work Group collaborated with a consultant team to develop the GI Plan. The Plan was presented at a Complete Streets Commission meeting on March 13, 2019, an Environmental Quality Commission meeting on April 17, 2019, a City Council meeting on May 21, 2019 and to City Council for adoption on July 16, 2019. These actions were planned accordingly to meet the State's submittal deadline by September 30, 2019.

2.0 Coordination with Planning Documents

This chapter outlines the City's endeavor to synergize GI initiatives with respect to related planning documents. The goals, policies and implementation strategies of the GI Plan should align with the City's General Plan, and other related planning documents, to maximize success. The MRP requires permittees to review and modify such documents where applicable to appropriately incorporate GI requirements. The GI Plan must also include a workplan identifying how GI measures will be included in future plans as defined in the following sections.

2.1 Existing City Plans and Policies

The City completed a review of its existing planning documents to determine the extent to which GI-related language, concepts and policies have been incorporated. The plans that were reviewed are listed below:

- General Plan
- El Camino Real Downtown Specific Plan
- Sidewalk Master Plan
- Bicycle Development Plan
- Transportation Master Plan
- Neighborhood Traffic Management Plan
- Bedwell Bayfront Park Master Plan
- Parks & Recreation Facilities Master Plan

The following sections provide a brief discussion for each plan. A prioritized workplan for the integration of GI language into existing and future City planning documents is provided in Section 2.3 and Appendix D.

2.1.1 General Plan

The General Plan is a State requirement to guide long-term land use and development. The Plan includes goals, policies, and programs to address land use, circulation, housing, conservation, open space, noise, and safety. The elements in the General Plan were developed as three separate documents over several years: the first document combined the Open Space and Conservation, Noise and Safety Elements (May 2013), the second document covered the Housing Element (April 2014) and the third addressed the Land Use and Circulation Elements (November 2016).

The GI Plan implements many goals, policies, and actions within various sections of the General Plan, including Open Space and Conservation (OSC), Noise (N), Safety (S), Housing (H), Land Use (LU) and Circulation (C) Elements. The Land Use and Circulation Elements are referred to as ConnectMenlo. The following provides examples of how the General Plan includes GI elements:

- Promote and/or establish environmentally sustainable building practices or standards in new development that would conserve water and energy, prevent stormwater pollution, reduce landfilled waste, and reduce fossil fuel consumption from transportation and energy activities. (OSC-4)

- Enforce stormwater pollution prevention practices and appropriate watershed management plans in the RWQCB general National Pollutant Discharge Elimination System requirements, the San

Mateo County Water Pollution Prevention Program and the City's Stormwater Management Program. Revise, as necessary, City plans so they integrate water quality and watershed protection with water supply, flood control, habitat protection, groundwater recharge, and other sustainable development principles and policies. (S-1)

- Promote the implementation and maintenance of sustainable development, facilities and services to meet the needs of Menlo Park's residents, businesses, workers, and visitors. (LU-7.1)

- Implement use of adequately treated "reclaimed" water (recycled/ non potable water sources such as, graywater, blackwater, rainwater, stormwater, foundation drainage, etc.) through dual plumbing systems for outdoor and indoor uses, as feasible. (LU-7.5)

- Develop a Green Infrastructure Plan that focuses on implementing City-wide projects that mitigate flooding and improve storm water quality. (LU7.I)

- In addition to completing the streets, Menlo Park has the opportunity to incorporate "green street" designs when retrofitting and designing streets. Green streets contain environmental features like trees, rain gardens, and infiltration planters to slow the course of runoff and filter it naturally before it reaches major waterways and sensitive plant and animal life. (CIRC)

- Maximize the potential to implement green infrastructure by: a) Reducing or removing administrative, physical, and funding barriers; b) Setting implementation priorities based on stormwater management needs, as well as the effectiveness of improvements and the ability to identify funding; and c) Taking advantage of opportunities such as grant funding, routine repaving or similar maintenance projects, funding associated with Priority Development Areas, public private partnerships, and other funding opportunities. (CIRC-2.10)

The General Plan may be updated to include additional policies to facilitate GI during annual or four-year major reviews, as needed, to further support the GI Plan.

2.1.2 El Camino Real / Downtown Specific Plan

The Menlo Park El Camino Real/Downtown Specific Plan establishes a framework for private and public improvements on El Camino Real, in the Caltrain station area and in downtown Menlo Park for the next several decades. This Specific Plan includes standards and guidelines for public and private enhancements to the area, including specific guidelines encouraging the use of pervious pavement and green roofs. References to bioswales and soil-filled catch basins will be changed to bioretention areas and references to stormwater management will be changed to specifically include green infrastructure in the next update.

2.1.3 Sidewalk Master Plan

The Sidewalk Master Plan serves as the primary guide in the allocation of capital, maintenance, administrative, and matching funds in order to establish a comprehensive network of safe, convenient walking routes throughout the City. The Plan inventories existing sidewalk facilities and needs and prioritizes pedestrian capital improvement projects to achieve this network. There is no language in the Plan that would prohibit or discourage GI, however, references to green

infrastructure, stormwater planters, pervious concrete and stormwater curb extensions will be added during the next update.

2.1.4 Comprehensive Bicycle Development Plan

The Bicycle Development Plan provides a blueprint for a citywide system of bike lanes, routes, paths and associated facilities. This Plan may be superseded by the new Transportation Master Plan targeted for completion in 2019, therefore, the City will not be making any updates to this document.

2.1.5 Neighborhood Traffic Management Plan

The Menlo Park Neighborhood Traffic Management Plan provides policies for traffic management in the neighborhood areas of the City, but it may be superseded by the new Transportation Master Plan being completed in 2019, so the City will not be making any updates to this document.

2.1.6 Street Tree Management Plan

The City's Street Tree Management Plan provides procedures and policies for managing the one section of the City's urban forest – specifically its street trees. No GI-related language is currently in the document; however, street trees can be a significant aspect of the City's GI plan and program, so GI-related language will be considered for all tree policy documents.

2.1.7 Park and Recreation Facilities Master Plan Update

The City created a parks and recreation facilities master plan in 1999. The City is currently updating the plan with new information and the draft document was released in February of 2019. GI language and references are being added to the plan to encourage assessing the use of parks for stormwater treatment and GI.

2.2 Regional Plans

The City of Menlo Park has partnered with other agencies on several GI planning efforts across the region and recognizes the importance of this collaboration. Therefore, the City's GI Plan builds upon these previous endeavors and incorporates lessons learned with an awareness to both local and regional priorities. Regional GI documents that the City participated in include the San Mateo County Stormwater Resource Plan (SRP), the C/CAG Sustainable Streets Master Plan, and the Bay Area Integrated Regional Water Management Plan (IRWMP) amongst others.

2.2.1 San Mateo County Stormwater Resource Plan (SRP)

The SRP is a countywide evaluation of opportunities for stormwater capture, treatment, and use. The SRP is required by the State to allow stormwater capture projects to be eligible for State grant funds. Development of the SRP was led by C/CAG and SMCWPPP through a collaborative effort with stakeholders and the public to address specific stormwater and dry weather runoff issues in the region. The main goal of the SRP is to identify and prioritize opportunities for GI projects in San Mateo County by analyzing watershed processes, surface and groundwater resources, input from stakeholders, and resulting GI benefits.

The GI prioritization analysis in the SRP forms the building block for identifying project opportunities within Menlo Park as noted in the subsequent chapters of this Plan.

For example, the regional priorities addressed by the SRP were incorporated into the GI Plan and

augmented with the local planning priorities of the City (see Chapter 4 for more details).

2.2.2 C/CAG Sustainable Streets Master Plan

The Sustainable Streets Master Plan (SSMP) is a collaborative effort between Caltrans and C/CAG to further prioritize GI into roadways for stormwater treatment and retention. As an additional objective, the SSMP aims to build upon current planning efforts within the County to assist vulnerable communities which may be disproportionately burdened by the effects of climate change.

In addition to prioritizing sites and developing concepts for sustainable street projects, the SSMP effort will also result in the development of a Countywide GI Tracking Tool. This tool is further described in Chapter 6.4.2 and I will be used to track completed GI projects, quantify key project benefits, and report progress towards GI implementation for multiple objectives, including meeting requirements of the MRP provisions.

2.2.3 Bay Area Integrated Regional Water Management Plan

The San Francisco Bay Area IRWMP (Kennedy/Jenks Consultants, 2013) is a nine county, multi-stakeholder regional effort to address major challenges and opportunities related to water and natural resource management in the Bay Area in four functional areas: 1) water supply and water quality; 2) wastewater and recycled water; 3) flood protection and stormwater management; and 4) watershed management and habitat protection and restoration.

The IRWMP provides a collaborative and integrative framework to address the major water-related challenges in the region through goals, objectives, selected resource management strategies, and prioritized projects. The IRWMP includes a list of over 300 project proposals and a methodology for ranking those projects to prioritize grant funding. On February 27, 2017, the Bay Area IRWMP Coordinating Committee included SRP projects for consideration as well. As SRP projects are also proposed for grant funding, they will be added to the IRWMP list using established procedures.

2.3 Work Plan for GI Integration with Related Plans

2.3.1 Recommendations to Existing Plans

Although current City plans are generally aligned with support for the GI Plan, several City plans could benefit from additional GI-related language. The following plans will be updated as needed in accordance with each document's scheduled update in Table 2-1. A summary of recommended language updates is detailed in Appendix D of this document.

Table 2-1 Plan Update Summary

Name of Plan	Last Update	Next Update[a]
General Plan		
Open Space and Conservation, Noise and Safety	May 2013	2020
Land Use and Circulation Elements	November 2016	2020
El Camino Real Downtown Specific Plan	July 2012	2020
Transportation Master Plan	In Progress	As part of Adoption
Parks Master Plan	In Progress	As part of Adoption

[a]All dates are subject to change pending schedules set forth by the appropriate authorizing body

2.3.2 GI Language Inclusion in Future Plans

The City will review GI Plan requirements and policies when updating existing planning documents. Similarly, new planning documents will also be synergized to promote GI where applicable. Examples of recommended GI language can be found in references such as SMCWPPP's *Planning Document Update – Model Language* (December 2016) and as proposed in Appendix D.

3.0 GI Design Guidelines, Details & Specifications

This chapter outlines current design guidelines, details, and specifications for GI projects at the County and City level. The first edition of the San Mateo Countywide Green Infrastructure Design Guide (GI Design Guide) was released by the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) in April 2019. The GI Design Guide is meant to assist jurisdictions with implementing GI through the design, construction, and maintenance of any given project. A separate manual, titled the C.3 Regulated Projects Guide (C3RPG)[1], is specific to MRP-regulated projects within the County and is an equally vital resource.

These two guides are commonly referred to as the "GreenSuite" and constitute acting design templates for this GI Plan (as further described in Chapter 6.3). Menlo Park referenced these documents, while tailoring select content to align with City initiatives, per the following subsections.

3.1 Development Process

3.3.1 Design Templates for the GI Plan

The City of Menlo Park worked with other member agencies during the development phase of the GI Design Guide. The GI Design Guide covers a broad range of projects spanning street and parcel-based categories and includes provisions for:

- Thirteen GI measures
- Opportunities for integration of GI applicable to San Mateo County
- Key design and construction considerations
- Key implementation strategies
- Operations and maintenance guidance
- Typical GI Details and Specifications

More technical and specific requirements for the sizing and design of stormwater control measures for regulated projects are included in the companion document, the C3RPG.

3.3.2 Green Infrastructure Details

Appendix A-3 of the GI Design Guide includes the San Francisco Public Utilities Commission (SFPUC) Typical GI Details and Specifications (Typical GI Details). These details show standard GI sections, appurtenances, and configurations for site-specific conditions within public streets and parcels.

With the exception of a few updates to single sheets and four new details, the Typical GI Details have not yet been modified for SMCWPPP. For example, the Typical GI Details still include references to San Francisco-specific codes, requirements, combined sewer systems, and street conditions. The GI Design Guide does acknowledge that member agencies will need to review the provided details carefully and make modifications to coordinate with their agency-specific requirements and conditions.

[1] The C.3 Regulated Projects Guide can be found at https://www.flowstobay.org/newdevelopment#C3TechGuidance

The City has reviewed the entire set of Typical GI Details and identified where updates are needed to cater construction specific to Menlo Park. These updates are provided in the form of redlines, separate from this Plan, which the City may consider as part of future projects and standards.

In addition, the City developed brand new details specific to its development needs. The result of this endeavor is summarized below and per Appendix A of this Plan.

- Connected Tree Wells within a Street with Parallel Parking
- Bioretention Edge Treatment – Rock Stabilized Slope
- Bioretention Edge Treatment – Compacted Soil Bench
- Bioretention Planter – Stormwater Barrier Planter – Class 4 Bikeway
- Bioretention Basin – Roadside Layout with Valley Gutter
- Interpretive Signage for City GI Projects

The City also identified a need for specific GI utility setbacks and protection protocols as these conditions are not addressed in its existing codes or standards. To rectify this issue, the City reviewed the SFPUC Asset Protection Standards[2] which specifies requirements for protecting utilities that cross under, through, and/or near certain GI facilities. Thereby, the City used this document to outline a list of recommendations where utility conflicts may exist in proximity to green infrastructure. This resulting list is also referenced within Appendix A but will need to be finalized with outside stakeholders, such as West Bay Sanitary District, before it can be formally adopted into the City's utility standards and specifications.

3.2 Design Guidelines

The City of Menlo Park will refer to the GI Design Guide and C3RPG for general design, construction and maintenance of GI facilities. Additionally, the City intends to share the "GreenSuite" with designers, contractors, and maintenance personnel for applicable projects spanning multiple departments. As more GI projects are constructed within the City, best practices may evolve and new technologies will emerge that will require supplemental and/or updated guidelines to make GI projects even more effective, resilient, and valuable to the community.

3.2.1 Approach to GI Design

The SMCWPPP GI Design Guide highlights the different design approaches to GI measures that are retrofit into different locations in the public realm such as roadways, parks and parking lots. The GI Design Guide provides guidance on selection, integration, prioritization, sizing, and construction of GI facilities. It includes sections describing the various types of GI, their benefits, and design considerations; including how to incorporate GI with other uses of the public right-of-way, and guidelines on utility coordination and landscape design. In addition, the GreenSuite provides guidance on post-construction maintenance practices for GI facilities.

3.2.2 Sizing Guidelines

MRP Provision C.3.d specifies minimum GI sizing requirements for development projects exceeding certain thresholds ("regulated projects"). Regulated projects must treat a designated flow or volume of stormwater

[2] The SFPUC Asset Protection Standards can be viewed here: https://sfwater.org/modules/showdocument.aspx?documentid=10873

runoff through GI (the "C.3.d" Amount). Certain Regulated Projects must also meet Hydromodification Management (HM) requirements based on project location and impervious area impact. These criteria are herein labeled the **"Standard Sizing Methodology"** and further described in Appendix C.

GI measures in public rights-of-way must be designed to meet the same treatment and HM sizing requirements as Regulated Projects wherever feasible. However, if GI measures cannot be designed to meet the Standard Sizing Methodology due to constraints such as lack of space, utility conflicts, or other factors, the City may still wish to construct the measure to achieve other benefits (e.g., traffic calming, pedestrian safety, etc.).

To address this situation, MRP Provision C.3.j.i.(2)(g) states that, for non-regulated Green Street projects, "Permittees may collectively propose a single approach with their Green Infrastructure Plans for how to proceed should project constraints preclude fully meeting the C.3.d requirements." Such a regional approach has been developed by BASMAA[3] for use by the City of Menlo Park and other Permittees in their GI Plans. This "**Alternative Sizing Methodology"** is also described in Appendix C.

3.3 City Standard Details and Specifications

The City reviewed its standard detail drawings for streetscape and utility improvements and identified opportunities to integrate GI design measures in the future. For example, options for pervious pavement were included to supplement existing standard sidewalk, driveway, and roadway section details.

A comparison of the City Standard Details to the SFPUC Typical GI Details revealed instances where it may be advantageous for the City to adopt new standards for GI in public rights-of-way. Because varying site conditions impact the overall layout, form, and design of GI facilities, it is more practical to incorporate certain key components of the GI facilities into standard designs. Some examples of Typical GI Details that the City may consider converting into Standard Details include:

- Pervious pavement sections and specifications
- Bioretention outlet structure
- Bioretention planter curb cut inlet and outlet
- Bioretention planter trench drain inlet/outlet

[3] BASMAA, 2018. Guidance for Sizing Green Infrastructure Facilities in Street Projects. http://basmaa.org/Announcements/basmaa-guidance-for-sizing-green-infrastructure-facilities-in-street-projects-june-2019

4.0 GI Project Prioritization Methodology

4.1 Introduction and Background

The Stormwater Resource Plan (SRP) is a document which identifies and prioritizes GI opportunities across San Mateo County. The GI Plan further builds upon the methods used in the SRP to cater potential projects specific to the City's priorities.

Therefore, the purpose of this Chapter is to describe the SRP's prioritization process for GI opportunities at the County level and updates for this methodology to best reflect Menlo Park's interests.

4.2 Project Types

The GI Plan adopts methods of the SRP as a basis for identifying and prioritizing GI projects. For example both the GI Plan and SRP, demarcate GI project opportunities into three categories due to the differences in scale, GI types, and measures of effectiveness.

Once identified, these GI projects were prioritized relative to opportunities within the same category. These three categories are further described in the follow subsections:

Category 1:
Regional Stormwater Capture Projects
Regional projects are defined as facilities that capture, treat and/or use stormwater draining from onsite and offsite areas. They are typically centralized facilities associated with large drainage boundaries that divert runoff from a nearby storm drain or channel.

Category 2:
Low Impact Development (LID) Projects
LID projects mitigate stormwater impacts by reducing on-site runoff through capture, infiltration and treatment before it enters the storm drain system. LID techniques are intended to imitate pre-urbanization (natural) hydrologic conditions. Examples include bio retention, pervious pavement, infiltration systems, green roofs, etc.

Category 3:
Green Street Projects
Green Streets use treatment measures similar to LID but are typically implemented linearly in the public right-of-way.

All GI projects utilize a variety of treatment mechanisms, including absorption into native soils, settling, and filtration. Captured runoff is typically removed from the storm drain system through infiltration or recycled non-potable use. Alternatively, runoff may also return to the storm drain system after treatment at a reduced rate. Example photographs of each category are shown in Figure 4-1.

Example 1: Regional Stormwater Capture (subsurface infiltration)

Example 2: LID (Pervious paving in a parking lot)

Example 3: Green Street (Chilco Street, Menlo Park)

Figure 4-1 Examples of GI Projects by Category

4.3 Stormwater Resource Plan Prioritization

Upon establishing GI Project categories, the SRP utilized a two-step process to:

Step 1:
Identify project opportunities and screen sites infeasible for GI implementation.

Step 2:
Prioritize the identified GI opportunities based on a multi-benefit scoring process.

These two steps are detailed in the following sections.

4.3.1. Step 1: Opportunity Identification and Screening

In the first step, the SRP screened GI opportunities countywide based on factors that may be considered prohibitive constraints for implementing GI, such as parcel type and slope. Figure 4-2 provides a flow chart of the screening process.

Both regional and LID project opportunities were defined using the County Assessor's parcel dataset. The focus of the SRP was implementation of GI on publicly-owned land, so public ownership was a primary screening factor. Parcels that were owned by a public entity or were associated with a public use (e.g., park, school, golf course) were selected. Sites with steeper slopes present additional design challenges to GI facilities, therefore, parcels with average

slopes greater than 10 percent were removed from the selection.

Parcel size was also used to determine whether a project opportunity is considered an opportunity for both LID and regional projects or for LID projects only. For example, sites greater than or equal to 0.25 acres were considered large enough to support both LID and regional projects. Parcels less than 0.25 acres were considered an opportunity for LID only. The remaining parcels in the selection comprise the list of opportunities for regional and LID projects used in this prioritization step.

Green street opportunities were defined as street segments (divided at intersections) using the County street centerline dataset. Public right-of-way, street functional class, and slope were used to screen street segments suitable for green street projects. Variables such as high traffic volumes and road speed limit can impact suitability in terms of both system performance and long term operation and maintenance costs. Street segments were selected if they fell into functional classes of arterial streets, local neighborhood roads, city streets, parking lots, and alleys, based on classifications in the 2015 Census TIGER road line dataset[1]. This excludes highways and other street classes that typically exhibit higher traffic volume/speeds and make the implementation of GI less ideal. Site slope is also an important consideration in green streets, since it may affect project feasibility and effectiveness. Street slopes greater than 5 percent present challenges with design and maintenance of GI. Therefore, segments with an average slope greater than 5 percent were screened out. The remaining street segments in the selection comprise the list of green street opportunities used in the prioritization step.

The City recommended no changes to the screening process used in the SRP for the purposes of the GI Plan. Figure 4-2 shows this process and the criteria used to screen both parcel and street-based opportunities.

[1] The 2018 TIGER roads dataset was examined for the GI Plan analysis to identify any changes to street classification or geometry since the Stormwater Resource Plan was developed.

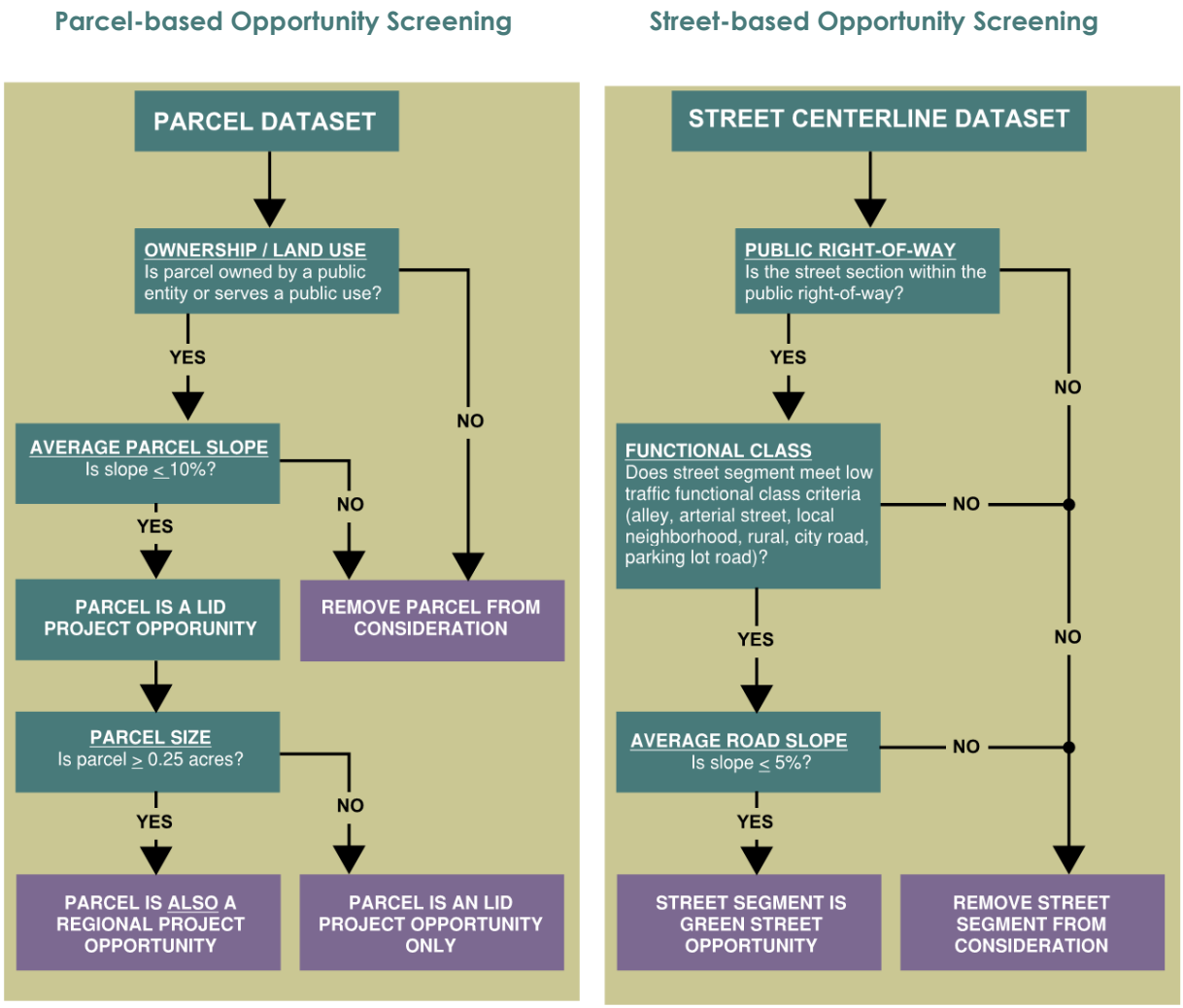


Figure 4-2 Flow chart of Step 1: Project opportunity screening process.

4.3.2. Step 2: Prioritization Metrics and Opportunity Scoring

After the screening process, the SRP evaluated a series of quantitative metrics to prioritize project opportunities by their potential benefits. These benefits were related to water supply, water quality source control, reestablishing natural hydrology, creating or enhancing natural habitat, and providing community enhancement.

The City provided additional considerations to tailor the SRP prioritization analysis to projects and policies in Menlo Park. A detailed analysis of these prioritization metrics from the SRP and City are further defined in Sections 4.4.1 and 4.4.2 respectively.

Prioritization metrics were selected for the SRP that were considered surrogate indicators of one of three things: available stormwater capture opportunity, project effectiveness, and expected co-benefits. For example, imperviousness, parcel size, and land use are indicators of available opportunity (e.g., runoff-generating potential, available footprint, compatibility with current site use). Hydrologic soil group and slope are indicators of project effectiveness (e.g., infiltration capacity,

prohibitive constraints, design challenges). Proximity to flood-prone streams, polychlorinated biphenyls (PCBs) interest areas, and other co-located projects are indicators of expected co-benefits (e.g., flood attenuation, pollutant source control, cost synergies).

A project received a score for each metric based on specified ranges of values. Total scores for a project opportunity were derived by summing each metric and, for some metrics, applying a weighting factor. Each project type (i.e., regional, LID, green street) was evaluated using its own table of metrics and ranked independently of each other.

The following metrics were used in the **SRP** prioritization and scoring process.

Parcel Land Use

Parcel land use was used to prioritize sites with land uses compatible with the project type being considered. This factor was evaluated for regional and LID project opportunities only. For a regional project, parks or other public open space were given the highest priority since it was assumed these parcels would have the largest area to support a regional project footprint. Schools and golf courses, while having public uses and often containing significant open space, were considered lower priority since partnerships and coordination with the owners of these parcels is often difficult. Public buildings and parking lots were given higher priority for LID projects.

Street Type

Street type, evaluated for green street projects only, was used to prioritize streets associated with lower traffic volume. Heavily-used streets may require increased maintenance and reduce system performance. Highest priority was given to local neighborhood roads, city streets, parking lot roads, and alleys, while lower priority was given to major arterials, collector roads, and highways.

Imperviousness

Imperviousness was evaluated for all three project types because of the relationship between high impervious areas and greater runoff potential. Because the primary goal of the SRP was to treat runoff via stormwater capture projects, opportunities with potential to produce more runoff were prioritized.

Parcel Size

Parcel size, considered for regional projects only, was evaluated to prioritize sites that have sufficient available area for a regional project footprint to treat runoff from larger drainage areas. Only parcels over 0.25 acres were considered for regional project opportunities. Higher priority was given to parcels greater in size.

Hydrologic Soil Group

Hydrologic soil group was evaluated for all three project types to prioritize sites that sit on well-drained soils. Group A represents the most well-drained soils and Group D represents the least well-drained soils. Because infiltration is a common treatment mechanism of stormwater capture, highest priority was given to Soil Group A, with each subsequent group assigned fewer points. In many areas throughout the County, the dominant soil type is unknown due to lack of adequate soils data in highly urbanized areas. Projects that fall within the "Unknown" category were assumed to be a mix of Group C, the dominant soil group in the county, and Group D.

Slope

Slope was evaluated for all three GI categories. Sites with mild slopes often provide the most feasible opportunities for stormwater capture. Construction on steep slopes presents challenges with design, effectiveness, and maintenance of most GI projects.

Tributary to Flood-prone Streams

Proximity to flood-prone streams was evaluated for all three project types using a list of flood-prone streams throughout the County identified by C/CAG staff. Project opportunities located within the watershed of a flood-prone stream would help mitigate flood risks and reduce hydromodification impacts by limiting the volume of runoff that reaches the impacted streams. Regional stormwater capture projects can slow the conveyance of runoff through detention and slow release; or remove the captured runoff through infiltration and non-potable use. Distributed LID and green street projects in the watershed of a flood-prone stream would reduce the imperviousness of the area so that less runoff can contribute to flooding. Points for this metric were only given to project opportunities within the watershed of a flood-prone stream; no points were given if a site was not within the watershed of a flood-prone stream. Higher priority was given to sites that were closer to the stream with the assumption that greater upstream area is available to be treated.

PCBs Interest Areas

PCBs interest areas were used in the prioritization to give higher priority to projects with the potential for source control. PCBs are one of the primary pollutants of concern within the Bay Area; therefore, siting of stormwater capture projects in PCBs interest areas can potentially address water quality issues. The PCBs interest area dataset was developed in a separate C/CAG study (SMCWPPP 2016). The interest areas are organized into either a High or Moderate category, defined in Table 4-1. Areas with High interest were given the higher priority than Moderate interest, while areas that were of low or no interest for generating PCBs received zero points. Projects received points in this category if a PCBs interest area was within the project's representative drainage area or the project parcel itself is a PCBs interest area.

Category	Description
High	• Parcels associated with land uses that have a relatively higher likelihood of having elevated concentrations of PCBs (≥0.5 mg/kg) in street dirt, sediment from the MS4, or in stormwater runoff (particle concentration). • Most commonly old industrial, electrical, recycling, railroad, and military. • These areas generally have not been redeveloped and do not contain stormwater treatment facilities.
Moderate	• Parcels associated with land uses that have limited risk factors with PCBs. • Typically older non-industrial urban land uses. • These areas generally have not been redeveloped and do not contain stormwater treatment facilities. • Less likely to have elevated concentrations of PCBs.

Table 4-1 PCBs interest areas

Co-located Planned Projects

Co-located planned projects are opportunities that can be implemented in parallel with new and redevelopment projects or other municipal capital improvement projects in the planning phase at the time of the prioritization analysis. These projects were given a higher priority in the prioritization process. Co-locating stormwater capture and treatment projects with other priority projects increases opportunities for cost-sharing and maximizes

multiple benefits that may not otherwise be achieved by a single project. Each jurisdiction was given the opportunity to submit projects for co-location with stormwater capture. Through a survey[2] the County and cities submitted planned projects with the project description, contact information, and multiple benefits expected to be achieved by each project. ***Ten projects were submitted by the City of Menlo Park during development of the SRP and are listed in Table 4-2.*** Parcels and street segments that were located near one of the submitted projects were given higher priority. A project opportunity was considered co-located with another project if it was within 500 feet of a submitted project location.

The Safe Routes to School Program

The Safe Routes to School Program is a coordinated effort by C/CAG and the San Mateo County Office of Education to identify recommended improvements for pedestrian and bicycle safety along school routes. Walk audits were performed to provide recommendations on projects that would increase safety for children walking or biking to school, and include infrastructure improvements such as new crosswalks, pedestrian bulb-outs, sidewalks, and ADA-compliant curb ramps. These types of improvements are prime opportunities for GI implementation since replacing curb and gutter is a chance for drainage improvements. Pedestrian bulb-outs can be converted to vegetated curb extensions to capture and treat stormwater, new curb ramps can be created in conjunction with vegetated curb extensions, new sidewalks can be constructed of pervious pavements or with sidewalk planters, and new crosswalks can incorporate vegetated curb extensions to reduce pedestrian crossing distances and increase visibility while also managing stormwater. Proximity to recommended improvements through this program was evaluated for green street projects only.

Drains to Total Maximum Daily Load Waters

Project opportunities that drain to Total Maximum Daily Load (TMDL) waters, i.e., San Francisco Bay, are given higher priority. All projects in the SRP contain some element of stormwater capture resulting in volumetric reductions of runoff. The Bay is subject to several TMDLs, including PCBs and mercury TMDLs that require reductions in pollutant loads over the next several decades. Since stormwater is identified as the primary contribution of these pollutants to the Bay (SFBRWQCB 2013), volume reduction from stormwater capture projects will also result in reduction of these pollutants. This metric was removed from the GI Plan prioritization because all of Menlo Park drains to the Bay.

Multiple Benefits

Multiple benefits that are expected of typical GI projects were also evaluated in the SRP prioritization. The *Storm Water Resource Plan Guidelines* specifies that the SRP should evaluate multiple benefits related to five benefit categories: Water Quality, Water Supply, Flood Management, Environmental, and Community. The benefits listed below were also evaluated in the prioritization and fall into at least one of these benefit categories. Because of the nature of GI, many of these benefits are expected for any GI project whether or not the specific details of those projects are yet known. For this reason, all project opportunities within one of the three project types were given the same points for these metrics, i.e., all regional project opportunities were given the same points in the benefit categories.

- ***Groundwater recharge* and *augmenting water supply*** are considered important benefits of stormwater capture projects. All stormwater projects listed in the SRP were assumed to include infiltration since it is a major element in restoring natural

[2] e-mail from Matt Fabry to C/CAG Stormwater Committee, February 29, 2016

watershed processes. These metrics fall under the Water Supply category of the Guidelines.

- ***Source control*** includes design practices that treat or prevent stormwater runoff or pollutants on-site before it is able to enter a storm drain system or waterbody. These design practices can include considerations for landscape planning, roof runoff controls, efficient irrigation, and signs that alert the public about the effects of and prohibition against waste disposal in storm drain systems. This metric falls under the Water Quality benefit category of the Guidelines.
- ***Reestablishment of natural hydrology*** is an important benefit of GI projects. Urbanization replaces pervious soils with impervious land cover, effectively converting infiltration to overland flow. Stormwater capture projects are designed to mimic pre-development hydrology by either slowly releasing captured runoff (e.g. detention basin) to emulate natural peak flows or through removal of volume through infiltration (e.g. rain gardens, infiltration chambers, trenches), reducing both peak flows and runoff volume. The reduction of overland flow improves water quality in downstream waterbodies, as pollutants that are conveyed by runoff will be removed and treated when captured by a project. This metric falls under the Water Quality, Flood Management, and Environmental benefit categories of the Guidelines.
- ***Creating or enhancing natural habitat*** can be incorporated into stormwater capture projects by designing with a focus on habitat enhancement and maximization of open space. Vegetated treatment types often provide habitat enhancement. Examples are wetland treatment systems, riverine habitats, and rain gardens. Vegetation supports local insect, aquatic, and bird populations while enhancing open space and providing opportunities for recreation. Recreational trails and parks are often constructed alongside these types of stormwater capture projects. This metric falls under the Environmental benefit category of the Guidelines.
- ***Community enhancement*** can be achieved by introducing urban green space and connectivity. Green street and LID projects would create the most opportunities for additional urban green space, as these projects often substitute impervious areas with vegetation. Additionally, the attainment of water quality standards through achieving the TMDLs will preserve beneficial uses, such as commercial fishing, sport fishing, and other recreational uses.

Weighting Factor

A weighting factor was applied to several metrics that were considered high priority. Through discussions with C/CAG and member agencies, several factors were deemed of special importance and given a weighting factor of 2. For these metrics, the scores from 1 to 5 were multiplied by the weighting factor when tallying total scores, giving increased weight to those metrics. The metrics that were given weighting factors were *proximity to flood-prone streams, PCBs interest areas*, *co-located planned projects*, and the *Safe Routes to School Program*.

4.4 City-Specific Prioritization

Because no changes were proposed to the screening process (Step 1), the opportunities evaluated in the City's GI Plan are identical to those identified in the SRP. However, the SRP metrics used in Step 2 were reevaluated for the City's GI Plan to cater rankings reflective of City priorities. As a result, project opportunities in the GI Plan are scored differently than the SRP. The resulting prioritized list can serve as a tool for identifying near-term GI projects and form the basis for the City's implementation strategy. The subsequent sections outline City-specific metrics that were incorporated into the GI Plan prioritization.

4.4.1. Adjustment of SRP Metrics to City Priorities

Metrics that were originally included in the SRP but modified for the GI Plan are described below.

Revised Co-located Projects List

The list of co-located projects, submitted by the City during development of the SRP (2016), was revisited as part of this GI Plan update. Many of these projects were from the City's Capital Improvement Program (CIP). ***Table 4-2 lists the projects that were included in the initial SRP analysis and those that were added as part of the GI Plan.***

Projects that have since been deemed inapplicable for GI were removed from the list as demarcated by an "**REM**" notation. Projects that were identified as part of this GI Plan update are designated under the "GI Plan" column. Added projects come from the following near-term planning initiatives within the City:

- **ConnectMenlo Paseos**
  A paseo[3] is a pedestrian and bicycle path that provides public access through one or more parcels and to public streets and/or other paseos. Paseos must be publicly accessible, established through a public access easement, but they remain private property. Paseos count as publicly accessible open space. These public spaces present opportunities to incorporate GI along walkways. Paseos identified in the *ConnectMenlo* General Plan Update are an important part of the solution to improving transportation and circulation throughout the City. Therefore, opportunities that are co-located with paseos are given higher priority in the GI Plan.
- **Privately-funded Frontage Improvements**
  Privately-funded development projects are opportunities for the City to negotiate for GI incorporated into frontage improvements. These opportunities are not a blanket mandate across the City and are instead negotiated on a case-by-case basis. The City has identified privately-funded frontage improvement projects currently planned across the City. GI opportunities co-located with these projects are given higher priority in the scoring criteria.
- **Transportation Masterplan**
  The City of Menlo Park is currently developing a Transportation Master Plan (TMP), which has an overlapping development schedule with the GI Plan. The TMP is scheduled for adoption in December 2019. Because the GI Plan will likely be finalized before development of the TMP is completed, the TMP may leverage the GI Plan project list to inform prioritization of transportation projects. Early development of the TMP has identified an initial list of potential GI opportunities as defined in Table 4-2. These projects were incorporated into the GI Plan prioritization process by giving higher priority to opportunities co-located with the identified TMP projects. Additionally, the TMP will include language defining the aforementioned GI project opportunities with reference to provisions of the City's GI Plan.
- **Parks and Recreation Facilities Master Plan**
  The City of Menlo Park is currently updating its Parks and Recreation Facilities Master Plan (PRFMP) which has an overlapping development schedule with the GI Plan. The PRFMP is scheduled for adoption in May 2019. Because the GI Plan will likely be finalized concurrent with this initiative, the PRFMP may leverage the GI Plan project list to prioritize applicable LID and Regional projects. Early development of the PFRMP has identified a preliminary index of potential

[3] Menlo Park Municipal Code (Menlo Park 2018, Ch. 16-43)

GI opportunities summarized per Table 4-2. Additionally, the PRFMP will include language defining the requirement to assess GI opportunities with reference to the City's GI Plan.

Table 4-2 Projects submitted by Menlo Park for SRP and projects to be added for GI Plan

#	Project Title	Project Description	Location	From SRP	In GI Plan
1	Stormwater / Groundwater Reuse Facility	Stormwater and groundwater capture water recycling facility - capacity of 0.5 million gallons per day.	Vicinity of 151 Commonwealth Dr.	X	X
2	Chilco Street Improvements - North	Green street / streetscape improvements.	North side of Chilco St. between Bayfront Expressway and Terminal Ave.	X	X
3	Chilco Street Improvements - South	Green street / streetscape improvements.	South side of Chilco St. between Bayfront Expressway and Terminal Ave.	X	X
4	Parking Plaza 7 & 8 Renovation	Green infrastructure / pervious pavement installation.	Santa Cruz Ave. between Chestnut and Curtis Streets	X	X
5	Downtown Streetscape Improvements	Green street / streetscape improvements.	Downtown Menlo Park	X	X
6	Downtown Outdoor Seating Program	Green street / streetscape improvements.	Downtown Menlo Park	X	**REM**
7	Caltrain Bike/Pedestrian Undercrossing	Green street / streetscape improvements.	Alma St. west of Burgess Dr.	X	X
8	El Camino Real Corridor Study & Design Implementation	Green street / streetscape improvements.	El Camino Real between Sand Hill Rd. and Alejandra Ave.	X	X
9	Sidewalk Repair Program	Green street / streetscape improvements.	Citywide	X	**REM**
10	Street Resurfacing Program	Green street / streetscape improvements.	Citywide	X	**REM**

REM = Inapplicable projects removed for GI consideration since the initial SRP listing.

#	Project Title	Project Description	Location	From SRP	In GI Plan
11	Oak Grove Street Improvement	Green street / streetscape improvements	Oak Grove Ave. from Rebecca Ln. to Laurel St.		X
12	Nealon Park frontage along Middle Ave.	Green infrastructure	800 Middle Ave.		X
13	Pope Street and Woodland Ave. Street Improvement	Green infrastructure	Intersection of Pope St. and Woodward Ave.		X
14	Jefferson Drive Sidewalk Project	Conditioned as part of future frontage, #20 in TMP	Entire length of Jefferson Dr.		X
15	Menlo Gateway	Swale incorporated on Southside of street. Northside may be conditioned for the same, especially at 111 and 115 Independence Dr	Entire length of Independence Dr.		X
16	Chrysler Street Improvement	Condition as part of future frontage projects	Chrysler Dr. from Commonwealth Dr. to Constitution Dr.		X
17	Hotel/Caltrans development	High potential for GI and close proximity to creek	Haven Dr. from Marsh Rd. to Haven Ct.		X
18	Menlo Gateway Pocket Park	Detention Basin	Intersection of Independence Dr. and Marsh Rd.		X
19	Constitution Dr. Pedestrian Network Improvement	Northside of Constitution may have potential for GI conditioned as part of future frontage projects. #19 in TMP	Entire length of Constitution Dr.		X
20	Belle Haven School Frontage	Frontage improvements	Chilco Ave. from Hamilton Ave. to Ivy Dr.		X
21	Facebook Willow Campus	Entire street to be reconfigured. High potential for GI here as part of future frontage	1080 Hamilton Ct, Menlo Park, CA 94025		X
22	O'Brien Drive Improvement	#32 in TMP project	Entire Length of O'Brien Dr.		X

#	Project Title	Project Description	Location	From SRP	In GI Plan
23	Adams Dr. Pedestrian and Bicycle Network Improvement	#30 in TMP – will be a combination of frontage projects and TMP measures	Entire length of Adams Dr.		X
24	Dumbarton Corridor Project	#13 in TMP – construct Class I Multi-use path	Trail from Marsh Rd. to University Ave.		X
25	Willow Rd. Corridor Improvement Project	#35, 40, 47 in TMP	Willow Rd. @ Bayfront Expy, O'Brien Dr. and Middlefield Rd.		X
26	Menlo-Atherton High School Safe Routes to School	#63 in TMP	Middlefield Rd. & Ravenswood Ave.		X
27	West Menlo Mobility Improvements	#137 in TMP	Altschul Ave. & Harkins Ave.		X
28	Sand Hill Rd. Corridor Project	#145 in TMP	Sand Hill Rd. & Santa Cruz Ave.		X
29	Burgess Park/Civic Center Parking Lots/Arrillaga Family Gymnastics Center	From draft Parks Master Plan	701 Laurel St.		X
30	Hamilton Park	From draft Parks Master Plan	Hamilton Ave. & Sage St.		X
31	Kelly Park/Belle Haven Community Center	From draft Parks Master Plan	100 Terminal Ave.		X
32	Nealon Park	From draft Parks Master Plan	800 Middle Ave.		X
33	Sharon Park	From draft Parks Master Plan	1100 Monte Rosa Dr.		X
34	Willow Oaks Park	From draft Parks Master Plan	490 Willow Rd.		X

Removal of "Drains to TMDL Waters" Metric

Project opportunities that drain to Total Maximum Daily Load (TMDL) waters, i.e., San Francisco Bay, were given higher priority in the SRP. However, because all areas in the City of Menlo Park discharges to the Bay, this metric is not a differentiator and was removed from the GI Plan prioritization.

Revisions to the "Above Groundwater Basin" and "Augments Water Supply" Metrics

The *Above groundwater basin* and *Augments water supply* metrics were both included in the SRP analysis to approximate a project opportunity's potential to recharge groundwater supply through infiltration-type GI measures. For the GI Plan, the *Above groundwater basin* metric and *Augments water supply* metric were combined into a single metric. Project opportunities that are above a groundwater basin, outside of active groundwater contamination cleanup sites from the Geotracker database by at least 500 feet, and outside of areas of high groundwater table (less than 20 feet from the surface) were given points in this category. These additional conditions were incorporated to prevent prioritizing projects with potential to mobilize existing groundwater pollutants, and to prevent prioritizing projects in areas where high groundwater may reduce or negate the effectiveness of infiltration GI measures.

Re-prioritized Street Types

In the SRP, local streets and alleys were given the highest priority followed by collector and arterial roads in order to focus efforts in locations where maintenance would be minimized. However, due to opportunities in commercial and industrial districts, where private commercial development may spur GI implementation with frontage improvements, arterial and collector streets were given higher priority in the GI Plan prioritization.

4.4.2. Consideration of Additional Local Priorities

In addition to modifications to the SRP metrics, new metrics were devised for the GI Plan that consider local priorities and GI planning goals specific to the City. These metrics were used to augment the prioritization analysis with local data that were not considered on the countywide scale of the SRP. These metrics are described below.

Results of the Reasonable Assurance Analysis

C/CAG initiated a county-wide effort to develop a Reasonable Assurance Analysis (RAA) for estimating baseline stormwater pollutant loads to the Bay. The RAA also set goals for the amount of GI needed to mitigate a portion of this pollutant load through 2040 as required by the MRP.

From the RAA, each jurisdiction received a tailored cost-optimized implementation strategy specifying the amount and type of GI, by subwatershed, required to meet water quality targets (e.g., future regulated projects, existing GI projects, identified regional projects, green streets).

The GI Plan includes a metric that prioritizes opportunities based on the results of the RAA. This effectively targets the greatest amount of GI that is needed to meet MRP requirements in the most cost-effective manner. The amount of GI in each subwatershed varies across the different project types and is reflected in the prioritization results. For instance, projects in subwatersheds that were identified as requiring greater investment in GI were given a higher score accordingly.

Figure 4-3 shows the GI project capacities required in the City of Menlo Park to meet the load reductions specified by the MRP and provides a visual representation of how the City's GI needs are distributed spatially. The darker blue subwatersheds represent areas that require more GI, while lighter blue subwatersheds are areas requiring less GI.

Refer to Appendix B for additional discussion of the RAA modeling process and a detailed explanation of results.

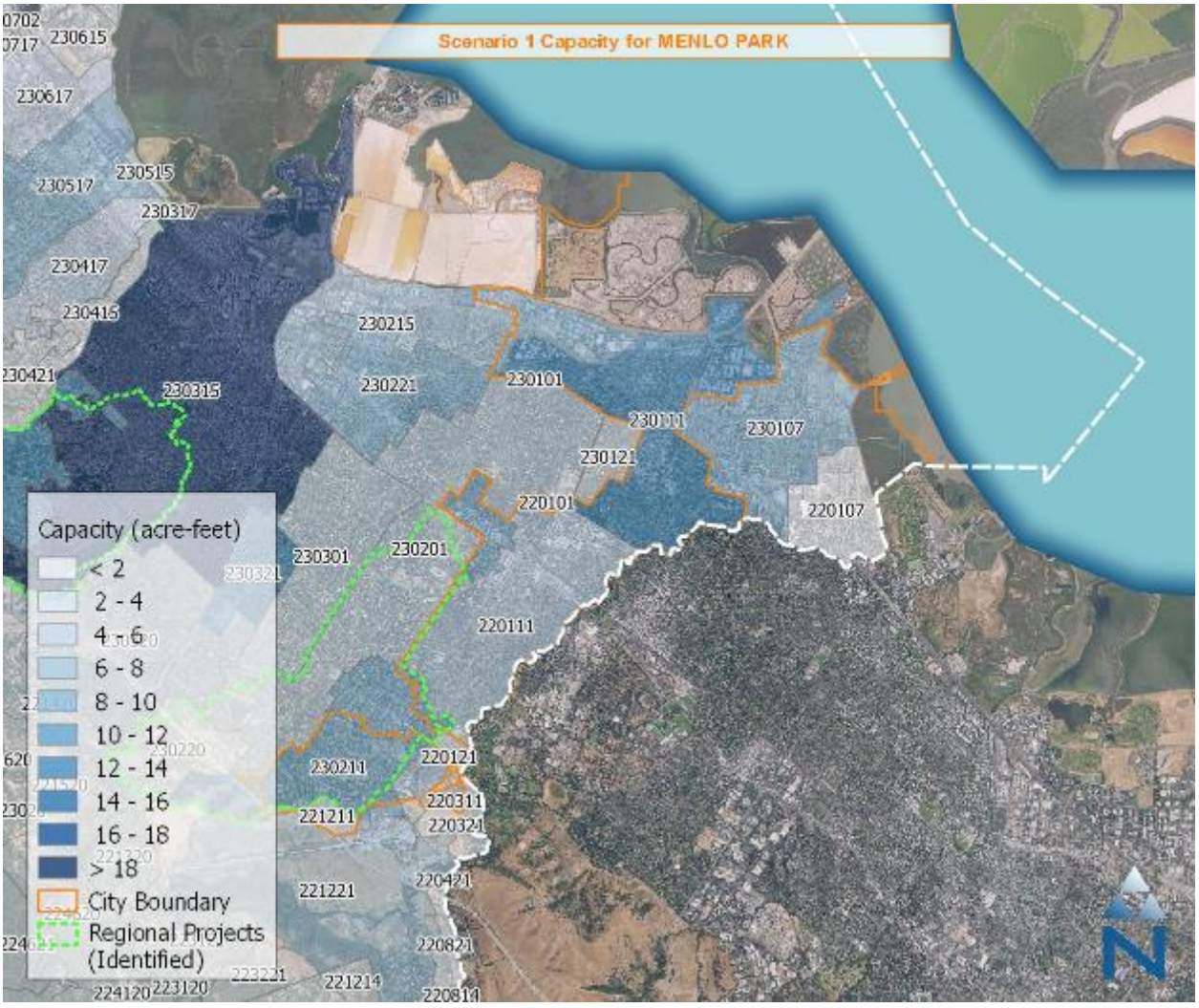


Figure 4-3 Spatial distribution of GI Capacity Needs by Subwatershed

Proximity to Storm Drains

Many types of GI depend on connections to existing storm drain infrastructure. For example, in order to treat flows from the greatest drainage area possible, regional stormwater capture projects must often divert runoff directly from a nearby storm drain or channel.

Furthermore, certain GI measures require storm drain connections through an underdrain to evacuate runoff where poorly-drained soils and larger-sized storm events prevail. Consequently, projects were assigned scores based on distance from the nearest storm drain.

Distances were modeled relative to each GI project type and vary in scale. Diversions to regional projects can often span greater distances, especially if pumping is involved. Regional project opportunities more than 1,000 feet from the nearest drain received zero points in this category. Opportunities between 500 and 1,000 feet, 200 and 500 feet, and less than 200 feet from the nearest drain received 1, 3, and 5 points, respectively.

Distributed GI, if designed with an underdrain, must often be placed nearer to existing storm drains than regional projects with pump diversions. LID and green street

project opportunities more than 500 feet from the nearest storm drain received zero points in this category. Opportunities between 200 and 500 feet, 100 and 200 feet, and less than 100 feet from the nearest drain received 1, 3, and 5 points, respectively.

Right-of-Way Width

Right-of-way width is an important metric for green street projects. The right-of-way is one of the most space-constrained sites for implementing GI. The right-of-way must maintain functionality for automotive, bicycle, and pedestrian traffic before consideration of GI.

Implementing GI within the existing right-of-way without requiring a change to the right-of-way boundaries is a priority. For this reason, streets segments within wider right-of-way have a greater chance of supporting GI projects and were given higher priority. Because different street types (e.g., local, connector, arterial) have different roadway widths and width constraining features (e.g., sidewalks, street parking), streets are bracketed into the 33% widest, 33% moderate, and 33% narrowest streets according to their type. For example, the widest street segments of arterial streets occupy the same bracket as the widest street segments of local streets. Street segments within wider right-of-way were given higher priority.

Right-of-Way Management

Right-of-ways managed by Caltrans or the San Francisco Public Utilities Commission (SFPUC) were assigned lower points due to difficulties in coordination. Projects that are under the jurisdiction of other agencies are likely to face challenges with obtaining buy-in and coordinating operations and maintenance responsibilities.

Assigning a lower score does not remove these opportunities from consideration for implementation. Instead, because one goal of the GI Plan is to identify the top-ranking projects for near-term implementation and with the greatest chances for success, the project opportunities under Caltrans or SFPUC management can be considered as part of a later phase of the implementation plan.

Spacing Impact from Driveways

Driveways represent just one of the constraints for siting GI improvements in the right-of-way. Streets with densely-spaced driveways contain less available space for curb extension bioretention or other green street improvements. Width of driveways were calculated from the Menlo Park's GIS data, which maps locations of driveways across the City. Street segments with smaller percentages of street length occupied by driveways were given higher priority.

Utility Conflicts

Utility constraints are some of the most important factors determining feasibility for GI implementation in the right-of-way. Conflicts with large utilities, i.e., gas and large water mains, are often cost prohibitive to design around. Smaller utilities, such as sewer laterals and water distribution lines, are more easily relocated or amenable to other utility designs.

The two utilities considered in the analysis were PG&E gas transmission pipelines and large water mains. These two datasets were categorized as either a conflict or a high conflict, based on difficulties in either relocation or accommodating potential GI design. Water mains greater than 8 inches in diameter were considered a conflict, while gas transmission lines were considered a high conflict. This metric was only considered for green street opportunities.

Opportunities with the least amount of water main per linear length of street segment were prioritized. For street segments with multiple utility lines, the aggregate length was used.

Opportunities containing any length of gas transmission pipeline were given the least number of points.

Table 4-3 through 4-5 summarize the criteria and scoring used to prioritize GI opportunities across the City. The tables highlight the metrics that were previously used in the SRP, the metrics that were modified for the GI Plan, and the new City-specific metrics added to the prioritization process.

Table 4-3 Metrics for **REGIONAL STORMWATER CAPTURE** project opportunities
(**Bold** = metric was included in the SRP but modified for the GI Plan; ~~Gray~~ = removed from GI Plan metrics)

	Points						Weight Factor
	0	1	2	3	4	5	
Stormwater Resource Plan Metrics							
Parcel land use			Schools / Golf Courses	Public Buildings	Parking Lot	Park / Open Space	
Imperviousness (%)	< 40	40 – 50	50 – 60	60 - 70	70 - 80	80 - 100	
Parcel size (acres)	0.25 - 0.5	0.5 – 1	1 – 2	2 - 3	3 - 4	≥ 4	
Hydrologic soil group		D	Unknown	C	B	A	
Slope (%)	5 - 10	4 – 5	3 – 4	2 - 3	1 - 2	≤ 1	
Proximity to flood-prone channels (miles)	Not in sub-basin	> 3		1 - 3		≤ 1	2
Contains PCB interest areas	None			Moderate		High	2
Currently planned by City or co-located with other City project	**No**					**Yes**	**2**
~~Drains to TMDL water~~	~~No~~					~~Yes~~	
~~Above groundwater basin~~	~~No~~		~~Yes~~				
Augments water supply	**No**					**Above groundwater basin, not near cleanup site, and outside high groundwater**	
Water quality source control	No	Yes					
Reestablishes natural hydrology	No	Yes					
Creates or enhances habitat	No	Yes					
Community enhancement	No	Yes					
City-Specific Metrics							
Subwatershed with highest capacity in RAA (by project type)	Not in RAA subwatershed	Remaining subwatersheds		Subwatershed ID 230211		Subwatershed ID 220111	
Proximity to storm drain (ft)	> 1,000	500 – 1000		200 - 500		≤ 200	

Table 4-4 Metrics for **LID** project opportunities
(**Bold** = metric was included in the SRP but modified for the GI Plan; **Gray** = removed from GI Plan metrics)

	Points						Weight Factor
	0	1	2	3	4	5	
Stormwater Resource Plan Metrics							
Parcel land use			Schools / Golf Courses	Park / Open Space	Parking Lot	Public Buildings	
Imperviousness (%)	< 40	40 – 50	50 – 60	60 - 70	70 - 80	80 - 100	
Hydrologic soil group		D	Unknown	C	B	A	
Slope (%)	5 - 10	4 – 5	3 – 4	2 - 3	1 - 2	≤ 1	
Proximity to flood-prone channels (miles)	Not in sub-basin	> 3		1 - 3		≤ 1	2
Contains PCB interest areas	None			Moderate		High	2
Currently planned by City or co-located with other City project	**No**					**Yes**	**2**
~~Drains to TMDL water~~	~~No~~					~~Yes~~	
~~Above groundwater basin~~	~~No~~		~~Yes~~				
Augments water supply	**No**					**Above groundwater basin, not near cleanup site, and outside high groundwater**	
Water quality source control	No	Yes					
Reestablishes natural hydrology	No	Yes					
Creates or enhances habitat	No	Yes					
Community enhancement	No	Yes					
City-Specific Metrics							
Subwatershed with highest capacity in RAA (by project type)	Not in RAA subwatershed	Remaining subwatersheds		Subwatershed ID 220111		Subwatershed ID 230111 or 230211	
Proximity to storm drain (ft)	> 500	200 – 500		100 - 200		≤ 100	

Table 4-5 Metrics for **GREEN STREETS** project opportunities
(**Bold** = metric was included in the SRP but modified for the GI Plan; **Gray** = removed from GI Plan metrics)

	Points						Weight Factor
	0	1	2	3	4	5	
Stormwater Resource Plan Metrics							
Street type	**Highway**		**Alley**	**Local**	**Collector**	**Arterial**	
Imperviousness (%)	< 40	40 – 50	50 - 60	60 - 70	70 - 80	80 - 100	
Hydrologic soil group		D	Unknown	C	B	A	
Slope (%)		4 – 5	3 - 4	2 - 3	1 – 2	≤ 1	
Proximity to flood-prone channels (miles)	Not in sub-basin	> 3		1 - 3		≤ 1	2
Contains PCB interest areas	None			Moderate		High	2
Currently planned by City or co-located with other City project	**No**					**Yes**	**2**
Safe Routes to School program	No					Yes	2
~~Drains to TMDL water~~	~~No~~					~~Yes~~	
~~Above groundwater basin~~	~~No~~		~~Yes~~				
Augments water supply	**No**					**Above groundwater basin, not near cleanup site, and outside high groundwater**	
Water quality source control	No	Yes					
Reestablishes natural hydrology	No	Yes					
Creates or enhances habitat	No	Yes					
Community enhancement	No	Yes					
City-Specific Metrics							
Subwatershed with highest capacity in RAA (by project type)	Not in RAA subwatershed	Remaining subwatersheds		Subwatershed ID 230211		Subwatershed ID 220111	
Roadway width (ft)		Narrowest 33% of street class		Middle 33% of street class		Widest 33% of street class	
Right-of-way management	Caltrans/ SFPUC					City of Menlo Park	
Loss of available street length due to presence of driveways	> 50%	40 - 50%	30 - 40%	20 - 30%	10 - 20%	≤ 10%	
Proximity to storm drain (ft)	> 500	200 – 500		100 - 200		≤ 100	

	Points						Weight Factor
	0	1	2	3	4	5	
Utility conflicts		High conflict utilities	> 1000 ft of conflict per 1000 LF of street	500 - 1000 ft of conflict per 1000 LF of street	100 - 500 ft of conflict per 1000 LF of street	≤ 100 ft of conflict per 1000 LF of street	

4.4.3. Resulting City-Specific Prioritization List

The screening of parcels and street segments resulted in 75 regional, 92 LID, and 1,038 green street project opportunities across public parcels or right-of-way in Menlo Park. For comparison, project opportunities were bracketed into High, Medium, and Low priority categories based on the total score from the prioritization analysis:

- High is defined as the 90th percentile of project opportunities.
- Medium is defined as between the 60th and 90th percentile.
- Low is defined as below the 60th percentile.

These categories represent the likeliness a project opportunity would result in an effective GI project if implemented at that site and is used as the basis for implementation strategy of the GI Plan. The number of project opportunities that fall into these brackets is summarized in Table 4-6.

Table 4-6 Summary of prioritization results for Menlo Park

Bracket	Criteria	Project Type		
		Regional	LID	Green Street
High	> 90%	6	6	86
Medium	60 – 90%	22	31	294
Low	< 60%	47	55	658
TOTAL	**-**	**75**	**92**	**1,038**

a. Potential Regional Projects

A total of 6 high-priority, 22 medium-priority, and 47 low-priority potential regional projects resulted from the City-specific prioritization.

Table 4-7 depicts an example score sheet for two regional project opportunities in Menlo Park. Figure 4-4 and Figure 4-5 show the regional project opportunities in Menlo Park bracketed into High, Medium, and Low priority categories.

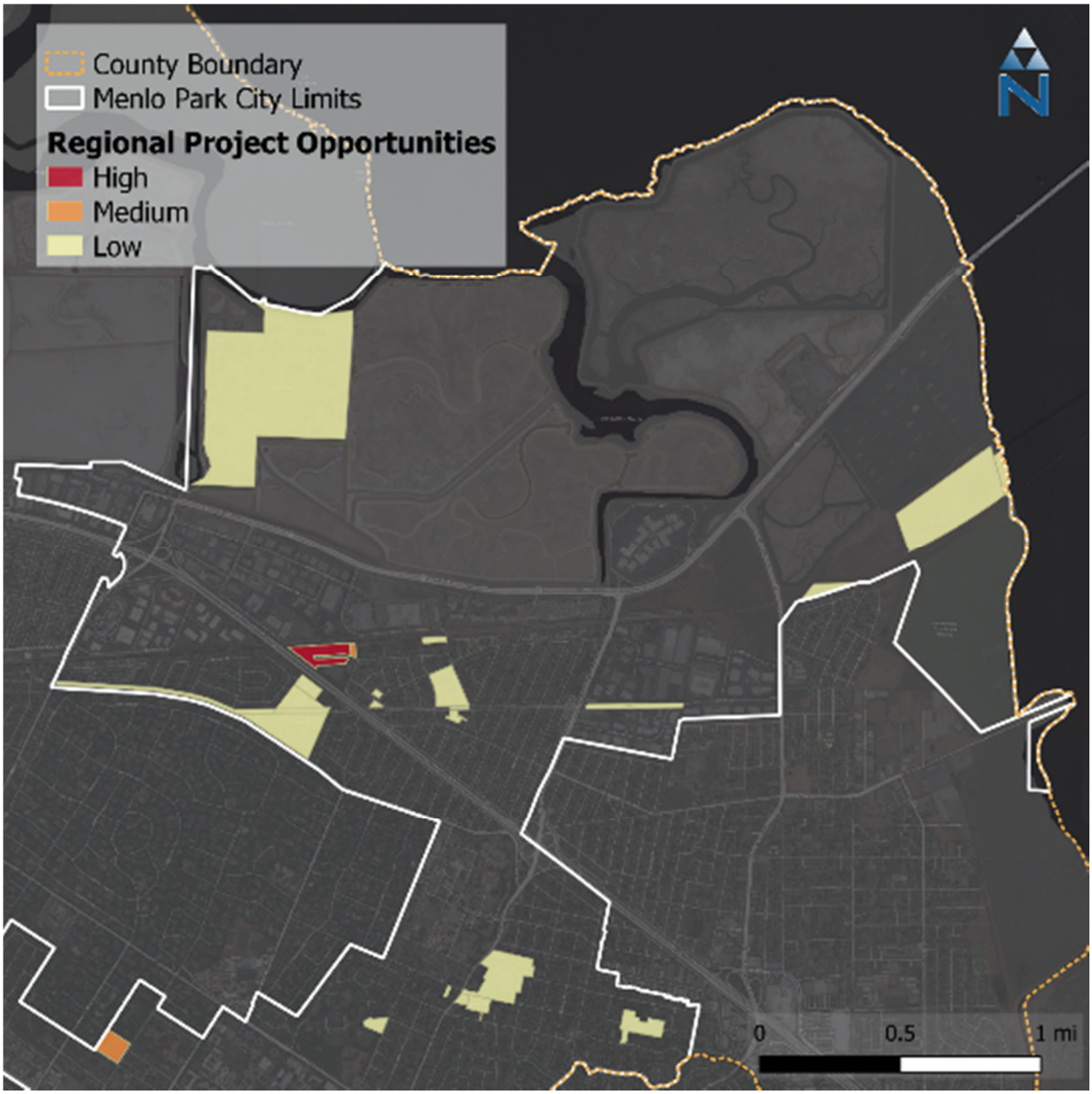


Figure 4-4 Regional project opportunities in Menlo Park (north).

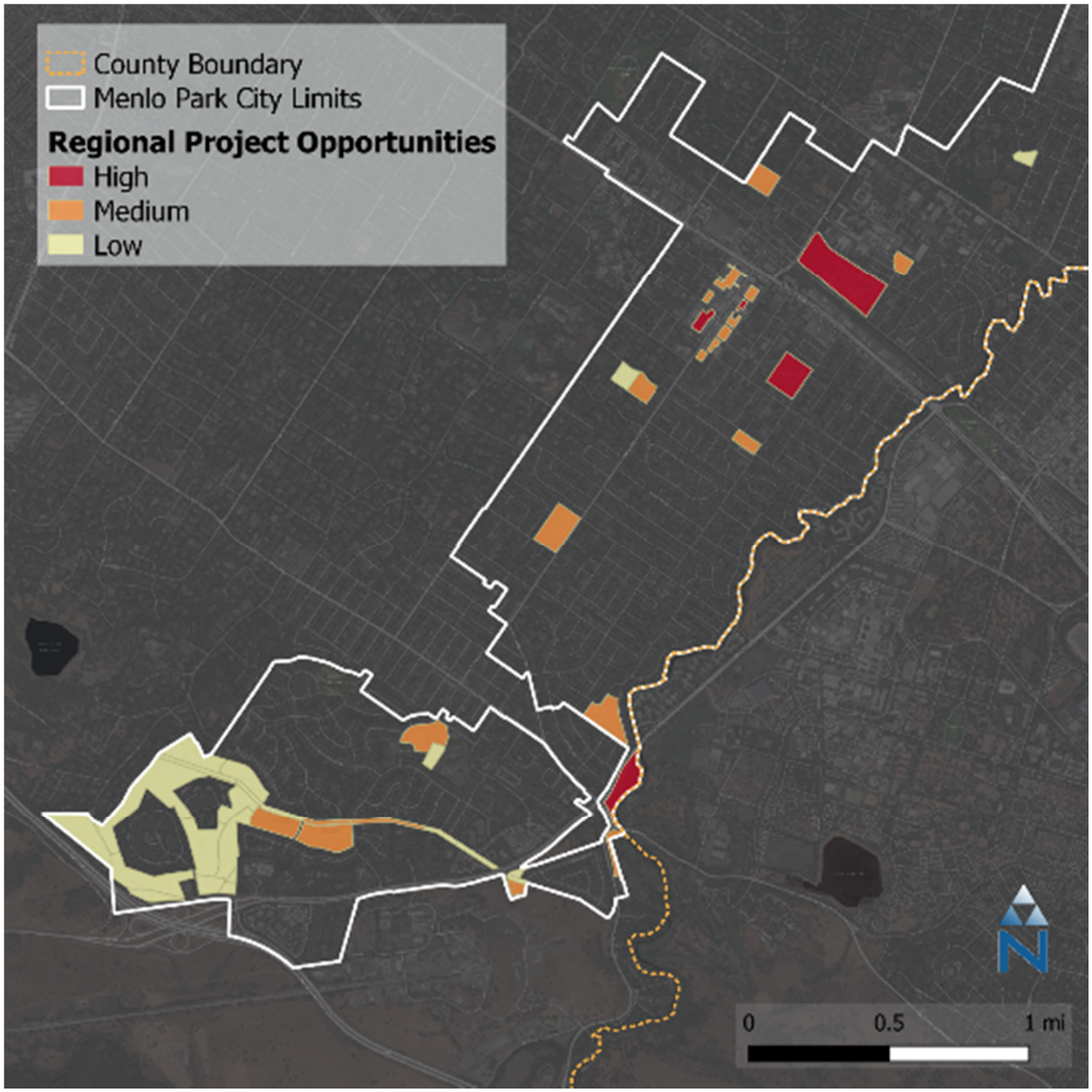


Figure 4-5 Regional project opportunities in Menlo Park (south).

Table 4-7 Example scoring for two regional project opportunities in Menlo Park

Project Opportunity Site Name	City Hall/ Burgess Park		Seminary Oaks Park	
Category	High		Low	
Total Score	63		28	
Characteristic	**Value**	**Score**	**Value**	**Score**
Parcel Land Use	Public Buildings	3	Park/Open Space	5
Impervious Area (%)	26	0	34	0
Parcel size (acres)	24.34	5	1.89	2
Hydrologic soil group	Unknown	2	C	3
Slope (%)	1	5	1	5
In flood-prone watershed	Yes	10	No	0
Contains PCB Interest Areas	High	10	None	0
Currently planned by City or co-located with other City project	Yes	10	No	0
Augments water supply	Above groundwater basin, not near cleanup site, and outside high groundwater	5	Above groundwater basin, not near cleanup site, and outside high groundwater	5
Water quality source control	Yes	1	Yes	1
Reestablishes natural hydrology	Yes	1	Yes	1
Creates or enhances habitat	No	0	No	0
Community enhancement	Yes	1	Yes	1
Subwatershed with highest capacity in RAA (by project type)	SWS 220111	5	Not in RAA watershed	0
Proximity to storm drain (ft)	59	5	106	5

b. Potential LID Projects

A total of 6 high-priority, 31 medium-priority, and 55 low-priority potential LID projects resulted from the City-specific prioritization. Table 4-8 depicts an example score sheet for two LID project opportunities in Menlo Park. Figure 4-6 and Figure 4-7 show the LID project opportunities in Menlo Park bracketed into High, Medium, and Low priority categories.

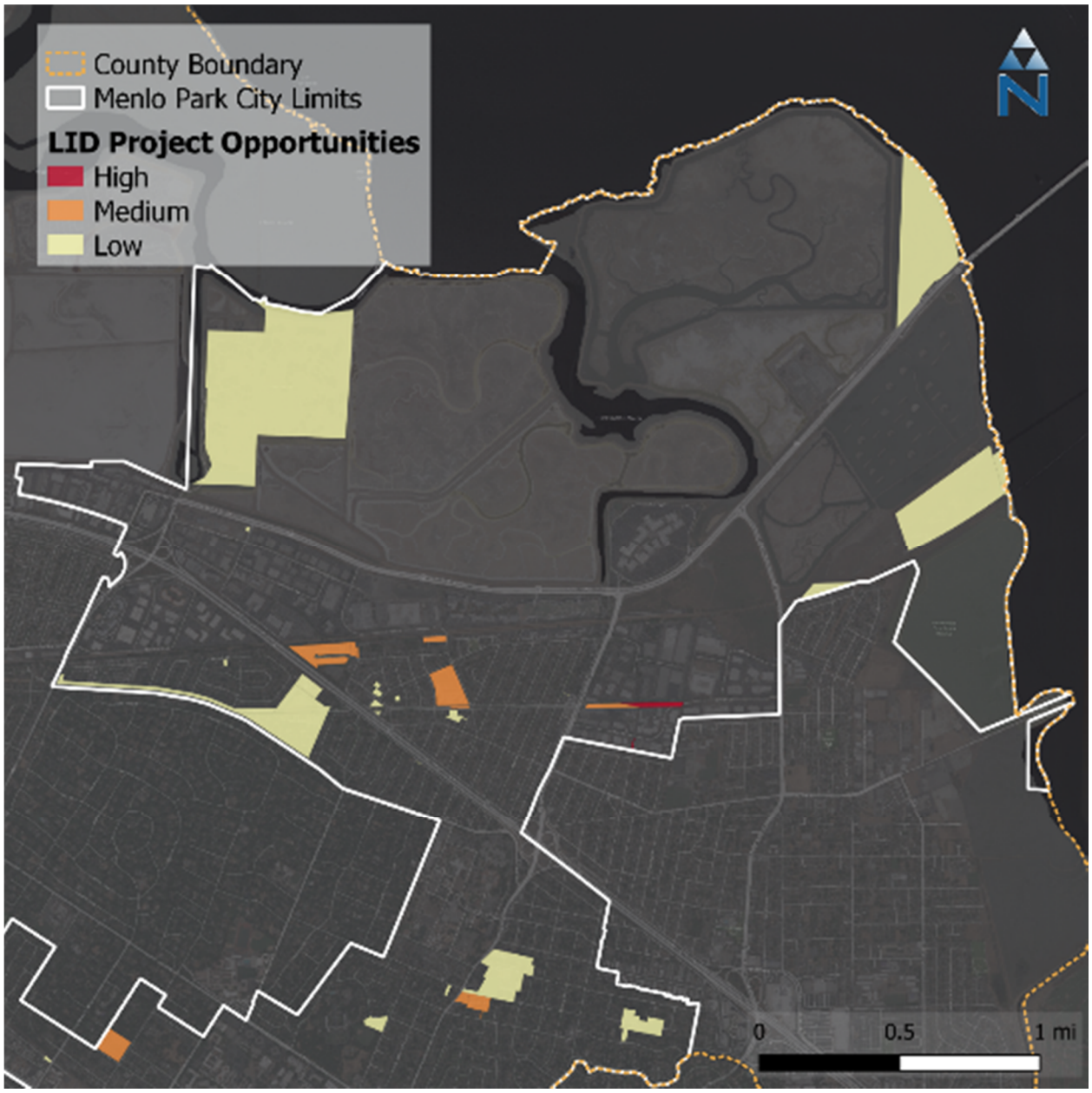


Figure 4-6 LID project opportunities in Menlo Park (north).

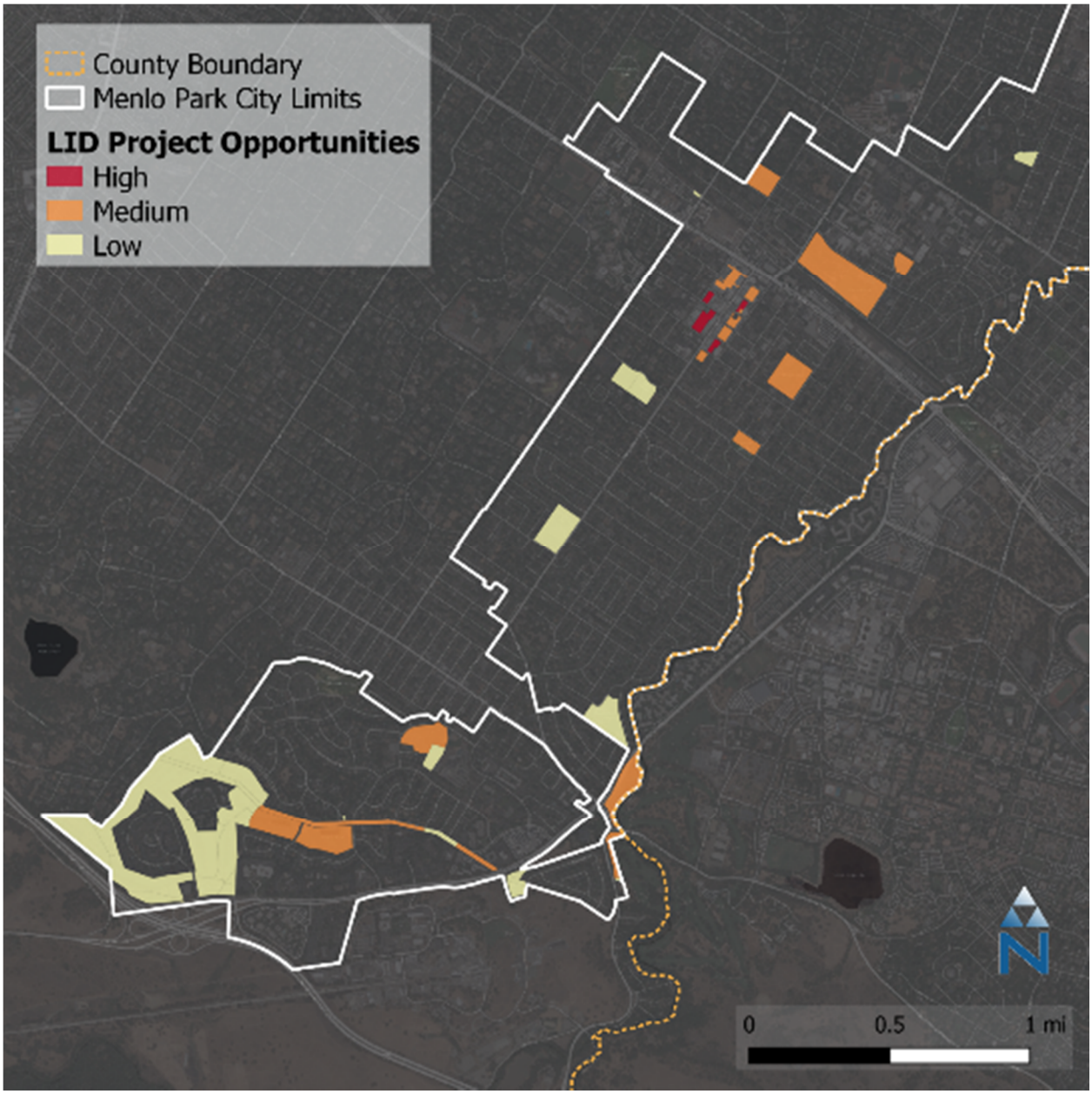


Figure 4-7 LID project opportunities in Menlo Park (south).

Table 4-8 Example scoring for two LID project opportunities in Menlo Park

Project Opportunity Site Name	**Public Parking Lot – University Dr & Santa Cruz Ave**		**Karl E. Clark Park**	
Category	High		Low	
Total Score	51		31	
Characteristic	**Value**	**Score**	**Value**	**Score**
Parcel land use	Parking Lot	4	Park	5
Impervious area (%)	78	4	46	1
Hydrologic soil group	Unknown	2	Unknown	2
Slope (%)	1	5	0	5
In flood-prone watershed	Yes	10	No	0
Contains PCB Interest Areas	None	0	None	0
Currently planned by City or co-located with other City project	Downtown Streetscape Improvements	10	No	0
Augments water supply	Above groundwater basin, not near cleanup site, and outside high groundwater	5	Above groundwater basin, not near cleanup site, and outside high groundwater	5
Water quality source control	Yes	1	Yes	1
Reestablishes natural hydrology	Yes	1	Yes	1
Creates or enhances habitat	No	0	No	0
Community enhancement	Yes	1	Yes	1
Subwatershed with highest capacity in RAA (by project type)	SWS 220111	3	SWS 230111	5
Proximity to storm drain (ft)	16	5	89	5

c. Potential Green Street Projects

A total of 86 high-priority, 294 medium-priority, and 658 low-priority potential green street projects resulted from the City-specific prioritization. Table 4-9 depicts an example score sheet for two green street project opportunities in Menlo Park. Figure 4-8 and Figure 4-9 show the green street project opportunities in Menlo Park bracketed into High, Medium, and Low priority categories.

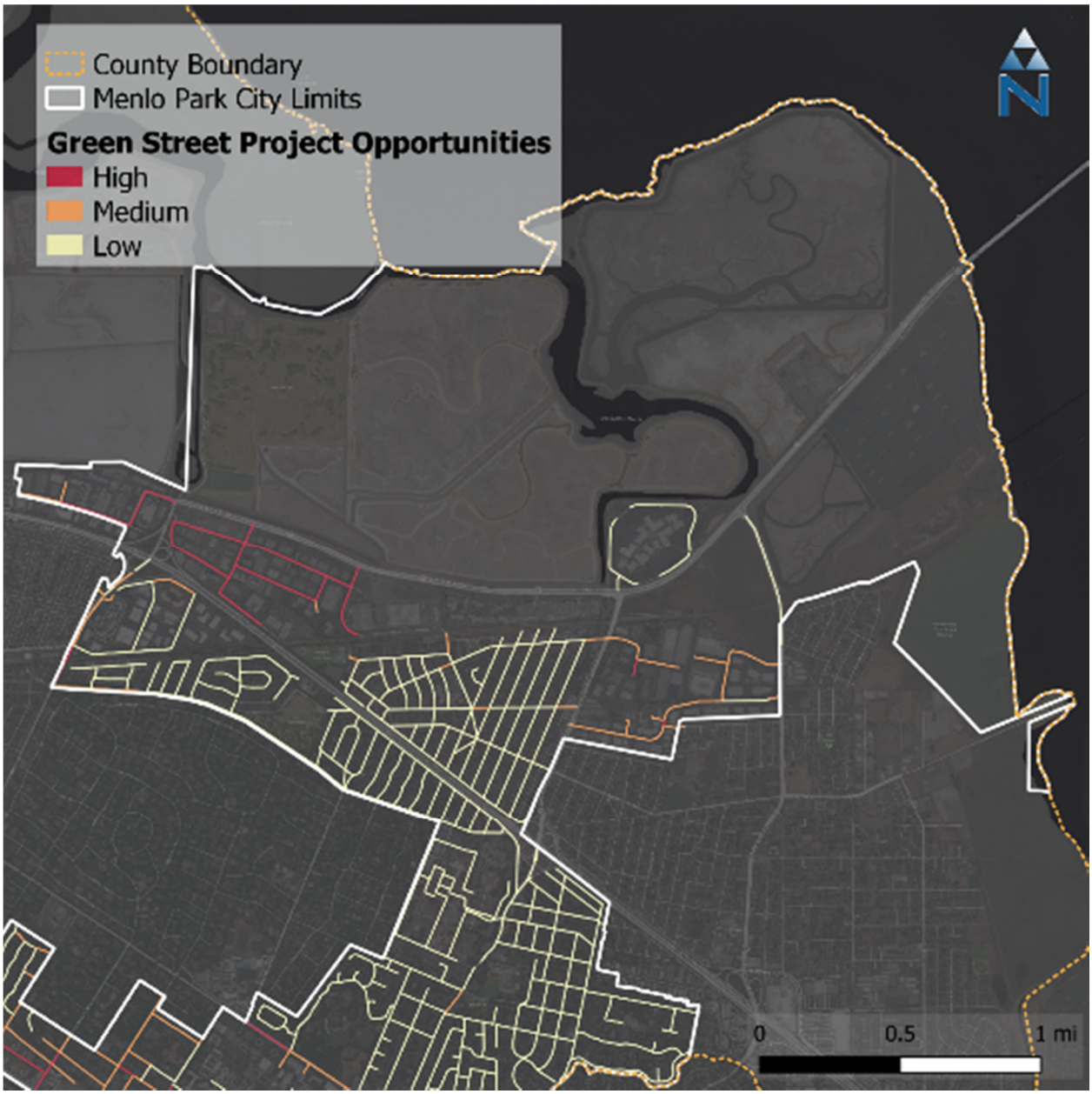


Figure 4-8 Green street project opportunities in Menlo Park (north).

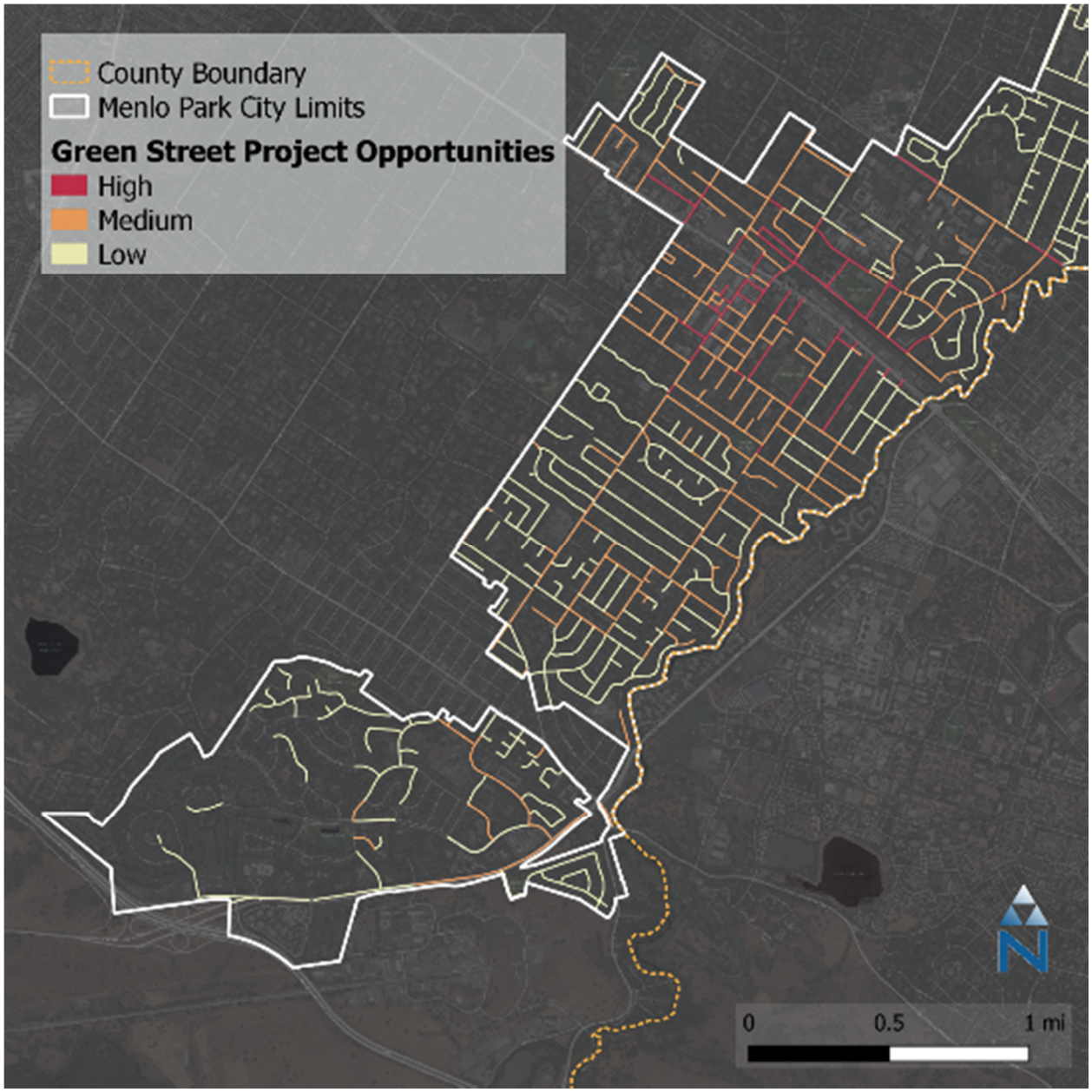


Figure 4-9 Green street project opportunities in Menlo Park (south).

Table 4-9 Example scoring for two Green Street project opportunities in Menlo Park

Project Opportunity Site Name	**Constitution Dr – from Independence Dr to Chilco St**		**Grayson Ct**	
Category	High		Low	
Total Score	75		31	
Characteristic	**Value**	**Score**	**Value**	**Score**
Street type	Local	3	Local	3
Impervious area (%)	70	4		1
Hydrologic soil group	C	3		2
Slope (%)	1	5		5
In flood-prone watershed	Yes	10	No	0
Contains PCB Interest Areas	High	10	None	0
Currently planned by City or co-located with other City project	Yes	10	No	0
Co-located with Safe Routes to School project	No	0	No	0
Augments water supply	Within 500 ft of active cleanup site	0	Above groundwater basin, not near cleanup site, and outside high groundwater	5
Water quality source control	Yes	1	Yes	1
Reestablishes natural hydrology	Yes	1	Yes	1
Creates or enhances habitat	No	0	No	0
Community enhancement	Yes	1	Yes	1
Subwatershed with highest capacity in RAA (by project type)	SWS 230211	3	SWS 230111	1
Right-of-way width (ft)	60 (Widest 33%)	5	48 (Narrowest 33%)	1
Right-of-way management	City-maintained	5	City-maintained	5
Loss of available street length due to driveways	14% of street is driveway	4	21% of street is driveway	3
Proximity to storm drain (ft)	20	5	251	1
Utility conflicts	No PG&E gas main, 17 ft of water main per 1000 ft of street	5	Along PG&E gas main	1

5.0 Citywide GI Strategy

C/CAG initiated a county-wide Reasonable Assurance Analysis (RAA) for estimating storm water pollutant loads to the Bay. The RAA also sets the amount of GI required to mitigate a portion of this pollutant load, through 2040, pursuant to the MRP. Chapters 1.1.2 and 4.4.3 further describe the regulatory and historical components of this initiative.

From the RAA, each jurisdiction received a tailored cost-optimized implementation strategy specifying the amount and type of GI required to meet pollutant reduction targets. This chapter demonstrates the City's strategy to address this goal by assessing a variety of GI projects.

5.1 Strategy Overview

The City of Menlo Park is committed to the transition from "gray" stormwater storm drain infrastructure to a system that is comprised of both gray and "green" infrastructure (GI) elements. Traditionally, gray infrastructure is used to convey untreated stormwater runoff to San Francisco Bay. Urban and developing areas are known contributors to certain pollutants in stormwater runoff. GI is designed to capture, detain, and treat stormwater using mechanisms that mimic natural treatment processes while providing a number of other benefits to the community.

The RAA quantifies the storage capacity from five types of GI projects to meet the pollutant reduction requirements of the MRP and forms the basis for the City's GI strategy. The City's strategy also utilizes the RAA results to specify an optimal mix of project types that would most cost-effectively achieve GI implementation goals. A summary of the RAA results for Menlo Park is detailed in Appendix B of this Plan. The five project types that are used in the RAA and form the basis of the City's GI strategy include:

Existing Projects:

Stormwater treatment and GI projects that have been implemented since FY-2004/05. This primarily consists of all of the regulated projects that were mandated to treat runoff via Provision C.3 of the MRP, but also includes any public green street or other demonstration projects that were not subject to Provision C.3 requirements. For regulated projects in the early years of C.3 implementation, stormwater treatment may have been achieved through non-GI means, such as underground vault systems or media filters.

Future New and Redevelopment:

This category encompasses potential C.3 regulated projects based on an estimate of future development proposals. This category is also tied to regional models for population and employment growth.

Regional Projects (identified):

C/CAG worked with agencies to identify five projects within public parks or Caltrans property to provide regional capture and infiltration/treatment of stormwater, and included conceptual designs to support further planning and designs.

Green Streets:

The SRP identified and prioritized opportunities throughout San Mateo County for retrofitting existing streets with GI in public rights-of-way. Green streets were ranked as high, medium, and low priority based on a

multiple-benefit prioritization process developed for the SRP.

Other GI Projects (to be determined):

This category represents any additional combination of publicly owned, parcel-based GI or Regional Projects. The SRP screened and prioritized public parcels to assess opportunities for onsite LID and Regional Projects. These opportunities need further investigation to determine feasibility and prioritization.

Figure 5-1 shows an example of how each of the project types builds upon each other in the GI strategy to achieve the City's stormwater capture goals. Figure 5-2 and 5-3 spatially displays an example of drainage areas treated by various project types across the City.

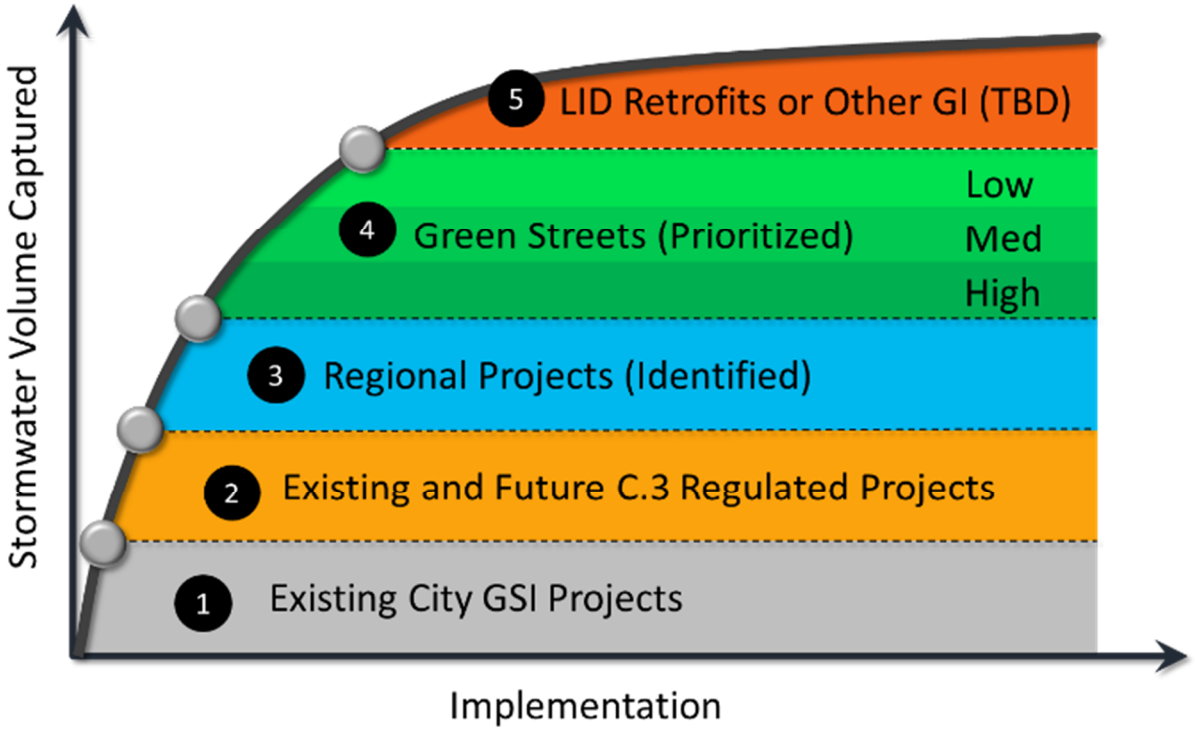
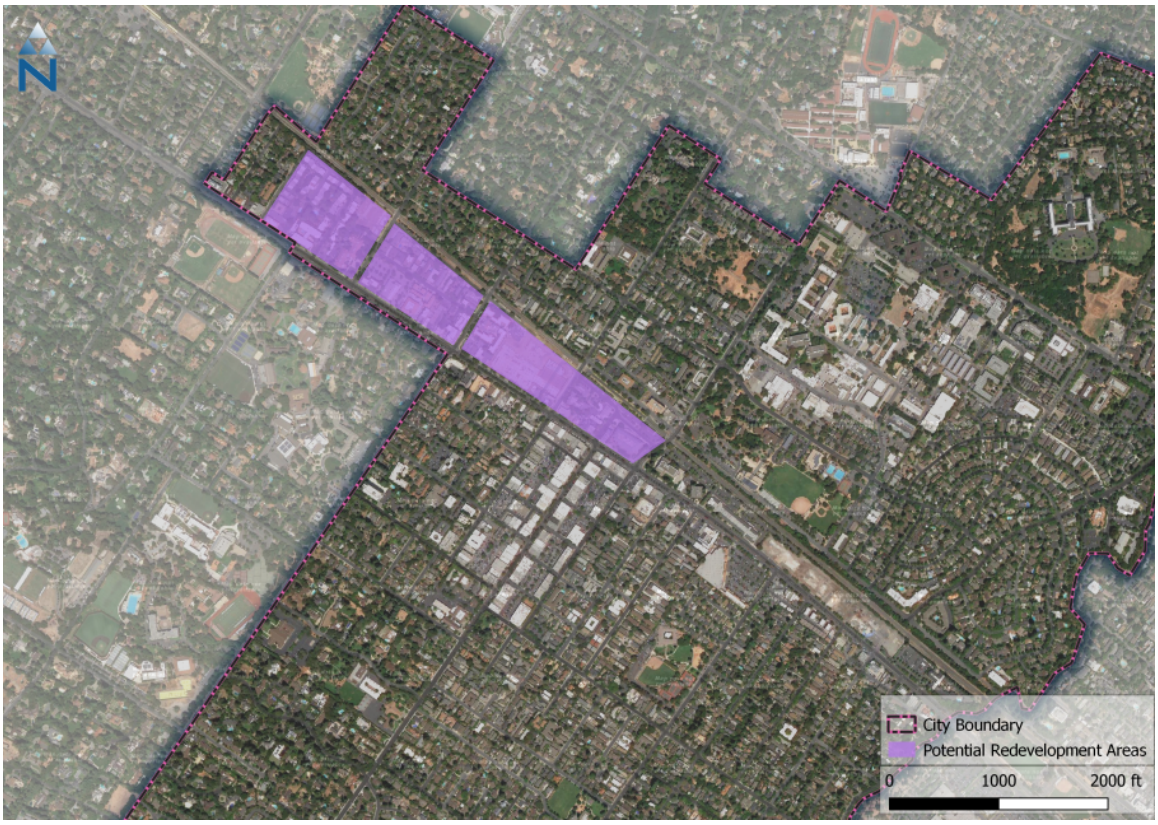


Figure 5-1 Multifaceted GI Strategy.



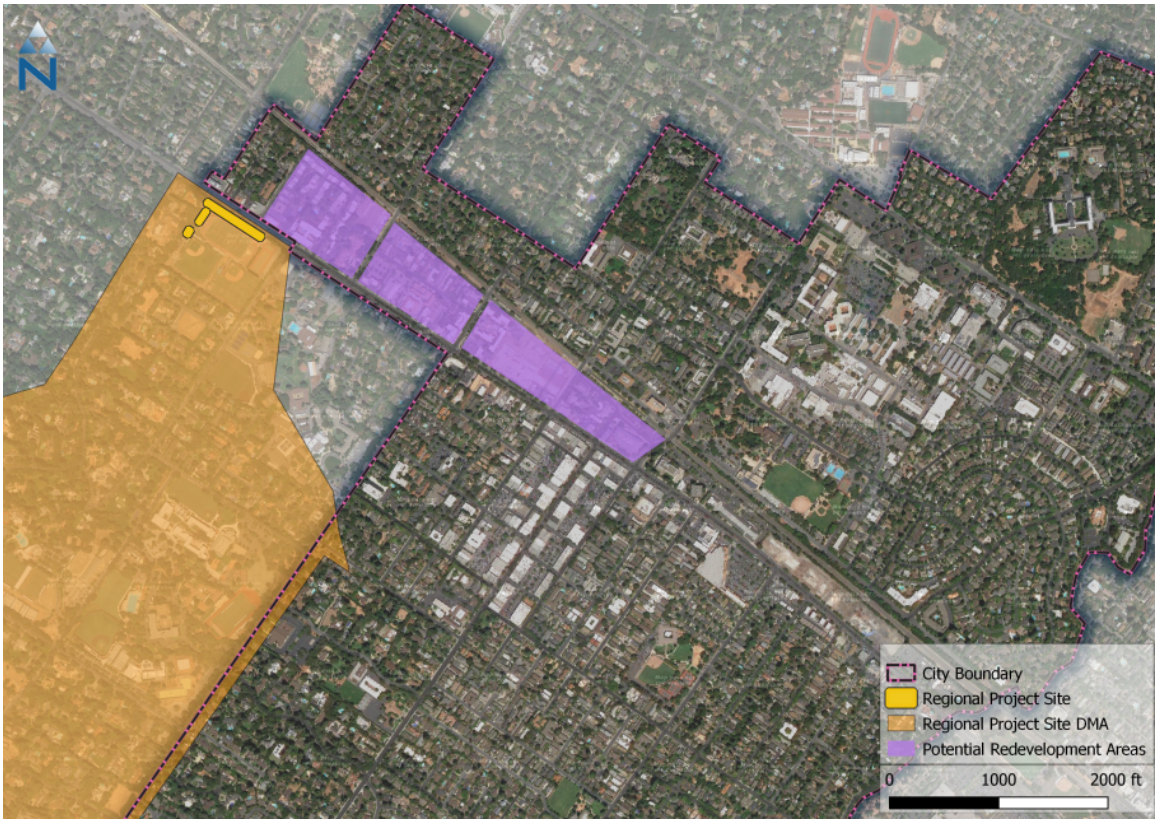


Figure 5-2 Map of example sequencing of GI project types.

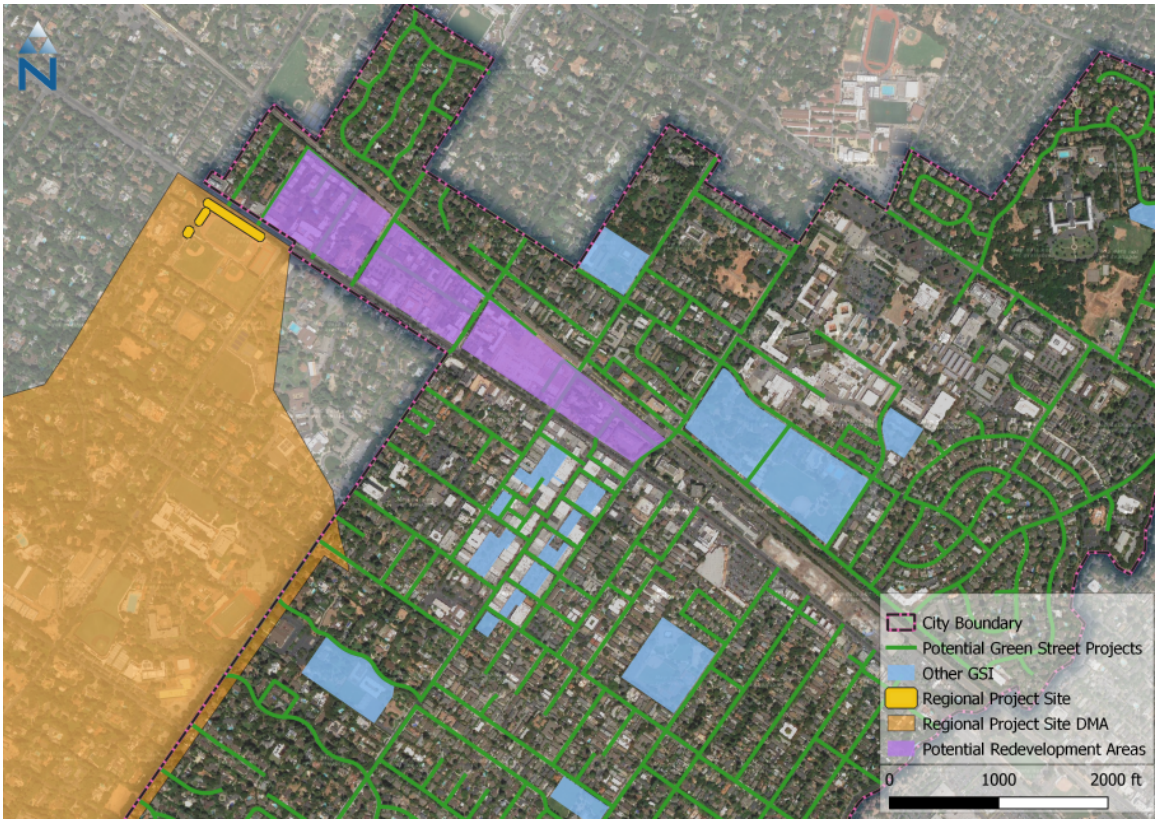


Figure 5-3 Map of example sequencing of GI project types.

Given the relatively small scale of most GI projects (e.g., LID on an individual parcel, a single street block converted to green street), numerous individual GI projects will be needed to address the pollutant reduction goals. All the GI projects will require site investigations to assess feasibility and costs. As a result, the City's GI strategy is based on the preliminary investigation of the amount of GI needed spatially (e.g., by subwatershed and municipal jurisdiction) to achieve the countywide pollutant load reduction target.

The RAA sets the GI Plan "goals" in terms of the amount of GI implementation over time to address pollutant load reductions. The GI Plan is intended to be continually updated to capture changing conditions and advancements in the state of science. As methods for quantifying pollutant reductions evolve – from updated GI assumptions, improved data quality, or new accounting methods for the effects of non-structural programmatic controls – the GI Plan and strategy may be updated through an adaptive management process. The content presented in this section represents an initial strategy based on best available data that will be improved over time.

5.2 Early Implementation

Several street improvement projects are already planned for design and construction and can be modified to incorporate green infrastructure in addition to, or in lieu of, traditional drainage infrastructure to achieve water quality goals. The City actively looks for these types of opportunities, which has resulted in several green street projects being constructed and more scheduled for implementation. These existing and early implementation green street projects include:

- Chilco Street (Northbound Improvements)
- Chilco Street (Southbound Improvements)
- Oak Grove Street Improvements
- Menlo Gateway

Additional information on each project is further described in the following sections.

5.2.1 Chilco Street (Northbound Improvements)

This privately funded project is associated with Facebook's on-site campus expansion (1 Facebook Way). The scope of work includes flow through planters along Chilco Street's Northbound lane to promote stormwater treatment, flood mitigation, and pedestrian / bicycle safety. The City conditioned the maintenance of these features pursuant to the terms of Facebook's development permit. This project represents the first phase of Chilco Street's green street retrofit and was successfully completed in Q4 of 2016.

Figure 5-4 Chilco Street Northbound Improvements

5.2.2 Chilco Street (Southbound Improvements)

This privately funded project is associated with Facebook's on-site campus expansion (1 Facebook Way). The scope of work proposes flow through planters and detention ponds along Chilco's Southbound lane to promote stormwater treatment, flood mitigation, and pedestrian/bicycle safety. The City leveraged installation of these features to Facebook pursuant to the terms of development, however, Public Works will assume responsibility for post-construction maintenance. This project is under construction as of this Plan with a tentative completion date of Q4 2019.

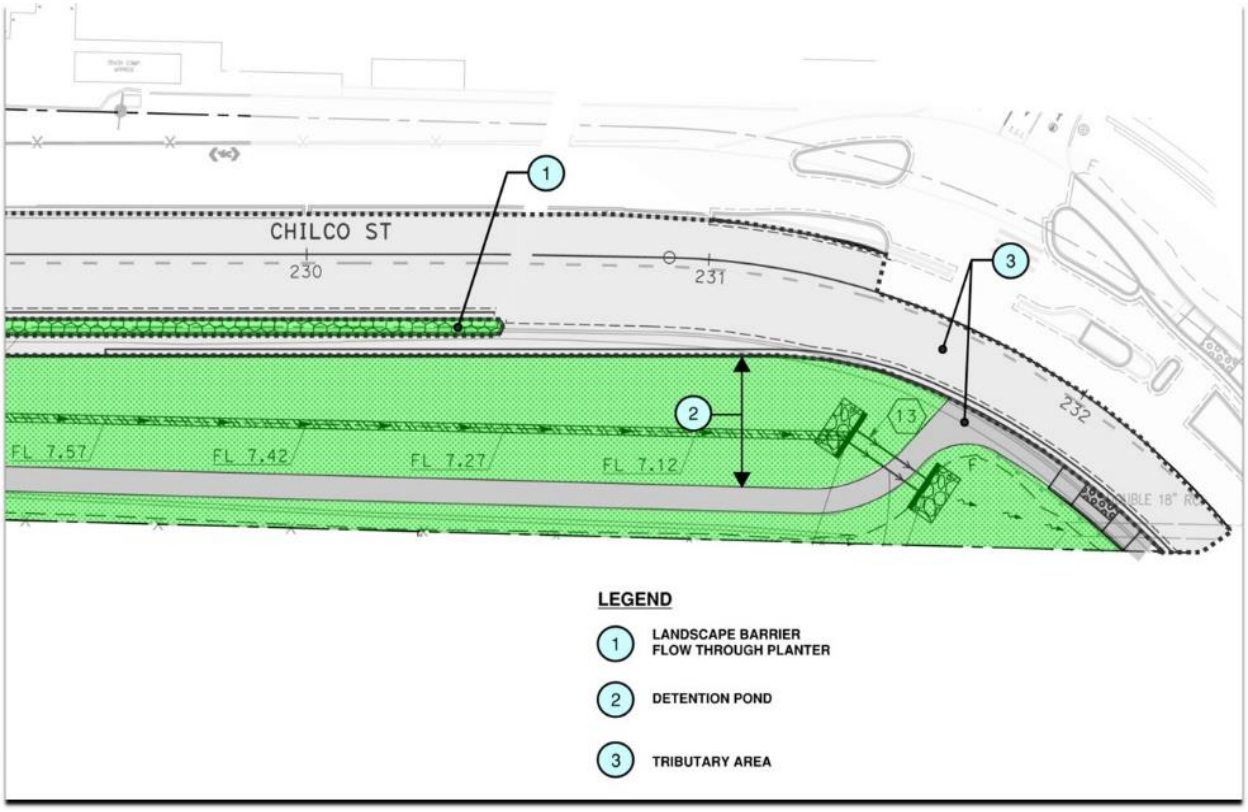


Figure 5-5 Chilco Street Southbound Improvements (excerpt from schematic plans)

5.2.3 Oak Grove Street Improvements

This forthcoming Capital Improvement Project spans Oak Grove Avenue between Marcussen Drive and Rebecca Lane. The scope of work includes new sidewalk with two bio-retention areas (totaling approximately 1,700 sf) for stormwater treatment and retention. The project is currently under schematic design with a tentative completion date by Q4 2019 unless otherwise noted.

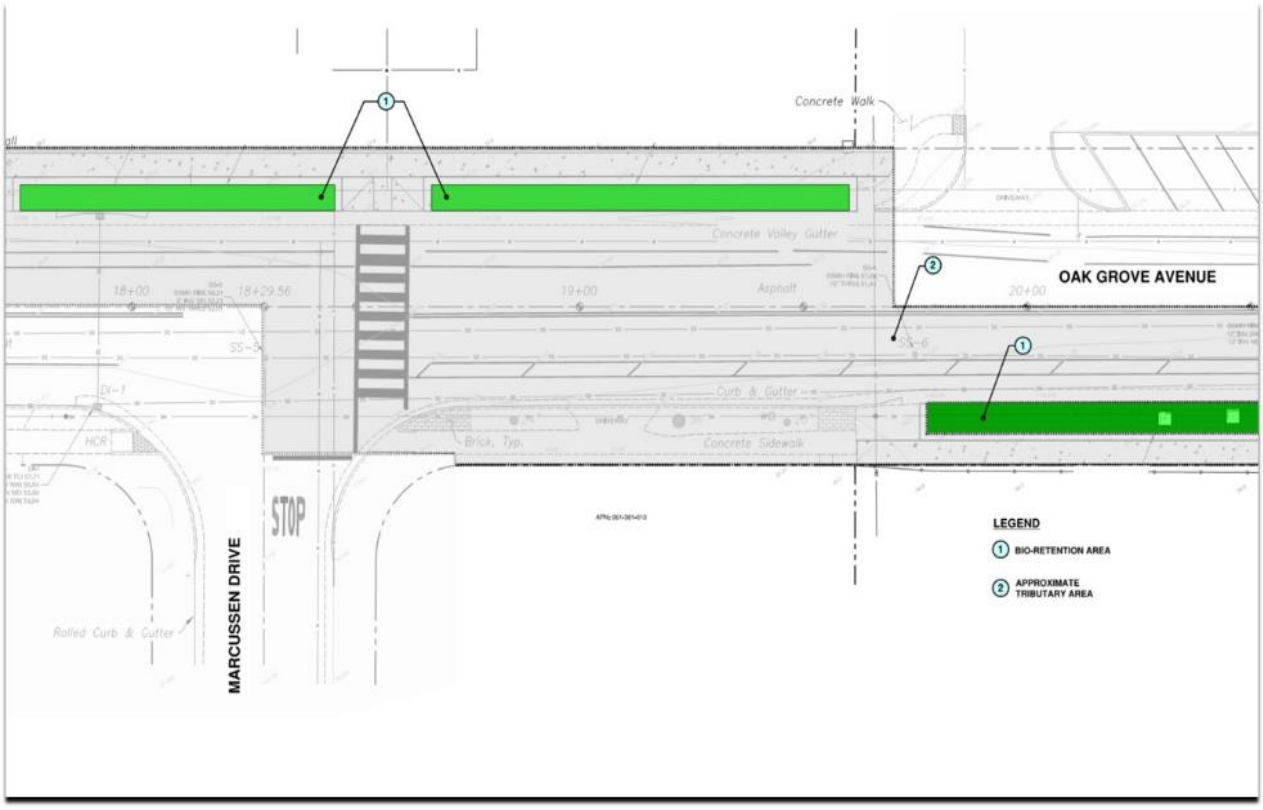


Figure 5-6 Oak Grove Street Improvements (excerpt from schematic plans)

5.2.4 Menlo Gateway

This privately funded project includes sidewalks, utilities, and green infrastructure spanning the Menlo Gateway site at Independence Drive. GI Bio-swales were constructed in lieu of traditional planters to advocate for stormwater treatment and mitigate the rate of runoff to storm drain networks downstream. Although the bio-swale was not sized in accordance with traditional C.3 metrics, it aligns with the concept of utilizing "off-line" facilities to treat a portion of a larger tributary area for "no missed opportunities". The maintenance of these facilities is incumbent upon the Owner by way of a Landscape Maintenance Agreement. The project concluded construction in Q2 of 2018.

Figure 5-7 Menlo Gateway Project at Independence Drive

5.3 Regulated Projects

5.3.1 Current Requirements

Provision C.3 of the MRP requires development projects that exceed a threshold in impervious area impact to address stormwater treatment via Low Impact Development measures (including GI). These projects are known as regulated projects and encompass both private and public development as identified in the MRP.[1] The GI Plan expands these measures to non-regulated projects on public parcels and rights-of-way. GI facilities on regulated projects help achieve multiple benefits within City watersheds and are considered part of the City's total inventory of GI facilities.

[1] As of Order R2-2015-0049, which became effective on January 1, 2016, the threshold for most regulated project types is 10,000 square feet of impervious area created and/or replaced. For gas stations, restaurants, automotive shops, and uncovered parking lots, the threshold is 5,000 square feet.

5.3.2 Project Inventory to Date

Since 2005, approximately 243 acres of development in the City have been subject to the Provision C.3 regulations. The City tracks the locations of these facilities and conducts an operation and maintenance verification inspection program to ensure that they are maintained properly. The City will continue to require future regulated projects to incorporate appropriate GI measures, as part of the City's long-term GI implementation strategy.

5.4 Regional GI Projects

Five potential regional GI projects across the County were identified based on the SRP's prioritization process per Section 4.3. Amongst these projects, a subsurface storage and filtration facility at Cartan Field in the Town of Atherton overlaps Menlo Park watershed and is applicable for a regional credit opportunity. This allows the City to partner on a multi-benefit, multi-jurisdictional stormwater capture project that will make progress towards the City's implementation goals.

While Cartan Field is in the conceptual design phase for the Town of Atherton, approximately 572 acres (23%) of its total 2,488-acre drainage area rests in Menlo Park. The project is, therefore, estimated to provide approximately 1.6 acre-feet of storage capacity credited towards the City based on the ratio of these cross jurisdictional tributary boundaries. A map of the proposed project location and drainage area is shown in Figure 5-8.

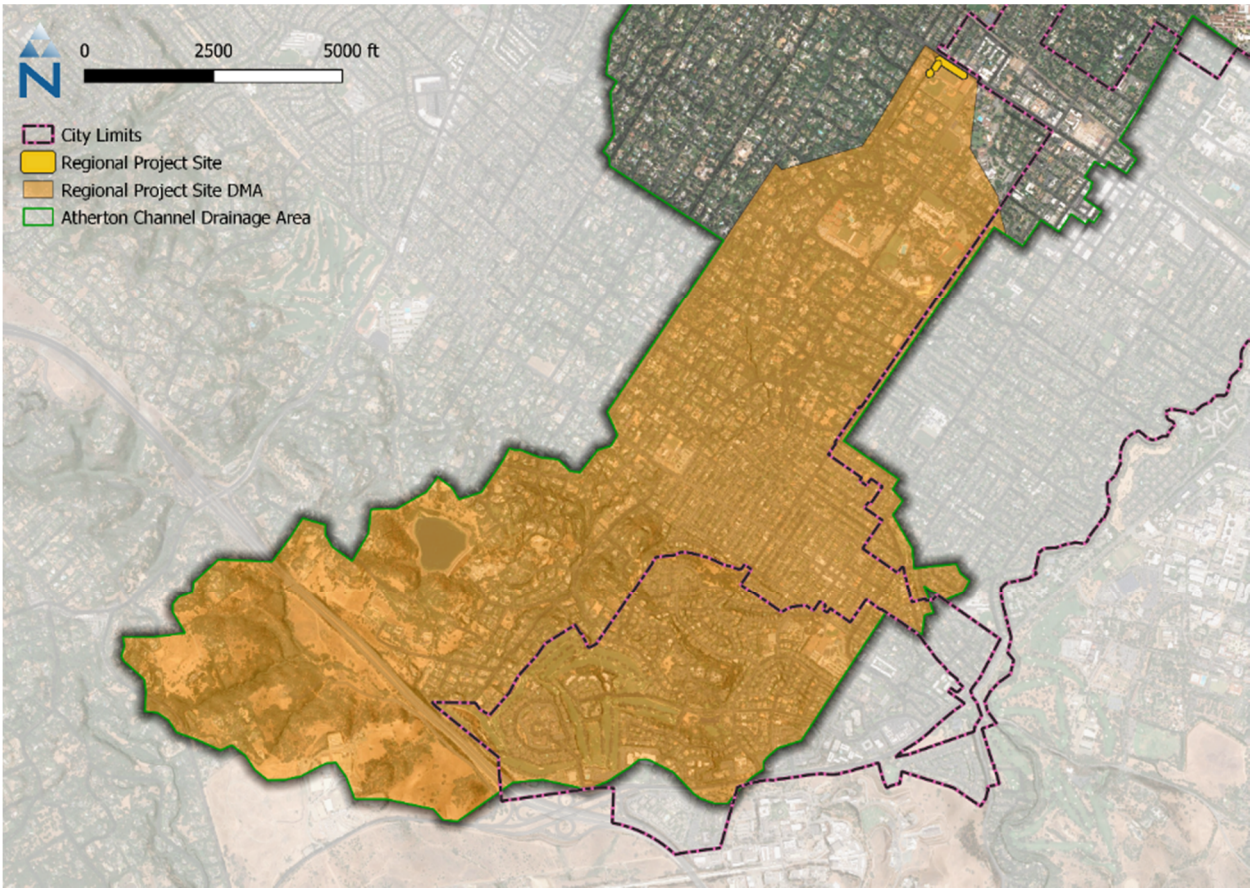


Figure 5-8 Location and drainage area of identified regional project (Cartan Field).

The City will continue to evaluate additional regional project locations. For example, the prioritization process in Chapter 4 may be leveraged to assess future regional project feasibility. The resulting list of prioritized potential regional projects may serve as a starting point for evaluating considerations such as community priorities, understanding of current site uses, and schedules for other capital improvement projects. Identified projects may then be advanced through conceptual design to determine the details necessary for estimating project performance and benefit.

Project sites identified in the future may be added to the current list. Regional projects tend to be more cost-effective than green street and LID projects in terms of runoff volume managed due to economies of scale. Future regional projects would offset the number of green street and LID retrofit projects needed to meet pollutant reduction goals.

5.5 Green Streets Projects

In addition to the early implementation green street projects discussed in Section 5.2, the City will continue to explore opportunities for implementation of green infrastructure in the right-of-way. Coupling GI with streetscape improvements is an effective way to increase treatment of stormwater runoff across the City.

Green street opportunities will be prioritized in areas where existing, regulated, and regional projects are not sufficient to meet GI implementation goals of the City. This prioritization method coupled with the results of the RAA (Appendix B) form the basis of the green street portion of the City's strategy. For example, the prioritization identifies the highest-ranking sites considering feasibility and potential performance, while the RAA determines volume capture needs by the subwatershed. The strategy can be refined as funding and grant opportunities are assessed and ongoing coordination with various City departments occurs. Figure 5-9 shows the potential green street projects from the prioritization and subwatersheds with greatest total GI capacities specified in the RAA.

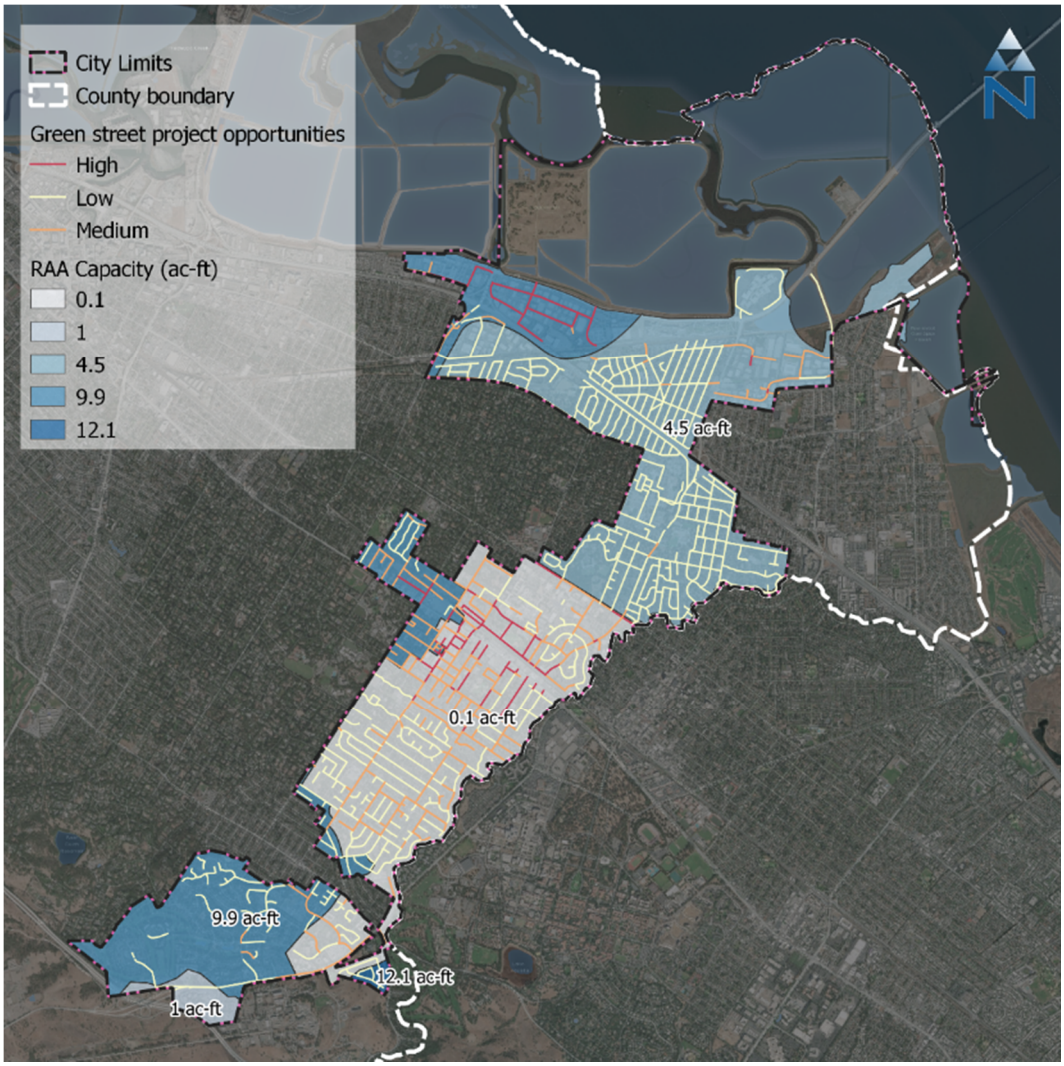


Figure 5-9 Prioritized potential green street projects and RAA-specified project capacity by subwatershed.

5.6 LID Retrofits and Other GI

Where insufficient opportunities or cost optimization constraints exist for regional and green street projects, stormwater treatment may be addressed through other types of GI projects "to be determined". Storage capacity determined for this category may be met through any combination of project types, including LID retrofits on public parcels and additional regional projects yet to be identified.

The City's storage capacity needs are projected to be fully met through a combination of C.3 projects on private development, the identified regional project, and green streets. As a result, no additional storage capacity is specified through other GI projects. However, while the RAA sets goals for where and which types of GI projects should be implemented, further engineering analysis (e.g., feasibility studies, site evaluations) may result in implementation of project types different from those specified by the RAA.

For example, future analysis may determine that certain LID projects on public parcels may be more favorable than green streets in the lower priority category. LID retrofits on public parcels may offset the volume from green streets specified by the RAA. Regional

project opportunities that have not yet been identified may also offset the amount of green street project capacity specified by the RAA. Regional projects tend to be more cost effective than green streets due to scale. For these reason, the GI strategy will be subject to adaptive management.

The City will continue to evaluate other project opportunities that may improve the cost-effectiveness of the strategy and ensure goals are met. Additional GI projects will also be assessed as part of future updates to the GI Plan. Figures 5-10 and 5-11 show potential LID retrofit and regional projects, categorized within the City's subwatershed, per the RAA.

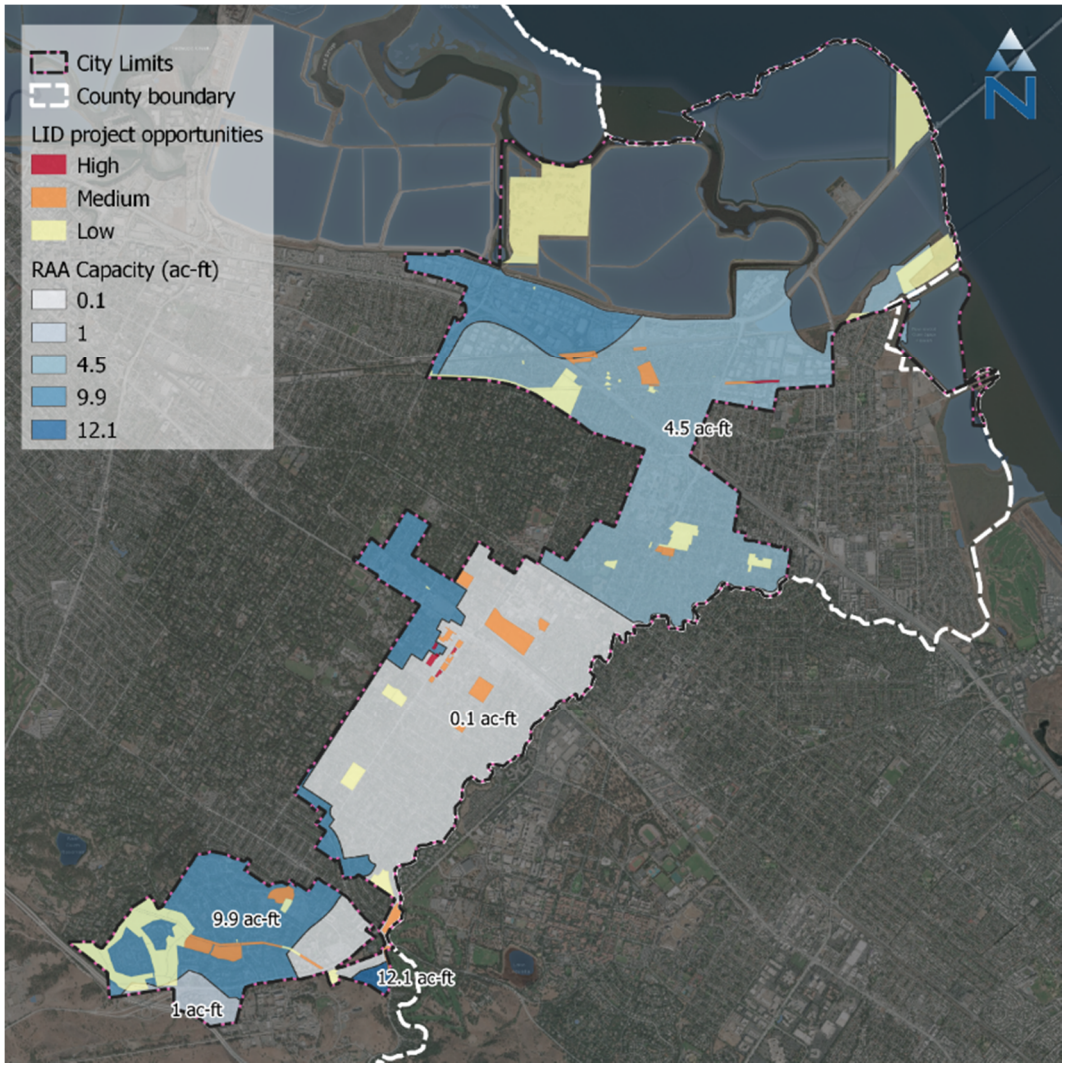


Figure 5-10 Prioritized potential LID projects and RAA-specified project capacity by subwatershed.

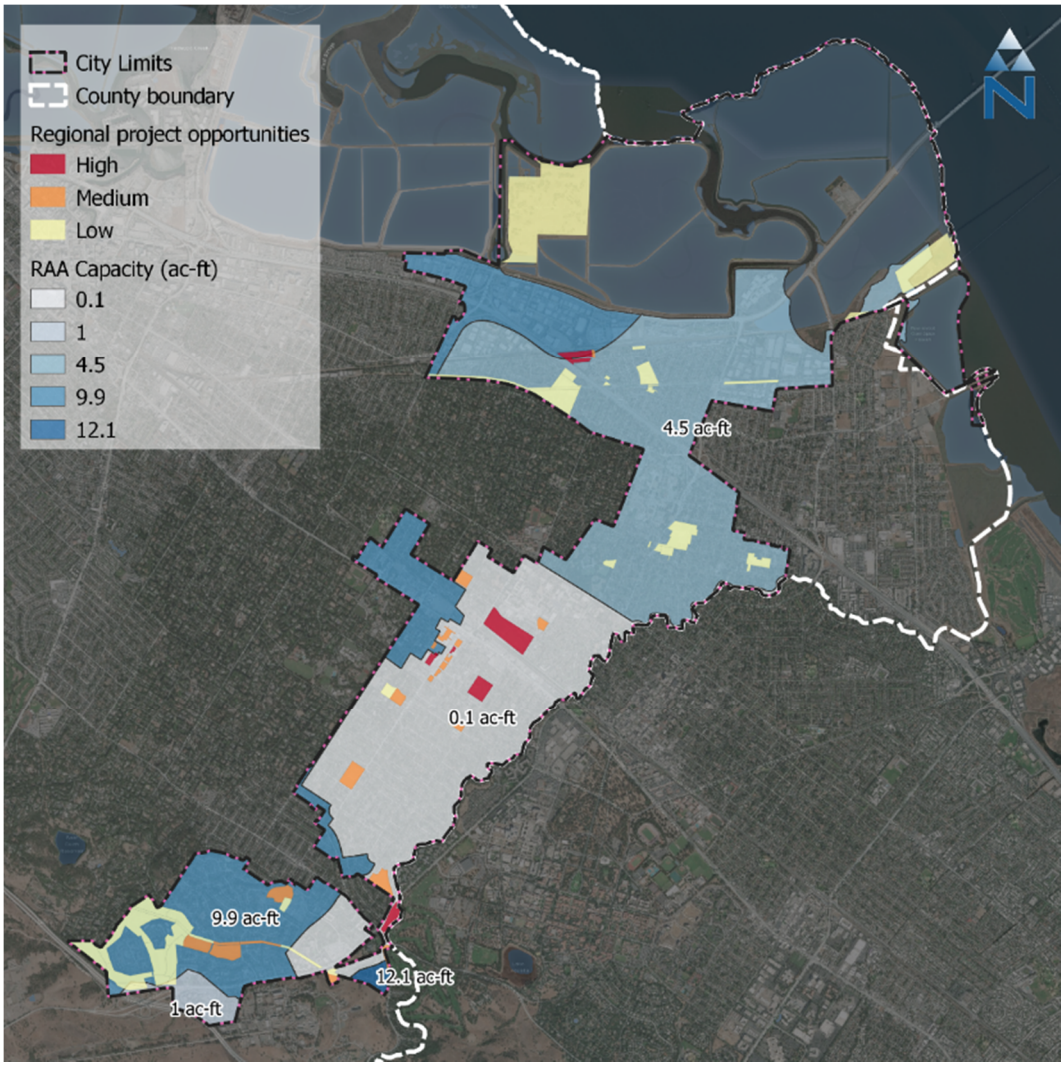


Figure 5-11 Prioritized potential regional projects and RAA-specified project capacity by subwatershed.

5.7 Impervious Area Projections

The MRP (Provision C.3.j) states that the GI Plan "shall include means and methods to track the area within each Permittee's jurisdiction that is treated by green infrastructure controls and the amount of directly connected impervious area". This is necessary to develop a "process for tracking and mapping completed projects, public and private, and making the information publicly available."

Impervious area treated by GI may be used as a gauge of progress towards implementation goals. Impervious areas projected to be treated by GI were determined from the RAA model. Table 5-1 shows the treated impervious area, as well as other metrics that can be used to gauge implementation progress, that will be achieved through the City's GI strategy and across the milestones specified in the MRP.

Table 5-1: Implementation Metrics for PCB Load Reduction from the RAA

Implementation Metrics		Implementation Milestones		
		2020	**2030**	**Final 2040**
Index	% Load Reduction	11.2%	15.4%	17.9%
	Volume Managed (acre-ft/yr)	64.4	93.6	110.6
Capacities (acre-ft)	Existing Projects	8.9	8.9	8.9
	Future New & Redevelopment	2.7	3.6	13.9
	Regional Projects (Identified)	--	1.6	1.6
	Green Streets (High)	--	1.8	3.1
	Green Streets (Medium)	--	0.0	0.1
	Green Streets (Low)	--	0.0	0.0
	Other GI Projects (TBD)	--	--	--
	Total	**11.5**	**15.9**	**27.6**
Impervious Area Treated (acres)	Existing Projects	33.0	33.0	33.0
	Future New & Redevelopment	14.8	19.7	76.0
	Regional Projects (Identified)	--	80.0	80.0
	Green Streets (High)	--	8.8	15.1
	Green Streets (Medium)	--	0.0	0.6
	Green Streets (Low)	--	0.0	0.2
	Other GI Projects (TBD)	--	--	--
	Total	**47.8**	**141.5**	**205.0**

Advancing project opportunities from the GI strategy in this chapter is described in Chapter 6. GI projects will undergo feasibility analysis, site investigations, and funding evaluations before moving to the next phase of implementation. As the GI Plan is executed, the strategy presented in this section can be refined using adaptive management to incorporate new information and sync with ongoing municipal planning.

6.0 Implementation Plan

This chapter outlines procedures to implement the City's "GI Strategy" for prioritized projects. This process is instrumental to meeting RAA and MRP requirements and is compiled into the following three categories:

Section 6.1 Workplan for Priority Projects:
The Workplan defining the steps to implement prioritized GI projects.

Section 6.2 Implementation Mechanisms:
The legal and funding mechanisms that enable implementation.

Section 6.3 Performance Assurance:
The technical tools that ensure implemented projects perform and enable quantification of overall progress toward the citywide goals.

6.1 Workplan for Priority Projects

The Workplan defines an overall process for implementing prioritized GI projects to meet the water quality goals specified in Chapter 5. This paradigm separates key project milestones into **5 steps** to advance project opportunities from the schematic design phase through capital improvement delivery.

The Workplan is a collaborative effort between several City departments and—pending the scope of the GI project—may involve coordination with county, regional, or state agencies as well. An overview of the GI project development stages is shown in Figure 6-1.

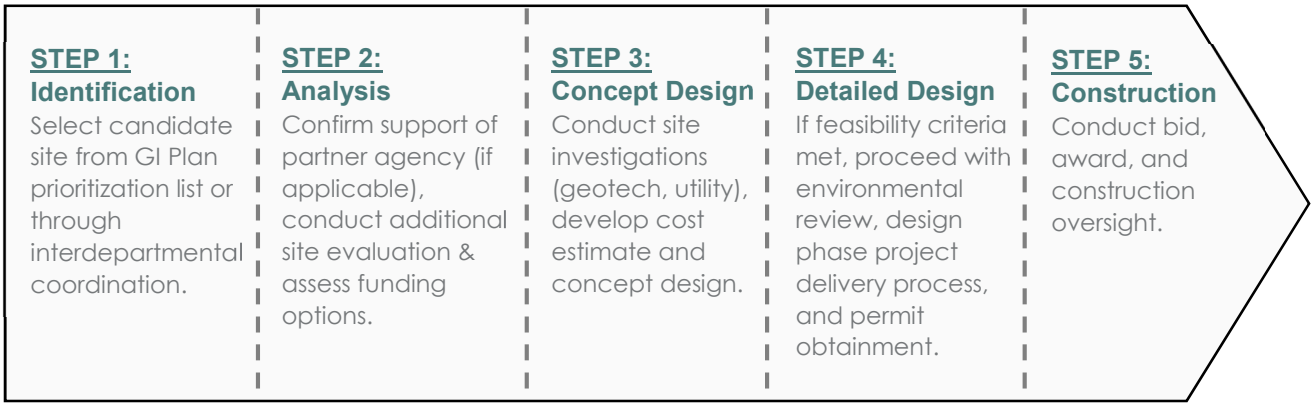


Figure 6-1: Overview of Project Development Stages

Subsections 6.1.1 and 6.1.2 applies the Workplan procedures for Steps 1 (Identification) through 3 (Concept Design) relative to varying GI project types. After Step 3, the project advances to the City's CIP delivery process which is separate from this GI Plan.

An early evaluation of technical feasibility and stakeholder acceptance are critical pre-requisites to advancing GI projects. For this purpose, each proposal is leveraged against defined feasibility criteria the end of Steps 2 and 3. For example, a project's ability to meet sizing and performance requirements relative to local site constraints will be analyzed during this phase. Similarly, outreach is conducted to assess local stakeholder preferences and support. Each of these considerations must be carefully analyzed prior to pursuing onwards to Step 4.

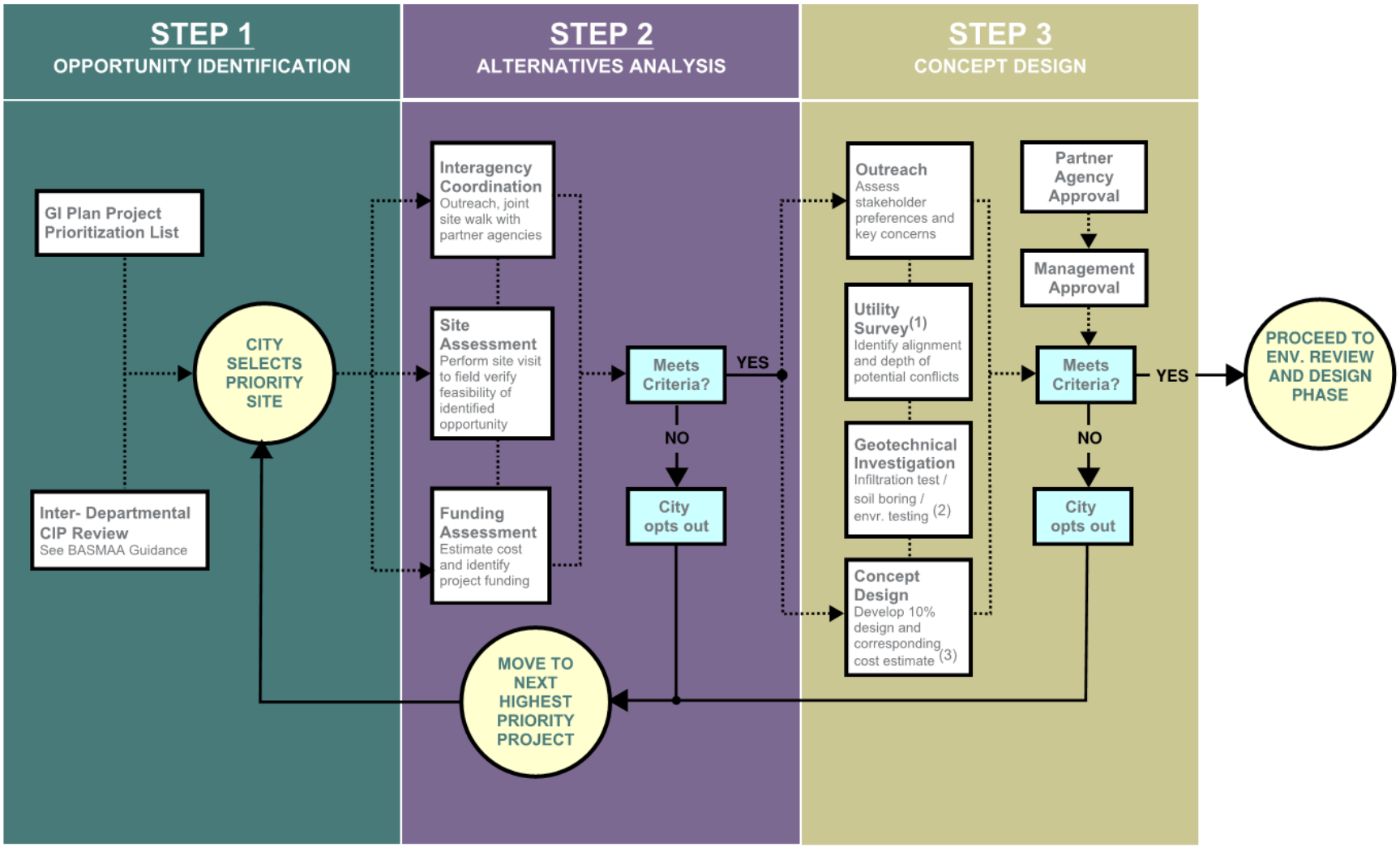
Evaluation during Step 2 and 3:

- Meets minimum impervious drainage area thresholds (i.e., ≥ 1 acre for co-located project, ≥ 2 acres for GI-only capital project)[1]
- Meets minimum GI sizing ratios
- Meets minimum feasibility criteria for infiltration and/or for rainwater harvesting (RWH) storage and demand, where applicable
- Addresses key feedback from outreach process and has community support

Figure 6-2 depicts the overall workflow process for Steps 1 through 3. This criteria may be applied when assessing the feasibility of potential GI opportunities. In particular, certain milestones are outlined to either proceed with a select project or opt-out and choose the next opportunity on the prioritization list.

Subsections 6.1.1 and 6.1.2, detail how STEPs 1 through 3 of the Workplan applies to various types of GI Projects. In summary these are categorized according to Regional Projects, Green Streets, and LID Retrofits.

[1] Due to fixed costs associated with delivering capital projects, GI projects must be of minimum scale to achieve reasonable cost-effectiveness. The minimum drainage area thresholds are based on precedents set by other Bay Area GI programs (e.g., SFPUC Collection System Plan 2018).



1. If utilities are not expected to be a conflict, then only site survey is required.
2. Environmental testing if soil contamination is possible.
3. Consider structural testing if roof BMPs, such as green roofs, are central to the project.

Figure 6-2 Workplan for Prioritized Projects

6.1.1. Regional Projects

Step 1: Opportunity Identification

As summarized in Section 5, the City developed a prioritization list of regional project opportunities. One of the opportunities—identified during the SRP—is currently in the conceptual design phase. The proposed project is located at Cartan Field in the Town of Atherton but includes approximately 572 acres of drainage area within the City of Menlo Park. This is the only regional project currently proposed as part of the citywide GI strategy. However, additional regional projects may be proposed as the City moves forward with implementation of the GI Plan to 2040.

To propose future candidate projects, the City will not only use the existing prioritization list but will also engage with potential project collaboration partners to identify new opportunities. The City's Parks and Recreational Facilities Master Plan is one example of ongoing City initiatives that may provide opportunities for regional GI project integration. Similarly, projects proposed by others as part of regional water management plans, such as the San Francisco Bay IRWMP, may provide collaboration potential. Examples of relevant regional project partners include C/CAG and member agencies, Caltrans, the County of San Mateo Office of Sustainability, the Flood Resilience Program, and the new Flood and Sea Level Rise Resiliency Agency (FSLRRA).

Step 2: Alternatives Analysis

The alternatives analysis step evaluates which GI technologies could be integrated at the candidate site and conducts stage one feasibility assessment to select preferred technologies and develop the site layout that moves forward to concept design. The workplan for Step 2 includes:

Step 2a: Interagency Coordination

The area draining to regional project sites often extends across multiple jurisdictions. Thus, after the City selects a prioritized regional opportunity to move forward, the next step is to reach out to related agency stakeholders and potential collaboration partners to discuss the opportunity. Based on the results of the regional project prioritization, some example relevant non-City stakeholders include: SMCWPPP, Caltrans, Menlo Park City School District, SFPUC, and Stanford University.

In addition to interagency coordination, interdepartmental coordination should also be conducted. To have enough space for implementation, regional projects are often located in parks or open spaces within the City and involve coordination with the Community Services Department or others before proceeding with development of a concept. Figure 6-3 provides a summary of potential project collaboration stakeholders.

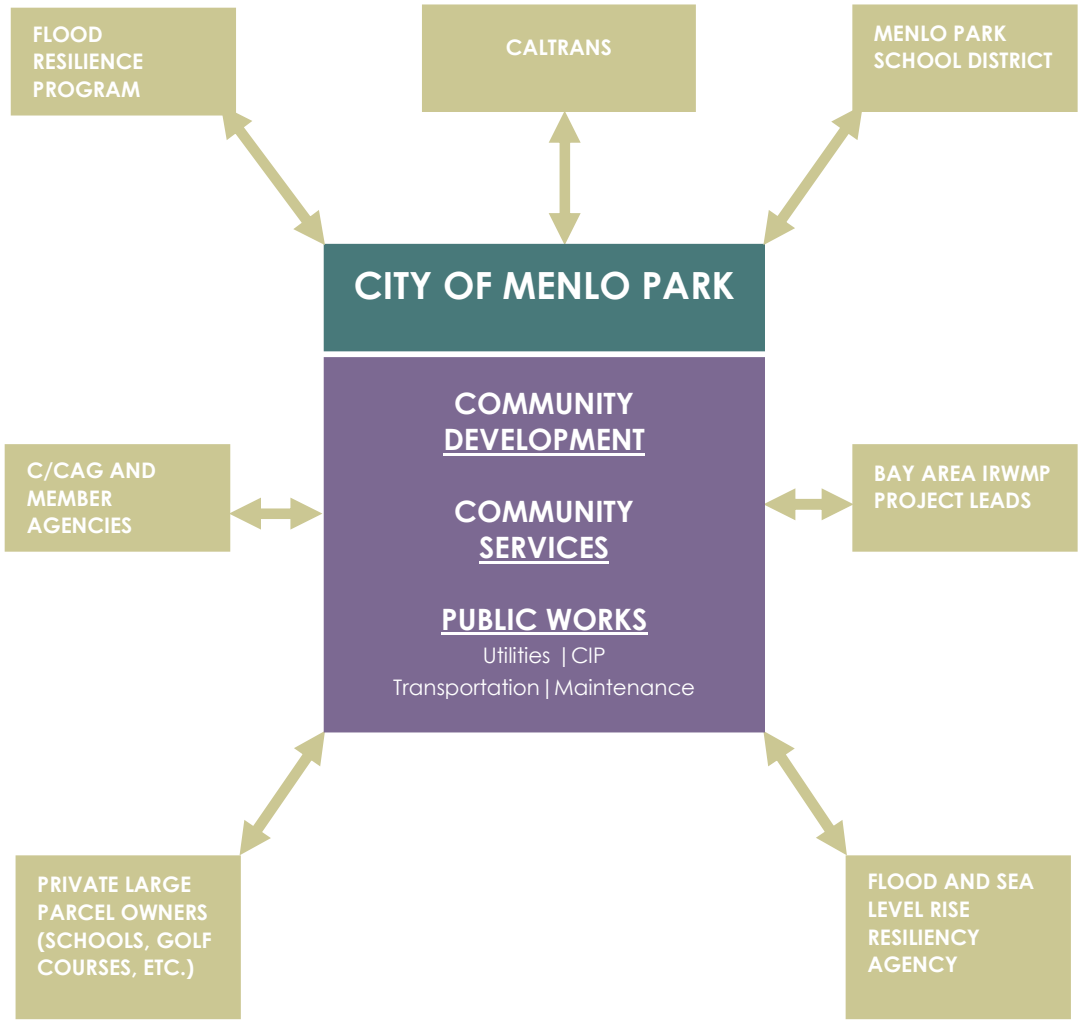


Figure 6-3 Example of Potential GI Project Collaboration Stakeholders

Step 2b: Funding Potential

Critical to the feasibility of the identified opportunity is the assessment of project costs and funding source. Due to the scale of regional projects, grants or contributing funds from other agencies may be needed to enable design and implementation. For example, a grant award from Caltrans enabled the Cartan Field regional project opportunity to move forward to design and feasibility evaluation. Section 6.2.2 provides a more detailed description of the GI funding options that should be evaluated as part of this process.

If the opportunity is proposed as a co-located project with another planned City project, the GI design and implementation schedule should be developed in this step to assess feasibility of project integration. During this step, note any co-located project schedule constraints that would preclude including time to integrate GI into the design and construction. Also note any constraints on project schedule that would complicate aligning a separate funding stream for the GI elements.

Step 2c: Site Assessment

During Step 1 Opportunities Identification, sites were prioritized primarily based on desktop analysis using best available spatial data. Within the alternatives analysis, these data should be updated and the site reassessed based on the following steps:

1. **Information Collection**
   Compile as-built and private utility data to update the utility conflict assessment. Identify the most feasible location for a storm drain diversion to the proposed regional project site and identify the most feasible overflow or flow-through treatment discharge location. Confirm the drainage area to proposed storm drain tie-in and develop a site map for the field visit.

2. **Site Visit Coordination**
   Coordinate a site walk with partnering agencies and City departments to review proposed GI locations, discuss potential concerns, and field-verify site constraints.

3. **GI Integration Analysis**
   While on the site walk, field verify the location of storm drain connections, area drains, and drainage pathways. Identify the most feasible GI locations within the site and confirm the drainage area based on the proposed storm drain connection. Discuss key design parameters with agency stakeholders, such as: sources and quantity of dry-weather flows, site potable water irrigation demand, existing site drainage issues, local stakeholder preferences based on past projects, and planned site projects or masterplans.

4. **Constraints Analysis**
   While on the site walk, update the site space constraints data based on visual assessment of utilities and mature trees. Discuss key design constraints with agency stakeholders, such as the predominant current site use and potential loss of use due to the regional project (e.g., types of sports played, frequency of use, parking demand, etc.). Assess the ability to access proposed GI locations for construction and maintenance. Consider key setback criteria when assessing constraints, such as vertical separation from high groundwater and horizontal separation from utilities, water supply wells, trees, hydrants, foundations, and steep slopes.

5. **GI Feasibility Criteria**
   After updating site information, compare against the criteria below:

   - Meets minimum drainage area thresholds

- Meets minimum GI sizing requirements
- Meets minimum infiltration and/or RWH feasibility criteria where applicable
- Schedule development indicates that GI elements could be completed in time to meet any constraints associated with proposed co-located projects (if applicable) and in time to meet any required funding deadlines.

If the site still has GI potential, proceed to Step 3.

Step 3: Concept Design

In addition to developing the concept design, Step 3 involves direct expenditures for site investigations, such as site surveys, potholing, and geotechnical investigations. The objectives of this step are to further refine site (e.g., utility constraints and infiltration assumptions) and public preference data in order to develop a well-informed concept. Conducting these investigations during this early step enables the City to opt-out of sites with identified fatal flaws or poor cost-benefit ratio in favor of moving to the next prioritized GI opportunity.

Step 3a: Public Outreach

To inform concept development, outreach should be conducted to assess local stakeholder preferences and concerns. Educational-based outreach regarding GI types and benefits can be presented, along with general information about identified opportunities for GI integration compiled from Step 2. Outreach should attempt to assess local preferences related to GI technology types (e.g., below-ground vs. above-ground improvements, types and look of vegetated systems, etc.). Outreach should also gauge priority of site uses (e.g., playing field usage, parking demands) and perceived importance of stormwater issues relative to other community needs.

Step 3b: Soils/Geotech Investigation

Conduct subsurface investigations to confirm soil types and infiltration rates. The type and quantity of investigations will vary based on project scale and type (e.g., borings, infiltration tests, and environmental soils testing). Initiate USA North 811 ticket process to mark utility locations if there is any excavation/boring/potholing required for the investigations.

Step 3c: Surveys

Conduct a site survey to enable concept design development. Include an underground utility survey if the site is in the right-of-way or shows potential for utility conflicts based on existing conditions data or based on the site inspection conducted in previous step. Request private utility data if not yet acquired.

Step 3d: Concept Development

Develop a 10% concept design showing existing and proposed conditions and a construction cost estimate. An example of information included in the concept plans is listed in Table 6-1.

Table 6-1 Example Concept Design Information

Existing Conditions	Proposed Site Plan

• Impervious areas (e.g., roof, pavement, driveway)
• On-site stormwater infrastructure (drains, downspouts, inlets, etc.), pipe and structure locations
• Labels of existing uses (playground, parking, etc.)
• Flow direction arrows for sheet/surface flow and pipe flow
• Existing connections to the storm sewer
• Utilities (e.g., water, sewer, gas, electric)
• Trees (drip line and trunk diameter)
• Existing contours
• Road labels
• North arrow and scale
• Property and easement boundaries
	• Project boundary
	• Stormwater management practices (BMPs): footprint of each, corresponding drainage areas, and drainage components (e.g., underdrain, outlet control structures)
	• Proposed connections to existing conveyance systems or storm drains
	• Proposed site drainage features (new drains, downspouts, etc.)
	• Flow direction arrows for sheet flow and pipe flow.
	• Changes to land cover, including impervious surfaces
	• Areas that require regrading or grading contours
	• Labels of proposed uses (playground, parking, etc.)
	• BMP Performance Summary Table
	  o BMP ID Number
	  o Facility type and sizing information
	  o Size of each drainage area

Although the degree of concept design development may vary depending on the identified opportunity and available funding, a 10% design set for a GI project should consider the following:

- Plan Sheets: Existing Conditions and Demo, Site Layout, Facility Layout, Grading and Stormwater, Civil Details, Landscape Planting, Landscape Details;
- An evaluation of ADA, Fire, and other permit needs;
- A constructability evaluation based on maintenance and construction access (e.g., City moratorium constraints, site access constraints, etc.);
- Construction cost estimate and schedule; and
- CEQA checklist.

Step 3e: GI Feasibility Criteria

After developing a concept that is informed by the data gathered in Steps 3a through 3c, the resulting concept should be compared against the criteria below.

- Meets minimum drainage area thresholds
- Meets minimum GI sizing requirements
- Meets minimum infiltration and/or RWH feasibility criteria, where applicable

- Schedule development indicates that GI elements could be completed in time to meet any constraints associated with proposed co-located projects (if applicable) and in time to meet any required funding deadlines.

- No critical flaws identified through public outreach process.

If the site still has GI potential, proceed to the design phase.

6.1.2. Green Streets and LID Retrofits

Step 1: Opportunity Identification

The RAA establishes target quantities of high, medium, and low priority green street projects within the City's subwatersheds. The results also establish the remaining quantity of LID Retrofits (or "Other GI") needed to achieve capture targets. This forms the basis of the identified green street and LID retrofit GI opportunities.

In addition, the City will continue to identify GI opportunities through ongoing CIP review and interagency coordination, as well as through frontage improvement opportunities as part of private redevelopments. Relevant City initiatives that may provide GI integration opportunities include the City's Transportation Master Plan and ConnectMenlo General Plan update. Through this process of reviewing plans and programs for potential synergies with GI objectives, the City has already identified several near-term projects to be evaluated for GI integration (see project list in Section 4). The City may identify additional opportunities through coordination with C/CAG's Sustainable Streets Master Plan (SSMP), which is currently in development.

The next steps for evaluating identified opportunities is outlined in the following sections. These steps are consistent with but further build upon the *BASMAA Guidance for Identifying GI Potential in Municipal CIP Projects*[2] to provide a descriptive workflow for moving projects from opportunities identification into the design phase.

Step 2: Alternatives Analysis

The alternatives analysis step evaluates which GI technologies could be integrated at the candidate site and conducts stage one feasibility assessment to select preferred technologies and develop the site layout that moves forward to concept design. The workplan for Step 2 includes:

Step 2a: Interagency Coordination

The first step after selecting a prioritized opportunity for further evaluation is to conduct interagency or interdepartmental coordination. Green street implementation typically requires collaboration between multiple City departments or divisions—such as the Engineering, Transportation, and Utilities Divisions of Public Works. Similarly, LID Retrofits on parcels typically require the City's stormwater staff to collaborate with the Community Development and/or Community Services departments. Coordination with stakeholder agencies should be conducted prior to proceeding with development of a concept.

Step 2b: Funding Potential

The assessment of project costs and funding sources are critical to the feasibility of the identified opportunity. Part of the role of the countywide SSMP is to identify potential implementation mechanisms and funding sources for prioritized green streets. This could include Safe Route to Schools projects, bike/pedestrian plans, transportation plans, etc. It may also include proposed policies or negotiated agreements with redevelopments, such as required frontage improvements at select private developments.

[2] BASMAA Development Committee. 2016. Guidance for Identifying Green Infrastructure Potential in Municipal Capital Improvement Program Projects. May 6, 2016.

Several of the high-priority green street and LID Retrofit sites identified in the City's GI Plan overlap with previously planned capital improvement projects. For these projects, a preliminary cost estimate and design and implementation schedule should be developed to assess feasibility of GI integration. During this step, note any co-located project schedule constraints including time to integrate GI into the design and construction. Also note any constraints on project schedule that would complicate aligning a separate funding stream for the GI elements. Section 6.2 provides a description of the GI funding options that should be evaluated as part of this process.

Step 2c: Site Assessment

During Step 1 - Opportunity Identification, sites were prioritized primarily based on desktop analysis using best available spatial data. In Step 2 – Alternatives Analysis, this site data should be updated and reassessed based on the following steps:

1. **Information Collection**
   Compile as-built and private utility data to update the utility conflict assessment. Delineate the drainage area based on best available data and develop a site map for the field visit.

2. **Site Visit Coordination**
   Coordinate a site walk with partnering agencies and City departments to review proposed GI locations, discuss potential concerns, and field-verify site constraints.

3. **GI Integration Analysis**
   While on the site walk, field verify the location of catch basins, area drains, downspouts, and drainage pathways. Identify the most feasible GI locations within the site and confirm the drainage area, including run-on to the street from adjacent parcels. Draw facility footprints and piped connections on the site map (i.e., document maximum footprint available and overflow/underdrain connections to storm drains). Discuss key design parameters with agency stakeholders, such as: available soils data, site ownership and easements, existing site drainage issues, local stakeholder preferences based on past projects, and planned site projects or masterplans.

4. **Constraints Analysis**
   While on the site walk, update site spacing constraints based on visual assessment of utilities, mature trees, and other features as applicable. Discuss key design constraints with agency stakeholders, including the predominant current use of the site and its potential loss of use due to the project (e.g., types of sports played, frequency of use, parking demand, etc.).

   It is also imperative to assess proposed GI locations for construction and maintenance during this step. Lastly, consider key setback criteria when assessing constraints, such as vertical separation from high groundwater and horizontal separation from utilities, water supply wells, trees, hydrants, foundations, and steep slopes.

5. **GI Feasibility Criteria**
   After updating site information, compare the project design against the criteria below.

   - Meets minimum drainage area thresholds
   - Meets minimum GI sizing requirements
   - Meets minimum infiltration and/or RWH feasibility criteria, where applicable
   - Schedule development indicates that GI elements could be completed in time to meet any constraints associated with

proposed co-located projects (if applicable) and in time to meet any required funding deadlines.

If the site still has GI potential, proceed to Step 3.

Step 3: Concept Design

In addition to developing the concept design, Step 3 involves direct expenditures for site investigations, such as site surveys, potholing, and geotechnical investigations. The objectives of this step are to further refine site (e.g., utility constraints and infiltration assumptions) and public preference data in order to develop a well-informed concept. Understanding utility constraints is especially critical for right-of-way projects like green streets. Conducting these investigations during this early step enables the City to opt-out of sites with identified fatal flaws or poor cost-benefit in favor of moving to the next prioritized GI opportunity.

Step 3a: Public Outreach

To inform concept development, outreach should be conducted to assess local stakeholder preferences and concerns. Educational-based outreach regarding GI types and benefits can be presented, along with general information about identified opportunities for GI integration compiled from Step 2. Outreach should attempt to assess local preferences related to GI technology types (below-ground vs. above-ground improvements, vegetated vs. low maintenance). Outreach should also gauge priority of site uses (e.g., sidewalk width, community spaces, parking demands) and perceived importance of stormwater issues relative to other community needs.

Step 3b: Soils/Geotech Investigation

Conduct subsurface investigations to confirm soil types and infiltration rates. The type and quantity of investigations will vary based on project scale and type (e.g., borings, infiltration tests, and environmental soils testing). Initiate USA North 811 ticket process to mark utility locations if there is any excavation/boring/potholing required for the investigations.

Step 3c: Surveys

Conduct a site survey to enable concept design development. Include an underground utility survey if the site is in the right-of-way or shows potential for utility conflicts based on existing conditions data or based on the site inspection conducted in previous step. Request private utility data if not yet acquired.

Step 3d: Concept Development

Develop a 10% concept design showing existing and proposed conditions and a construction cost estimate. An example of information included in the concept plans was listed earlier in Table 6-1.

6.2 Implementation Mechanisms

The GI Plan prioritizes projects for near-term integration into CIPs and long-term integration into City planning efforts. However, implementation of these projects is contingent upon the City having the proper legal mechanisms to execute the Plan. These mechanisms include identifying sufficient funding sources for GI planning, design, construction, and maintenance as described in the following subsections.

6.2.1 Legal Mechanisms

Provision C.3.j.i.(3) of the MRP requires permittees to "Adopt policies, ordinances, and/or other appropriate legal mechanisms to ensure implementation of the Green Infrastructure Plan in accordance with the requirements of this provision."

MRP – Regulated Projects

As described in Section 1.3, the City of Menlo Park is subject to Provision C.3 of the MRP, which requires Low Impact Development measures, including GI, on regulated projects. These post-construction stormwater

controls mitigates pollutants from flowing to streams, creeks, and the Bay and reduce the risk of flooding by managing peak flows. Chapter 7.42 of the City's Municipal Code provides legal authority for the City to require regulated private development projects to comply with MRP requirements.

Other City Policies and Ordinances

GI projects are typically public projects under control of the City. As part of the GI Plan process, the City reviewed its existing policies, ordinances, and other legal mechanisms related to the implementation of stormwater NPDES permit requirements. This was executed in order to identify documents that need to be updated to provide sufficient legal authority to implement the GI Plan.

The City determined that it has sufficient legal authority to construct GI projects in the public right-of-way or on public property, and there are no barriers to GI implementation within current legal codes, policies, or ordinances. The City intends to continue evaluating such legal mechanisms to facilitate GI projects with private developers and/or other agency partners as part of this GI Plan. The City may also consider whether additional policies or ordinances could help facilitate GI Plan implementation in the future.

For example, the City's zoning regulations are an important tool for GI implementation. The regulations are very comprehensive and complex with specific requirements for each kind of land use, so there are many areas that could be amended for GI integration. Two example sections for amended language consideration that could be helpful in leveraging new development activities for GI implementation are:

- Chapter 16.43 O Office District – 16.43.120 Required street improvements, and
- Chapter 16.45 R-MU Residential Mixed-Use District – 16.45.110 Required street improvements.

Other sections could also be amended to include GI language and/or thresholds could be developed specifically for GI.

6.2.2 Funding Options

Provision C.3.j.i.(2)(k) of the Municipal Regional Stormwater Permit (MRP) requires that the City's Green Infrastructure (GI) Plan include:

> *"An evaluation of prioritized project funding options, including, but not limited to: Alternative Compliance funds; grant monies, including transportation project grants from federal, State, and local agencies; existing Permittee resources; new tax or other levies; and other sources of funds."*

Consequently, efforts have been made to evaluate funding sources and methods to leverage new development activities pursuant to the goals and objectives of the Plan. These evaluations were conducted on a County-wide and City-specific basis as further described in the subsections below.

County Evaluation - Funding Sources

To aid the funding evaluation effort, SMCWPPP developed a report for permittees entitled, "Green Infrastructure Funding Nexus Evaluation"[3] (referenced herein as the **GI Funding Report**) that is intended to provide guidance on funding types, challenges and strategies. Sections of that report serve as a basis for the City's evaluation of GI funding mechanisms described subsequently.

Additionally, San Mateo County municipalities are considering a new countywide agency called The Flood and Sea Level Rise Resiliency Agency which could, in the future, provide funding for GI to

[3] SMCWPPP – January 2019 https://www.flowstobay.org/sites/default/files/a6-funding-study.pdf

the City and the other SMCWPPP Permittees.[4] One step in that process is establishing a nexus to support implementation of a stormwater infrastructure impact fee (stormwater fee). The GI Funding Report, as referenced in the footnote of this Chapter, addresses this issue in more detail.

In 2017, the Bay Area Stormwater Management Agencies Association (BASMAA) sponsored a group forum with government agencies, private sector representatives, and non-profit partners to identify solutions for funding projects that include GI and transportation improvements[5]. The resulting discussion produced the Roadmap of Funding Solutions for Sustainable Streets (BASMAA 2018), which identified actions to fund Sustainable Street projects in compliance with regional permit requirements.

The Roadmap provides an evaluation of various grant and loan monies which may be used to fund projects that include both GI and transportation improvements. The results of this evaluation are presented in two tables described subsequently and as linked in the footnote of this page[5]:

- **Table B-1**: Transportation Funding Sources that May Potentially Fund Sustainable Streets, identifies nine transportation grants, and provides an evaluation of the conditions under which green stormwater infrastructure is eligible for funding.

- **Table B-2:** Resource-Based Grant and Loan Programs that May Potentially Fund Sustainable Streets, identifies nine resource-based grant and loan programs and provides an evaluation of the conditions under which transportation is eligible for funding.

The City will review these sources as part of the funding plan for prioritized projects as they are advanced to the City's capital improvements program.

Current Funding Sources

The funding of the GI Plan can be considered a part of Menlo Park's overall stormwater management program; therefore, GI can be integrated with related City asset management programs. Implementing and maintaining the GI Plan, and constructed GI assets, can be aligned with the following costs related to MRP compliance and City stormwater and drainage infrastructure:

- Overall stormwater and GI program administration, reporting and planning

- Public GI asset management - administration and planning

- Public GI asset delivery - design, engineering, inspection and construction

- Public GI asset maintenance - assessment, tracking, mapping, inspection, operations and maintenance (O&M), utility relocation, repair and replacement

- Private GI (LID) program administration – design review, inspection, reporting, tracking and mapping

- Public and Private GI outreach, training, education and communication

- Other stormwater program components – municipal operations, illicit discharge detection and elimination, commercial and industrial control, pesticide monitoring, public information and participation, sustainable landscaping, construction site control, creek

[4] Flood and Sea Level Rise Resiliency Agency: https://resilientsanmateo.org/
[5] BASMAA. 2018. Roadmap of Funding Solutions for Sustainable Streets. http://www.sfestuary.org/wp-content/uploads/2018/05/Roadmap_Funding_Solutions_Sustainable_Streets_FINAL_reduced.pdf

monitoring, and implementing controls on pollutants of concern such as trash, PCBs, mercury and copper.

It is likely that no single source of revenue will be adequate to fund implementation of GI, therefore a portfolio of funding sources will probably be needed. There are a variety of approaches available to help fund up-front and long-term asset delivery. Those approaches are discussed in detail in the GI Funding Report.

The City currently uses a mix of funding sources including contribution from private development projects to support GI initiatives. The City's General Fund, permit fees, taxes and other revenue sources are used for public streets, parking lots and building construction and maintenance; and maintenance of other landscaped areas (e.g., parks, medians, public plazas, etc.) Table 6-2 displays the various sources and how the objectives and management of the City's Stormwater Program are achieved with those sources of revenue

Source	Public or Private Funds	Activity Type: Administration, Implementation or Maintenance	
General Fund	Public	A	Stormwater program
	Public	I	Capital Improvement Program
C/CAG	Public	M	Street sweeping
	Public	I	Pilot projects
Property Tax	Private	A	Stormwater program
Development Fees	Private	A	Project plan review & inspections (permit fees)
	Private	A	Stormwater program (storm drain connection fee)
Development Requirements (COA)[6]	Private	I	Deferred Frontage Improvement Agreement for including GI as part of bonding requirement
	Private	I	Project frontage - GI improvements

Table 6-2: Current Funding Sources

Potential Future Funding Options

The City has reviewed the GI Funding Report and determined that the following additional sources of funding could be considered in the future to increase revenues and implementation of GI: stormwater fee, local sales tax, bond measures, in-lieu fees and grants.

Each of the five options being considered by the City for future enactment are discussed in the sections below, which were excerpted from the GI Funding Report. The first three are balloted approaches: stormwater fee, sales tax and bond measures. The fourth one entails a fee or option that would be part of an alternative compliance[7] program for private new and redevelopment projects. Grants are discussed in the final section.

[6] COAs (Conditions of Approval) are requirements for a private development's discretionary use permit or building permit

[7] Alternative compliance programs can be used for implementing stormwater treatment in the public ROW where on-site constraints preclude GI. Additional information is further described on page 6 of this memo.

Balloted Funding Approaches

Stormwater Fee

A Proposition 218-compliant[8], property owner balloted, property-related fee is a very viable revenue mechanism to fund stormwater programs. Property-related fees are decided by a mailed vote of the property owners with a simple majority (50%) threshold required for approval, with each parcel getting one vote. The property-related fee process is generally not as well known, and it is more time consuming and is more expensive than the special tax process, but it is much more common for funding stormwater management, and in many communities, more suitable to meet the voter approval threshold. One of the more successful municipalities to implement a property-related fee for stormwater services is Palo Alto, where they have succeeded twice.

As they pertain to GI, property-related fees remain a flexible and stout funding source. However, under Proposition 218, property-related fees must apply to defined services within a defined service area, and the costs of providing those services must be spread equitably over the properties that receive the services. The scope of GI is stretching the traditional boundaries of stormwater services, and great care must be taken when crafting a property-related stormwater fee structure. But just as water agencies have embraced conservation efforts and watershed habitat protections, so, too, can stormwater agencies carefully expand into the area of GI.

Local Sales Tax Measure

Special taxes are decided by registered voters and require a two-thirds majority for approval. Traditionally, special taxes have been decided at polling places corresponding with primary and general elections. More recently, however, local governments have had success with single issue special taxes by conducting them entirely by mail and not during primary or general elections. Special taxes are well known to Californians and are utilized for all manner of services, projects, and programs. They are usually legally very stout and flexible and can support an issuance of debt such as loans or bonds in most cases.

There are several types of special taxes, but the most common for stormwater services are parcel taxes. Parcel taxes are levied against real property and can be calibrated for some parcel metric such as acreage, size of building, impervious area, type of use, or simply a flat rate where each parcel pays the same amount. One thing that distinguishes taxes from fees is that taxes do not necessarily need to have a direct nexus between the amount of the tax and the service received. As such, tax mechanisms can exempt certain types of property (e.g., public property) or owners (e.g., seniors or low income). While exemptions may reduce revenues somewhat, they are usually very popular with voters. Examples of parcel taxes that have been successfully implemented for stormwater services are in the cities of Culver City, Los Angeles, Santa Cruz, and Santa Monica. The most recent successful parcel tax measure was in Los Angeles County where the Flood Control agency passed a tax that will raise as much as $300 million per year for projects that would capture, treat and recycle rainwater.

Other types of special taxes include sales, business license, vehicle license, utility users, and transient occupancy taxes. These types can also be implemented as a general (not special) tax, where they would only require a simple 50% majority for passage. But to qualify as a general tax, it must be pledged only for an agency's general fund with no strings attached, in which case any GI or stormwater services must compete with other general funded services such as police, fire and parks. Although a general tax requires only a simple majority, voters tend to

[8] For more information on Prop 218, see https://www.californiataxdata.com/pdf/Proposition218.pdf

show better support for special taxes where the purpose of the tax is explicitly identified.

General Obligation Bond

The voting public is very familiar with general obligation (GO) bond measures, which typically come in the form of a general obligation bond and require a two-thirds majority for passage. Bonds are issued to raise funding up front and are repaid through a tax levied against property on the annual property tax bill. These levies are based on property value, so higher value properties pay a higher portion of these taxes. Because the rate of taxation is based on value, ballot measures cannot state an annual amount that would be paid by an individual. This is usually an advantage, as the voter is presented with a bond amount (e.g., $25 million bond measure) for a project or program, and votes based on that without knowing exactly what it will cost them or for how long.

One primary restriction on GO bonds is that they can only be used for capital projects. While that includes land acquisition, planning, design and construction, the costs for maintenance and operations cannot be paid from the bond proceeds.

Selling bonds for GI has become more viable this year with a clarification from the Government Accounting Standards Board (Statement #62, or "GASB 62") that distributed infrastructure can be considered an asset upon which an agency can capitalize and therefore more easily be included in a bonded debt program. Distributed infrastructure is a term for smaller improvements that are often distributed around an area – sometimes on private property – like green roofs, rain barrels, bioretention areas, and pervious pavement. GASB goes so far as to include the cost of rebate programs for distributed infrastructure as well.

Examples of stormwater-related GO bonds successfully implemented include Berkeley's Measure M ($30 million – partly for GI, 2012) and Los Angeles' Measure O ($500 million, 2004).

Challenges with Balloted Approaches

Ballot measures are inherently political and are often outside of the areas of experience and expertise of most stormwater managers. For any measure to have a fair chance, the community must be well informed, and their preferences and expectations must be woven into the measure. This requires significant outreach and research, which is something best handled by specialized consultants, and can take considerable time and resources.

Over the past 15 years, there have been fewer than two dozen community-wide measures attempted for stormwater throughout California, and the success rate is just over 50%. Very few attempts have been made to pass a stormwater ballot measure even though there may be over 500 agencies with stormwater needs, because success is not assured. Clearly this is a high bar to clear, and any agency considering a balloted approach must carefully weigh the pros and cons before proceeding.

Funding strategies are discussed in greater detail in the GI Funding Report, which also includes a list of balloted efforts throughout the State along with a discussion on why they succeeded or failed.

Impacts of Senate Bill 231 on Stormwater Fees

Water and sewer fees are exempt from the voter approval requirements of Proposition 218. Senate Bill (SB) 231[9], signed by Governor Brown on October 6, 2017, provides a definition for sewer that includes storm

[9] For more information on SB 231 see https://www.casqa.org/resources/funding-resources/overview-and-background

drainage. This clarification would give stormwater management fees the same exemption from the balloting requirement that applies to sewer, water, and refuse collection fees, and would make stormwater property-related fees a non-balloted option – something very attractive to municipalities. Unfortunately, the Howard Jarvis Taxpayers Association, who authored and sponsored Proposition 218, is expected to file a lawsuit against any municipality that adopts a stormwater fee without a ballot proceeding. Therefore, the SB 231 approach must be given a very cautionary recommendation at this time. Any agency considering moving in that direction should consult with other agencies and industry groups to coordinate their efforts in a strategic manner and avoid setting an unfavorable legal precedent. C/CAG staff is keeping abreast of developments in this area and would be a good first point of contact.

Development of an In-lieu Fee

Establishment of an alternative compliance program with an in-lieu fee is a type of non-balloted approach to stormwater funding, which can be implemented without voter approval. Given the amount of development occurring within the City of Menlo Park, approaches such as this one that leverage new and redevelopment will be seriously considered.

MRP Requirements for Alternative Compliance

Provision C.3 of the MRP requires new development and redevelopment projects above certain size thresholds to comply with stormwater regulations. One of the regulations requires low-impact development (LID) measures to be constructed and maintained in perpetuity for the management of on-site stormwater runoff. In some situations, on-site stormwater management can be difficult to design, expensive to construct, and/or costly to maintain. One option for the developer is the consideration of off-site alternative compliance with approval of the regulating municipality.

Provision C.3.e.i. of the MRP 2.0 allows the following alternative compliance options:

- Construction of a joint stormwater treatment facility for multiple developments;
- Construction of a stormwater treatment system off-site (on public or other private property) that treats runoff from an equivalent amount of impervious surface;
- Payment of an in-lieu fee for a regional project (on another public or private property).

Each option comes with obligations for municipal staff in addition to other pros and cons for the municipality and developer. Currently, qualified urban infill redevelopment projects in the Bay Area that have site constraints that limit use of LID treatment measures often take advantage of the Special Project option in MRP 2.0 Provision C.3.e.ii.[10] However, the Special Project option may not be included in future MRPs, and the City may leverage alternative compliance as an option to fund and/or construct municipal GI projects. The City may also consider updating the stormwater section of its municipal code to allow for one or more of these alternative compliance options.

In-Lieu Fee Approaches and Challenges

In-lieu fees are attractive in the GI arena as they could be a source of funding for regional projects that help an agency meet their GI Plan goals. There are two basic ways to collect in-lieu fees for alternative compliance: ad hoc approach; and structured approach.

[10] Special Projects are urban in-fill, transit-oriented development projects that meet certain criteria in the MRP and are allowed to use certain types of non-LID treatment measures (high flow rate media filters) to treat a portion of the site's runoff.

The **ad hoc approach** is done on a case-by-case basis and is usually negotiated with an individual developer depending on the financial and logistical circumstances. The City of Emeryville project is an example of this approach. This approach presents challenges and opportunities, but the agency's leverage is limited to its discretionary authority and compliance with local regulations and the MRP.

One advantage is that the outcome can be customized to the project. For instance, compliance could be severed into any (or all) of three options: on-site construction; off-site construction; and in-lieu fee contribution. In the Emeryville example, all three of the options were utilized: on-site LID for the majority of the site, off-site LID for five selected locations, and an in-lieu fee for the estimated 30-year O&M costs of the project. An ad hoc approach allows for out-of-the-box thinking. This is often the course followed for agencies that have few and sporadic development projects. But for agencies with a steady stream of development, it can be laborious to the point of overwhelming.

A **structured approach** would typically follow the developer fee model (AB 1600[11]). This would end up with a set of in-lieu fees adopted and published in the agency's master fee schedule. The San Francisco Public Utilities Commission (SFPUC) is exploring this approach and it appears that they have made a calculation of the amount of their in-lieu fee[12]. The SFPUC recently announced a GI Grant program[13] that may use future revenue from developer in-lieu fees, among other funding sources.

However, for MRP permittees, the path to set up a structured approach must include a comprehensive nexus study complete with goals, objectives, project lists, and a reasoned methodology linking development impacts or compliance needs to projects – possibly by geographic or watershed zones – and options for variations.

If the City is anticipating numerous development projects (particularly small to midsized projects) in the near future, the effort to adopt in-lieu fees would be worthwhile. It allows staff to simply apply the scheduled fees to each project as it comes around. At the same time, for larger projects that enter into a developer agreement, those adopted fees could be set aside for a more creative or appropriate ad hoc approach.

One key element to an in-lieu fee program is the identification of in-lieu projects. The development of the list of prioritized projects for the City's GI Plan coupled with the identification of GI opportunities in the City's CIP projects will go a long way toward meeting this challenge.

Grants

Federal, state, and regional grant programs have funding available to local governments to support GI efforts. These grant programs include:

- California Proposition 1 (Water Quantity, Supply, and Infrastructure Improvement Act of 2014) Stormwater Implementation Grant Program;
- US Environmental Protection Agency: San Francisco Bay Water Quality Improvement Fund;

[11] Development impact fee program requirements are set forth in Government Code §§ 66000-66025 (the "Mitigation Fee Act"), the bulk of which were adopted as 1987's AB 1600.

[12] $765,000 per acre of impervious surface managed (based on the GI grant program and previous presentations.) Note that the basis for this fee may be not be applicable to municipalities with separate storm sewer systems.

[13] https://sfwater.org/index.aspx?page=1260

- California Water Resources Control Board: 319(h) Non-Point Source Implementation Program;[14]
- California Department of Water Resources: Integrated Regional Water Management Program Implementation Grants;
- California State Parks: Land & Water Conservation Fund and Rails-to-Trails Programs;
- California Department of Forestry and Fire Protection: Urban and Community Program;
- Strategic Growth Council: Urban Greening Program;
- California Office of Emergency Services (OES) 404 Hazard Mitigation Grant Program;
- Caltrans Cooperative Implementation Agreements or Grants Program; and
- One Bay Area Grant Program (transportation projects).

Other potential grant resources that may be tapped in the future to support GI include Greenhouse Gas Reduction Funds derived from the California Cap and Trade Program.

As a result of Senate Bill 985, now incorporated into the California Water Code, stormwater capture and use projects must be part of a prioritized list of projects in a Stormwater Resource Plan in order to compete for state grant funds from any voter-approved bond measures. Advantages of using grant funding may include the following:

- Grants can fund programs or systems that would otherwise take up significant general fund revenues;
- Grants often fund new and innovative ideas that a local agency might otherwise be reluctant to take on using general funds;
- Grants can be leveraged with other sources of funding increasing the viability, benefits, and/or size of a project; and
- Successful implementation of a grant-funded project can establish a record that can lead to other grants.

Challenges with using grants as a funding approach typically include:

- Grants are opportunistic in that local governments have no control over when grant monies will become available. However, in some cases opportunities to apply for grants and the anticipated level and timeline of the funding are scheduled well in advance;
- Grants are often available only once for the same purpose, which can lead to agencies creating ever "new" programs to qualify for funds. Other "strings" can be attached to the grant creating implementation or maintenance complexities;
- Grants are competitive. Considerable resources may be required to apply for a grant with no guarantee of success;
- Some level of matching funds is usually required. Some types of funds cannot be matched with other types. For example, some federal funds are pass-through via the state, but they are still considered federal and may therefore not be eligible as a match with other federal funds; and
- Most grants have a requirement for the agency to provide adequate post-project maintenance for the improvement. This can impose significant costs on the agency that are not funded by the grant.

While grant funding can help propel a GI program forward, it typically requires another source of funding to cover grant obligations

[14] Projects or activities required by or that implement a National Pollutant Discharge Elimination System permit, including urban, area-wide stormwater programs covering discharges from a MS4, are not eligible for funding under Section 319(h) grants.

such as matching funds or post-project maintenance. This understanding helps to underscore the importance of an underlying, dedicated and sustainable revenue source such as a stormwater fee or tax.

6.2.3 Private Development Programs, Incentives, and Policies

The City of Menlo Park has begun to implement additional GI requirements for new private development projects. As appropriate and determined by City staff, some private new and redevelopment projects are being required to construct GI measures along the public frontages of their property boundaries to treat runoff from roadways, sidewalks and other impervious surfaces. The City will continue to develop and refine their process for implementing this requirement including the development of standard conditions of approval, design standards and maintenance responsibilities.

6.3 Performance Assurance

The success of the GI Plan is contingent upon the performance of implemented GI facilities meeting or exceeding expectations for stormwater volume capture and pollutant removal. To increase reliability that implemented projects perform as predicted, the City has compiled a suite of tools that set the standards for GI design, construction, inspection, and maintenance. These tools are summarized in Table 6-3 and image excerpts from the plans are shown in Figure 6-4.

Guidance Topic	Project Phase	Guidance Document
Sizing Requirements	Planning and Design	SMCWPPP C.3 Regulated Projects Guide
		BASMAA Alternative GI Sizing Guidance (*See Appendix C*)
Design Guidance	Planning and Design	SMCWPPP GI Design Guide
		Menlo Park Typical GI Details and Specifications
Contractor Training	Construction	Negotiated as part of development's permit condition or as contracted through the CIP bidding selection process
Inspection and Maintenance	Inspection and Maintenance	SMCWPPP GI Design Guide
		Per City inspection staff with training where required or as contracted through third party firm

Table 6-3 GI Performance Assurance – Technical Guidance Documents

SMCWPPP C.3 Regulated Projects Guide

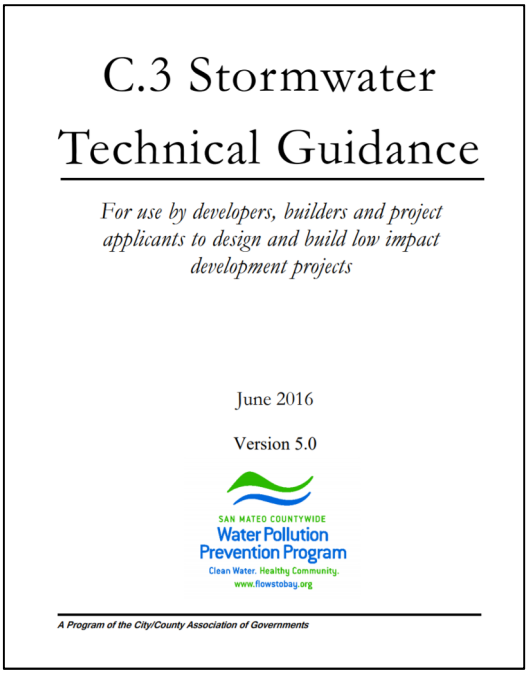
The C.3 Regulated Projects Guide (C3RPG) was written to help developers, builders, and project applicants to select and size appropriate post-construction stormwater controls for regulated projects. The C3RPG provides the regulatory background and requirements under the MRP, as well as guidance for stormwater control measure selection, sizing, design, and maintenance. The C3RPG was recently updated to be consistent with the GI Design Guide.

SMCWPPP GI Design Guide

The GI Design Guide provides guidance on design and implementation of stormwater controls in the public right-of-way and on public property. This includes definitions of GI types, integration strategies per site type, operation and maintenance guidance, and construction considerations.

Menlo Park GI Typical Details and Specifications

The GI Typical Details and Specifications refine the Sustainable Streets Typical Details included in the SMCWPPP GI Design Guide to make them suited for Menlo Park. GI projects in Menlo Park will be designed and built in accordance, or consistent with, the typical details and specifications.



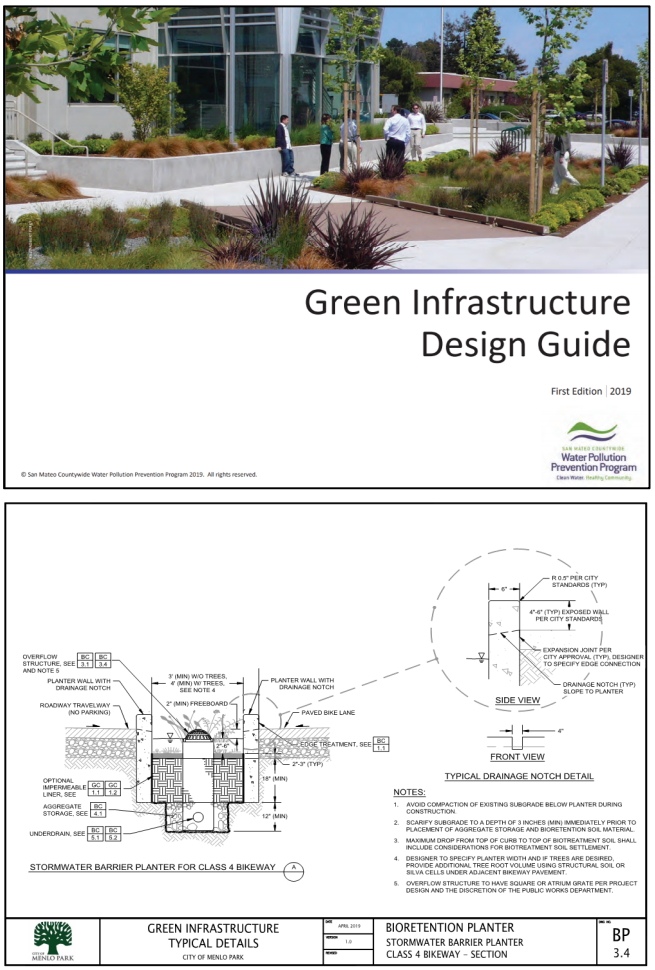


Figure 6-4 Key Technical Tools

Training

The City will continue to explore opportunities for GI inspection training. For example, Public Works may consider promoting staff attendance at ReScape Workshops to ensure a robust understanding of GI landscaping components. The City may also solicit experienced contractors during the CIP bidding process for applicable projects with GI facilities.

Inspection and Maintenance Plan

The City will aim to develop a thorough inspection and maintenance program to provide assurance that the facilities will perform as intended over their lifespan. This program may be incorporated as part of the City's CIP processes as more GI projects are planned and implemented. In the interim, the City will utilize the County's GI Design Guide, with appropriate training for internal staff, as a template for maintenance and inspections.

6.4 Project Tracking System

6.4.1 Current City Tracking Systems (Regulated and GI Projects)

The City maintains an existing database of GI projects and associated project activities

and all installed GI facilities in the City is entered into an inspection cycle. From that point on, any inspection records are uploaded to the database, and facilities are adaptively managed to meet the observed needs of each project. This comprehensive project data tracking system provides assurance that inspections and maintenance are being conducted in compliance with the MRP requirements. A countywide tool is currently being developed to further improve and standardize tracking and mapping of completed GI projects. This tracking tool is described in detail in the following section.

6.4.2 Proposed C/CAG Tracking System

C/CAG is in the process of developing a Green Infrastructure Tracking Tool (GI Tracking Tool) to document planned and completed GI projects countywide pursuant to the MRP. Additionally, the City's GI Plan must demonstrate with "reasonable assurance" that pollutant reductions will be met over defined periods of time (SFBRWQCB 2015).

Ultimately, the GI Tracking Tool aims to document GI projects, quantify key metrics related to their performance, and compare those metrics to goals established by the MRP. While the GI Tracking Tool is not scheduled for completion until the end of Fiscal Year 2019-2020, the GI Plan outlines protocols for incorporating completed projects into the system once developed.

a. Tracked Metrics

The GI Tracking Tool will document projects and quantify performance metrics on a project and city/countywide basis. The MRP (Provision C.3.j) states that the GI Plan "shall include means and methods to track the area within each Permittee's jurisdiction that is treated by green infrastructure controls and the amount of directly connected impervious area", and a "process for tracking and mapping completed projects, public and private, and making the information publicly available."

The most basic tracking mechanism incorporates the location and type of each uploaded project that has been uploaded into the GI Tool with respect to the following:

- The locations of projects will be shown on a dynamic map along with key base layers (watershed boundaries, waterbodies, city boundaries, storm drains, etc.)
- The user may click on any project and view information including its type (LID on a parcel, green street, regional facility, etc.) and other desired fields set by C/CAG members.
- The user may also query the GI Tool to find projects based on keywords (as opposed to clicking through the map)

The GI Tracking Tool will also include algorithms to quantify performance metrics and track progress toward key goals, including the following:

1. **Estimate of total area and impervious area treated with GI:** for each project, the user will provide information on capture area or the system will use 'default' values.
2. **Stormwater volumes managed during the annual average year:** the GI Tracking Tool will include algorithms that estimate stormwater runoff volumes managed with GI using methods that are consistent with the RAA/GI Plans. The stormwater volume metrics will also be useful to the SRP (which encourages tracking of stormwater volume capture) and for engaging third parties who are interested in broader water resources programs such as water supply.
3. **Progress toward implementation goals:** the GI Tracking Tool will include a user-editable database of compliance / implementation goals from the GI Plan

(and/or other programs), and will visualize the progress toward those goals.

The GI Tracking Tool will be developed in a manner in which additional metrics could be added over time. For example, in future phases of the tool could track metrics related to flood control and peak flow reduction. The Tracking Tool could also quantify bottom line benefits to promote investments in potential projects, such as carbon sequestration, public health benefits, heat island reduction, and water supply augmentation.

b. Tool Components

The Tracking Tool will contain components to document GI projects across San Mateo County. The tool will be organized into several interfaces to support mapping, project details, and annual reporting. The components of the GI Tracking Tool are outlined in Figure 6-5 and further described in the following sub-categories of this section.

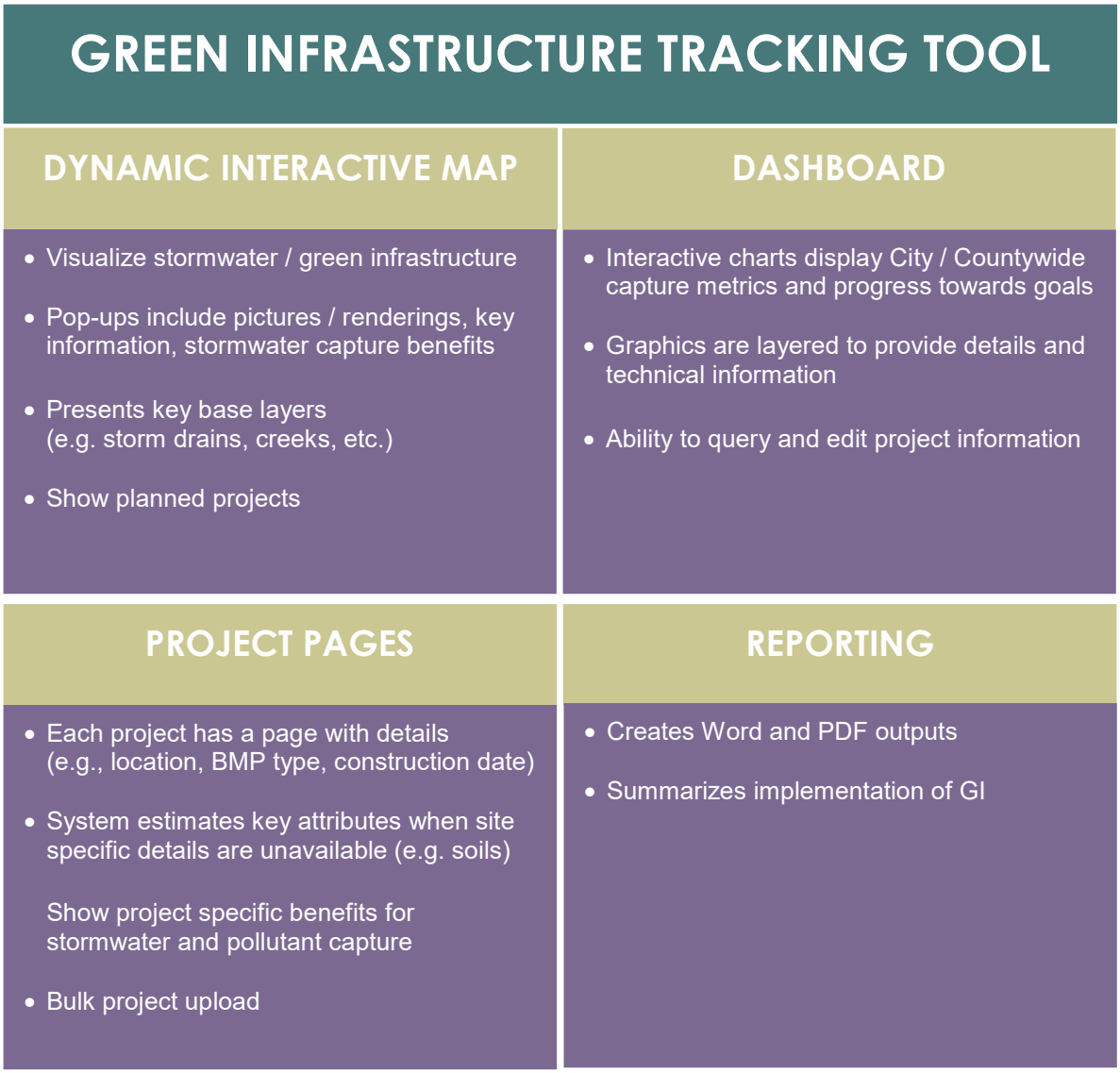


Figure 6-5 Overview of Tracking Tool elements and functionality

Mapping

A dynamic interactive map will be included as part of the Tracking Tool to support the visualization of planned and completed projects across the county. The mapping interface locates implemented projects and helps convey the scale of constructed efforts to-date. The map will be interactive and display pictures, renderings, project details, and key metrics on stormwater capture benefits. Base layers, such as administrative and planning boundaries, storm drains, creeks, and watersheds, will be overlaid to provide context with project locations.

Dashboard/Visualization
A dashboard of completed projects will be included to view dynamic charts displaying capture metrics and progress towards goals. Graphics will be interactive and intuitive, enabling users to gain supplemental details or more technical information by interacting with dynamic graphics. The user will also have the ability to query and edit project information.

Project Pages
In addition to the high-level visualization and analytics, the Tracking Tool will catalog project details as they are submitted to the system. Types of details that will be included are location, GI type, construction (or planned) date. In addition, the system will estimate key attributes (e.g., soils) using regional geospatial datasets when site-specific information is unavailable.

Reporting
The Tracking Tool also facilitates annual reporting of GI to meet MRP requirements. For example, the system allows for exporting project summaries into multiple formats (e.g., Word, PDF). These generated outputs include tables summarizing key project characteristics (such as location and drainage area) to supplement annual reports for regulatory agencies.

6.4.3 Proposed Process and Timeline for Tracking System Integration

The City's current process for annual reporting will be updated to integrate with the Tracking Tool once completed. Currently, project information is compiled annually to C/CAG which in turn packages the data for annual reporting to the San Francisco Bay Regional Water Quality Control Board. Current methods typically utilize desktop applications (e.g., Microsoft Excel) to display project details, calculate benefits, and transfer information between users. The Tracking Tool's web-based platform will streamline the City's annual reporting process while providing the following benefits:

- **System maintainability:** A web-based tool will be easier to maintain than existing desktop applications. Current project tracking utilizes Excel files for maintaining project information which is prone to multiple versions, unintended modifications, and accidental use of outdated or incorrect versions. The transition to a web-based tool will ensure users will only have access to the most recent version of the database.
- **Incremental data entry:** The web-based system will allow for projects to be entered incrementally throughout the year in lieu of large-scale annual uploads. This may ease the burden on City staff by reducing data compilation into manageable blocks. Additionally, planned projects may be entered into the system and updated throughout different phases of development (e.g., design, construction). An inventory of planned projects may help provide a better picture of implementation progress, increase awareness of near-term projects, and creates a placeholder for project details prior to completion.
- **Data consistency:** Standardized data entry ensures that same parameters are tracked for all completed projects. Furthermore, this promotes consistency in calculation outputs and streamlines annual reporting to the Water Board while minimizing errors. For example, missing or erroneous values (i.e., out of reasonable bounds) may be flagged prior to submission of project information to the database.
- **Bulk upload:** Completed projects prior to the Tracking Tool's development may opt to upload projects in bulk using current reporting methods (e.g. Excel). This option accelerates an easy transition from existing processes to the new tracking mechanism.

The data and metrics analyzed by the GI Tracking Tool will be based upon data

provided by the C/CAG members, including the following:

- **Base GIS layers:** The base layers for the dynamic map will be compiled and hosted through the GI Tracking Tool. Layers to be compiled and incorporated into the map include watershed boundaries, city boundaries, storm drains, soil types (to support infiltration estimates), rain gages (to support performance estimates), and aerial imagery and street map (from ESRI). Users will be able to toggle these layers off and on.
- **Project data:** Each C/CAG member agency will hold responsibility for uploading data for projects in its jurisdiction. Users will have both 'bulk upload' and manual (through browser) data upload options. The bulk upload Excel template will be similar to formats currently used for MS4 annual reporting. This Excel template will include required fields such as location, project type, and sizing information, along with optional fields set by C/CAG members. The GI Tracking Tool will also have an option to 'assume typical values' for pending field inputs that can edited in the future once available.

The GI Tracking Tool is scheduled for completion at the end of Fiscal Year 2019/2020. Once completed, existing projects will be uploaded from the City's database to the tracking tool where relevant metrics (i.e., impervious area treated, capture volumes) will be calculated. Additionally, new projects may be entered into the system as they are completed.

Appendix A

Green Infrastructure Typical Details & Standards

City of Menlo Park Guidance Regarding the Protection of Public Utility Assets Near and/or Under Green Infrastructure Facilities

General:

1. The City of Menlo Park Public Works Department, West Bay Sanitary District, and/or other relevant utility providers may exercise exemptions to the following asset protection standards based on site-specific constraints and project conditions.

Bioretention Planters and Permeable Pavement:

1. Bioretention planters and permeable pavement edge treatments are not permitted above or within three (3) horizontal feet of the outside diameter of a sewer/storm drain main, water main, gas main, valve box, manhole collar, or other public utility asset unless otherwise approved by Public Works.

2. Bioretention planter inlets and outlets are not permitted within twelve (12) horizontal inches of a catch basin, or a distance that allows for the standard curb inlet gutter apron to be constructed, whichever is greater.

3. The footprint of bioretention planters are not permitted to contain operable water surface facilities and service points (including but not limited to water valves, meter boxes, and manholes).

4. Bioretention planters shall not impact the structural integrity of compacted subgrade soil that supports adjacent utility poles, including overhead power poles, street light foundations, and sign footings. The uncompacted subgrade beneath and biotreatment soil within a planter cannot support lateral loading. A geotechnical engineer shall advise on the appropriate influence line of the adjacent structural element and minimum setbacks to the bioretention planter.

5. Projects that install bioretention planters or permeable pavement above potable water or sewer service laterals shall maintain 12 inches (minimum) vertical separation between the bottom of the bioretention planter/permeable pavement system and the top of the lateral pipe with special accommodations for pipe protection (e.g. sleeving, concrete encasement, etc.) where applicable per the discretion of Public Works (for water service lines) or West Bay Sanitary District (for sewer laterals).

6. Projects should avoid locating bioretention planters over/through any dry utility trenches or duct banks. Crossing of small dry utility service lines, including street light/traffic light conduit and telecom/data lines with special accommodations for pipe protection (e.g. sleeving, compacted earth cover with impermeable liner, etc.) may be allowed per the discretion of Public Works or relevant utility provider.

7. Paving materials installed above or adjacent to water and/or wastewater assets within the public right of way shall:
    a. Be approved by Menlo Park Public Works prior to the installation.
    b. Meet H-20 traffic loading ratings (as defined by AASHTO).
    c. Not diminish the overland flow capacity of the street.
    d. Not obstruct or obscure water castings.

8. Trees shall not be located within five (5) horizontal feet of a water asset, from the centerline of the tree to the outside edge of the asset.

Stormwater Curb Extensions:

1. Stormwater curb extensions longer than 130 feet shall only be allowed to extend over potable and recycled water mains when approved in writing by Menlo Park Public Works and/or water agency in writing.

2. Stormwater curb extensions longer than 130 feet are not allowed over high-pressure water systems; their valves are not allowed within stormwater curb extensions.

3. Stormwater curb extensions may extend over potable/recycled water lateral service valves, provided the following conditions are satisfied:
    a. The valve box shall be replaced.
    b. A clear path of travel a minimum of four (4) feet wide shall be provided for Water Department staff between the street and the valve.

4. Stormwater curb extensions shall not extend over or around potable/recycled water main valves that are in the street under existing conditions. Main valves shall be accessible at all times by Water Department and Fire Department vehicles.

5. Sidewalk extensions, bulbouts, curbs and gutters shall not be built in the same location as existing manholes, unless special approval is granted by Menlo Park Public Works and the manhole cover is modified to meet ADA and maintenance requirements. The lip of any new gutter shall be horizontally offset from the outside edge of any manhole frame by a minimum of six (6) inches. The face of any new curb shall be horizontally offset from the outside edge of any manhole frame by a minimum of eighteen (18) inches.

6. If a project results in a manhole located outside of a vehicular path of travel, unobstructed vehicular access with H-20 traffic loading shall be provided within ten (10) horizontal feet of the manhole.

Utilities:

1. Sewer Laterals:
    a. Positive surface slope shall be maintained from all sewer lateral cleanouts to the gutter.
    b. Pedestrian path-of-travel shall avoid the flow path for sewage resulting from a sewer lateral cleanout back-up.

2. New utilities and/or underground structures shall comply with all utility agency requirements and other applicable federal, state, and local codes.

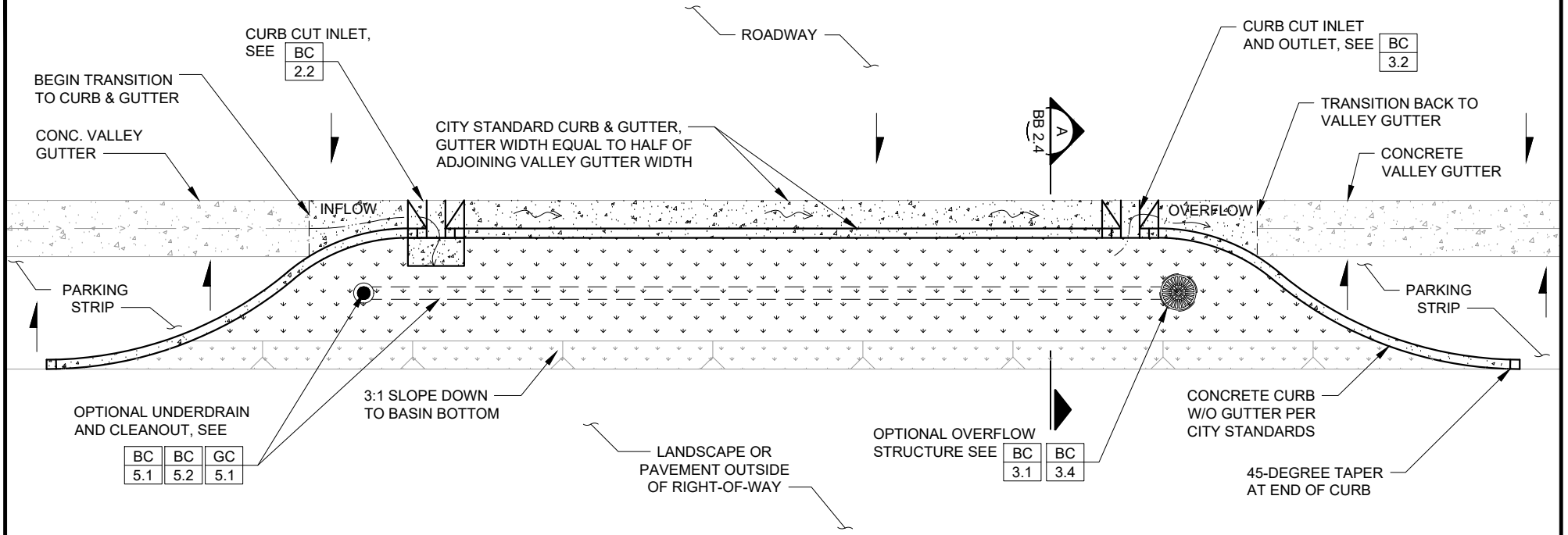
3. New utilities and/or underground structures aligned adjacent to an existing water/wastewater asset shall not be installed within three (3) horizontal feet of the outside diameter of the existing utility asset.

4. New utilities and/or underground structures that cross over or under an existing water asset shall be installed as far as possible from and no closer than twelve (12) inches to the outside diameter of the asset.

5. New utilities and/or underground structures that cross over or under an existing water/wastewater asset shall cross at an angle of forty-five (45) to ninety (90) degrees, as measured between the centerline of the crossing utility and the water asset, unless otherwise authorized.

6. PG&E Facilities: Per current Greenbook Joint Trench Configurations & , the minimum allowable horizontal separation between PG&E facilities and "wet" facilities is 3' with a minimum 1' of undisturbed earth or the installation of a suitable barrier between the facilities. If a 3' horizontal separation cannot be attained between "wet" utilities and PG&E dry facilities, a variance may be approved by the local Inspection Supervisor and submitted to the Service Planning Support Program Manager for approval. Separations of 1' or less are not permissible and will not be allowed.
   https://www.pge.com/includes/docs/pdfs/mybusiness/customerservice/startstop/newconstruction/greenbook/servicerequirements/greenbook_manual.pdf#page=381

   Gas only service trenches shall have a minimum cover of 24 inches (12" to warning tape, 12" to top of pipe, 4" of approved backfill immediately above pipe. See page 2-9 here:
   https://www.pge.com/includes/docs/pdfs/mybusiness/customerservice/startstop/newconstruction/greenbook/servicerequirements/greenbook_manual.pdf#page=69



NOT FOR CONSTRUCTION - REFER TO USER GUIDE

CITY OF MENLO PARK

GREEN INFRASTRUCTURE TYPICAL DETAILS

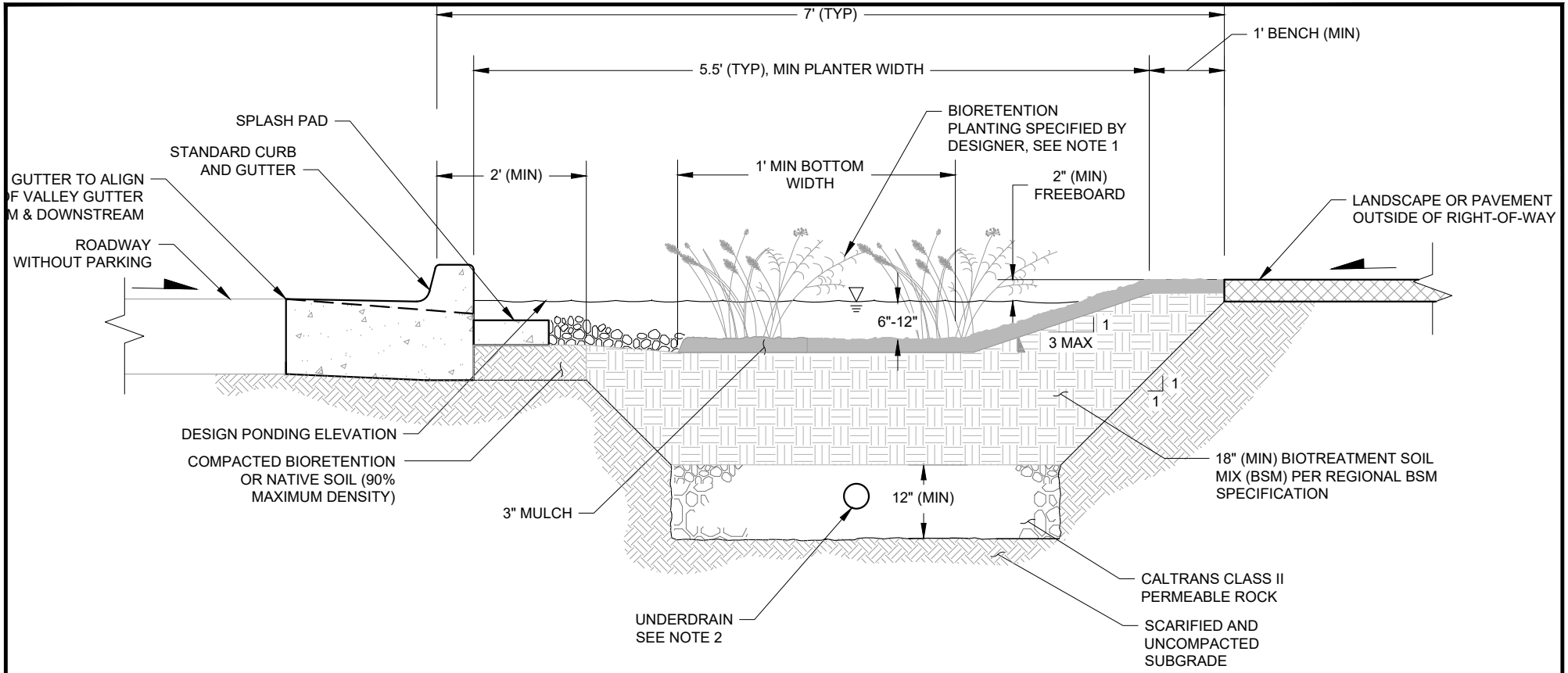
CITY OF MENLO PARK

DATE: APRIL 2019
VERSION: 1.0
REVISED:

BIORETENTION BASIN

ROADSIDE LAYOUT - STREET WITH VALLEY GUTTERS

DWG NO.
BB 2.3



SECTION A (A)

CONSTRUCTION NOTES:

1. AVOID COMPACTION OF EXISTING SUBGRADE BELOW BASIN.
2. SCARIFY SUBGRADE TO A DEPTH OF 3 INCHES (MIN) IMMEDIATELY PRIOR TO PLACEMENT OF AGGREGATE STORAGE AND BIORETENTION SOIL MATERIALS.
3. COMPACT BIORETENTION SOIL IMMEDIATELY BEHIND CURB TO 90% OF MAXIMUM DENSITY PER STANDARD PROCTOR TEST (ASTM D698).
4. UNDERDRAIN REQUIRED FOR ALL FACILITIES WITH IMPERMEABLE LINER.
5. PROVIDE ONE CLEANOUT PER PLANTER (MIN) FOR FACILITIES WITH UNDERDRAINS.
6. MINIMUM UTILITY SETBACKS AND PROTECTION MEASURES MUST CONFORM TO CURRENT SFPUC ASSET PROTECTION STANDARDS. COORDINATE WITH ENGINEER IN THE EVENT OF UTILITY CROSSING AND UTILITY CONFLICTS.
7. GEOTECHNICAL OR HYDRAULOGIST ENGINEER TO DETERMINE IF LINER SHALL BE USED.
8. ANGLE OF REPOSE MAY VARY BASED ON GEOTECHNICAL ENGINEER RECOMMENDATIONS.

NOT FOR CONSTRUCTION – REFER TO USER GUIDE

CITY OF MENLO PARK

GREEN INFRASTRUCTURE TYPICAL DETAILS

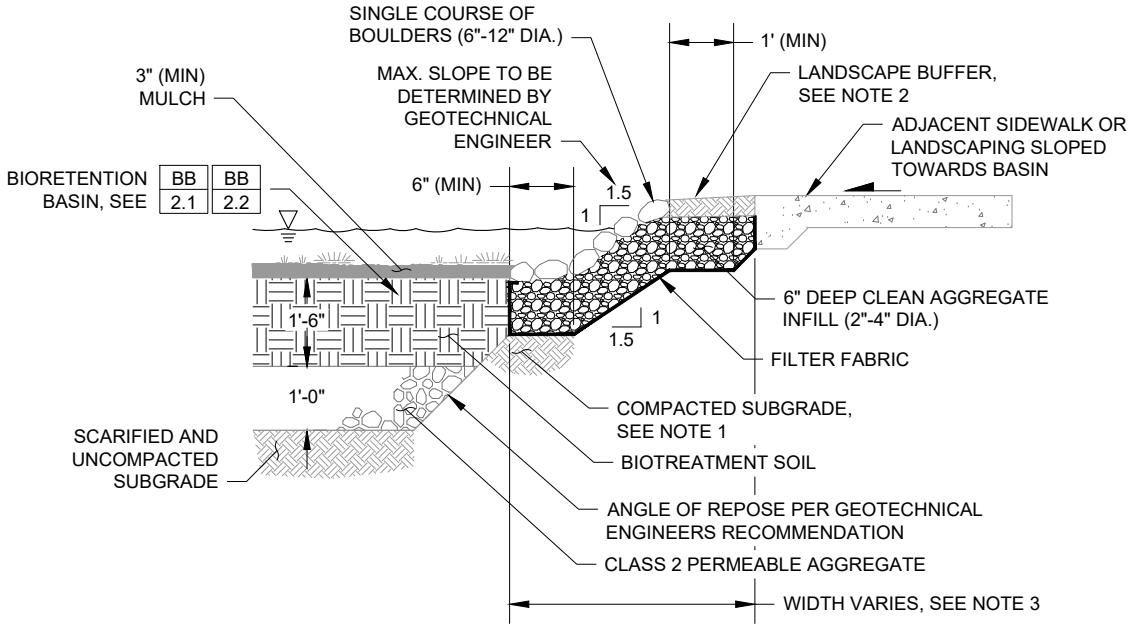
CITY OF MENLO PARK

DATE: APRIL 2019
VERSION: 1.0
REVISED:

BIORETENTION BASIN

ROADSIDE SECTION TYPE 3

DWG NO. BB 2.4



NOTES:

1. IF ADDITIONAL TREE ROOT VOLUME IS NEEDED FOR TREES PLANTED WITHIN THE BIORETENTION BASIN, THE DESIGNER MAY SPECIFY THE USE OF STRUCTURAL SOIL OR SILVA CELLS UNDER THE STABILIZED SLOPE AND/OR SIDEWALK BASE WITH APPROVAL FROM GEOTECHNICAL ENGINEER AND PUBLIC WORKS.
2. IF THERE IS A RISK OF EROSION ADJACENT TO A WIDE SIDEWALK/PLAZA, COBBLES SHALL BE USED IN LIEU OF LANDSCAPING TO PROVIDE ENERGY DISSIPATION AND EROSION PROTECTION. BUFFER AREA SHALL BE DESIGNED AND MAINTAINED TO ALLOW FOR FREE FLOW OF RUNOFF FROM ADJACENT SURFACE INTO BASIN.
3. IF SPACE CONSTRAINTS REQUIRE REDUCED WIDTH, A STEEPER SLOPE AND VERTICAL WALL EDGE RESTRAINT WITH RAISED CURB AT SIDEWALK MAY BE USED, SUBJECT TO APPROVAL BY GEOTECHNICAL ENGINEER.
4. REFER TO SMCWPPP GI DESIGN GUIDE FOR ADDITIONAL DESIGN GUIDANCE.

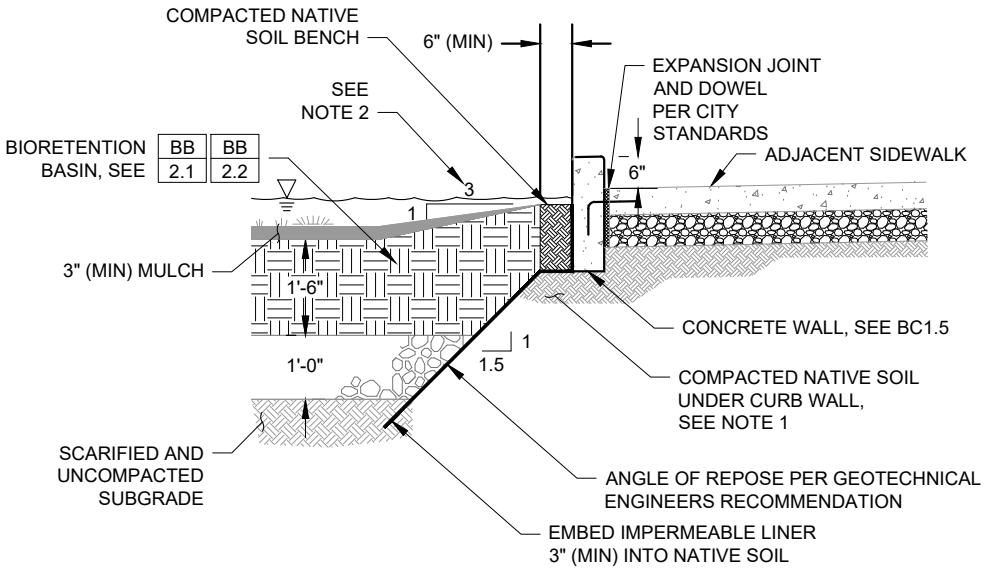
CITY OF MENLO PARK

GREEN INFRASTRUCTURE
TYPICAL DETAILS
CITY OF MENLO PARK

DATE: APRIL 2019
VERSION: 1.0
REVISED:

BIORETENTION BASIN
EDGE TREATMENTS – PEDESTRIAN APPLICATIONS
(3 OF 4) ROCK STABILIZED SLOPE

DWG NO.
BC
1.5.1

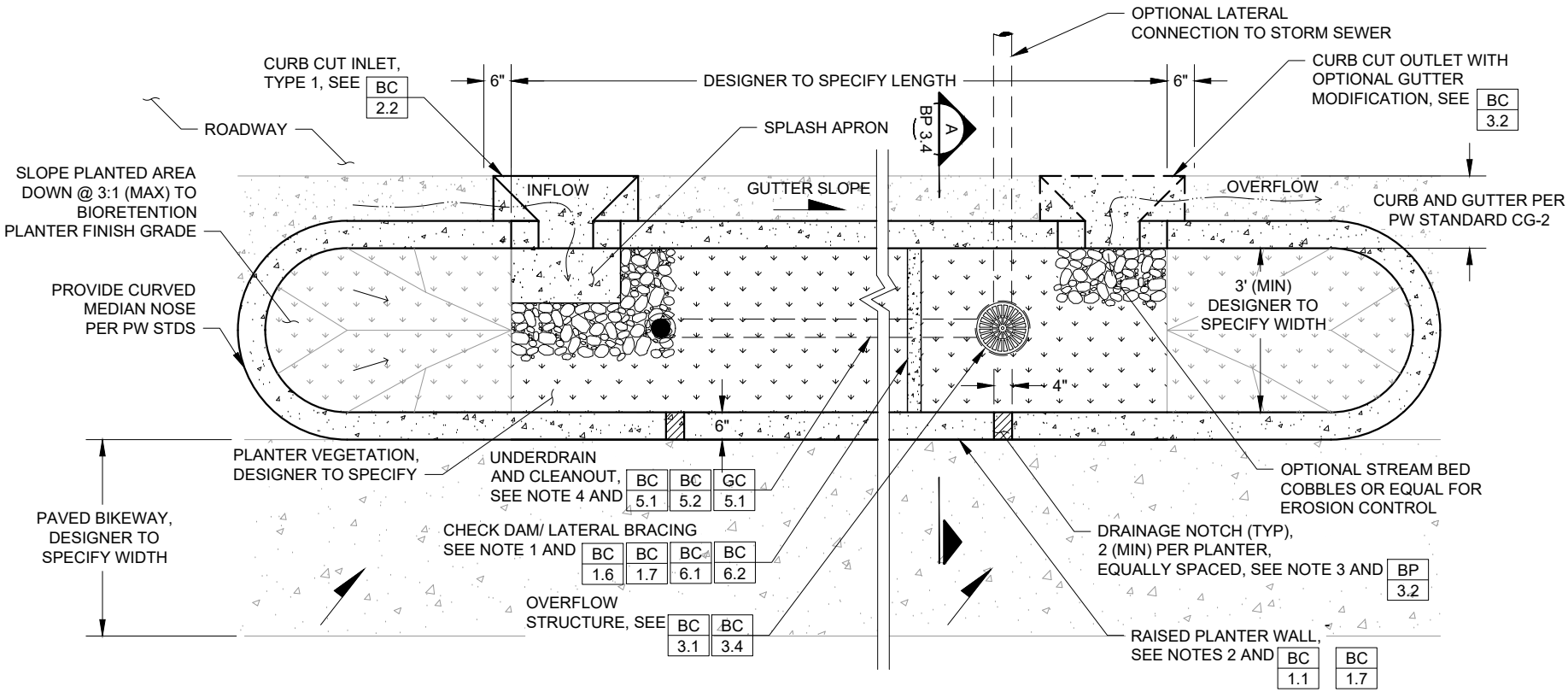


NOTES:

1. IF ADDITIONAL TREE ROOT VOLUME IS NEEDED FOR TREES PLANTED WITHIN THE BIORETENTION BASIN, DESIGNER MAY SPECIFY THE USE OF STRUCTURAL SOIL OR SILVA CELLS UNDER THE STABILIZED SLOPE AND/OR SIDEWALK BASE WITH APPROVAL FROM GEOTECHNICAL ENGINEER AND PUBLIC WORKS.
2. IF SITE CONSTRAINTS REQUIRE STEEPER SIDE SLOPES, THE DESIGNER MAY STEEPEN THE EARTHEN SLOPE TO 2:1 (MAX) WITH APPROVAL FROM THE GEOTECHNICAL ENGINEER. HOWEVER, ADDITIONAL COMPACTION AND/OR NON-BIOTREATMENT SOIL WILL LIKELY BE REQUIRED TO ACHIEVE SLOPES STEEPER THAN 3:1 AND THUS THE SLOPED SIDE AREAS MUST BE EXCLUDED FROM STORMWATER MANAGEMENT FACILITY SIZING CALCULATIONS.
3. REFER TO SMCWPPP GI DESIGN GUIDE FOR ADDITIONAL DESIGN GUIDANCE.

NOT FOR CONSTRUCTION – REFER TO USER GUIDE

CITY OF MENLO PARK	GREEN INFRASTRUCTURE TYPICAL DETAILS CITY OF MENLO PARK	DATE: APRIL 2019 VERSION: 1.0 REVISED:	BIORETENTION BASIN EDGE TREATMENTS – PEDESTRIAN APPLICATIONS (4 OF 4) COMPACTED SOIL BENCH	DWG NO. BC 1.5.2



NOTES:

1. CHECK DAMS SHALL BE SPACED TO PROVIDE PONDING PER SITE SPECIFIC DESIGN.
2. SLOPE TOP OF PLANTER WALL TO MATCH LONGITUDINAL SLOPE OF ADJACENT SURFACE.
3. LAY OUT DRAINAGE NOTCHES TO PREVENT PONDING BEHIND PLANTER WALL WITH 5' MAXIMUM SPACING BETWEEN NOTCHES.
4. PROVIDE ONE CLEANOUT PER PLANTER (MIN) AND NO LESS THAN ONE CLEANOUT FOR EVERY 100 LINEAR FEET OF PIPE FOR FACILITIES WITH UNDERDRAINS.
5. MINIMUM UTILITY SETBACKS AND PROTECTION MEASURES MUST CONFORM TO CURRENT JURISDICTION'S UTILITY PROTECTION STANDARDS. COORDINATE WITH ENGINEER IN THE EVENT OF UTILITY CROSSING AND UTILITY CONFLICTS.

NOT FOR CONSTRUCTION – REFER TO USER GUIDE

CITY OF MENLO PARK

GREEN INFRASTRUCTURE TYPICAL DETAILS

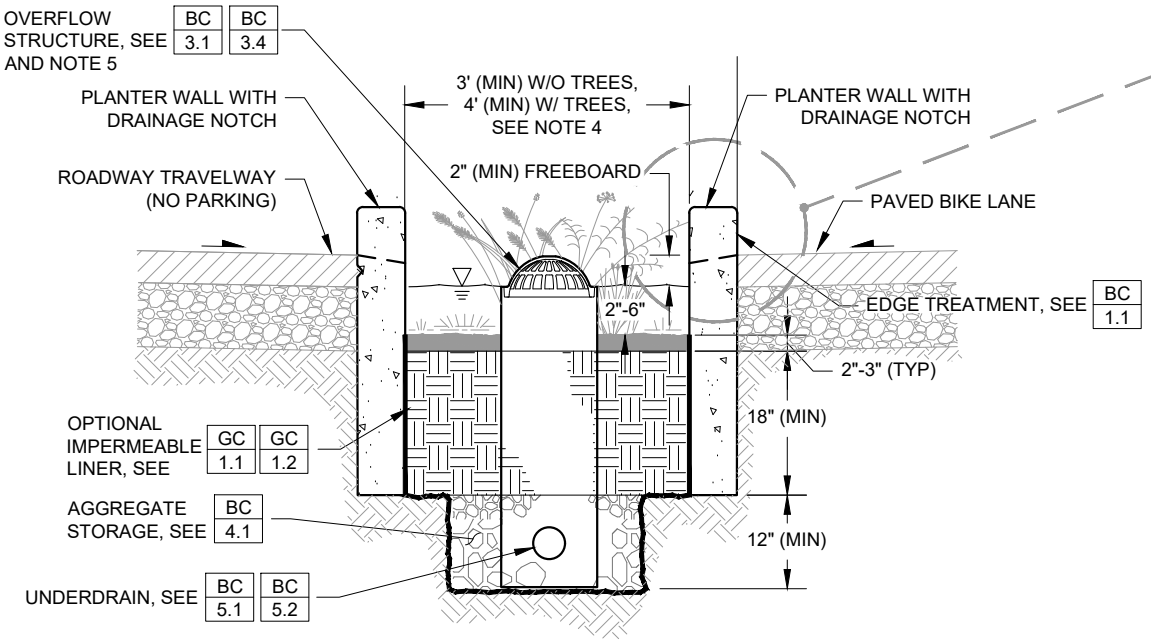
CITY OF MENLO PARK

DATE: APRIL 2019
VERSION: 1.0
REVISED:

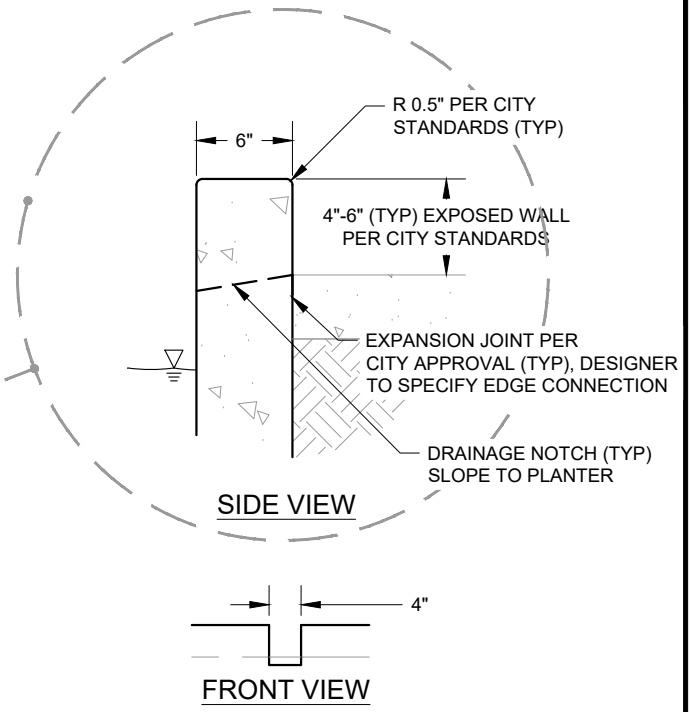
BIORETENTION PLANTER

STORMWATER BARRIER PLANTER – CLASS 4 BIKEWAY – PLAN

DWG NO.
BP
3.3



STORMWATER BARRIER PLANTER FOR CLASS 4 BIKEWAY (A)



TYPICAL DRAINAGE NOTCH DETAIL

NOTES:

1. AVOID COMPACTION OF EXISTING SUBGRADE BELOW PLANTER DURING CONSTRUCTION.
2. SCARIFY SUBGRADE TO A DEPTH OF 3 INCHES (MIN) IMMEDIATELY PRIOR TO PLACEMENT OF AGGREGATE STORAGE AND BIORETENTION SOIL MATERIAL.
3. MAXIMUM DROP FROM TOP OF CURB TO TOP OF BIOTREATMENT SOIL SHALL INCLUDE CONSIDERATIONS FOR BIOTREATMENT SOIL SETTLEMENT.
4. DESIGNER TO SPECIFY PLANTER WIDTH AND IF TREES ARE DESIRED, PROVIDE ADDITIONAL TREE ROOT VOLUME USING STRUCTURAL SOIL OR SILVA CELLS UNDER ADJACENT BIKEWAY PAVEMENT.
5. OVERFLOW STRUCTURE TO HAVE SQUARE OR ATRIUM GRATE PER PROJECT DESIGN AND THE DISCRETION OF THE PUBLIC WORKS DEPARTMENT.

NOT FOR CONSTRUCTION – REFER TO USER GUIDE

CITY OF MENLO PARK

GREEN INFRASTRUCTURE
TYPICAL DETAILS
CITY OF MENLO PARK

DATE: APRIL 2019
VERSION: 1.0
REVISED:

BIORETENTION PLANTER
STORMWATER BARRIER PLANTER
CLASS 4 BIKEWAY – SECTION

DWG NO.
BP
3.4

PURPOSE:

TREE WELLS CONTROL PEAK FLOWS AND VOLUMES OF STORMWATER RUNOFF BY PROVIDING SURFACE, SUBSURFACE STORAGE, AND INFILTRATION INTO NATIVE SOIL. WATER IS ALSO TREATED AS IT FILTERS THROUGH THE BIOTREATMENT SOIL.

DESIGNER NOTES & GUIDELINES:

1. THE DESIGNER MUST ADAPT PLAN AND SECTION DRAWINGS TO ADDRESS SITE-SPECIFIC CONDITIONS.

2. TREE WELL AREA, PONDING DEPTH, BIOTREATMENT SOIL DEPTH, AND AGGREGATE STORAGE DEPTH MUST BE SIZED TO MEET PROJECT WATER QUALITY REQUIREMENTS. C.3. REGULATED PROJECTS MAY REQUIRE EXPANSION OF TREE WELL VOLUME UNDER THE PAVEMENT USING INFILTRATION TRENCHES, STRUCTURAL SOIL, AND/OR MODULAR PAVEMENT SUPPORT CELLS.

3. FACILITY DRAWDOWN TIME (i.e. TIME FOR SURFACE PONDING TO DRAIN THROUGH THE ENTIRE SECTION INCLUDING AGGREGATE STORAGE AFTER THE END OF A STORM REQUIREMENTS:

   - 48 HOUR MAXIMUM FACILITY DRAWDOWN UNLESS OTHERWISE APPROVED PER THE PROVISIONS OF THE COUNTY'S MOSQUITO & VECTOR CONTROL DISTRICT.

4. THE TREE WELL PLANTER EDGE SHOULD BE DELINEATED WITH A 6-INCH HIGH CURB (PREFERRED), LOW RAILING, OR TREE GRATE TO PREVENT PEOPLE FROM ENTERING THE PLANTER. THE VERTICAL DROP BETWEEN THE TREE WELL AND ADJACENT PATH OF TRAVEL MUST COMPLY WITH ACCESSIBILITY REQUIREMENTS. WHEN A TREE GRATE IS USED, A MINIMUM SEPARATION OF 4 INCHES BETWEEN THE GRATE AND TREE TRUNK SHOULD BE MAINTAINED. REFER TO SECTION 3.1 OF HE SMCWPPP GREEN INFRASTRUCTURE DESIGN GUIDE FOR DETAILED GUIDANCE ON CURB, RAILING, AND OTHER EDGE TREATMENTS.

5. RECOMMENDED TREE ROOT VOLUME IS 400 CUBIC FEET FOR SMALL TREES (6-INCH DIAMETER TRUNK), 1,000 CUBIC FEET FOR MEDIUM SIZED TREES (16-INCH DIAMETER TRUNK), AND 1,400 CUBIC FEET FOR LARGE TREES (24-INCH DIAMETER TRUNK), WHERE VOLUMES ARE BASED ON A 3-FOOT DEPTH PLANTER AREA. IN CONSTRAINED SITES, ROOT CHANNELS, MODULAR PAVEMENT SUPPORT CELLS, AND OTHER TECHNIQUES CAN BE USED TO EXPAND THE TREE ROOT VOLUME. CONSULT WITH A DESIGN PROFESSIONAL TO ENSURE SUFFICIENT TREE ROOT VOLUME IS PROVIDED FOR TREE HEALTH.

6. WHEN A TREE WELL IS BEHIND A STREET CURB, VERTICAL ELEMENTS OF THE TREE WELL THAT ARE MORE THAN 12 INCHES ABOVE THE ROAD SURFACE SHALL BE SETBACK 18 INCHES FROM THE FACE OF CURB. TREE PLACEMENT SHOULD NOT IMPACT SIGHT DISTANCE FOR EXISTING DRIVEWAYS AND ON-STREET PARKING OR EXISTING DRIVEWAY AND PARKED VEHICLE INGRESS AND EGRESS.

7. TREE SPECIES AND UNDERSTORY PLANTS (IF USED) SHALL BE SPECIFIED BY A DESIGN PROFESSIONAL. PROVIDE MINIMUM 2-FOOT CLEARANCE BETWEEN TREE TRUNK AND UNDERSTORY PLANTS TO REDUCE COMPETITION FOR WATER, NUTRIENTS, AND ROOT SPACE WITH TREES.

8. THE PREFERRED SIZE FOR A TREE WELL IS 6-FEET WIDE AND 6-FEET LONG, FOR A PLANTER AREA OF 36 SQUARE FEET. WHERE SIDEWALK WIDTH IS CONSTRAINED, WIDTH MAY BE 4 FEET MINIMUM AND A DESIRED LENGTH OF 8 FEET WITH A MINIMUM OF 5 FEET.

9. MULTIPLE TREES IN A TREE TRENCH SHOULD BE SPACED APPROXIMATELY 25 FEET TO 35 FEET APART DEPENDING ON TREE SPECIES.

10. IF STREET PARKING IS PROHIBITED ADJACENT TO THE SIDEWALK/TREE WELL AREA, THE STEPOUT ZONE CAN BE REMOVED AND THE TRENCH DRAIN INLET CAN BE CHANGED TO A SIMPLER CURB CUT INLET.

11. IF PROJECT REQUIREMENT, THE DESIGNER SHOULD DETERMINE IF ADDITIONAL MEASURES ARE NEEDED TO MEET THE REGIONAL WATER QUALITY BOARD'S TRASH FULL CAPTURE REQUIREMENTS, i.e. TRASH CAPTURE INLET STRUCTURE AND/OR SCREEN WITHIN THE OVERFLOW STRUCTURE.

12. THE DESIGNER MUST EVALUATE UTILITY SURVEYS FOR POTENTIAL UTILITY CROSSINGS OR CONFLICTS. REFER TO **GC 2.1** - **GC 2.12** FOR UTILITY CROSSING DETAILS AND **GC 1.4** - **GC 4.4** FOR UTILITY CROSSING CONFLICT DETAILS.

13. MINIMUM UTILITY SETBACKS AND PROTECTION MEASURES MUST CONFORM TO CURRENT CITY OF MENLO PARK STANDARDS AND OTHER UTILITY PROVIDER REQUIREMENTS. TREES SHALL NOT BE LOCATED WITHIN FIVE (5) HORIZONTAL FEET OF A WATER ASSET, MEASURED FROM THE CENTERLINE OF THE TREE TO THE OUTSIDE EDGE OF THE ASSET.

RELATED COMPONENTS		
EDGE TREATMENTS:	BC 1.1	BC 1.7
INLETS:	BC 2.1	BC 2.4
OUTLETS:	BC 3.1	BC 3.4
AGGREGATE STORAGE:		BC 4.1
UNDERDRAINS:	BC 5.1	BC 5.2
LINERS:	GC 1.1	GC 1.2
UTILITY CROSSINGS:	GC 2.1	GC 2.12
OBSERVATION PORTS:	GC 3.1	GC 3.3
UTILITY CONFLICTS:	GC 4.1	GC 4.4
CLEANOUTS:		GC 5.2

NOT FOR CONSTRUCTION – REFER TO USER GUIDE

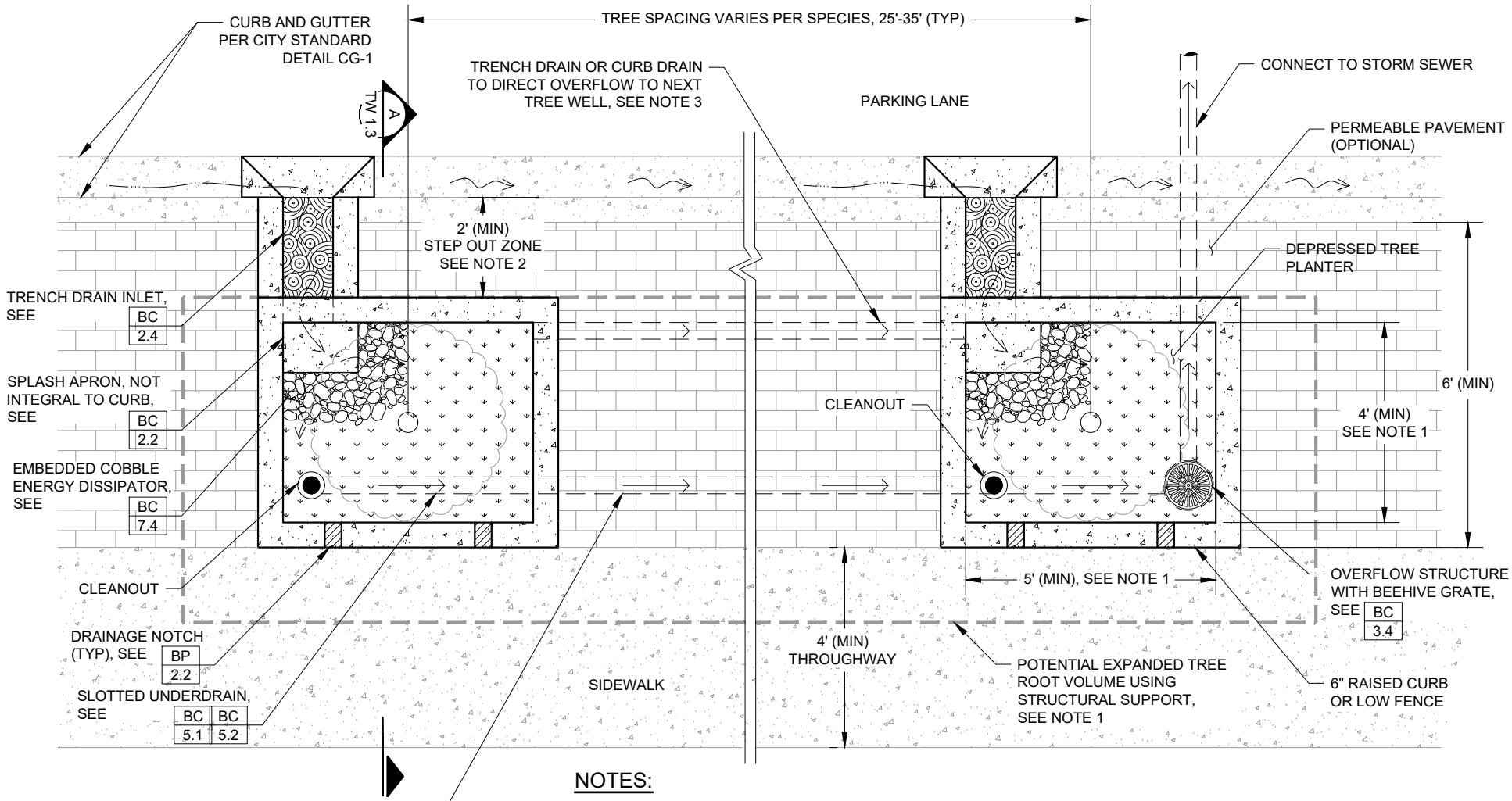
CITY OF MENLO PARK

GREEN INFRASTRUCTURE
TYPICAL DETAILS
CITY OF MENLO PARK

DATE: APRIL 2019
VERSION: 1.0
REVISED:

TREE WELL
DESIGNER NOTES (1 OF 1)

DWG NO.
TW
1.1



NOTES:

1. PREFERRED TREE WELL SIZE IS 6 FEET BY 6 FEET, BUT CONSTRAINED SITES CAN REDUCE WIDTH TO 4 FEET PROVIDED THEY CAN ACCOMMODATE MINIMUM REQUIRED TREE ROOT VOLUME BY INCREASING LENGTH AND/OR USING STRUCTURAL SOIL, PERMEABLE PAVEMENT, AND/OR SILVA CELLS UNDER ADJACENT SIDEWALK.
2. DESIGNER TO SPECIFY MINIMUM SIDEWALK WIDTH BEHIND AND STEP-OUT ZONE IN FRONT OF TREE WELL THAT COMPLIES WITH ALL APPLICABLE AGENCY AND ADA REQUIREMENTS. STEP-OUT ZONE CAN BE ELIMINATED IF PARKING IS PROHIBITED ALONG CURB. SEE DESIGNER NOTES.
3. IF CURB DRAIN, I.E. SHALLOW PIPES, ARE USED TO CONVEY SURFACE WATER BETWEEN TREE WELLS, 3 INCH CAST IRON PIPES SHALL BE INSTALLED AND A MINIMUM COVER OF 1-1/2 INCHES OF CONCRETE OVER PIPES SHALL BE PROVIDED. IF TRENCH DRAIN IS USED, THE GRATE SHALL BE ADA COMPLIANT AND HAVE A NON-SLIP SURFACE.

NOT FOR CONSTRUCTION – REFER TO USER GUIDE

CITY OF MENLO PARK

GREEN INFRASTRUCTURE TYPICAL DETAILS

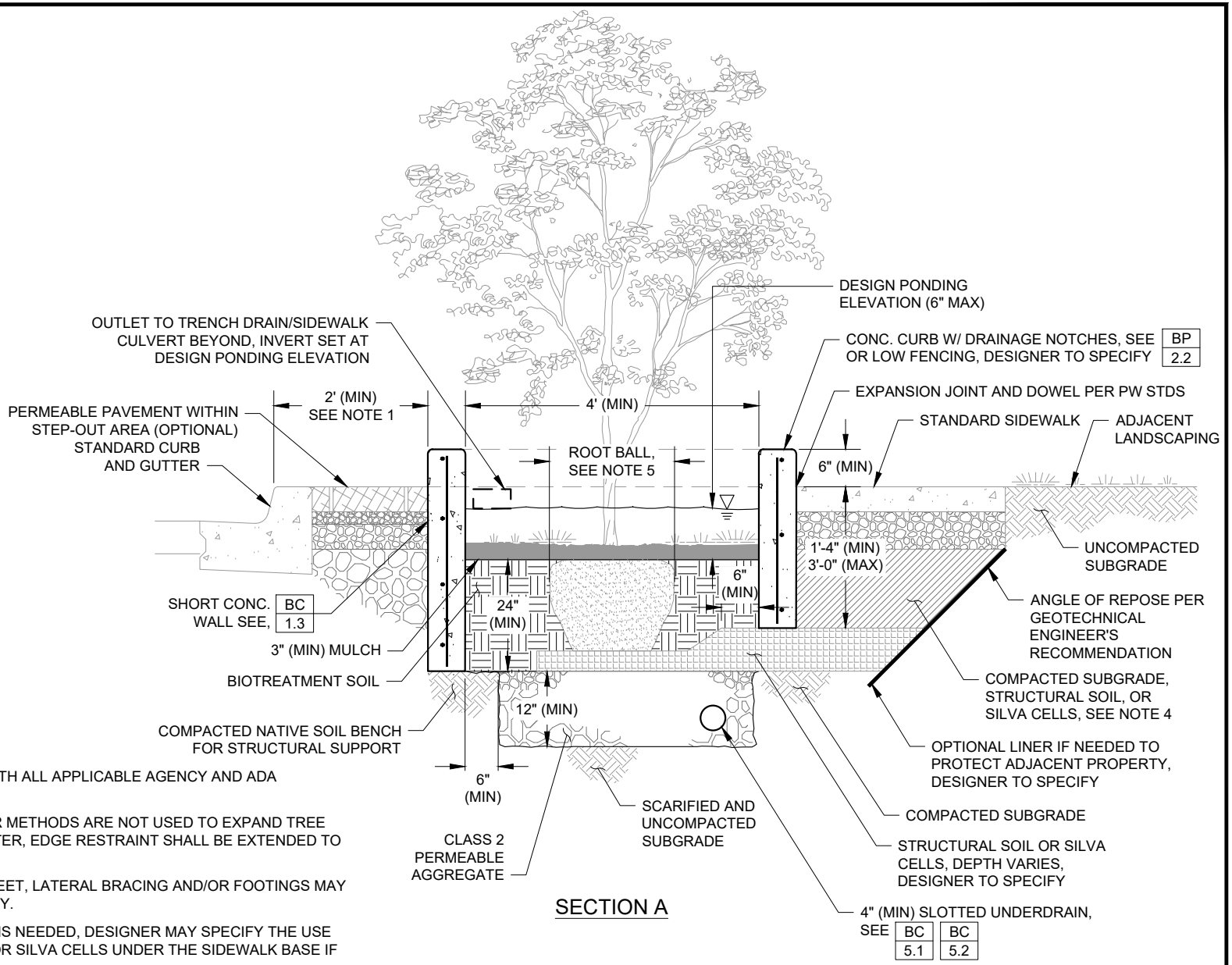
CITY OF MENLO PARK

DATE: APRIL 2019
VERSION: 1.0
REVISED:

TREE WELL

CONNECTED TREE WELLS WITH PARKING – PLAN

DWG NO. TW 1.2



SECTION A

NOTES:

1. STEP-OUT WIDTH SHALL COMPLY WITH ALL APPLICABLE AGENCY AND ADA STANDARDS.
2. IF STRUCTURAL SOIL AND/OR OTHER METHODS ARE NOT USED TO EXPAND TREE ROOT VOLUME BEYOND TREE PLANTER, EDGE RESTRAINT SHALL BE EXTENDED TO BOTTOM OF BIOTREATMENT SOIL.
3. IF TREE WELL LENGTH EXCEEDS 6 FEET, LATERAL BRACING AND/OR FOOTINGS MAY BE REQUIRED. DESIGNER TO SPECIFY.
4. IF ADDITIONAL TREE ROOT VOLUME IS NEEDED, DESIGNER MAY SPECIFY THE USE OF ADDITIONAL STRUCTURAL SOIL OR SILVA CELLS UNDER THE SIDEWALK BASE IF ALLOWED BY PUBLIC WORKS.
5. ROOT BALL SIZE TO BE SPECIFIED BY THE DESIGNER AND APPROVED BY THE CITY ARBORIST IF WITHIN PUBLIC RIGHT-OF-WAY.
6. REFER TO DESIGNER NOTES FOR ADDITIONAL DESIGN GUIDANCE.

NOT FOR CONSTRUCTION – REFER TO USER GUIDE

CITY OF MENLO PARK

GREEN INFRASTRUCTURE TYPICAL DETAILS

CITY OF MENLO PARK

DATE: APRIL 2019
VERSION: 1.0
REVISED:

TREE WELL

CONNECTED TREE WELLS WITH PARKING – SECTION

DWG NO.
TW 1.3

Appendix B

Reasonable Assurance Analysis for Menlo Park

APPENDIX B – Reasonable Assurance Analysis for Menlo Park

Reasonable Assurance Analysis and Green Infrastructure Implementation Goals

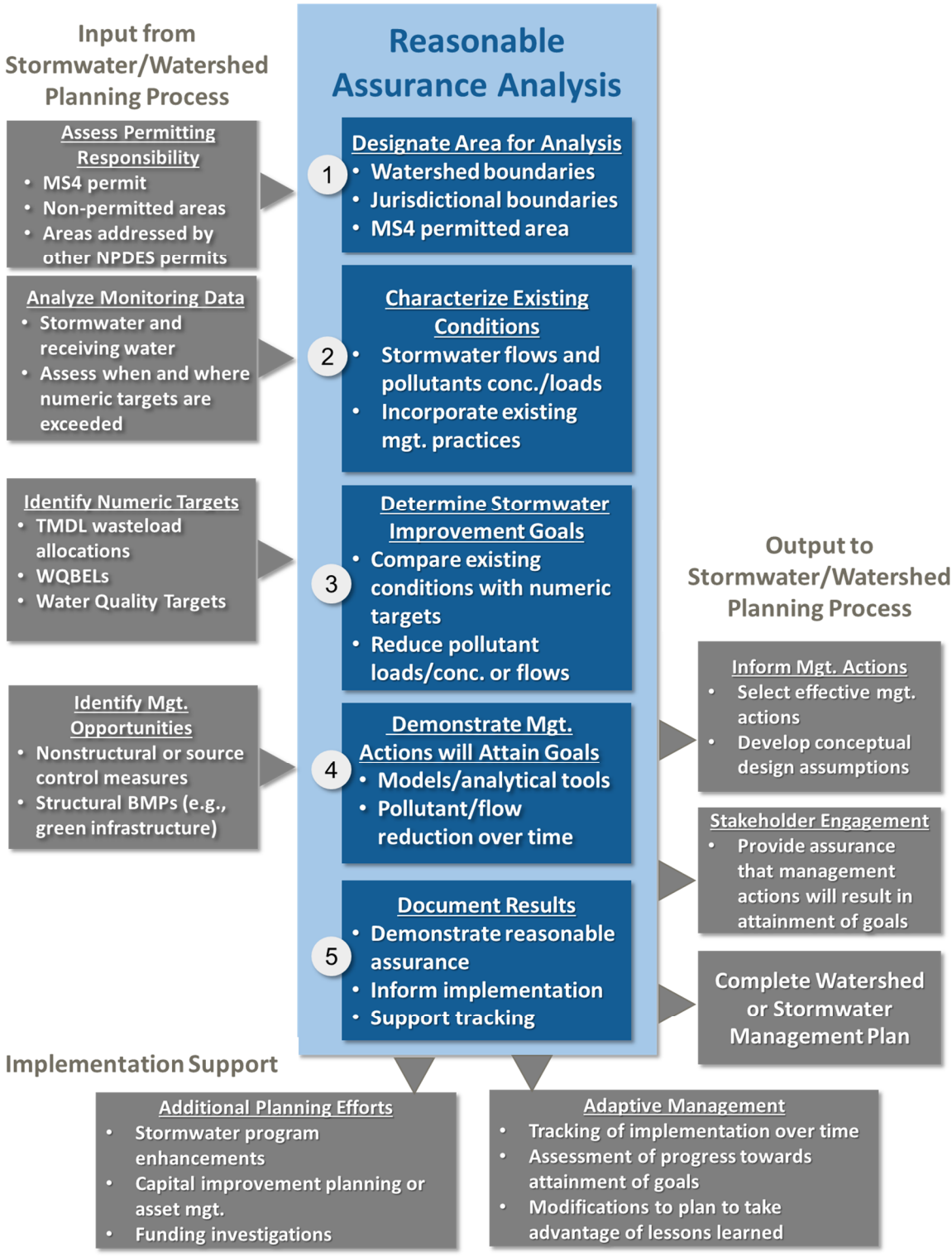
The Municipal Regional Stormwater Permit (MRP) (Order No. R2-2015-0049) requires the development of Green Infrastructure (GI) Plans (Provision C.3) and Polychlorinated Biphenyls (PCBs) and Mercury Control Measure Implementation Plans (Provisions C.11 and C.12) that provide the necessary pollutant load reductions to meet Total Maximum Daily Load (TMDL) wasteload allocations (WLAs) over specified compliance periods. A key component of these plans is a Reasonable Assurance Analysis (RAA) that quantitatively demonstrates that proposed control measures will result in sufficient load reductions of PCBs and mercury to meet WLAs for municipal stormwater discharges to the Bay. The City/County Association of Governments (C/CAG) of San Mateo County, via its San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), led a county-wide effort to develop an RAA to estimate the baseline PCB and mercury loads to the Bay, determine load reductions to meet WLAs, and set goals for the amount of GI needed to meet the portion of PCB and mercury load reduction the MRP assigns to GI (SFBRWQCB 2015). Two reports provide documentation of the county-wide RAA:

- Phase I Baseline Modeling Report – Provides documentation of the development, calibration, and validation of the baseline hydrology and water quality model, and the determination of PCB and mercury load reductions to be addressed through GI implementation (SMCWPPP 2018).
- Phase II Green Infrastructure Modeling Report – Provides documentation of the application of models to determine the most cost-effective GI implementation for each municipality, setting stormwater improvement goals for the GI Plan (SMCWPPP 2019).

This appendix provides an overview of the purpose of the RAA, and a summary of RAA results for Menlo Park to serve as stormwater improvement goals that set the stage for an adaptive management approach.

Purpose of the Reasonable Assurance Analysis

In 2017, the U.S. Environmental Protection Agency (EPA) Region 9 released *Developing Reasonable Assurance: A Guide to Performing Model-Based Analysis to Support Municipal Stormwater Program Planning* (EPA RAA Guide) (USEPA 2017), which provides guidance on the technical needs of the RAA and considerations for model selection. Building upon the EPA RAA Guide, the Bay Area Stormwater Management Agencies Association (BASMAA) prepared the *Bay Area Reasonable Assurance Analysis Guidance Document* (Bay Area RAA Guidance) (BASMAA 2017), which provides specific guidance on modeling to support RAAs performed in the Bay Area to meet MRP requirements, address TMDLs for PCBs and mercury, and support GI planning. The EPA RAA Guide and Bay Area RAA Guidance both outline essential steps for performing an RAA, as depicted in Figure B-1.



FigureB-1. RAA Process Flow Chart (USEPA 2017).

Depending on the audience, the purpose of the RAA can vary in terms of what constitutes reasonable assurance. The EPA RAA Guide provides an example of three differing perspectives for defining reasonable assurance (USEPA 2017):

- **Regulator Perspective** - Reasonable assurance is a demonstration that the implementation of a GI Plan will result in sufficient pollutant reductions over time to address TMDL WLAs or other targets specified in the MRP.
- **Stakeholder Perspective** - Reasonable assurance is a demonstration that specific management practices are identified with sufficient detail, and implemented on a schedule to ensure that necessary improvements in water quality will occur.
- **Permittee Perspective** - Reasonable assurance is based on a detailed analysis of the TMDL WLAs and associated MRP targets themselves, and a determination of the feasibility of those requirements. The RAA may also assist in evaluating the financial resources needed to meet pollutant reductions based on schedules identified in the MRP.

The Phase I and II reports referenced earlier in this appendix (SMCWPPP 2018 and SMCWPPP 2019) provide full documentation of the technical approaches and results of the RAA, which are consistent with the recommendations of the EPA RAA Guide and Bay Area RAA Guidance.

Preliminary Identification of Opportunities for GI Projects

To support the RAA and GI Plans, C/CAG has initiated a number of planning efforts that identify opportunities for GI implementation. The following is a summary of those efforts:

- **LID for New Development and Redevelopment** – The MRP includes a Provision (C.3) for the integration of LID within new development and redevelopment. As LID techniques are implemented as new development and redevelopment occurs throughout the City, the benefits of such practices in terms of reducing urban runoff flows and associated pollutant loads can be considered as part of the pollutant load reductions attributed to implementation of GI. C/CAG worked with San Mateo County Permittees to compile information on LID practices that have been implemented within new development and redevelopment since water year 2003 (baseline year for the TMDL). C/CAG also performed an analysis to project the number of acres of future new development and redevelopment to be addressed by the Provision C.3 regulated development by 2040. The RAA considers existing LID practices and projections of LID in future new development and redevelopment areas to estimate anticipated PCBs and mercury load reductions from 2003 to 2040.

- **Countywide Stormwater Resource Plan (SRP)** – The SRP is a comprehensive plan that identifies and prioritizes thousands of GI project opportunities throughout San Mateo County and within each municipal jurisdiction. Prioritized project opportunities include: (1) large regional projects within publicly-owned parcels (e.g., public parks) that infiltrate or treat stormwater runoff generated from surrounding areas (e.g., diversion from neighborhood storm drain system; diversions from creeks draining large urban areas); (2) retrofit of publicly-owned parcels with GI that provide demonstration of onsite LID designs; and (3) retrofit of public street rights-of-way with GI, or "green streets." The SRP included a multi-benefit scoring and prioritization process that ranks GI project opportunities based on multiple factors beyond pollutant load reduction (e.g., proximity to flood prone channels, potential groundwater basin recharge). Figure B-2 provides an example of green street opportunities identified, scored, and prioritized by the SRP throughout San Mateo County (SMCWPPP 2017).

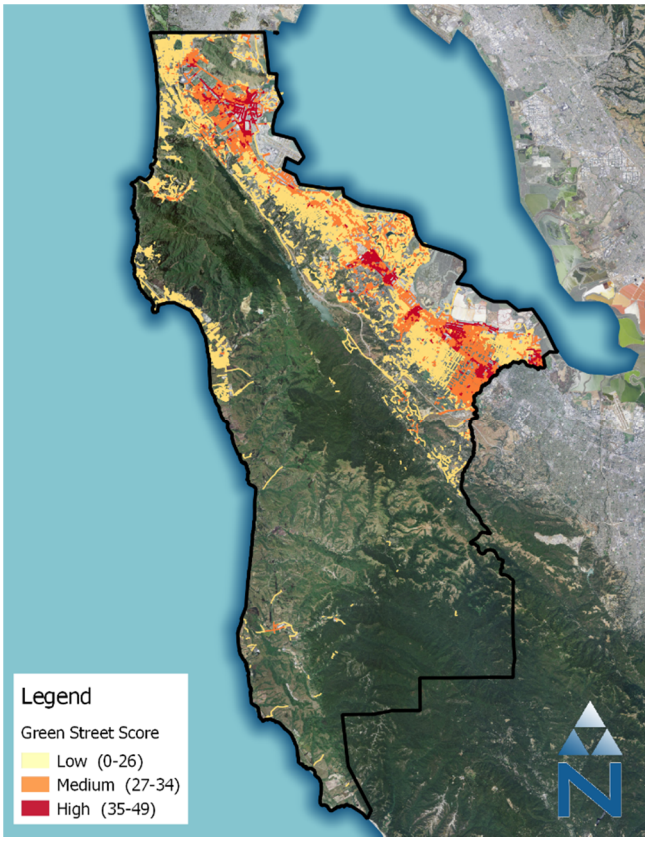


Figure B-2. SRP Prioritized Green Street Opportunities.

The above efforts and resulting technical products provide preliminary identification of opportunities for GI projects. These GI project opportunities serve as the foundation for the RAA and GI Plans as strategies are developed for implementation plans to meet the PCBs and mercury load reduction goals.

Description of the RAA Model

C/CAG performed a comprehensive, countywide modeling effort to provide: (1) simulation of baseline loads of PCBs and mercury for each of the County's watersheds and municipal jurisdictions discharging to San Francisco Bay; (2) estimation of necessary load reduction goals to meet requirements of the MRP and TMDL WLAs; and (3) determination of the amount of GI needed to address load reduction goals. The RAA also provides analysis of alternative implementation scenarios through cost-benefit optimization that can inform cost-effective GI implementation within each municipal jurisdiction. These results set goals for GI Plans developed by each Permittee.

The analytical framework selected to support the San Mateo Countywide RAA is based on a linked system of models (Figure B-3). Component models of the linked system include:

- **Loading Simulation Program C++ (LSPC)** – The hydrologic and water quality model selected for the baseline model of San Mateo County watersheds was the Loading Simulation Program in C++ (LSPC) (Shen et al., 2004), a watershed modeling system that includes Hydrologic Simulation Program – FORTRAN (HSPF) (Bicknell et al. 1997) algorithms for simulating watershed hydrology,

erosion, water quality, and in-stream fate and transport processes. The model can simulate upland loading and transport of sediment, mercury, and PCBs. LSPC is built upon a relational database platform, making it easier to collate diverse datasets to produce robust representations of natural systems. LSPC integrates GIS outputs, comprehensive data storage and management capabilities, the original HSPF algorithms, and a data analysis/post-processing system into a convenient PC-based Windows environment. The algorithms of LSPC are identical to a subset of those in the HSPF model with selected additions, such as algorithms to address land use change over time. LSPC is an open-source public-domain watershed model available from EPA.

- **System for Urban Stormwater Treatment & Analysis Integration (SUSTAIN)** – Developed by EPA's Office of Research and Development, SUSTAIN was primarily designed as a decision-support system for selection and placement of GI projects at strategic locations in urban watersheds. It includes a process-based continuous project simulation module for representing flow and pollutant transport routing through various types of GI projects. A distinguishing feature of SUSTAIN is a robust cost-benefit optimization model that incorporates dynamic, user-specified project unit-cost functions to quantify the costs associated with project construction, operation, and maintenance. The cost-benefit optimization model runs iteratively to generate a cost-effectiveness curve that is sometimes comprised of millions of GI project scenarios representing different combinations of projects throughout a watershed. Those results are used to make cost-effective management recommendations by evaluating the trade-offs between different scenarios. The "benefit" component can be represented in several ways: (1) reduction in flow volume (2) reduction in load of a specific pollutant or (3) other conditions including numeric water quality targets, frequency of exceedances of numeric water quality targets, or minimizing the difference between developed and pre-developed flow-duration curves (USEPA 2009, Riverson et al. 2014).

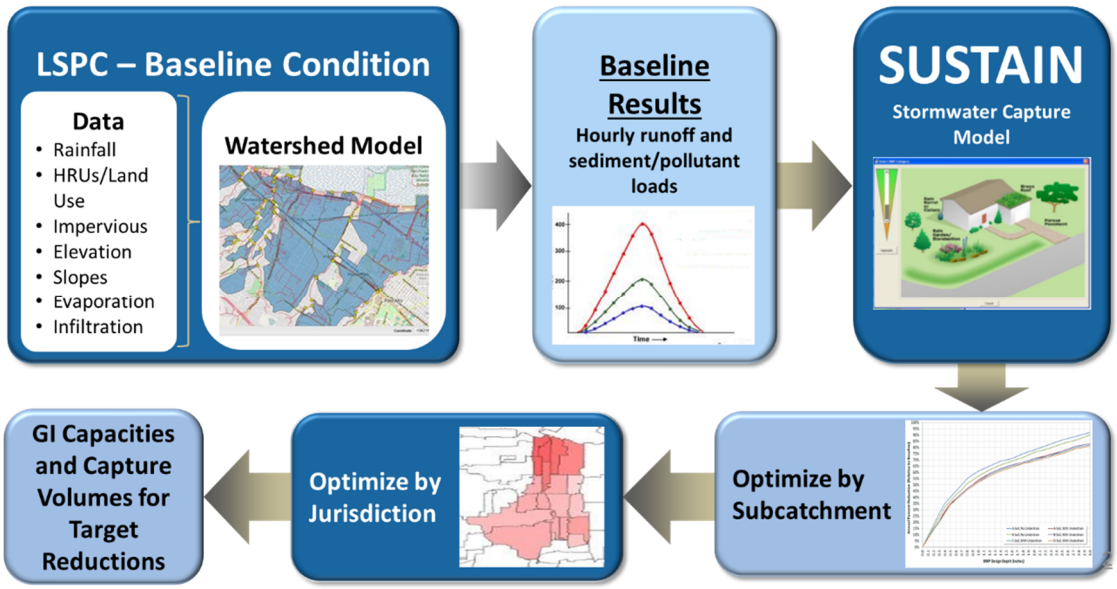


Figure B-3. Modeling System Supporting the RAA.

The LSPC model provides a characterization of existing conditions and determination of necessary pollutant load reductions to meet requirements of TMDLs and the MRP. SUSTAIN provides analysis of the amount of GI needed to provide the portion of the load reduction assigned to GI by the MRP.

Model Considerations to Inform the GI Plans

An important consideration for the RAA was the ability to track costs and benefits of different categories of GI projects within the model. This tracking was performed for GI project categories within each model subwatershed and municipal jurisdiction, and supports the selection of the most cost-effective implementation strategy to attain pollutant reduction goals. The RAA builds upon the previous planning efforts and utilizes the following categories of GI projects for model representation:

- **Existing Projects**: Stormwater treatment and GI projects that have been implemented since FY-2004/05. This primarily consists of all of the regulated projects that were mandated to treat runoff via Provision C.3 of the MRP, but also includes any public green street or other demonstration projects that were not subject to Provision C.3 requirements. For regulated projects in the early years of C.3 implementation, stormwater treatment may have been achieved through non-GI means, such as underground vault systems or media filters.
- **Future New and Redevelopment:** All the regulated projects that will be subject to Provision C.3 requirements to treat runoff via LID and is based on spatial projections of future new and redevelopment tied to regional models for population and employment growth.
- **Regional Projects (identified)**: C/CAG worked with agencies to identify five projects within public parks or Caltrans property to provide regional capture and infiltration/treatment of stormwater, and included conceptual designs to support further planning and designs.
- **Green Streets**: The SRP identified and prioritized opportunities throughout San Mateo County for retrofitting existing streets with GI in public rights-of-way. Green streets were ranked as high, medium, and low priority based on a multiple-benefit prioritization process developed for the SRP.
- **Other GI Projects (to be determined)**: Other types of GI projects on publicly owned parcels, representing a combination of either additional parcel-based GI or other Regional Projects. The SRP screened and prioritized public parcels for opportunities for onsite LID and Regional Projects. These opportunities need further investigation to determine the best potential projects.

The RAA considers the numerous GI project opportunities that exist within each municipal jurisdiction, and selects a suite or "recipe" of projects that can most cost-effectively address pollutant load reductions. The amount and combination of those GI projects can be determined through analysis of estimated load reductions and implementation costs. Figure B-4 presents an example GI recipe showing the distribution of selected GI project categories versus incremental reductions in pollutant loading and increasing cost. To build upon preliminary C/CAG planning efforts above, and to properly inform and set meaningful goals for GI Plans, it was determined to be beneficial for the countywide RAA approach to include the capability of performing cost-benefit optimization of GI project opportunities. For multiple combinations of GI projects, SUSTAIN provides an estimate of pollutant load reduction and implementation costs, allowing for the comparison of various GI implementation scenarios and the selection of the most cost-effective implementation plan to address pollutant reduction goals.

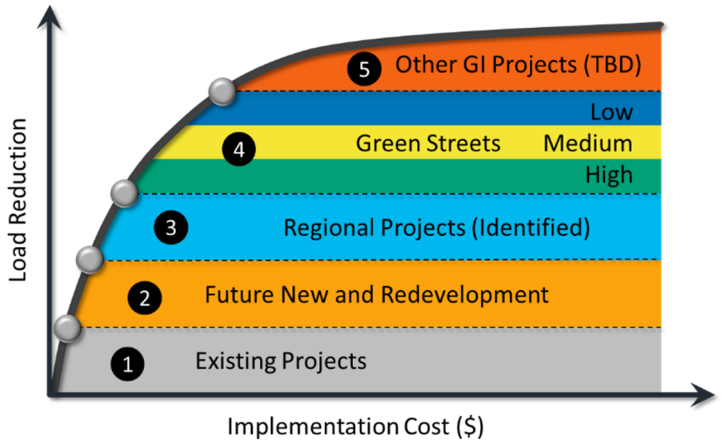


Figure B-4. Example Implementation Recipe Showing General Sequencing of GI Projects.

Goals for Green Infrastructure Implementation

Depending on the perspective of the regulators, stakeholders, or Permittees, the purpose and expectations of the RAA can vary in terms of how reasonable assurance is demonstrated. As a result, the output from the RAA must consider multiple perspectives and strike the right balance between detail and specificity while still leaving ample opportunity to allow for future adaptive management. The following are key considerations for the RAA output:

- **Demonstrate PCBs and Mercury Load Reductions** – The primary goal of the RAA is to quantitatively demonstrate that GI Plans and Control Measure Implementation Plans will result in load reductions of PCBs and mercury sufficient to attain their respective TMDL WLAs and stormwater improvement goals associated with GI. Based on the baseline hydrology and water quality model (Phase I Report, SMCWPPP 2018), the RAA determined that a 17.6% reduction in PCB loads is needed to meet the GI implementation goals established by the MRP. Zero reduction in mercury loads was determined to be needed based on GI, as baseline loads are predicted to be below the TMDL WLA for San Mateo County. As a result, a 17.6% reduction in PCB loads is established as the primary pollutant reduction goal for the GI Plan. However, there is some uncertainty in terms of how PCB source areas are represented in the model, which will require more monitoring and analysis in the future to gain an improved understanding of PCB source areas and the ability to target these areas with GI. Since PCBs are generally understood to be transported with cohesive sediment (e.g., silt and clay), sediment load can serve as a surrogate on which to base a load reduction target. The RAA considers a 17.6% reduction of sediment load as a more conservative surrogate until a better understanding is reached in terms of specific PCB source areas within the County. Once PCB source areas are confirmed, these areas can be targeted

for GI implementation, likely resulting in greater effectiveness for GI to reduce PCB loads, and thus reducing the amount of GI needed to meet the load reduction target based on sediment load.

- **Develop Metrics to Support Implementation Tracking** – The MRP (Provision C.3.j) also requires tracking methods to provide reasonable assurance that TMDL WLAs are being met. Provision C.3.j states that the GI Plan "shall include means and methods to track the area within each Permittee's jurisdiction that is treated by green infrastructure controls and the amount of directly connected impervious area."
- **Support Adaptive Management** – Given the relatively small scale of most GI projects (e.g., LID on an individual parcel, a single street block converted to green street), numerous individual GI projects will be needed to address the pollutant reduction goals. All the GI projects will require site investigations to assess feasibility and costs. As a result, the RAA provides a preliminary investigation of the amount of GI needed spatially (e.g., by subwatershed and municipal jurisdiction) to achieve the countywide pollutant load reduction target. The RAA sets the GI Plan "goals" in terms of the amount of GI implementation over time to address pollutant load reductions. As GI Plans are implemented and more comprehensive municipal engineering analyses (e.g., masterplans, capital improvement plans) are performed, the adaptive management process will be key to ensuring that goals are met. In summary, the RAA informs GI implementation goals, but the pathway to meeting those goals is subject to adaptive management and can potentially change based on new information or engineering analyses performed over time.

The RAA output, or goals for GI implementation, attempt to identify the appropriate balance in terms of detail and specificity needed to address the above considerations. The RAA also considered multiple alternative scenarios that can inform implementation and the adaptive management process. These scenarios tested the underlining assumptions for GI implementation, and demonstrate the need for further research, collaboration among multiple Permittees, and incorporation of lessons learned in order to gain efficiencies and maximize the cost-effectiveness of GI to reduce pollutant loads over time. Four modeling scenarios were configured for this analysis (as summarized inTable B-1):

Table B-1. Model scenarios objectives and cost-benefit evaluation.

Load Reduction Objective	Percent of Total GI Cost to Achieve Reduction Objective		
	Jurisdictional	Countywide	*Total Savings (Jurisdictional vs. Countywide)*
Cohesive Sediment 17.6% Reduction	**Scenario 1**	**Scenario 2**	→ *Savings*
Total PCBs 17.6% Reduction	**Scenario 3**	**Scenario 4**	→ *Savings*
Total Savings (Sediment vs. PCBs)	↓ *Savings*	↓ *Savings*	↘ *Overall Savings*

The following factors are considered for each model scenario:

- **Load Reduction Objective** - With a cohesive sediment load reduction objective, Scenarios 1 and 2 represent the most conservative approaches. Those scenarios assume that given the uncertainties about PCB source areas, targeting an overall 17.6% load reduction of cohesive sediment in general (silts and clays) achieves the PCB load reduction objective for GI. Scenarios 3 and 4 assume that PCB sources are spatially distributed based on analysis of land use types. The cost-benefit optimization process targets those areas as having the highest likelihood of PCB sources. Scenarios 3 and 4 highlight the potential cost savings (relative to Scenarios 1 and 2) that could be realized if PCB sources are identified and targeted for GI implementation.
- **Jurisdictional verses Countywide** - There are many possible ways to achieve a 17.6% load reduction for all of San Mateo County. The "Jurisdictional" approach stipulates that each jurisdiction must individually achieve at least a 17.6% load reduction. On the other hand, the "Countywide" approach achieves the 17.6% load reduction countywide by allowing the management burden of GI implementation to vary freely across jurisdictional boundaries. The countywide approach can provide significant cost savings over the jurisdictional approach, especially where pollutant sources are spatially concentrated. Figure B-5 conceptually illustrates the jurisdictional versus countywide optimization approaches. Where there is cooperation among jurisdictions, results from these two scenarios can provide a useful analytical framework for cost-sharing and implementation of the most cost-effective management scenarios.

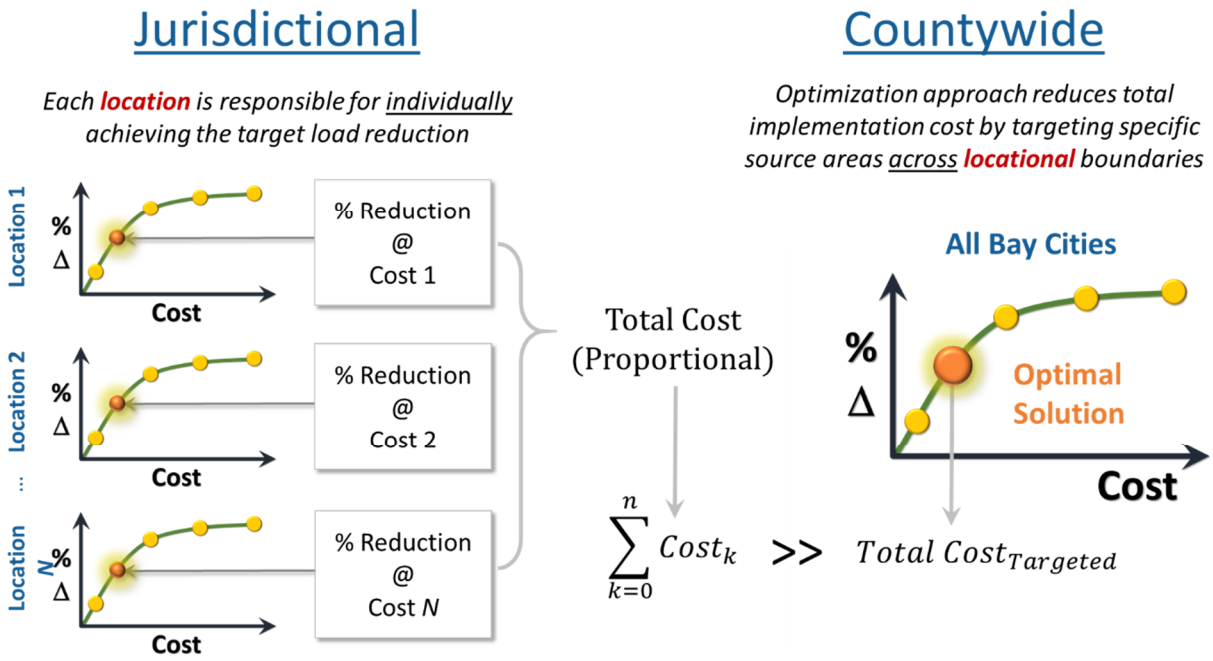


Figure B-5. Jurisdictional vs. countywide approaches for cost-benefit optimization

Results of each of the four RAA scenarios are documented in the Phase II Report (SMCWPPP 2019). These results can inform the adaptive management process for GI implementation, and help garner support for collaborative efforts for GI implementation or further research of PCB source areas that can seek more cost-effective implementation strategies over time. Figure B-6, Table B-2, and Figure B-7 provide a summary of Scenario 1 RAA results for the City of Menlo Park. The following steps outline the process for formulating the scenario in the RAA model and utilizing results to set goals for GI implementation.

- Based on GI project categories defined inthe City's GI Plan, SUSTAIN was used to simulate effectiveness/load reductions and estimate planning-level costs for various combinations of GI projects within the City's jurisdiction (along the x-axis of Figure B-6, from low pollutant reduction/effectiveness to high reduction/effectiveness). "Existing Projects" were locked in the model and included those GI projects included in the FY 2016-17 MRP Annual Report to the Water Board. "Future New & Redevelopment" is an estimation of the LID that will likely be implemented in the future in redevelopment areas (based on Provision C.3). "Green Streets" were based on prioritized and ranked (High, Medium, and Low) street retrofit opportunities reported in the SRP. For Menlo Park, the "Regional Project (Identified)" refers to the regional project located within Cartan Field that is currently under consideration by the Town of Atherton. "Other GI Projects" refer to additional GI projects needed, but specific locations for project opportunities within certain subwatersheds yet to be determined.
- As depicted in Figure B-6, a 17.6% reduction of PCBs was identified as the target reduction to be attained through the implementation of GI (for Scenario 1, cohesive sediment reduction is used as a surrogate to represent load reduction of PCBs).

- SUSTAIN is used to provide cost-optimization and selection of the most cost-effective combination of GI projects to attain the target reduction. In theFigure B-6, this solution can be viewed as the vertical slice that intersects the point on the x-axis at 17.8% reduction. The combination of GI structural capacities in that slice at the 17.6% load reduction represents the proposed GI implementation plan for Menlo Park. Table B-2 provides details on that implementation plan for the five subwatersheds within the City's jurisdiction (represented by each row in table). Optimization results recommend that varying amounts of GI capacity in different subwatersheds (different rows) are needed to achieve the most cost-effective solution, but the overall PCBs load reduction addresses 17.6% (bottom row of table). The relative amount of GI capacities (normalized by area) for each subwatershed are shown in the map in Figure B-7.

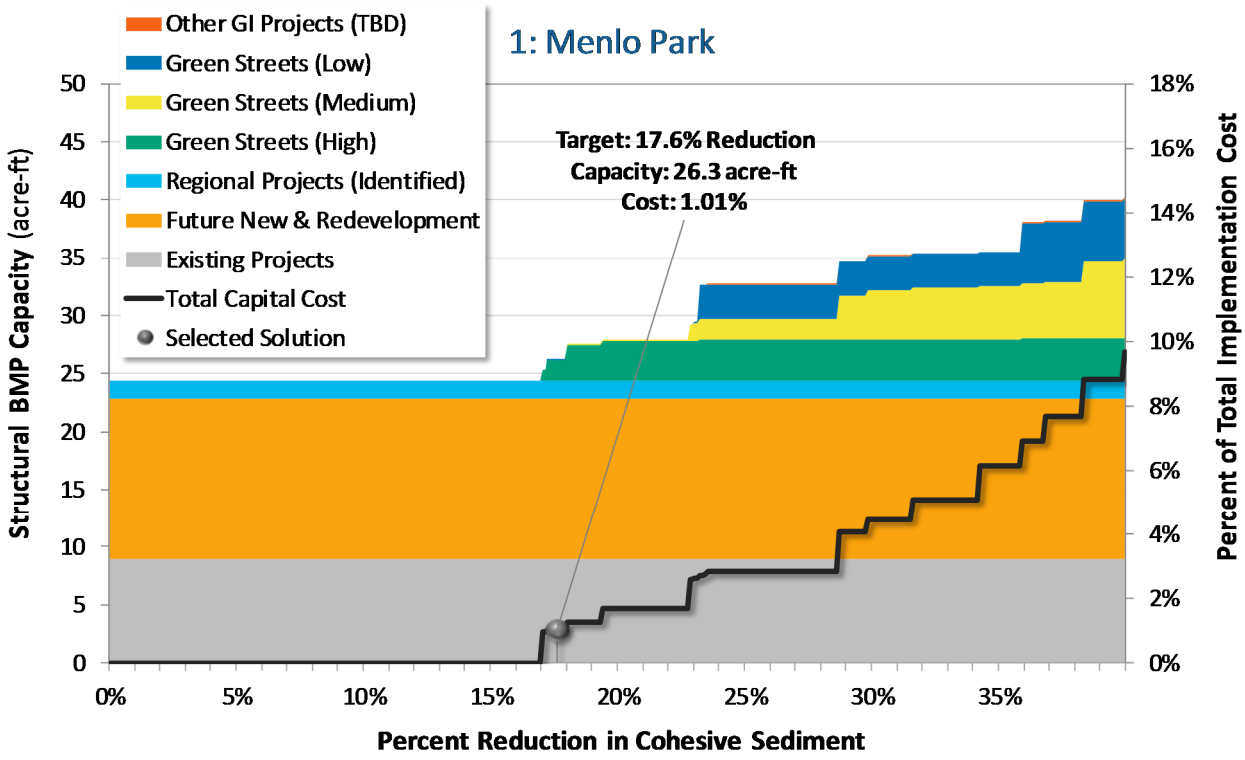


Figure B-6. Scenario 1: Optimization summary for Menlo Park (sediment target, with regional identified project).

Table B-2. Scenario 1: GI implementation strategy for Menlo Park (sediment target, with regional identified project)

Subwatershed ID	Management Metrics for GI			Green Infrastructure Capacity to Achieve 17.6% Reduction Target (Capacity expressed in units of acre-feet)							
				Existing/Planned			Green Streets				
	% Load Reduction PCBs (Annual)	Annual Volume Managed (acre-ft)	Impervious Area Treated (acres)	Existing Projects	Future New & Redevelopment	Regional Projects (Identified)	High	Medium	Low	Other GI Projects (TBD)	Total BMP Capacity (acre-ft)
220111	23%	1.26	26.11	1.12	1.12	0.03	2.19	0.08	--	--	**4.5**
220311	13%	1.10	0.27	--	--	--	--	0.03	0.05	--	**0.1**
221211	15%	0.50	4.22	0.86	0.10	0.02	--	--	--	--	**1.0**
230111	19%	69.81	94.39	4.81	7.32	--	--	--	--	--	**12.1**
230211	17%	37.95	80.00	2.10	5.41	1.50	0.91	--	--	--	**9.9**
Total	**17.9%**	**110.6**	**205.0**	**8.9**	**13.9**	**1.6**	**3.1**	**0.1**	**0.0**	**--**	**27.6**

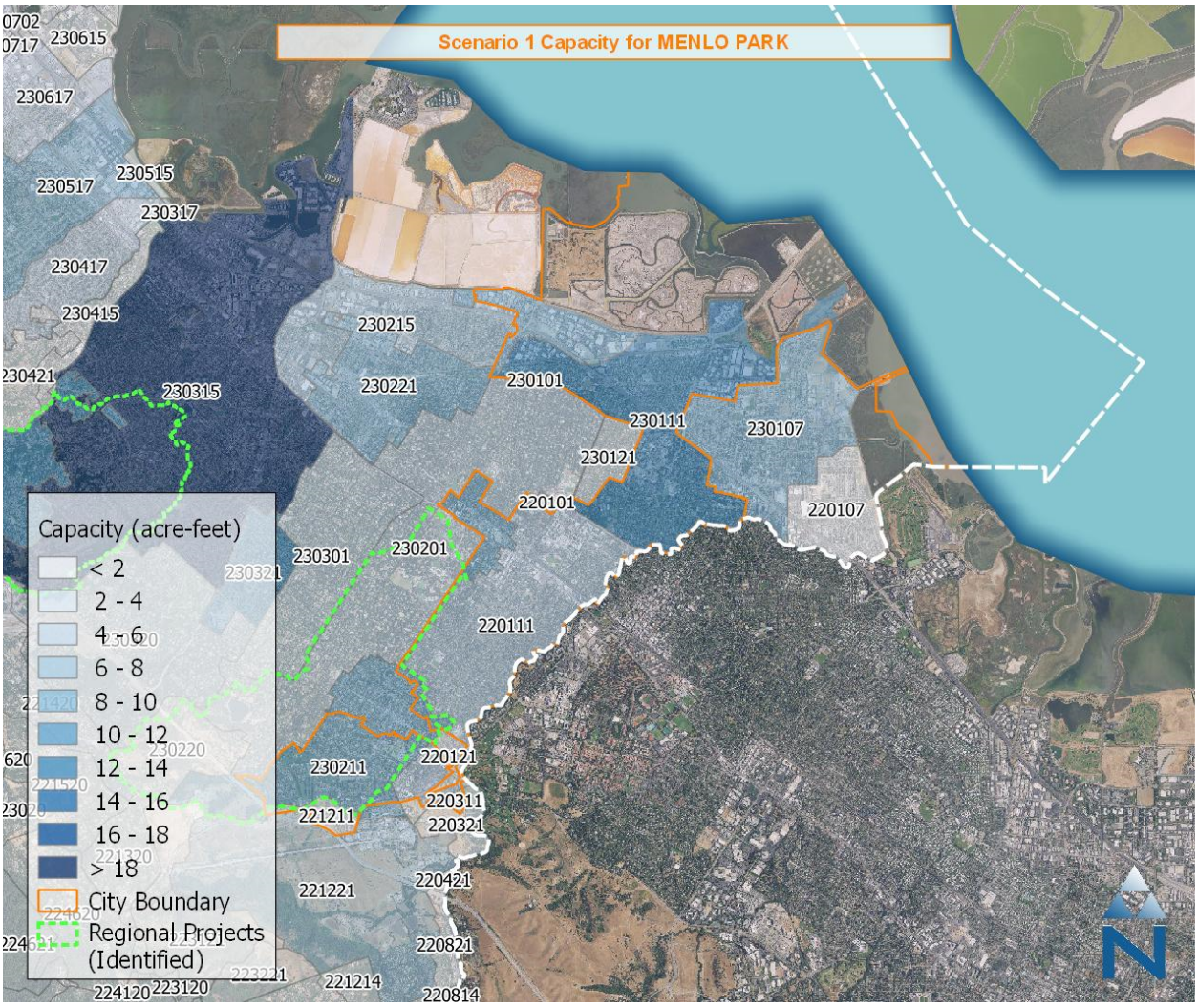


Figure B-7. Scenario 1: Map of GI capacities within each subwatershed of Menlo Park (sediment target, with regional identified project).

As can be seen in the above results, the cost-optimization favored implementation of different combinations of GI projects within each subwatershed. These combinations were based on: (1) number and type of GI project opportunities identified within each subwatershed, and (2) cost-effectiveness given various characteristics associated with GI control measure efficiency (typically governed by infiltration rates), higher sediment (or PCBs) generation in upstream areas, etc. During implementation, it is almost certain that the actual implementation of GI will not follow the RAA output exactly. Dimensions and location of GI projects will vary based on on-the-ground feasibility and site-specific constraints. At the same time, all GI project capacity is not created equal in terms of effectiveness. For these reasons, it is not recommended that *GI capacity* serve as the focus for stormwater improvement goals for the GI Plan.

The RAA recommends management metrics for the GI Plan that are based on metrics that can be easily measured and tracked throughout implementation. At the left side of the table in Figure B-6 are columns under the header "Management Metrics for GI," which include performance metrics for "% Load Reduction PCBs (Annual)," "Annual Volume Managed (acre-ft)," and "Impervious Area Treated (acres)." The "% Load Reduction PCBs (Annual)" and "Annual Volume Managed (acre-ft)" metrics are based on annualized results represented in the RAA modeling system that are directly comparable to TMDL WLAs. The "% Load Reduction PCBs (Annual)" provides a relative comparison of the load reduction to be achieved within each subwatershed. The "Annual Volume Managed (acre-ft)" shows the acre-feet of water captured and infiltrated and/or treated within each subwatershed, resulting in a total annual volume of 110.6 acre-feet of stormwater managed in Menlo Park for an average year. This 110.6 acre-feet of stormwater managed could serve as the primary metric to be tracked for GI implementation. In other words, stormwater volume managed is being used as a unifying metric to evaluate GI effectiveness. "Impervious Area Treated (acres)"is an additional metric required by the MRP for implementation tracking. As a result of adaptive management, the implementation plan may change over time and alternative GI projects can be substituted without having to re-run the RAA, as long as the "Management Metrics for GI," representing the goals for the GI Plan, remain on track.

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USEPA (U.S. Environmental Protection Agency). 2017. *Developing Reasonable Assurance: A Guide to Performing Model-Based Analysis to Support Municipal Stormwater Program Planning*. U.S. Environmental Protection Agency Region 9, San Francisco, CA.

Appendix C

GI Sizing Methodology

APPENDIX C - GI Sizing Methodology

MRP Provision C.3.d specifies minimum GI sizing requirements for development projects exceeding certain thresholds ("regulated projects"). Regulated projects must treat a designated flow or volume of stormwater runoff (the "C.3.d" Amount). Certain regulated projects must also meet Hydromodification Management (HM) requirements based on project location and impervious area impact. These criteria are herein labeled the **"Standard Sizing Methodology"** and further described below.

GI measures in public right-of-way must be designed to meet the same treatment and HM sizing requirements as regulated projects wherever feasible. However, if GI measures cannot be designed to meet the **Standard Sizing Methodology** due to constraints such as lack of space, utility conflicts, or other factors, the City may still wish to construct the GI measures to achieve other benefits (e.g., traffic calming, pedestrian safety, etc.).

To address this situation, MRP Provision C.3.j.i.(2)(g) states that, for non-regulated Green Street projects, "Permittees may collectively propose a single approach with their Green Infrastructure Plans for how to proceed should project constraints preclude fully meeting the C.3.d requirements." Such a regional approach has been developed by BASMAA[1] for use by the City of Menlo Park and other Permittees in their GI Plans. This **Alternative Sizing Methodology** is also described in this appendix.

Standard Sizing Methodology

Chapter 5 of the SMCWPPP C.3 Technical Guidance[2] contains detailed procedures for sizing specific stormwater treatment measures using volume-based sizing criteria, flow-based sizing criteria, or a combination flow and volume approach. In general, the treatment measure design standard is capture and treatment of 80% of the annual runoff (the small, frequent storm events.) There is also a simplified sizing method for biotreatment in which the surface area of the treatment measure is equal to 4% of the contributing impervious area, i.e., a sizing factor of 0.04[3].

GI measures should be located and sized to treat the C.3.d Amount from the contributing impervious surface area from the public right-of-way (street and sidewalk) where possible. Similarly, for GI measures in parking lots and public parks, every attempt should be made to locate and size GI measures to treat the C.3.d amount of runoff from the contributing impervious surface areas. Consideration should be given to the feasibility of treating impervious surface area from adjacent parcels, even if privately owned. If site constraints prevent locating and sizing GI measures to meet C.3.d requirements in public right-of-way, the alternative sizing methodology described below may be used.

Alternative Sizing Methodology

To develop the Alternative Sizing Methodology, BASMAA contracted with a consultant to model bioretention facilities, using rainfall data from six Bay Area gauges, to determine the treatment

[1] BASMAA, 2018. Guidance for Sizing Green Infrastructure Facilities in Street Projects.
[2] SMCWPPP C.3 Stormwater Technical Guidance V.5, 2016 – www.flowstobay.org/newdevelopment
[3] This sizing factor is based on a permeability of 5 (in/hr) through the biotreatment soil media and a rainfall intensity of 0.2 in/hr, as specified in MRP Provision C.3.d.

capacity of GI facilities relative to the C.3.d volume. The hydrologic analysis report also provides minimum bioretention sizing criteria to provide the Standard Sizing Methodology based on the mean annual precipitation (MAP) of the project site. The equation below was developed from the model results and displayed in Figure C-1.

Bioretention Sizing Factor = *0.00060 x MAP + 0.0086*

Where:
Bioretention Sizing Factor is the ratio of the surface area of the bioretention facility to the impervious area contributing runoff

MAP is the mean annual precipitation of the project site.

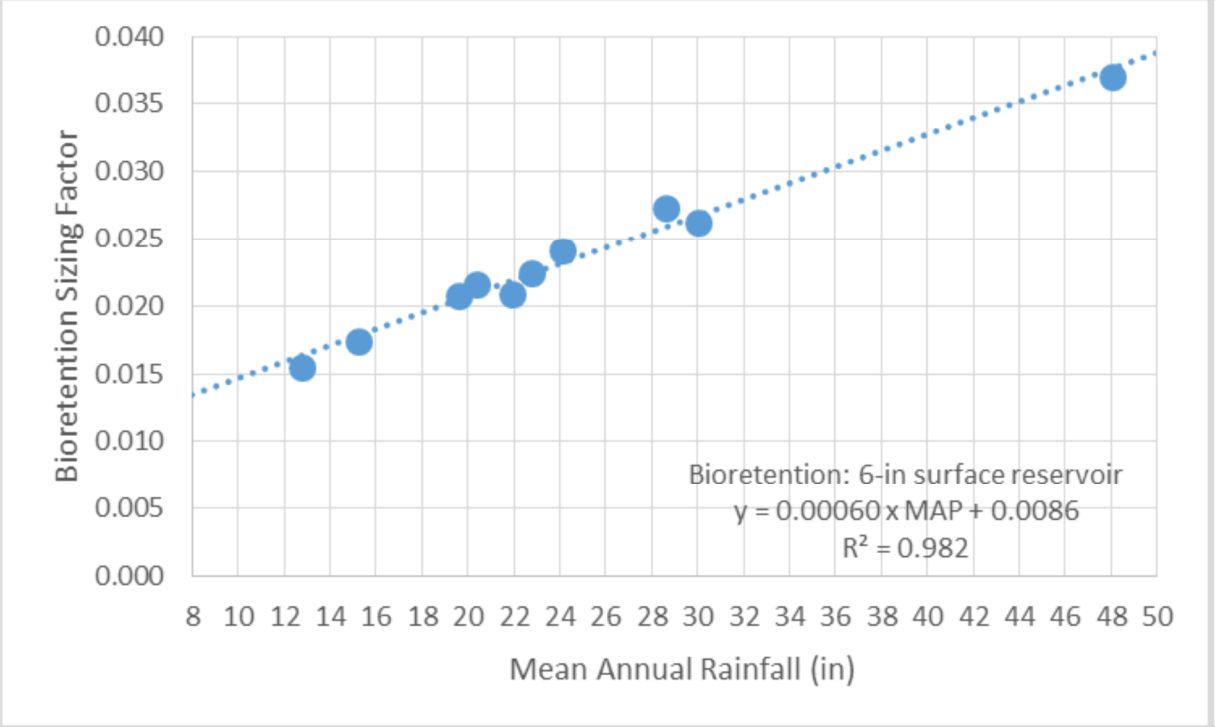

Figure C-1 Bioretention size needed to provide 80 percent of annual runoff treatment with 6-in reservoir

The MAP for Menlo Park ranges from approximately 16.5 to 20 inches per year. Using the sizing factor equation, the sizing factor for non-regulated GI projects in Menlo Park would range from 0.019 to 0.021 (or roughly 2%). This indicates that GI facilities in the street right-of-way can be sized with as low as a 2% sizing factor and still meet the C.3.d sizing requirements.

There are typically more constraints on the placement and sizing of GI measures in a public right-of-way (street) than for parcel-based GI projects, and there may be GI opportunities for which the 2% sizing factor cannot be achieved. However, undersized GI measures may still have some water quality, runoff reduction, or other benefits.

The BASMAA Development Committee developed regional guidance on how to use the modeling results and what design approaches to use in specific situations when the C.3.d sizing requirements cannot be met[4].

The regional guidance includes the following recommendations for sizing GI facilities in green street projects:

- Bioretention facilities in street projects should be sized as large as feasible and meet the C.3.d Amount where possible. Constraints in the public right-of-way may affect the size of these facilities and warrant the use of smaller sizing factors. Bioretention facilities in street projects may use the sizing curves in the BASMAA GI Facility Sizing Report to meet the C.3.d criteria. Local municipal staff involved with other assets in the public right of way should be consulted to provide further guidance to design teams as early in the process as possible.
- GI Measures in street projects smaller than what would be required to meet the Provision C.3.d Amount may be appropriate in some circumstances. As an example, it might be appropriate to construct a GI measure where a small proportion of runoff is diverted from a larger runoff stream. Where feasible, such facilities can be designed as "off-line" facilities, where the bypassed runoff is not treated or is treated in a different facility further downstream. In these cases, the proportion of total runoff captured and treated can be estimated using the BASMAA GI Facility Sizing Report (BASMAA, 2017). In cases where "in-line" bioretention systems cannot meet the C.3.d criteria, the facilities should incorporate erosion control as needed to protect the facility from high flows.
- Pollutant reduction achieved by GI facilities in street projects can be estimated in accordance with the Interim Accounting Methodology or the applicable Reasonable Assurance Analysis [standard methodologies employed by SMCWPPP].

If it is determined that GI measures in a City green street project are unable to be designed to meet the C.3.d sizing requirements, the following steps can be taken:

- Document the project constraints that preclude meeting the Standard Sizing Methodology. For example, if an underground utility is preventing installation at the appropriate depth, or the sidewalk planter area is inadequate for ideal sizing, or heritage trees and their root structures conflict with the desired GI location, document those constraints.
- Confirm adequate sizing with the Alternative Sizing Methodology. Use the sizing charts from the BASMAA GI Facility Sizing Report (BASMAA, 2017) or the equation in this appendix to determine the smallest facility size that will meet C.3.d sizing requirements.
- If the Alternative Sizing Methodology is also infeasible, identify possible variations from the standard design. For example, determine whether the depth can be adjusted only in the area where a utility conflict exists. Using this alternative design, estimate the percent of the C.3.d volume that will be treated. Evaluate the cost-effectiveness of installing the GI measure given the other benefits realized (e.g., pedestrian safety, traffic calming, reduced local flooding, etc.) and the amount of pollutant removal achieved.

[4] BASMAA, 2018. "*Guidance for Sizing Green Infrastructure Facilities in Street Projects*."

Appendix D

Summary of Planning Document Review

Environmental and Public Health Engineering

MEMORANDUM

TO: Michael Fu, City of Menlo Park

CC: Menlo Park GI Team

FROM: Peter Schultze-Allen, CPSWQ, Jill Bicknell, P.E., and Courtney Siu, P.E.

DATE: March 5, 2019

SUBJECT: Planning Document Review for the City of Menlo Park GI Plan - Final

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Background

This memorandum has been prepared in response to Provisions C.3.j.i.(2)(h) and C.3.j.i.(2)(i) of the San Francisco Bay Region Municipal Regional Stormwater NPDES Permit (MRP). The MRP requires the following:

- That the City of Menlo Park develop a GI Plan that includes a summary of the planning documents the City has updated or modified to appropriately incorporate GI concepts and requirements, and
- That the City is expected to complete these modifications as part of completing its GI Plan, and provide a workplan describing how GI measures will be included in new and updated plans in the future.

In preparation for this task, the City outlined several documents to be reviewed for updates in the "City of Menlo Park Green Infrastructure Plan for Stormwater Workplan" (Workplan) dated May 6, 2017. Additionally the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) prepared a report in November of 2016 with excerpts from various documents from municipalities within the County to be used as model language for updates. Several Menlo Park documents were cited in the report and were included in the review.

EOA performed a review of these plans to determine whether the plans adequately incorporated references to GI concepts and requirements, and if not, where appropriate recommendations should be added to the plans. EOA confirmed that some of the plans needed additional language to support GI; however, EOA's determination is that the existing language in the plans does not create barriers to implementing GI.

The plans that were mentioned for updates in the Workplan (and cited in the SMCWPPP report) are included in Table 1 below with the date they were last updated, EOA's determination that they have language relevant to, and/or supportive of, GI, and EOA's recommendation on whether the plan could benefit from updated GI-related language.

Table 1 – Summary of Planning Document Review

Name of Plan	Last Updated	Includes GI Language	GI Language Recommendations
General Plan			
Open Space and Conservation, Noise and Safety	May 2013	Yes	No
Housing Element	April 2014	No	Yes
Land Use and Circulation Elements (ConnectMenlo)	November 2016	Yes	Yes
El Camino Real Downtown Specific Plan	July 2012	Yes	Yes
Sidewalk Master Plan	January 2009	No	Yes
Comprehensive Bicycle Development Plan	January 2005	No	No[1]
Transportation Master Plan	In Progress	Yes	TBD
Neighborhood Traffic Management Plan	November 2004	No	No[1]
Bedwell Bayfront Park Master Plan	February 2018	Yes	No
Zoning Ordinance	2016	Yes	Yes
Parks Master Plan	In Progress	Yes	Yes

For those plans that EOA recommends be updated in Table 1, suggested language (with suggested language from the 2016 SMCWPPP report identified with an asterisk,*) and guidance for revisions to the plans that require updates are contained in the following pages and tables for each document.

Recommendations for text additions are in shown in red *italicized underline* font. Text deletions are in red ~~strikeout~~.

[1] This plan may be wholly, or at least partially, superseded by the Transportation Master Plan, so no updates are recommended.

Menlo Park General Plan

The General Plan is a State requirement to guide long-term land use and development. The Plan includes goals, policies, and programs to address land use, circulation, housing, conservation, open space, noise, and safety. The elements in the General Plan were developed as three separate documents over several years: the first document combined the Open Space and Conservation, Noise and Safety Elements (May 2013), the second document covered the Housing Element (April 2014) and the third addressed the Land Use and Circulation Elements (November 2016).

Open Space and Conservation, Noise and Safety Elements, May 2013

Page/Description	Current Language	Suggested Language or Comments
Page 23: Goal OSC4: Promote Sustainability and Climate Action Planning - Polices OSC4.2 Sustainable Building.	Promote and/or establish environmentally sustainable building practices or standards in new development that would conserve water and energy, prevent stormwater pollution, reduce landfilled waste, and reduce fossil fuel consumption from transportation and energy activities.	No revision needed.
Page 36: Goal S1: Assure a Safe Community – Hazardous Materials Polices S1.27 Regional Water Quality Control Board (RWQCB) Requirements.	Enforce stormwater pollution prevention practices and appropriate watershed management plans in the RWQCB general National Pollutant Discharge Elimination System requirements, the San Mateo County Water Pollution Prevention Program and the City's Stormwater Management Program. Revise, as necessary, City plans so they integrate water quality and watershed protection with water supply, flood control, habitat protection, groundwater recharge, and other sustainable development principles and policies.	No revision needed.

Housing Element, April 2014

Page/Description	Current Language	Suggested Language or Comments
Page 24 B. Housing Goals Goal H4 New Housing	Goal H4 is intended to: (1) promote the development of a balanced mix of housing types and densities for all economic segments throughout the community, (2) remove governmental and non-governmental constraints on the production, rehabilitation and/or cost of housing where appropriate, and (3) to encourage energy efficiency in both new and existing housing.	Goal H4 is intended to: (1) promote the development of a balanced mix of housing types and densities for all economic segments throughout the community, (2) remove governmental and non-governmental constraints on the production, rehabilitation and/or cost of housing where appropriate, and (3) to encourage energy efficiency, *sustainability, and green infrastructure* in both new and existing housing.
Page 43 Policy H4.3 Housing Design	Review proposed new housing in order to achieve excellence in development design through an efficient process and will encourage infill development on vacant and underutilized sites ...	Review proposed new housing in order to achieve excellence in development design through an efficient process and will encourage infill development on vacant and underutilized sites ... *Design of new housing, including streets and public open spaces, shall be implemented with green infrastructure and green street practices in accordance with the Municipal Regional Stormwater NPDES Permit (MRP) and the City's GI Plan.*
Page 52 Program H4.P Update Parking Stall and Driveway Design Guidelines.	Review and modify Parking Stall and Driveway Design Guidelines, including driveway widths, back-up distances, and turning templates to provide greater flexibility in site planning for multi-family residential housing.	Review and modify Parking Stall and Driveway Design Guidelines, including driveway widths, back-up distances, and turning templates to provide greater flexibility in site planning for multi-family residential housing, *and to facilitate compliance with the stormwater practices and requirements in the MRP and the standards and guidance in the City's GI Plan.**

Land Use and Circulation Element (ConnectMenlo), November 2016

Page/Description	Current Language	Suggested Language or Comments
Page I-11 Guiding Principles: Sustainable Environmental Planning	Menlo Park is a leader in efforts to address climate change, adapt to sea-level rise, protect natural and built resources, conserve energy, manage water, utilize renewable energy, and promote green building.	Menlo Park is a leader in efforts to address climate change, adapt to sea-level rise, protect natural and built resources, conserve energy, manage water, utilize renewable energy, and promote green building *and green stormwater infrastructure*.
Page LU-19 Orderly Development Program LU-1.B Capital Improvement Program.	Annually review progress implementing General Plan policies, and update the Capital Improvement Program to reflect the latest City and community priorities embodied in the General Plan, including for physical projects related to transportation, water supply, drainage, and other community-serving facilities and infrastructure.	Annually review progress implementing General Plan policies, and update the Capital Improvement Program to reflect the latest City and community priorities embodied in the General Plan, including for physical projects related to transportation, water supply, ~~drainage~~ *stormwater management*, and other community-serving facilities and infrastructure.
Page LU-22 Neighborhood-Serving Uses Policy LU-3.1 Underutilized Properties.	Encourage underutilized properties in and near existing shopping districts to redevelop with attractively designed commercial, residential, or mixed-use development that complements existing uses and supports pedestrian and bicycle access.	Encourage underutilized properties in and near existing shopping districts to redevelop with attractively designed commercial, residential, or mixed-use development that complements existing uses, ~~and~~ supports pedestrian and bicycle access, *and incorporates green infrastructure elements, such as infiltration and biotreatment*.
Page LU-26 Open Space Policy LU-6.8 Landscaping in Development.	Encourage extensive and appropriate landscaping in public and private development to maintain the City's tree canopy and to promote sustainability and healthy living, particularly through increased trees and water-efficient landscaping in large parking areas and in the public right-of-way.	Encourage extensive and appropriate landscaping in public and private development to maintain the City's tree canopy and to promote sustainability and healthy living, particularly through increased trees, ~~and~~ water-efficient *Bay-Friendly* landscaping, *and green infrastructure elements, such as infiltration and biotreatment* in large parking areas and in the public right-of-way." *The City shall promote and require, where appropriate, new tree planting designs that integrate suspended pavement and stormwater treatment systems providing multiple benefits.*

Page/Description	Current Language	Suggested Language or Comments
Page LU-26 Open Space New Policy LU-6.12 *Green and Complete Streets.*	New Policy	*Implement Complete Streets that also provide opportunities for GI by following the guidelines and standards of the City's GI Plan. This will create attractive multimodal streets that meet requirements of the MRP.**
Page LU-27 Open Space Program LU-6.A San Francisquito Creek Setbacks	Establish Municipal Code requirements for minimum setbacks for new structures or impervious surfaces within a specified distance of the top of the San Francisquito Creek bank.	Establish Municipal Code requirements for minimum setbacks for new structures or impervious surfaces within a specified distance of the top of the San Francisquito Creek bank. *Refer to the city's GI Plan for GI opportunities associated with San Francisquito Creek.**
Page LU-27 Open Space New Program LU-6.F GI Plan.	New Program	*Use GI and green streets to provide sustainable stormwater management and treatment as required by the MRP and the City's GI Plan.**
Page LU-27 Sustainable Services GOAL LU-7	Promote the implementation and maintenance of sustainable development, facilities and services to meet the needs of Menlo Park's residents, businesses, workers, and visitors.	No revision needed.
Page LU-27 Sustainable Services Policy LU-7.1 Sustainability	Promote sustainable site planning, development, landscaping, and operational practices that conserve resources and minimize waste.	Promote sustainable site planning, development, *Bay-Friendly* landscaping, *green infrastructure,* and operational practices that conserve resources and minimize waste.
Page LU-28 Sustainable Services Policy LU-7.5 Reclaimed Water Use.	Implement use of adequately treated "reclaimed" water (recycled/nonpotable water sources such as, graywater, blackwater, rainwater, stormwater, foundation drainage, etc.) through dual plumbing systems for outdoor and indoor uses, as feasible.	No revision needed.

Page/Description	Current Language	Suggested Language or Comments
Page LU-29 Sustainable Services New Policy LU-7.10 Green Infrastructure	New Policy	*Prevent urban runoff pollution and reduce flooding through the promotion and incorporation of green infrastructure elements, such as infiltration and biotreatment in private and public development as described in the City's GI Plan.*
Page LU-29 Sustainable Services Program LU-7.A Green Building Operation and Maintenance.	Employ green building and operation and maintenance best practices, including increased energy efficiency, use of renewable energy and reclaimed water, and install drought-tolerant landscaping for all projects.	Employ green building and operation and maintenance best practices, including increased energy efficiency, use of renewable energy and reclaimed water, *integration of green infrastructure,* and install drought-tolerant *Bay-Friendly* landscaping for all projects.*
Page LU-29 Sustainable Services Program LU-7.D Performance Standards.	Establish performance standards in the Zoning Ordinance that requires new development to employ environmentally friendly technology and design to conserve energy and water and minimize the generation of indoor and outdoor pollutants.	Establish performance standards in the Zoning Ordinance that requires new development to employ environmentally friendly technology, *Bay-Friendly landscaping* and design to conserve energy and water*, manage and improve stormwater runoff (coordinate and maintain consistency with the City's GI Plan and other provisions of the MRP),* and minimize the generation of indoor and outdoor pollutants.
Page LU-29 Sustainable Services Program LU-7.F Adaptation Plan.	Work with emergency service providers to develop an adaptation plan, including funding mechanisms, to help prepare the community for potential adverse impacts related to climate change, such as sea level rise, extreme weather events, wildfire, and threats to ecosystem and species health.	Work with emergency service providers to develop an adaptation plan, including funding mechanisms, to help prepare the community for potential adverse impacts related to climate change, such as sea level rise, extreme weather events, wildfire, and threats to ecosystem and species health. *Green infrastructure is one technique to aid in reducing stormwater flows and help reduce storm surge.**
Page LU-30 Sustainable Services Program LU-7.I Green Infrastructure Plan.	Develop a Green Infrastructure Plan that focuses on implementing City-wide projects that mitigate flooding and improve storm water quality.	Develop a Green Infrastructure Plan that focuses on implementing City-wide projects that mitigate flooding and improve storm water quality *and that satisfies the provisions of the MRP.**

Page/Description	Current Language	Suggested Language or Comments
Page CIRC-5 Circulation Street Network Complete Streets	In addition to completing the streets, Menlo Park has the opportunity to incorporate "green street" designs when retrofitting and designing streets. Green streets contain environmental features like trees, rain gardens, and infiltration planters to slow the course of runoff and filter it naturally before it reaches major waterways and sensitive plant and animal life.	In addition to completing the streets, Menlo Park has the opportunity to incorporate "green street" designs when retrofitting and designing streets. Green streets contain environmental features like trees, rain gardens, and infiltration planters to slow the course of runoff and filter it naturally before it reaches major waterways and sensitive plant and animal life. *Green streets can be integrated with cycling and pedestrian facilities to improve safety and provide multiple benefits. The City's GI Plan and Transportation Master Plan include GI guidelines and standards. (Consider adding a photo of a sustainable street in Menlo Park such as on Chilco Street or at the Menlo Gateway.)*
Page CIRC-15 Safe Transportation System GOAL CIRC-1	Provide and maintain a safe, efficient, attractive, user-friendly circulation system that promotes a healthy, safe, and active community and quality of life throughout Menlo Park.	Provide and maintain a safe, efficient, attractive, *environmentally-sustainable, and* user-friendly circulation system that promotes a healthy, safe, and active community and quality of life throughout Menlo Park.
Page CIRC -16 Safe Transportation System New Policy CIRC-1.10 Green Infrastructure	New Policy Coordinate with TMP	*Integrate GI systems into transportation projects, such as Class IV bikeways and curb extensions, to increase cyclist and pedestrian safety while also reducing stormwater pollution.*
Page CIRC -16 Safe Transportation System Program CIRC-1.C Capital Improvement Program	Annually update the Capital Improvement Program to reflect City and community priorities for physical projects related to transportation for all travel modes.	Annually update *and coordinate* the Capital Improvement Program to reflect City and community priorities for physical projects related to transportation for all travel modes *and related facilities and opportunities for green infrastructure as identified in the City's GI Plan and Transportation Master Plan*.*
Goal CIRC 2	Increase accessibility for and use of streets by pedestrians, bicyclists, and transit riders.	No revision needed.

Page/Description	Current Language	Suggested Language or Comments
Page CIRC -18 Complete Streets Policy CIRC-2.10 Green Infrastructure.	Maximize the potential to implement green infrastructure by: a) Reducing or removing administrative, physical, and funding barriers; b) Setting implementation priorities based on stormwater management needs, as well as the effectiveness of improvements and the ability to identify funding; and c) Taking advantage of opportunities such as grant funding, routine repaving or similar maintenance projects, funding associated with Priority Development Areas, public private partnerships, and other funding opportunities.	Maximize the potential to implement green infrastructure by: a) Reducing or removing administrative, physical, and funding barriers; b) Setting implementation priorities *and objectives* based on stormwater management needs *and requirements of the MRP and the City's GI Plan*, as well as the effectiveness of improvements and the ability to identify funding; and c) Taking advantage of opportunities such as grant funding, routine repaving or similar maintenance projects, funding associated with Priority Development Areas, public private partnerships, *complete street projects,* and other funding opportunities.*
Page CIRC-19 Complete Streets Program CIRC-2.B NACTO Design Guidelines	Adopt the National Association of City Transportation Officials (NACTO) Urban Street Design Guide and Urban Bikeway Design Guide as supplements to the California Manual for Uniform Traffic Control Devices to enhance safety for users of all travel modes and improve aesthetics.	Adopt the National Association of City Transportation Officials (NACTO) Urban Street Design Guide*, Urban Street Stormwater Guide,* and Urban Bikeway Design Guide as supplements to the California Manual for Uniform Traffic Control Devices to enhance safety for users of all travel modes and improve aesthetics and environmental performance.
Page CIRC-21 Complete Streets Program CIRC-2.J Multi-modal Stormwater Management	Identify funding opportunities for stormwater management that can be used to support implementation of Menlo Park's streets.	Identify funding opportunities for stormwater management *and multimodal street improvements* that can be used to support implementation of *these facilities in* Menlo Park's streets. *Coordinate and leverage funding to benefit both green street and complete street projects.**
Page CIRC-21 Complete Streets Program CIRC-2.K Zoning Ordinance Requirements	Establish Zoning Ordinance requirements for all new development to incorporate safe and attractive pedestrian and bicycle facilities, including continuous shaded sidewalks, pedestrian lighting, and other amenities.	Establish Zoning Ordinance requirements for all new development to incorporate safe and attractive pedestrian and bicycle facilities, including continuous shaded sidewalks, pedestrian lighting, and other amenities. *Many of these pedestrian and bicycle elements are complementary to and provide opportunities for green street infrastructure; green street objectives and design considerations should be coordinated with pedestrian and bicycle facility provisions.**

Page/Description	Current Language	Suggested Language or Comments
Page CIRC-22 Sustainable Transportation GOAL CIRC-3	Increase mobility options to reduce traffic congestion, greenhouse gas emissions, and commute travel time.	Increase mobility options to reduce traffic congestion, greenhouse gas emissions, and commute travel time, *and improve air and water quality*.
Page CIRC-22 Sustainable Transportation New Policy CIRC-3.5 Sustainable Streets	New Policy Coordinate with TMP	*Prioritize and institutionalize the use and practice of Sustainable Streets (the combination of Complete and Green Streets per the City's GI Plan) in the City's roadway design practices and guidelines to improve water quality, multi-modal access and safety, and canopy coverage, and provide Bay-Friendly landscaping, climate change resiliency, and reductions in localized flooding.*
Page CIRC-23 Sustainable Transportation New Program CIRC-3.C Sustainable Streets	New Program Coordinate with TMP	*Implement and maintain Sustainable Streets in the City's street network system.*
Page CIRC-23 Sustainable Transportation New Program CIRC-3.D Sustainable Streets Impact Fee	New Program Coordinate with TMP	*Explore adoption of an Impact Fee to fund a City-wide Sustainable Streets implementation program and the GI projects described in the City's GI Plan and Transportation Master Plan.*
Page CIRC-23 Health and Wellness New Policy CIRC-4.5 Local Water Pollution	New Policy Coordinate with TMP	*Promote the use of Sustainable Streets to reduce water pollution through the collection of litter and treatment of water borne pollutants on the City's roadways.*
Page CIRC-27 Parking Policy CIRC-7.2 Off-Street Parking	Ensure both new and existing off-street parking is properly designed and used efficiently through shared parking agreements and, if appropriate, parking in-lieu fees	Ensure both new and existing off-street parking is properly designed, *integrates GI,* is used efficiently through shared parking agreements and, if appropriate, includes parking in-lieu fees. *See the City's GI Plan for GI standards and guidance, including descriptions of, and design, construction, operation, and maintenance of GI facilities.* *

Menlo Park El Camino Real/Downtown Specific Plan, 2012

The Menlo Park El Camino Real/Downtown Specific Plan establishes a framework for private and public improvements on El Camino Real, in the Caltrain station area and in downtown Menlo Park for the next several decades. This Specific Plan includes standards and guidelines for public and private enhancements to the area, including specific guidelines encouraging the use of pervious pavement and green roofs. References to bioswales and soil-filled catch basins should be changed to bioretention areas.

Page/Description	Current Language	Suggested Language or Comments
Page C19 C.5 Sustainability	-Improve stormwater management with best practices and application of existing requirements for private developments as well as new public spaces and parks. -Reduce heat island effects by reducing the amount of land dedicated to surface parking lots or by mitigating with tree canopy or other shading device, and by advocating green roofs through development guidelines.	Improve stormwater management with *green infrastructure* best practices and application of existing requirements for private developments as well as new public spaces and parks.
Page D12 D.2 Downtown Santa Cruz Ave Sidewalks - Guidelines	**D.2.11** The furnishings zone accommodates public amenities such as street trees, street lamps, benches, bike racks, kiosks, news racks, mailboxes, transit shelters, public art, plantings, utility poles and utility boxes.	The furnishings zone accommodates public amenities such as street trees, street lamps, benches, bike racks, kiosks, news racks, mailboxes, transit shelters, public art, *green infrastructure and aesthetic* plantings, utility poles and utility boxes.
Page D44 D.4 El Camino Real East West Connectivity - Guidelines	**D.4.09** Integrate additional landscaping and "low impact development" (LID) materials, such as pervious materials to manage storm water, where possible.	**D.4.09** Integrate additional landscaping, *green infrastructure,* and "low impact development" (LID) materials such as pervious materials to manage storm water, where possible.
Page D48 D. 6 Sustainable Practices Guidelines - Stormwater Management	**D.6.03** Pervious materials should be used on sidewalks and other paved surfaces wherever possible to minimize stormwater run-off from paved surfaces. **D.6.04** Large soil-filled, planted catch basins are encouraged as a part of sidewalk design. They should be coordinated with street trees, lighting, and infrastructure on the street.	**D.6.04** ~~Large soil-filled, planted catch basins~~ *Bioretention areas or other green infrastructure elements* are encouraged as a part of sidewalk design. They should be coordinated *and/or integrated* with street trees, lighting, and infrastructure on the street.

Page/Description	Current Language	Suggested Language or Comments
Page E43 E.3.8 Sustainable Practices Stormwater and Wastewater Management Guidelines	Effective stormwater management techniques are recommended. Such techniques could include bioswales on surface parking lots, rain gardens in landscaped areas, green roofs and porous materials on driveways and parking lots. **E.3.8.12** Buildings should incorporate intensive or extensive green roofs in their design **E.3.8.13** Projects should use porous material on driveways and parking lots to minimize stormwater run-off from paved surfaces.	Effective *green infrastructure/*stormwater management techniques are recommended. Such techniques could include ~~bioswales~~ *biotreatment* on surface parking lots, rain gardens in landscaped areas, green roofs and porous materials on driveways and parking lots.
Page F7 F.3 Pedestrian Improvements El Camino Real Pedestrian Circulation North-South Connectivity	The furnishing zone provides a place for plantings (e.g., planter strip) as well as street lamps, trees, hydrants and other street furnishings.	The furnishing zone provides a place for *green infrastructure* plantings (e.g., *stormwater* planter*s and tree well filters*) as well as *aesthetic planter strips,* street lamps, trees, hydrants and other street furnishings.

Menlo Park Sidewalk Master Plan, 2009

The Sidewalk Master Plan serves as the primary guide in the allocation of capital, maintenance, administrative, and matching funds in order to establish a comprehensive network of safe, convenient walking routes throughout the City. The Plan inventories existing sidewalk facilities and needs and prioritizes pedestrian capital improvement projects to achieve this network.

Page/Description	Current Language	Suggested Language or Comments
Page 32 Standard Sidewalk	Although the City standard of five feet is recommended, three feet of clear width is allowed at choke points where there are obstructions, such as trees or utilities. On roadways with high vehicle volumes or a preponderance of obstructions, a buffer zone between the sidewalk and roadway is recommended. Sidewalks may consist of concrete, asphalt, brick, or some combination of these materials.	Although the City standard of five feet is recommended, three feet of clear width is allowed at choke points where there are obstructions, such as ~~*trees or*~~ *utilities, trees or other green infrastructure*. On roadways with high vehicle volumes or a preponderance of obstructions, a buffer zone between the sidewalk and roadway is recommended*, such as stormwater planters*. Sidewalks may consist of *pervious or impervious* concrete, asphalt, brick, or some combination of these materials.
Page 33 & 63 Home Zones	Unique design features and environmental cues, such as planter boxes, special entryways, narrow lanes and lower speed limits, encourage drivers slow down and share the road.	Unique design features and environmental cues, such as *stormwater planters,* planter boxes, special entryways, narrow lanes and lower speed limits, encourage drivers slow down and share the road.
Page 33 Home Zones	- Using features that slow traffic while serving the needs of residents, such as benches, play equipment, landscaping. - Adding curves to the travel lane to break up the driver's sight line.	- Using features that slow traffic while serving the needs of residents, such as benches, play equipment, ~~landscaping~~ *and green infrastructure*. - Adding curves to the travel lane to break up the driver's sight line*, such as stormwater curb extensions*.

Menlo Park Comprehensive Bicycle Development Plan, 2005

The Bicycle Development Plan provides a blueprint for a citywide system of bike lanes, routes, paths and associated bicycle facilities in the City, but it may be being superseded by the new Transportation Master Plan being completed in 2019, so EOA does not recommend any updates to this document.

Menlo Park Neighborhood Traffic Management Plan, 2004

The Menlo Park Neighborhood Traffic Management Plan provides policies for a traffic management in the neighborhood areas of the City, but it may be being superseded by the new

Transportation Master Plan being completed in 2019, so EOA does not recommend any updates to this document.

Menlo Park Street Tree Management Plan, 2006

The City's Street Tree Management Plan provides procedures and policies for managing the one section of the City's urban forest – specifically its street trees. No GI-related language was found in the document. However, street trees can be a significant aspect of the City's GI plan and program, so GI-related language should be considered for all tree policy documents.

Page/Description	Current Language	Suggested Language or Comments
Page 2 – Goals of the Street Tree Management Plan	None	Add the following goal: *Green Infrastructure Plan - The City's Green Infrastructure (GI) Plan describes how the City will gradually transform its urban landscape and storm drainage systems from "gray" to "green"; that is, supplement traditional storm drain infrastructure with a more resilient, sustainable system that reduces and slows runoff by dispersing it to vegetated areas on streets and in parks, promotes infiltration and evapotranspiration, collects runoff for non-potable uses, and treats runoff using biotreatment and other GI practices. Street trees can be incorporated into stormwater tree filter systems that provide these GI benefits and reduce potable water demand for irrigation of trees. A goal of the Street Tree Management Plan is to identify opportunities to integrate street trees with GI implementation on City streets.*
Page 2 – Goals of the Street Tree Management Plan	None	Add the following policy: *Incorporate green infrastructure elements, such as infiltration and biotreatment, into street tree planting projects and urban forest maintenance practices to reduce pollutants flowing into the City's storm drain system.*

Menlo Park Zoning Regulations, 2016

The City's zoning regulations are an important tool for GI implementation. The regulations are very comprehensive and complex with specific requirements for each kind of land use, so there

are many areas that could be amended for GI integration. Two example sections below are recommended for amended language consideration as they could be very helpful in leveraging new development activities for GI implementation. Other sections could also be amended to include GI language and/or thresholds could be developed specifically for GI.

Page/Description	Current Language	Suggested Language or Comments
Chapter 16.43 O OFFICE DISTRICT – 16.43.120 Required street improvements.	For new construction and/or building additions of ten thousand (10,000) or more square feet of gross floor area or for tenant improvements on a site where the cumulative construction value exceeds five hundred thousand dollars ($500,000) over a five (5) year period, the public works director shall require the project to provide street improvements on public street edges of the property that comply with adopted city of Menlo Park street construction requirements for the adjacent street type. When these are required by the public works director, the improvements do not count as community amenities pursuant to Section 16.43.070. The threshold for the value of improvements shall be adjusted annually on the first day of July, based on the ENR Construction Cost Index. (1) Improvements shall include curb, gutter, sidewalk, street trees, and street lights; (2) Overhead electric distribution lines of less than sixty (60) kilovolts and communication lines shall be placed underground along the property frontage; (3) The public works director may allow a deferred frontage improvement agreement, including a bond to cover the full cost of the improvements and installation to accomplish needed improvements in coordination with other street improvements at a later date.	For new construction and/or building additions of ten thousand (10,000) or more square feet of gross floor area or for tenant improvements on a site where the cumulative construction value exceeds five hundred thousand dollars ($500,000) over a five (5) year period, the public works director shall require the project to provide street improvements on public street edges of the property that comply with adopted city of Menlo Park street construction requirements for the adjacent street type. When these are required by the public works director, the improvements do not count as community amenities pursuant to Section 16.43.070. The threshold for the value of improvements shall be adjusted annually on the first day of July, based on the ENR Construction Cost Index. (1) Improvements shall include curb, gutter, sidewalk, street trees, *Green Infrastructure measures (treating runoff from impervious surfaces in the public right of way, such as streets and sidewalks)* and street lights; (2) Overhead electric distribution lines of less than sixty (60) kilovolts and communication lines shall be placed underground along the property frontage; (3) The public works director may allow a deferred frontage improvement agreement, including a bond to cover the full cost of the improvements and installation to accomplish needed improvements in coordination with other street improvements at a later date.

Page/Description	Current Language	Suggested Language or Comments
Chapter 16.45 R-MU RESIDENTIAL MIXED USE DISTRICT– 16.45.110 Required street improvements.	For new construction and/or building additions of ten thousand (10,000) or more square feet of gross floor area or for tenant improvements on a site where the cumulative construction value exceeds five hundred thousand dollars ($500,000) over a five (5) year period, the public works director shall require the project to provide street improvements on public street edges of the property that comply with adopted city of Menlo Park street construction requirements for the adjacent street type. When these are required by the public works director, the improvements do not count as community amenities pursuant to Section 16.45.070. The threshold for the value of improvements shall be adjusted annually on the first day of July, based on the ENR Construction Cost Index. (1) Improvements shall include curb, gutter, sidewalk, street trees, and street lights; (2) Overhead electric distribution lines of less than sixty (60) kilovolts and communication lines shall be placed underground along the property frontage; (3) The public works director may allow a deferred frontage improvement agreement, including a bond to cover the full cost of the improvements and installation to accomplish needed improvements in coordination with other street improvements at a later date.	For new construction and/or building additions of ten thousand (10,000) or more square feet of gross floor area or for tenant improvements on a site where the cumulative construction value exceeds five hundred thousand dollars ($500,000) over a five (5) year period, the public works director shall require the project to provide street improvements on public street edges of the property that comply with adopted city of Menlo Park street construction requirements for the adjacent street type. When these are required by the public works director, the improvements do not count as community amenities pursuant to Section 16.45.070. The threshold for the value of improvements shall be adjusted annually on the first day of July, based on the ENR Construction Cost Index. (1) Improvements shall include curb, gutter, sidewalk, street trees, Green Infrastructure measures (treating runoff from impervious surfaces in the public right of way, such as streets and sidewalks) and street lights; (2) Overhead electric distribution lines of less than sixty (60) kilovolts and communication lines shall be placed underground along the property frontage; (3) The public works director may allow a deferred frontage improvement agreement, including a bond to cover the full cost of the improvements and installation to accomplish needed improvements in coordination with other street improvements at a later date. (Ord. 1026 § 3 (part), 2016).

Menlo Park – Park and Recreation Facilities Master Plan Update, 2019

The City created a parks and recreation facilities master plan in 1999. The City is currently updating the plan with new information and the draft document was released in February of 2019. The following recommendations are for possible inclusions in the draft document to incorporate GI issues. (The page #s refer to the page numbers on the bottom of the document.)

Page/Description	Current Language	Suggested Language or Comments
Chapter 2 – Context Planning Context Page 19 Green Infrastructure Plan (Stormwater) (In Process)	The Green Infrastructure Plan will include low impact and sustainable stormwater management practices that are readily incorporated in park settings.	Revise passage to include the following language: *Green Infrastructure are stormwater treatment features which utilize vegetation and soils to promote clean discharge our local waterbodies. GI is especially well suited within large open space areas such as parks and promotes stormwater treatment and flood mitigation.* *All park projects should be assessed for GI with special attention to the "regional" projects category as defined in the City's GI Plan. Please refer to the subject masterplan for additional information.*
Chapter 2 – Context Park and Recreation Trends Page 22 – Climate Change, Resiliency and Sustainability	Open space and parks also can be effective buffers for potential flood zones resulting from increased severe weather patterns, particularly on the coast and adjacent to riparian corridors.	Include flood mitigation topic in content and add the following text: *As parts of the City of Menlo Park are along the bay and could be subject to sea-level rise impacts in the future, the City's parks can be designed to retain, infiltrate and/or harvest stormwater and rainwater. See page 104 for more information and examples.*
Chapter 2 – Context Park and Recreation Trends Page 23 – Climate Change, Resiliency and Sustainability		Incorporate Green Infrastructure language in this paragraph. Considerations: *1. Parks can be used for GI that satisfies regional projects.* *2. GI can reduce pollutant loads, treat storm discharge, and mitigate flooding concerns while contributing to a more sustainable ecosystem.*
Chapter 4 – Sustainability Page 88		As part of environmental sustainability, include implementation of Green Infrastructure per GI Plan which incorporates: 1. flood mitigation 2. pollutant reduction 3. cleaner storm discharge

Page/Description	Current Language	Suggested Language or Comments
Chapter 5 – Guidelines Section 1.1.3 – Coordinated Effort Page 95	1.1.3 Coordinated Effort: Align and coordinate park and facility planning with other existing and ongoing City planning efforts, including the Transportation Plan, the Downtown Plan, the Library Plan, and Climate Action Plan.	1.1.3 Coordinated Effort: Align and coordinate park and facility planning with other existing and ongoing City planning efforts, including the Transportation Plan, the Downtown Plan, the Library Plan, ~~and~~ Climate Action Plan*, and GI Plan*.
Chapter 5 – Guidelines Section 4.1.1 – Utilize Best Practices Page 103	4.1.1 "energy efficiency, stormwater and…" 4.1.1.1 Conserve water… 4.1.1.4 Improve water quality and manage stormwater by incorporating bioretention features such as rain gardens and pervious pavers to cleanse stormwater and recharge groundwater 4.1.1.5 – New Section	4.1.1 - After "stormwater" add "*treatment*" and after "Climate Action Plan" add "*, and GI Plan"* 4.1.1.1 – At the end of the sentence add "*, pursuant to the City's WELO program.* 4.1.1.4 - "*pursuant to the City's Green Infrastructure Plan"* 4.1.1.5 Consider integrating stormwater treatment as part of the Regional Projects opportunities identified in the City's GI Plan. Dedicate landscape for bioretention areas and retention basins to treat runoff from adjacent tributary areas to promote clean discharge and sustainability. Please refer to Chapter 6 of this document for recommendations.
Chapter 5 - Guidelines Section 4.1.6 – Street Trees Page 104	New Section 4.1.6	Add the following policy: *Incorporate green infrastructure elements, such as infiltration and biotreatment, into street tree planting projects and urban forest maintenance practices to reduce pollutants flowing into the City's storm drain system.*
Chapter 5 – Guidelines Section 4.1.5 - Resilience Page 104		Give examples of how parks can be used to reduce flooding, decrease risk from seal-level rise and increase resiliency. One term for this type of park is a "Floodpark". *Two common types of Floodparks are: 1. Parks that are bowl-shaped to hold water temporarily and that can serve multiple purposes when not flooded. 2. Parks with underground stormwater storage can allow the park surface to remain as a typical flat park landscape.* Can San Francisquito Creek in Menlo Park be harnessed for flood control in a park?

Page/Description	Current Language	Suggested Language or Comments
Chapter 5 – Guidelines Section 4.3.1 – Signage Page 105	Provide interpretive signage where appropriate to identify natural, cultural, and environmentally sustainable elements within the parks and facilities. Explore utilizing wayfinding signage to expand awareness of parks.	Provide interpretive signage where appropriate to identify natural, cultural, and environmentally sustainable elements *including GI features such as bio-retention areas* within the parks and facilities. Explore utilizing wayfinding signage to expand awareness of parks.
Chapter 6 – Recommendations Joseph B. Kelly Park Page 113	Renovate landscaping to emphasize native and drought tolerant planting.	*and make considerations for GI opportunities such as bio-retention areas*
Chapter 6 – Recommendations Burgess Park Page 118	1. Graphic: Add callout box. 2. Renovate the existing playground with an emphasis on nature play experiences, and access for children of all abilities. 3. Replace small, unused lawn areas with native, drought tolerant plants, demonstration gardens, and artistic combinations of colors and textures. Adjacent to streets, parking and other hardscape areas, install bioswales to cleanse stormwater and replenish groundwater.	Add "…*and make considerations for GI opportunities and education."* Install ~~bioswales~~bioretention areas to ~~cleanse stormwater and~~ replenish groundwater~~.~~ *and to treat runoff from roof tops, parking lots and other impervious surfaces.* Change the term "bioswale" to "bioretention area" throughout the document. Refer to Page 104 for more information on what parks can look like. Add *"per the City's GI Plan."* and add TMDL content.
Chapter 6 – Recommendations Willow Oaks Park Page 119	Improve drainage throughout the site and in particular to prevent lawn drainage onto tennis courts, and flooding in driveway of the adjacent school.	Add: "…*with considerations for GI features such as retention ponds and bio-retention areas per the City's GI Plan's Regional Project opportunities."*
Chapter 6 – Recommendations Nealon Park Page 120	Create demonstration garden with native plants to reinforce the nature theme of the new playground.	Add: "… *including bio-retention area to treat adjacent hardscape and tributary areas."*
Chapter 6 – Recommendations Sharon Park Page 121	Image	Can existing pond be retrofitted for a detention basin?

Page/Description	Current Language	Suggested Language or Comments
Chapter 6 – Recommendations Hamilton Park Page 123	Plant more trees to increase shade, and to create a natural canopy and visual interest. Enhance the plantings at the bioswales and add educational signage to explain their functions.	Add: "…*per the GI Plan"*
Chapter 6 – Recommendations At All Parks Page 128	Add new 5th bullet	*Assess all potential projects for GI opportunities per the City's GI Plan*
Chapter 7 – Implementation 4. Sustainability Page 135	Add to existing bullet or add a new one.	*Does the project incorporate stormwater goals?*

Proposed Work Plan for GI Updates to City Planning Documents

The following table represents the Work Plan for updating various documents that EOA recommends for updates with a suggested time frame for the updates. This table can be inserted into the GI Plan as part of the commitment that the City is making per the MRP requirement to update plans with GI-related language in a timely manner.

Table 2 – Proposed Plan Update Work Plan

Name of Plan	Last Update	Next Update*
General Plan		
Open Space and Conservation, Noise and Safety	May 2013	2020
Land Use and Circulation Elements	November 2016	2020
El Camino Real Downtown Specific Plan	July 2012	2020
Transportation Master Plan	In Progress	As part of Adoption
Parks Master Plan	In Progress	As part of Adoption

**All dates are tentative and subject to change pending schedules set forth by the appropriate authorizing body (City Council, etc.)*