

C/CAG

CITY/COUNTY ASSOCIATION OF GOVERNMENTS OF SAN MATEO COUNTY

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Millbrae • Pacifica • Portola Valley • Redwood City • San Bruno • San Carlos • San Mateo • San Mateo County • South San Francisco • Woodside*

2:30 PM, Thursday, April 21, 2016
San Mateo County Transit District Office¹
1250 San Carlos Avenue, 2nd Floor Auditorium
San Carlos, California

STORMWATER (NPDES) COMMITTEE AGENDA

- | | | |
|---|------------------|--------------|
| 1. Public comment on items not on the Agenda (presentations limited to three minutes). | Breault | No materials |
| 2. Stormwater Issues from March C/CAG Board meeting: <ul style="list-style-type: none">• Receive copy of executed Task Order EOA-02, issued to EOA, Inc. for an amount not to exceed \$247,027 for water quality monitoring services to the Countywide Water Pollution Program for Fiscal Year 2015-16. (Information)• Review and approve Resolution 16-04, authorizing the Executive Director to execute Task Orders with EOA, Inc., Larry Walker & Associates, and S. Groner & Associates in amounts not to exceed \$464,480, \$326,209, and \$250,000, respectively, for technical support services to the Countywide Water Pollution Program for Fiscal Year 2015-16. (ACTION) | Fabry | No materials |
| 3. ACTION – Review and approve January 21 and February 18 Stormwater Committee meeting minutes | Fabry | Pages 1-8 |
| 4. INFORMATION – Announcements on stormwater issues | Fabry | Verbal |
| 5. ACTION - Receive presentation on and provide feedback to C/CAG’s technical consultant on project screening and prioritization for the countywide Stormwater Resource Plan | Fabry/
Carter | Page 9-60 |
| 6. ACTION – Review preliminary 2016-17 budget information for the Countywide Water Pollution Prevention Program | Fabry | Handouts |
| 7. Regional Board Report | Mumley | No Materials |
| 8. Executive Director’s Report | Wong | No Materials |
| 9. Member Reports | All | No Materials |

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C/CAG AGENDA REPORT

Date: April 21, 2016
To: Stormwater Committee
From: Matthew Fabry, Program Manager
Subject: Review and approve January 21 and February 18, 2016 Stormwater Committee meeting minutes

(For further information or questions contact Matthew Fabry at 650 599-1419)

RECOMMENDATION

Review and approve January 21 and February 18, 2016 Stormwater Committee meeting minutes, as drafted.

ATTACHMENTS

1. Draft January 21, 2016 Minutes
2. Draft February 18, 2016 Minutes

STORMWATER COMMITTEE
Regular Meeting
Thursday, January 21, 2016
2:30 p.m.

DRAFT Meeting Minutes

The Stormwater Committee met in the SamTrans Offices, 1250 San Carlos Avenue, San Carlos, CA, 2nd floor auditorium. Attendance at the meeting is shown on the attached roster. In addition to the Committee members, also in attendance were Sandy Wong (C/CAG Executive Director), Matt Fabry (C/CAG Program Manager), Jon Konnan (EOA, Inc.), Jim Eggemeyer (San Mateo County), Patrick Ledesma (San Mateo County), Michelle Daher (East Palo Alto), Azalea Mitch (Menlo Park), and John Fuller (Daly City). In Chair Breault's absence, Vice-Chair Walter called the meeting to order at 2:40 p.m.

1. Public comment: None

2. C/CAG staff Matt Fabry provided an update on issues relevant to the Committee from the November and December C/CAG Board meetings:

- In November the Board approved issuing a task order to EOA, Inc. to continue providing technical support services to the Countywide Water Pollution Program while C/CAG staff completes the competitive procurement process for selecting consultants to continue supporting the Program in the future.
- In November the Board reviewed and approved a resolution that affirmed C/CAG's commitment to supporting its member agencies in meeting stormwater permitting mandates, requested State Water Board partnership on addressing pollutants of concern, and expressed concern regarding the quantitative load reduction requirement for PCBs which are presented as Numeric Effluent Levels rather than Numeric Action Levels in the reissued Municipal Regional Permit (MRP).
- In December the Board reviewed and approved the appointment of Peter Vorametsanti, Interim Public Works Director, to represent the City of Millbrae on the Stormwater Committee, and received a presentation from Fabry on key provisions of the reissued MRP.

3. ACTION – The draft minutes from the August 20 and October 15, 2015 Stormwater Committee meetings were approved unanimously. (Motion: Willis, Second: Oskoui).

4. PRESENTATION – Fabry and Jon Konnan (EOA, Inc.) provided a presentation on key provisions of the reissued MRP and how they compare to the previous MRP. Fabry noted that the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) adopted the revised MRP on November 19, 2015. Despite many hours of testimony at the adoption hearing, Permittees remaining concerns with the final draft permit were mainly not addressed. The permit regulates the stormwater discharges from C/CAG's member agencies, all of the municipalities in Santa Clara, Alameda, and Contra Costa Counties, and the cities of Vallejo, Fairfield, and Suisun City. It addresses the full spectrum of stormwater issues, including municipal operations, industrial and commercial facility BMPs/inspections, construction site management, water quality monitoring, public outreach, new and redevelopment, and certain water quality pollutants of concern. Key provisions in the revised permit include requirements to reduce trash, mercury, and PCBs (polychlorinated biphenyls) discharges from storm drains and for each municipality

to develop a Green Infrastructure Plan.

Committee members asked about C/CAG's level of support to agencies in developing their Green Infrastructure Plans. Fabry stated that C/CAG will provide as much support as possible on the countywide level (e.g., guidances and templates) but noted that each agency will need to have its own local council and community engagement process.

Fabry noted one key change with the revised MRP is that potable water discharges are no longer covered. Agencies that have water utilities must get coverage under the State General Permit for Drinking Water System Discharges and should have filed a Notice of Intent for coverage by January 1, 2016.

Konnan summarized the Countywide Water Pollution Prevention Program's recent approach to identifying watersheds in San Mateo County where PCBs and mercury controls would be most cost-effective. The approach is consistent with MRP requirement and includes desktop and field monitoring components. It is intended to show a reasonable level of effort towards identifying source areas for these pollutants. Konnan also briefly summarized the new MRP requirement to develop a program to manage PCBs-containing materials and wastes during building demolition. The program is for buildings constructed during the 1950s through 1970s when PCBs were in widespread use including in caulking around windows and doors and in concrete joints and in sealants in floor systems. Konnan noted that this program will play a key role in meeting the PCBs load reduction requirements, in that the permit stipulates that two-thirds of the required load reduction will be credited if the program is satisfactorily implemented.

Committee member Walter asked if there is ongoing monitoring for PCBs and mercury in fish in San Francisco Bay and Konnan confirmed that this type of monitoring has been and will continue to be conducted every few years.

5. ACTION – In August 2015, the C/CAG Board approved 10 on-call contracts with firms qualified to provide support to the Countywide Water Pollution Prevention Program in various categories of expertise. In November, C/CAG staff issued a Request for Proposals to the 10 firms for numerous support tasks associated with the reissued Municipal Regional Permit. Nine of the 10 firms submitted proposals. Staff convened a review panel including Committee members Porter and Oskoui and conducted interviews during the first week of January. Fabry provided a handout detailing the review panel's recommendation regarding which consultant should receive task orders to provide support services to the Countywide Water Pollution Prevention Program. Committee members requested a future presentation by the selected consultants on the overall scopes of work.

The Committee unanimously approved the staff recommendation (Motion: Murtuza, Second: McMinn).

6. INFORMATION – Fabry summarized information on a SMCWPPP/SCVURPPP water quality petition requesting the State Water Resources Control Board (State Water Board) to review the Regional Water Board's reissuance of the MRP. At the December 8, 2015 C/CAG Board meeting the C/CAG Board directed staff to explore opportunities for signing on with another Countywide Stormwater Program's petition. C/CAG's Countywide Water Pollution Prevention Program signed on as a co-petitioner with the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) on behalf of C/CAG's member agencies. The SCVURPPP petition addressed procedural concerns with the reissuance process as well as the technical issue of whether Numeric Effluent Limitations for mercury and polychlorinated biphenyls (PCBs) reductions are appropriate instead of Numeric Action Levels. The petition was filed on December 16, 2015.

Committee members requested additional information about the timeline for the State Water Board to consider the petition. Committee members also requested C/CAG staff forward a model letter urging State Water Board review of the SMCWPPP/SCVURPPP petition on the reissued MRP.

7. Regional Board Report: NONE

8. Executive Director's Report: C/CAG Executive Director Sandy Wong provided an update on the new C/CAG Water Committee, which will facilitate discussions on countywide approaches to water related issues, such as stormwater runoff pollution control, flood control, and sea level rise. The new committee includes seats for elected officials and city/county managers, and a seat for BAWSCA. Wong noted that the Water Committee is inviting various guest speakers, including the following in February 2016:

- A speaker from the Santa Clara Valley Water District to discuss how that organization functions, including aspects such as obtaining federal funding.
- A representative from the Integrated Water Resource Management Plan program, especially since San Mateo County may not be getting its share of available funding through this program.

9. Member Reports: NONE

Vice-chair Walter adjourned the meeting at 3:46 p.m.

STORMWATER COMMITTEE
Regular Meeting
Thursday, February 18, 2016
2:00 p.m.

DRAFT Meeting Minutes

The Stormwater Committee met in the SamTrans Offices, 1250 San Carlos Avenue, San Carlos, CA, 2nd floor auditorium. Attendance at the meeting is shown on the attached roster. In addition to the Committee members, also in attendance were Sandy Wong (C/CAG Executive Director), Matt Fabry (C/CAG Program Manager), Chris Sommers (EOA, Inc.), Sandy Mathews (Larry Walker and Associates), Steve Carter and John Riverson (Paradigm Environmental), Phil Erickson (Community Design + Architecture), Stephen Groner (S. Groner Associates), Tatum Mothershead and Cynthia Royer (Daly City), Patrick Ledesma, Julie Casagrande, Joe LaClair, and Andrea Chow (San Mateo County), Terence Kyaw (Redwood City), Ali Hatefali (Town of Hillsborough), Leticia Alvarez and Gilbert Yau (City of Belmont), John Swiecki and Keegan Black (City of Brisbane), Paige Safe (City of San Carlos), Azalea Mitch (City of Menlo Park), Sarah Scheidt and Ralph Braboy (City of San Mateo), Andrew Wemmer (City of South San Francisco), Michelle Daher (City of East Palo Alto), and Dale Bowyer (Regional Water Board). Vice-chair Walter called the meeting to order at 2:10 p.m.

1. Public comment: None

2. C/CAG staff Matt Fabry provided an update on issues relevant to the Committee from the January C/CAG Board meeting. The Board received a copy of the water quality petition requesting the State Water Resources Control Board review the San Francisco Bay Regional Water Quality Control Board's reissuance of the Municipal Regional Permit. The Board also approved the appointment of Justin Murphy, Director of Public Works, to represent the City of Menlo Park on the Stormwater Committee.

3. ACTION – Approval of the draft minutes from the January 21, 2015 Stormwater Committee meeting was deferred due to lack of a quorum.

4. PRESENTATION – C/CAG's technical consultants provided the following presentations on planned Municipal Regional Permit compliance support to member agencies:

- Chris Sommers (EOA) – EOA is continuing to provide support at the local (Permittee), countywide (SMCWPPP) and regional (BASMAA) levels. EOA will continue to provide general support to the Program Manager, support for most subcommittees, trainings, and assistance with annual reporting, trash load reduction, green infrastructure “no missed opportunities,” mercury and PCBs controls, and water quality monitoring.
- Sandy Mathews (LWA) – LWA is assessing SMCWPPP's subcommittee structure, including the mix of focus areas, frequency and length of meetings, and participants vs. target audiences. LWA will identify any opportunities for improvement. LWA is also reviewing SMCWPPP's training program and methods relative to requirements in the reissued Municipal Regional Permit (MRP 2.0) and target audiences and will develop a training framework document.
- Phil Erickson (CD+A) – Erickson reviewed basic information on green infrastructure (GI) including its multiple benefits. Erickson then presented the schedule and process for CD+A to assist local agencies in San Mateo County to prepare individual GI plans and described coordination with

the Stormwater Resource Plan development and mercury and PCBs load reduction tasks. A new San Mateo County GI Technical Advisory Committee is being formed that will need involvement of staff from a variety of municipal departments. Standard specifications and design details will be compiled and made available along with a model GI plan. CD+A will assist with identifying GI opportunities, prioritization, and implementation tracking. Measures of success will include MRP 2.0 compliance and the level of integration of GI into standard municipal practices.

- Steve Carter (Paradigm) – Paradigm is assisting with development of a countywide Stormwater Resource Plan (SRP). A June 2016 draft of the SRP will incorporate project concepts in support of Proposition 1 grant applications. The final SRP is anticipated to be due to the State by January 2017. The SRP will start by characterizing drainage areas, stormwater infrastructure, land characteristics (soils, topography, land use, imperviousness), hydrology (rainfall and flow), and pollutant sources and transport. It will then identify opportunities for stormwater capture projects and GI and prioritize, using a GIS screening of public parcels and rights-of-way. The prioritization will be based on maximum effectiveness for stormwater control and achieving multiple benefits (groundwater recharge, reuse, enhancement of habitat or open space). Input from local agencies on candidate projects will be needed by April. Draft project concepts will be completed by May 25 and final project concepts by June 10.
- Steve Carter – Paradigm will perform a Reasonable Assurance Analysis (RAA) consistent with requirements in MRP 2.0. The analysis will build off of watershed stormwater capture modeling conducted as part of SRP development to calculate estimated GI project capture volumes. The watershed modeling will provide the ability to recalculate the San Mateo County wasteload allocation via an improved estimate of sediment loading (which is the basis of the allocation), assessment of the critical period, and incorporation of local mercury and PCBs concentrations. The RAA will identify the quantitative relationship between GI implementation and mercury/PCBs load reductions and will include an optimization step to ensure cost-effective planning. Separate analyses will be performed for each jurisdiction.
- Stephen Groner (SGA) – SGA will support SMCWPPP’s public outreach/education program. The goals of the program include MRP 2.0 compliance (e.g., pollution prevention), developing community awareness of the associated challenges, and support for obtaining additional revenue and expanding the program. SGA will develop a 5-year strategic outreach plan that identifies appropriate audiences, barriers and motivators and integrates with other SMCWPPP components. SGA will implement pollutant specific outreach that targets reduced runoff (rain barrel program), bacteria (pet owner outreach), pesticides (point of purchase outreach), and litter reduction (coastal cleanup inland sites). SGA will also manage SMCWPPP’s web site and utilize social media, support school and community engagement, and support with outreach aspects of technical efforts related to GI and the countywide SRP.

5. INFORMATION – Fabry referred Committee members to the agenda package for a calendar of Bay Area Stormwater Management Agencies Association (BASMAA) committee meetings, which was provided in an effort to promote attendance by permittee staff representatives. Fabry noted that significant permit compliance activities take place at the regional level in BASMAA committees and San Mateo permittees have historically relied solely on C/CAG’s consultants to represent them at these meetings. With a revised permit recently adopted, staff is seeking support from Committee members in identifying committed individuals to begin participating in BASMAA committees.

6. INFORMATION – Fabry referred Committee members to the agenda package for a list of approvals

anticipated to be needed in 2016 for regional or countywide submittals on behalf of C/CAG's member agencies in accordance with requirements in the Municipal Regional Permit.

7. Regional Board Report: NONE

8. Executive Director's Report: C/CAG Executive Director Sandy Wong provided an update on an upcoming tour of the Santa Clara Valley Water District's Advanced Water Purification plant through the C/CAG Water Committee and invited committee members to attend.

9. Member Reports: NONE

Vice-chair Walter adjourned the meeting at 3:32 p.m.

DRAFT

2016 Stormwater Committee Roster			Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Agency	Representative	Position												
Atherton	Gordon Siebert	Public Works Director												
Belmont	Afshin Oskoui	Public Works Director	X	O										
Brisbane	Randy Breault	Public Works Director/City Engineer		O										
Burlingame	Syed Murtuza	Public Works Director	X											
Colma	Brad Donohue	Director of Public Works and Planning		X										
Daly City	Patrick Sweetland	Director of Water & Wastewater	O	O										
East Palo Alto	Kamal Fallaha	City Engineer	O	O										
Foster City	Jeff Moneda	Public Works Director	X	X										
Half Moon Bay	Brian Lee	Interim City Engineer												
Hillsborough	Paul Willis	Public Works Director	X	X										
Menlo Park	Justin Murphy	Public Works Director	X	O										
Millbrae	Peter Vorametsanti	Interim Public Works Director	X											
Pacifica	Van Ocampo	Public Works Director/City Engineer		X										
Portola Valley	Howard Young	Public Works Director												
Redwood City	Saber Sarwary	Supervising Civil Engineer	X	X										
San Bruno	Jimmy Tan	City Engineer	X	X										
San Carlos	Jay Walter	Public Works Director	X	X										
San Mateo	Brad Underwood	Public Works Director	X	O										
South San Francisco	Brian McMinn	Public Works Director	X	O										
Woodside	Dong Nguyen	Acting Public Works Director												
San Mateo County	Jim Porter	Public Works Director	O	X										
Regional Water Quality Control Board	Tom Mumley	Assistant Executive Officer		O										

"X" - Committee Member Attended

"O" - Other Jurisdictional Representative Attended

C/CAG AGENDA REPORT

Date: April 21, 2016

To: Stormwater Committee

From: Matthew Fabry, Program Manager

Subject: Receive presentation from C/CAG's technical consultant on project screening and prioritization for the countywide Stormwater Resource Plan

(For further information or questions contact Matthew Fabry at 650 599-1419)

RECOMMENDATION

Receive presentation from C/CAG's technical consultant on project screening and prioritization for the countywide Stormwater Resource Plan

BACKGROUND

C/CAG is contracted with Paradigm Environmental (via subcontract to Larry Walker & Associates) to develop a countywide Stormwater Resource Plan (SRP) in accordance with requirements promulgated in [SB 985](#) (Pavley, 2014) and [guidance](#) from the State Water Resources Control Board (State Board). SRPs are now required in order to compete for voter-approved bond funds for stormwater or dry weather capture projects. C/CAG is working with Paradigm Environmental to develop a countywide SRP on an expedited schedule to enable its member agencies to submit implementation grant proposals for the State Board's stormwater grant program, which will be distributing up to \$200 million in Proposition 1 Water Bond funds in two separate funding rounds. Round 1 grant applications are due the first week of July.

To support development of the SRP, C/CAG solicited GIS data from its member agencies. Paradigm Environmental compiled the GIS data with other publicly available state data sets to help model watershed processes and develop a screening and prioritization process for identifying stormwater capture projects. In addition, C/CAG asked member agencies to provide projects for inclusion in the SRP, which Paradigm Environmental also compiled. Attachment 1 summarizes all GIS data sets that pertain to San Mateo County and all projects submitted by member agencies.

In addition to projects proactively identified by member agencies, Paradigm Environmental is developing a screening and prioritization process to identify other potential opportunities for stormwater capture and green infrastructure (GI). These opportunities are broken down into three main categories: public parcels with regional stormwater capture potential, public parcels with potential for inclusion of on-site green infrastructure or low impact development measures, and green streets.

These opportunities are then prioritized based on a variety of criteria. Weighting factors are applied to the different criteria to develop an overall score for the various project opportunities. This is to satisfy SB 985's requirement for a quantitative, metrics-based prioritization process. Attachment 2 summarizes the key assumptions and process Paradigm Environmental has implemented to-date in developing a screening and prioritization process.

The short-term goal in developing a countywide SRP is to support member agencies' ability to compete for grant funds to implement green infrastructure projects during the current term of the Municipal Regional Permit in support of achieving mandated load reductions for mercury and PCBs. As part of C/CAG's consultant-led effort to assist member agencies in applying for grant funds, Paradigm Environmental is contracted to develop project concept documents for each agency. These concepts would provide the basis for a grant application. C/CAG originally solicited consultant support in this regard with a goal of producing two project concepts per agency. In order to develop this many concepts, Paradigm Environmental has provided a simplified project concept template based on similar work they have performed in southern California. Alternatively, Paradigm Environmental has proposed a more detailed project concept that could be utilized if the overall number of concepts produced was reduced to just one per member agency (21 concepts vs. 42). C/CAG staff is requesting Committee member feedback on the desired approach in this regard. Attachment 3 provides the two project concept templates, one simplified and one more detailed, for Committee consideration.

The long-term goal of the SRP, in addition to developing a comprehensive countywide plan for managing stormwater runoff in San Mateo County, is to support C/CAG's member agencies in developing their GI Plans, as mandated by the Municipal Regional Permit. The GIS analyses and project screening and prioritization processes Paradigm Environmental is developing will feed directly into the same required efforts for the GI planning process. As such, C/CAG's member agencies should be well-positioned moving forward in meeting Municipal Regional Permit requirements for GI Plans.

Steve Carter with Paradigm Environmental will be providing a presentation that goes over all of the work to-date, including preliminary results of the screening and prioritization process. He is seeking input from the Stormwater Committee on the topics below:

- Major concerns with the screening process for identifying opportunities for stormwater capture projects and green infrastructure.
- Feedback on the process for prioritizing projects for the SRP and selection for candidates for developing concept documents.
- Decision on the number and detail of project concepts to be developed.
- General feedback on projects submitted by C/CAG member agencies for co-locating stormwater capture projects or green infrastructure.

ATTACHMENTS

1. Summary of Compiled Datasets and Projects
2. Preliminary Process for Identification and Prioritization of Stormwater Capture Projects and Green Streets
3. Mock Project Concepts (Simplified and Detailed Options)

To: Matt Fabry, PE, San Mateo Countywide Water Pollutant Prevention Program
From: Stephen Carter, PE, Paradigm Environmental
cc: Sandy Mathews, Larry Walker Associates
Date: 4/1/2016
Re: Summary of Compiled Datasets

1 INTRODUCTION

The Countywide Storm Water Resource Plan (SWRP) provides an ideal opportunity for C/CAG to proactively plan for future requirements of the Municipal Regional Permit (MRP) while providing essential information needed to explore funding needs and opportunities and Proposition 1 grants for project implementation. The development of the SWRP requires extensive compilation, review, and analysis of numerous datasets obtained from a variety of sources.

On February 29th, 2016, the San Mateo Countywide Water Pollution Prevention Program requested datasets from various agencies, and Paradigm is in the process of reviewing these data and analyzing various watershed characteristics to inform the planning process. The request was sent to San Mateo County, all cities within the County, the Regional Water Quality Control Board, community groups, and several consultants. The information requested was grouped into two major categories which included (1) GIS or other spatial data, and (2) candidate project information. The following sections of this memo are organized around these two categories of data.

2 GIS DATA

This section summarizes the collected GIS datasets that pertain to the San Mateo County. Two subsections organize this discussion based on datasets that were publicly available online (Section 2.1) and datasets that were obtained directly from each jurisdiction (Section 2.2).

2.1 Publicly Available Datasets

To assist with the development of the SWRP, publicly available local and regional datasets were downloaded to provide necessary background information on the hydrology, water quality issues, and planning efforts throughout the County. GIS data that would support model development and identification of project opportunities throughout the County were also obtained. Organizations such as the Oakland Museum, California Department of Forestry and Fire Protection, United States Geologic Survey (USGS), and the California Department of Water Resources were useful sources of hydrologic data for the County. Water quality data for local waterbodies, such as 303(d) impaired waters, was obtained from the United States Environmental Protection Agency (EPA). Most of the planning and administrative datasets were obtained from the San Mateo County Online GIS Enterprise, with supplemental data downloaded from the Association of Bay Area Governments (ABAG). GIS data obtained from online sources are presented in Table 1 in Attachment A.

2.2 Requested Datasets

While a wide range of data are available online, several GIS datasets were specifically requested from each jurisdiction. For the development of the stormwater capture model and green infrastructure project concepts, higher resolution datasets will be required. While several county-wide datasets discussed in the previous section create a foundation for a regional database, cities and other local entities typically have more detailed information that will supplement and enhance the downloaded datasets. The types of datasets received generally fall into three broad categories describing the type of information and potential use in developing the SWRP:

- *Physical Characteristics:* Local soils, land use, topography, and impervious cover datasets were requested to supplement regional datasets for use in the development of hydrologic response units (HRU) and other foundational elements derived for the stormwater capture model.
- *Infrastructure:* Additional GIS data containing locations, geometry, and attribute data for infrastructure, such as sidewalks, streets, buildings, public utilities and facilities were requested and will be used to inform the development of project concepts and green infrastructure planning efforts.
- *Political & Administrative:* Planning datasets such as General Plan land uses, special planning area boundaries, housing opportunity sites, and planned improvements were also requested and will be considered for use during project prioritization and green infrastructure planning efforts.

A summary of datasets received directly from individual jurisdictions is provided in Attachment A (Table 2).

3 PROJECT DATA

In addition to GIS data that helps to characterize watersheds in the County, information on planned projects within the various jurisdictions was requested to identify projects with opportunities for co-locating stormwater capture projects. Co-locating stormwater capture projects with other infrastructure improvements increases opportunities for cost-sharing and maximizes multiple benefits achieved by a single project. This section outlines projects that will be considered for co-location during the prioritization of stormwater capture projects for the SWRP. Two subsections organize this discussion based on survey responses from each jurisdiction (Section 3.1) and a list of planned projects associated with the “Safe Routes to School” program (Section 3.2).

3.1 Project Data Survey

A survey was conducted to provide each jurisdiction within the County an opportunity to identify potential project for co-location of stormwater capture projects. The following information was requested for each submitted project: project name and description, location, sponsoring agency, main contact for the project, and multi-benefits received from each planned project. Of cities and agencies surveyed, responses were received from 10 jurisdictions which included a total of 60 projects for consideration. The jurisdictions that provided input for potential co-located projects are the County of San Mateo, Atherton, Belmont, Burlingame, Half Moon Bay, Menlo Park, Redwood City, San Carlos, City of San Mateo, and South San Francisco. The list will be reviewed to identify projects that represent ideal opportunities for co-locating with stormwater capture projects. Projects

for which locations were provided are shown in Figure 1. A summary of responses to the survey is presented in Attachment B (Table 3).

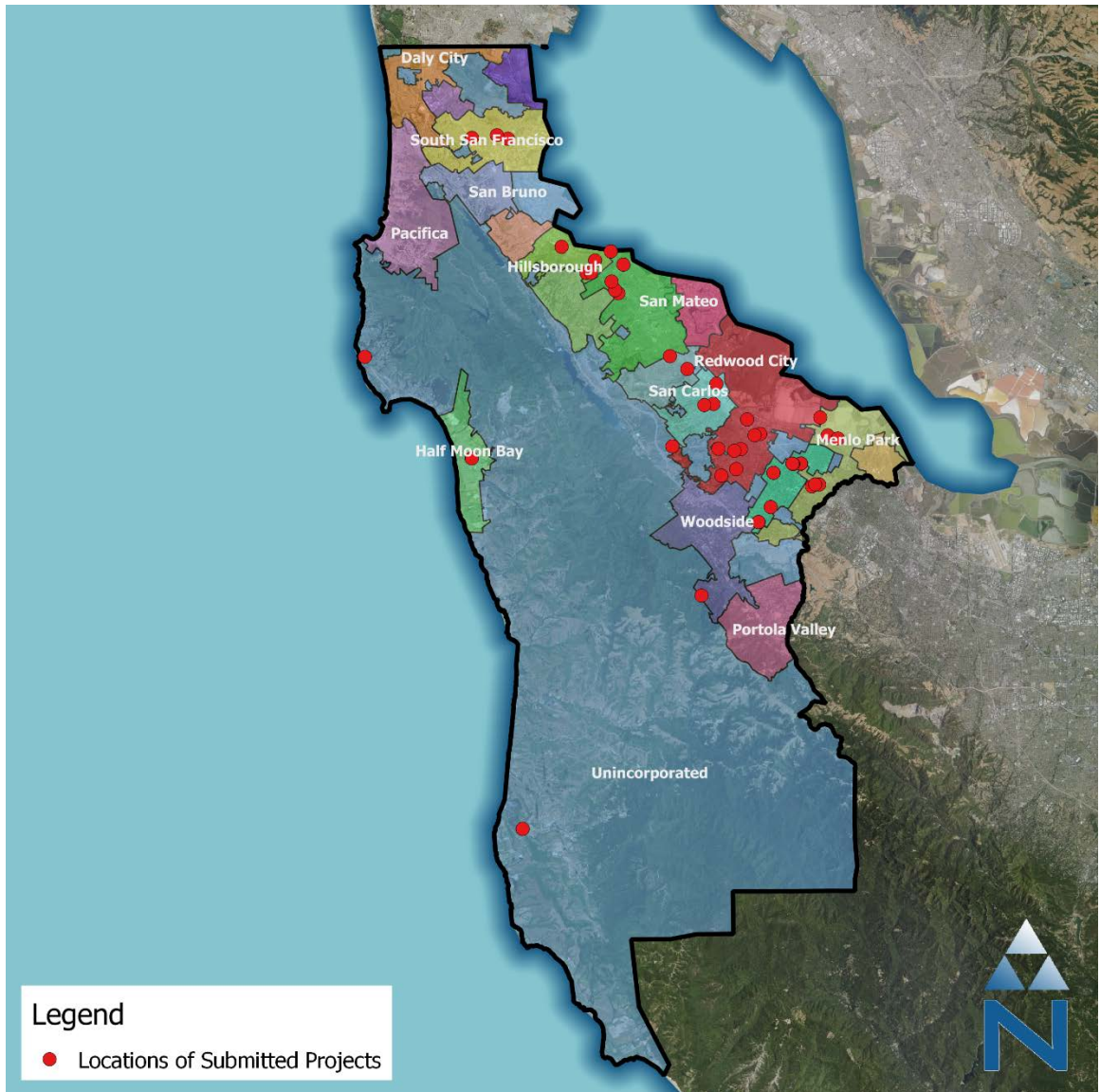


Figure 1. Locations of Submitted Projects.

3.2 Safe Routes to School Program

The Safe Routes to School Program is a coordinated effort from the San Mateo County Office of Education and C/CAG to encourage school children to walk and bicycle to school by implementing projects that improve safety and reduce traffic and emissions associated with school-related travel. Walk audits supported by C/CAG identified areas throughout the County that would benefit from infrastructure improvements, such as new crosswalks, curb extensions, sidewalks, and curb ramps. These types of improvements also present opportunities to include green streets that will serve to improve drainage characteristics in addition to many other benefits. Locations of each of the infrastructure improvements are shown in Figure 2. A list of projects identified from the walk audits is presented in Attachment B (Table 4). This information will be considered during the prioritization of stormwater capture projects for the SWRP.

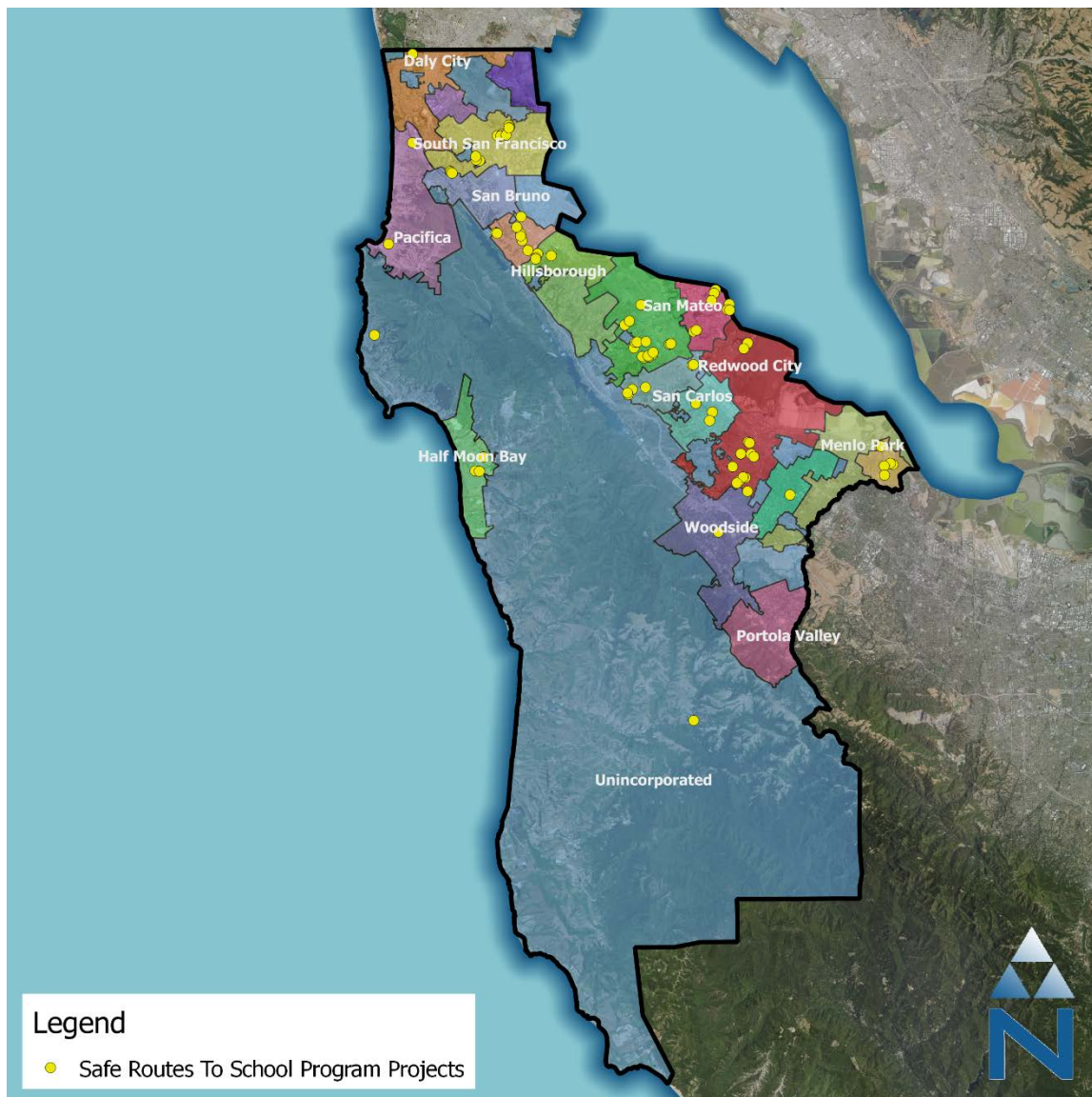


Figure 2. Location of Safe Routes to School Program Improvements.

ATTACHMENT A: SUMMARY OF GIS DATASETS

Table 1. Summary of GIS Datasets Obtained from Publicly Available Sources

Layer	Category	Description	Source	Website
Neatline.shp	Other	Map boundary	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SF_Combined_sewer.shp	Infrastructure	San Francisco's combined sewer system, including underground drains, tunnels, force mains, transport storage structures, and transport/storage tunnels	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SF_CSDischarge.shp	Infrastructure	San Francisco combined sewer discharge points	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SF_wastewater_outfall.shp	Infrastructure	San Francisco wastewater treatment plant outfall	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SF_wastewater_plant.shp	Infrastructure	San Francisco wastewater treatment plant	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_Artificial_water.shp	Hydrology	Artificial water bodies	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_flownetwork_.shp	Hydrology	Modern flow network including creeks, engineered channels, and underground culverts & storm drains	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_Historical_Beach.shp	Hydrology	Historical beach sand	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_Historical_Creek.shp	Hydrology	Historical creeks that are presently buried or drained, location: well located, uncertain	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_Historical_Freshwater_Marsh.shp	Hydrology	Freshwater marsh, circa 1850	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_Historical_Lake.shp	Hydrology	Historical lakes that are presently buried or drained	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_Historical_Shoreline.shp	Hydrology	Historical bay shoreline, circa 1850	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_Historical_Slough.shp	Hydrology	Historical tidal sloughs	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_Historical_Tidal_Marsh.shp	Hydrology	Tidal marsh, circa 1850	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html

Layer	Category	Description	Source	Website
SFP_Historical_Tidal_Marsh_Still_Present	Hydrology	Historical tidal marsh still present	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_Historical_Willow_Grove.shp	Hydrology	Willow groves, circa 1850	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_Natural_Lake.shp	Hydrology	Modern natural lakes	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_Pier	Infrastructure	Piers in the San Francisco Bay	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_Tidal_marsh_post_1850.shp	Hydrology	Tidal marsh that formed post-1850	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SFP_watershed.shp	Hydrology	Watershed areas including bay fill	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Daly_city.tif	Elevation / Topo	USGS 7.5-minute topographic maps – Portions of San Francisco South (1993), and Hunters Point (1997)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
San_fran.tif	Elevation / Topo	USGS 7.5-minute topographic quadrangle maps – Portions of Point Bonita (1997), San Francisco North (1999), Hunters Point (1997), and San Francisco South (1993) quadrangles	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
San_Mateo.tif	Elevation / Topo	USGS 7.5-minute topographic maps – Portions of San Mateo (1993), Redwood Point (1993) and Montara Mountain (1997) quadrangles	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Artificial_marsh.avl	Hydrology	Modern Artificial marsh (artificial_marsh_sp3nad83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Artificial_water.avl	Hydrology	Artificial water bodies (artificial_water_sp3nad83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Bays_or_sloughs.avl	Hydrology	Water boundary for major sloughs and the San Francisco Bay (bays_or_sloughs_SP3NAD83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Modern_distributary_points.avl	Infrastructure	Creek distributary points both natural and engineered (modern_distributary_pointsSP3NAD83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Flood_control_channel.avl	Infrastructure	Flood control channel polygons (Flood_control_channels_SP3NAD83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
SCV_flownetwork_.avl	Hydrology	Modern flow network including creeks, engineered channels, and underground culverts & storm drains (SCV_flownetwork_SP3nad83feet_v1_1.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Historical_Creeks.avl	Hydrology	Historical creeks that are presently buried or drained, location well located, uncertain, or ephemeral (historical_creek_sp3nad83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html

Layer	Category	Description	Source	Website
Historical-distributary-points.avl	Infrastructure	Historical Creek distributary points (Historical_distributary_points_SP3NAD83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Historical-Marsh.avl	Hydrology	Historical freshwater marshes (historical_tidalmarsh_sp3nad83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Historical-Tidal-Marsh.avl	Hydrology	Tidal marsh, circa 1850 (historical_tidal_marsh_sp3nad83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Historical-Willow-Groves.avl	Hydrology	Willow groves, circa 1850 (historical_willowgroves_sp3nad83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Lake-circa-1850.avl	Hydrology	Lake, circa 1850 (lake_circa_sp3nad83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Modern_fw_marsh.avl	Hydrology	Modern freshwater marsh (modern_fw_marsh_sp3nad83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Neatline.avl	Hydrology	Map boundary (neatline_sp3nad83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Neatline_buffer.avl	Hydrology	Map boundary buffer (neatline_buffer_sp3nad83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Tidal-marsh-post-1850.avl	Hydrology	Tidal marsh, that formed post-1850 (tidal_marsh_post1850_sp3nad83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
Watersheds.avl	Hydrology	Watershed boundaries (watersheds_sp3nad83feet.shp)	Oakland Museum	http://explore.museumca.org/creeks/GIS/index.html
I08_B118_CA_GroundwaterBasins.shp	Hydrology	Groundwater basins	Department of Water Resources	http://www.water.ca.gov/gro undwater/bulletin118/gwbasi ns.cfm
calw221_hrAnno any	Other	Annotation boxes for hydrologic regions	CalWater	http://frap.cdf.ca.gov/data/frapgisdata-sw-calwater_download
calw221_huc_8 any	Hydrology	Federal 8-digit Hydrologic Unit Code	CalWater	http://frap.cdf.ca.gov/data/frapgisdata-sw-calwater_download
calw221_hr any	Hydrology	Hydrologic regions	CalWater	http://frap.cdf.ca.gov/data/frapgisdata-sw-calwater_download
calw221 any	Hydrology	CalWater 2.2.1 watersheds	CalWater	http://frap.cdf.ca.gov/data/frapgisdata-sw-calwater_download

Layer	Category	Description	Source	Website
OW_303d_list_epsg3310.shp	Hydrology	EPA 303(d) impaired waters	EPA	http://www.epa.gov/waterdata/waters-geospatial-data-downloads
CITY.shp	Administrative	City boundaries	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
COUNTY_BOUNDARY.shp	Administrative	County boundary	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
ACTIVE_PARCELS_ADDRESS.shp	Administrative	Parcels with known addresses	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
ACTIVE_PARCELS_ALL.shp	Administrative	All parcels within San Mateo County	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
APN.dbf	Administrative	Assessor's parcel number database	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
STREETS.shp	Infrastructure	Streets	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
CONTOURS.shp	Elevation / Topo	20-ft contours	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
LAKES.shp	Hydrology	Inland lakes	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
OCEAN_BAY.shp	Hydrology	Ocean and San Francisco Bay water bodies	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
STREAMS.shp	Hydrology	Streams	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
LANDMARKS.shp	Infrastructure	Landmarks such as schools, parks, police and fire stations, public buildings, etc.	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/

Layer	Category	Description	Source	Website
ROW_2006.shp	Administrative	Rights-of-Way (updated 2006)	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
SFO_SCHEMATIC.shp	Administrative	Schematic of San Francisco International Airport (SFO)	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
ZIPCODES.shp	Administrative	Zipcode areas	San Mateo County (website)	http://gis.co.sanmateo.ca.us/gisdata/
General_Plan_Land_Use.shp	Administrative	General Plan land use	San Mateo County (website)	http://maps.smcgov.org/planning/
Sewer_Maintenance_County.shp	Administrative	County-administered sewer maintenance districts	San Mateo County (website)	http://maps.smcgov.org/planning/
Water_Districts.shp	Administrative	Water districts in SMC	San Mateo County (website)	http://maps.smcgov.org/planning/
Water_Supply.shp	Administrative	Water supply service areas	San Mateo County (website)	http://maps.smcgov.org/planning/
NHD_1805_San_Francisco_Bay_HU4.gdb	Hydrology	NHD flowlines	USGS	http://nhd.usgs.gov/
12sm.shp	Other	Land use survey	Department of Water Resources	http://www.water.ca.gov/landwateruse/lusrvymain.cfm
PriorityDevelopmentAreas_current.shp	Administrative	Priority Development Areas	ABAG	http://gis.abag.ca.gov/gisdata.html

Table 2. Summary of GIS Datasets Received from Various Jurisdictions

Layer	Category	Description	Source
San_Mateo_County_Catchments_9_9_14.shp	Hydrology	Catchments	San Mateo County WPPP
SMU_Outfalls_20131008.shp	Infrastructure	Outfalls	San Mateo County WPPP
SMU_StormDrains_20131008.shp	Infrastructure	Storm drains	San Mateo County WPPP
San_Mateo_Ksat_Total_MRP.shp	Other	Infiltration rate of saturated soils	San Mateo County WPPP
NonVacant_Dev_Sites.shp	Administrative	Non-vacant potential housing sites from 2010 Housing Element Project	County of San Mateo
Vacant_Sites.shp	Administrative	Vacant potential housing sites from 2010 Housing Element Project	County of San Mateo
Streets.shp	Infrastructure	Streets (County only) with detailed street characteristics	County of San Mateo
SWR_MAINS.shp	Infrastructure	County-owned sewer mains	County of San Mateo
Underground_Projects.shp	Infrastructure	Locations of underground projects in County	County of San Mateo
GIS_ADMIN.DPW_PARKING_STRIP_STATIC.shp	Infrastructure	Location of parking strips within the County	County of San Mateo
North_County_Mosaic.tif	Elevation/Topo	LiDAR data for northern half of County	County of San Mateo
South_County_Mosaic.tif	Elevation/Topo	LiDAR data for southern half of County	County of San Mateo
BelmontCityLimits.shp	Administrative	Belmont city boundary	Belmont
Medians.shp	Infrastructure	Street medians within City of Belmont	Belmont
Parcels_Zoning_LandUse.shp	Administrative	Parcels in Belmont with zoning and land use data	Belmont
PublicFacilities.shp	Infrastructure	Location of public parks, buildings, etc. in Belmont	Belmont
Sidewalks.shp	Infrastructure	Sidewalks with condition information	Belmont
StreetCenterlines.shp	Infrastructure	The location of street centerlines to supplement ROW data	Belmont
StreetSurface	Infrastructure	Elevation of street surfaces	Belmont
Building_Footprints.shp	Infrastructure	Building footprints in Burlingame	Burlingame
FEMA_Zones_2012.shp	Hydrology	Flood zone designations from FEMA 2012	Burlingame
General_Plan_Landuse.shp	Administrative	General Plan Land Use in Burlingame	Burlingame
Landmarks.shp	Infrastructure	Landmark locations Burlingame	Burlingame
metered_parking.shp	Infrastructure	Public metered parking lots	Burlingame
Parcels.shp	Administrative	Parcel data (same as County Assessor's)	Burlingame

Layer	Category	Description	Source
Planimetric.shp	Infrastructure	Sidewalk and planter strip data	Burlingame
Streets.shp	Infrastructure	Detailed street information in Burlingame	Burlingame
Zoning.shp	Administrative	Zoning in Burlingame	Burlingame
MP_Data.mdb	Other	Access database with Downtown plan, General Plan, Parks, streets, trees, Zoning, and other planning areas	Menlo Park
BikeRoutes.shp	Infrastructure	Bike routes	Redwood City
GeneralPlan2010.shp	Administrative	General Plan 2010	Redwood City
Parks.shp	Infrastructure	Public parks	Redwood City
PrecisePlans.shp	Administrative	Precise plans	Redwood City
Roads.shp	Infrastructure	Road line shapefiles	Redwood City
Schools.shp	Infrastructure	School parcels	Redwood City
Sidewalks.shp	Infrastructure	Sidewalks with condition information	Redwood City
StormDrainInlets.shp	Infrastructure	Storm drain inlets	Redwood City
StormDrainMains.shp	Infrastructure	Storm drain mains	Redwood City
StormDrainManholes.shp	Infrastructure	Storm drain manholes	Redwood City
StormDrainPumpStations.shp	Infrastructure	Storm drain pump structures	Redwood City
Trees.shp	Other	Tree coverage in Redwood City	Redwood City
Zoning.shp	Administrative	Zoning in Redwood City	Redwood City
COMMON_COUNTY_AERIALS_2014_9INCH.lyr	Elevation/Topo	Aerial imagery at 9-inch resolution	San Carlos
CURRENTPCICONDITIONLINE.shp	Infrastructure	Condition of pavements in San Carlos	San Carlos
ROW.shp	Administrative	Rights-of-way	San Carlos
SanCarlos_City_Boundary.shp	Administrative	City boundary	San Carlos
SanCarlos_Parcels.shp	Administrative	Parcels	San Carlos
Streets.shp	Infrastructure	Public street information in San Carlos	San Carlos
Streets_Private.shp	Infrastructure	Private streets	San Carlos
SanCarlos_Zoning.shp	Administrative	Zoning	San Carlos
PARCELS.shp	Administrative	Parcels in San Mateo	San Mateo

Layer	Category	Description	Source
ROW.shp	Administrative	Rights-of-way	San Mateo
SM_Facilities	Infrastructure	Public facilities	San Mateo
SM_Sidewalks.shp	Infrastructure	Sidewalks with condition information	San Mateo
STREETS.shp	Infrastructure	Streets with characteristics	San Mateo
bicycle_facshp	Infrastructure	Bicycle lanes	South San Francisco
generalplan.shp	Administrative	General Plan	South San Francisco
publicfacilities.shp	Infrastructure	Public facilities	South San Francisco
street_centerlines.shp	Infrastructure	Street centerlines to supplement rights-of-way data	South San Francisco
trails1.shp	Infrastructure	Trails	South San Francisco
trails2.shp	Infrastructure	Trails	South San Francisco
trails3.shp	Infrastructure	Trails	South San Francisco
trees.shp	Other	Tree coverage	South San Francisco
zoning.shp	Administrative	Zoning	South San Francisco

ATTACHMENT B: SUMMARY OF POTENTIAL CO-LOCATED PROJECTS

Table 3. Project Information from Survey Responses

No.	Submitted by	Project Title	Address	Project Type			Multiple Benefits					
				LID	Regional	Green Street	Flood Control	Stormwater Capture	Stormwater Treatment	Groundwater Recharge	Community Enhancement	Other (Describe)
1	County of San Mateo	Skylonda Fire Station	17290 Skyline Blvd, Woodside, CA 94062	•				•	•			
2	County of San Mateo	Pescadero Fire Station	1200 Pescadero Ck Rd, Pescadero, CA 94060	•				•	•			
3	County of San Mateo	Animal Shelter	12 Airport Blvd, San Mateo, CA 94401	•				•	•	•		
4	County of San Mateo	Cordilleras Replacement Project	200 Edmonds Rd. Redwood City, CA 94062	•		•	•	•	•		•	
5	County of San Mateo	CEDAR EOC	501 Winslow St. Redwood City, CA 94063	•					•			
6	County of San Mateo	Tower Road Radio Shop	Tower Rd Campus, San Mateo, CA 94402	•					•			
7	County of San Mateo	Carlos Street Green Infrastructure Project	Carlos St (California Ave to Virginia Ave) in Moss Beach	•				•	•			
8	Atherton	Las Lomas Detention Basin	273 Alameda de Las Pulgas, Atherton, CA 94027		•		•	•	•	•	•	Educational and recreational opportunities in cooperation with LLESD

No.	Submitted by	Project Title	Address	Project Type			Multiple Benefits						
				LID	Regional	Green Street	Flood Control	Stormwater Capture	Stormwater Treatment	Groundwater Recharge	Community Enhancement	Other (Describe)	
9	Atherton	Holbrook-Palmer Park Detention Basin	150 Watkins Avenue, Atherton, CA 94027		•		•	•	•	•	•	•	Development of riparian habitat and integrate with trail in Park
10	Atherton	Holbrook-Palmer Park Seasonal Pond	150 Watkins Avenue, Atherton, CA 94027	•			•	•	•	•	•	•	Construct banks to act as natural amphitheater
11	Atherton	Civic Center Marsh	2 Dinklespiel Station Lane, Atherton, CA 94027	•		•	•	•	•	•	•	•	Provide demonstration project as an example for private development, and reuse water for irrigation
12	Atherton	Civic Center Green Streets	91 Ashfield Rd, Atherton, CA 94027			•	•	•		•			
13	Atherton	Upper Atherton Channel Slope Restoration	75 Reservoir Road, Atherton, CA 94027	•			•	•	•				Habitat restoration
14	Atherton	Upper Atherton Channel Streambed Restoration	75 Reservoir Road, Atherton, CA 94027	•	•		•	•	•				Habitat restoration
15	Atherton	Stockbridge Lane Green Street	Stockbridge Lane, El Camino Real to Selby Lane		•	•	•	•		•			
16	Belmont	Belmont Creek Watershed Project	Belmont, San Carlos, San Mateo		•		•	•			•		

No.	Submitted by	Project Title	Address	Project Type			Multiple Benefits					
				LID	Regional	Green Street	Flood Control	Stormwater Capture	Stormwater Treatment	Groundwater Recharge	Community Enhancement	Other (Describe)
17	Belmont	Davey Glen Storm Retention and Reuse Project					•	•				Stormwater reuse
18	Belmont	Ruth Avenue Green Street Project	Ruth Avenue, Belmont CA			•	•	•	•	•		
19	Burlingame	Burlingame Recreation Center	850 Burlingame Ave, Burlingame, CA 94010	•				•	•		•	Can serve as demonstration project and provide opportunities for education and outreach, especially for nearby high school.
20	Burlingame	City Municipal Corporation Yard	1361 N. Carolan Ave.	•			•	•	•		•	Can serve as demonstration project and provide opportunities for education and outreach.
21	Burlingame	Parking Lot H near El Camino and Ralston	El Camino Real and Ralston Ave.	•			•	•	•		•	Can serve as demonstration project and provide opportunities for education and outreach.

No.	Submitted by	Project Title	Address	Project Type			Multiple Benefits					
				LID	Regional	Green Street	Flood Control	Stormwater Capture	Stormwater Treatment	Groundwater Recharge	Community Enhancement	Other (Describe)
22	Burlingame	Parking Lot K near El Camino and Burlingame Avenue	El Camino Real and Burlingame Ave.	•			•	•	•		•	Can serve as demonstration project and provide opportunities for education and outreach.
23	Burlingame	Parking Lot G near Primrose and Howard	Primrose Rd. and Howard Ave.	•			•	•	•		•	Can serve as demonstration project and provide opportunities for education and outreach.
24	Half Moon Bay	Regency Group Shopping Center Storm Capture Device	Hwy 1/Hwy 92 near Pilarcitos Creek					•	•			
25	Half Moon Bay	Citywide Sidewalk Repairs	Various locations, Citywide				•				•	Safety
26	Half Moon Bay	Storm Drain Master Plan	Various locations, Citywide	•	•	•	•	•	•	•	•	
27	Half Moon Bay	Citywide Pavement Management System	Various locations, Citywide								•	Safety
28	Half Moon Bay	Stormwater Program (MRP)	Various locations some residential, some public projects	•			•	•	•	•		

No.	Submitted by	Project Title	Address	Project Type			Multiple Benefits					
				LID	Regional	Green Street	Flood Control	Stormwater Capture	Stormwater Treatment	Groundwater Recharge	Community Enhancement	Other (Describe)
29	Menlo Park	Stormwater / Groundwater Reuse Facility	Vicinity of 151 Commonwealth Dr. Menlo Park, CA 94025	•			•	•	•		•	
30	Menlo Park	Chilco Street Improvements - North	North side of Chilco St. between Bayfront Expressway and Terminal Ave. Menlo Park, CA 94025	•		•	•	•	•	•	•	
31	Menlo Park	Chilco Street Improvements - South	South side of Chilco St. between Bayfront Expressway and Terminal Ave. Menlo Park, CA 94025	•		•	•	•	•	•	•	
32	Menlo Park	Parking Plaza 7 Renovation	Santa Cruz Ave. between Chestnut and Curtis Streets Menlo Park, CA 94025	•			•	•	•	•	•	
33	Menlo Park	Downtown Streetscape Improvements	Downtown Menlo Park, CA 94025	•		•	•	•	•	•	•	
34	Menlo Park	Downtown Outdoor Seating Program	Downtown Menlo Park, CA 94025	•		•	•	•	•	•	•	
35	Menlo Park	Caltrain Bike/Pedestrian Undercrossing	Alma St. west of Burgess Dr. Menlo Park, CA 94025	•		•	•	•	•	•	•	
36	Menlo Park	El Camino Real Corridor Study & Design Implementation	El Camino Real between Sand Hill Rd. and Alejandra Ave. Menlo Park, CA 94025	•		•	•	•	•	•	•	
37	Menlo Park	Sidewalk Repair Program	Citywide	•		•	•	•	•	•	•	

No.	Submitted by	Project Title	Address	Project Type			Multiple Benefits					
				LID	Regional	Green Street	Flood Control	Stormwater Capture	Stormwater Treatment	Groundwater Recharge	Community Enhancement	Other (Describe)
38	Menlo Park	Street Resurfacing Program	Citywide	•		•	•	•	•	•	•	
39	Redwood City	Middlefield Streetscape Project	Middlefield Road, Main Street to Woodside Road, Redwood City CA			•		•	•		•	
40	Redwood City	Kennedy Safe Routes to School Project	Vicinity of 2521 Goodwin Avenue, Redwood City			•		•	•			
41	Redwood City	Bayfront Canal & Atherton Channel Improvement Project	1600 Marsh Road, Menlo Park 94025		•		•	•				Habitat restoration
42	Redwood City	Red Morton Armory Play Picnic Area Renovation	1120 Roosevelt Ave, Redwood City, CA 94061	•				•	•	•	•	
43	Redwood City	National Guard Armory Exterior Improvements	739 Valota Rd, Redwood City, CA 94061	•				•	•	•	•	
44	Redwood City	Brewster Water Tank Undergrounding	Intersection of Brewster Ave and Upland Road, Redwood City CA	•				•	•	•	•	
45	Redwood City	Community Garden - Maple & Lathrop	Intersection of Maple Street and Lathrop St, Redwood City CA	•				•	•	•	•	
46	Redwood City	Stulsaft Park Master Plan	3737 Farm Hill Blvd, Redwood City, CA 94061	•			•	•	•	•	•	

No.	Submitted by	Project Title	Address	Project Type			Multiple Benefits						
				LID	Regional	Green Street	Flood Control	Stormwater Capture	Stormwater Treatment	Groundwater Recharge	Community Enhancement	Other (Describe)	
47	San Carlos	US-101 Holly Street Bicycle and Pedestrian Overpass	N/A Overpass will connect E. San Carlos Ave with Skyway Rd	•		•		•	•			•	Reduced greenhouse gas emission, increased safety for everyone on the road, increased community connectivity
48	San Carlos	Rosewood and Elm Green Streets Project	Elm St and Rosewood between Brittan and Arroyo, Arroyo between Elm and Woodland, Brittan between Elm and Rosewood	•	•	•	•	•	•			•	Increased safety for drivers, pedestrians and bicyclists as the streets will be less flooded during rain events. Increased aesthetic appearance of these streets.
49	San Carlos	Downtown Green Alleys	Cowgill and Ortega alley. Cowgill is bounded in the north by Holly St and in the south by Eaton Street. Ortega alley is bounded in the north by Belmont Ave and in the south by Eaton	•	•	•	•	•	•			•	Increased safety for drivers on these alleyways. Increased aesthetic appearance of these alleyways

No.	Submitted by	Project Title	Address	Project Type			Multiple Benefits					
				LID	Regional	Green Street	Flood Control	Stormwater Capture	Stormwater Treatment	Groundwater Recharge	Community Enhancement	Other (Describe)
50	San Carlos	Elizabeth Street Pedestrian Walkway Green Improvements	Pedestrian walkway connecting Elizabeth Street and Orange Ave	•	•	•	•	•	•		•	Increased safety for pedestrians using the walkway, increased community connectivity, decreasing erosion in a hillside area by capturing more stormwater
51	San Mateo	San Mateo Drive Pedestrian and Bicycle Improvements Project	San Mateo Drive from Peninsula Ave to Baldwin Ave			•		•	•		•	
52	San Mateo	East Poplar Improvements	East Poplar from Bayshore to Cavanaugh			•		•	•		•	
53	San Mateo	Central Park Improvements	Central Park, City of San Mateo 30 South El Camino Real	•				•	•	•	•	
54	South San Francisco	SSF CalTrain Station/Plaza	Grand Avenue and Airport Blvd	•		•		•	•		•	
55	South San Francisco	Chestnut/ECR Development	Chestnut and El Camino Real	•		•		•	•		•	
56	South San Francisco	Sewer Replacement	Throughout SSF			•	•				•	
57	South San Francisco	Underground Electrical Replacement	Spruce Avenue (b/w Parkway Ave and Railroad Ave)			•					•	

No.	Submitted by	Project Title	Address	Project Type			Multiple Benefits					
				LID	Regional	Green Street	Flood Control	Stormwater Capture	Stormwater Treatment	Groundwater Recharge	Community Enhancement	Other (Describe)
58	South San Francisco	New Police Station	TBD	•				•	•		•	
59	South San Francisco	New Parks&Rec/Library Complex	TBD	•				•	•		•	
60	South San Francisco	Large Trash Caprute Device Installation				•			•		•	

Table 4. List of Infrastructure Improvements for the Safe Routes to School Program

Project Title	Project Description	Address
Audubon Elementary School	Consider curb extensions on north and east corners.	Egret Ave/Crane Ave Foster City
Audubon Elementary School	Consider curb extensions on both sides of crosswalk	833 Gull Ave Foster City
Bowditch Middle School	Consider curb extensions on both ends of crosswalk	Beach Park Boulevard/Tarpon Street, Foster City
Bowditch Middle School	Consider curb extensions on both ends of crosswalk	Swordfish Street/Haddock Street, Foster City
Bowditch Middle School	Consider curb extensions on both ends of crosswalk	Beach Park Boulevard/Swordfish Street, Foster City
Brewer Island Elementary School	Consider curb extensions on both sides of crosswalk	Niantic Drive Foster City
Foster City Elementary School	Provide pedestrian signal on Edgewater Blvd for proposed crosswalk	Edgewater Boulevard, Foster City
Foster City Elementary School	Consider curb extension on northeast corner of intersection	Castor Street/Beach Park Boulevard, Foster City
Foster City Elementary School	Provide wider pedestrian waiting areas	Beach Park Boulevard/Edgewater Boulevard, Foster City
Franklin Elementary School	Consider bulb-outs at the southeast, southwest, and northeast corners to improve pedestrian visibility and reduce crossing distance	Trousdale / Quesada, Burlingame
Franklin Elementary School	Consider a modern roundabout in concert with a road diet on Trousdale Road	Trousdale / Quesada, Burlingame

Project Title	Project Description	Address
Franklin Elementary School	Consider installing high-visibility crosswalk on north leg of Trousdale Road with corner bulb-outs and RRFB	Trousdale / S. Ashton, Burlingame
Franklin Elementary School	Long-term improvement: Consider bulb-outs at all four corners	Castenada / Trousdale, Burlingame
Lincoln Elementary School	Consider reconfiguring park to provide a separated parking lot with parking aisle separated from sidewalk	Ray Park, Burlingame
Cabrillo Elementary School	Install curb extensions at the intersection with Crespi Drive; enough space could be reclaimed to install a small pocket park or rain garden; install high-visibility crosswalk.	De Solo Drive, Pacifica
Sunset Ridge Elementary	Curb extensions on Cataline Avenue	Hickey Boulevard/Catalina Avenue, Pacifica
Costano Elementary School	Work with the Bay Area Water Supply and Conservation Agency to construct a new access point from Purdue Avenue. Provide a wide (~14') walking/biking path with a landscape buffer and marked crosswalk	Hetch Hetchy Easement Driveway/Purdue Ave Realignment, EPA
Costano Elementary School	Consider full diversion of NB traffic at north leg of (existing) school driveway/Purdue Ave or installing a traffic circle at Purdue/Fordham	Purdue Ave/Fordham St Traffic Calming, EPA
East Palo Alto Charter Elementary	Consider paving dirt area and striping to facilitate circulation, provide additional loading zone and parking stalls.	School Parking Side/Rear Parking Lot, Runnymede Street EPA
East Palo Alto Charter Elementary	Construct curb extensions and bi-directional curb ramps on all corners, potentially in combination with modern mini-roundabout	Runnymede Street at Pulgas Street, EPA
Phoenix Academy Charter High School	Construct curb extension and bi-directional curb ramps on north-east corner	Clarke Ave/Garden St, EPA

Project Title	Project Description	Address
Ravenswood Tri-School Campus	Construct redesign of the school frontage/parking lot to improve loading and non-motorized access, ensure width of Clarke Avenue for Class II lanes	Clarke Ave/Brentwood Load Zones, EPA
Lomita Park Elementary School	Curb extensions on south and west corners	San Anselmo Ave/San Juan Ave, Millbrae
Meadows Elementary School	Curb extensions on both corners of the intersection	Mosswood Lane/Helen Drive, Millbrae
Meadows Elementary School	Curb extensions on both corners of the intersection	Banbury Lane/Helen Drive, Millbrae
Taylor Middle School	Construct curb extension on the southwest corner	Richmond Drive/Laurel Ave, Millbrae
Taylor Middle School	Construct curb extension on south corner	Alemenar St/Taylor Blvd, Millbrae
Taylor Middle School	Convert roadway to CCW one-way direction with an angled parking inside lane, one through lane, and an outside lane for school loading.	Lincoln Circle, Millbrae
Spring Valley Elementary School	Construct curb extensions with curb ramps on each corner to square up the skewed intersection	Murchison Drive/Ashton Way, Millbrae
Central Middle School	Evaluate the feasibility of reducing curb radii at north, east, and south corners of intersection	Cedar Street/Arroyo Ave, SC
Central Middle School	Trim vegetation at 2132 Brittan Ave blocking the beacon, consider replacing existing substandard beacon with RRFB, consider constructing curb extensions at crossing	Tamarack Ave/Greenwood Ave/Brittan Ave, SC
John Gill Elementary School	Road diet project for Jefferson Avenue	Jefferson Ave Road Diet, SC
John Gill Elementary School	Constructing curb extension in eastern corner to reduce curb radius and reduce crossing distance on Jefferson. Curb extension cannot obstruct storm drain on Hawes Street.	Jefferson Ave/Hawes St, SC
Roosevelt School	Reduced curb extensions in the NE and SW corner to facilitate SamTrans bus operations	Vera Ave/Alameda DLP, SC
Sacred Heart Schools	Close free right turn and create mini park with walkway	Elena Ave/Faxon Rd, Atherton
Fox Elementary	Construct curb extensions on NE and SE corners of intersection	Benson Way/St James Rd, Belmont
Fox Elementary	Construct curb extension on the SE corner of intersection	Ralston Ave/Hallmark Drive, Belmont

Project Title	Project Description	Address
Fox Elementary	Repave and widen existing pathways, reconstruct stairway below the school ate, trim vegetation on sections of pathways.	Pedestrian Parkways, Belmont
Nesbit Elementary School	Remove vegetation on median in parking lot	Front Parking Lot, Belmont
Nesbit Elementary School	Construct curb extension on the SE corner of intersection	Hiller Street/Biddulph Wy, Belmont
Ralston Middle School	Widen sidewalk on south side of Ralston Ave from Parking Lot to Davis Drive. Trim vegetation along sidewalk	Ralston Ave/Davis Dr, Belmont
Sandpiper Elementary	Construct median pedestrian island in landscaped median	Redwood Shores Parkway/Seastorm Drive, Redwood Shores
Sandpiper Elementary	Construct sidewalk on the south side of Redwood Shores Parkways from Waterside Circle to Egret Lane	Redwood Shores Parkway/Westside Circle, Redwood Shores
La Honda Elementary	Install a sidewalk along the east side of Entrada Way. Alternatively, move informal pedestrian path from west side of the road to east side.	Entrada Way, La Honda
Monte Verde Elementary	Add curb bulb-outs, widen crosswalk, and replace curb ramps with directional ramps	Shannon Dr/Turnberry Dr, SSF
Monte Verde Elementary	Add curb bulb-out and red curb to improve visibility	Shannon Dr/Saint Cloud Dr, SSF
Monte Verde Elementary	Add curb bulb-out and red curb to improve visibility	Shannon Dr/Orrey Wy, SSF
Ponderosa Elementary	Add sidewalks on north side	Country Club Dr, SSF
Ponderosa Elementary	Add sidewalk	Constitution Way, SSF
Ponderosa Elementary	Add sidewalk	Ponderosa Rd/Lassen St, SSF
Hatch/Cunha School	Add curb extension, median improvements	Cabrillo Hwy/Kelly Ave, HMB
Hatch/Cunha School	Add curb extension	Church St/Kelly St, HMB
Kennedy Middle School	Consider modern roundabout	Alameda DLP/Maddux Dr, RWC

Project Title	Project Description	Address
Kennedy Middle School	Add curb extensions for all crosswalk entrances	Goodwin Ave/Maddux Dr, RWC
Kennedy Middle School	Add curb extension on both sides of crosswalks, consider median pedestrian refuge on east side of intersection	Connecticut Ave/Washington Ave, RWC
Kennedy Middle School	Add curb extension on both sides of crosswalk	Connecticut Ave/Oregon Ave, RWC
Abbott Middle School	Curb extensions should be installed on the north leg of the intersection	Alameda de Las Pulgas and 36th Avenue, SM
Abbott Middle School	Install "walk-through" median be installed north of the intersection	North of the intersection of Alameda de Las Pulgas and 36th Avenue, SM
Abbott Middle School	New sidewalk be installed	East side of Fernwood Street from Hillsdale Boulevard to 36th Avenue, SM
Abbott Middle School	Curb extensions be installed on the west leg of intersection	Hillsdale Boulevard and Fernwood, SM
Borel Middle School	Curb extensions be installed at the south leg of the intersection	Alameda de Las Pulgas and Barneson Avenue, SM
Borel Middle School	Curb extensions be installed on the west and south leg of the intersection	Barneson Avenue and Edinburgh Street, SM
George Hill Elementary	50-foot median be installed on the north and south legs	Curtiss Street and San Miguel Way, SM
George Hill Elementary	Curb extensions be installed on the east leg	San Miguel Way and Meadow Court, SM
Meadow Heights Elementary School	Curb extensions be installed at the intersection	28th Avenue and Mason Lane, SM
Meadow Heights Elementary School	Curb extensions should be installed on the north leg	Dolores Street and Sequoia Avenue, SM
Meadow Heights Elementary School	Curb extensions be installed at the south entrance of the school	South Entrance Driveway, Parkside Way, SM
Sunnybrae Elementary	Consider curb extensions on north and west corners of intersection	S. Delaware St/Birch Street, SM

Project Title	Project Description	Address
Green Hills Elementary School	Redesign parking lot to improve internal circulation.	Cypress Ct/Laurel Ave, Millbrae
Spruce Elementary School	Consider constructing a bulb-out at the southeast corner	Tamarack and Elm, SSF
Spruce Elementary School	Consider constructing a bulb-out on the east side of Spruce	Spruce Ave north of Driveway, SSF
Spruce Elementary School	Consider constructing bulb-outs at the northeast and southeast corners.	Spruce and Lux, SSF
Spruce Elementary School	Consider constructing bulb-outs at the driveway	Spruce / School Lot Driveway, SSF
Farallone View Elementary School	the sidewalk between the school driveway and the school frontage be widened to allow safer pedestrian activity. It is recommended that the sidewalk be constructed as 8 to 10 feet wide to allow for two-by-two passing of students and their parents	Le Conte Ave, Montara
Laurel Elementary School	Along the south frontage of the school, there is currently an underutilized area with low height vegetation and compacted dirt. It is recommended that this area could be better utilized as an opportunity area for school bus waiting, bike parking, other Safe Route to School activities, or maybe school education opportunities	36th Avenue, SM
Laurel Elementary School	Curb extensions should be installed on the north leg of the intersection	Alameda de Las Pulgas and 36th Avenue
Laurel Elementary School	Install "walk-through" median be installed north of the intersection	North of the intersection of Alameda de Las Pulgas and 36th Avenue, SM
Laurel Elementary School	Curb extensions should be installed on the north leg of the intersection	Hacienda Street and Winway, SM
Beresford Elementary School	Curb extensions should be installed on the north leg of the intersection	28th Avenue and Juniper Street, SM

Project Title	Project Description	Address
McKinley Institute of Technology and North Star Academy	Construct bulb-outs	Duane / Harrison, RWC
McKinley Institute of Technology and North Star Academy	Construct bulb-outs at the northwest and southwest corners of Jefferson / Cleveland with ADA-compliant curb ramps	Jefferson at Clinton and Cleveland, RWC
Adelante Spanish Immersion School	Consider constructing curb extensions in the NW and SE corners, aligning the curb with the existing crosswalks.	Fernside Street/Sterling Way, RWC
Hawes Community School	Construct curb extension in northern corner	Roosevelt Ave/Hudson St, RWC
Hawes Community School	Construct curb extensions in all corners	Oak Avenue/Hudson St, RWC
Woodside Elementary School	Provide new pathway through fire station, Improve pathway along south side of Add walkway near Woodside Road	Cedar Lane, Woodside
Half Moon Bay HS	Consider widening the existing sidewalk by cutting into the slope	Lewis Forest Drive/School Parking Lot, HMB
Martin Elementary	Consider constructing curb extensions.	Hillside Boulevard and Arden Avenue, SSF
Martin Elementary	Consider constructing curb extensions.	Hillside Boulevard and Belmont Avenue, SSF
Martin Elementary	Consider reconstructing both sides of the street to provide raised sidewalks, curbs, and gutters. Consider widening the north sidewalk to provide clear passage around the utility poles.	School Street from Hillside Boulevard to Olive Avenue, SSF
Martin Elementary	Consider studying drainage issues.	School Street and Olive Avenue, SSF
Westlake Elementary	Curb extensions should be installed on the east leg	Fieldcrest Drive and Westlawn Avenue, DC
Arundel School	Install mini-roundabout with mountable center island	Phelps Rd/Palm Ave, SC

To: Matt Fabry, PE, San Mateo Countywide Water Pollutant Prevention Program
From: Stephen Carter, PE, Paradigm Environmental
cc: Sandy Mathews, Larry Walker Associates
Date: 3/25/2016
Re: Preliminary Process for Identification and Prioritization of Stormwater Capture Projects and Green Streets

1 INTRODUCTION

The Countywide Storm Water Resource Plan (SWRP) provides an ideal opportunity for C/CAG to proactively plan for future requirements of the MRP while providing essential information needed to explore funding needs and opportunities and Proposition 1 grants for project implementation. Key to the SWRP will be a detailed characterization of the watersheds within the County and the opportunities and constraints to the implementation of stormwater capture projects. Paradigm has requested several datasets from various agencies and is in the process of reviewing these data and analyzing various watershed characteristics to inform the planning process.

The State Water Resources Control Board (SWRCB) has developed *Storm Water Resource Plan Guidelines* (Guidelines) to guide public agency SWRP development efforts and ensure individual stormwater and dry weather runoff capture projects included within the SWRP are eligible for bond funds (e.g., Proposition 1 grant funding). As part of these Guidelines, the SWRP must employ quantitative methods to identify and prioritize stormwater and dry weather runoff capture projects. Based on analysis of data compiled for the County, a preliminary process has been developed for project identification and prioritization that is summarized within this memorandum for C/CAG review. This process will result in a prioritized list of projects that will assist in the selection of high-priority projects to be considered for development of individual concept reports to accompany Proposition 1 grant proposals. However, as other tools are developed and additional analyses are performed throughout the project duration, additional quantitative methods will be used to strengthen the overall process and associated narrative for the SWRP. For example, the Guidelines suggest the quantification of stormwater capture volumes as a metric to be used in the project identification/prioritization process. A stormwater capture model is currently under development and therefore this metric cannot be used in the preliminary approach. Instead, surrogate indicators are used to gage each project's stormwater capture effectiveness, such as impervious areas addressed by the project and underlying soils that can influence infiltration at the project site. Once the stormwater capture model is completed it will be used to estimate project-specific stormwater capture volumes, which will be integrated within the process for incorporation in the SWRP.

Several assumptions are included within this preliminary process that will influence the identification and prioritization of projects for the SWRP. The goal of this memorandum is to summarize these assumptions for C/CAG review, and receive feedback on the process before it is initiated for the project.

2 SUMMARY OF DATASETS

This section summarizes collected and derived datasets that will be used in the screening and prioritization process. Two subsections organize this discussion based on natural/physical datasets (Section 2.1) and boundary/categorical datasets (Section 2.2).

2.1 Hydrologic Response Units

When creating a process for analyzing a watershed and identifying/prioritizing potential stormwater and dry weather runoff capture projects, the spatial representation of the landscape must include elements which most affect hydrology and pollutant transport. Natural hydrology is most affected by physical characteristics such as soil type, infiltration rate, and land segment slope. Hydrologic Soil Group categorizes soils based on drainage characteristics, with Group A consisting of well-drained soils and Group D consisting of poorly-drained soils. In the urban setting, other complicating factors such as impervious cover, urban irrigation, and artificial drainage networks are also important to consider. To begin the opportunity screening process, these essential characteristics were combined into a single representation of the landscape termed Hydrologic Response Units (HRUs).

For San Mateo County, the combination of impervious cover, hydrologic soil group, slope, and land use were used to define a set of HRUs for project identification and prioritization. This spatial layer also forms the basic foundation for characterizing the physical landscape in a watershed model, which will be developed for subsequent SWRP tasks as well as future efforts to address MRP requirements (e.g., Reasonable Assurance Analysis). Table 1 summarizes the four components of the HRUs and the source datasets used to derive each. Maps showing the spatial distribution of each of the 4 primary HRU components are presented as Figure 1 through Figure 4.

Table 1. Summary of HRU components and source data sets

Characteristic	Data Source	Approximate Source Date
Impervious Cover	National Land Cover Dataset (NLCD)	2011
Hydrologic Soil Group	National Resource Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO)	2016 ¹
Percent Slope	Derived from San Mateo County LiDAR Digital Elevation Model (DEM)	2010
Land Use	San Mateo County Assessor's Office Parcels	2014

1: NRCS SSURGO dataset was downloaded in March 2016

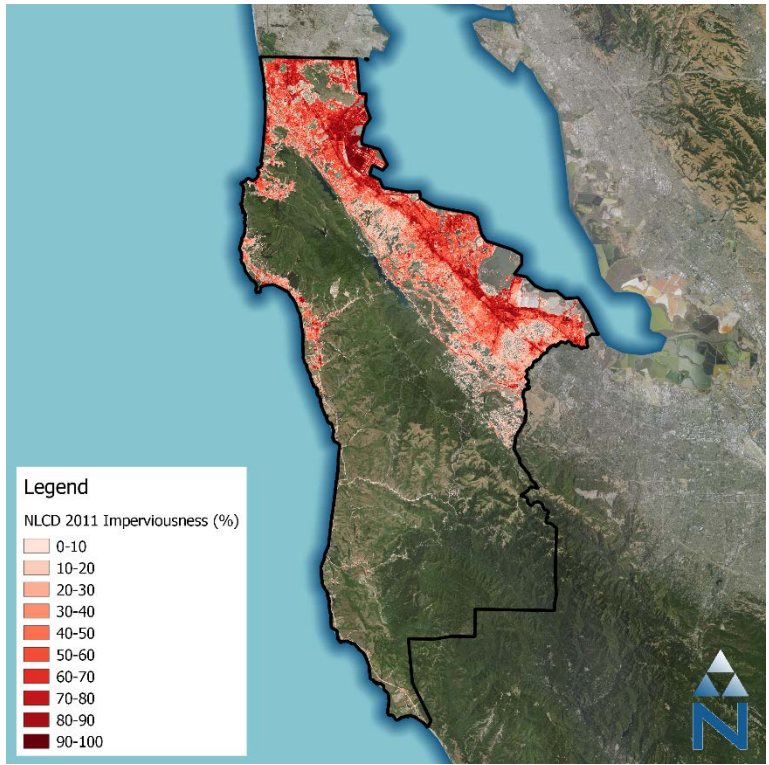


Figure 1. Impervious Cover

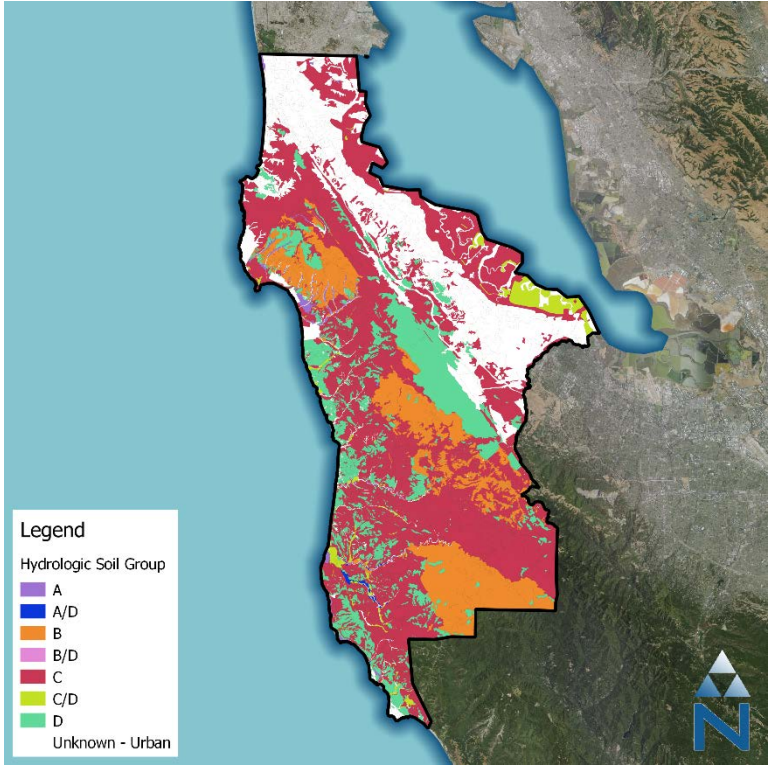


Figure 2. Hydrologic Soil Group

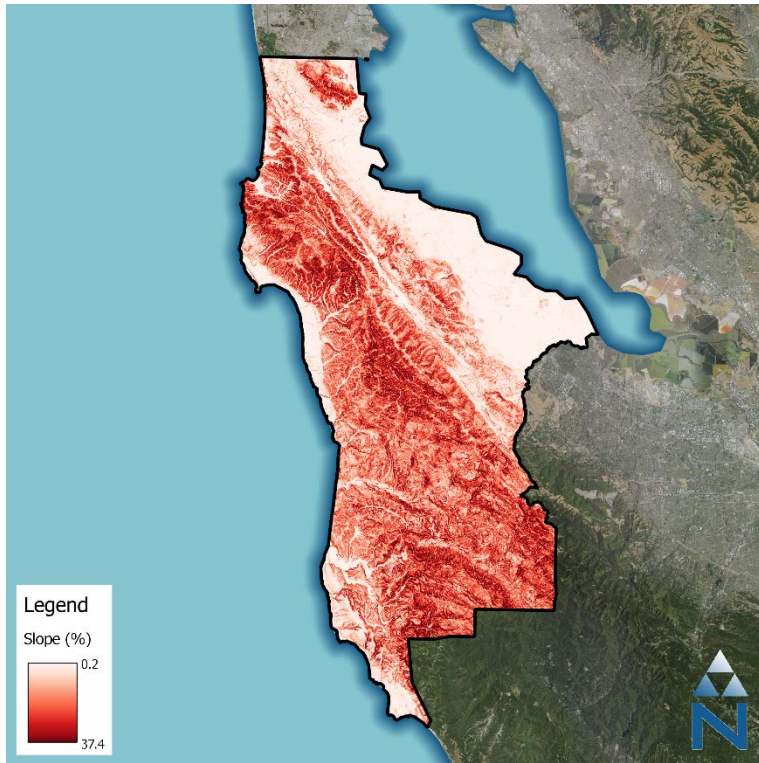


Figure 3. Percent Slope

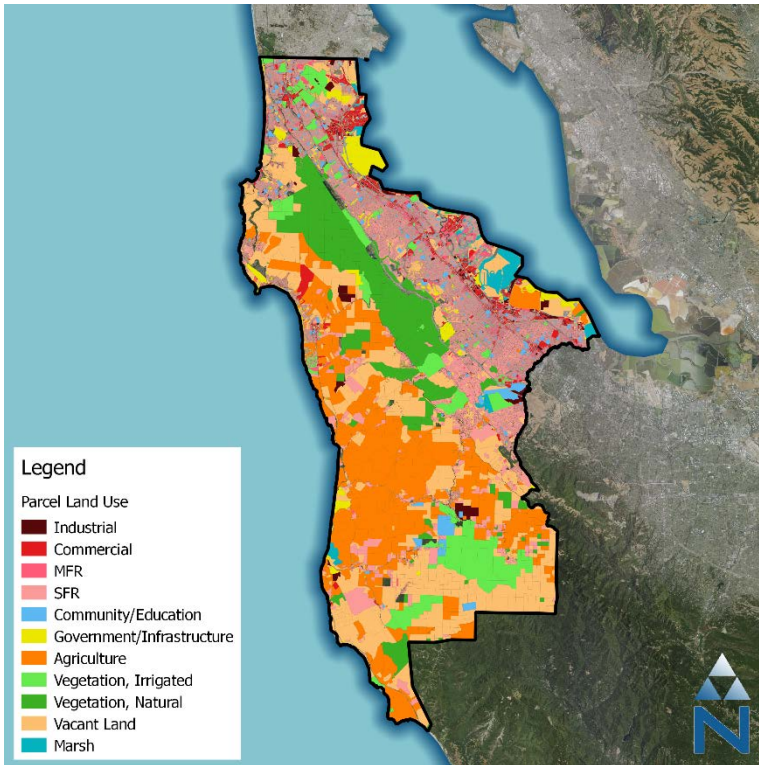


Figure 4. Land Use

2.2 Ownership & Special Considerations

The following subsections describe datasets containing information regarding (1) ownership and public right-of-way that will be used as filters for identifying potential projects, and (2) other special considerations that will be used to establish additional context within the identification and prioritization process.

2.2.1 Parcels

The parcel dataset will be used in the screening of public parcels. This dataset was derived from the County Assessor's Office data from 2014. The parcel dataset includes land use and owner information that will be used to identify public parcels. Since no specific attribute information is apparent that designates public parcels specifically, a combination of parsing techniques will likely be applied to the ownership and land use attributes to decipher public parcels.

2.2.2 Streets & Right-of-Way

The street dataset was obtained as a line shapefile from the County Department of Public Works (DPW). The right-of-way (ROW) dataset was obtained as a polygon shapefile. The layer was developed in 2006 and is not actively updated by the County. Updated information on the rights-of-way are contained in the most recent parcel data from the County Assessor's Office and will be used in conjunction with the 2006 rights-of-way layer.

Typical street attributes such as street hierarchy (arterial, collector, local), width, and condition were not immediately discernable within the streets dataset. The most recent 2015 Census TIGER line shapefile will be used in conjunction with the DPW streets shapefile to determine each road's functional class for screening. After functional classes are determined, the ROW shapefile will be used to assess the width of remaining streets.

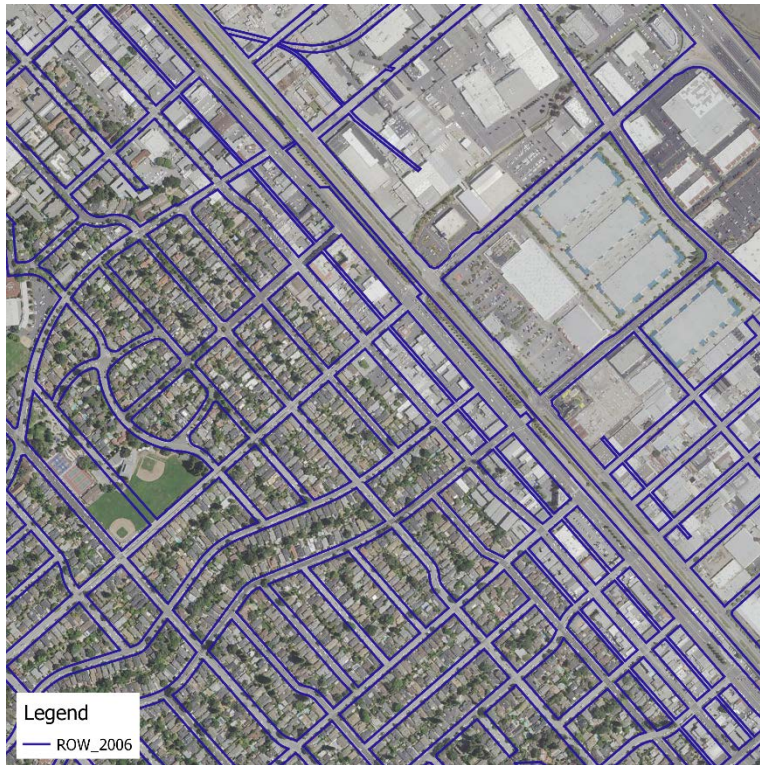


Figure 5. Zoom Extent of Right-of-Way

2.2.3 Flood-prone Streams

A layer for flood-prone streams was created using the National Hydrography Dataset (NHD) stream layer. A list of streams with known flooding issues within the County was used to extract the creek segments from the NHD dataset. The flood-prone streams will be used in conjunction with local watershed layers to prioritize projects within areas tributary to these streams.

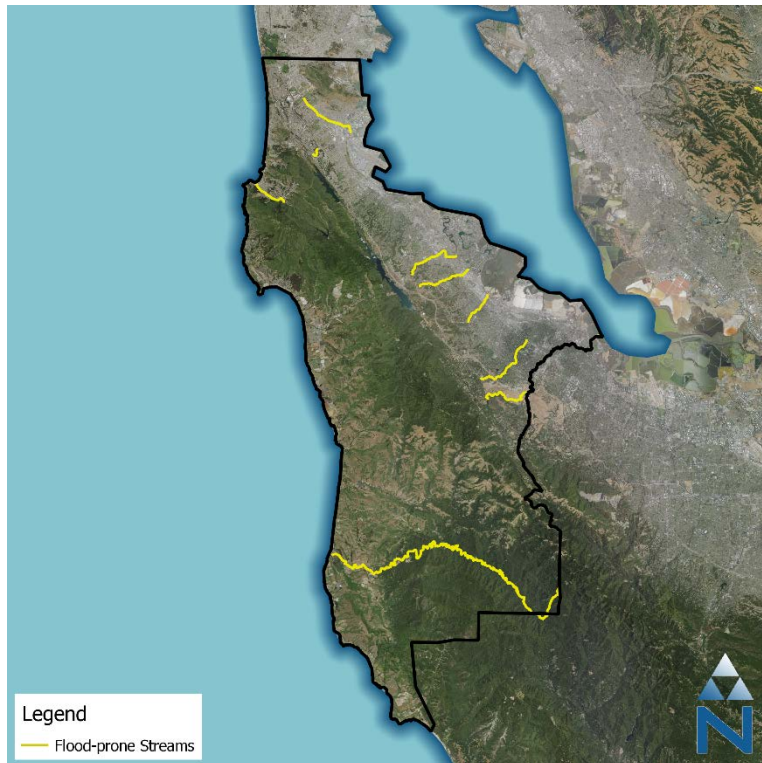


Figure 6. Flood-prone Streams

2.2.4 Polychlorinated Biphenyl (PCB) Areas

Areas of interest due to the likely presence of PCB sources will be used in assessing the priority of projects. This layer was developed by EOA, Inc. to identify parcels that have a higher risk of being a PCB source. Level of risk was determined by evaluating a number of risk-factors associated with each parcel and whether or not a parcel has a history of being a PCB source. Risk-factors were evaluated using a variety of datasets, such as land use pre-1980, SWRCB Industrial Permitted Facilities, pavement conditions, and violations previously issued by the Permittee. Section 4.3 outlines the different levels of risk assigned to each PCB risk area.

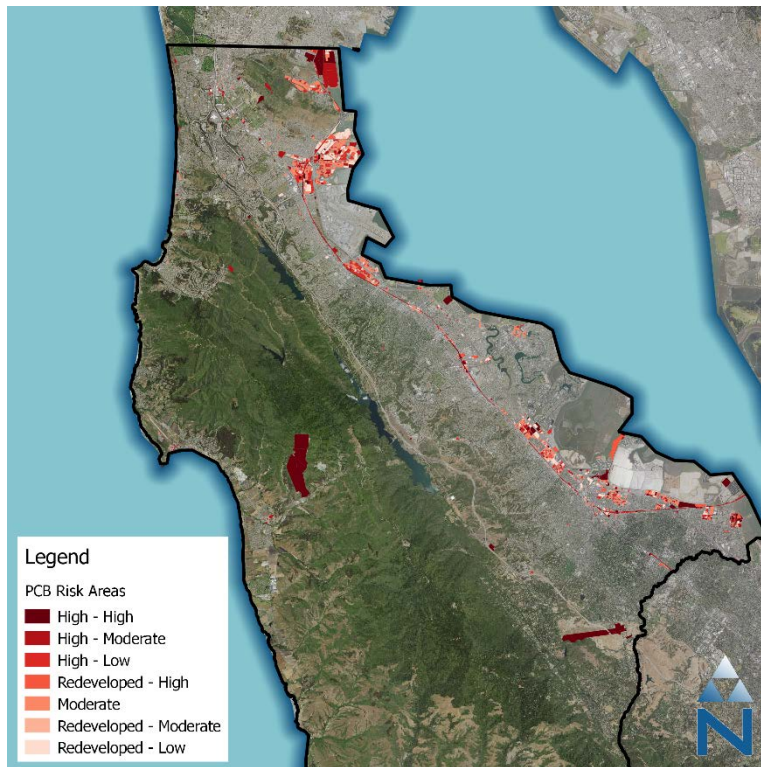


Figure 7. PCB Risk Areas

3 SCREENING

The following subsections outline the method for identifying and screening public land and streets for siting stormwater and dry weather runoff capture and green street projects.

3.1 Screening of Public Parcels

Beginning with the County Assessor’s parcels dataset, the first step is to identify suitable public parcels for potential project consideration. Parcels will first be screened for public ownership. As no readily identifiable attribute is available flagging public ownership, such as a special attribute or within the APN number, the owner attribute will be parsed to distinguish public entities. Parcels with an owner attribute that begins with “City of”, “County of” or “Town of” will be selected. Additionally, the land use attribute will be used to select a set of additional parcels to be added to the set selected based on ownership. Parcels with a land use designations that described as public use (e.g., park or school) will also be selected. Parcels that are part of a waterbody will be excluded.

Once a set of suitable parcels is selected, additional criteria will be imposed to designate locations that are most suitable for either a regional stormwater and dry weather runoff capture project (capturing runoff from surrounding areas) or onsite Low Impact Development (LID) retrofits (capturing onsite runoff only)¹. All parcels that are less than 0.25 acres will be removed from

¹ Note that regional stormwater and dry weather runoff capture projects will likely be most cost-effective from a countywide standpoint of maximizing the capture of stormwater. However, onsite green infrastructure

consideration for regional stormwater capture, and will be categorized as opportunities for onsite green infrastructure retrofits. The HRUs will be used to eliminate parcels with physical limitations due to high slopes or known poorly drained soils that would also impede the primary goal of stormwater capture. A summary of the screening factors for both (1) selecting parcels, and (2) eliminating parcels based on physical constraints is presented in Table 2.

Table 2. Screening factors for identifying potential project sites

Screening Factor	Parcel Characteristic	Criteria	Reason
Public Parcels	Ownership	City, County or Town	Identify all public parcels for regional storm and dry weather runoff capture projects or onsite LID retrofits
	Land Use	Park, School, Other (e.g., Golf Course)	
Suitability	Parcel Size	>0.25 acres	Adequate space for regional stormwater and dry weather runoff capture project
		<0.25 acres	Opportunity for onsite green infrastructure retrofit
	Site Slope	< 10 %	Steeper grades present additional design challenges

3.2 Screening of Rights-of-Way

In addition to public parcels, rights-of-way must be identified and screened for potential green street implementation. Street type, slope, and soil type will be used to screen rights-of-way suitable for green streets.

Street use is often a significant consideration in siting green streets. 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. Selection of streets will focus on local neighborhood roads, city streets, parking lot roads and alleys as these functional classes typically exhibit characteristics of lower traffic volume and lower speeds limits as opposed to major arteries, collector roads, and highways. The 2015 Census TIGER road lines will be used to assign a functional class to each street in the County’s street data set. The ROW dataset will be used to remove any private roads from the selection.

Because mild slopes are more suitable for green streets, sections of street that have greater than a 5% slope will be removed from consideration.

A summary of the screening factors for both (1) selecting potential streets, and (2) eliminating streets based on physical or ownership constraints is presented in Table 3.

projects are also often very useful as public demonstration projects to promote wider-scale green infrastructure and LID on privately owned land.

Table 3. Screening Criteria for Streets & Right-of-Way

Screening Factor	Street Section Characteristic	Criteria	Reason
Selection	Functional Class	S1400 S1730 S1780	Local neighborhood road, rural road, city street, alley, parking lot roads
Suitability	Ownership	Private	Potential projects are focused on public and right-of-way opportunities
	Road Slope	< 5%	Steep grades present additional design challenges; reduce capture opportunity due to increased runoff velocity

4 PRIORITIZATION OF PROJECT OPPORTUNITIES

The following subsections outline the methodology for prioritizing stormwater capture and green street project sites. In addition to the physical characteristics, several special considerations were included in the prioritization methodology to take into account high opportunity projects and currently planned projects provided by agencies, as well as consideration of potential multiple benefits. Because the conditions for a suitable project differ between project type, regional stormwater capture, green streets, and LID retrofit projects will be evaluated independently and given a separate prioritization score.

4.1 Prioritization Based on Physical Characteristics

Physical characteristics of the identified project opportunities are key considerations in the prioritization process, as these typically serve as surrogate indicators of the expected effectiveness of each project in terms of ability to capture stormwater. In subsequent efforts to develop the SWRP, a stormwater capture model will be developed that will provide estimates of project-specific potential for stormwater capture. Once this tool is available, the prioritization process can be revisited to validate the methods used and build the narrative for the SWRP, which per the Guidelines requires quantitative scoring metrics associated with stormwater capture volumes.

4.1.1 Regional Stormwater Capture Project Opportunities

After the identification of feasible project locations, screened parcels will be prioritized to aid in the selection of projects that would be the most effective and provide the greatest number of benefits. A scoring system was developed to take into account key physical characteristics obtained in the development of the HRUs, as well as the considerations in Section 4.3 through 4.5. Prioritization scoring criteria for stormwater capture projects on public parcels are presented in Table 5.

In order to determine the physical characteristics of each parcel, some characteristics require averaging of values over the potential drainage area. Since it is infeasible to accurately delineate every parcel drainage area at this stage, a method was derived to establish a *representative drainage area* for each parcel. Several assumptions are made in determining the representative drainage area: (1) a regional project footprint will account for 50 percent of its parcel area, and (2) the estimated

drainage area is 250 times the area of the project footprint. Using these assumptions, the representative drainage area is drawn as a circular buffer around each parcel centroid using the estimated area. For large parcels, the buffer will be limited to 1,000 acres to limit uncertainty. Additionally, buffers will be clipped to the County land boundary to remove sections that extend into a waterbody. The representative drainage area for each parcel will be used to obtain an average value for imperviousness and slope that will be used in the prioritization scoring method. There are five physical characteristics used in the prioritization of parcels for regional stormwater capture:

1. **Parcel land use** is used to prioritize sites that are most likely to have adequate space for a regional project and cause minimal disturbance of existing use. Parks or other public open space are given the highest priority, followed by parking lots, parcels that require full or partial demolition of public buildings, and, finally, schools and golf courses.
2. **Impervious area**, averaged over the representative drainage area, is included in the prioritization due to the connection between highly impervious areas and large runoff potential. Because the primary goal is to reduce runoff via stormwater capture, regional projects should be placed to treat areas that produce high runoff volumes. Higher priority is given to parcels with representative drainage areas with high imperviousness.
3. **Parcel size** is prioritized to ensure that regional project sites have adequate space to treat large drainage areas. Larger parcels are given higher priority scores.
4. **Hydrologic Soil Group** at the parcel is also considered in the prioritization. Soil groups are categorized based on their drainage properties, with Group A representing the most well-drained soils and Group D representing the least well-drained soils. Because infiltration is one of the objectives of stormwater capture, highest priority is given to Soil Group A, with each subsequent group assigned fewer points.
5. **Slope**, averaged over the representative drainage area, is the last physical characteristic in the prioritization of parcels for regional projects. Sites with mild slopes often provide the most feasible opportunities for stormwater capture. Constructing on steep slopes presents difficulties with implementation and performance of the stormwater capture structure.

4.1.2 Onsite LID Retrofit Project Opportunities

After the identification of feasible project locations, screened parcels will be prioritized to aid in the selection of projects that would be the most effective and provide the greatest number of benefits. A scoring system was developed to take into account key physical characteristics obtained in the development of the HRUs, as well as the considerations in Section 4.3 through 4.5. Prioritization scoring criteria for LID projects on public parcels are presented in Table 6.

While many of the same characteristics for regional projects are used to evaluate LID, the scale of projects requires different spatial evaluation. Low-impact development typically treats runoff generated onsite. This means that the drainage area for LID is typically no larger than the parcel size. For LID prioritization, all physical characteristics will be evaluated at the parcel spatial scale. There are four physical characteristics used in the prioritization of LID retrofit projects:

1. **Parcel land use** was used to prioritize sites that are ideal for LID retrofit projects. Because LID treats runoff generated onsite, it is typically located where imperviousness is high, such as existing buildings, walkways, and pavements. Public buildings and parking lots are given the highest priority, followed by public open space, and schools and golf courses.
2. **Impervious area**, averaged over the parcel area, is included in the prioritization because of the connection between highly impervious areas and large runoff potential. Because the primary goal is to reduce runoff, LID projects should be placed to treat sites that produce high runoff. Higher priority is given to parcels with high imperviousness.
3. **Hydrologic Soil Group** at the parcel is also considered in the prioritization. Soil groups are categorized based on their drainage properties, with Group A representing the most well-drained soils and Group D representing the least well-drained soils. Because infiltration is one of the objectives of stormwater capture, highest priority is given to Soil Group A, with each subsequent group assigned fewer points.
4. **Slope**, averaged over the parcel, is the last physical characteristic in the prioritization of parcels for LID retrofit projects. Sites with mild slopes often provide the most feasible opportunities for stormwater capture. Constructing on steep slopes presents difficulties with implementation and performance of the LID structures.

4.1.3 Green Street Opportunities

After the identification of feasible green streets opportunities, screened streets will be prioritized to aid in the selection of locations that would be the most effective and provide the greatest number of benefits. A scoring system was developed to take into account key physical characteristics obtained in the development of the HRUs, as well as the considerations described in Section 4.3 through 4.5. Prioritization scoring criteria for green streets in rights-of-way are presented in Table 7.

In order to evaluate the physical characteristics of each street, street lines must be discretized into segments of appropriate length for evaluating feasibility of distributed practices at the proper scale. Street lines in GIS will be broken at each intersection to further segment continuous roads into well-defined segments. It is then necessary to average each physical characteristic over the potential drainage area.

Since it is infeasible to accurately delineate drainage areas to every street at this stage, a method was derived to establish a *representative drainage area* for each street segment. Representative drainage areas will be based on an assumed ratio of contributing drainage area per length of street. Previously, similar analysis suggested a ratio of approximately 20 acres of drainage area per 1 mile of suitable street. Using these assumptions, the representative drainage area will be drawn as a buffer (approximately 85 feet on both sides) around each street line equaling the estimated area described above. Buffers will be clipped to the County land boundary to remove sections that extend into a waterbody. The representative drainage area for each street will be used to obtain an average value for imperviousness and slope that will be used in the prioritization scoring method. There are four physical characteristics used in the prioritization of suitable green streets:

1. **Street type** was used to prioritize sites that are most suitable for green street retrofit. Heavily-used streets can require increased maintenance and reduce system performance. Highest priority is given to local neighborhood roads, city streets, parking lot roads and alleys, while lower priority is given to major arteries, collector roads, and highways.
2. **Impervious area**, averaged over the representative drainage area, is included in the prioritization due to the connection between highly impervious areas and large runoff potential. Because the primary goal is to reduce runoff via stormwater capture, green streets should be placed to treat areas that produce high runoff. Higher priority is given to parcels with representative drainage areas with high imperviousness.
3. **Hydrologic Soil Group** in the right-of-way is also considered in the prioritization. Soil groups are categorized based on their drainage properties, with Group A representing the most well-drained soils and Group D representing the least well-drained soils. Because infiltration is one of the benefits of green streets, highest priority is given to Soil Group A, with each subsequent group assigned fewer points.
4. **Slope**, averaged over the length of street segment, is the last physical characteristic in the prioritization of rights-of-way for green streets. Sites with mild slopes are ideal for green streets because it allows for street design that capture more volume and reduces maintenance requirements.

4.2 Flood-prone Streams

Regional, LID, and green street project sites will be given higher priority according to proximity to flood-prone streams. Projects placed within the subwatersheds of flood-prone streams will help to mitigate flood risks and reduce flood and hydromodification impacts by limiting the volume of runoff that reaches the impacted streams. Regional stormwater capture projects can either slow the travel of runoff to the flood-prone stream through capture and slow release or remove the runoff volume entirely through infiltration or beneficial use. Distributed LID and green streets in subwatersheds of flood-prone streams would alter the imperviousness and hydrology so that less runoff contributes to flooding. Higher priority will be given to sites closest to the flood-prone streams with the assumption that more upstream area could potentially be captured. Project sites that are not within the subwatersheds of flood-prone streams will receive no additional points.

4.3 PCB Risk Areas

PCB risk areas were examined during project prioritization to give higher priority to projects with potential for source control². PCBs are one of the primary pollutants of concern within the Bay Area and so siting of stormwater capture projects in PCB risk areas can potentially address water quality issues. Table 4 lists the various levels of PCB risk developed by EOA, Inc. that were used in the prioritization of projects. Areas with High-High and High-Moderate were given the highest priority, while areas that show signs of redevelopment with moderate to low risk are given the lowest priority.

² As part of the Reasonable Assurance Analysis (RAA) required by the MRP to address PCB and mercury TMDLs and the Green Infrastructure Plan, further analysis will be performed after completion of the SWRP to determine the full extent that TMDLs will be addressed with green infrastructure. Future updates of the SWRP can incorporate finding of the RAAs.

Regional capture and green street projects receive points in this category if the PCB risk area is within the project’s representative drainage area. LID retrofit projects receive points if the project parcel is a PCB risk area.

Table 4. PCB Risk Levels

Interest Category	Interest Sub-Category	Description
High	High - High	Parcel has the highest risk for elevated POC concentrations, with either a history of PCB pollution or greater than 4 risk-factors
	High - Moderate	Parcel has a high risk for elevated POC concentrations, with 2-4 risk-factors (usually unpaved areas and "poor" housekeeping)
	High - Low	Parcel has a relatively high risk for elevated POC concentrations, with at least one risk-factor.
	Redeveloped - High	Parcel has signs of redevelopment based on aerial analysis but is still a high risk for elevated POC concentrations based on risk-factors
Moderate	Moderate	Parcel has zero risk-factors associated with elevated POC concentrations or sediment runoff (fully paved, good housekeeping, etc)
Low	Redeveloped - Moderate	Parcel is redeveloped and has no more than one minor risk-factor
	Redeveloped - Low	Parcel is redeveloped and has zero risk-factor associated with elevated POC concentrations or sediment runoff

4.4 Co-located Planned Projects

Higher priority scores will be given to project opportunities that may be implemented in parallel with new development and redevelopment projects currently in planning phase throughout the various jurisdictions within the County. Co-locating stormwater capture and treatment projects with other priority projects provides opportunities increases opportunities for cost-sharing and maximizes multiple benefits achieved by a single project.

The opportunity was given for each jurisdiction to submit projects to be considered for co-location with stormwater capture and green street projects. Through the survey, the County and cities submitted planned projects with relevant information, such as project description, contact information, and multiple benefits received from each project. A total of fifty-five projects were submitted from the various jurisdictions. Parcels and rights-of-way that are located near potential co-located projects are given higher priority, with additional points awarded for each benefit perceived to be an outcome of the project.

C/CAG, in coordination with the San Mateo County Office of Education, supported walk audits at schools throughout San Mateo County designed to identify recommended improvements for the Safe Routes to School program. These walk audits provide a variety of recommendations on projects that can increase safety for children walking or biking to school, including infrastructure improvements such as new crosswalks, pedestrian bulb-outs, sidewalks, and ADA-compliant curb ramps. These types of improvements are prime opportunities for incorporation of green streets, as any project that is tearing out and 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 permeable pavements or incorporate sidewalk planters for stormwater management, and new crosswalks are opportunities for incorporation of vegetated curb extensions to reduce pedestrian crossing distances and increase visibility while also managing stormwater. These project opportunities are considered in the prioritization of rights-of-way.

4.5 Multiple Benefits

One of the objectives of project prioritization is to maximize the number of benefits received for each opportunity. While there are many direct benefits that result from satisfying the primary objectives, many ancillary benefits can be achieved to improve cost effectiveness. Mindful planning and design to include some of these ancillary benefits can aid in public acceptance, community engagement, and funding acquisition.

As part of the prioritization scoring criteria, each project will receive one (1) additional point for each multiple benefit identified from the following list:

1. Project is identified to augment local water supply through groundwater recharge or beneficial use.
2. Project is a source control of pollutants and wet-weather or dry-weather runoff volume.
3. Project reestablishes natural water drainage treatment and infiltration, or mimics natural pre-development drainage.
4. Project creates, enhances, or restores habitat and open space through stormwater management.
5. Project promotes community enhancement, which encompasses a variety of benefits, such as the beautification of neighborhoods, mitigation of heat island effect through urban greening, boosts property values, improves traffic, and promotes pedestrian use.

4.6 Final Priority Scoring

There are three separate priority scores: one score each for regional stormwater capture projects, green streets, and onsite LID retrofits. Three separate scoring systems are used because different conditions determine the suitability of a project type. Every screened parcel will be given a score for regional stormwater capture and a score for onsite LID retrofits. Every screened street right-of-way segment will be given a score for green streets. Each priority score is determined by summing all of the points assigned from the evaluated physical characteristics, proximity to areas of interest, potential for co-locating projects, and the various multiple benefits. A factor is assigned to each individual category to modify the weight given during the prioritization step. Given that these weight factors will greatly influence the prioritization, it is important that C/CAG review these factors prior to initiation of the prioritization process.

Table 5. Parcel Prioritization Criteria for Regional Stormwater Capture

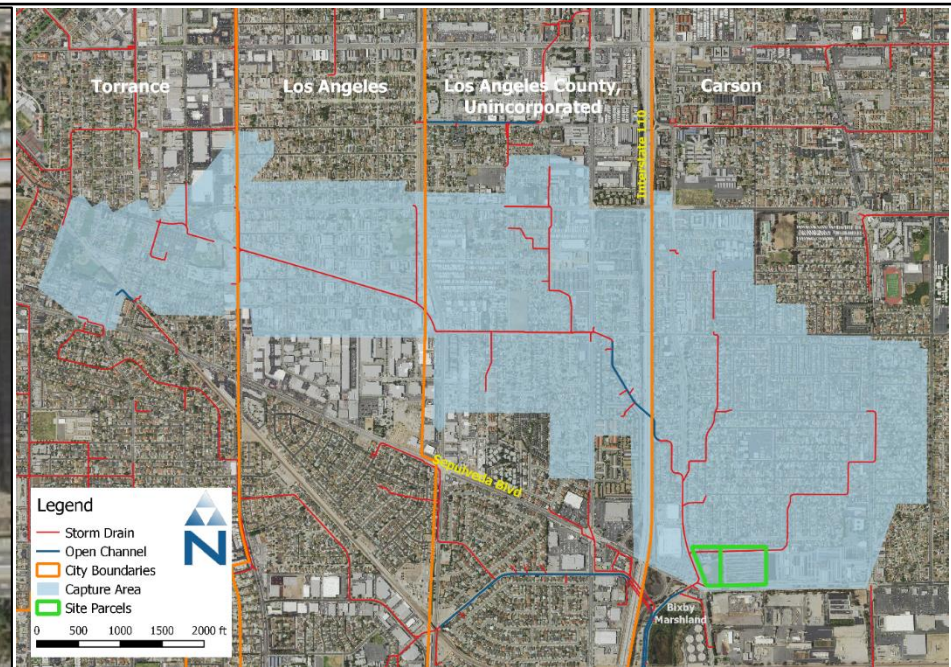
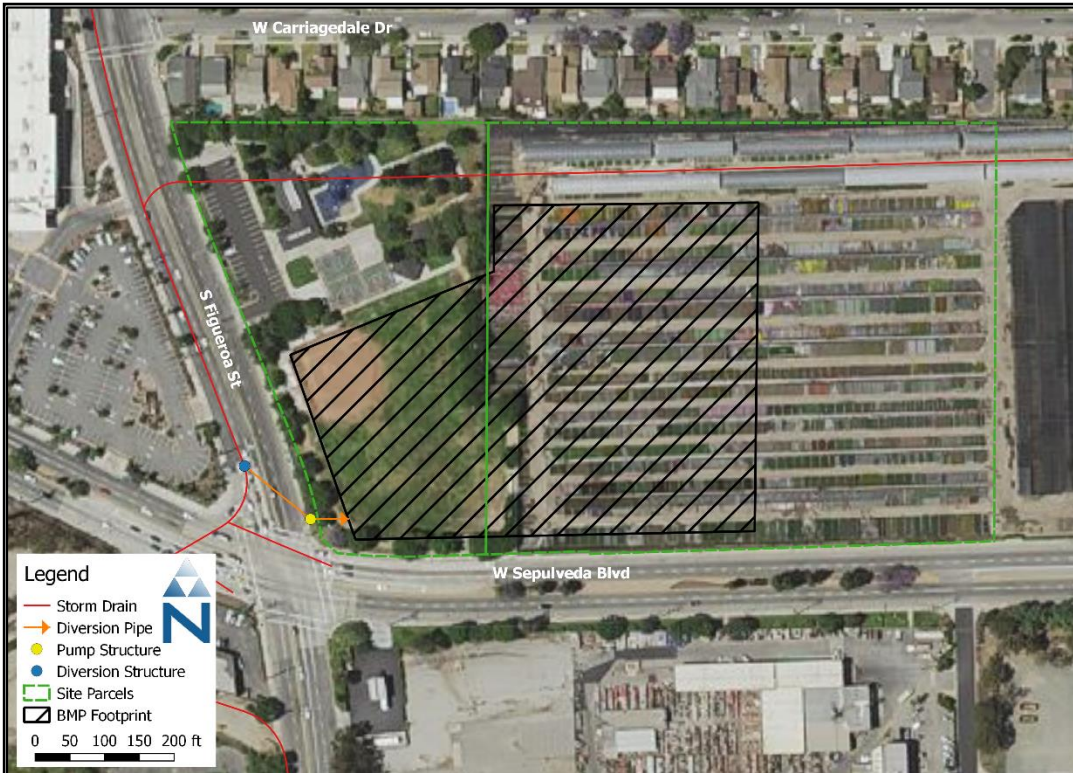
	Points						Weight Factor
	0	1	2	3	4	5	
Parcel Land Use	--	--	Schools/Golf Courses	Public Buildings	Parking Lot	Park / Open Space	--
Impervious Area	$X < 40$	$40 \leq X < 50$	$50 \leq X < 60$	$60 \leq X < 70$	$60 \leq X < 80$	$80 \leq X < 100$	--
Parcel Size (acres)	$0.25 \leq X < 0.5$	$0.5 \leq X < 1$	$1 \leq X < 2$	$2 \leq X < 3$	$3 \leq X < 4$	$4 \leq X$	--
Hydrologic Soil Group	--	D	Unknown	C	B	A	--
Slope (%)	$5 < X \leq 10$	$4 < X \leq 5$	$3 < X \leq 4$	$2 < X \leq 3$	$1 < X \leq 2$	$0 < X \leq 1$	--
Proximity to Flood-prone Channels (miles)	Not in sub-basin	$3 < X$	--	$1 < X \leq 3$	--	$X \leq 1$	2
Contains PCB Risk Areas	None	Redeveloped -Low	Redeveloped-Moderate	Moderate	High-Low / Redeveloped-High	High-High / High-Moderate	2
Currently planned by City or co-located with other City project	No					Yes	2
Augments water supply	No	Yes					--
Water quality source control	No	Yes					--
Reestablishes natural hydrology	No	Yes					--
Creates or enhances habitat	No	Yes					--
Community enhancement	No	Yes					--

Table 6. Parcel Prioritization Criteria for LID

	Points						Weight Factor
	0	1	2	3	4	5	
Parcel Land Use	--	--	Schools/Golf Courses	Park / Open Space	Parking Lot	Public Buildings	--
Impervious Area	$X < 40$	$40 \leq X < 50$	$50 \leq X < 60$	$60 \leq X < 70$	$60 \leq X < 80$	$80 \leq X < 100$	--
Hydrologic Soil Group	--	D	Unknown	C	B	A	--
Slope (%)	$5 < X \leq 10$	$4 < X \leq 5$	$3 < X \leq 4$	$2 < X \leq 3$	$1 < X \leq 2$	$0 < X \leq 1$	--
Proximity to Flood-prone Channels (miles)	Not in sub-basin	$3 < X$	--	$1 < X \leq 3$	--	$X \leq 1$	2
Contains PCB Risk Areas	None	Redeveloped -Low	Redeveloped-Moderate	Moderate	High-Low / Redeveloped-High	High-High / High-Moderate	2
Currently planned by City or co-located with other City project	No					Yes	2
Augments water supply	No					Yes	--
Water quality source control	No					Yes	--
Reestablishes natural hydrology	No					Yes	--
Creates or enhances habitat	No					Yes	--
Community enhancement	No					Yes	--

Table 7. Right-of-Way Prioritization Criteria for Green Streets

	Points						Weight Factor
	0	1	2	3	4	5	
Street Type	Highway	--	Arterial	Collector	Alley	Local	--
Imperviousness (%)	$X < 40$	$40 \leq X < 50$	$50 \leq X < 60$	$60 \leq X < 70$	$60 \leq X < 80$	$80 \leq X < 100$	--
Hydrologic Soil Group	--	D	Unknown	C	B	A	--
Slope (%)	--	$4 < X \leq 5$	$3 < X \leq 4$	$2 < X \leq 3$	$1 < X \leq 2$	$0 < X \leq 1$	--
Proximity to Flood-prone Channels (miles)	Not in sub-basin	$3 < X$	--	$1 < X \leq 3$	--	$X \leq 1$	2
Contains PCB Risk Areas	None	Redeveloped -Low	Redeveloped -Moderate	Moderate	High-Low / Redeveloped-High	High-High / High-Moderate	2
Currently planned by City or co-located with other City project	No					Yes	2
"Safe Routes to School" program	No					Yes	2
Augments water supply	No					Yes	--
Water quality source control	No					Yes	--
Reestablishes natural hydrology	No					Yes	--
Creates or enhances habitat	No	Yes	--				
Community enhancement	No	Yes	--				



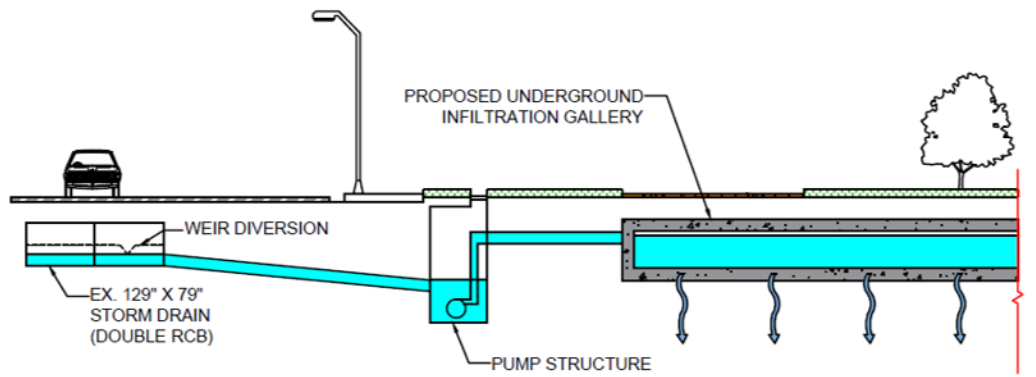
Site Information

Land Owner	City of Carson
Street Address	23800 Figueroa St, Carson, CA 90745
Latitude/Longitude	33° 48' 32.2" N / 118° 17' 5.1" W
Assessor's Identification Number (AIN)	7330007905, 7330007906
Capture Area (acres)	1,118
Impervious Area (%)	69
Dominant Land Use	Residential
Receiving Water	Wilmington Drain / Machado Lake

BMP Characteristics

BMP Type	Subsurface Infiltration Chamber
BMP Footprint (acres)	6
Design Volume (ac-ft)	46.7
Required BMP Height (ft)	8
Total Cost	\$46,091,014.00

SUBSURFACE INFILTRATION (WITH PUMPING)



* NOT TO SCALE NOTE: PUMPING MAY NOT BE NECESSARY. SUBJECT TO GEOTECHNICAL INVESTIGATION

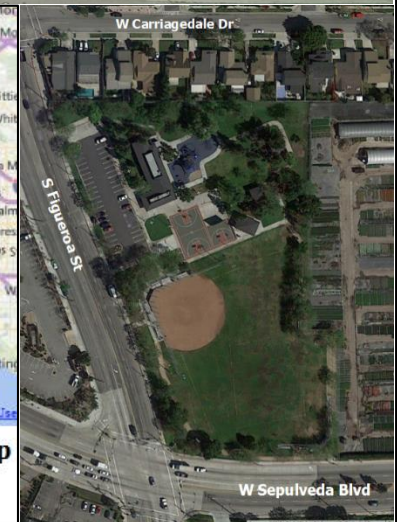
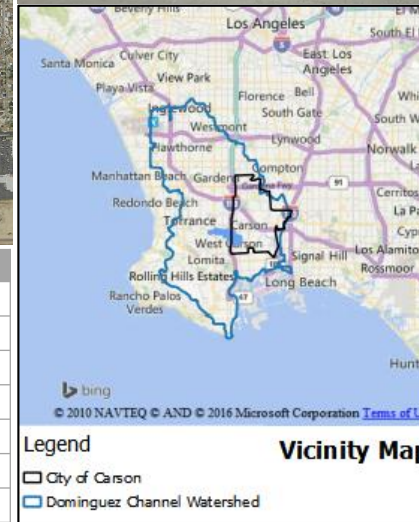
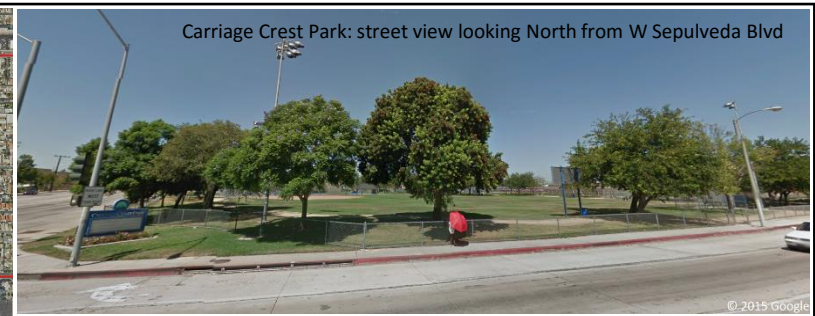
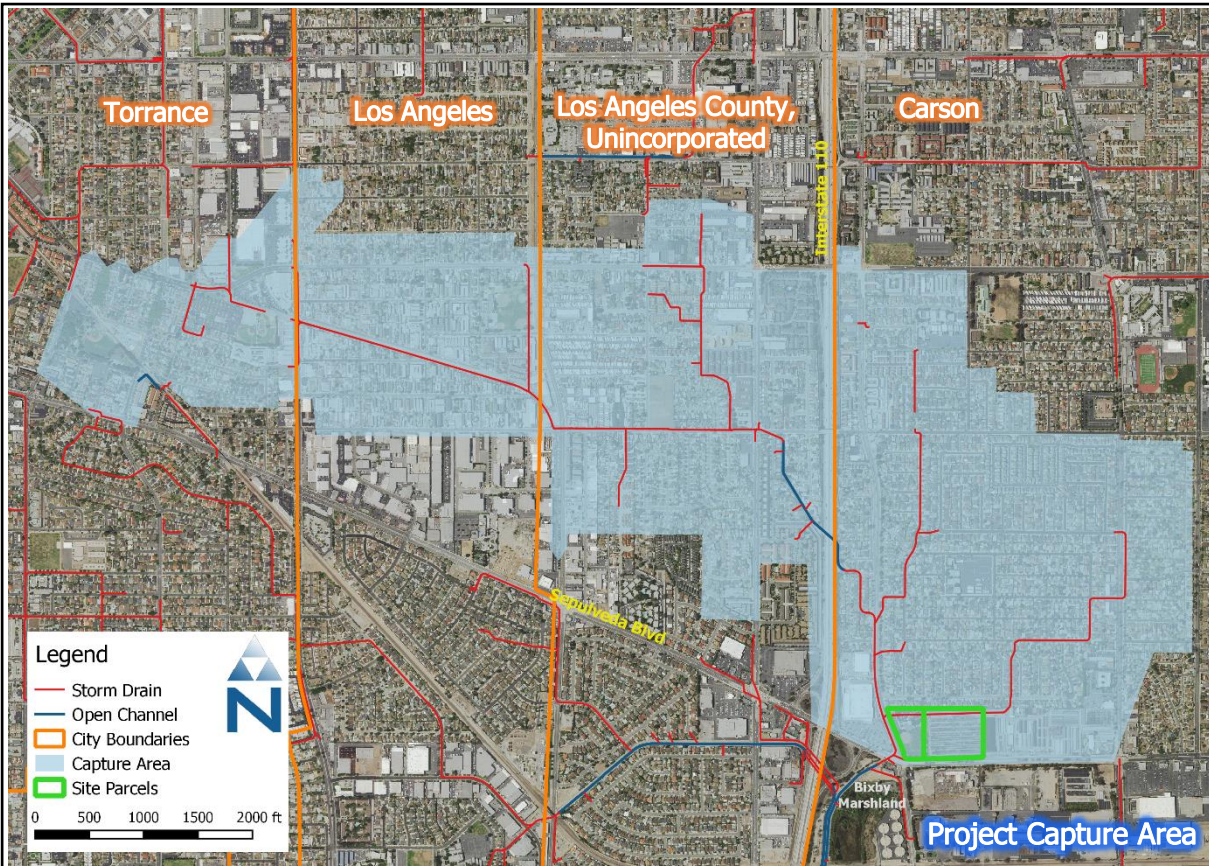
Project Description:

Carriage Crest Park was identified as a high opportunity site for a regional stormwater capture project. The site is owned by the City of Carson. The City intends to acquire or lease a portion of the neighboring parcel, location of the Color Spot Nurseries, to expand the park. A preliminary sizing analysis concluded the park expansion would provide adequate space for a structural BMP capable of treating the 85th percentile, 24-hour runoff event from a total of 1,118 acres. This configuration would maximize the urban area that benefits from the BMP and would also promote collaboration with neighboring jurisdictions.

The proposed project consists of an offline infiltration chamber below the ballfield of Carriage Crest Park and extended into the adjacent parcel. Stormwater would be diverted from the existing double box drain under South Figueroa Street to treat the design runoff volume. A diversion structure will be required to convey runoff from the box drain to the proposed structure. The invert of the existing storm drain is approximately 9 feet below ground surface and pumping may be required to lift the water to the BMP. If a geotechnical investigation finds that groundwater levels are sufficiently low in this area, then pumping may not be required and stormwater could be directed to the structure via gravity flow.

Multi-Jurisdictional Regional Stormwater BMP
Carriage Crest Park (City of Carson)





Site Information	
Land Owner	City of Carson
Street Address	23800 Figueroa St, Carson, CA 90745
Latitude/Longitude	33° 48' 32.2" N / 118° 17' 5.1" W
Parcel ID	CC_16
Assessor's Identification Number (AIN)	7330007905, 7330007906
Watershed Management Area	Dominguez Channel Watershed
Receiving Water	Wilmington Drain/Machado Lake

Site Description:
 Carriage Crest Park was identified as a high opportunity site for a regional stormwater capture project due to its proximity to two large storm drains (and thus large treatment area) and potential for multi-jurisdictional partnership. The park is owned and operated by the City of Carson. The City intends to acquire or lease a portion of the neighboring parcel, location of the Color Spot Nurseries, to expand the park. A preliminary sizing analysis concluded the park expansion would provide adequate space for a structural BMP capable of treating the 85th percentile, 24-hour runoff event from the project capture area, a total of 1,118 acres. The project would intercept runoff that is typically received by Wilmington Drain and Machado Lake. This configuration would maximize the urban area that benefits from the BMP and would also promote collaboration with neighboring jurisdictions (Unincorporated Los Angeles County and the cities of Los Angeles and Torrance).

Drainage Characteristics	
Capture Area (acres)	1,118
Impervious Area (%)	69
Dominant Land Use	Residential

Capture Area by Jurisdiction				
Jurisdiction	Torrance	Los Angeles	LA County	Carson
Area (acres)	133	175	339	471
% Area	12%	16%	30%	42%

DESIGN CONSIDERATIONS FOR REGIONAL STORMWATER CAPTURE



BMP Concept Description:

The proposed concept for the Carriage Crest regional BMP consists of an offline infiltration gallery below the ballfield of Carriage Crest Park and extended into the adjacent parcel. The gallery would have a storage volume of 46.7 acre-feet and be constructed as either a concrete chamber or series of pipes. Stormwater would be diverted from the existing double 129" x 79" concrete box drain under South Figueroa Street to treat the 85th percentile, 24-hour runoff volume. A diversion structure will be required to convey runoff from the box drain to the proposed BMP. The diversion will be sized to accommodate the peak flow rate of 62 cubic feet per second. The invert of the existing storm drain is approximately 9 feet below ground surface and pumping may be required to lift the water to the BMP. If a geotechnical investigation finds that groundwater levels are sufficiently low in this area, then pumping may not be required and stormwater could be directed to the BMP via gravity flow. With pumping, excavation would only be necessary down to 10 feet below ground level. If gravity flow is used, excavation would be required down to 19 feet below the surface.

DISCLAIMER: All elements of this conceptual design are planning-level, based on desktop analysis. All assumptions and design parameters must be re-evaluated during the detailed design process.

Multiple Benefits:

Flood control, groundwater recharge, pollutant load reductions, park enhancements

Considerations:

Existing ball diamond, tree removal/relocation, existing utilities

Design Criteria

Sizing Criteria	85 th percentile, 24 hour storm event
85 th percentile, 24-hr precipitation (in)	0.89
Infiltration Rate (in/hr)	0.58
85 th percentile, 24-hr runoff volume (ac-ft) ¹	53.7
Volume infiltrated during 24-hr storm (ac-ft)	7
Peak Discharge, 85 th percentile 24-hr storm (cfs)	62

1. Runoff volume was estimated using HydroCalc 0.3.1, which uses the Modified Rational Method (MODRAT) developed by LA County. Due to the large drainage area, a detailed subwatershed analysis should be used during actual design.

BMP Characteristics

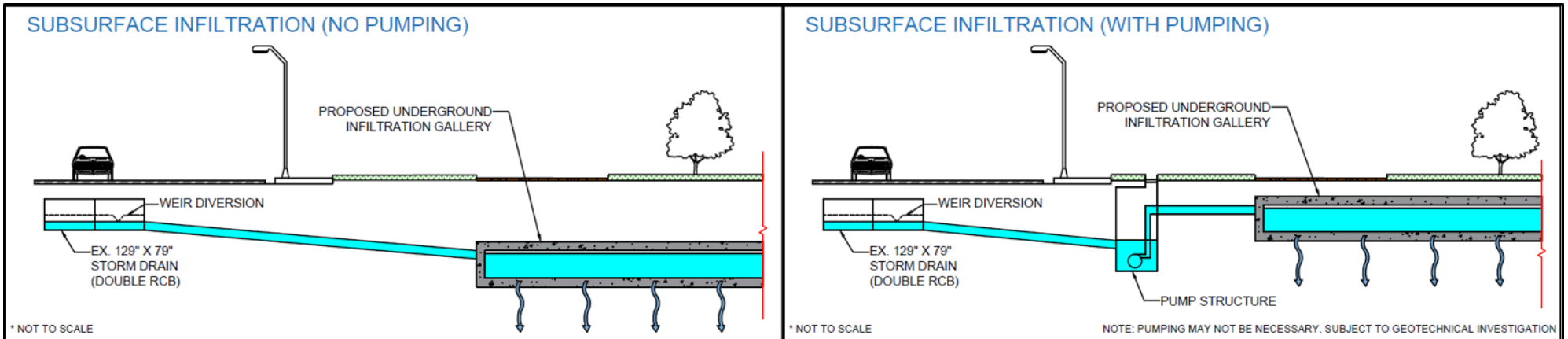
BMP Type	Underground Infiltration Gallery
BMP Footprint (acres)	6
Design Volume (ac-ft) ²	46.7
Required BMP Height (ft)	8 (concrete chamber) / 10 (pipe)
Depth of Excavation (ft)	19 (no pumping) / 10 (with pumping)
Diversion Structure	Required
Pump Structure	Subject to geotechnical investigation

2. Design volume takes into account the 85th percentile, 24-hour runoff volume and infiltration

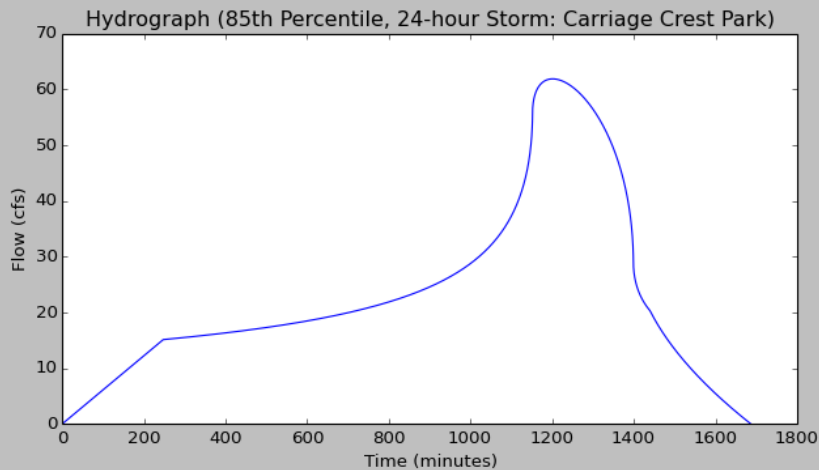
Multi-Jurisdictional Regional Stormwater BMP Carriage Crest Park (City of Carson)



DESIGN CONSIDERATIONS FOR REGIONAL STORMWATER CAPTURE



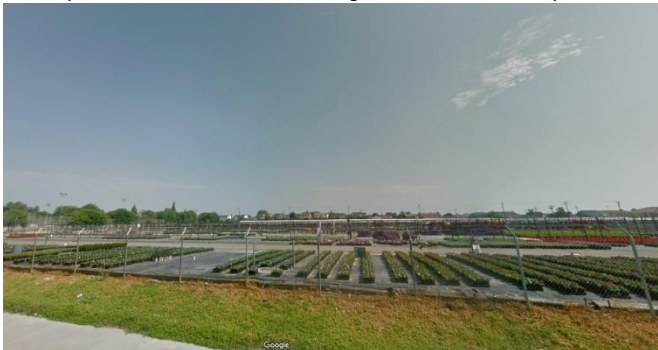
Hydrograph from Modified Rational Method (MODRAT, HydroCalc 0.3.1)



Cost Estimate for Infiltration Gallery Concept

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Excavation/Removal (10 ft depth)	96,800	CY	\$50.00	\$4,840,000.000
Diversion				
Pump Structure (62 cfs/40 MGD)	1	EA	\$2,000,000.00	\$2,000,000.00
Diversion Structure	1	EA	\$1,000,000.00	\$1,000,000.00
Diversion Pipe (24" RCP)	350	LF	\$200.00	\$70,000.00
Subsurface Infiltration Structure	75,350	CY	\$300.00	\$22,605,000.00
Restoration (Landscaping/Ballpark)	261,360	SF	\$2.00	\$522,720.00
CONSTRUCTION SUBTOTAL				\$31,037,720.00
Mobilization (10% construction)				\$3,103,772.00
Contingency (25% construction)				\$7,759,430.00
Design (10% total)				\$4,190,092.00
TOTAL COST				\$46,091,014.00

Color Spot Nurseries: Street view looking Northwest from W Sepulveda Blvd



Example corrugated metal pipe configuration



Example concrete chamber configuration



Multi-Jurisdictional Regional Stormwater BMP Carriage Crest Park (City of Carson)

