SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
Clean Water. Healthy Community.

555 County Center
Redwood City, CA 94063

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flowstobay.org

September 30, 2018

Bruce Wolfe, Executive Officer
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

SUBJECT: SUBMITTAL OF THE SAN MATEO COUNTYWIDE WATER POLLUTION PREVENTION PROGRAM'S FY 2017/18 ANNUAL REPORT

Dear Mr. Wolfe:

The San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), a program of the City/County Association of Governments of San Mateo County (C/CAG), is pleased to submit the attached Fiscal Year 2017/18 Annual Report. This report describes Municipal Regional Permit (MRP) compliance activities conducted at the regional and countywide levels on behalf of C/CAG's member agencies. It also incorporates by reference and includes as appendices three reports submitted by the Bay Area Stormwater Management Agencies Association (BASMAA) on behalf of all Bay Area MRP Permittees.

I certify under penalty of law that the SMCWPPP FY 2017/18 Annual Report was prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my enquiry of the person or persons who manage the system, or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SMCWPPP and its 22 partner agencies look forward to continuing to work with you and your staff on implementation of the MRP. If you have any questions or comments, please call me at (650) 599-1419.

Sincerely,

Matthew Fabry
Program Manager

Attachment: SMCWPPP FY 2017/18 Annual Report

SAN MATEO COUNTYWIDE
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FY 2017-18 Annual Report

September 30, 2018

Credits

This report is being submitted by the participating agencies in the

SAN MATEO COUNTYWIDE
Water Pollution
Prevention Program
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Town of Atherton
City of Belmont
City of Brisbane
City of Burlingame
Town of Colma
City of Daly City
City of East Palo Alto
City of Foster City
City of Half Moon Bay
Town of Hillsborough
City of Menlo Park
City of Millbrae
City of Pacifica
Town of Portola Valley
City of Redwood City
City of San Bruno
City of San Carlos
City of San Mateo
County of San Mateo
SM County Flood Control District
City of South San Francisco
Town of Woodside

San Mateo Countywide Water Pollution Prevention Program
555 County Center
Redwood City, California 94063

A Program of the City/County Association of Governments
(C/CAG)

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LIST OF ACRONYMS

BASMAA:	Bay Area Stormwater Management Agencies Association
BAWSCA:	Bay Area Water Supply and Conservation Agency
BMPs:	Best Management Practices
BSM:	Biotreatment Soil Mix
C3TG:	C.3 Stormwater Technical Guidance
CALBIG:	California Building Inspectors Group
CASQA:	California Stormwater Quality Association
C/CAG:	City/County Association of Governments of San Mateo County
CEH:	County Environmental Health
CEQA:	California Environmental Quality Act
CII:	Commercial/Industrial/Illicit Discharge
CRM:	Constituent Relationship Management
DC:	Development Committee
DIY:	Do-It-Yourself
DO:	Dissolved Oxygen
DPR:	Department of Pesticide Regulation
EPA:	Environmental Protection Agency
FY:	Fiscal Year
GSRD:	Gross Solids Removal Device
GI:	Green Infrastructure
GIS:	Geographic Information System
IPM:	Integrated Pest Management
IMR:	Information Monitoring Report
JPA:	Joint Powers Authority
LID:	Low Impact Development
MRP:	Stormwater NPDES Municipal Regional Permit
MS4:	Municipal Separate Storm Sewer System
NPDES:	National Pollutant Discharge Elimination System
OAL:	California Office of Administrative Law
O&M	Operations and Maintenance
OSH:	Orchard Supply Hardware

OWOW:	Our Water Our World
PCBs:	Polychlorinated Biphenyls
PIP:	Public Information and Participation
POC:	Pollutants of Concern
POTW:	Publicly-Owned Treatment Works (sewage treatment plants)
RFQ:	Request for Qualifications
RMP:	San Francisco Estuary Regional Monitoring Program
SAP:	Sampling and Analysis Plan
SCVURPPP:	Santa Clara Valley Urban Runoff Pollution Prevention Program
SFEP:	San Francisco Estuary Partnership
SFEI:	San Francisco Estuary Institute
SMC:	San Mateo County
SMCWPPP:	San Mateo Countywide Water Pollution Prevention Program
SOP:	Standard Operating Procedure
STLS:	Small Tributaries Load Strategy
SWRP:	Stormwater Resource Plan
SWPPP:	Stormwater Pollution Prevention Plan
TAC:	Technical Advisory Committee
TMA:	Trash Management Area
TMDL:	Total Maximum Daily Load
UGBA:	Urban Greening Bay Area
WLA:	Waste Load Allocation
WY:	Water Year

EXECUTIVE SUMMARY

INTRODUCTION

This FY 2017/18 Annual Report was developed in compliance with the reissued National Pollutant Discharge Elimination System (NPDES) Municipal Regional Permit (referred to as the MRP)[1] for stormwater runoff discharges from San Mateo County and certain other San Francisco Bay Area communities. It summarizes stormwater management activities implemented by the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP or Countywide Program) in FY 2017/18. SMCWPPP's activities benefit all 22 of its member agencies: 15 cities, five towns, the County of San Mateo, and the San Mateo County Flood Control District. Each member agency also separately submits an individual Annual Report to the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) focusing on that agency's stormwater management activities during FY 2017/18.

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SMCWPPP is a program of the City/County Association of Governments (C/CAG) of San Mateo County. C/CAG is a Joint Powers Authority (JPA) for issues of regional importance to San Mateo County jurisdictions. The C/CAG Board of Directors is comprised of a local elected city council representative from each city and town, a member of the County Board of Supervisors, and representatives from the transit district and transportation authority. A 1993 amendment to the JPA Agreement made C/CAG responsible for assisting member agencies with complying with the NPDES municipal stormwater permit, including its latest incarnation as the MRP. Stormwater management-related activities of C/CAG and its various related committees and workgroups are described below.

C/CAG Board

Throughout FY 2017/18, the C/CAG Board of Directors received presentations, updates, and took actions on various stormwater-related issues, as summarized below (all C/CAG Board meeting agenda materials and minutes are available at www.ccag.ca.gov/board-of-directors/):

- July 2017: Approved resolution authorizing the Safe Routes to School and Green Streets Infrastructure Pilot Program, its funding guidelines, and Call for Projects.
- September 2017:
    - Staff presentation on highlights of Countywide Water Pollution Prevention Program activities during FY 2016/17
    - Approved appointment of Khee Lim, Director of Public Works, to represent the City of Millbrae on the Stormwater Committee.

[1]NPDES Permit No. CAS612008 (Order No. R2-2015-0049), dated November 19, 2015 and effective January 1, 2016. The MRP has a five-year term and expires December 31, 2020.

- December 2017: Executed funding agreements with ten member agencies for Safe Routes to School and Green Streets Infrastructure Pilot Projects for a total not to exceed $2,112,863
- February 2018:
    - Extended four on-call contracts for technical support to the Countywide Water Pollution Prevention Program, extending the term through September 2021.
    - Received information on the "Floods, Drought, Rising Seas, OH MY!" event scheduled for March 30, 2018.
- March 2018: approved appointments of Robert Ovadia and Maziar Bozorginia to represent the Town of Atherton and the City of Half Moon Bay, respectively, on the Stormwater Committee.
- June 2018:
    - Approved executing Task Orders for technical support to the Countywide Water Pollution Prevention Program in FY 2018/19.
    - Executed Amendment No. 1 to the funding agreement with the Bay Area Stormwater Management Agencies Association (BASMAA), extending the term through FY 2018/19 and adding an additional funds for C/CAG's contributions to regional stormwater compliance projects.
    - Authorized the Executive Director to execute agreements with the California Department of Transportation to receive grant funding for the "Calm before the Storm: San Mateo Countywide Sustainable Streets Master Plan" project.
    - Approved the addition of the C/CAG Chair and immediate past Chair to the Countywide Water Coordination Committee.
    - Approved appointments of Steven Machida from the City of San Carlos and Norm Dorais from the City of Foster City to serve on the Stormwater Committee.

Program Manager and Staff

C/CAG's Program Manager oversees the overall Countywide Program, serving as staff to the C/CAG Board and liaison among C/CAG's member agencies, technical consultants, committees, BASMAA, the California Stormwater Quality Association (CASQA), and Regional Water Board staff. The Program Manager represents C/CAG's member agencies at regional and statewide meetings and manages technical consultants that support programmatic activities. C/CAG hired an additional stormwater staff member in November 2016 to assist the Program Manager in implementing the Countywide Program. In addition to providing regular staff support, agenda reports, and presentations to the C/CAG Board and the Stormwater Committee, the Program Manager and staff participated in the following activities during the FY 2017/18 reporting year:

- BASMAA: The Program Manager continued representing the Countywide Program on the Board of Directors (re-elected Chair in March 2017, and Vice-Chair in January 2018). Program manager and staff participate in monthly Board meetings, BASMAA regional project meetings, and BASMAA committee meetings.

- CASQA: The Program Manager continued serving on the Board of Directors through the end 2017, finishing his third and final two-year term, participating in/attending monthly Board meetings/calls, quarterly meetings, and strategic planning meetings. Staff attended the annual CASQA conference.
- San Francisco Estuary Partnership Implementation Committee: The Program Manager continued serving on the committee representing the municipal stormwater perspective, participating in quarterly meetings.
- The Program Manager participated in two EPA-sponsored workshops focused on improving municipal stormwater permits. The first two-day meeting was in December 2017 focused on core-program elements, with the second two-day meeting in March focused on monitoring and reporting requirements.
- C/CAG awarded $2.1 million to 10 of its member agencies for Safe Routes to School/Green Streets Infrastructure Pilot projects in December 2017. These projects will help member agencies with green infrastructure implementation as well as load reductions for pollutants of concern.
- The Program Manager/staff gave presentations through organizations such as C/CAG, municipalities, and CASQA on a variety of topics such as stormwater management and green infrastructure.
- Grant Activities: Continued representing BASMAA on the Urban Greening Bay Area grant from EPA (Water Quality Improvement Fund) to the San Francisco Estuary Partnership/Association of Bay Area Governments. BASMAA's grant project finished in 2017/18, with the following tasks taking place during the fiscal year: The Draft Roadmap of Funding Solutions for Sustainable Streets was distributed to Roundtable Participants in September 2017 and discussed at a September 9, 2017 Roundtable meeting. Feedback on the Roadmap was incorporated in the Final Roadmap, which was published in April 2018. BASMAA and SFEP began forming a Roadmap Committee to guide implementation of the Roadmap. The Program Manager presented on the Roadmap at the May 2018 CASQA Quarterly meeting and submitted an abstract for the 2018 CASQA conference, which was accepted as an alternate presentation.

Stormwater Committee

C/CAG's stormwater management-related decisions are generally made in consultation with the NPDES Stormwater Committee. In 2012, the C/CAG Board authorized reconvening this committee to include director-level appointees with decision-making authority for implementing stormwater management programs within the member agencies in compliance with requirements in the MRP. The Committee meets on an approximate bimonthly basis (depending on need) on the third Thursday of the month at the San Mateo County Transit District Office in San Carlos. Public notices for Committee meetings are posted in accordance with Brown Act requirements on the ground floor of the same location.

The Stormwater Committee met five times during FY 2017/18 (September, November, February, April and May) to assist with planning and organizing SMCWPPP's stormwater management activities including MRP compliance actions. Details on Stormwater Committee meeting agendas, minutes, and presentations can be found on the Committee's website. In addition, the Stormwater Committee's ad-hoc permit implementation work group met twice during FY 2017/18 (October 19 and May 8). This small workgroup assists C/CAG staff with priority MRP implementation issues and overall program direction, including helping staff to develop recommendations to bring to the full Stormwater Committee for formal approval.

Technical Advisory Committee and Subcommittees

The Stormwater Committee provides direction to and receives feedback and recommendations from the Technical Advisory Committee (TAC). During FY 2012/13, the TAC transferred its former policy-related functions to the Stormwater Committee and transitioned to a quarterly workshop format. The new format allowed more detailed discussion of particular MRP compliance topics, including check-ins on what jurisdictions should be focused on in the coming quarter and what should have been accomplished and documented in the preceding quarter. The TAC did not meet during FY 2017/18. SMCWPPP has also established various subcommittees and work groups to the TAC that continued to meet periodically throughout FY 2017/18 to help implement the different aspects of the MRP, as summarized below.

C/CAG Water Committee

In October 2015, C/CAG created a new ad-hoc "Water Committee" to serve as a forum for countywide discussion regarding water-related issues and to advise the C/CAG Board regarding countywide collaboration strategies relative to water issues, including potential creation of a new agency or modification of an existing agency to accomplish such collaboration, as well as explore potential funding options. Issues being evaluated include stormwater pollution control, flood control, and sea level rise. The Committee recommended formation of a formal Countywide Water Coordinating Committee, which the C/CAG Board acted upon, with the new committee first meeting in May 2017. The Program Manager and staff, in conjunction with the Executive Director, provide staff support to the Committee. Details on the Committee can be found on C/CAG's website. The Program Manager presented on stormwater planning activities and collaboration opportunities at the Committee's August 2017 meeting.

SUMMARY OF ACCOMPLISHMENTS

This FY 2017/18 Annual Report is structured around the following major provisions of the MRP:

- C.2. Municipal Operations
- C.3. New Development and Redevelopment
- C.4. Industrial and Commercial Site Controls
- C.5. Illicit Discharge Detection and Elimination
- C.6. Construction Site Control
- C.7. Public Information and Outreach
- C.8. Water Quality Monitoring
- C.9. Pesticides Toxicity Control
- C.10. Trash Load Reduction
- C.11. Mercury Controls
- C.12. PCBs Controls
- C.13. Copper Controls
- C.15. Exempted and Conditionally Exempted Discharges

The following sections briefly summarize how SMCWPPP provided assistance in FY 2017/18 in

implementing the MRP for each of these provisions.

C.2 Municipal Operations

The objective of MRP Provision C.2 is to ensure development and implementation of appropriate Best Management Practices (BMPs) by all Permittees to control and reduce discharges of non-stormwater and stormwater runoff pollutants to storm drains and watercourses during operation, inspection, and routine repair and maintenance activities of municipal facilities and infrastructure. Most MRP-required Provision C.2 Municipal Operations tasks are implemented individually by each SMCWPPP member agency. SMCWPPP helps agency staff to understand MRP requirements and develops various tools that assist agency staff to effectively plan, implement, and report on compliance activities. SMCWPPP's assistance and the implementation of Municipal Operations tasks are coordinated through the SMCWPPP Public Works Municipal Maintenance Subcommittee.

During FY 2017/18, SMCWPPP performed a number of tasks to assist member agencies with implementation of Provision C.2, with input and assistance provided by the Public Works Municipal Maintenance Subcommittee. Accomplishments included the following:

- Held two Public Works Municipal Maintenance Subcommittee meetings.
- Organized vendors to present stormwater BMP products at the two Subcommittee meetings.
- Updated a pesticide tracking template, in coordination with the Parks Maintenance and IPM Work Group, to assist member agencies to comply with pesticide tracking and reporting requirements in MRP Provision C.9.a.

C.3 New Development and Redevelopment

In the reporting year FY 2017/18, San Mateo County development projects regulated by Provision C.3 continued to meet stormwater treatment requirements using low impact development (LID) measures, including infiltration, evapotranspiration, rainwater harvesting and use, and biotreatment. During FY 2017/18, SMCWPPP continued to provide compliance assistance with MRP Provision C.3 (and MRP Provision C.6 Construction Site Controls) through the New Development Subcommittee. The subcommittee met quarterly with good participation from municipal staff.

SMCWPPP's accomplishments during FY 2017/18 include the following major tasks to assist member agencies with implementation of Provision C.3:

- Updated guidance documents, checklists, and fact sheets for consistency with MRP requirements and ease of use by municipal staff.
- Participated in the BASMAA Development Committee and led its Green Infrastructure Alternative Sizing Criteria Work Group to develop an approach to sizing green infrastructure facilities in roadway projects.
- Continued a countywide effort to develop different model components of the Green Infrastructure Plans required by MRP Provision C.3.j. The model components were for local member agency review, use and/or modification in their local GI Plans.
- Conducted a variety of green infrastructure outreach activities, including rain barrel program promotion, publishing newsletter articles, and social media posts.

- Held four meetings of a San Mateo Countywide GI Technical Advisory Committee (GI TAC) to participate in the development, review, and selection of work products related to key elements of the GI Plan requirements, and to educate and support GI TAC members in their preparation of GI Plans. The work products can be customized by member agencies for use in their GI Plans.
- Began preparing a suite of green infrastructure design guides, designated the SMCWPPP GreenSuite, for San Mateo County Permittees: 1. Policy and Overview; 2. Buildings and Sites; 3. Sustainable Streets; 4. C.3 Regulated Projects; and 5. Operations and Maintenance.

C.4 Industrial and Commercial Site Controls

An important goal of SMCWPPP's Commercial, Industrial and Illicit Discharge (CII) component is to assist member agencies in controlling the discharge of pollutants in stormwater from commercial and industrial businesses to the maximum extent practicable. SMCWPPP member agencies are responsible for complying with various business inspection requirements under MRP Provision C.4. SMCWPPP's CII component assists member agency staff with understanding these MRP requirements and develops various related tools, templates, reporting forms, and other MRP compliance support materials. SMCWPPP's assistance with MRP Provision C.4 is coordinated through the CII Subcommittee.

During FY 2017/18, SMCWPPP performed a number of tasks to assist member agencies with implementation of MRP Provision C.4, with input and assistance provided by the CII Subcommittee. Accomplishments included the following:

- Held four CII Subcommittee meetings.
- Held a CII Inspector Training Workshop on February 28, 2018.
- Adapted postcards from the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) on (1) BMPs for Dumpsters, (2) General Storm Drain Dumping, and (3) Vehicles Dripping Auto Fluids.
- Updated the Facility Stormwater Inspection Form Template.
- Developed a Stormwater Inspection Tracking Excel Template.
- Updated the Business Stormwater Inspector contact list on the SMCWPPP website.
- Organized demonstrations of cities' data management systems at a Subcommittee meeting.

C.5 Illicit Discharge Detection and Elimination

Another important goal of SMCWPPP's CII component is to assist member agencies effectively prohibit the discharge of illicit, non-stormwater discharges to the municipal storm drain system. SMCWPPP member agencies are responsible for controlling non-stormwater discharges prohibited by MRP Provision C.5. SMCWPPP's CII component assists member agency staff with understanding these MRP requirements and develops various related tools, templates, reporting forms, and other MRP compliance support materials. SMCWPPP's assistance with MRP Provision C.5 is coordinated through the CII Subcommittee.

During FY 2017/18, SMCWPPP performed a number of tasks to assist member agencies with implementation of MRP Provision C.5, with input and assistance provided by the CII Subcommittee. Accomplishments included the following:

- Updated the Illicit Discharge contact list on the SMCWPPP website.

- Updated the table of stormwater enforcement actions against mobile businesses to share countywide with stormwater inspectors.

C.6 Construction Site Control

During FY 2017/18, SMCWPPP continued to provide compliance assistance with MRP Provision C.6 (and MRP Provision C.3) through the New Development Subcommittee (described above under C.3. New Development and Redevelopment).

SMCWPPP's accomplishments during FY 2017/18 include the following major tasks to assist member agencies with implementation of Provision C.6:

- Conducted a construction site controls training for the California Building Inspectors Group (CALBIG) on October 11, 2017.
- Conducted the March 20, 2018 Construction Site Inspector Workshop.
- Updated and then printed 2,000 copies of the Construction Site Inspection Form and distributed them to the Subcommittee members.
- Updated the SMCWPPP inspection data tracking template.

C.7 Public Information and Outreach

The primary goals of SMCWPPP's Public Information and Participation (PIP) component are to:

- Educate the public about the causes of stormwater pollution and its adverse effects on water quality in local creeks, lagoons, shorelines and neighborhoods;
- Encourage residents to adopt less polluting and more environmentally beneficial practices; and
- Increase resident's participation and involvement in SMCWPPP activities.

PIP is essential for controlling and reducing the source of pollution since many preventable pollutants are associated with everyday residential activity. Stormwater pollution may be reduced when residents are educated and motivated by the benefits of reducing pollutants. This approach of education and motivation is cost-effective and efficient in meeting the goal of reducing pollutants in stormwater to the maximum extent practicable. SMCWPPP's accomplishments during FY 2017/18 include the following major tasks to assist member agencies with implementation of Provision C.7:

- Partnered with Bay Area Water Conservation Supply Agency (BAWSCA) on a Rain Barrel outreach campaign that received 975 website page views. Received 50 rebate applications from residents and distributed rain barrel rebate fliers at outreach events. Over 1,050 rain barrels have been installed to-date in San Mateo County under the rebate program.
- Promoted the San Mateo County Environmental Health Services (CEH) campaign to reduce littering of cigarette butts.
- Promoted and attended Coastal Cleanup Day (4,447 volunteers this year), raising awareness of the event and the consequences of littering behaviors.
- Promoted Caltrans educational materials in English and Spanish regarding uncovered loads.
- Gained 4,651 new Facebook fans with a total of 365,975 total page reach with stormwater pollution prevention Facebook messaging.

- Gained 1,405 new Twitter followers with 109,729 total page reach with stormwater pollution prevention messaging.
- Sent six newsletters to a list of 2,813 opt-in subscribers with topics covering eco-friendly gardening practices, local cleanup events, and stormwater pollution prevention information and tips.
- Received 11,026 visitors to the SMCWPPP website, which focuses on stormwater pollution prevention messaging and resources.
- Participated in 10 public outreach and citizen involvement events in San Mateo County, to speak one-on-one with residents, perform demonstrations, and hand out collateral materials. Had SMCWPPP materials distributed at an additional 14 outreach events by a partnering agency.
- Planned and launched a countywide school outreach program that asked students to submit proposals to green up their school campus, reaching approximately 150 students.
- Performed point-of-purchase outreach with Our Water Our World (OWOW) materials to 10 hardware stores in San Mateo County while training store employees on eco-friendly alternatives to pesticides.
- Promoted outreach messaging to residents regarding eco-friendly alternatives to pesticides in SMCWPPP's newsletter, website and social media channels.

C.8 Watershed Quality Monitoring

On behalf of it member agencies, SMCWPPP performs water quality monitoring activities in compliance with MRP Provision C.8. Some of this work is accomplished through participation in BASMAA regional projects. Per Provision C.8, a complete documentation of all water quality monitoring data collected from October 1, 2017 through September 30, 2018 (i.e., Water Year 2018 or WY 2018) will be presented in SMCWPPP's Urban Creeks Monitoring Report, which will be submitted to the Regional Water Board by March 31, 2019.

In addition, in accordance with MRP Provision C.8.f., Pollutants of Concern (POC) Monitoring, SMCWPPP will submit by October 15, 2018 a report describing the POC Monitoring tasks accomplished in WY 2018 and the planned allocation of sampling effort for POC Monitoring in WY 2019. The report will include monitoring locations, number and types of samples collected, a description of the objectives of the sampling (i.e., management question addressed), and the analytes measured. However, per Provision C.8.h., the results of the monitoring will not be included, but instead will be documented in the Urban Creeks Monitoring Report, as described above.

C.9 Pesticides Toxicity Control

The primary objective of MRP Provision C.9 is to prevent the impairment of urban streams by pesticide-related toxicity, and thereby implements requirements of the *TMDL for Diazinon and Pesticide-related Toxicity for Urban Creeks* in the region. Permittees are required to implement a pesticide toxicity control program that addresses their own and others' use of pesticides within their jurisdictions that pose a threat to water quality and that have the potential to enter the municipal stormwater conveyance system. Most MRP-required Provision C.9 tasks are implemented individually by each SMCWPPP member agency. SMCWPPP helps agency staff to understand MRP requirements and develops various tools that assist agency staff to effectively plan, implement, and report on compliance activities. SMCWPPP's assistance

with MRP Provision C.9 Pesticides Toxicity Control is mainly coordinated through the Parks Maintenance and Integrated Pest Management (IPM) Work Group.

During FY 2017/18, SMCWPPP performed a number of tasks to assist member agencies with implementation of Provision C.9, with input and assistance provided by the Parks Maintenance and IPM Work Group. Accomplishments included the following:

- Held two meetings of the Parks Maintenance and IPM Work Group.
- Developed periodic update documents with relevant pesticide-related news, events and regulatory developments for the Parks Maintenance and IPM Work Group.
- Conducted SMCWPPP's Annual Landscape IPM Training Workshop in March 2018.
- Conducted an IPM Contractor Management Workshop in May 2018.
- Continued coordinating with San Mateo County Agriculture / Weights and Measures.
- Participated in relevant BASMAA and CASQA activities.
- Continued to maintain retail partnerships at 10 top-tier stores (e.g., Home Depot and OSH) within San Mateo County. Tasks included ordering materials, organizing outreach collateral, checking in with store managers, and providing outreach to residents.
- Educated hardware store employees to become program messengers and pass on the pollution prevention message to customers. Conducted five in-store trainings for store employees.
- Conducted outreach at community events to educate customers on less toxic alternatives to commercial pesticides and fertilizers.

C.10 Trash Load Reduction

MRP Provision C.10 Trash Load Reduction tasks are implemented by each SMCWPPP member agency. SMCWPPP helps agency staff to understand trash load reduction requirements and develops various tools needed to effectively plan, implement, and report on compliance with trash management activities. Provision C.10 requires Permittees (as applicable) to:

- Reduce trash discharges from 2009 levels by 70% by July 2017 and 80% by July 2019;
- Ensure that lands they do not own or operate but that are plumbed directly to their storm drain systems in Very High, High and Moderate trash generation areas are equipped by full capture systems or managed to a level equivalent to full capture systems;
- Install and maintain full capture systems that treat a mandatory minimum acreage;
- Assess trash reductions associated with control measures other than full capture systems using an on-land visual assessment protocol;
- Develop and implement a receiving waters trash monitoring program plan;
- Annually cleanup and assess a mandatory minimum number of creek/shoreline trash hotspots; and
- Maintain a Long-Term Trash Load Reduction Plan designed to achieve 100% trash reduction by July 2022.

During FY 2017/18, SMCWPPP performed a number of tasks to assist member agencies with

implementation of Provision C.10 and the requirements listed above, with input and assistance provided by the SMCWPPP Trash Subcommittee and the Litter Work Group. Accomplishments included the following:

- Coordinated and facilitated four meetings of SMCWPPP's Trash Subcommittee and four meetings of SMCWPPP's Litter Work Group.
- Assisted SMCWPPP member agencies in delineating trash full capture treatment areas in GIS.
- Continued to implement SMCWPPP's Trash Assessment Strategy, including conducting roughly 750 On-land Visual Trash Assessments (OVTAs) at about 250 sites and maintaining the Program's online OVTA database to allow member agencies access to timely load reduction estimates.
- Continued to provide guidance to member agencies on MRP operation and maintenance (O&M) requirements and standard operating procedures for trash full capture systems.
- Collated and standardized data from 32 trash hot spot assessments and cleanups, and entered the data into the SMCWPPP hot spot database.
- Finalized and distributed the *Litter Reduction Toolkit for Multi-family Dwellings* which provides member agency staff with design guidance and information on BMPs for reducing litter at multi-family properties in San Mateo County.
- Held the Litter Work Group's 3rd Roundtable Event on May 30, 2018 to share information and best practices for reducing illegal dumping in communities and discuss the associated administrative, legal and practical challenges.
- Distributed the report on *Litter Practices Recommendations for Solid Waste Franchise Agreements* to member agencies.
- Coordinated with the SMCWPPP Public Information and Participation (PIP) Subcommittee on countywide school outreach and countywide litter campaign branding efforts.
- Coordinated with Rethink Waste on franchise agreement issues related to reducing litter.
- Coordinated with Caltrans on trash capture efforts, including the installation of trash full-capture systems through cooperative implementation agreements.
- Identified for each member agency areas >10,000 ft^2 draining to private inlets connected to its MS4.
- Participated in the development and re-submittal of the revised *BASMAA Receiving Waters Trash Monitoring Program Plan*, in compliance with MRP provision C.10.b.v.
- Conducted qualitative trash receiving water monitoring at 30 creek/channel sites and conducted a field training for member agency staff on protocols included in the *BASMAA Receiving Waters Trash Monitoring Program Plan.*
- Assisted member agencies in developing information necessary for reporting trash load reductions with their FY 2017/18 annual reports.

C.11 Mercury Controls

MRP Provision C.11 Mercury Controls implements stormwater runoff-related actions required by the San Francisco Bay mercury Total Maximum Daily Load (TMDL) water quality restoration program. SMCWPPP performs a variety of activities to address mercury in stormwater runoff in compliance with

MRP Provision C.11. Some of this work is accomplished via participation in BASMAA regional projects. Please note that efforts that address both PCBs and mercury are described in this section rather than the following section (Section 12, PCBs Controls). Section 12 focuses on efforts that address PCBs only.

MPR Provisions C.11/12.b., Assess Mercury/PCBs Load Reductions from Stormwater, required Permittees to submit in their 2015/16 Annual Report for Executive Officer approval an assessment methodology. The purpose of the assessment methodology is to quantify in a technically sound manner mercury and PCBs loads reduced through implementation of a variety of pollutant controls, including pollution prevention, source control, and stormwater runoff treatment measures such as green infrastructure. SMCWPPP and its member agencies helped develop the assessment methodology through participation in a BASMAA regional project. The assessment methodology developed via the BASMAA regional project is referred to as the Interim Accounting Methodology and has been approved by the Executive Officer of the Regional Water Board.

Beginning with the 2016/17 Annual Report, Permittees are required to report on the use of the methodology to demonstrate progress toward achieving the mercury and PCBs load reductions required in this permit term. SMCWPPP's and its member agencies' efforts to implement control measures to achieve mercury and PCBs load reductions in San Mateo County and the load reductions quantified to-date are described in a separate report (*Updated Control Measures Plan for PCBs and Mercury in San Mateo County Stormwater Runoff, SMCWPPP, September 30, 2018*). Appendix 12 contains the report. In addition, the estimated cumulative mercury and PCBs loads reduced to-date by all Permittees during the time period of FY 2013/14 through FY 2017/18 are described and compared to load reduction requirements in a document entitled *Regional PCBs and Mercury Load Reductions* (see Appendix 11).

Permittees are also required to conduct a Reasonable Assurance Analysis (RAA) to demonstrate quantitatively that mercury and PCBs load reductions specified in the MRP will be achieved by 2040 through implementation of green infrastructure. During FY 2016/17, SMCWPPP worked proactively to make an early start on development of approaches for quantifying mercury and PCBs loads in San Mateo County, and developing modeling approaches to performing the RAA to demonstrate that future control measures will provide sufficient pollutant load reductions to meet permit requirements and the countywide portions of TMDL wasteload allocations. During FY 2017/18, SMCWPPP continued linking the baseline USEPA Loading Simulation Program C++ (LSPC) model with USEPA's System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN), which provides simulation of green infrastructure and estimation of pollutant load reductions. The model has been configured based on the project opportunities identified in the San Mateo Countywide Stormwater Resource Plan (SWRP) for LID retrofit, Green Streets, and regional stormwater capture projects, as well as projects of LID for new and redevelopment (C.3) and green infrastructure projects currently constructed. During FY 2017/18, SUSTAIN was used to begin testing various alternative strategies for achieving countywide mercury and PCBs load reduction targets for green infrastructure. SMCWPPP also developed methods for reporting RAA output that will inform each Permittee on the goals for green infrastructure to be considered during the efforts to plan control measures for mercury and PCBs in coordination with green infrastructure planning. Additional description of the baseline LSPC and SUSTAIN green infrastructure model is provided in Appendix 11 (see memorandum entitled *Quantitative Relationship between Green Infrastructure Implementation and PCBs/Mercury Load Reduction*). These efforts will continue into FY 2018/19, with results that will inform green infrastructure plan development.

Per MRP Provision C.11/12.c.iii (1), Permittees must include in the FY 2017/18 Annual Report a report on the approach to be used by the RAA to establish the quantitative relationship between green infrastructure implementation and PCBs and mercury load reductions. The submittal must include all data used and a full description of models and model inputs relied on to establish this relationship. Accordingly, Appendix 11 includes a preliminary report on the RAA approach that SMCWPPP is using to support green infrastructure planning efforts by Permittees in San Mateo County (see memorandum entitled *Quantitative Relationship between Green Infrastructure Implementation and PCBs/Mercury Load Reduction*). Since the FY 2017/18 Annual Report precedes the completion and documentation of the RAA, the memorandum provides a description of the models supporting the RAA, methods for using the model to determine stormwater improvement goals to be met with green infrastructure, and RAA output that will be used to demonstrate the relationship between green infrastructure implementation and pollutant load reduction and set goals for municipal green infrastructure planning.

During FY 2017/18, SMCWPPP also continued to participate in the regional BASMAA RAA Workgroup, which supports and coordinates Permittee efforts to plan control measures for mercury and PCBs in coordination with green infrastructure planning. Following completion of the BASMAA Bay Area RAA Guidance in 2017, the BASMAA RAA Workgroup has continued to meet to discuss opportunities to share information between countywide RAA efforts, present the status of RAAs to Regional Water Board staff, and identify regional studies or approaches for peer review to support Permittee efforts to perform the RAA. SMCWPPP has presented to the RAA Workgroup and the regional Pollutants of Concern (POC) Steering Committee on the status of the San Mateo Countywide RAA.

MRP Provisions C.11/12.d require that Permittees prepare a plan and schedule for mercury and PCBs control measure implementation and a corresponding RAA demonstrating quantitatively that sufficient control measures will be implemented to attain the mercury and PCBs TMDL wasteload allocations by 2028 and 2030, respectively. The plan and schedule are due in September 2020. As described in the previous section and in Appendix 11, SMCWPPP has begun developing modeling approaches for quantifying mercury and PCBs loads in San Mateo County and conducting the RAA. SMCWPPP will continue these efforts into FY 2018/19, along with continuing to develop a longer-term control measures plan to attain the San Mateo County portions of the mercury and PCBs TMDL wasteload allocations.

MRP Provisions C.11.e and C.12.h require Permittees to conduct an ongoing risk reduction program to address public health impacts of mercury and PCBs in San Francisco Bay fish. During FY 2017/18, SMCWPPP continued to assist its member agencies comply with the risk reduction program requirements by coordinating with and reporting on the Fish Smart program conducted by San Mateo County Environmental Health Services. During FY 2017/18, CEH conducted a variety of activities that target at-risk populations (e.g., subsistence fisherman) via the Fish Smart program. Activities included maintaining signs that were previously posted by CEH at 11 locations along the Bay's shore (e.g., at fishing piers), printing an existing brochure entitled "Guide to Eating Fish and Shellfish from San Francisco Bay" in English, Spanish, Chinese, and Tagalog, distributing the brochure and other educational materials at targeted locations, providing a presentation on the Fish Smart program to San Mateo County Family Health Division Women, Infant, and Children (WIC) employees, social media posts on the Fish Smart program, and maintaining the smchealth.org/fishsmart webpage. Cumulatively, CEH had a total of nearly 12,000 electronic or in person Fish Smart program impressions for FY 2017/18.

C.12 PCBs Controls

MRP Provision C.12, PCBs Controls, implements stormwater runoff-related actions required by the San Francisco Bay PCB Total Maximum Daily Load (TMDL) water quality restoration program. SMCWPPP performs a variety of activities to address PCBs in stormwater runoff in compliance with MRP Provision C.12. Please note that efforts that address both PCBs and mercury are described in the previous section (Section 11, Mercury Controls). This section focuses on efforts that address PCBs only.

Permittees are required to report on the use of the Interim Accounting Methodology to demonstrate progress toward achieving PCBs load reductions required in this permit term. The estimated PCBs load reduction across the permit area over the time period of FY 2013/14 through FY 2017/18 is 691 g/year, indicating that the MRP regional performance criterion of a 500 g/year PCBs load reduction by July 2018[2] has been achieved (see the document entitled Regional PCBs and Mercury Load Reductions included in Appendix 11).

MRP Provision C.12.e requires that Permittees collect samples of caulk and other sealants used in storm drains and between concrete curbs and street pavement and investigate whether PCBs are present in such material and in what concentrations. During FY 2017/18, SMCWPPP staff continued to participate in the BASMAA regional project that is addressing Provision C.12.e., including serving as the BASMAA project manager. The project team completed the investigation in FY 2017/18 by developing a final study design, collecting 54 samples of caulk and sealant materials from ten types of roadway and storm drain infrastructure throughout the MRP area, compositing the samples and submitting to a laboratory for analysis for the RMP-40 PCBs congeners, and preparing a project report that presents and discusses the full details of the investigation.

Provision C.12.f requires that Permittees develop and implement or cause to be developed and implemented an effective protocol for managing materials with PCBs concentrations of 50 ppm or greater in applicable structures at the time such structures undergo demolition, so that PCBs do not enter municipal storm drain systems. In FY 2017/18, BASMAA continued to conduct a multi-year regional project to assist MRP Permittees to address Provision C.12.f. SMCWPPP staff continued to participate in the regional project, including serving as the BASMAA project manager. The project, which began in FY 2016/17, is developing guidance materials, tools and training materials and conducting outreach. The goal is to assist Permittees to develop local programs to prevent PCBs from being discharged to municipal storm drains due to demolition of applicable buildings. Local agencies will need to tailor the BASMAA products for local use, adopt the program (e.g., via local ordinance), and train local staff to implement the new program. During FY 2017/18, the project Technical Advisory Group (TAG), a small balanced advisory group formed from industry, regulatory, and Permittee representatives, continued to meet. Other efforts to engage key stakeholders included an industry stakeholder roundtable meeting (August 2017) and two larger stakeholder group meetings (December 2017 and May 2018) that included industry, regulatory and municipal representatives. Major deliverables completed during FY 2017/18 included a protocol for pre-demolition building survey for priority PCBs-containing building materials, model language for municipal adoption (e.g., via ordinance) of the new program to manage PCBs materials during building demolition and model supporting staff report and resolution, and supplemental demolition permit model application materials, including forms, process flow charts, and applicant instructions. During the first half of FY 2018/19, the project will conclude by conducting outreach and training tasks.

[2] It is important to note that the MRP allows Permittees to meet the regional criterion as a group – criteria for individual counties would only apply when the regional group criterion was not met.

Provision C.12.g requires Permittees to conduct or cause to be conducted studies concerning the fate, transport, and biological uptake of PCBs discharged from urban runoff to San Francisco Bay margin areas. This provision is being addressed through a multi-year project by the Regional Monitoring Program (RMP) to develop a series of conceptual models of PCBs in Priority Margin Units (PMUs). During FY 2017/18, SMCWPPP and BASMAA staff continued participating in the RMP PCBs Work Group that oversees this project. Urban embayments along the Bay shoreline with management actions to address PCBs planned or ongoing in the upstream watersheds were selected as PMU for conceptual modeling. Conceptual site models have been developed for two PMUs in Alameda County, the Emeryville Crescent and San Leandro Bay (the latter is still in draft form), and a model is under development Steinberger Slough in San Mateo County. The conceptual models are intended to provide a foundation for future monitoring to track responses to load reductions and may eventually help guide planning of management actions.

C.13 Copper Controls

Provision C.13 of the MRP addresses copper control measures identified in the San Francisco Bay Basin Water Quality Control Plan (commonly referred to as the Basin Plan) that the Regional Water Board has deemed necessary to support copper site-specific objectives in San Francisco Bay. SMCWPPP's accomplishments during FY 2017/18 include the following tasks to assist member agencies with implementation of Provision C.13:

- Continued to train municipal inspectors on the MRP requirements and BMPs for architectural copper installation, cleaning, and treating. The trainings utilized a SMCWPPP factsheet entitled "Requirements for Architectural Copper: Protect water quality during installation, cleaning, treating, and washing!" which targets suppliers and installers of copper materials and is available on the SMCWPPP website (www.flowstobay.com). Construction site inspectors received the information during the March 20, 2018 SMCWPPP Construction Site Inspection Workshop and building inspectors received the information from a SMCWPPP staff presentation at the California Building Inspectors Group (CALBIG) meeting on October 11, 2017.
- Provided BMP information related to managing discharges from pools, spas and fountains that contain copper-based chemicals on the SMCWPPP website.
- Provided information through the SMCWPPP website on ensuring through routine industrial facility inspections that proper BMPs are in place at industrial facilities likely to use copper or have sources of copper. In addition, industrial inspectors received information on this topic during SMCWPPP's CII training workshop on February 28, 2018.

C.15 Exempted and Conditionally Exempted Discharges

The objective of MRP Provision C.15, Exempted and Conditionally Exempted Discharges, is to exempt unpolluted non-stormwater discharges from the MRP's general non-stormwater discharge prohibition (Provision A.1) and to conditionally exempt non-stormwater discharges that are potential sources of pollutants. During FY 2017/18, SMCWPPP continued to assist municipal staff with understanding the MRP's requirements and made available for their use various MRP compliance support materials. The SMCWPPP CII Subcommittee facilitates and coordinates providing this assistance to the member agencies for a variety of different types of non-stormwater discharges that may be conditionally exempted.

In addition, during FY 2017/18 SMCWPPP's PIP component conducted selected activities to help San Mateo County Permittees comply with outreach requirements in Provision C.15.b.iv. Individual

Residential Car Washing Discharge and Provision C.15.b.vi. Irrigation Water, Landscape Irrigation, and Lawn or Garden Watering, including the following:

- SMCWPPP continued to promote water-saving tips via social media.
- SMCWPPP used social media to continue previous years' outreach efforts to encourage residents to use car washes rather than washing their cars at home. SMCWPPP also targeted mobile car wash businesses to educate them on the hazards of dumping their used wash waters down storm drains.
- SMCWPPP continued conducting outreach to San Mateo County residents to support and promote eco-friendly alternatives to toxic pesticides. This promotion took place on social media and the SMCWPPP quarterly newsletter and blog. Additional messaging was provided through SMCWPPP's point-of-purchase program, where materials from the Our Water Our World (OWOW) point-of-purchase outreach program were distributed that educate residents about eco-friendly pesticide alternatives.
- SMCWPPP continued promoting planting of drought tolerant, native vegetation through its online media channels, including social media and the SMCWPPP quarterly newsletter and blog. Messaging focused on the environmental benefits of planting native plants, including their tolerance to drought. Resources were included to identify native plants and how to plant and maintain them.

SECTION 1
INTRODUCTION

BACKGROUND

This FY 2017/18 Annual Report was developed in compliance with the reissued National Pollutant Discharge Elimination System (NPDES) Municipal Regional Permit (referred to as the MRP)[1] for stormwater runoff discharges from San Mateo County and certain other San Francisco Bay Area communities. It summarizes stormwater management activities implemented by the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP or Countywide Program) in FY 2017/18. SMCWPPP's activities benefit all 22 of its member agencies: 15 cities, five towns, the County of San Mateo, and the San Mateo County Flood Control District. Each member agency also separately submits an individual Annual Report to the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) focusing on that agency's stormwater management activities during FY 2017/18.

The organizational structure of SMCWPPP is shown on Figure 1-1. SMCWPPP is a program of the City/County Association of Governments (C/CAG) of San Mateo County. C/CAG is a Joint Powers Authority (JPA) that addresses issues of regional importance to San Mateo County jurisdictions such as congestion management and water quality. The C/CAG Board of Directors is comprised of a local elected city council representative from each city and town in San Mateo County, a member of the County Board of Supervisors, and representatives from the transit district and transportation authority. A 1993 amendment to the JPA Agreement made C/CAG responsible for assisting member agencies with complying with the municipal stormwater NPDES permit, including its latest incarnation as the MRP. Stormwater management-related activities of C/CAG and its various related committees and workgroups are described below.

C/CAG Board

Throughout FY 2017/18, the C/CAG Board of Directors received presentations, updates, and took actions on various stormwater-related issues, as summarized below (all C/CAG Board meeting agenda materials and minutes are available at www.ccag.ca.gov/board-of-directors/):

- July 2017: Approved resolution authorizing the Safe Routes to School and Green Streets Infrastructure Pilot Program, its funding guidelines, and Call for Projects.

[1]NPDES Permit No. CAS612008 (Order No. R2-2015-0049), dated November 19, 2015 and effective January 1, 2016. The MRP has a five-year term and expires December 31, 2020.

- September 2017:
  - Staff presentation on highlights of Countywide Water Pollution Prevention Program activities during FY 2016/17
  - Approved appointment of Khee Lim, Director of Public Works, to represent the City of Millbrae on the Stormwater Committee.
- December 2017: Executed funding agreements with ten member agencies for Safe Routes to School and Green Streets Infrastructure Pilot Projects for a total not to exceed $2,112,863
- February 2018:
  - Extended four on-call contracts for technical support to the Countywide Water Pollution Prevention Program, extending the term through September 2021.
  - Received information on the "Floods, Drought, Rising Seas, OH MY!" event scheduled for March 30, 2018.
- March 2018: approved appointments of Robert Ovadia and Maziar Bozorginia to represent the Town of Atherton and the City of Half Moon Bay, respectively, on the Stormwater Committee.
- June 2018:
  - Approved executing Task Orders for technical support to the Countywide Water Pollution Prevention Program in FY 2018/19:
    - Amended Task Order EOA-06 and executed Task Orders EOA-07, and EOA-08 with EOA, Inc. in amounts not to exceed $191,960, $830,000, and $390,000, respectively.
    - Executed Task Order LWA-04 with Larry Walker Associates in an amount not to exceed $314,000.
    - Executed Task Order SGA-04 with S. Groner Associates in an amount not to exceed $275,000.
  - Executed Amendment No. 1 to the funding agreement with the Bay Area Stormwater Management Agencies Association, extending the term through FY 2018/19 and adding an additional $107,000 for C/CAG's contributions to regional stormwater compliance projects for a new total of $389,426.
  - Authorized the Executive Director to execute agreements with the California Department of Transportation to receive grant funding in the amount of $986,300 for the "Calm Before the Storm: San Mateo Countywide Sustainable Streets Master Plan" project.
  - Approved the addition of the C/CAG Chair and immediate past Chair to the Countywide Water Coordination Committee.
  - Approved appointments of Steven Machida from the City of San Carlos and Norm Dorais from the City of Foster City to serve on the Stormwater Committee.

Program Manager and Staff

C/CAG's Program Manager oversees the overall Countywide Program, serving as staff to the C/CAG Board and liaison among C/CAG's member agencies, technical consultants, committees, the Bay Area Stormwater Management Agencies Association (BASMAA), the California Stormwater Quality Association (CASQA), and Regional Water Board staff. The Program Manager represents C/CAG's member agencies at regional and statewide meetings and manages technical consultants that support programmatic activities. C/CAG hired an additional stormwater staff member in November 2016 to assist the Program Manager in implementing the Countywide Program. In addition to providing regular staff support, agenda reports, and presentations to the C/CAG Board and the Stormwater Committee, the Program Manager and staff participated in the following activities during the FY 2017/18 reporting year:

- BASMAA: The Program Manager continued representing the Countywide Program on the Board of Directors (re-elected Chair in March 2017, and Vice-Chair in January 2018). Program manager and staff participate in monthly Board meetings, BASMAA regional project meetings, and BASMAA committee meetings;
- CASQA: The Program Manager continued serving on the Board of Directors through the end 2017, finishing his third and final two-year term, participating in/attending monthly Board meetings/calls, quarterly meetings, and strategic planning meetings. Staff attended the annual CASQA conference;
- San Francisco Estuary Partnership Implementation Committee: The Program Manager continued serving on the committee representing the municipal stormwater perspective, participating in quarterly meetings;
- The Program Manager participated in two EPA-sponsored workshops focused on improving municipal stormwater permits. The first two-day meeting was in December 2017 focused on core-program elements, with the second two-day meeting in March focused on monitoring and reporting requirements.
- C/CAG awarded $2.1 million to 10 of its member agencies for Safe Routes to School/Green Streets Infrastructure Pilot projects in December 2017. These projects will help member agencies with Green Infrastructure implementation as well as load reductions for pollutants of concern.
- Presentations by the Program Manager/staff:
    - C/CAG Countywide Water Coordination Committee ("Stormwater Planning," August)
    - C/CAG Board of Directors ("Stormwater Program Highlights 2016-17," September)
    - CASQA Annual Conference ("Out on a Limb but Front of the Line: Preparing the First Stormwater Resource Plan in the San Francisco Region," September)
    - Daly City staff ("Green Infrastructure Summary," October)
    - San Francisco Estuary Partnership Implementation Committee ("BASMAA Regional Roundtable on Sustainable Streets," November)
    - Floods, Droughts, Rising Seas, Oh My! Water Summit ("The Future of Stormwater Management in San Mateo County," March)
    - San Mateo County staff (Reasonable Assurance Analysis and Green Infrastructure planning updates, January, April, and May)

- CASQA Quarterly Meeting ("BASMAA Roadmap of Funding Solutions for Sustainable Streets," May)

- Grant Activities: Continued representing BASMAA on the Urban Greening Bay Area grant from EPA (Water Quality Improvement Fund) to the San Francisco Estuary Partnership/Association of Bay Area Governments. BASMAA's grant project finished in 2017/18, with the following tasks taking place during the fiscal year: The Draft Roadmap of Funding Solutions for Sustainable Streets was distributed to Roundtable Participants in September 2017 and discussed at a September 9, 2017 Roundtable meeting. Feedback on the Roadmap was incorporated in the Final Roadmap, which was published in April 2018. BASMAA and SFEP began forming a Roadmap Committee to guide implementation of the Roadmap. The Program Manager presented on the Roadmap at the May 2018 CASQA Quarterly meeting and submitted an abstract for the 2018 CASQA conference, which was accepted as an alternate presentation.

Stormwater Committee

C/CAG's stormwater management-related decisions are generally made in consultation with the NPDES Stormwater Committee. At its November 2012 meeting, the C/CAG Board authorized reconvening this committee to include director-level appointees with decision-making authority for implementing stormwater management programs within the member agencies in compliance with requirements in the MRP. The Committee meets on an approximate bimonthly basis (depending on need) on the third Thursday of the month at the San Mateo County Transit District Office in San Carlos. Public notices for Committee meetings are posted in accordance with Brown Act requirements on the ground floor of the same location.

The Stormwater Committee met five times during FY 2017/18 (September, November, February, April and May) to assist with planning and organizing SMCWPPP's stormwater management activities including MRP compliance actions. Appendix 1 includes a table summarizing attendance at the Stormwater Committee meetings held during FY 2017/18. Details on Stormwater Committee meeting agendas, minutes, and presentations can be found on the Committee's website.

In addition, the Stormwater Committee's ad-hoc permit implementation work group met twice during FY 2017/18 (October 19 and May 8). This small workgroup assists C/CAG staff with priority MRP implementation issues and overall program direction, including helping staff to develop recommendations to bring to the full Stormwater Committee for formal approval.

The below sections describe the Stormwater Committee's mission statement, membership criteria, and roles and responsibilities.

Mission Statement

The Stormwater Committee provides policy and technical advice and recommendations to the C/CAG Board of Directors and direction to technical committees (described below) on all matters relating to stormwater management and compliance with associated regulatory mandates from the State and Regional Water Boards.

Membership

The Stormwater Committee is comprised of one director-level representative from each of the member agencies, recommended by City/Town/County Managers, with decision-making authority and primary responsibility for implementing stormwater management programs within their jurisdictions, and one non-voting executive management representative from the Regional Water Board staff, all appointed by the C/CAG Board. There are no term limits and members may be removed and replaced as needed.

Roles & Responsibilities

The role of the Stormwater Committee is to provide policy and technical advice, recommendations to the C/CAG Board, and direction to stormwater technical committees on matters related to stormwater management and associated regulatory requirements. While the Stormwater Committee may consider any item reasonably related to stormwater and associated regulatory requirements, the following issues are the primary focus of the Stormwater Committee:

- Review and provide recommendations for SMCWPPP's annual budget as part of the overall C/CAG budget approval process.
- Authorize submittal of countywide and regional compliance documents on behalf of their respective agencies for activities performed via C/CAG through SMCWPPP or BASMAA.
- Convey relevant program and compliance information and direction to appropriate staff and departments within their agencies.
- Form ad-hoc work groups to address particular stormwater-related issues on an as-needed basis (e.g., permit reissuance).
- Discuss and provide policy recommendations on stormwater issues, such as:
    - funding stormwater compliance activities at the local and countywide level;
    - unfunded mandate test claims;
    - permit appeals and litigation;
    - reissuance of the Municipal Regional Permit;
    - permit requirements, especially those related to new and redevelopment, green infrastructure, monitoring, and pollutants of concern, including trash, mercury, PCBs, and pesticides;
    - training and technical support needs for municipal staffs; and
    - legislation and statewide policy issues impacting member agencies.

Technical Advisory Committee and Subcommittees

The Stormwater Committee provides direction to and receives feedback and recommendations from the Technical Advisory Committee (TAC). During FY 2012/13, the TAC transferred its former policy-related functions to the Stormwater Committee and transitioned to a quarterly workshop format. The new format allowed more detailed discussion of particular MRP compliance topics, including check-ins on what jurisdictions should be focused on in the coming quarter and what should have been accomplished and documented in the preceding quarter. The TAC did not meet in FY 2017/18 but received regular

emails from the Program Manager and staff with updates on key permit compliance topics and occasional requests for feedback.

SMCWPPP has also established various subcommittees and work groups to the TAC to help implement the different aspects of MRP, as shown on Figure 1-1. The subcommittees and work groups met regularly during FY 2017/18 and are discussed further in the remaining sections of this report.

C/CAG Water Committee

In October 2015, C/CAG created a new ad-hoc "Water Committee" to serve as a forum for countywide discussion regarding water-related issues and to advise the C/CAG Board regarding countywide collaboration strategies relative to water issues, including potential creation of a new agency or modification of an existing agency to accomplish such collaboration, as well as explore potential funding options. Issues being evaluated include stormwater pollution control, flood control, and sea level rise. The Committee recommended formation of a formal Countywide Water Coordinating Committee, which the C/CAG Board acted upon, with the new committee first meeting in May 2017. The Program Manager and staff, in conjunction with the Executive Director, provide staff support to the Committee. Details on the Committee can be found on C/CAG's website. The Program Manager presented on stormwater planning activities and collaboration opportunities at the Committee's August 2017 meeting.

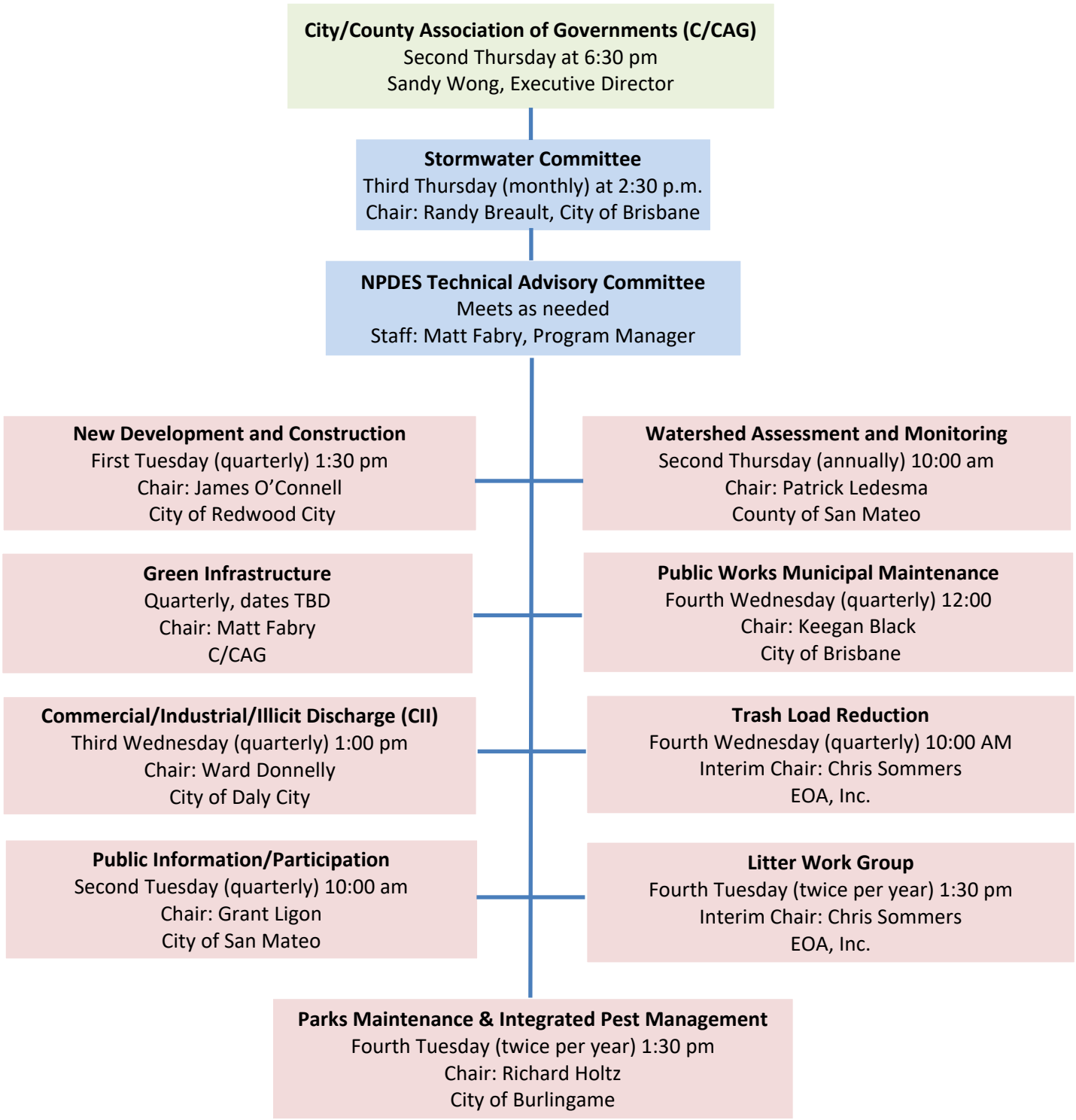
ORGANIZATION OF REPORT

This FY 2017/18 Annual Report is structured around the following major provisions of the reissued MRP:

- C.2. Municipal Operations
- C.3. New Development and Redevelopment
- C.4. Industrial and Commercial Site Controls
- C.5. Illicit Discharge Detection and Elimination
- C.6. Construction Site Control
- C.7. Public Information and Outreach
- C.8. Water Quality Monitoring
- C.9. Pesticides Toxicity Control
- C.10. Trash Load Reduction
- C.11. Mercury Controls
- C.12. PCBs Controls
- C.13. Copper Controls
- C.15. Exempted and Conditionally Exempted Discharges

The following sections of this report summarize how SMCWPPP provided assistance in FY 2017/18 in implementing the MRP for each of the above provisions. Each section includes three sub-sections: 1) Introduction, 2) Implementation of MRP Actions, and 3) Future Actions.

Figure 1-1. Organizational Structure and FY 2017/18 Meeting Schedule.



SECTION 2
C.2 MUNICIPAL OPERATIONS

INTRODUCTION

The objective of MRP Provision C.2 is "to ensure development and implementation of appropriate Best Management Practices (BMPs) by all Permittees to control and reduce discharges of non-stormwater and stormwater runoff pollutants to storm drains and watercourses during operation, inspection, repair and maintenance activities of municipal facilities and infrastructure."

Most MRP-required Provision C.2 Municipal Operations tasks are implemented individually by each Permittee in San Mateo County. The Countywide Program helps agency staff to understand MRP requirements and develops various tools that assist agency staff to effectively plan, implement, and report on compliance activities. SMCWPPP's assistance and the implementation of Municipal Operations tasks are coordinated through the SMCWPPP Public Works Municipal Maintenance Subcommittee.

IMPLEMENTATION OF MRP PROVISIONS

During FY 2017/18, SMCWPPP performed a number of tasks to assist member agencies with implementation of Provision C.2, with input and assistance provided by the Public Works Municipal Maintenance Subcommittee. Accomplishments included the following:

- Held two Public Works Municipal Maintenance Subcommittee meetings;
- Organized vendors to present stormwater BMP products at the two Subcommittee meetings; and
- Updated a pesticide tracking template for FY 2017/18, in coordination with the Parks Maintenance and IPM Work Group, to assist member agencies comply with pesticide tracking and reporting requirements in MRP Provision C.9.a.

More information on each of these accomplishments is provided below.

Public Works Municipal Maintenance Subcommittee

The Public Works Municipal Maintenance Subcommittee provides the opportunity for sharing information about municipal operations-related MRP requirements and methods for achieving compliance. The meetings provided a forum to share experiences with implementing MRP provisions and applying associated BMPs related to activities such as:

- Street and road repair maintenance activities;
- Sidewalk/plaza maintenance and pavement washing;
- Graffiti removal;
- Corporation yard activities; and

- Stormwater pump station monitoring and inspections.

Keegan Black from the City of Brisbane chaired the Subcommittee during FY 2017/18. The Subcommittee met two times in FY 2017/18 with good participation by municipal staff, as shown by the attendance list, included in Appendix 2.

Stormwater BMP vendors provided presentations at each of the FY 2017/18 Subcommittee meetings. Countywide Program staff also facilitated discussions at meetings about storm drain cleaning activities, corporation yard BMPs, storm drain system repairs, performance of trash full capture devices and Green Infrastructure (GI) maintenance.

Program Materials

Since the first version of the MRP was adopted in 2009, SMCWPPP staff has developed a variety of materials to assist municipal maintenance agency staff with implementing Provision C.2. These materials are all available on the SMCWPPP website (www.flowstobay.org) and continue to be useful tools that assist agency staff to achieve permit compliance. The materials are described below.

In FY 2009/10, SMCWPPP developed a Stormwater Pollution Prevention Plan (SWPPP) template for use by member agencies in tailoring, updating, or creating SWPPPs for their corporation yards, satellite facilities, and maintenance facilities.

In FY 2010/11, SMCWPPP prepared the "Municipal Corporation Yard Inspection Form." This form provides detailed checklists for the types of BMPs recommended in the corporation yard SWPPP template. During FY 2010/11, SMCWPPP also prepared "Sources of Stormwater BMP information for Maintenance Activities Listed in MRP's Provision C.2," to assist member agencies with complying with the following Provision C.2 requirements: Provision C.2.a Street and Road Repair and Maintenance; Provision C.2.b Sidewalk/Plaza Maintenance and Pavement Washing; Provision C.2.c Graffiti Removal; and Provision C.2.f Corporation Yards. The sources of BMP information used to develop these materials were CASQA's Stormwater BMP Handbook Maintenance and Caltrans' Storm Water Quality Handbook Maintenance Staff Guidance.

During FY 2010/11, SMCWPPP developed the "Stormwater Pump Station Dry Season DO Monitoring and Inspection Form" to assist member agencies in developing a systematic and efficient way to collect DO monitoring and inspection information. The following twelve agencies in San Mateo County operate stormwater pump stations: Cities of Belmont, Burlingame, East Palo Alto, Foster City, Menlo Park, Millbrae, Pacifica, Redwood City, San Carlos, San Mateo, and South San Francisco, and the San Mateo County Flood Control District.

In FY 2015/16, SMCWPPP developed a trash full capture device inspection and cleaning field form template, a Small Full Capture Device O&M Standard Operating Procedure (SOP), a Hydrodynamic Separator O&M SOP, and a Trash Full-Capture Device O&M Verification Program Template and Guidance document. These materials were developed in coordination with the Trash Subcommittee to help municipal staff comply with new requirements in MRP Provision C.10.b.i., Full Trash Capture Systems. These requirements include certifying that trash full capture systems are operated and maintained to meet full trash capture system requirements and keeping associated maintenance records.

In FY 2016/17, SMCWPPP developed a trash full capture device inspection and cleaning data tracking Microsoft Excel template to assist with tracking and reporting requirements in MRP Provision C.10.b.i.

Also in FY 2016/17, SMCWPPP developed a template in Excel to assist with pesticide tracking and reporting requirements in MRP Provision C.9.a. The pesticides tracking template utilizes a lookup list of pesticides and active ingredients compiled from data tables available on the Department of Pesticide Regulation (DPR) website. In coordination with the Parks Maintenance and IPM Work Group, the template was updated during FY 2017/18 with the current two years of pesticide product data from the DPR website.

FUTURE ACTIONS

FY 2018/19 activities planned by SMCWPPP to assist member agencies comply with MRP requirements in Provision C.2 include the following:

- Continue holding Public Works Municipal Maintenance Subcommittee meetings.
- Update tracking templates and guidance materials, as needed.
- Coordinate with the GI Work Group to provide information on GI maintenance guidance and training materials.

SECTION 3
C.3 NEW DEVELOPMENT AND REDEVELOPMENT

INTRODUCTION

This section describes SMCWPPP's activities to assist member agencies in complying with MRP Provision C.3, New Development and Redevelopment. SMCWPPP continued to provide compliance assistance with MRP Provision C.3 (and Provision C.6 Construction Site Controls – see Section 6) through the New Development Subcommittee (NDS). During FY 2017/18 the NDS was chaired by James O'Connell with the City of Redwood City. SMCWPPP staff also obtained input and direction from agency representatives through the NDS. The NDS met four times in FY 2017/18 with good participation by municipal staff, as shown by the attendance list, included in Appendix 3.

IMPLEMENTATION OF MRP PROVISIONS

SMCWPPP's accomplishments during FY 2017/18 include the following major tasks to assist member agencies with implementation of Provision C.3:

- Updated guidance documents, checklists, and fact sheets for consistency with MRP requirements and ease of use by municipal staff.
- Participated in the BASMAA Development Committee and led its Green Infrastructure (GI) Alternative Sizing Criteria Work Group to develop an approach to sizing GI facilities in roadway projects.
- Continued a countywide effort to develop different model components of the Green Infrastructure (GI) Plans required by MRP Provision C.3.j. The model components were for local member agency review, use and/or modification in their local GI Plans.
- Held four meetings of a San Mateo Countywide GI Technical Advisory Committee (GI TAC) to participate in the development, review, and selection of work products related to key elements of the GI Plan requirements, and to educate and support GI TAC members in their preparation of GI Plans. The work products can be customized by member agencies for use in their GI Plans.
- Began preparing a suite of GI design guides, designated the SMCWPPP GreenSuite, for San Mateo County Permittees: 1. Policy and Overview; 2. Buildings and Sites; 3. Sustainable Streets; 4. C.3 Regulated Projects; and 5. Operations and Maintenance.
- Conducted a variety of GI outreach activities, including rain barrel program promotion, publishing newsletter articles, and social media posts.

More information on these accomplishments is provided below.

C.3 Implementation and Outreach Products

With the assistance of the NDS, SMCWPPP developed, updated and/or assisted with the following technical and outreach products:

- Biotreatment Soil Media (BSM) Products – SMCWPPP developed an updated BSM Supplier List, which is provided in Appendix 3. The NDS approved the update in August 2017. The document has been posted on the SMCWPPP website.
- C.3 – C.6 New Development Checklist – SMCWPPP and the NDS updated the checklist that is used with new development projects to collect the necessary data for reporting to the Regional Water Board and for proper approval of plans and specifications for the projects. The checklist was converted to a fillable PDF form with input cells and embedded calculations. It was finalized in May of 2018 and is posted on the SMCWPPP website.
- Stormwater Treatment Sizing Spreadsheets – SMCWPPP updated the sizing spreadsheets with new guidance for Permittee and design community use. The new spreadsheets were distributed and posted on the SMCWPPP website.

Green Infrastructure Planning

During FY 2017/18, SMCWPPP continued its efforts to develop countywide GI Plan model documents and language for review, comment, and eventual use or modification by member agencies to meet the requirements of the MRP.

Green Infrastructure Technical Advisory Committee (GI TAC)

SMCWPPP continued to work with and assist member agencies via the GI TAC. The central purpose of the GI TAC is to ensure consistent jurisdictional involvement with and formal review and comment on work products prepared by SMCWPPP. The GI TAC also provides input reflective of local issues, needs, and opportunities that should be taken into account in the development of the countywide tools and model documents that will be used by local jurisdictions in their preparation of local GI Plans. The GI TAC also provides a forum for member agencies to discuss their ongoing work in preparing GI Plans and learning from each other's processes. The GI TAC meets on a quarterly basis unless additional meetings are necessary for workflow and MRP deadline purposes.

Four GI TAC meetings were held in FY 2017/18: September 20 and November 11, 2017, and January 31 and May 23, 2018. Topics and discussion items included:

- Model plan update materials;
- Discussion of member agencies' ongoing work in preparing their individual GI Plans;
- Guidelines and standards, typical details, and specifications approach, organization, and content;
- Reasonable Analysis Assurance (RAA) and its various inputs including new and redevelopment land use, and initial countywide and jurisdictional modelling results;
- Project/GI opportunities prioritization criteria and selection, initial funding opportunities and approach, and GI Plan development;
- Discussion of funding strategies and opportunities;
- Opportunities for public outreach support; and

- Deliverables and schedules.

GI Plan Development

SMCWPPP provided member agency representatives with various materials to support the development of their GI Plans. SMCWPPP and member agency staff participated in related discussions, including determining approaches to develop the various components needed to comply with the MRP requirements and milestone deadlines. SMCWPPP and member agency staff also reviewed and commented on RAA criteria and results, draft GreenSuite design guides, potential funding opportunities, and public outreach opportunities. These are all elements needed to complete a GI Plan. The development of countywide model documents for use and/or refinement by member agencies, and direction on how to achieve or complete other required elements, have been presented to member agencies for review and comment. Multiple avenues of coordination and outreach are being used to ensure a consistent GI Plan approach is understood and accepted by all member agencies.

In FY 2017/18 SMCWPPP also began preparing a San Mateo Countywide GreenSuite of GI design guides that include the following primary components:

1. Policy and Overview
2. Buildings and Sites
3. Sustainable Streets
4. C.3 Regulated Projects
5. Operations and Maintenance

Green Infrastructure Outreach

During FY 2017/18, SMCWPPP continued performing GI-related outreach, including the following efforts:

- Created and conducted a high school contest where students proposed GI solutions to be implemented on their campus and were challenged to think of rainwater as a resource;
- Continued the Countywide Rain Barrel Rebate Program in partnership with the Bay Area Water Supply and Conservation Agency, including regular social media, newsletter, and community outreach event promotion;
- Conducted and promoted a rain barrel workshop for community residents to learn more about rain barrel usage, benefits, and installation;
- Wrote 4 GI-related newsletter articles that were distributed to 2,814 people.
- Made 26 social media posts related to GI, reaching 13,265 followers, including the following examples:
    - Great news for green infrastructure and sustainable development! The California Natural Resources Agency announced a $76 million grant to fund 39 green infrastructure projects through the state's Urban Greening Program.
    - What is green infrastructure? Why is it important? How do you identify it? Find the answers to all your green infrastructure questions here on our blog! http://www.flowstobay.org/blog/greeninfrastructure

- #GreenInfrastructure (GI) uses nature to provide critical services for communities, protecting against flooding or excessive heat, helping to improve air and water quality, preserving ecological function, managing water, providing wildlife habitat, and creating a balance between built and natural environments. Read more about GI ideas we can use to protect our SMC community: http://bit.ly/2zTsm6R.
- We are so proud of the students who participated in our Green Infrastructure Contest in SMC! High school students learned about stormwater pollution and proposed green infrastructure solutions for their school. Read about the contest and results on our blog. http://bit.ly/2eRFZgd

San Mateo Countywide Stormwater Resource Plan

SMCWPPP developed the Countywide Stormwater Resource Plan (SRP) to support San Mateo County MRP Permittees in developing GI Plans and achieving San Francisco Bay mercury and PCBs TMDL implementation requirements. It also serves an essential role in pursuing funding needs and opportunities (e.g., Proposition 1 grants) for project implementation. The SRP addresses stormwater and water resources planning needs within watersheds of San Francisco Bay and the Pacific Ocean coast. The SRP identifies and prioritizes stormwater capture opportunities throughout the county using a metrics-based process that considers factors such as: effectiveness for stormwater capture (e.g., imperviousness of drainage area, parcel size, soil type, slope); proximity to flood-prone channels, TMDL waterbodies, and potential PCBs risk areas; ability to co-locate the project with other city or county projects; and multiple benefits including potential to augment local water supplies, water quality source control, re-establishment of natural hydrology, creation or enhancement of natural habitat, or community enhancement.

This process identified LID retrofit, green streets, and regional stormwater capture project opportunities. The process screened theoretical projects on public parcels within every city and unincorporated County jurisdictions and ranked them into high, medium, and low priority. The resulting prioritized list of potential projects provides an initial attempt to identify opportunities that can be considered (in combination with LID for new and redevelopment) for GI and TMDL implementation planning efforts to meet MRP requirements. The SRP includes conceptual designs for four LID retrofit projects, three regional projects, and 15 green streets. These concepts include maps of the proposed projects and associated drainage areas, information to support future designs, modeled estimates of stormwater capture volumes and mercury and PCBs loads reduced, and cost estimates.

The SRP was approved by C/CAG and submitted to the State Water Resources Control Board in February 2017. The State Water Board issued a letter on May 18, 2017 confirming the SWRP is consistent with State guidelines. The following sections provide an update of early implementation and "no missed opportunity" efforts stemming from the SRP concepts and related prioritization efforts.

Atherton

Atherton continued pursuing a new GI facility in Holbrook-Palmer Park to help reduce existing flooding issues in the lower reaches of Atherton Creek and reduce pollutant loads. The Town hired a consultant that developed a preliminary project design in early 2018. The project was presented at the Town's Park and Recreation Committee and Town Council multiple times. The project received significant public opposition with respect to siting the project in the Town's only park. As a result, the Council directed Town staff to evaluate other potential project locations at which a facility could be sited and still take advantage

of the $13.6 million funding commitment for the project from Caltrans. Efforts to identify an alternative location are currently ongoing. The Town has created a page on their website that includes details on the proposed project.

Redwood City

Redwood City continued designing two green street projects that received funding via Round 1 of Proposition 1 stormwater implementation grants administered by the State Water Resources Control Board: Middlefield Road Streetscape and Kennedy Middle School Safe Routes to School. These green streets were originally included as a project concept in the Stormwater Resource Plan that SMCWPPP recently developed to ensure San Mateo County MRP Permittees would be eligible to compete for this type of funding. SMCWPPP also prepared the successful grant proposal for the City. The two projects are currently out to bid and scheduled to be constructed in 2019. SMCWPPP developed a concept for regional stormwater retention facilities beneath playing fields at the City's Red Morton Park that would potentially manage runoff from up to 1,650 acres. The concept was presented to the City's Utilities Subcommittee, but there is currently no funding to move the project forward. City staff are evaluating options to further study the project's feasibility.

San Bruno/Caltrans

SMCWPPP developed another concept for a regional retention facility on Caltrans property between the I-280 and I-380 interchange. The project concept was responsive to an identified need for upstream retention in San Bruno's Storm Drain Master Plan to alleviate downstream flooding. The project concept was submitted to Caltrans for consideration for funding given that approximately 40 acres of Caltrans rights-of-way are in the project drainage area. The concept is currently on a list for Caltrans consideration in late 2018-19 for future funding, but it is currently anticipated to be a low priority project for Caltrans due to low overall benefit relative to Caltrans interests (primarily trash load reduction and then TMDL load reductions).

City of San Mateo

Due to escalating construction costs and unforeseen budget items, the City of San Mateo withdrew from its Proposition 1 stormwater implementation grant for two green streets and a green parking lot administered by the State Water Resources Control Board. These projects were originally included as project concepts in the Stormwater Resource Plan and SMCWPPP prepared the successful grant proposal for the City of San Mateo. The City still plans to build a green street project at 4th Avenue and Fremont (with curb extension and bioretention) as part of the San Francisco Estuary Partnership/BASMAA Urban Greening Bay Area grant from U.S. EPA through its San Francisco Bay Water Quality Improvement Fund.

South San Francisco

The City of South San Francisco continues to pursue a regional retention facility at Orange Memorial Park with $9.5 million in funding from Caltrans. The City is in the design phase for a stormwater capture facility that will remove sediment, clean water flowing from Colma Creek into the San Francisco Bay, and potentially provide for parkland irrigation at Orange Memorial Park. This regional stormwater capture project would potentially capture flows from a large multi-jurisdictional area of primarily old urban land uses. The City is exploring various project alternatives for initial community engagement in September 2018 and anticipates starting construction in 2019.

Safe Routes to School/Green Streets Infrastructure Pilot Program

C/CAG awarded $2.1 million in December 2017 for 10 Safe Routes to School/Green Streets Infrastructure Pilot Projects funded by $2 million in local Safe Routes to School and stormwater funding, all from vehicle registration fees imposed by C/CAG on registered vehicles in San Mateo County. Grants were awarded to the following jurisdictions:

- City of Brisbane
- Town of Colma
- City of Daly City
- City of East Palo Alto
- City of Half Moon Bay (Figure 3-1)
- City of Menlo Park
- City of Millbrae
- City of Pacifica
- City of Redwood City
- County of San Mateo

Figure 3-1. Completed Half Moon Bay Pilot

Although grant agreements extend through June 2020 and most projects will be constructed in 2019, the Half Moon Bay project was already constructed in August.

Collectively these projects represent a commitment by SMCWPPP and San Mateo County MRP Permittees to pursue early implementation opportunities during the term of MRP 2.0. These projects will augment groundwater recharge, remove pollutants, and reduce the volume and velocity of stormwater runoff entering the storm drainage system and discharging into local creeks. The projects represent proactive implementation of GI while these cities develop GI Plans as required by the MRP.

Tracking and Reporting Progress on Green Infrastructure

During FY 2017/18, SMCWPPP continued to make progress towards development and implementation of methods to track and report implementation of GI in San Mateo County. The ongoing effort to update an existing inventory of GI/LID facilities throughout the county is described in a separate report (*Updated Control Measures Plan for PCBs and Mercury in San Mateo County Stormwater Runoff, SMCWPPP, September 30, 2018*). Appendix 11 contains the report.

In addition, C/CAG received a $986,300 Adaptation Planning Grant from Caltrans (C/CAG will match with $145,185) that will be used for a variety of tasks, including developing a San Mateo County GI tracking tool. C/CAG, working with its 21 member agencies and Caltrans, will develop the "San Mateo Countywide Sustainable Streets Master Plan" (Master Plan) to prioritize locations for integrating green stormwater infrastructure into roadways to capture, treat, and infiltrate stormwater runoff to better adapt the transportation network to precipitation-based climate change impacts while simultaneously helping local agencies achieve state mandates for treating runoff. Sustainable Streets combine Complete Streets that accommodate all modes and users safely and Green Streets that incorporate green stormwater infrastructure to manage stormwater. As climate change impacts local infrastructure, it will be increasingly important to focus on disadvantaged and vulnerable communities – flooding can have a disproportionate impact on those dependent upon walking, biking, or transit. The proposed project will

take a multi-benefit approach to prioritizing Sustainable Streets opportunities throughout San Mateo County that includes evaluation of community-specific needs for safer, more sustainable streets. Commencing during the fall of 2018, the two-year effort builds upon existing regional and countywide green infrastructure planning efforts and another Caltrans Adaptation Planning Grant to the County of San Mateo. Project deliverables include a master plan, GIS data layers, model policies, project concepts, public outreach, and web-based implementation tracking tools. The project will support local Green Infrastructure Plans by providing enhanced detail on green street priorities, higher-resolution drainage mapping, and a tracking tool that will meet the requirements in MRP Provision C.3.j.

Regional Collaboration

As in past years, throughout FY 2017/18 SMCWPPP participated in BASMAA's Development Committee (DC). Through the BASMAA DC, SMCWPPP participated in regional projects that assist SMCWPPP and its member agencies in meeting specific requirements of Provision C.3, as described below.

Regional Project on Alternative Sizing Criteria for GI Systems

In FY 2017/18 BASMAA continued implementing a regional project to evaluate approaches to treatment measure selection and sizing where GI project constraints preclude fully meeting the MRP Provision C.3.d sizing requirements. SMCWPPP staff participated in the project oversight through the BASMAA DC GI Alternative Sizing Work Group. In December 2017, BASMAA's consultant, Dubin Environmental, completed a hydrologic modeling analysis and report containing bioretention facility sizing curves for different rainfall regions in the Bay Area. The report was approved by the BASMAA Board of Directors in January of 2018. SMCWPPP staff assisted the Work Group in developing accompanying guidance for the report. The final deliverable of the project, which will be completed in FY 2018/19, will be a guidance on a GI sizing approach that will inform municipal GI plans, policies, and development procedures. See the following BASMAA report for more information: *Annual Reporting for FY 2017-2018, Regional Supplement for New Development and Redevelopment* (Appendix 13).

Biotreatment Soil Media (BSM) Specifications

In FY 2017/18 SMCWPPP continued to support municipal staff, consultants and suppliers who have questions on the review and use of BSM. SMCWPPP staff screened and worked with vendors that are supplying the BSM product in the Bay Area and wish to be added to the vendor list that is posted on the SMCWPPP website. The vendors must demonstrate an understanding of the BASMAA specification, submit lab results and a sample of their BSM product, and use consistent terminology on their websites advertising the product. See the http://basmaa.org/Announcements/basmaa-revisions-to-mrp-biotreatment-soil-mix-bsm-spec and the flowstobay.org/newdevelopment webpages for more details.

Biotreatment Soil Mix Specifications and Bioretention Design with Trees

As a result of the Biotreatment Soil Roundtable held on June 30, 2016, a regional work group was formed to discuss designs that incorporate trees into bioretention areas. SMCWPPP staff took the lead on facilitating this new Trees and BSM Design Work Group. In FY 2017/18, the Trees-BSM Design Work Group met once in October of 2017 to share and receive input on various design issues with trees in bioretention areas. Attendees included several arborists, GI consultants and municipal staff from parks departments and stormwater programs. Integration of trees and stormwater treatment was also discussed with the Green Infrastructure Leadership Exchange, a national non-profit peer-to-peer organization whose mission is to assist municipal organizations across North America with the sharing of best practices and lessons

learned related to green infrastructure. The Work Group continues to grow as additional professionals are solicited. In FY 2018/19, the Work Group will review additional examples of tree-specific treatment measure designs, discuss soil and maintenance issues, and develop recommendations for design and maintenance of stormwater tree systems using the new GI Alternative Sizing approach.

Participation in Processes to Promote Green Infrastructure

Provision C.3.j.iii requires that Permittees individually or collectively, track processes, assemble and submit information, and provide informational materials and presentations as needed to assist relevant regional, State, and federal agencies to plan, design, and fund incorporation of GI measures into local infrastructure projects, including transportation projects. SMCWPPP is tracking and participating in the BASMAA activities to assist Permittees comply with this provision.

BASMAA's efforts include finishing work on its portion of the Urban Greening Bay Area grant from EPA (Water Quality Improvement Fund) to the San Francisco Estuary Partnership/Association of Bay Area Governments. During FY 2017/18, the following tasks took place: the Draft Roadmap of Funding Solutions for Sustainable Streets was distributed to Roundtable Participants in September 2017 and discussed at a September 9, 2017 Roundtable meeting. Feedback was incorporated into the Final Roadmap, which was published in April 2018. BASMAA and SFEP began forming a Roadmap Committee to guide implementation of the Roadmap. The Program Manager presented on the Roadmap at the May 2018 CASQA Quarterly meeting and submitted an abstract for the 2018 CASQA conference, which was accepted as an alternate presentation. See the following BASMAA report for more information: *Annual Reporting for FY 2017-2018, Regional Supplement for New Development and Redevelopment* (Appendix 13).

FUTURE ACTIONS

In FY 2018/19, SMCWPPP plans to continue working with the NDS to conduct the following activities to assist member agencies to comply with MRP Provision C.3:

- Continue to exchange information with member agencies on MRP implementation and other timely issues through quarterly NDS meetings and the annual C.3 workshop.
- Complete the San Mateo Countywide GreenSuite of GI design guides.
- Update the C.3 Technical Guidance Manual as part of the new GreenSuite.
- Revise checklists and outreach flyers as needed to respond to member agency issues, concerns and suggestions for improvement.
- Continue to collaborate with BASMAA and Bay Area countywide stormwater programs to develop and distribute the GI Alternative Sizing approach report and guidance, update the BSM specifications and BSM suppliers list, and develop designs for biotreatment areas with trees. To the extent possible, work with biotreatment mulch suppliers to develop better specifications for that product.
- Plan and conduct a C.3 workshop for municipal staff (tentatively scheduled for late 2018), building on the trainings conducted in previous years. Topics may include an update on GI Plan development and coordination, an overview of the new GreenSuite design guides, and example reviews of development project plans.
- Continue working with BASMAA on issues related to MRP implementation, particularly the GI requirements and related sections.

- Continue coordinating and working with member agencies to develop and refine the countywide model components for the local GI Plans.
- Continue facilitating GI TAC meetings and provide support for local GI Plan development efforts, including working with the GI TAC to:
    - Finalize development of prioritization criteria for GI project opportunities;
    - Review and comment upon 2020 and 2030 development projections;
    - Finalize process for tracking and mapping completed GI projects;
    - Finalize GreenSuite design guides;
    - Review and collaborate with BASMAA on a single approach to alternative sizing of GI treatment measures;
    - Conduct GI outreach and education with the public, municipal staff, and elected officials;
    - Evaluate GI funding opportunities and options; and
    - Continue to provide a forum for discussion among member agency staff as they work to complete their GI Plans.

SECTION 4
C.4 INDUSTRIAL AND COMMERCIAL SITE CONTROLS

INTRODUCTION

A primary goal of SMCWPPP's Commercial, Industrial and Illicit Discharge (CII) component is to assist member agencies in controlling the discharge of pollutants in stormwater from commercial and industrial businesses to the maximum extent practicable. SMCWPPP member agencies are responsible for complying with various commercial and industrial business facility inspection requirements under MRP Provision C.4. SMCWPPP's CII component assists member agency staff with understanding these MRP requirements and develops various related tools, templates, reporting forms, and other MRP compliance support materials. SMCWPPP's CII component also assists member agencies to comply with other MRP provisions that are discussed in other sections of this report (Sections 5, 13 and 15).

SMCWPPP's assistance with MRP Provision C.4 and other CII component provisions is coordinated through the CII Subcommittee.

IMPLEMENTATION OF MRP PROVISIONS

During FY 2017/18, SMCWPPP performed a number of tasks to assist member agencies with implementation of MRP Provision C.4, with input and assistance provided by the CII Subcommittee. Accomplishments included the following:

- Held four CII Subcommittee meetings;
- Held a CII Inspector Training Workshop;
- Adapted postcards from the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) on (1) BMPs for Dumpsters, (2) General Storm Drain Dumping, and (3) Vehicles Dripping Auto Fluids;
- Updated the Facility Stormwater Inspection Form Template;
- Developed a Stormwater Inspection Tracking Excel Template;
- Updating the Business Stormwater Inspector contact list on the SMCWPPP website in four languages; and
- Organized demonstrations of cities' data management systems at a Subcommittee meeting.

More information on each of these accomplishments is provided below.

CII Subcommittee

The CII Subcommittee provides the opportunity for sharing information about MRP requirements related to commercial/industrial facility inspections and methods for achieving compliance. The Subcommittee met four times during FY 2017/18 with good participation by municipal staff, as shown by the attendance list, included in Appendix 4. The meetings provided the opportunity for municipal staffs to share their experiences with implementing MRP provisions related to the CII component, including Provision C.4. Ward Donnelly from the City of Daly City continued to chair the CII Subcommittee during FY 2017/18.

Most San Mateo County cities had agreements with San Mateo County Environmental Health (CEH) for CEH staff to conduct stormwater inspections of certain businesses (i.e., sites that CEH already inspects for other reasons, including facilities with onsite hazardous materials and retail food facilities). In an April 3, 2017 letter CEH notified the cities with these agreements of its intention to terminate the agreements on December 31, 2017, due to staffing and cost concerns.

During FY2017/18 Subcommittee meetings, Countywide Program staff focused on facilitating discussions on the transition from CEH conducting stormwater inspections to cities conducting their own stormwater inspections. Countywide Program staff organized a data management roundtable at one Subcommittee meeting where cities could demonstrate their various stormwater inspection data management systems. In addition, Countywide Program staff updated the Business Stormwater Inspector contact list available on the SMCWPPP website.

Program Materials

To assist cities with the transition from CEH performing stormwater inspections, Countywide Program staff updated Program materials such as the SMCWPPP Stormwater Inspection Form Template. SMCWPPP printed the inspection forms on carbon triplicate forms and provided them to cities upon request. Countywide Program staff also developed a Stormwater Inspection Tracking Excel Template for cities to track their stormwater inspection data, if needed.

In addition, Countywide Program staff surveyed the Subcommittee to determine what outreach materials needed updating and whether additional materials were needed. Three illicit discharge postcards from SCVURPPP were adapted to SMCWPPP postcards with BMPs in three languages (English, Spanish and Vietnamese): (1) BMPs for Dumpsters, (2) General Storm Drain Dumping, and (3) Vehicles Dripping Auto Fluids. These postcards are included in Appendix 4. SMCWPPP is also working with the CII Subcommittee to update the General Business Stormwater BMP booklet in four languages (English, Spanish, Vietnamese and Chinese).

CII Training Workshop

The Commercial/Industrial/Illicit Discharge Inspector Training Workshop was held on February 28, 2018 at the City of San Mateo Public Library's Oak Room and was attended by 55 people. The workshop covered the basics of a commercial and industrial facility stormwater inspection and included four inspection case scenarios: a shared trash enclosure, auto repair facility, large retail facility, and mobile business. Appendix 4 includes a copy of the workshop agenda, attendance list and evaluation form summary. Based on the evaluation forms submitted, attendees generally found that the workshop was useful and met their expectations.

FUTURE ACTIONS

FY 2018/19 activities planned by SMCWPPP to assist member agencies comply with MRP requirements in Provision C.4 include the following:

- Continue holding quarterly CII Subcommittee meetings.
- Continue to update existing or develop new business outreach materials as needed.
- Assist member agencies with the implementation of commercial and industrial stormwater inspection tasks, including continuing to assist with Business Inspection Plans (BIPs) and associated prioritizing of inspections, data management, and Enforcement Response Plans (ERPs).

SECTION 5
C.5 ILLICIT DISCHARGE DETECTION AND ELIMINATION

INTRODUCTION

A primary goal of SMCWPPP's Commercial, Industrial and Illicit Discharge (CII) component is to assist member agencies effectively prohibit the discharge of illicit, non-stormwater discharges to the municipal storm drain system. SMCWPPP member agencies are responsible for controlling non-stormwater discharges prohibited by MRP Provision C.5. SMCWPPP's CII component assists member agency staff with understanding these MRP requirements and develops various related tools, templates, reporting forms, and other MRP compliance support materials. SMCWPPP's CII component also assists member agencies to comply with other MRP provisions that are discussed in other sections of this report (see Sections 4, 13 and 15).

SMCWPPP's assistance with the MRP provisions listed above is coordinated through the CII Subcommittee. Further details about the CII Subcommittee were provided in Section 4 of this report.

IMPLEMENTATION OF MRP PROVISIONS

During FY 2017/18, SMCWPPP performed a number of tasks to assist member agencies with implementation of MRP Provision C.5, with input and assistance provided by the CII Subcommittee. Accomplishments included the following:

- Updated the table of stormwater enforcement actions against mobile businesses to share countywide with stormwater inspectors; and
- Updated the Illicit Discharge contact list on the SMCWPPP website.

More information on these accomplishments is provided below.

Mobile Businesses

In FY 2012/13, the CII Subcommittee adapted a Mobile Business BMPs brochure developed by the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) for use in San Mateo County. The brochure is available on the SMCWPPP website (www.flowstobay.org).

Beginning in FY 2013/14, the CII Subcommittee surveyed San Mateo County agencies and compiled information on mobile businesses that were subject to stormwater enforcement actions during that fiscal year. This information was compiled in a table and made available on the password-protected section of the SMCWPPP website. The table is periodically updated with additional enforcement action information.

During FY 2014/15, the CII Subcommittee worked with SMCWPPP's Public Information and Participation (PIP) Subcommittee to post in April 2015 an outreach message on Facebook that targeted mobile cleaner businesses. The posting included a link to the BMPs brochure. In March 2017, the PIP Subcommittee posted two additional outreach messages on Facebook targeting residents who hire carpet cleaners or pet groomers.

During FY 2016/17, the CII Subcommittee developed a regional inventory of mobile businesses operating in San Mateo County by compiling lists provided by individual agencies with additional businesses identified via Internet searches (e.g., through Google and Yelp). The mobile businesses identified fell in the following categories: carpet cleaners, auto washers, steam cleaners, power washers and pet care providers. The Countywide Program mailed its mobile business BMPs brochure to all of the businesses in the inventory in late June and early July 2017.

In FY 2017/18 the mobile businesses stormwater enforcement actions table was updated and this information was made available on a password-protected page of the Countywide Program's website (www.flowstobay.org). CII Subcommittee representatives were informed when each update was completed.

BASMAA has a long-standing Surface Cleaner Training and Recognition program that focuses on improving the use of BMPs for businesses that clean surfaces (i.e., sidewalks, plazas, parking areas and building exteriors). See the following BASMAA report for more information: *Annual Reporting for FY 2017-2018, Regional Supplement for Training and Outreach* (Appendix 13). SMCWPPP member agencies have continued to refer cleaners to BASMAA's website for surface cleaning training materials.

Countywide Program Materials

SMCWPPP has developed a variety of materials to assist municipal agency staff with implementing Provision C.5. These materials are all available on the SMCWPPP website (www.flowstobay.org) and continue to be useful tools that assist agency staff to achieve permit compliance. The materials include an Illicit Discharge Investigation Field Form template and an Illicit Discharge Tracking Excel Template.

FUTURE ACTIONS

FY 2018/19 activities planned by SMCWPPP to assist member agencies comply with MRP requirements in Provision C.5 include the following:

- Continue holding CII Subcommittee meetings.
- Assist member agencies with the implementation of illicit discharge detection and elimination tasks, including continuing to assist with data management, Enforcement Response Plans (ERPs), and complaint tracking and follow-up.
- Help member agencies comply with the requirements for controlling mobile sources in MRP Provision C.5.e. SMCWPPP will continue its programs related to mobile business BMPs, including sharing enforcement information, periodically updating the regional enforcement inventory, and outreach activities.

SECTION 6
C.6 CONSTRUCTION SITE CONTROL

INTRODUCTION

This component of SMCWPPP assists member agencies in complying with MRP Provision C.6 (Construction Site Control). This assistance continued to be provided through the New Development Subcommittee (NDS, see Section 3 for more details). SMCWPPP staff also obtained input and direction from agency representatives through the NDS when planning the trainings and other compliance assistance activities described below.

IMPLEMENTATION OF MRP PROVISIONS

SMCWPPP's accomplishments during FY 2017/18 include the following major tasks to assist member agencies with implementation of Provision C.6:

- Conducted a construction site controls training for the California Building Inspectors Group (CALBIG) on October 11, 2017;
- Updated and then printed 2,000 copies of the Construction Site Inspection Form and distributed them to the Subcommittee members;
- Updated the SMCWPPP inspection data tracking template; and
- Conducted the March 20, 2018 Construction Site Inspector Workshop.

CALBIG Training Meeting

In FY 2017/18, SMCWPPP continued its partnership with CALBIG, a group in which many building inspectors from SMCWPPP member agencies participate. At the group's October 11, 2017 meeting, SMCWPPP staff gave a presentation covering an overview of the MRP and Provisions C.3 and C.6, current stormwater requirements for construction sites, proper implementation of construction BMPs, C.13.a (architectural copper), current issues, and tips for keeping construction inspection programs in compliance. Approximately 42 people attended the training, including agency inspectors, local stormwater program staff, and contractors. The meeting announcement, agenda and sign-in sheet are provided in Appendix 6.

Construction Site Inspection Form

In August 2017, SMCWPPP staff printed and distributed 1,500 copies in triplicate form of the SMCWPPP Construction Site Inspection Report to member agencies. An additional 500 were distributed in February of 2018. The form was updated prior to the printing. The SMCWPPP inspection data tracking template was also updated at that time.

2018 Construction Site Inspector Workshop

The 2018 Construction Site Inspector Workshop was held March 20, 2018 at the County of San Mateo's Coyote Point Park in San Mateo and was attended by 52 people. The workshop began by dividing the attendees into two groups which then alternated between interactive field and classroom trainings. The trainings covered C.6 Construction Site inspections and best management practices (BMPs) with product suppliers demonstrating the various BMPs outside of the training building in the adjacent landscaped area. The indoor training consisted of a PowerPoint presentation on: (1) MRP C.6 regulatory requirements, (2) a BMP overview, and (3) conducting construction site inspections, with a focus on filling out the Construction Site Inspection Report. The outdoor training leaders discussed BMP types as well as placement, use, function, cost, and corresponding inspection issues for each BMP. Appendix 6 includes a copy of the workshop flyer, agenda, sign-in sheet, and evaluation summary. Based on the evaluation forms submitted, attendees generally found that the workshop, and the field training in particular, were valuable and indicated that it met or exceeded their expectations. Similar field trainings are planned for future workshops.

FUTURE ACTIONS

In FY 2018/19, SMCWPPP staff plans to work with the NDS to conduct the following activities to assist member agencies comply with MRP Provision C.6:

- Continue to exchange information with member agencies through quarterly NDS meetings.
- Plan and conduct a Construction Site Inspector Workshop focusing on field trainings, BMP inspections, Enforcement Response Plans and/or other topics of interest to the NDS.
- Continue to coordinate with partner organizations such as CALBIG to provide additional training on construction-related stormwater issues.

SECTION 7
C.7 PUBLIC INFORMATION AND PARTICIPATION

INTRODUCTION

The primary goals of SMCWPPP's Public Information and Participation (PIP) component are to:

- Educate the public about the causes of stormwater pollution and its adverse effects on water quality in local creeks, lagoons, shorelines and neighborhoods;
- Encourage residents to adopt less polluting and more environmentally beneficial practices; and
- Increase resident's participation and involvement in SMCWPPP activities.

PIP is essential for controlling and reducing the source of pollution since many preventable pollutants are associated with everyday residential activity. Stormwater pollution may be reduced when residents are educated and motivated by the benefits of reducing pollutants. This approach of education and motivation is cost-effective and efficient in meeting the goal of reducing pollutants in stormwater to the maximum extent practicable.

Summary of Accomplishments in FY 2017/18

The SMCWPPP PIP Subcommittee oversees the development of outreach and educational materials and guides the implementation of the PIP component of the program. The Subcommittee met two times in FY 2017/18 with good participation by municipal staff, as shown by the attendance list, included in Appendix 7.

SMCWPPP's PIP accomplishments during FY 2017/18 include the following:

- Partnered with Bay Area Water Conservation Supply Agency (BAWSCA) on a Rain Barrel outreach campaign that received 975 website page views. Received 50 rebate applications from residents and distributed rain barrel rebate fliers at outreach events. Over 1,050 rain barrels have been installed to-date in San Mateo County under the rebate program.
- Promoted the San Mateo County Environmental Health Services (CEH) campaign to reduce littering of cigarette butts.
- Promoted and attended Coastal Cleanup Day (4,447 volunteers this year), raising awareness of the event and the consequences of littering behaviors.
- Promoted Caltrans educational materials in English and Spanish regarding uncovered loads.
- Gained 4,651 new Facebook fans with a total of 365,975 total page reach with stormwater pollution prevention Facebook messaging.

- Gained 1,405 new Twitter followers with 109,729 total page reach with stormwater pollution prevention messaging.
- Sent six newsletters to a list of 2,813 opt-in subscribers with topics covering eco-friendly gardening practices, local cleanup events, and stormwater pollution prevention information and tips.
- Received 11,026 visitors to the SMCWPPP website, which focuses on stormwater pollution prevention messaging and resources.
- Participated in 10 public outreach and citizen involvement events in San Mateo County, to speak one-on-one with residents, perform demonstrations, and hand out collateral materials. Had SMCWPPP materials distributed at an additional 14 outreach events by a partnering agency.
- Planned and launched a countywide school outreach program that asked students to submit proposals to green up their school campus, reaching approximately 150 students.
- Performed point-of-purchase outreach with Our Water Our World materials to 10 hardware stores in San Mateo County while training store employees on eco-friendly alternatives to pesticides.
- Promoted outreach messaging to residents regarding eco-friendly alternatives to pesticides in SMCWPPP's newsletter, website and social media channels.

IMPLEMENTATION OF MRP PROVISION C.7

C.7.b. Outreach Campaigns

Flows to Bay Challenge

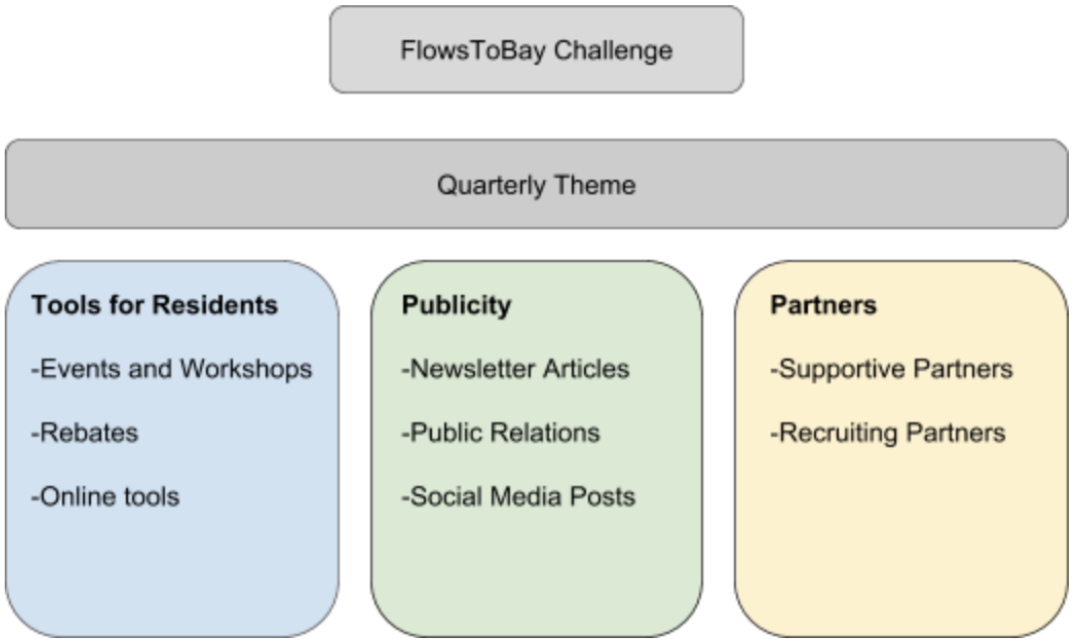
In FY 2017/18, SMCWPPP ran a year-long campaign called the Flows to Bay Challenge. The Challenge created a call-to-action for San Mateo County residents to take a stand and adopt lifestyle practices to prevent stormwater pollution. An emphasis was placed on residents finding solutions to pollution prevention at home and in their communities to reduce the amount of pollutants flowing directly into San Francisco Bay. The campaign provided residents with tools in the form of: rebates, events, workshops and education on how to conveniently integrate stormwater pollution prevention into their everyday lives, while also partnering with non-governmental organizations (NGOs) and community-based organizations (CBOs) to support SMCWPPP's education and outreach efforts. The goal of the Challenge was to make these impactful actions seem easy and doable for residents. The campaign goals were:

- Gain adoption of Flows to Bay Challenge by residents.
- Educate San Mateo County residents on stormwater pollution prevention.
- Provide convenient solutions for residents to implement in their home to reduce their water pollution impact.
- Overcome barriers to adopting pollution reduction practices.
- Create a community of champions consisting of residents and like-minded organizations.
- Increase recognition for SMCWPPP and its efforts in the community.
- Create meaningful partnerships with NGOs and CBOs to secure rebates or discounts.

Campaign Implementation

Themes

The Challenge emphasized three main themes in FY 2017/18 with corresponding tactics. The themes were implemented in three quarters (quarters 2, 3 and 4 of the fiscal year). Each theme had its own corresponding calls-to-action, partnerships, resources, and events. There were three sections of focus for the quarterly themes: tools for residents, publicity, and partners.



Challenge 1 Theme: Rainwater as a Resource (Quarter 2: Oct - Dec 2017)

- Residents were challenged to make rainwater a resource

Challenge 2 Theme: Inside the Home (Quarter 3: Jan - Mar 2018)

- Residents were challenged to remove and replace toxic chemicals in the home

Challenge 3 Theme: In the Garden and Community (Quarter 4: Apr - Jun 2018)

- Residents were challenged to reduce pollutants in the garden and community

Partner/Rebate Offering

The Challenge partnered with various related-interest businesses and organizations to promote participation and support among San Mateo County residents. This provided various ways for Challenge participants to engage with the campaign and included rebates and/or discounts on theme-related purchases as well as events and workshops hosted by local organizations.

Each Challenge formed two types of partnerships: community partnerships and commercial partnerships. Community partnerships with community organizations helped promote the challenge via

social media. Commercial partnerships with businesses offered discounts, rebates, and prizes for the Challenge. Both partnerships were promoted via social media. The Challenge promotional card is included in Appendix 7.

Challenge 1: Rainwater as a Resource

- Partner: Grassroots Ecology and Rain Savers, who served as a source for presenters at the rain barrel presentation; and Save The Bay, who provided publicity with social media and article promotion.
- Rebate: $100 rain barrel rebates from Bay Area Water Supply & Conservation Agency (BAWSCA).

Challenge 2: Inside the Home

- Partner: Pure Living Space wrote a blog article.
- Rebate: 20% off online purchases at purelivingspace.com and grabgreenhome.com.

Challenge 3: In the Garden and Community

- Partner: UC Master Gardeners of San Mateo helped provide publicity with social media; and Hassett Hardware wrote a blog article.
- Rebate: 10% discount off purchases at Hassett Hardware brick-and-mortar and online stores.

Online Promotion of the Challenge

Publicity for the Flows To Bay Challenge included public relations, blogs, e-newsletter articles, and social media contests and posts. Participants were also encouraged to use the hashtag #FTBChallenge to share photos and content on social media.

Challenge email blasts

The Flows to Bay quarterly e-newsletter was used as a promotional tool to make current subscribers aware of the Challenge and to inform them on how to get involved. Appendix 7 includes e-newsletter examples and analytics.

Challenge blog articles

A total of 11 blog posts were written before and throughout each Challenge to direct the audience's attention to upcoming Challenge activities and events and to familiarize and promote various partners. Blog post examples and metric analytics are included in Appendix 7.

Social Media contest and posts

Social media was used to promote the Challenge, build engagement with community members, and publicize the Challenge contest. The contest prompted community members to make a pledge to participate in the Challenge activities. Social media ads were utilized to boost content and posts amongst community members. Quizzes fostered engagement and increased visits to the website, examples are included in Appendix 7.

Contest results:

- Challenge 1: 44 entries

- Reach: 2,178

- Challenge 2: 59 entries
  - Reach: 7,799
- Challenge 3: 64 entries
  - Reach: 2,378

Examples of The Challenge social media posts are provided in Figure 7-1.

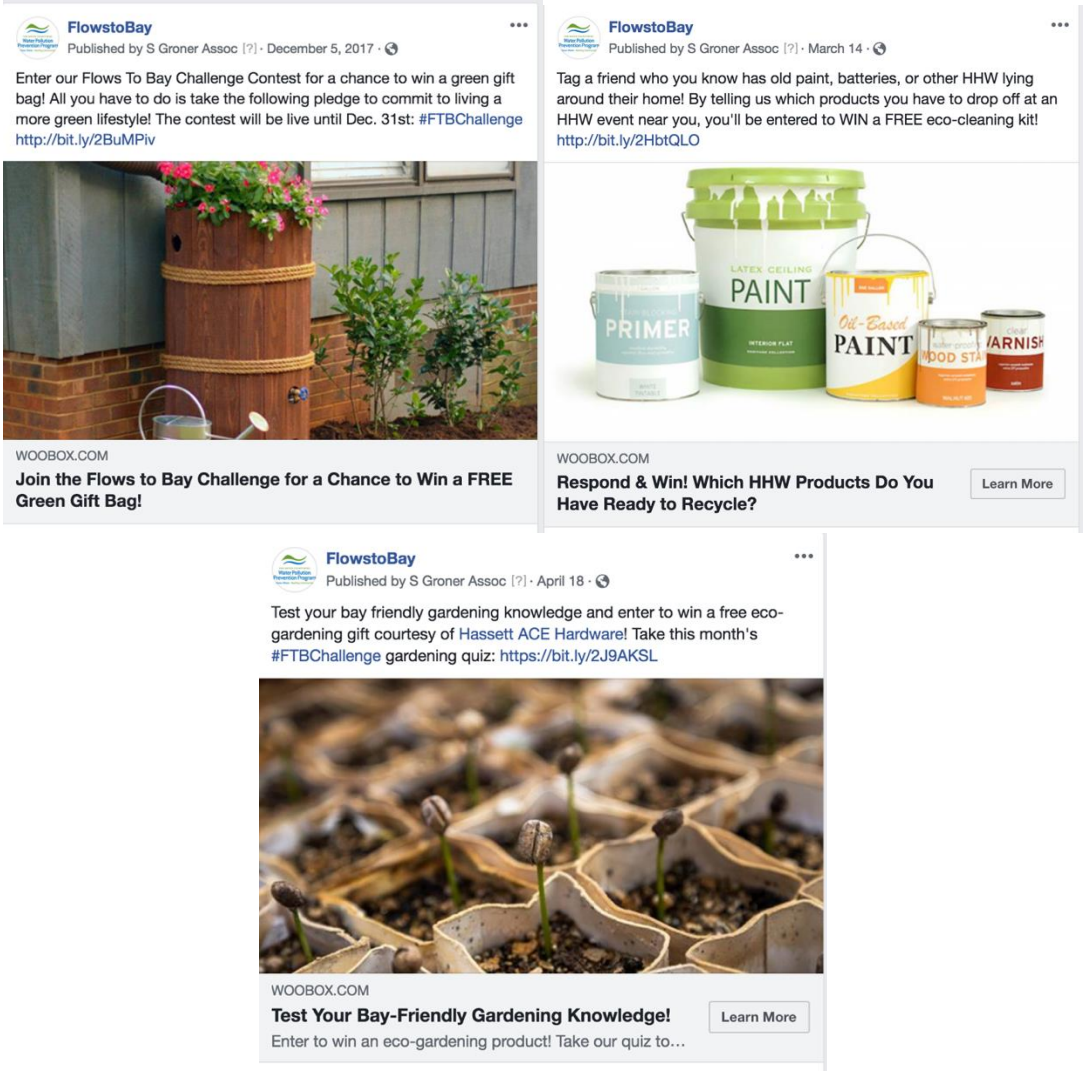


Figure 7-1. Examples of the Challenge Social Media Posts

Website

The Flows to Bay Challenge page launched in October of 2017. The website hosted all Challenge materials including rebate information, a tools page and an events calendar. The tools page provided further information to educate and inspire residents to take action in their homes and communities. Every quarter the flowstobay.org website was updated to fit the new theme. The webpage flowstobay.org/challenge was the hub for the campaign, a one-stop location for residents to find resources, partnership information, and ways to participate in the Challenge. Appendix 7 includes examples of the website pages and analytics information.

Workshops/Events and Surveys

The Challenge collaborated with partners to attend and distribute materials at community events throughout San Mateo County. Surveys were distributed at each event to measure awareness and effectiveness of the campaign and its components. The events we attended in collaboration with are listed below.

Challenge 1 Event: Rain Barrel Workshop

In Challenge 1, SMCWPPP hosted a rain barrel workshop at the San Mateo public library on December 2, 2017. There were a total of 37 registrations for the workshop and a total of 22 attendees. The workshop was promoted on Facebook through advertisements, social media posts, and on NextDoor App with assistance from PIP members. Representatives from Grassroots Ecology and Rain Savers gave a presentation on the importance of rain barrels and demonstrated how to install and maintain rain barrels. Information on BAWSCA rain barrel rebate was also provided to attendees. There was active participation in terms of questions about installation and rebates.

Workshop attendees were asked to fill out a survey designed to gauge previous knowledge of rain barrels and how helpful the attendees found the workshop. The overall results of the survey were favorable, with 79% of survey participants indicating they learned the following: basic understanding of rain barrels, preparation of how to install rain barrels, the environmental benefits, and knowledge of local rebates. Of the survey participant, 86% of the guests rated the presentation as being very interesting/fun. Tables 7-1 to 7-3 highlight a portion of the survey results.

Overall, the event turnout was positive with high ratings stretching across the board. Future suggestions/topics from attendees consisted of: information on native plants, low-water gardening, drip systems, holding such workshops at a nursery, and utilizing electronic surveys. Appendix 7 includes the event invites as well as full survey results.

Table 7-1. Rating Percentages of Environmental Information Provided (1 - poor, 5 - excellent)

	1	2	3	4	5
Guests	0%	0%	0%	14%	86%

Table 7-2. Rating Percentages of Rain Barrel Installation Instruction (1 - poor, 5 - excellent)

	1	2	3	4	5
Guests	0%	0%	7%	21%	71%

Table 7-3. Rating Percentages Asking if Information was Presented in an Interesting/Fun Format (1 – not fun/uninteresting, 5 - very fun/interesting)

	1	2	3	4	5
Guests	0%	0%	0%	14%	86%

Challenge 2: HHW events

SMCWPPP partnered with San Mateo County's Office of Sustainability on promoting four events regarding household hazardous waste (HHW) for the Challenge. The following events were hosted and promoted via social media (see Appendix 7 for social media post examples):

1. HHW Recycling Event: Drop off Leftover Paint in Redwood City on Feb 24, 2018
    a. Facebook event stats: 3 people marked "Going", 58 marked "Interested", 5.5k reach
2. HHW Event: Recycle Your Used Motor Oil in South San Francisco on Mar 3, 2018
    a. Facebook event stats: 1 person marked "Going", 29 marked "Interested", 3.6k reach
3. HHW Event: Recycle Old Pesticides in Daly City on Mar 10, 2018
    a. Facebook event stats: 0 people marked "Going", 26 marked "Interested", 3.8k reach
4. HHW Recycling Event: Batteries in Pacifica on Mar 17, 2018
    a. Facebook event stats: 1 people marked "Going", 50 marked "Interested", 3.8k reach

Challenge 3: Eco-Day on May 19, 2018

SMCWPPP coordinated three events for Flows to Bay Eco-Day on May 19, 2018. This event provided a way for community members to put into practice new knowledge and passion from the In the Garden and the Community Challenge. It was also a way for residents who shared similar interests to come together as a community and learn more about how to make a positive impact on the environment.

The Flows to Bay Eco-Day consisted of three events held by community partners throughout San Mateo County and was open to all residents. These three events were:

1. Beach Clean Up with Pacifica Beach Coalition

    The Pacifica Beach Coalition hosted a beach cleanup at Linda Mar State Beach in Pacifica. RSVPed on Eventbrite: 5; Total attendance for event: 25

2. Native Plant Nature Walk with the Friends of Edgewood

Friends of Edgewood celebrated the beauty of the peninsula with a native plant nature walk at the Edgewood Park & Natural Preserve.

RSVPed on Eventbrite: 5; Total attendance for event: 5

3. Integrating Edibles Into Your Garden Class with BAWSCA

The Bay Area Water Supply & Conservation Agency (BAWSCA) led an Integrating Edibles into your Existing Garden class at Redwood City Public Works. Total attendance for event: 12

Eventbrite RSVP pages were created for the beach cleanup and nature walk events. For the third event, attendees were encouraged to RSVP via the existing host's webpage. Each Eco-Day partner was also sent a packet of Flows to Bay materials to distribute amongst all event attendees.

The three community event partners (Ana Garcia of Pacifica Beach Coalition, Laurie Alexander of Friends of Edgewood, Debbie Ivazes of BAWSCA) were surveyed after the Eco-Day event to find out how successful the event was from their perspective and in comparison to other events they have held, to gather data on the number of participants, and to get their overall feedback on working with Flows To Bay. All partners responded that they would partner with Flows to Bay for another event in the future with very favorable feedback. Partner survey responses for Eco-Day can be found below. Full survey results are included in Appendix 7.

Campaign Evaluation

The Challenge achieved measurable changes in awareness and behavior for FY 2017/18. Through the Challenge eblasts, we reached over 8,200 recipients with an average open rate of 23.5%. The Challenge blog posts received over 700 total page views and average time of 2:04 spent on a post. For social media contest entries, we received 167 entries (209% of goal) with an overall reach of 12,355. The website Challenge pages (Challenge home page and tools page) received over 1,618 total page views and average time of 4:01 spent on page. For the Challenge events, we reached over 34.6k viewers on social media. For the rain barrel workshop event, we received 14 completed survey responses from attendees, 79% of which stated learning all of the above which consisted of: basic understanding of rain barrels, preparation of how to install rain barrels, the environmental benefits, and knowledge of local rebates. An overwhelming 86% of the attendees rated the environmental information provided was very helpful, and 71% of the guests rated the rain barrel installation instructions to also be very helpful. As for the post-Eco-Day event surveys to our partner organizations, 100% of partners responded that they would partner with Flows to Bay for another event in the future.

Rain Barrel Rebate Program

As a result of the California drought and in an attempt to pursue alternative approaches to public engagement, SMCWPPP partnered with the Bay Area Water Supply Conservation Agency (BAWSCA) in 2014 to implement a pilot countywide rain barrel rebate program. During FY 2017/18, SMCWPPP continued its partnership with BAWSCA to promote the program, which subsidizes the cost of purchasing a rain barrel by providing rebates up to $100. The program objectives include: 1) educate residents about the benefits of rain barrels to water conservation and water quality efforts, 2) promote green infrastructure tools for keeping local waters clean, and 3) encourage residents to participate in the Rain Barrel Rebate Program. Over 1,050 rain barrels have been installed to-date in San Mateo County under the rebate program, and in FY 2017/18, a total of 71 rain barrel rebates were issued stemming from 50 applications. This was an 11% increase from the previous year's efforts.

Prior to this partnership, the only agency in San Mateo County offering rain barrel rebates was the City of Millbrae. C/CAG provided BAWSCA with an additional $25,000 in FY 2017/18 to subsidize the rebates for San Mateo County residents, which, like BAWSCA's other water conservation programs, is a subscription-based program in which BAWSCA's member agencies (water supply agencies that receive water from the San Francisco Public Utilities Commission) can choose to participate. The program provides rebates for up to two rain barrels for single-family residential and four for multi-family/commercial properties. C/CAG's funding provides rebates of $50 per barrel, countywide. Rebates are matched (total of $100 per barrel) in areas of the county where a water supply agency is participating in the program.

During FY 2017/18, SMCWPPP's PIP component continued efforts to promote the rain barrel program and inspire San Mateo County residents to join the rainwater harvesting movement. SMCWPPP conducted outreach to inform residents about the rebate and also the non-monetary benefits. The outreach strategy consisted of promoting the rain barrel rebate program through offline, online, and community outreach tactics.

As an offline tactic, rain barrel tip cards were designed and distributed at community outreach events and made available as point-of-purchase materials at home improvement stores. The tip cards helped to create awareness of the purpose of rain barrels, emphasize how easy they are to install, and provide examples of financial and environmental benefits for installing a rain barrel.

Online tactics utilized included an "opt-in" map hosted on the rain barrel page of the SMCWPPP website. The "opt-in" map allows users to enter their location onto a map to demonstrate that they have installed a rain barrel and place themselves on a map of San Mateo County. By placing themselves on the map, all website visitors will see how many rain barrels are being used throughout San Mateo County. This helps to establish the social norm of rainwater harvesting and encourage others to join the movement. The opt-in map can be viewed at FlowsToBay.org/rainbarrel.

SMCWPPP also promoted the rain barrel rebate program via our social media channels on Facebook and Twitter. Educational posts were created to inform residents about the functions and benefits of rain barrels. SMCWPPP used posts showing photos of various rain barrels, while encouraging use of the "opt-in" map and using ads to reach a wider audience (Figure 7-2).

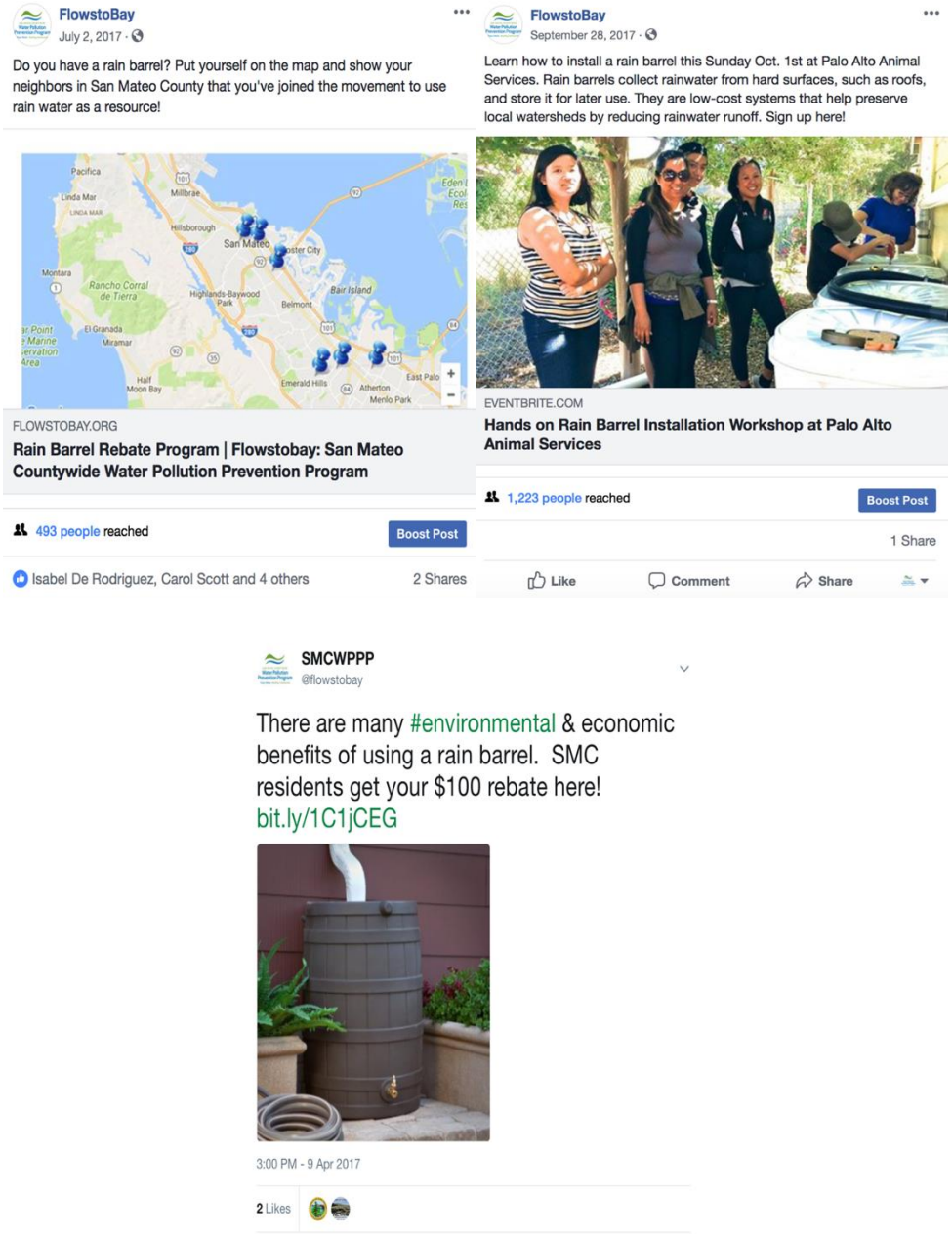


Figure 7-2. Examples of Rain Barrel Facebook and Twitter Posts

The PIP committee was provided with marketing material to promote the rain barrel rebate program:

1. Pre-crafted copy and photos to be used for any medium that best suits their constituents;
2. Rain Barrel Tip cards to provide at community outreach events (Figure 7-3);
3. BAWSCA rain barrel rebate cards;
4. A link to the Rain Barrel Opt-in map to encourage residents to join the movement at FlowsToBay.org/rainbarrel.

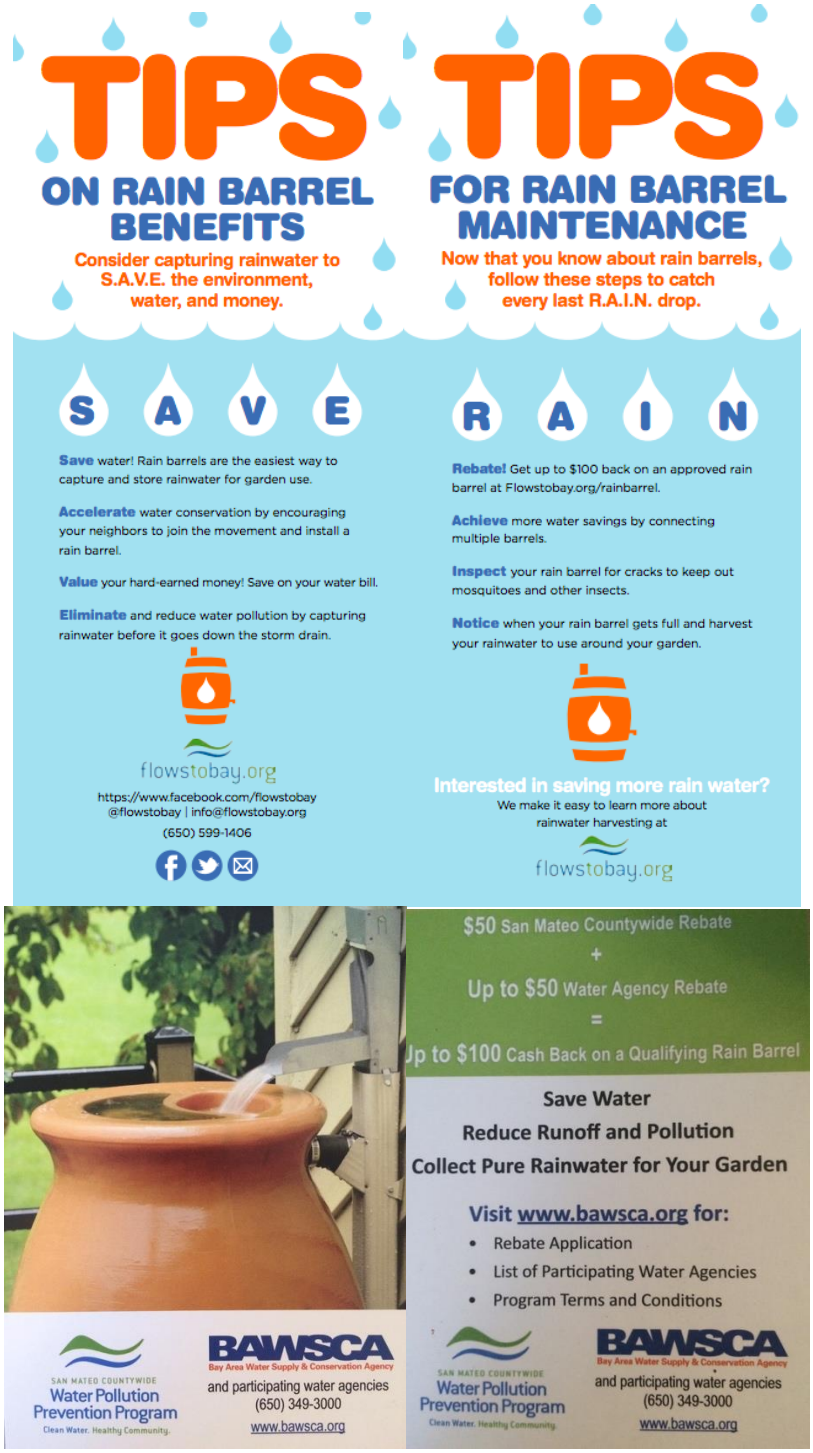


Figure 7-3. Rain Barrel Tip Card Design

C.7.c. Stormwater Pollution Prevention Education

SMCWPPP continued to use social media, the SMCWPPP website, and the quarterly newsletter to promote stormwater pollution prevention messages.

Social Media

SMCWPPP continued to maintain Facebook and Twitter social networks. These platforms were used as tools for two-way communication and have continued to be an effective method to engage with residents in the absence of face-to-face interactions. Both social media platforms experienced a significant increase in followers this reporting period. We gained 4,651 Facebook fans, reaching a total of 14,744 fans between July 1, 2017 and June 30, 2018. We gained 1,403 Twitter followers, reaching a total of 3,020 followers between July 1, 2017 and June 30, 2018.

Social media platforms were used to publicize stormwater issues, watershed characteristics, and stormwater pollution prevention alternatives. The platforms were primarily used to inform the public of environmental outreach events, to promote a shift towards incorporating sustainable behaviors into daily lifestyles, and to provide environmental and marine news relevant to San Mateo County pollution prevention. The accounts were monitored on a daily basis throughout the fiscal year. As part of the overall effort to enhance social presence and engagement with followers, several themed posts from FY 2016/17 were replicated in FY 2017/18. Additional themes were created and aired during FY 2017/18 due to their popularity in our audience.

The following is a breakdown of tasks and evaluation metrics associated with FY 2017/18 social media activity:

- Continued utilizing Facebook and Twitter as a two-way communication tool to share and exchange information between SMCWPPP residents, businesses, nonprofits, and community stakeholders within San Mateo County on pollution prevention messages. Specific program messages included watershed protection, water pollution and Bay area marine news, wash water pollution prevention, household hazardous waste, and used motor oil & filter recycling content.
- Continued to utilize Facebook as the SMCWPPP website's advertising platform to further promote messages.
- Facebook metrics:
    - Gained 4,651 Facebook fans, reaching a total of 14,744 Facebook fans.
    - Gained 365,975 total page impressions (number of people that viewed our page).
    - Gained 87,295 post impressions (number of people that viewed our posts).
    - Gained 2,934 interactions (likes, comments, and shares).
    - Drafted a total of 228 Facebook posts.
- Twitter metrics:
    - Gained 1,403 Twitter followers, reaching a total of 3,020 Twitter followers.
    - Gained 109,729 tweet impressions.
    - Gained 1,143 engagements.

- Drafted a total of 217 tweets.

Figure 7-4 presents some examples of FY 2017/18 Facebook Posts.

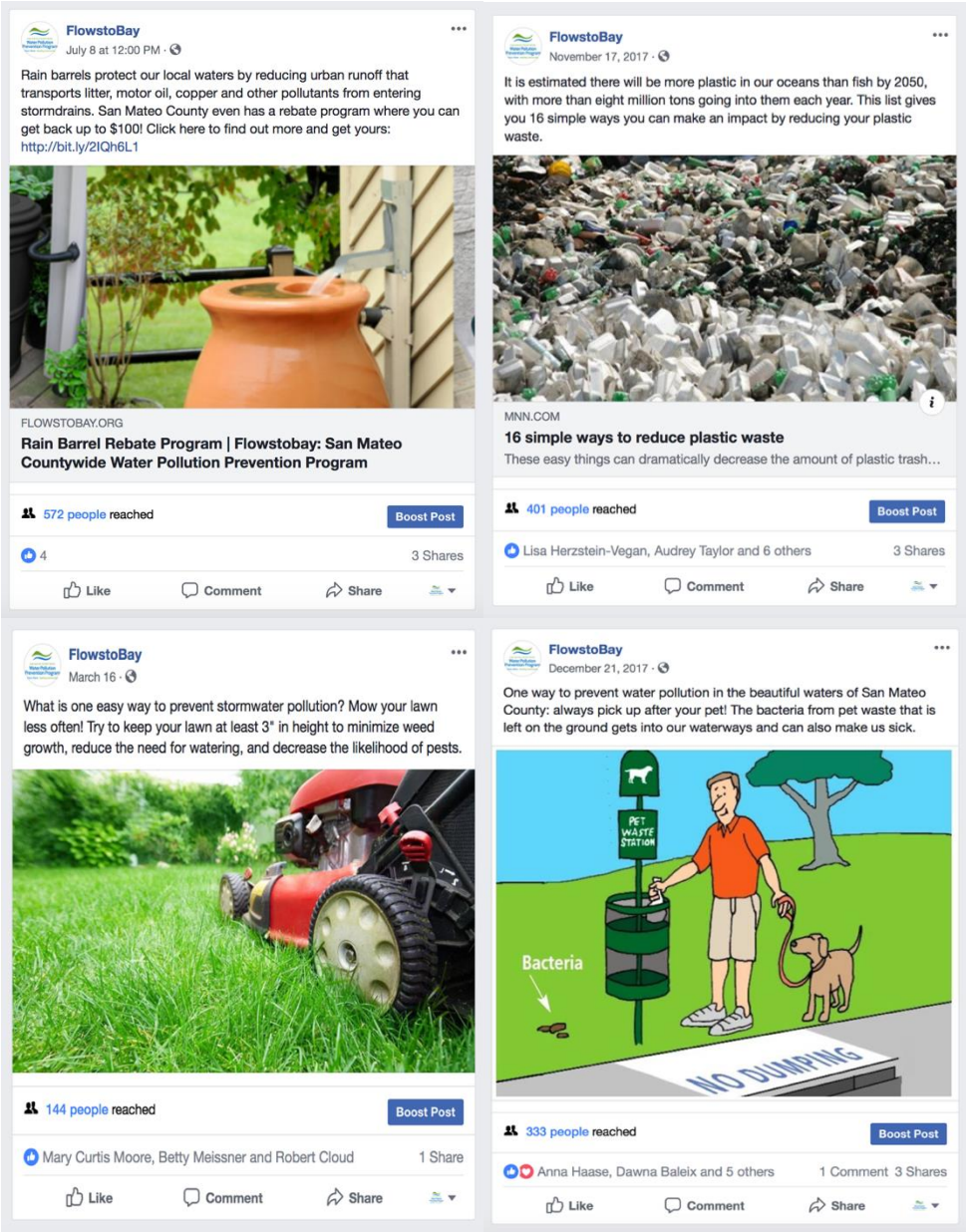


Figure 7-4. Example FY 2017/18 Facebook Posts

In addition to the standard Facebook and Twitter social media activity, Facebook and Twitter Ad Campaigns ran from July 1, 2017 – June 30, 2018. These campaigns increased SMCWPPP's reach to potential community members through the use of audience location and interest analytics. Specific ads

were created for a targeted audience group on both social media platforms and ran on an appropriate monthly budget approved by SMCWPPP. Both social media ad campaigns drew a significant increase in followers during this reporting period. During the ad campaign, the Flows to Bay Facebook page received 4,651 new fans and the Twitter page received 1,093 new fans.

The following is a breakdown of tasks and evaluation metrics associated with the FY 2017/18 social media ad campaigns:

- Facebook & Twitter ads:
    - July-June Campaigns: Tested multiple target audiences:
        - General Environmental Interest
        - Wildlife Interests
        - Gardening Interests
        - General Environmental / Water Interests
        - Rain Barrel
        - Pet Owners
    - Ran a total of 57 Facebook ads
        - Most successful audience was "Wildlife Interests" (3,841 likes) followed by "Gardening Interests" (577 likes), and "General Environmental / Water Interest" (226 likes)
    - Facebook Ads resulted in a total of:
        - 4,651 likes
        - 6,586 clicks
        - 886 link clicks
        - 69,899 reach
        - $0.53 per like on average
        - $0.50 per click on average
    - Ran a total of 65 Twitter ads
        - Most successful audience was "Wildlife Interests" (658 follows) followed by "Gardening Interests" (400 follows), and "General Environmental Interest" (345 follows)
    - Twitter Ads resulted in a total of:
        - 1,403 followers
        - 405,413 impressions
        - $2.14 per follow

Figure 7-5 presents some examples of FY 2017/18 Facebook Advertisements.

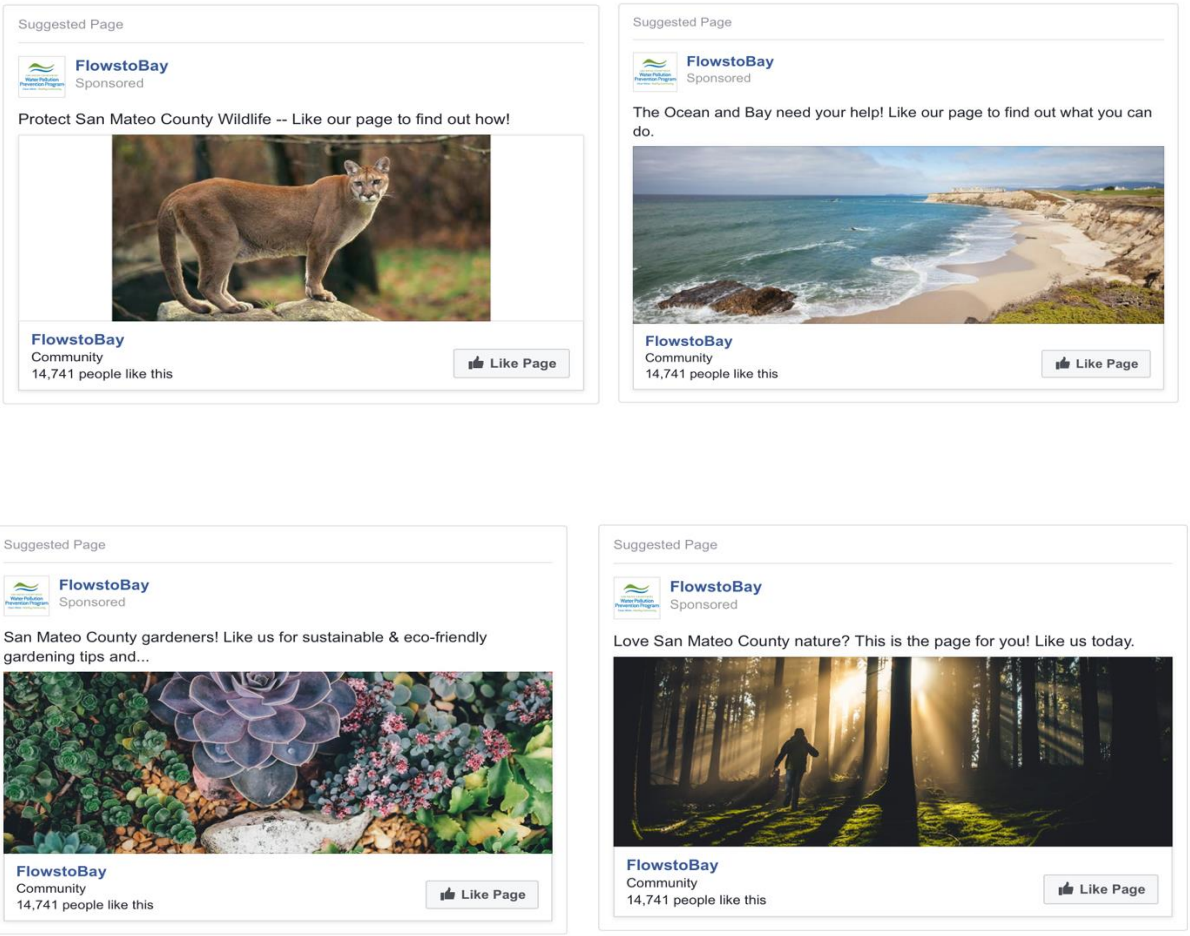


Figure 7-5. Example FY 2017/18 Facebook Advertisements.

Newsletter

The SMCWPPP quarterly newsletter was utilized to publicize stormwater issues, watershed information, and stormwater pollution prevention options to residents. The community newsletter was sent out quarterly to our community newsletter subscriber list. SMCWPPP's subscriber list reached a total of 2,805 subscribers in FY 2017/18. Examples of the newsletter are included in Appendix 7. The following is a breakdown for each quarterly newsletter in the FY 2017/18 campaign:

Summer 2017 Newsletter

- 2,643 Recipients
- 28.7% Open Rate
- 5.4% Click Rate

Fall 2017 Newsletter

- 2,591 Recipients

- 26.2% Open Rate
- 3.6% Click Rate

Winter 2017 Newsletter

- 2,909 Recipients
- 26.8% Open Rate
- 4.9% Click Rate

Spring 2018 Newsletter

- 2,843 Recipients
- 24.5% Open Rate
- 5.2% Click Rate

Summer 2018 Newsletter

- 2,840 Recipients
- 20.7% Open Rate
- 2.9% Click Rate

SMCWPPP Website

SMCWPPP continued to maintain its website (www.Flows To Bay.org) as the central point of contact, including contacts for each San Mateo County Permittee. The website was updated several times a month to ensure that SMCWPPP updates and contact information were up-to-date. These updates included changes to page text, images, the creation of three new pages (rain barrel, stormwater resource plan and school outreach contest). Regular maintenance and updates were also performed on SMCWPPP's "members only" pages for subcommittee members, such as the PIP Subcommittee.

Work and maintenance on the website included:

- Launched a blog page for residents to review archived blog articles.
- Launched a webpage publicizing the school outreach page for residents.
- Created Challenge pages for public outreach campaign
- Provided resources for 11,026 users with a total of 26,100 page views, allowing them to engage with content related to multiple topics (see website metrics chart below).
- Updated trainings page with latest reports and updates to provide transparent agency updates.
- Updated homepage components that included new blog articles and community events.
- Regularly updated events on website on a bi-monthly basis.

Additional website activities included:

- Monitored website visits on a bi-weekly basis.
- Used monthly data to inform decisions about which improvements to make to specific pages.

Total statistics for website total visits, unique users, pageviews, and other significant website metrics for FY 2017/18 fiscal year are shown in Table 7-4 (example of website pages are included in Appendix 7).

Table 7-4. Cumulative data for the Flowstobay.org website for FY 2017-18

Time Period	Sessions (Total Visits)	Users (Unique)	Page Views (Unique)	New Visitors %	Returning Visitors %	Overall Bounce Rate
July 1, 2017 - June 30 2018	17,463	11,026	26,100	84.6%	15.4%	47.3%

C.7.d. Public Outreach and Citizen Involvement Events

Overview

SMCWPPP directly participated in 10 public outreach and citizen involvement events in FY 2017/18 in order to reach a wide array of residents in different parts of the County at popular events such as Earth Day festivals, the San Mateo County Fair and Coastal Cleanup Day. We tabled most events in person and also partnered with other County agencies (including CEH and the Office of Sustainability) and the individual Permittees to distribute our outreach materials and promote these events through their own channels. There were an additional 14 public outreach and citizen involvement events where SMCWPPP materials were distributed by partner agency, San Mateo Resource Conservation District. A breakdown of these events can viewed below on Table 7-5.

SMCWPPP used online channels, such as Facebook, Twitter and the SMCWPPP website to promote events and gather volunteers. In addition, we collected a total of 156 signups from San Mateo County residents to join our email marketing program from the events we staffed. There was more of an emphasis however on one-on-one conversations about stormwater pollution and how residents can help reduce it with 585 total personal interactions. Event metrics are shown below.

Activity Goals

- Educate residents through personal interaction and educational materials
- Build our existing database of residents interested in stormwater issues
- Provide a platform for residents to engage with SMCWPPP messages and promotion of the Flows To Bay Challenge
- Develop outreach partnerships with County agencies, NGOs and CBOs
- Promote and support local cleanup events, such as Coastal Cleanup Day

Tasks

- Maintain a database of events we will participate in or provide materials to
- Continue to cultivate partnerships with County agencies, NGOs and CBOs
- Promote events on all online platforms

- Staff events and acquire e-newsletter subscribers
- Maintain resident database
- Promote and support local cleanup events on all online platforms

Deliverables

- Promotion of local events and cleanup on all online platforms
- Promotion and solicitation of Flows To Bay Challenge
- Event promotion materials

Outreach Materials

The following SMCWPPP items are given out at outreach events and/or by request provided to Permittees, organizations, and residents in San Mateo County (not including the less-toxic pest control items listed in section C.9.h.ii).

- "You Are The Solution To Water Pollution" pamphlet (English and Spanish)
- Stormwater tip card (English, Mandarin, and Spanish)
- Rain barrel tip card and rain barrel rebate application
- Flow To Bay Challenge information card
- Two children's activity books: "Pest or Pal" (OWOW – Our Water, Our World) and "Discover Stormwater"
- Dog waste bag canister
- Portable plastic ashtrays
- Recycled water bottle pens
- Reusable bags
- Sea animal stickers
- Fish carabiners
- Fish erasers

Table 7-5. FY 2017-18 Public Outreach and Citizen Involvement Events and Metrics

Dates	Event Location	Event Name	Type of Event	Estimated Event Attendance	e-Newsletter Sign Ups	Estimated Reach
9/16/17	San Mateo County	Coastal Cleanup Day	Citizen Involvement	4,447	N/A	4,447
9/20/17	El Granada	First Flush Training	Citizen Involvement	7	N/A	7
9/23/17 – 9/24/17	Pacifica	Fog Fest	Public Outreach	6,000	0	40
9/23/17 &	Moss Beach	Pet Waste Clean-	Citizen Involvement	9	N/A	200

Dates	Event Location	Event Name	Type of Event	Estimated Event Attendance	e-Newsletter Sign Ups	Estimated Reach
9/25/17	& Half Moon Bay	Ups				
10/7/17	Redwood City	Bay Day	Public Outreach	3,500	21	90
10/20/2017	Montara to Half Moon Bay	First Flush Event	Citizen Involvement	6	N/A	1,000
10/23/2017	Half Moon Bay	Sewer Science Field Trips	Public Outreach	240	N/A	250
10/27/2017	Pillar Point Harbor	San Mateo County Harbor District Website	Public Outreach	NA	N/A	500+
1/20/18	Colma	Colma Creek Habitat Restoration	Citizen Involvement	34	N/A	34
2/3/18	Brisbane	Habitat Restoration at Castanos Canyon Park	Citizen Involvement	38	N/A	38
2/12/18	Half Moon Bay	Sewer Authority Mid-Coastside Presentation	Public Outreach	15	N/A	50
2/21/18	El Granada	San Mateo Harbor District Presentation	Public Outreach	12	N/A	50
4/14/18	Redwood City	Marine Science Institute Earth Day	Public Outreach	2,700	22	105
4/18/18	San Mateo	College of San Mateo Earth Day	Public Outreach	400	13	60
4/21/18	Pacifica	Pacifica Beach Coalition Ecofest and Earth Day of Action	Citizen Involvement/Public Outreach	5,000	27	55
4/21/18	San Carlos	Earth Day at the Shoreway Environmental Center	Public Outreach	550	56	85
4/25/18	El Granada	Midcoast Community Council Presentation	Public Outreach	8	N/A	50
4/28/18	El Granada	Snapshot Day Training	Citizen Involvement	8	N/A	8
4/29/18	Half Moon Bay	Pacific Coast Dream Machines	Public Outreach	4,000	N/A	500

Dates	Event Location	Event Name	Type of Event	Estimated Event Attendance	e-Newsletter Sign Ups	Estimated Reach
5/4/18	Coastal San Mateo County	Snapshot Day Event + Hub	Citizen Involvement + Public Outreach	25	N/A	1,000
5/19/18	Moss Beach	Pet Waste Clean-Up	Citizen Involvement	2	N/A	100
5/30/18	Half Moon Bay	Half Moon Bay High School Lesson	Public Outreach	16	N/A	16
6/9/18 – 6/17/18	San Mateo	San Mateo County Fair	Public Outreach	127,000	18	160
6/28/18	Moss Beach	Princeton Task Force Presentation	Public Outreach	11	N/A	11

*Events highlighted in grey were attended by the San Mateo Resource Conservation District, however SMCWPPP outreach materials were distributed at these events.

C.7.e. Watershed Stewardship Collaborative Efforts

Rain Barrel Rebate Program

During FY 2017/18 SMCWPPP continued its partnership with BAWSCA to promote a countywide rain barrel rebate program and inspire San Mateo County residents to join the rainwater harvesting movement. The program subsidizes the cost of purchasing a rain barrel by providing rebates up to $100. In FY 2017/18 there were a total of 71 rain barrel rebates issued within the county from 50 submitted applications. Over 1,000 rain barrels have been installed to-date in San Mateo County under the rebate program. See Section C.7.b for additional details.

Social Media on Behalf of Partners

As part of our watershed stewardship collaborative efforts, social media content was posted on SMCWPPP's Facebook and Twitter social media platforms. Requests from partners to post and promote their messaging to our social media platforms included the following:

- Partner Event Promotion: 12 posts
- Household Hazardous Waste: 6 posts
- Wash Water Pollution Prevention: 2 posts
- Pesticides/ IPM: 7 posts
- Pet Waste: 2 posts

Example Posts are shown in Figure 7-6.

Collaborative Events

In FY 2017/18, SMCWPPP collaborated with partners to attend, host booths and distribute materials at three popular community events in San Mateo County (Table 7-6).

Table 7-6. List of FY 2017-18 Collaborative Events

Event	Location	Partner	Attendance
Coastal Cleanup Day	San Mateo County	CEH	4,447
Fog Fest	Pacifica	City of Pacifica	5,000
San Mateo County Fair	San Mateo	City of Burlingame, City of San Mateo, City of South San Francisco, Office of Sustainability	127,00

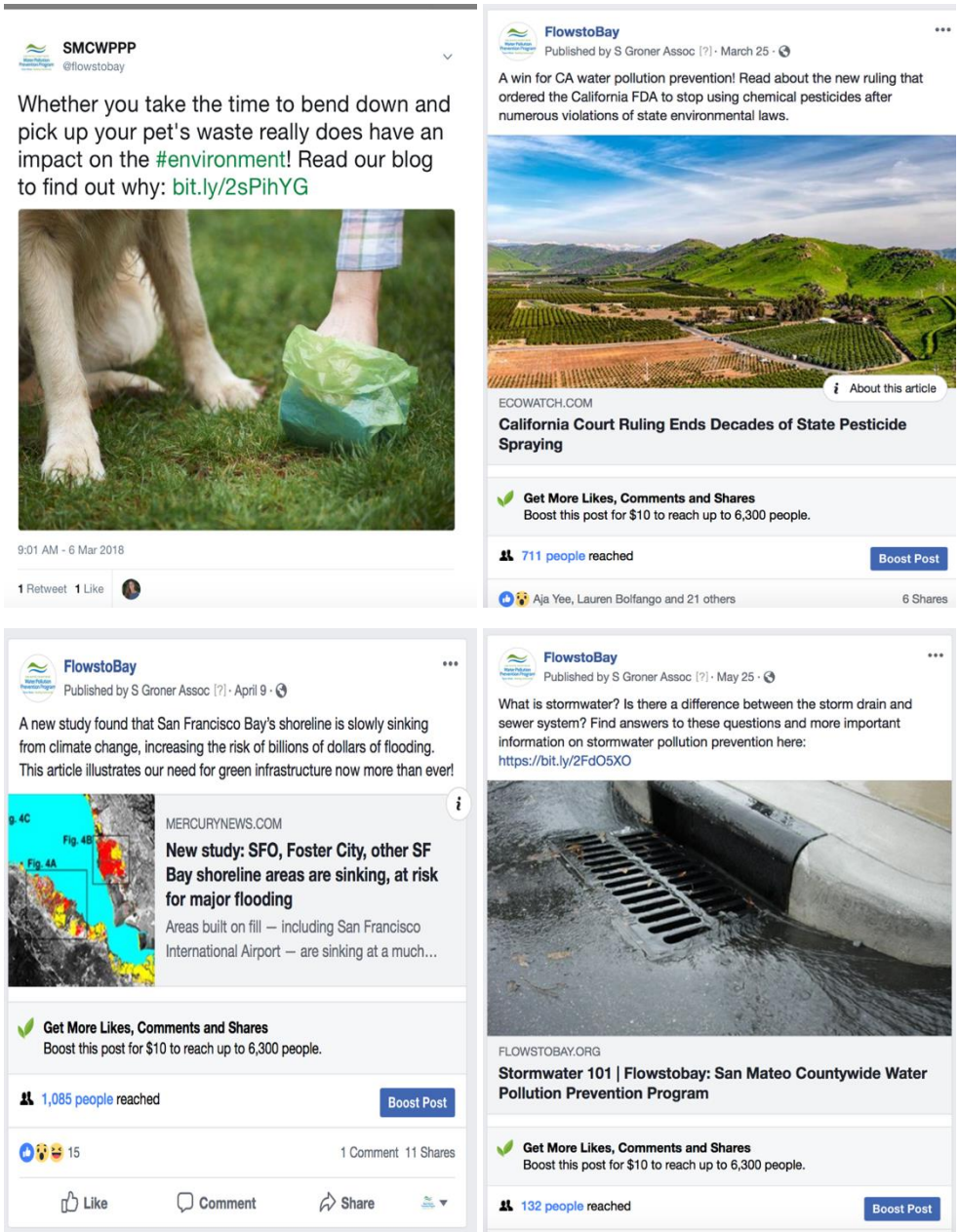


Figure 7-6. Example FY 2017/18 Social Media Posts Promoting Watershed Stewardship Collaborative Efforts

C.7.f. School-Age Children Outreach

Overview

During November 2017 to April 2018, the Flows To Bay High School Contest solicited proposals from San Mateo County high school students on "greening up" their school campuses. Four teachers led eight classes to submit proposals. Participating teachers and classrooms were provided with a Teacher Toolkit to guide the students in their research, design, and presentation efforts. Teachers worked with approximately 80 9th - 12th grade students on these proposals, researching using rainwater as a resource, litter reduction and removal, and/or removing and replacing toxics as tools to mitigate stormwater pollution effects on their high school campuses. Proposals were evaluated by SMCWPPP based on the criterion provided in the contest guidelines. Examples of the winning proposals are shown in Figure 7-7. Three top proposals were recognized with social media recognition and an EcoVoyage with the Marine Science Institute (Figure 7-8).

Figure 7-7. Winning Proposals of the Flows To Bay High School Contest

The winning proposal was submitted by four students in Ms. Stephanie Owens' Biology and Environmental Science class at Menlo-Atherton High School. This proposal by students Alondra Perez Gomez, Danny Hernandez-Martinez, Kate Summers and Kevin Angel Gutierrez offered a solution to flooding in a parking lot that often makes student pick-up treacherous during the rainy season. Their design focused on replacing the impervious and slick asphalt throughout the parking lot with permeable pavement, which would allow stormwater runoff to infiltrate into the underlying soils, promoting pollutant treatment and groundwater recharge, and reducing flooding. The students also included a plan

to place posters around the campus and near the affected areas to educate their classmates about permeable pavement, its purpose, and long-term benefits.

The winning proposals were submitted by Alex, Justin and Ethan from Veronica Heintz's class at Carlmont High School, Evelyn, Alexandra and Valentina from Kristen Hughes's class at Menlo-Atherton High School, and Ricardo Moreno's Grizzlies Go Green Club at Jefferson High School. Alex, Justin and Ethan submitted a proposal that utilized rainwater on their campus. Using rain gardens and swales, pervious pavement, increased tree canopy, and underground pipes, they found a visually appealing and technically feasible way to use rainwater as a resource. Evelyn, Alexandra and Valentina submitted a proposal that increased recycling and litter reduction awareness on their campus through school-wide cleanups that required participation by all students. The Grizzlies Go Green Club submitted a proposal that reduced the amount of plastic, particularly plastic water bottles, around their campus. Their plan was to implement water refill stations, plastic bottle and aluminum can-only recycling bins, and stormwater pollution posters used for education.

Three teachers, although they were unable to participate in the Flows To Bay High School Contest for various scheduling reasons, were able to review the content of the Flows To Bay Teacher Toolkit (regarding stormwater pollution prevention) with three of their classes, approximately 70 9th-12th grade students.

Table 7-7 and 7-8 summarizes teacher feedback on the Flows To Bay High School Contest (both those who were able and unable to participate).

Figure 7-8. Students Attending the Marine Science Institute EcoVoyage

Materials Created

- Flows To Bay High School Contest Teacher Toolkit
- Flows To Bay High School Contest Rubric

Schools Reached

Aragon High School, San Mateo

- Teacher contact: Jessica Valera, jvalera@smuhsd.org
- Subject: Science
- Classes: 2
- Status: Unable to participate

Carlmont High School, Belmont

- Teacher contact: Veronica Heintz, vheintz@seq.org.
- Subject: N/A

- Classes: 1
- Status: Participated

Jefferson High School, Daly City

- Teacher contact: Ricardo Moreno, rmoreno@juhsd.net
- Subject: Science
- Classes: 1 (club)
- Status: Participated

Menlo-Atherton High School, Atherton

- Teacher contact: Kristen Hughes, krhughes@seq.org and Stephanie Owens, sowens@seq.org
- Subject: Environmental Chemistry
- Classes: 6
- Status: Participated

Mercy High School, Burlingame

- Teacher contact: Jennifer Lambdin, jlambdin@mercyhsb.com
- Subject: Science
- Classes: 1
- Status: Unable to participate

Mills High School, Millbrae

- Teacher contact: Kathleen Louie, klouie@smuhsd.org
- Subject: History
- Classes: 1
- Status: Unable to participate

Woodside High School, Woodside

- Teacher contact: Ann Akey, aakey@seq.org
- Subject: Environmental Science
- Classes: 1
- Status: Unable to participate

Table 7-7. Summary of Teacher Feedback on the Flows To Bay High School Contest Teachers Who Participated

Name	School	Experience with the Contest (1-5)	Explanation of score?	Were the prompt and toolkit clear and detailed enough to guide your students through creating a mockup proposal? If not, recommendation for next year?	Rate of students' knowledge of topics covered in toolkit BEFORE being taught the materials and participated in the contest?	Rate of students' knowledge of topics covered in toolkit AFTER being taught the materials and participated in the contest?
Stephanie Owens	MAHS	5	I love the support from Flows to Bay. They communication was excellent.	Absolutely.	2	4
Veronica Heintz	Carlmont High School	4	I was a bit confused about the logistics of the project this year (collection of submissions, timeline of the actual project, difference between rollout day to students and date we got the information) but the administrators of the competition were quick to answer my questions and give clear answers. I think my kids did learn a lot that they had never even considered before doing this project.	Last year and this year were different in the prompt and I was a bit confused this year about whether or not there was a choice to incorporate all three aspects in your project or it was a requirement. I would recommend keeping it more narrow (as I followed with my students) because this allowed the students to really focus on learning one thing and learning a lot about it, rather than skimming a very broad scope of saving every single aspect of the school.	1	4
Ricardo Moreno	Jefferson High School	5	I was reminded plenty of times on submission dates and the toolkit was a great overview on what a project might look like.	The toolkit was pretty clear but students tend to lose focus through slide presentation. I would recommend a few youtube videos of some sort might be a good idea next year.	3	4
Kristen Hughes	Menlo Atherton High School	5	Much improved materials from you!	Yes, although last year worked better for my classes: limiting them to an engineering solution on campus. It also helped that last year the campus was flooded at exactly this time. This year no flooding = less relevant. And then facilities fixed a lot of the flooding issues after last year, so we may never have this opportunity again. I hadn't thought that through this year, and also I didn't give students as much time this year.	1	3

Name	School	Ways to improve this program to enhance students' grasp of stormwater pollution solutions and their role in addressing this issue?	How to improve communicating with teachers in getting the word out about the contest? What format works best for you?	Would you participate in the contest again next year?	Any other feedback?
Stephanie Owens	MAHS	I think providing material in Spanish and Tongan would help. These non-dominant cultures could benefit the most from the environmental justice afforded by stormwater remediation. At some point, we realize that the dominant culture (white and Asian in this area) probably have the power/money/resources/tools to remediate stormwater. That's why I loved doing this project with students who are recent immigrants. They all have some sort of environmental injustice that they bring from their communities in their own countries, and can relate, but don't know how to help in their current community.	I loved communication. Email is best.	Yes!	I am so grateful for this program- instead of a lengthy test, we got to complete a standards based project. No student will remember the test, but every kid will say, "Yeah, remember that group that sent us a text about getting our oil checked so we could clean the runoff?"
Veronica Heintz	Carlmont High School	Getting teachers on board to help plan actual lessons surrounding the topics that are engaging might get the kids more bought into the topic rather than having them do most of the research themselves. I understand it is a research project, but it is so new to many of them, that there is kind of a wall up - they don't really know where to start, even with the awesome resources you provided us with. A bit more of an intro lesson and to spark interest and passion for the ideas could be valuable. (I tried to do this with my kids, but having it streamlined as part of the program might give all kids participating more equal footing).	Email works great and I found the communication helpful.	Yes!	Thank you so much for this opportunity and the hard work you put into it all. It is clearly a very well thought out and purposeful competition and I enjoy getting to be a part of it. It is such a valuable experience and gives the kids agency to make change in an area they grow to care about rather than just being sad about the state of things and moving on. I think it is such a powerful project. Thank you!!!

Name	School	Ways to improve this program to enhance students' grasp of stormwater pollution solutions and their role in addressing this issue?	How to improve communicating with teachers in getting the word out about the contest? What format works best for you?	Would you participate in the contest again next year?	Any other feedback?
Ricardo Moreno	Jefferson High School	I would have someone or a group set up an info booth at potential schools participating or maybe at a coastal clean up event to spread the word about the contest at the beginning of the school year	Email works best and if all items could be summarized and attached in one email. Also I would suggest showing up to schools collaboration meetings or all district meetings to run it by science departments		Great program and I see much room for growth
Kristen Hughes	Menlo Atherton High School	I've been thinking about changing my stormwater pollution lab report to make it into something students can submit for this contest. Merging the two projects would make sense for me, but that is more curriculum development I need to do on my end rather than something you need to do. Although, I have students collect stormwater at their homes as part of my project, so if the rubric were more general (not limited to school campus) that would be nice.	It was good.	Probably.	Having a longer window where the contest is open would help time it around the rains that are so unpredictable here (open in January maybe?). Overall, a nice opportunity for students. thanks.

Table 7-8. Summary of Teacher Feedback on the Flows To Bay High School Contest Teachers Who Were Unable to Participate

School name	High school grades taught	Did you review any of the content of the Flows To Bay toolkit with your students?	Select the reason(s) you decided not to submit student proposals?	Which would increase your likelihood to participate in next year's program? Please select all that apply
Woodside	11th and 12th grade	Yes	Other: We were already working on longer projects relating to stormwater and we simply didn't finish them in time. I have 4 students who were part of a stormwater research team and we have been collecting water quality data from local streams all year as well as working on projects. The students went to Maine in June to be trained as part of the SMART (stormwater research team) program. I teach about stormwater in all of my environmental science classes - your toolkit was an additional research to draw on.	The toolkit was distributed to teachers before the start of the school year The program lasted for a longer period of time
Mercy High School	11th and 12th grade	Yes	I received the toolkit information too late in the year to incorporate into my class curriculum	The toolkit was distributed to teachers before the start of the school year
Aragon High School	9th, 10th, 11th, and 12th grade	No	Other: I went out on disability in mid February :(. Will try again next year!	The toolkit was distributed to teachers before the start of the school year
Kathleen Louie	12th grade	Yes	Other: Our Civic Action Project requires students identify an issue that engages city, county, or state decision-makers; your project directed students to engage site administrators and site related water issues. This did not fit the parameters of our curriculum.	The toolkit was distributed to teachers before the start of the school year Instead of a group proposal submission, the students completed an individual worksheet to evaluate what they have learned The program lasted for a longer period of time Other: see above

School name	High school grades taught	This year's program lasted 2 months, from program launch to proposal submission. What do you think the optimal program length should be?	What is the best time for us to reach out to you in the 2018/2019 school year to begin communications regarding participation the 3rd annual Flows To Bay High School Program?	What format works best for you in getting the word out about the contest? Please select all that apply.	What steps could be taken to ensure your participation in the 3rd annual Flows To Bay School Program?
Woodside	11th and 12th grade	All school year	Before school starts (July/August)	Email	Whatever you decide as the timeline please let us know during the summer. Thank you for offering this program.
Mercy High School	11th and 12th grade	All school year	Before school starts (July/August)	Email	N/A
Aragon High School	9th, 10th, 11th, and 12th grade	2 months	Mid-school year (October/November)	Email	N/A
Kathleen Louie	12th grade	All school year	Before school starts (July/August)	Email	N/A

Other County School Outreach Efforts

The San Mateo County Office of Sustainability has worked in conjunction with the San Mateo County Office of Education on a Zero Waste Initiative. During a Summer Institute in June 2018, teachers were invited to workshops to learn how to implement zero waste curriculum into their high school classes. Reporting on the Zero Waste Summer Institute will be available in the FY 2019/20 annual report. Please reference the County's annual report for more information on these countywide school outreach project.

FUTURE ACTIONS

In FY 2018/19, SMCWPPP plans to continue working with the PIP Subcommittee to conduct the following activities to assist member agencies to comply with MRP Provision C.7:

- Continue to grow the reach, engagement, and following of all SMCWPPP social media platforms with posts and advertisements;
- Promote county outreach events through the website and social media;
- Maintain and update SMCWPPP's www.flowstobay.org website as needed;
- Continue to support the Rain Barrel Rebate Program in partnership with BAWSCA, with C/CAG providing ongoing funding;
- Create a comprehensive program, sharing eco-friendly and stormwater pollution prevention practices, rebates and educational workshops with residents; and
- Build upon a partnership with the San Mateo County Office of Education to expand school outreach program and become a staple within San Mateo County schools and curriculum.

SECTION 8
C.8 WATER QUALITY MONITORING

On behalf of its member agencies, SMCWPPP performs water quality monitoring activities in compliance with MRP Provision C.8. Some of this work is accomplished through participation in BASMAA regional projects. Per Provision C.8, a complete documentation of all water quality monitoring data collected from October 1, 2017 through September 30, 2018 (i.e., Water Year 2018 or WY 2018) will be presented in SMCWPPP's Urban Creeks Monitoring Report, which will be submitted to the Regional Water Board by March 31, 2019.

In addition, in accordance with MRP Provision C.8.f., Pollutants of Concern (POC) Monitoring, SMCWPPP will submit by October 15, 2018 a report describing the POC Monitoring tasks accomplished in WY 2018 and the planned allocation of sampling effort for POC Monitoring in WY 2019. The report will include monitoring locations, number and types of samples collected, a description of the objectives of the sampling (i.e., management question addressed), and the analytes measured. However, per Provision C.8.h., the results of the monitoring will not be included, but instead will be documented in the Urban Creeks Monitoring Report, as described above.

SECTION 9
C.9 PESTICIDE TOXICITY CONTROLS

INTRODUCTION

The primary objective of MRP Provision C.9 Pesticides Toxicity Control is to prevent the impairment of urban streams by pesticide-related toxicity. Provision C.9 therefore helps implement the *TMDL for Diazinon and Pesticide-related Toxicity for Urban Creeks* in the San Francisco Bay region. Permittees are required to implement a pesticide toxicity control program that addresses their own use of pesticides and use by others within their jurisdictions. The focus is on pesticides that pose a threat to water quality, including applications with the potential to enter the municipal stormwater conveyance system.

Most MRP-required Provision C.9 tasks are implemented individually by each SMCWPPP member agency. SMCWPPP helps agency staff to understand MRP requirements and develops various tools that assist agency staff to effectively plan, implement, and report on compliance activities. SMCWPPP's assistance with MRP Provision C.9 is coordinated through SMCWPPP's Parks Maintenance and Integrated Pest Management (IPM) Work Group. The exception is Provision C.9.h, the public outreach portion of Provision C.9, which is implemented through the SMCWPPP Public Information and Participation (PIP) component.

IMPLEMENTATION OF MRP PROVISIONS

During FY 2017/18, SMCWPPP performed a number of tasks to assist member agencies with implementation of Provision C.9, with input and assistance provided by the Parks Maintenance and IPM Work Group. Accomplishments included the following:

- Held two meetings of the Parks Maintenance and IPM Work Group.
- Developed periodic update documents with relevant pesticide-related news, events and regulatory developments for the Parks Maintenance and IPM Work Group.
- Conducted SMCWPPP's Annual Landscape IPM Training Workshop in March 2018.
- Conducted an IPM Contractor Management Workshop in May 2018.
- Continued coordinating with San Mateo County Agriculture / Weights and Measures.
- Participated in relevant BASMAA and CASQA activities.
- Continued to maintain retail partnerships at 10 top-tier stores (e.g., Home Depot and OSH) within San Mateo County. Tasks included ordering materials, organizing outreach collateral, checking in with store managers, and providing outreach to residents.
- Educated hardware store employees to become program messengers and pass on the pollution prevention message to customers. Conducted five in-store trainings for store employees.
- Conducted outreach at community events to educate customers on less toxic alternatives to commercial pesticides and fertilizers.

- Updated a pesticide tracking template to assist member agencies comply with pesticide tracking and reporting requirements in MRP Provision C.9.a.

More information on each of these accomplishments is provided below.

Parks Maintenance and IPM Work Group

The Parks Maintenance and IPM Work Group provides the opportunity for sharing information about MRP Provision C.9 requirements and approaches for achieving compliance. Valerie Matonis from the City of Redwood City continued to chair the Work Group during the first half of FY 2017/18. After Ms. Matonis retired in December, Mr. Richard Holtz from the City of Burlingame became the Work Group Chair. The Parks Maintenance and IPM Work Group met two times in FY 2017/18 with good participation by municipal staff, as shown by the attendance list, included in Appendix 9.

In FY 2017/18, SMCWPPP staff continued to develop a periodic update document describing relevant pesticide related news, events and regulatory developments, including upcoming IPM workshops and trainings. The update documents were distributed as part of the Parks and IPM Work Group meeting agenda packets.

Seventeenth Annual Landscape Integrated Pest Management Workshop

The seventeenth annual SMCWPPP Landscape IPM Workshop was held on March 7, 2018 at the City of Foster City's Library Community Center. The workshop was attended by 90 municipal staff and contractors and covered the following topics:

- Pesticides and Water Quality.
- IPM for Gopher, Raccoon, and Bee Control.
- IPM for Municipal Landscapes.
- IPM for Controlling White Grubs and Yellowjackets.
- Regulatory Update and Common Violations.

Evaluation forms completed by the workshop's attendees included many positive comments and indicated that overall the workshop met their expectations. Appendix 9 includes the workshop agenda, attendance list and a summary of the evaluations. Other workshop materials are available on the SMCWPPP website (www.flowstobay.org).

IPM Contractor Management Workshop

SMCWPPP held a workshop titled "*Working with Pest Control Contractors to Ensure Stormwater Permit Compliance"* on May 14, 2018. The workshop's target audience was the following types of municipal staff: IPM coordinators, staff that hire and supervise structural or landscape pest control contractors, facilities managers, and/or staff responsible for completing the pesticides section of the stormwater permit annual report. The workshop was attended by 28 municipal staff and contractors and covered the following topics:

- Requirements in the MRP for municipal pest control contractors.
- Demonstration of the SMCWPPP Pesticide Tracking Spreadsheet.

- Ins and Outs of IPM Contract Management.
- Overview of the City of San Jose's online database for tracking contractor activities.

Appendix 9 includes the workshop agenda, attendance list and a summary of the evaluations. Other workshop materials are available on the SMCWPPP website (www.flowstobay.org).

Coordination with San Mateo County Agriculture / Weights and Measures

San Mateo County Agriculture / Weights and Measures staff attended both meeting of the Parks Maintenance and IPM Work Group and received information on water quality issues and the Municipal Regional Permit. In addition, SMCWPPP worked closely with San Mateo County Agriculture / Weights and Measures staff to provide Department of Pesticide Regulations Continuing Education Credits for participants in the Landscape IPM Workshop.

Participation in BASMAA and CASQA

Provision C.9.f requires Permittees to track and participate in regulatory processes relevant to pesticide toxicity control. During FY 2017/18, SMCWPPP accomplished this task by working with BASMAA and CASQA. For additional information, see *Pesticides Subcommittee Annual Report and Effectiveness Assessment - 2017-2018, California Stormwater Quality Association, Final Report, August 2018* (Appendix 13). In addition, SMCWPPP staff stayed current with pesticide controls and regulatory efforts by participating in selected CASQA Pesticide Committee meetings.

Point of Purchase Outreach

SMCWPPP conducted point-of-purchase outreach to home improvement store staff and customers at top-tier stores (e.g., Home Depot, Hassett Hardware, and Orchard Supply Hardware) with tips for proper use and disposal of pesticides and other lawn and garden chemicals. The purpose of reaching out to home improvement stores was twofold. First, store employees were educated about stormwater pollution and provided with pollution prevention tips and resources. This provides employees with the information needed to encourage San Mateo County residents to apply IPM practices and purchase lawn and gardening supplies accordingly. Second, program materials were provided directly to the public when they may be most receptive to hearing the message, via the point-of-purchase displays. All of these efforts helped to promote the regional Our Water Our World (OWOW) point-of-purchase program. The following BASMAA report provides more information on OWOW: *Annual Reporting for FY 2017-2018, Regional Supplement for Training and Outreach* (Appendix 13).

SMCWPPP's training sessions consisted of educating associates about: (1) stormwater runoff, (2) where the local Household Hazardous Waste management facility is located, (3) their role in reducing pesticide use, (4) how to properly read a pesticide label, (5) the less-toxic pesticides sold in their stores, and (6) proper usage of pesticides and current pest problems/less-toxic solutions to these problems. A total of 89 employees were trained at ten stores. Table 9-1 shows the stores that received trainings for their employees and the hours spent at each store performing the following: (1) meeting with department heads/managers to discuss current pest problems and training associates on such matters (maintenance/mentoring), (2) placing informational brochures of pest fact sheets in displays (pocket guide installation) and (3) displaying new shelf talkers. Example photographs of point-of-purchase displays and trainings are shown in Figure 9-2.

Table 9-1. FY 2017/18 San Mateo County IPM Instore Employee Trainings and Time Spent Updating the Display Materials

Store	Number of Associates Trained	Maintenance/ Mentoring Time (hours)	Shelf Talker Reset Time (hours)
Home Depot Daly City	15	3.5	3
Home Depot Colma	8	4.5	3
Home Depot San Mateo	14	4.5	3
Orchard Supply Hardware Foster City	8	4.5	0
Orchard Supply Hardware Millbrae	7	4.5	0
Orchard Supply Hardware Redwood City	10	4.5	0
Orchard Supply Hardware South San Francisco	6	4.5	0
Hassett's Ace San Mateo	8	3.5	3
Hassett's Ace Carlmont	5	3.5	3
Hassett's Ace Redwood City	8	4.5	0

Figure 9-1. FY 2017/18 San Mateo County IPM In-store Employee Trainings and Displays. Starting top left and moving clockwise: Hassett Hardware literature rack display; Employee training at Hassett Hardware; Home Depot point of purchase shelf talker display; Home Depot Employee training.

Pest Control Contracting Outreach

During FY 2017/18, SMCWPPP implemented outreach, including outreach that directly targeted pest control contractors, to (1) encourage San Mateo County communities to reduce their reliance on toxic pesticides that threaten water quality, (2) encourage public and private landscape irrigation practices that minimize pesticide runoff, (3) promote appropriate disposal of unused pesticides, and (4) encourage residents to hire pest control professionals that use IPM practices.

SMCWPPP conducted this outreach via the social media platforms Facebook and Twitter. Example social media posts are shown in Figure 9-2. The following is a breakdown of posts related to pest control promoted during FY 2017/18:

Facebook

- 7 posts
- 39 engagements
- 1,833 reach

Twitter

- 7 tweets
- 27 engagements
- 2,317 impressions

In addition to social media posts, SMCWPPP distributed the OWOW fact sheet entitled "Finding a Company That Can Prevent Pest Problems." The fact sheet describe the steps residents can take once they've identified that they have a pest problem, including the hiring of a pest control operator and evaluating the types of toxic chemicals they use. The fact sheets were distributed to hardware stores, at community events, and to PIP Subcommittee members to distribute throughout their municipalities.

In addition, to help fulfill the MRP Provision C.9.e.ii.(3) requirement for outreach to pest control operators, the Countywide Program mailed a letter to all licensed and cleared pest control operators in San Mateo County, using the license lookup website for the California Structural Pest Control Board. The letter included information on the linkage between the application of pesticides for structural pest control and water quality impacts via stormwater runoff, referencing recent data that shows pesticide related impacts in local creeks. The letter also included a request for businesses to practice IPM not only to protect local waters, but also to become a certified IPM pest control operator, and to have individual employees become certified if the business is already certified. Several options for third party certification programs were provided with links to websites for more information. The letter was mailed to 47 businesses. Appendix 9 includes a copy of the letter.

Pesticide Tracking Template

In FY 2016/17, SMCWPPP developed a template in Excel to assist with pesticide tracking and reporting requirements in MRP Provision C.9.a. The pesticides tracking template utilizes a lookup list of pesticides and active ingredients compiled from data tables available on the Department of Pesticide Regulation (DPR) website. The template was updated during FY 2017/18 with the current two years of pesticide product data from the DPR website.

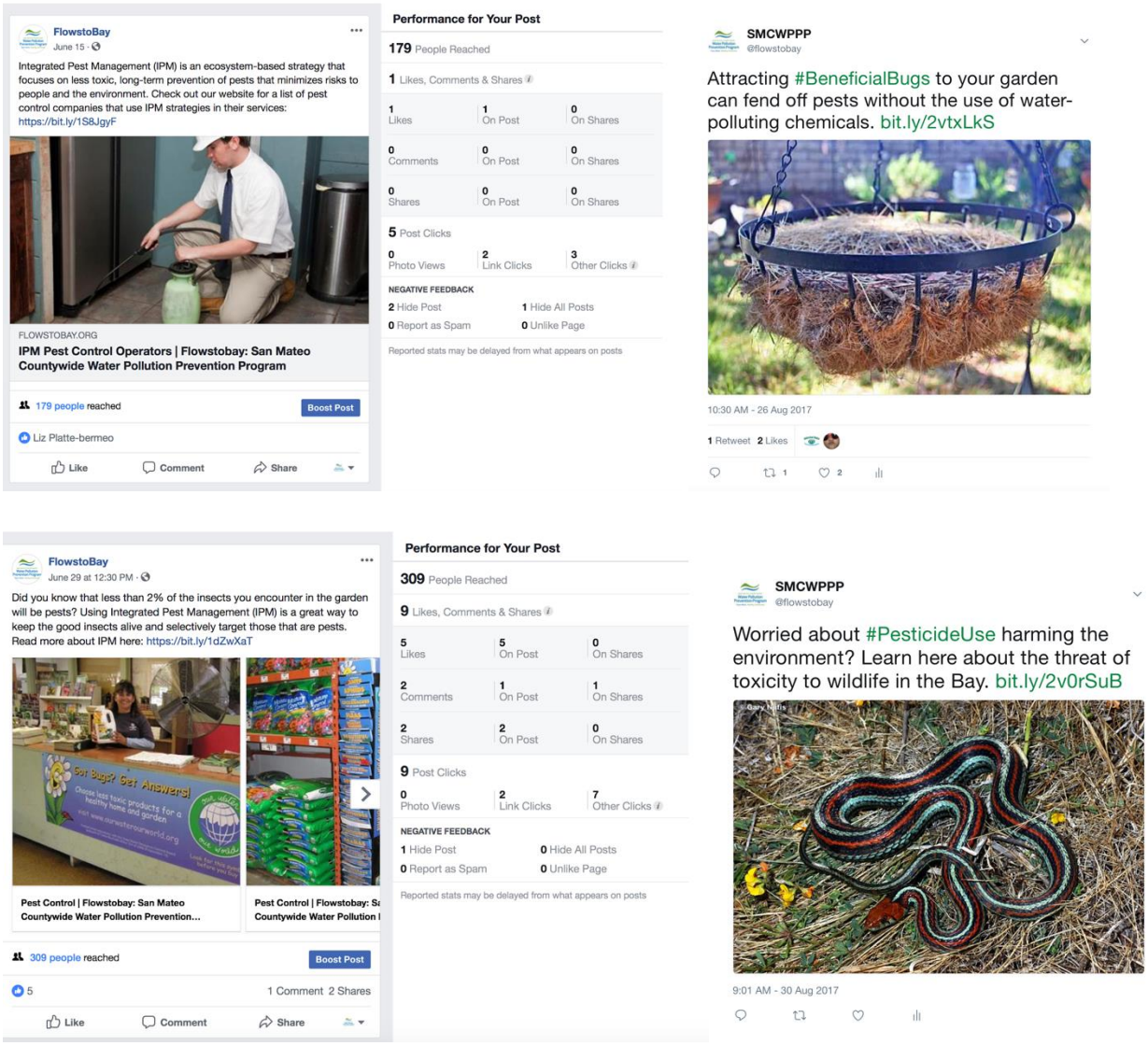


Figure 9-2. Example Social Media Posts Promoting Pesticide Pollution Prevention

FUTURE ACTIONS

SMCWPPP activities planned for FY 2018/19 to assist member agencies comply with MRP requirements in Provision C.9 include the following:

- Continue to assist member agencies implement their IPM programs and policies, with input and assistance provided by the Parks Maintenance and IPM Work Group;
- Hold one Parks Maintenance and IPM Work Group meeting;
- As required by Provision C.9.g, conduct an effectiveness evaluation of the pesticide control measures and IPM efforts implemented by San Mateo County Permittees and their contractors, evaluating the attainment of pesticides concentration and toxicity targets for water and sediment from local monitoring data, and identifying additions and/or improvements to existing control measures needed to attain targets;
- Continue to coordinate with County Agriculture / Weights & Measures, as needed;
- Continue using signage and materials developed by BASMAA for the point-of-purchase program;
- Perform outreach messaging to residents on best practices for hiring pest control contractor certified in IPM via fact sheets, SMCWPPP's website (flowstobay.org), social media posts, and a quarterly newsletter; and
- Send direct mailers to pest control professionals that encourage IPM certification and education.

SECTION 10
C.10 TRASH LOAD REDUCTION

INTRODUCTION

Provision C.10 Trash Load Reduction tasks are implemented by each SMCWPPP member agency. SMCWPPP helps agency staff to understand trash load reduction requirements and develops various tools needed to effectively plan, implement, and report on compliance with the requirements. More detailed information about SMCWPPP's assistance in helping member agencies comply with MRP requirements in Provision C.10 is included in the following sections.

IMPLEMENTATION OF MRP PROVISIONS

MRP Provision C.10 (Trash Load Reduction) requires Permittees (as applicable) to:

- Reduce trash discharges from 2009 levels by 70% by July 2017 and 80% by July 2019.
- Ensure that lands they do not own or operate but that are plumbed directly to their storm drain systems in Very High, High and Moderate trash generation areas are equipped by full capture systems or managed to a level equivalent to full capture systems.
- Install and maintain full capture systems that treat a mandatory minimum acreage.
- Assess trash reductions associated with control measures other than full capture systems using a visual assessment protocol.
- Develop and implement a receiving waters trash monitoring program plan.
- Annually cleanup and assess a mandatory minimum number of creek/shoreline trash hotspots.
- Maintain a Long-Term Trash Load Reduction Plan designed to achieve 100% trash reduction by July 2022.

During FY 2017/18, SMCWPPP performed a number of tasks to assist member agencies with implementation of Provision C.10 and the requirements listed above, with input and assistance provided by the SMCWPPP Trash Subcommittee and the Litter Work Group. Accomplishments included the following:

- Coordinated and facilitated four meetings of SMCWPPP's Trash Subcommittee and four meetings of SMCWPPP's Litter Work Group.
- Assisted SMCWPPP member agencies in delineating trash full capture treatment areas in GIS.
- Continued to implement SMCWPPP's Trash Assessment Strategy, including conducting roughly 750 On-land Visual Trash Assessments (OVTAs) at about 250 sites and maintaining the Program's online OVTA database to allow member agencies access to timely load reduction estimates.
- Continued to provide guidance to member agencies on MRP operation and maintenance (O&M) requirements and standard operating procedures for trash full capture systems.

- Collated and standardized data from 32 trash hot spot assessments and cleanups, and entered the data into the SMCWPPP hot spot database.
- Finalized and distributed the *Litter Reduction Toolkit for Multi-family Dwellings* which provides guidance to member agency staff on BMPs for reducing litter at properties in San Mateo County.
- Held the Litter Work Group's 3rd Roundtable Event to share information and best practices for reducing illegal dumping in communities and discuss the associated administrative, legal and practical challenges.
- Distributed the report on *Litter Practices Recommendations for Solid Waste Franchise Agreements* to member agencies.
- Coordinated with the SMCWPPP Public Information and Participation Subcommittee (PIP) on countywide school outreach and countywide litter campaign branding efforts.
- Coordinated with Caltrans on trash capture efforts, including the installation of trash full-capture systems through cooperative implementation agreements.
- Identified for each member agency areas >10,000 ft^2 draining to private inlets connected to its MS4.
- Participated in the development and re-submittal of the revised *BASMAA Receiving Waters Trash Monitoring Program Plan*, in compliance with MRP provision C.10.b.v.
- Conducted qualitative trash receiving water monitoring at 30 creek/channel sites and conducted a field training for member agency staff on protocols included in the *BASMAA Receiving Waters Trash Monitoring Program Plan.*
- Assisted member agencies in developing information necessary for reporting trash load reductions with their FY 2017/18 annual reports.

More information on each of these accomplishments is provided below.

Participation and Coordination of the Trash Subcommittee

SMCWPPP's Trash Subcommittee assists member agencies with the implementation of new or enhanced trash control measures and actions required by the MRP. The Trash Subcommittee generally meets quarterly. Additional meetings are scheduled as necessary to address high priority issues.

During FY 2017/18, SMCWPPP staff facilitated four Trash Subcommittee meetings, which were chaired by Chris Sommers (EOA). The Trash Subcommittee continued to have excellent participation by municipal staff and other stakeholders as shown in the FY 2017/18 attendance list which is included in Appendix 10. During the Trash Subcommittee meetings in FY 2017/18, Subcommittee members discussed and provided input on the following topics/projects:

- C.10 requirements in the MRP.
- SMCWPPP litter work group activities.
- New or planned installations of trash full capture systems in member agency jurisdictions.
- BASMAA Receiving Water Monitoring Plan.
- FY 2017/18 Annual Report format for Provision C.10.

- Implementation of trash control measures in private drainages >10,000 ft^2.
- Opportunities for collaboration with Caltrans.
- SMCWPPP Trash Assessment Strategy, including OVTAs conducted in Trash Management Areas (TMAs).
- Potential vector control issues with trash full-capture devices.
- State Water Board trash full capture system and multi-benefit system certification.

Demonstration of Trash Load Reductions (C.10.a.ii)

SMCWPPP developed the *Pilot Trash Assessment Strategy* (Strategy) in FY 2013/14 on behalf of its member agencies. The Strategy was submitted to the Regional Water Board on February 3, 2014 as part of member agency Long-Term Trash Load Reduction Plans, and was intended to serve as version 2.0 of the trash tracking method required by the Permit. SMCWPPP began to implement the Strategy in FY 2013/14 and continued to implement it at full-scale in FY 2017/18 on behalf of (and in collaboration with) all member agencies.

The Strategy is intended to provide information on the magnitude and extent of trash reductions associated with stormwater in the San Mateo County. The Strategy is consistent with trash monitoring, assessment and reporting requirements in the MRP and is primarily designed to answer the following core management question:

> *Have MS4 trash load reduction targets (i.e., 40%, 70%, and No Adverse Impacts) been achieved by SMCWPPP member agencies?*

The primary environmental and programmatic indicators that SMCWPPP and member agencies currently track to answer this core management question are:

1. **Full Capture Systems** – The extent of areas effectively treated by trash full capture devices.
2. **Other Trash Controls** – Decreases in the levels of trash observed on-land and available to MS4s.
3. **Source Controls** – Reductions in the levels of litter prone items observed in the environment that were subject to source controls.
4. **Additional Creek and Shoreline Cleanups (Offset)** – The volumes of trash removed via creek and shoreline cleanup events (above and beyond those required by the MRP).
5. **Direct Discharge Programs** – The extent and magnitude of trash removed or prevented from entering a receiving water body from sources directly impacting those water bodies (e.g., illegal dumping into or illegal encampments in creeks).

In selecting the indicators above, SMCWPPP member agencies recognized that no one indicator could provide the information necessary to effectively determine progress made in reducing trash discharged from MS4s. SMCWPPP's methods used to collect or track information on the primary indicators 1 - 4 listed above are briefly described below, along with summaries of associated activities conducted by SMCWPPP in FY 2017/18. Methods used to assess indicator 5 have not been implemented to-date because no SMCWPPP member agency has submitted or implemented a direct discharge plan as outlined in the MRP. Additional information and the results of data collected to support indicators 1 - 4 can be found in the Annual Reports (see Sections 10 – Provision C.10.b.ii Parts A and B) of individual member agencies.

1. Full Capture Systems (Including Operation and Maintenance)

Devices and facilities meeting the trash full capture design criteria described in the MRP are effective trash controls if adequately maintained to ensure their capture efficiency. Consistent with the Long-Term Plan Framework and discussions with Regional Water Board staff, if a full capture device is maintained effectively then trash from the area draining to the device is effectively reduced to a level of "no adverse impacts". Additional trash reductions, therefore, are not needed in areas draining to and treated by full capture devices.

From FY 2013/14 through FY 2017/18, SMCWPPP and member agencies have expended considerable time and resources identifying and mapping areas draining to full capture devices, using a combination of field work and Geographical Information System (GIS) analysis. Newly installed full capture devices are delineated and mapped as part of an annual update of individual member agency full-capture device GIS data layers. As a result, all drainage areas have been delineated for all devices installed to-date in San Mateo County. Trash reductions associated with these areas are calculated based on the baseline trash generation levels established on member agency baseline trash generation maps.

Additionally, SMCWPPP completed the development of a Model Trash Full Capture Device O&M Verification Program in FY 2015/16. The O&M Verification Program is intended to ensure that devices are operated at a level necessary to maintain their full capture designation. In FY 2017/18, SMCWPPP continued to provide guidance to member agencies on O&M requirements and standard operating procedures developed for member agencies as part of the Model Verification Program. Member agencies with full capture devices have an O&M verification program tailored to fit the types of devices in their stormwater conveyance system and the associated maintenance procedures needed to adequately maintain these devices. Individual member agency Annual Reports will provide information regarding O&M of full capture devices and any associated issues with the devices (see Sections 10 – Provision C.10.b.i).

2. Other Trash Control Measures (via On-land Trash Visual Assessments)

In FY 2013/14, SMCWPPP developed a pilot approach to assess trash reductions on land areas that generate substantial levels of trash (i.e., very high, high or moderate trash generation) and are not treated by full capture devices. The approach uses on-land visual trash assessment (OVTA) protocols developed by EOA, Inc. to record changes in the levels of trash on streets, sidewalks and properties over time. The assessment protocols score sites/areas using a 4-tier system (A - D, A being the least amount of trash). The four OVTA scoring categories correspond with the four trash generation rate categories (i.e., very high, high, moderate and low) and the associated weighting factors included in the MRP.

Consistent with the MRP, OVTAs are conducted at randomly selected street/sidewalk sites representing 10% of the applicable street miles in each trash management area (TMA) where trash reductions are being reported by member agencies. OVTAs are conducted at a frequency necessary to confidently detect reductions in trash levels at these sites. Based on the findings of the *Tracking California's Trash* State Water Resources Control Board funded project, conducting between 4 and 6 assessments at a site will allow improvements in trash levels to be detected with an acceptable level of confidence. Currently, SMCWPPP annually conducts roughly 3 assessments at each site and then averages two years of data to calculate trash load reductions in a given fiscal year. For example, in reporting reductions for FY 2017/18, results from assessments conducted in both FY 2016/17 and FY

2017/18 were averaged and used to represent the "current" levels of trash within the applicable land areas.

During FY 2017/18, SMCWPPP staff conducted roughly 750 OVTAs at about 250 assessment sites (averaging 1,000 feet in length). Nearly all sites were assessed at least three times during FY 2017/18. The results of the assessments were incorporated into member agency trash reduction estimates reported in Section C.10 (Provision C.10.b.ii Part B) of their FY 2017/18 Annual Reports. Additional assessments are planned for FY 2018/19, consistent with the SMCWPPP Trash Assessment Strategy. The number and location of sites will likely be adjusted based on the findings of the project completed in FY 2017/18 to identify land areas > 10,000 ft^2 draining directly to member agency MS4s. Since June 2014, SMCWPPP staff has conducted over 2,500 OVTAs in San Mateo County.

Assessment results are stored in SMCWPPP's online OVTA Database. In FY 2017/18, SMCWPPP staff entered assessment results within one week of conducting an assessment, which provided member agency staff with timely access to the results.

3. Source Controls (Via Surveys and Characterization Studies)

SMCWPPP member agencies have implemented actions to reduce the sale or distribution of litter-prone items and stop litter at its source. These source controls include the adoption and enforcement of ordinances enacted by member agencies to eliminate the distribution of single-use plastic grocery bags and expanded polystyrene (EPS) food service ware in their jurisdictions. To assist member agencies in determining to what degree these ordinances have reduced the level of these products found in the environment, SMCWPPP staff utilized the findings of a study conducted in Santa Clara County between March 2015 and July 2017. As part of the study, debris and trash were collected from large and small full-capture treatment systems within jurisdictions that have installed these devices.

Results from the project, which characterized the number of bags and amount of EPS observed in trash full capture systems pre- and post-ordinance, indicate that on average 72% fewer single-use plastic grocery bags and 74% less EPS food service ware was observed in storm drains systems after the ordinances went into effect. Along with other lines of evidence, these observed average reductions are used by SMCWPPP member agencies to demonstrate trash load reductions associated with the implementation of these ordinances. For additional details on results of the project, see the *Storm Drain Trash Monitoring and Characterization Project Technical Report* provided in Appendix 10.1 of the Santa Clara Valley Urban Runoff Pollution Prevention Program's FY 2015/16 Annual Report.

4. Additional Creek and Shoreline Cleanups (via volumes of trash removed from waterways)

Member agencies are also allowed to claim up to 10% trash load reduction for conducting trash cleanups in local water bodies above and beyond cleanups required by the MRP. SMCWPPP staff assists member agencies by calculating load reductions associated with these efforts based on the volumes of trash reported. Load reductions associated with these efforts are calculated based on methods described in the MRP and are reported in Section C.10.c of member agency annual reports.

Identification of Trash Generating Areas Directly Connected to MS4s

Provision C.10.a.ii.(b) of the Permit requires that Permittees by July 1, 2018 identify land areas that are greater than 10,000 ft^2, have very high, high, or moderate baseline levels of trash generation, and a direct connection to their MS4. Additionally, the trash control status of these areas must also be

determined. The Permit also requires that these areas are equipped with full trash capture systems or managed with equivalent trash discharge control actions.

To assist member agencies in identifying land areas applicable to this requirement and their trash control status, SMCWPPP developed and implemented the following methodology in FY 2017/18 for all member agencies:

1. Compiled readily available information and GIS data layers, including parcel databases, baseline trash generation levels, building footprints, existing trash full capture treatment areas, municipal storm drainage networks, and aerial photography.
2. In GIS, selected of all jurisdictional land areas on baseline trash generation maps that were not currently draining to trash full capture systems or identified as low trash generation.
3. Removed all building footprints from the remaining land areas since building rooftops generally don't generate trash.
4. Identified which of the remaining land areas are >10,000 ft^2 and therefore should be considered as potential applicable areas.
5. Via desktop analysis, identified whether storm drain inlets are visible on these potential applicable land areas and based on this evaluation categorized each land area one of the following categories:
    a. Directly Connected to MS4 – Land area contains a storm drain inlet that is connected underground to the member agencies MS4;
    b. Discharges Directly to Water Body - Land area contains a storm drain inlet that discharges directly to a receiving water;
    c. Does Not have Inlet – Land area does not contain a storm drain inlet and therefore drains via surface runoff to public ROW;
    d. Drains Back to Public ROW via Inlet – Land area contains a storm drain inlet that drains back to the surface of the public ROW; and
    e. Unknown – Drainage system configuration could not be determined.
6. In parallel to Task 5, conducted a "virtual" desktop-based OVTA on each of the potential applicable land areas using Google Earth Street View to assess the "current trash control status" of the land area.
7. To the extent possible, conducted field assessments of properties with unknown drainage system configurations to determine whether storm drain inlets exist on the land areas, and conducted OVTAs at each land area.
8. Developed and provided draft maps to member agencies for review and comment that illustrate the configuration of the storm drain system and current trash control status of applicable land areas.
9. Finalized maps based on comments received from member agencies and posted on the Countywide Program's website.

The project resulted in the identification of over 3,500 acres of land (including rooftops) that drain to storm drain inlets located on land areas >10,000 ft^2 that are directly connected to member agency MS4s. Results of the virtual OVTAs conducted to identify the current trash control status of these land

areas are presented in Table 10-1. Maps that illustrate the land areas and trash control status for each SMCWPPP agency can be found at http://www.flowstobay.org/content/municipal-trash-generation-maps.

Table 10-1. Trash control status of land areas >10,000 ft^2 that drain to storm drain inlets that are directly connected to member agency MS4s.

SMCWPPP Member Agency	Land Area (>10,000 ft^2 that Drains to Storm Drain Inlets that are Directly Connected to Member Agency MS4s) within Each Preliminary Virtual OVTA Score Category (Acres)				Total
	Low	Moderate	High	Very High	
Atherton	125.1	-	-	-	**125.1**
Belmont	68.6	-	-	-	**68.6**
Brisbane	66.1	-	-	-	**66.1**
Burlingame	77.6	3.2	2.5	-	**83.3**
Colma	45.6	14.8		-	**60.4**
Daly City	124.2	197.7	7.9	-	**329.8**
East Palo Alto	84.1	65.8	-	-	**149.8**
Foster City	64.4	0.4	-	-	**64.8**
Half Moon Bay	25.6	-	-	-	**25.6**
Hillsborough	-	-	-	-	**NA***
Menlo Park	84.6	0.5	-	-	**85.1**
Millbrae	20.8	-	-	-	**20.8**
Pacifica	113.4	55.7	-	-	**169.1**
Portola Valley	-	-	-	-	**0.0**
Redwood City	106.8	82.5	0.6	-	**189.9**
San Bruno	191.5	101.3	-	-	**292.8**
San Carlos	160.7	27.1	9.3	-	**197.0**
San Mateo	527.0	6.4	-	-	**533.4**
San Mateo County	135.3	11.2	-	-	**146.5**
South San Francisco	763.9	171.3	0.7	-	**935.9**
Woodside	-	-	-	-	**NA***
Total	**2785.3**	**737.9**	**21.0**	**0.0**	**3544.1**

*Not applicable because all jurisdictional land areas are low trash generating as illustrated on the member agency's baseline trash generation map.

The results presented in Table 10-1 should be considered preliminary since they were based on desktop, rather than field-based, OVTAs. In FY 2018/19, SMCWPPP plans to conduct field-based OVTAs on these land areas to validate the current trash control status. The results of the area-based OVTAs will be used to either revise member agency baseline trash generation maps or demonstrate progress toward MRP trash load reduction goals. Revised baseline maps will be provided in future annual reports, should they be revised based on field-based OVTAs conducted by SMCWPPP.

Trash Hot Spot Cleanup and Assessment Guidance

Provision C.10.c.i of the MRP requires Permittees to clean up trash hot spots to a level of "no visual impact" at least annually over the permit term. To assist Permittees in meeting this requirement, SMCWPPP staff developed the necessary tools (i.e., guidance memorandum, Trash Hot Spot Cleanup Data Collection Form and Trash Hot Spot Activity Reports) used to report trash hot spot assessment and cleanup activities conducted during the reporting period. Trash Hot Spot Activity Reports for individual Permittees are included in member agency Annual Reports.

During FY 2017/18, member agencies continued conducting annual cleanups and assessments required by the MRP. Results from this year's annual cleanups indicated that a total of 32 trash hot spot assessments and cleanups were conducted within SMCWPPP member agency jurisdictions. Approximately 74 cubic yards of trash was removed from these hot spots during FY 2017/18. [1] The timing of annual assessments and cleanups vary among hot spots due to the location of the hot spot, potential for natural resource impacts, crew availability, and other site-specific factors.

BASMAA Trash Receiving Water Monitoring Plan

The MRP requires that Permittees assess the level of trash in local receiving waters to answer specific monitoring/management questions. In FY 2016/17, SMCWPPP agreed to participate in a BASMAA regional project to develop the monitoring plan, including the monitoring design, protocols, and quality assurance/control procedures. The *BASMAA Trash Receiving Water Monitoring Plan* was developed based on the results of an extensive literature review and input from stakeholders (including Regional Water Board staff and non-governmental organizations) and scientific peer reviewers.

The Plan was submitted to the Regional Water Board on June 30, 2017 as required by the MRP. It includes a robust monitoring design that will answer monitoring/management questions outlined in the MRP. A total of 225 creek, river and Bay shoreline sites (region-wide) are proposed for monitoring over two years. Results will help inform development of trash monitoring requirements in subsequent permits and provide valuable knowledge to other regions in California where trash monitoring is currently not conducted.

Regional Water Board staff provided comments on the Plan on July 31, 2017. BASMAA submitted a revised Plan in November 2017. Trash monitoring/assessment began in October 2017 in San Mateo County. The Plan was approved by the Regional Water Board's Executive Officer in January 2018.

Monitoring Approach

The Trash Monitoring Plan incorporates two types of monitoring designs. Trash assessments are conducted at: (1) existing probabilistic (random) monitoring sites that were established for the BASMAA's Regional Monitoring Coalition (RMC) Creek Status Monitoring Program; and (2) targeted sites in creeks and along shorelines where trash regularly deposits and is periodically removed by member agencies and volunteers. Together, probabilistic and targeted sites are intended to represent the full range of trash conditions present in all creeks, rivers and channels flowing through urban areas that are subject to MRP trash reduction requirements and Bay shorelines that may be impacted by contributions of trash from

[1] Only hot spot cleanups and assessments conducted in compliance with MRP provision C.10.b.iii are included in the numbers presented in this paragraph. Some SMCWPPP member agencies conduct cleanups at trash hot spots more frequently than the MRP-required annual cleanup, and/or at more sites than the MRP requires. See Section 10, C.10.e of member agency Annual Reports for additional information.

municipal stormwater discharges.

Assessment Methods

Two different methodologies are used to conduct trash assessments: (1) qualitative visual assessments and (2) quantitative monitoring. Qualitative assessments are visual surveys where trained personnel assign a score to a site based on the trash conditions that are observed within a defined area. In addition, the survey includes documenting the site characteristics of assessment area that may affect trash deposition (e.g., vegetated condition) and the relative contribution of trash from different pathways (e.g., litter, illegal dumping) to the site. Qualitative monitoring is conducted at both probabilistic and targeted monitoring sites.

Quantitative monitoring entails removing, sorting and measuring the volume of all trash that is found within the assessment area of a targeted site. Both the qualitative assessment and quantitative monitoring methodologies are used at targeted sites to allow for comparison of the two data types. In addition to the targeted monitoring sites, member agencies are also conducting quantitative trash monitoring at selected locations in creeks, lakes, sloughs and lagoons where trash booms are currently deployed. The goal of the quantitative monitoring at booms is to better understand the utility of data collected from these locations to answer management questions outlined in the MRP.

Monitoring Sites

The Countywide Program is conducting qualitative trash assessments at 30 probabilistic sites in urban creeks and channels within San Mateo County. Additionally, both qualitative assessments and quantitative monitoring is being conducted at 15 targeted sites. These sites were derived from an existing list of creek, channel and shoreline locations where member agencies conduct trash removal activities. Both probabilistic and targeted sites were selected to represent the range of trash conditions in creeks, channels and shorelines within San Mateo County. An existing trash boom location in the City of San Mateo was also identified to periodically monitor the amount of trash accumulation.

Monitoring Frequency and Schedule

Trash monitoring/assessment data will be collected during both wet and dry seasons at all probabilistic sites during the term of MRP 2.0. Data collected during both seasons will allow for seasonal comparison between dry and wet season trash conditions and accumulation rates in receiving waters. Dry season monitoring will provide information about non-stormwater sources and pathways, such as wind and illegal dumping. Wet season monitoring will provide information on the transport and deposition of trash resulting from stormwater runoff.

Monitoring/assessment activities during MRP 2.0 will occur between October 2017 and February 2020 at the following frequencies:

- Probabilistic sites – 5 times (2 dry seasons and 3 wet season events);
- Targeted sites – 2 times (dry season); and
- Trash booms – varying frequencies during the dry season.

Progress Report

In FY 2017/18, the Countywide Program completed the following activities associated with the implementation of the Trash Monitoring Plan:

- Re-establishing Monitoring Sites - Office evaluations were conducted to re-establish permission and/or permits (where needed) to enter probabilistic sites. Field visits were conducted to confirm assessment area was physically accessible, especially during high flow conditions during the wet season.
- Field Staff Training - Data Quality Objectives for the Trash Monitoring Plan place a strong emphasis on training and oversight, with inter-comparisons between the performance of individual field team members participating in the various assessment and characterization efforts. BASMAA member agencies organized several inter-calibration field trainings for the field staff responsible for conducting trash monitoring. Following the approval of the Trash Monitoring Plan by the Regional Water Board Executive Officer, an inter-calibration training event was conducted for member agency staff on March 28, 2018.
- Trash Monitoring/Assessment - The Countywide Program completed qualitative assessments during wet season 2017/2018 at 30 qualitative probabilistic sites. Additionally, member agencies have conducted qualitative assessments and quantitative monitoring events at targeted sites. Coordination of monitoring at trash boom locations also began near the end of the fiscal year.
- Refinements to Standard Operating Procedures (SOPs) - Based on lessons learned from the first round of qualitative trash monitoring events, minor refinements were made to the qualitative assessment portion of the SOP, including the associated data collection forms. The refinements were primarily associated with adding data fields associated with site characterization and revising the categories for vegetative cover condition assessment. In addition, text was added to SOP clarifying the delineation of assessment areas at shoreline sites. All refinements were discussed with Regional Water Board staff at the June 2018 BASMAA Trash Committee meeting. There were no changes made to the protocol or data collection form associated with quantitative monitoring portion of the SOP. The revised protocol (Version 2.0) was redistributed to field staff and will be used for assessments conducted at both probabilistic and targeted sites during future monitoring events.
- Coordination with Statewide Trash Monitoring Project - In parallel to conducting trash receiving water monitoring per MRP requirements, Permittees are also coordinating with the San Francisco Estuary Institute (SFEI) and the Southern California Coastal Water Research Project (SCCWRP) on the California Trash Monitoring Methods Project, which is funded by the California Ocean Protection Council. The three-year Trash Monitoring Methods Project is attempting to develop and test methods for monitoring trash in California to provide a menu of standardized methods that can be used throughout the state. Field staff from SFEI and SCCWRP attended inter-calibration field events described above and have been involved in the review of the SOPs developed by MRP Permittees. SFEI is planning to implement trash assessment methods at selected targeted sites monitored by Permittees to test and calibrate additional methods, including the use of unmanned aerial vehicles (i.e., drones) to assess trash conditions. Coordination is planned to continue between Permittees and SFEI/SCCWRP during the term at least through 2020.

- Planning for Data Analysis, Management and Reporting - In FY 2017/18, the BASMAA Board of Directors approved a regional project to: (1) develop standard data management formats so that data collected via the Trash Monitoring Plan will be easily uploaded onto the California Environmental Data Exchange Network (CEDEN) and made publicly available; (2) conduct a preliminary data analysis and develop a preliminary report for submittal to the Regional Water Board by July 2019; and (3) conduct a final data analysis, facilitate a peer review process, and develop a final report for submittal to the Regional Water Board by July 2020.

Coordination with San Mateo Countywide Recycling Committee

To increase coordination among solid waste and recycling programs and SMCWPPP member agency MS4 trash reduction activities, SMCWPPP staff began attending Countywide Recycling Committee meetings in FY 2012/13. SMCWPPP continued to coordinate with the Recycling Committee in FY 2017/18, specifically targeting outreach and coordination with municipal solid waste/recyclable haulers in San Mateo County to reduce trash impacts associated with inadequate waste container management.

Litter Work Group

SMCWPPP's Litter Work Group, which was formed in March of 2014, coordinates litter reduction efforts among SMCWPPP, waste and stormwater program staff from San Mateo County municipalities, the San Mateo Countywide Recycling Committee, and waste collection and processing companies serving those jurisdictions. The Work Group met four times in fiscal year 2017/18. Attendees included representatives from San Mateo County municipalities (especially stormwater and trash program staff), the local hauling community, Rethink Waste (the South Bayside Waste Management Authority), and community members working on litter reduction efforts both in Santa Clara County and San Mateo County. The goals of the Work Group include developing a litter reduction program for San Mateo County related to waste issues and specific to its needs, developing BMPs for the waste collection industry, educating the public and those involved with litter control efforts, and coordinating and sharing information with the Zero Litter Initiative in Santa Clara County.

The Litter Work Group completed the following tasks in FY 2017/18:

- Held meetings on the following dates: August 29, November 7, February 6 and May 7. Participation by municipal staff was good as shown by the FY 2017/18 attendance list which is included in Appendix 10. In addition to municipal staff, attendees included staff from Recology - San Mateo County and South San Francisco Scavenger.
- Finalized and distributed the *Litter Reduction Toolkit for Multi-family Dwellings*. The Toolkit is a detailed guide for municipal and private sector design community professionals compiling best practices and tools for reducing litter and waste at existing and new multi-family residential properties in San Mateo County. The Toolkit includes information and recommendations for the design of new multi-family buildings and tools for working with existing properties such as tenant/management communication, hauler coordination, right-sizing of containers, tenant/management education, behavior change practices, signage examples, and tenant/management incentives. The compilation included associated appendices and links to other materials. The Toolkit was posted on the Countywide Program's website (www.flowstobay.org) and is included in Appendix 10.
- Coordinated with Caltrans on trash capture efforts, including the installation of trash full-capture systems through cooperative implementation agreements.

- Held the 3rd Roundtable Event on May 30, 2018 with member agency legal counsel, management staff and code enforcement officials to share information and best practices for reducing illegal dumping in communities and discuss the associated administrative, legal and practical challenges.
- Developed the FY 2018/19 Litter Work Group Work Plan (included in Appendix 10) which includes the following tasks:
    - Supporting ongoing Litter Work Group meetings;
    - developing a fact sheet (Executive Summary) that summarizes the findings and recommendations from the *Litter Reduction Toolkit for Multi-Family Dwellings*;
    - conducting the 4th Litter Roundtable to share design and O&M information and best practices for reducing litter and waste at existing and new multi-family buildings with member agency stormwater staff, development-related staff, hauler staff, architects, engineers and contractors from the private sector;
    - working with Caltrans on improvements to litter reduction and prevention actions, including the installation of trash capture devices and implementation of other control measures;
    - assisting SMCWPPP's PIP Subcommittee with outreach efforts to reduce litter at multi-family dwellings; and
    - conducting other countywide coordination efforts.
- Distributed the report on "Litter Practices Recommendations for Solid Waste Franchise Agreements" about reducing litter related to waste hauling in the County and coordinated with Rethink Waste on franchise agreement extension negotiations.
- Coordinated with the SMCWPPP PIP Subcommittee on countywide school outreach and countywide litter campaign branding efforts (a Litter Work Group representative attended three PIP Subcommittee meetings).
- Coordinated with the PIP Subcommittee on outreach efforts to reduce litter at multi-family dwellings in FY 2017/18.

FUTURE ACTIONS

FY 2018/19 activities that are planned by SMCWPPP to assist member agencies comply with MRP requirements in Provision C.10 include the following:

- Continued facilitation of SMCWPPP Trash Subcommittee meetings.
- Continued implementation of the SMCWPPP trash assessment strategy designed to demonstrate progress towards MRP trash load reduction goals.
- Continued maintenance of the SMCWPPP online OVTA database.
- Continued support for long-term plan implementation and control actions for trash management.
- Continued calculation and reporting on trash load reductions for each member agency.
- Continued calculation and reporting on the amount and types of trash removed via creek and/or shoreline cleanups required by the MRP.

- Continued update/revision of trash generation and full capture system maps and GIS data layers in preparation for the FY 2018/19 Annual Report submittal.
- Continued implementation of the Litter Work Group FY 2018/19 Work Plan tasks, including supporting ongoing Litter Work Group meetings, developing a fact sheet (Executive Summary) of the Litter Reduction Toolkit for multi-family dwellings, conducting the 4th Litter Roundtable, and other tasks.
- Continued coordination and information sharing with the SMCWPPP PIP Subcommittee on countywide litter reduction efforts.
- Continued coordination and information sharing with the Zero Litter Initiative in Santa Clara County.
- Continued Implementation of the Trash Receiving Waters Monitoring Program Plan in San Mateo County creeks and shorelines.
- Assessment of trash generation levels (i.e., current trash control status) on applicable land areas >10,000 ft^2 that connect directly to member agency MS4s.
- Receiving water monitoring data scoring/collection training for municipal staff.
- Continued coordination with Caltrans for trash capture device design review, purchase, installation, and maintenance agreements.
- Continued coordination with the GI and New Development Subcommittees (and State Water Resources Control Board) on trash load reduction credits for LID facilities.

SECTION 11
C.11 MERCURY CONTROLS

INTRODUCTION

MRP Provision C.11 Mercury Controls implements stormwater runoff-related actions described in the San Francisco Bay mercury Total Maximum Daily Load (TMDL) water quality restoration program. SMCWPPP performs a variety of activities to address mercury in stormwater runoff in compliance with MRP Provision C.11. Some of this work is accomplished through participation in BASMAA regional projects.

Efforts that address PCBs and mercury and are described in this section rather than Section 12 (PCBs Controls). Section 12 focuses on efforts that only address PCBs.

IMPLEMENTATION OF MRP PROVISIONS

C.11/12.a. Implement Control Measures to Achieve Mercury/PCBs Load Reductions

SMCWPPP's and its member agency's activities to address MRP Provisions C.11/12.a., Implement Control Measures to Achieve Mercury/PCBs Load Reductions, are described in a separate report (*Updated Control Measures Plan for PCBs and Mercury in San Mateo County Stormwater Runoff, SMCWPPP, September 30, 2018*) that is presented in Appendix 11.

C.11/12.b. Assess Mercury/PCBs Load Reductions from Stormwater

MPR Provisions C.11/12.b., Assess Mercury/PCBs Load Reductions from Stormwater, required Permittees to submit in their 2015/16 Annual Report for Executive Officer approval an assessment methodology. The purpose of the assessment methodology is to quantify in a technically sound manner mercury and PCBs loads reduced through implementation of a variety of pollutant controls, including pollution prevention, source control, and stormwater runoff treatment measures such as green infrastructure. SMCWPPP and its member agencies helped develop the assessment methodology through participation in a BASMAA regional project. The assessment methodology developed via the BASMAA regional project is referred to as the Interim Accounting Methodology and has been approved by the Executive Officer of the Regional Water Board.

Permittees must report on the use of the methodology to demonstrate progress toward achieving the mercury and PCBs load reductions required in stormwater runoff this permit term. San Mateo County load reductions are described in the separate report mentioned in the previous section (*Updated Control Measures Plan for PCBs and Mercury in San Mateo County Stormwater Runoff, SMCWPPP, September 30, 2018*). Appendix 11 contains the report.

In addition, the estimated cumulative mercury and PCBs loads reduced to-date by all Permittees during the MRP compliance period (FY 2013/14 through FY 2017/18) are described in a document entitled *Regional PCBs and Mercury Load Reductions* (see Appendix 11).

C.11/12.c. Plan and Implement Green Infrastructure to Reduce Mercury/PCBs Loads

Permittees are required to implement green infrastructure projects during the term of the MRP to achieve the mercury and PCBs load reductions required by the permit. San Mateo County load reductions via green infrastructure during this permit term are described in the separate report mentioned previously (*Updated Control Measures Plan for PCBs and Mercury in San Mateo County Stormwater Runoff, SMCWPPP, September 30, 2018*). Appendix 11 contains the report.

Permittees are also required to conduct a Reasonable Assurance Analysis (RAA) to demonstrate quantitatively that mercury and PCBs load reductions specified in the MRP will be achieved by 2040 through implementation of green infrastructure. SMCWPPP worked proactively to make an early start on development of approaches for quantifying mercury and PCBs loads in San Mateo County, and developing approaches to performing the RAA to demonstrate that future control measures will provide sufficient pollutant load reductions to meet the permit requirements and countywide portions of TMDL wasteload allocations. The first step in this process included the development of a baseline model of all County watersheds to simulate existing hydrology and sediment and pollutant loads to the Bay. The baseline model is based on USEPA's Loading Simulation Program C++ (LSPC), a recoded version of the Hydrology Simulation Program – FORTRAN (HSPF) into C++, with architectural improvements that allow efficient simulation of the many watersheds of San Mateo County, as well as tools for summarizing sediment and pollutant loads. The model provides hourly simulation of flows, sediment loads, and pollutant concentrations for each of the individual model subwatersheds in the County (Figure 11-1). The model was configured based on HSPF parameters established through previous model development efforts of the Bay Area Hydrologic Model (BAHM) and Santa Clara Valley Water District modeling of the Guadalupe River, with significant upgrades that utilized recent monitoring efforts to provide model calibration and validation.

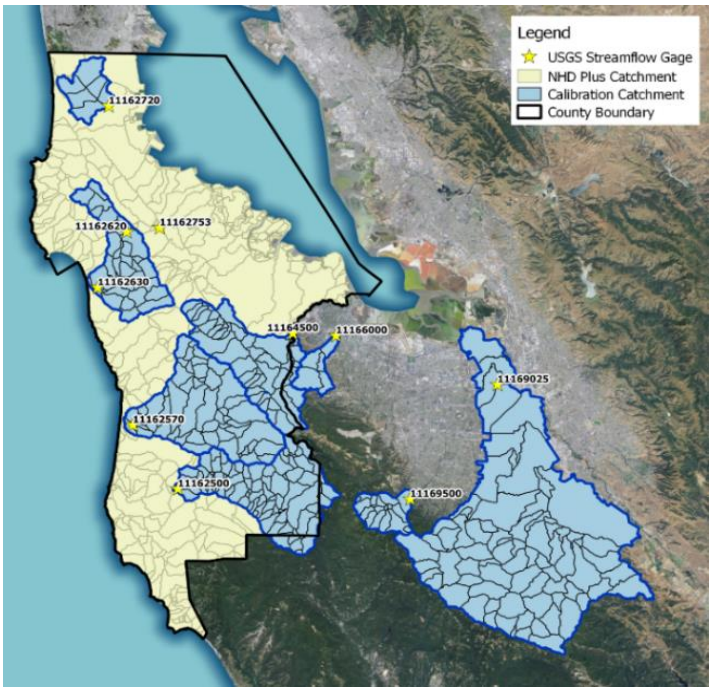


Figure 11-1. Model Domain of San Mateo County RAA

Early development of the baseline model provided SMCWPPP an opportunity to test methods for quantifying baseline mercury and PCB loads, and compare these loads with County portions of TMDL wasteload allocations for estimation of necessary load reductions to be met with control measures, including green infrastructure and source controls. This provided SMCWPPP an opportunity to discuss

early model results and share lessons learned with Regional Water Board staff and BASMAA representatives, which contributed to recommendations in the BASMAA Bay Area Reasonable Assurance Analysis Guidance Document (RAA Guidance) completed in June 2017. For example, SMCWPPP developed methods for linking results of the LSPC baseline model with modeling assumptions produced by SFEI's Regional Watershed Spreadsheet Model (RWSM) for representation of baseline PCB loads. Linking to RWSM takes advantage of the region-wide calibration efforts utilizing monitoring data collected throughout the Bay Area, and overcomes the limitations of model calibration based on the smaller PCBs monitoring dataset within the County. Results of this investigation were incorporated within the RAA Guidance.

During FY 2017/18, SMCWPPP continued linking the baseline LSPC model with EPA's System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN), which provides simulation of green infrastructure and estimation of pollutant load reductions. The model has been configured based on the project opportunities identified in the San Mateo Countywide Stormwater Resource Plan (SWRP) for LID retrofit, Green Streets, and regional stormwater capture projects, as well as projects of LID for new and redevelopment (C.3) and green infrastructure projects currently constructed. During FY 2017/18, SUSTAIN was used to begin testing various alternative strategies for achieving countywide mercury and PCBs load reduction targets for green infrastructure. SMCWPPP also developed methods for reporting RAA output that will inform each Permittee on the goals for green infrastructure to be considered during the efforts to plan control measures for mercury and PCBs in coordination with green infrastructure planning. Additional description of the baseline LSPC and SUSTAIN green infrastructure model is provided in Appendix 11 (see memorandum entitled *Quantitative Relationship between Green Infrastructure Implementation and PCBs/Mercury Load Reduction*). These efforts will continue into FY 2018/19, with results that will inform green infrastructure plan development.

Per MRP Provision C.11/12.c.iii (1), Permittees must include in the FY 2017/18 Annual Report a report on the approach to be used by the RAA to establish the quantitative relationship between GI implementation and PCBs and mercury load reductions. The submittal must include all data used and a full description of models and model inputs relied on to establish this relationship. Accordingly, Appendix 11 includes a preliminary report on the RAA approach that SMCWPPP is using to support GI planning efforts by Permittees in San Mateo County (see memorandum entitled *Quantitative Relationship between Green Infrastructure Implementation and PCBs/Mercury Load Reduction*). Since the FY 2017/18 Annual Report precedes the completion and documentation of the RAA, the memorandum provides a description of the models supporting the RAA, methods for using the model to determine stormwater improvement goals to be met with GI, and RAA output that will be used to demonstrate the relationship between GI implementation and pollutant load reduction and set goals for municipal GI planning.

During FY 2017/18, SMCWPPP also continued to participate in the regional BASMAA RAA Workgroup, which supports and coordinates Permittee efforts to plan control measures for mercury and PCBs in coordination with green infrastructure planning. Following completion of the BASMAA Bay Area RAA Guidance in 2017, the BASMAA RAA Workgroup has continued to meet to discuss opportunities to share information between countywide RAA efforts, present the status of RAAs to Regional Water Board staff, and identify regional studies or approaches for peer review to support Permittee efforts to perform the RAA. SMCWPPP has presented to the RAA Workgroup and the regional Pollutants of Concern (POC) Steering Committee on the status of the San Mateo Countywide RAA.

C.11/12.d. Prepare Implementation Plan and Schedule to Achieve TMDL Wasteload Allocations

MRP Provisions C.11/12.d require that Permittees prepare a plan and schedule for mercury and PCBs control measure implementation and a corresponding RAA demonstrating quantitatively that sufficient control measures will be implemented to attain the mercury and PCBs TMDL wasteload allocations by 2028 and 2030, respectively. The plan must:

1. Identify all technically and economically feasible mercury and PCBs control measures to be implemented (including green infrastructure projects).
2. Include a schedule according to which these technically and economically feasible control measures will be fully implemented.
3. Provide an evaluation and quantification of the mercury and PCBs load reduction of such measures as well as an evaluation of costs, control measure efficiency and significant environmental impacts resulting from their implementation.

The plan and schedule are due in September 2020. As described in the previous section and in Appendix 11, SMCWPPP has begun developing modeling approaches for quantifying mercury and PCBs loads in San Mateo County and conducting the RAA. SMCWPPP will continue these efforts into FY 2018/19, along with continuing to develop a longer-term control measures plan to attain the San Mateo County portions of the mercury and PCBs TMDL wasteload allocations.

C.11.e./C.12.h. Risk Reduction Program

MRP Provisions C.11.e and C.12.h require Permittees to conduct an ongoing risk reduction program to address public health impacts of mercury and PCBs in San Francisco Bay fish. The fish risk reduction program is required to include actions to reduce actual and potential health risks in those people and communities most likely to consume San Francisco Bay-caught fish, such as subsistence fishers and their families. The program is required to have the potential to reach 3,000 individuals annually (Bay Area-wide total for all MRP 2.0 Permittees) who are likely consumers of San Francisco Bay-caught fish. Permittees are required to report on the status of the risk reduction program in each of their Annual Reports, including a brief description of actions taken, an estimate of the number of people reached, and why these people are deemed likely to consume Bay fish.

SMCWPPP is assisting its member agencies comply with the risk reduction program requirements by coordinating with and reporting on the Fish Smart program conducted by San Mateo County Environmental Health Services (CEH). Fish Smart builds upon the San Francisco Bay Fish Project (www.sfei.org/sfbfp#sthash.eOcfwrhA.dpbs), a risk reduction framework developed regionally in the previous permit term. The Fish Project funded Bay Area community-based organizations to develop and deliver appropriate communications to appropriately targeted individuals and communities about how to reduce their exposure to mercury and PCBs from consuming San Francisco Bay fish.

During FY 2017/18, CEH conducted the following activities that target at-risk populations (e.g., subsistence fisherman) via its Fish Smart program:

- Maintained signs that were previously posted by CEH at 11 locations along the Bay's shore (e.g., at fishing piers) in the Cities of Brisbane, Burlingame, Redwood City, San Mateo, and South San Francisco.

- Printed Fish Project brochure "Guide to Eating Fish and Shellfish from San Francisco Bay" in English, Spanish, Chinese, and Tagalog.
- Continued to distribute educational materials (e.g., the above Fish Project brochure) at targeted locations:
    - CEH provided 50 brochures each to 4 marinas in San Mateo County.
    - CEH attended 17 community health fairs, events, and the San Mateo County Fair, where brochures were distributed and a spinning wheel game was played. Over 4,000 people were reached regarding Fish Smart and other CEH programs.
    - CEH created a Fish Smart fishing game where children catch fish with a fishing pole and identify if the fish is safe or not safe to each in exchange for a prize (Figure 11-2).

Figure 11-2. Fish Smart Fishing Game

- Provided a presentation on the Fish Smart program to 30 San Mateo County Family Health Division Women, Infant, and Children (WIC) employees and provided brochures to them to distribute to their clients.
- Posted 4 social media posts on the Fish Smart program, which totaled 4,114 impressions combined.
- Maintained the smchealth.org/fishsmart webpage, which received 3,800 views over an 11 month period.

Cumulatively, CEH had a total of nearly 12,000 electronic or in person Fish Smart program impressions for FY 2017/18.

FUTURE ACTIONS

SMCWPPP activities that are planned for FY 2018/19 to assist member agencies comply with MRP requirements in Provision C.11/12 to reduce mercury and PCBs loads in stormwater runoff and report on the load reductions are described in the separate report mentioned earlier (*Updated Control Measures Plan for PCBs and Mercury in San Mateo County Stormwater Runoff, SMCWPPP, September 30, 2018*). Appendix 11 contains the report.

During FY 2018/19, SMCWPPP also plans to continue to:

- Complete the RAA to support green infrastructure plan development and demonstration of mercury and PCBs load reductions to meet goals set by the MRP and TMDLs. The modeling system supporting the RAA will be used to test various combinations of green infrastructure projects within each city and unincorporated county jurisdiction, and will provide output that will support decision-making and the development of green infrastructure plans.
- Conduct long-term control measure planning to attain the San Mateo County portions of the mercury and PCBs TMDL wasteload allocations.

- Assist its member agencies comply with the risk reduction program requirements by coordinating with and reporting on the Fish Smart program conducted by CEH. During FY 2018/19, CEH plans to continue all of the Fish Smart activities described above.

SECTION 12
C.12 PCBS CONTROLS

INTRODUCTION

MRP Provision C.12, PCBs Controls, implements stormwater runoff-related actions required by the San Francisco Bay PCB Total Maximum Daily Load (TMDL) water quality restoration program. SMCWPPP performs a variety of activities to address PCBs in stormwater runoff in compliance with MRP Provision C.12. Many of these activities address mercury in addition to PCBs and are described in the previous chapter (Section 11, Mercury Controls) rather than this section.

IMPLEMENTATION OF MRP PROVISIONS

C.12.a. Implement Control Measures to Achieve PCBs Load Reductions

SMCWPPP's and its member agencies' activities to address MRP Provisions C.11/12.a., Implement Control Measures to Achieve Mercury/PCBs Load Reductions, are described in a separate report (*Updated Control Measures Plan for Mercury and PCBs in San Mateo County Stormwater Runoff, SMCWPPP, September 30, 2018*) that is presented in Appendix 11.

C.12.b. Assess PCBs Load Reductions from Stormwater

For a description of SMCWPPP's and its member agencies' activities to address MRP Provisions C.11/12.b., Assess PCBs Load Reductions from Stormwater, please see Section 11 (C.11 Mercury Controls) and the separate report mentioned previously (*Updated Control Measures Plan for PCBs and Mercury in San Mateo County Stormwater Runoff, SMCWPPP, September 30, 2018*). Appendix 11 contains the report.

In addition, the estimated cumulative mercury and PCBs loads reduced by MRP Permittees over the time period of FY 2013/14 through FY 2017/18 are described in a document entitled *Regional PCBs and Mercury Load Reductions* (included in Appendix 11). The estimated PCBs load reduction across the permit area over this time period is 691 g/yr, indicating that the MRP regional performance criterion of 500 g/yr of PCBs load reduced by July 2018 has been achieved.[1]

[1] It is important to note that the MRP allows Permittees to meet the regional criterion as a group – criteria for individual counties would only apply when the regional group criterion was not met.

C.12.c. Plan and Implement Green Infrastructure to Reduce PCBs Loads

For a description of SMCWPPP's and its member agencies' activities to address MRP Provisions C.11/12.c., Plan and Implement Green Infrastructure to Reduce PCBs Loads, please see Section 11 (C.11 Mercury Controls) and the separate report mentioned in the previous sections (*Updated Control Measures Plan for PCBs and Mercury in San Mateo County Stormwater Runoff, SMCWPPP, September 30, 2018*). Appendix 11 contains the report.

C.12.d. Prepare Implementation Plan and Schedule to Achieve TMDL Wasteload Allocations

As described in more detail in Section 11 (C.11 Mercury Controls), MRP Provisions C.11/12.d require that Permittees prepare a plan and schedule for mercury and PCBs control measure implementation and a corresponding RAA demonstrating quantitatively that sufficient control measures will be implemented to attain the mercury and PCBs TMDL wasteload allocations by 2028 and 2030, respectively. The plan and schedule are due in September 2020. SMCWPPP has begun developing modeling approaches for quantifying mercury and PCBs loads in San Mateo County and conducting the RAA. SMCWPPP will continue these efforts into FY 2018/19, along with beginning to develop a longer-term control measures plan to attain the San Mateo County portions of the mercury and PCBs TMDL wasteload allocations.

C.12.e. Evaluate PCBs Presence in Caulks/Sealants Used in Storm Drain or Roadway Infrastructure in Public Rights-of-Way

MRP 2.0 Provision C.12.e requires that Permittees collect samples of caulk and other sealants used in storm drains and between concrete curbs and street pavement and investigate whether PCBs are present in such material and in what concentrations. PCBs are most likely present in material applied during the 1970s, so the focus of this investigation is on structures installed during this era. Permittees are required to collect at least 20 composite samples (throughout the permit-area) of caulk and sealants used in storm drains or roadway infrastructure in public rights-of-way and analyze this material for PCBs using methods that can detect a minimum PCB concentration of 200 ppb. Permittees are required to report the results of this investigation (including all data gathered) no later than this FY 2017/18 Annual Report.

To achieve compliance with Provision C.12.e, MRP Permittees agreed to collectively conduct this sampling via a BASMAA regional project. SMCWPPP staff participated in the project, including serving as the BASMAA project manager. This effort also contributes to partial fulfillment of pollutants of concern (POC) monitoring required in Provision C.8.f of the MRP to address source identification, one of the five management information needs identified in the MRP. Source identification monitoring focuses on identifying which sources or watershed source areas provide the greatest opportunities for reductions of POCs in urban stormwater runoff.

In February 2017, BASMAA selected a consultant team to develop a study design for the caulk investigation and implement sampling for this investigation under the direction of a project management team (PMT) consisting of members of the BASMAA Monitoring and Pollutants of Concern (MPC) Committee. The project team completed the investigation in FY 2017/18 by conducting the following tasks:

- Developed a final study design.

- Developed a final Sampling and Analysis Plan and Quality Assurance Project Plan.
- Developed screening criteria to inform selection of infrastructure for sampling.
- Conducted outreach efforts and recruited municipal partners to participate in the project.
- Collected 54 samples of caulk and sealant materials from ten types of roadway and storm drain infrastructure throughout the MRP area.
- Determined how samples would be combined into 20 composites;
- Submitted the samples to a laboratory for analysis for the RMP-40 PCBs congeners2 using modified EPA Method 8270C (Gas Chromatography/Mass Spectroscopy-Selective Ion Monitoring, GC/MS-SIM).
- Prepared a project report which presents and discusses the full details of the investigation, including the methods and chemical analysis results (PCBs concentrations in the 20 composite samples).

The project report is included in Appendix 12. Submittal of the report fulfills the requirements of MRP Provision C.12.e.

C.12.f. Manage PCB-Containing Materials and Wastes during Building Demolition Activities So That PCBs Do Not Enter Municipal Storm Drains

MRP Provision C.12.f. requires that Permittees develop and implement or cause to be developed and implemented an effective protocol for managing materials with PCBs concentrations of 50 ppm or greater in applicable buildings at the time such buildings undergo demolition, so that PCBs do not enter municipal storm drain systems. Applicable buildings include, at a minimum, non-residential buildings constructed or remodeled between the years 1950 and 1980 with building materials such as masonry and concrete with PCBs concentrations of 50 ppm or greater. Single-family residential and wood frame buildings are exempt. Also, a Permittee is exempt from this requirement if it provided evidence acceptable to the Executive Officer in its 2016/17 Annual Report that the only buildings that existed pre-1980 within its jurisdiction were single-family residential and/or wood-frame buildings.

Permittees are required to develop a protocol by June 30, 2019 that includes each of the following components, at a minimum:

1. The necessary authority to ensure that PCBs do not enter municipal storm drains from PCBs-containing materials in applicable buildings at the time such buildings undergo demolition;
2. A method for identifying applicable buildings prior to their demolition; and
3. Method(s) for ensuring PCBs are not discharged to the municipal storm drain from demolition of applicable buildings.

By July 1, 2019 and thereafter, Permittees are required to:

[2] The 40 individual congeners routinely quantified by the Regional Monitoring Program (RMP) for Water Quality in the San Francisco Estuary include: PCBs 8, 18, 28, 31, 33, 44, 49, 52, 56, 60, 66, 70, 74, 87, 95, 97, 99, 101, l05, 110, 118, 128, 132, 138, 141, 149, l51, 153, 156, 158, 170, 174, 177, 180, 183, 187, 194, 195, 201, and 203.

- Implement or cause to be implemented the PCBs management protocol for ensuring PCBs are not discharged to municipal storm drains from demolition of applicable buildings via vehicle track-out, airborne releases, soil erosion, or stormwater runoff.
- Develop an assessment methodology and data collection program to quantify in a technically sound manner PCBs loads reduced through implementation of the protocol for controlling PCBs during demolition of applicable buildings.

In FY 2017/18, BASMAA continued to conduct a multi-year regional project to assist MRP Permittees to address Provision C.12.f. SMCWPPP staff continued to participate in the regional project, including serving as the BASMAA project manager. The project, which began in FY 2016/17, is developing guidance materials, tools and training materials and conducting outreach. The goal is to assist Permittees to develop local programs to prevent PCBs from being discharged to municipal storm drains due to demolition of applicable buildings. Local agencies will need to tailor the BASMAA products for local use, adopt the program (e.g., via local ordinance), and train local staff to implement the new program.

At the outset of the project, a BASMAA Steering Committee was convened to provide project oversight and guidance during the project. The Steering Committee includes BASMAA Directors, countywide stormwater program staff, and Permittee staff from various relevant municipal departments. The Steering Committee has and continues to meet periodically throughout the project. In addition, a project Technical Advisory Group (TAG) was convened, a small balanced advisory group formed from industry, regulatory, and Permittee representatives to provide review and input on selected project work products. The TAG is comprised of seven persons, with two representatives each from industry and state/federal regulatory agencies and three Permittee representatives (from large, medium and small municipalities). Other efforts to engage key stakeholders included an industry stakeholder roundtable meeting (August 2017) and two larger stakeholder group meetings (December 2017 and May 2018) that included industry, regulatory and municipal representatives.

Project deliverables completed to-date, which will be made available to each MRP Permittee to use as appropriate given local procedures and needs, include:

- A coordination/communication strategy for the project.
- A technical memorandum summarizing any new information & decisions needed by BASMAA at outset, including an annotated table of regulatory drivers and relevant requirements.
- A technical memorandum with the state of the practice for identifying PCBs-containing building materials (developed to inform development of the pre-demolition building survey protocol listed below).
- Industry stakeholder outreach materials and a fact sheet for municipal staff.
- A spreadsheet tool that generates a prioritized list of potential PCBs-containing building materials.
- A protocol for pre-demolition building survey for priority PCBs-containing building materials.
- Model language for municipal adoption (e.g., via ordinance) of the new program to manage PCBs materials during building demolition and model supporting staff report and resolution.
- CEQA strategy and model notice of exemption.

- Supplemental demolition permit model application materials, including forms, process flow charts, and applicant instructions.
- An analysis to assist municipalities that pursue cost recovery.
- A conceptual approach for an assessment methodology and data collection program to quantify PCBs loads reduced through managing PCBs-containing materials during building demolition.

The above list of completed products comprises most of the major deliverables for the project. During the first half of FY 2018/19, the project will conclude by conducting the following remaining outreach and training tasks:

- Prepare training materials for municipal staff on adoption and implementation of the new program.
- Using the above training materials, conduct one pilot training workshop and one "train the trainer" session for key municipal and countywide stormwater program staff so that they may conduct subsequent trainings for other municipal staff.
- Develop outreach materials and a standard presentation to inform industry stakeholders including developers, planning firms, urban planning NGOs, demolition firms, property owners, property managers, and realtors about the new program to manage PCBs in building materials during demolition.
- Develop a list of Bay Area opportunities, including contact information and dates, for municipal and/or stormwater program staff to conduct outreach to industry stakeholders using the above industry outreach materials.

C.12.g. Fate and Transport Study of PCBs: Urban Runoff Impact on San Francisco Bay Margins

MRP Provision C.12.g requires Permittees to conduct or cause to be conducted studies concerning the fate, transport, and biological uptake of PCBs discharged from urban runoff to San Francisco Bay margin areas. Permittees submitted in their FY 2016/17 Annual Reports a workplan describing how these information needs will be accomplished, including the studies to be performed and a preliminary schedule. Permittees are required to report on the status of the studies in this FY 2017/18 Annual Report.

Provision C.12.g is being addressed through a multi-year project by the San Francisco Bay Regional Monitoring Program (RMP) to develop a series of conceptual models of PCBs in Priority Margin Units (PMUs). The project is:

- Identifying margin units that are high priority for management and monitoring.
- Developing conceptual models and mass budgets for margin units downstream of watersheds where management actions will occur.
- Conducting monitoring in these units as a performance measure.

This work will inform the review and possible revision of the PCBs TMDL and the reissuance of the MRP, both of which are tentatively scheduled to occur in 2020. During FY 2017/18, BASMAA representatives to the RMP continued to participate in the RMP PCBs Workgroup, which is providing ongoing oversight

of the project. A general description and multi-year budget for this project is in the "PCBs" section of the RMP Multi-Year Plan, 2018 Annual Update (dated January 2018) available at:

www.sfei.org/sites/default/files/biblio_files/2018%20Multi-Year%20Plan%20Final%20Approved%20by%2020180117%20SC.pdf

Four urban embayments along the Bay shoreline with management actions to address PCBs planned or ongoing in the upstream watersheds were initially selected as PMU for conceptual modeling:

- Emeryville Crescent (Alameda County)
- San Leandro Bay (Alameda County)
- Steinberger Slough (San Mateo County)
- Richmond Harbor (Contra Costa County)

The conceptual models are intended to provide a foundation for future monitoring to track responses to load reductions and may eventually help guide planning of management actions. Three of the selected embayments (all except San Leandro Bay) receive drainage from pilot watersheds that were included in BASMAA's Clean Watersheds for a Clean Bay project.

Status of PMU Conceptual Models

The status as of July 2018 of conceptual model development for individual PMUs is provided in the following sections.

Emeryville Crescent

A final conceptual model report (dated April 2017) has been completed. The key finding, which was based on a simple one-box model and dependent on assumptions made for input parameters, was that PCBs concentrations in sediment and the food web could potentially decline fairly quickly (within 10 years) in response to load reductions from the watershed. The report is available here: www.sfei.org/sites/default/files/biblio_files/Emeryville%20Crescent%20Draft%20Final%20Report%2005-02-17%20Final%20Clean_0.pdf

San Leandro Bay

A conceptual model for San Leandro Bay is being developed in three phases. Reports for Phase 1 and Phase 2 have been completed. The Phase 1 report (dated June 2017) presented analyses of watershed loading, initial retention, and long-term fate, including results of sediment sampling in 2016. It is available here: http://www.sfei.org/sites/default/files/biblio_files/Yee%20et%20al%202017%20Conceptual%20Model%20Report%20San%20Leandro%20Bay%20Phase%201.pdf.

The Phase 2 report (dated December 2017) is designated a data report and documented the methods, quality assurance, and all of the results of the 2016 field study. It is available here: www.sfei.org/sites/default/files/biblio_files/San%20Leandro%20Bay%20PCB%20Study%20Data%20Report%20Final.pdf

A draft of the Phase 3 report has been developed and is currently under review. It incorporates all of the results of the 2016 field study, and includes additional discussion of the potential influence of

contaminated sites in the watershed, the results of passive sampling by Stanford researchers, and a comparative analysis of long-term fate in San Leandro Bay and the Emeryville Crescent. The Phase 3 report also includes a section on bioaccumulation and a concluding section with answers to the management questions that were the impetus for the work.

Steinberger Slough

A conceptual model for Steinberger Slough is currently under development. Like the other conceptual models it will include results of monitoring in the PMU and watershed, analyses of watershed loading, development of a mass budget, and long-term fate modeling, including projected PCBs concentrations in sediment and the food web in response to load reductions from the watershed.

Richmond Harbor

Due to budget limitations and other efforts deemed higher priority (e.g., see below 2019 RMP Special Studies), development of a conceptual model for The Richmond Harbor PMU has been postponed indefinitely.

Special Studies Related to PMUs

In addition to ongoing conceptual model development (as described above), and continuing technical and logistical support for the RMP PCBs Workgroup, the two PMU-related projects described in the following sections have been approved as 2019 RMP Special Studies.

Priority Margin Unit Stormwater PCBs Monitoring

This study will yield valuable information on PCBs concentrations and particle ratios in stormwater in watersheds draining to two PMUs. The study areas include the major subwatersheds draining into the Emeryville Crescent, and one subwatershed draining into San Leandro Bay. The subwatershed draining into San Leandro Bay is downstream of a recently remediated hotspot, the former General Electric (GE) transformer and electrical equipment facility, where PCB contamination was severe. The goals of the study are to better estimate current PCBs loads into these PMUs (a critical component of the PMU mass budgets) and to support tracking of the effectiveness of the major remediation action on the GE property. Sampling will be completed over two years, as storms allow.

Shiner Surfperch Priority Margin Unit Survey

Conceptual site models for PCBs in priority margin units have been developed for the Emeryville Crescent and San Leandro Bay. The San Leandro Bay model was supported by an intensive field study. These conceptual site models identified shiner surfperch as a crucial indicator of impairment in these areas, due to their explicit inclusion as an indicator species in the TMDL, importance as a sport fish species, tendency to accumulate high concentrations, and site fidelity, and other factors. The conceptual site models recommend periodic monitoring of shiner surfperch to track trends in the PMUs, and as the ultimate indicator of progress in reduction of impairment. Shiner surfperch and other sport fish species will be monitored in 2019 as part of RMP Status and Trends (S&T) monitoring. A coordinated sampling of PCBs in shiner surfperch in PMUs will be conducted as an add-on to the 2019 S&T sport fish sampling. This coordination will yield significant cost savings in data management and reporting, because these efforts will leverage S&T activities resulting in minimal additional costs. In addition, a dataset for shiner surfperch will be obtained that is directly comparable across the PMUs and the five locations that are sampled in S&T.

During FY 2018/19 and future years, BASMAA representatives to the RMP will continue to participate in the RMP PCBs Workgroup to help provide ongoing oversight of PMU conceptual model development and the related RMP Special Studies.

C.12.h. Risk Reduction Program

SMCWPPP is assisting its member agencies comply with the risk reduction program requirements by coordinating with and reporting on the Fish Smart program conducted by San Mateo County Environmental Health Services (CEH). Please see Section 11 for additional details.

FUTURE ACTIONS

SMCWPPP activities that are planned for FY 2018/19 to assist member agencies comply with MRP requirements in Provision C.11/12 to reduce mercury and PCBs loads in stormwater runoff and report on the load reductions are described in the separate report mentioned earlier (*Updated Control Measures Plan for PCBs and Mercury in San Mateo County Stormwater Runoff, SMCWPPP, September 30, 2018*). Appendix 11 contains the report.

SMCWPPP also plans to continue to:

- Complete the RAA to support green infrastructure plan development and demonstration of mercury and PCBs load reductions to meet goals set by the MRP and TMDLs. The modeling system supporting the RAA will be used to test various combinations of green infrastructure projects within each city and unincorporated county jurisdiction, and will provide output that will support decision-making and the development of green infrastructure plans.
- Develop a longer-term control measures plan to attain the San Mateo County portions of the mercury and PCBs TMDL wasteload allocations.
- Continue to participate in the BASMAA regional project to develop guidance materials, tools and training materials and conduct outreach to assist Permittees in developing programs to manage PCBs-containing materials and wastes during building demolition in compliance with Provision C.12.f. The Countywide Program will also assist San Mateo County Permittees to use the BASMAA project products to prepare for adoption of the new program and begin implementation as of July 1, 2019, per the requirements of C.12.f.
- Continue to participate in the RMP PCBs Work Group to help oversee RMP studies concerning the fate, transport, and biological uptake of PCBs discharged from urban runoff to San Francisco Bay margin areas. One focus will be the conceptual model under development for Steinberger Slough in San Mateo County.
- Assist its member agencies to comply with the risk reduction program requirements by coordinating with and reporting on the Fish Smart program conducted by CEH. CEH plans to continue all of the Fish Smart activities described above.

SECTION 13
C.13 COPPER CONTROLS

INTRODUCTION

Provision C.13 of the MRP addresses copper control measures identified in the San Francisco Bay Basin Water Quality Control Plan (commonly referred to as the Basin Plan). The Regional Water Board has deemed these controls are necessary to support copper site-specific objectives in San Francisco Bay. C.13 includes the following sub-provisions:

- C.13.a. Manage waste generated from cleaning and treating copper architectural features, including copper roofs, during construction and post-construction;
- C.13.b. Manage discharges from pools, spas and fountains that contain copper-based chemicals; and
- C.13.c. Industrial Sources.

In FY 2017/18, Permittees and the Countywide Program continued to conduct activities related to complying with Provision C.13. Local actions are documented in each Permittee's individual Annual Report. This section summarizes copper control activities conducted by the Countywide Program.

IMPLEMENTATION OF MRP PROVISIONS

C.13.a. Copper Architectural Features

Provision C.13.a requires Permittees to manage waste from cleaning and treating copper architectural features, including copper roofs, during construction and post-construction.

During 2017/18, SMCWPPP continued to train municipal inspectors on the MRP requirements and BMPs for architectural copper installation, cleaning, and treating. The trainings utilized a SMCWPPP factsheet entitled "Requirements for Architectural Copper: Protect water quality during installation, cleaning, treating, and washing!" which targets suppliers and installers of copper materials and is available on the SMCWPPP website (www.flowstobay.com). Construction site inspectors received the information during the March 20, 2018 SMCWPPP Construction Site Inspection Workshop and building inspectors received the information from a SMCWPPP staff presentation at the California Building Inspectors Group (CALBIG) meeting on October 11, 2017 (see Section 6, Construction Site Control).

C.13.b. Manage Discharges from Pools, Spas and Fountains

Provision C.13.b requires Permittees to manage discharges from pools, spas and fountains that contain copper-based chemicals by adopting local ordinances. These requirements are implemented by individual Permittees and are reported on in their Annual Reports. Guidance on these requirements for illicit discharge inspectors is provided through SMCWPPP's CII Subcommittee and public outreach on related

BMPs is provided through SMCWPPP's PIP Subcommittee. A fact sheet entitled *Maintenance Tips for Pools, Spas, and Fountains* (Prepared by the Our Water Our World point-of-purchase outreach program) includes information on avoiding the use of copper-based algaecides and is available on the SMCWPPP website (www.flowstobay.org).

C.13.c. Industrial Sources

Provision C.13.c requires Permittees to ensure through routine industrial facility inspections that proper BMPs are in place at industrial facilities likely to use copper or have sources of copper. SMCWPPP's CII Subcommittee assists member agency staff with understanding this MRP requirement and SMCWPPP develops MRP compliance support materials as necessary. In addition, in June 2010 BASMAA developed pollutants of concern commercial/industrial inspector training materials and a guidance manual that address industrial sources of copper. These materials are available on SMCWPPP's website (www.flowstobay.org). Industrial inspectors received information on this topic during SMCWPPP's CII training workshop on February 28, 2018.

FUTURE ACTIONS

FY 2018/19 activities planned by SMCWPPP to assist member agencies comply with MRP requirements in Provision C.13 include the following:

- Continue to provide information on MRP requirements regarding architectural sources of copper to construction site and building inspectors at New Development Subcommittee meetings, SMCWPPP's FY 2018/19 Construction Site Inspector Workshop, and at presentations to CALBIG or other partner organizations.
- Provide guidance to San Mateo County Permittees via SMCWPPP's CII Subcommittee and/or SMCWPPP's FY 2019/20 Stormwater Business Inspector Training Workshop to assist them with conducting routine industrial facility inspections that ensure proper BMPs are in place at industrial facilities likely to use copper or have sources of copper.
- Continue to provide outreach material and guidance via SMCWPPP's CII Subcommittee and PIP Subcommittee regarding pool, spa and fountain discharge BMPs.

SECTION 15
C.15 EXEMPTED AND CONDITIONALLY EXEMPTED DISCHARGES

INTRODUCTION

The objective of MRP Provision C.15, Exempted and Conditionally Exempted Discharges, is to exempt unpolluted non-stormwater discharges from the MRP's general non-stormwater discharge prohibition (Provision A.1) and to conditionally exempt non-stormwater discharges that are potential sources of pollutants. This section describes SMCWPPP's countywide activities conducted to help its member agencies to implement this provision. SMCWPPP helps municipal staff to understand the MRP's requirements and to make available for their use various MRP compliance support materials. The SMCWPPP CII Subcommittee, discussed in Section 4, facilitates and coordinates providing this assistance to the member agencies for a variety of different types of non-stormwater discharges that may be conditionally exempted.

In addition, during FY 2017/18 SMCWPPP's PIP component conducted selected activities to help San Mateo County Permittees comply with outreach requirements in Provision C.15.b.iv. Individual Residential Car Washing Discharge and Provision C.15.b.vi. Irrigation Water, Landscape Irrigation, and Lawn or Garden Watering. These activities are described below.

IMPLEMENTATION OF MRP PROVISIONS

Provision C.15.b.iv. Individual Residential Car Washing

During FY 2017/18, SMCWPPP continued previous years' outreach efforts to encourage residents to use car washes rather than washing their cars at home using social media as shown in Figure 15-1. SMCWPPP also targeted mobile car wash businesses to educate them on the hazards of dumping their used wash waters down storm drains. The practice of using commercial car washes helps keep soaps, automotive pollutants, and environmental toxins from washing into San Mateo County storm drains.

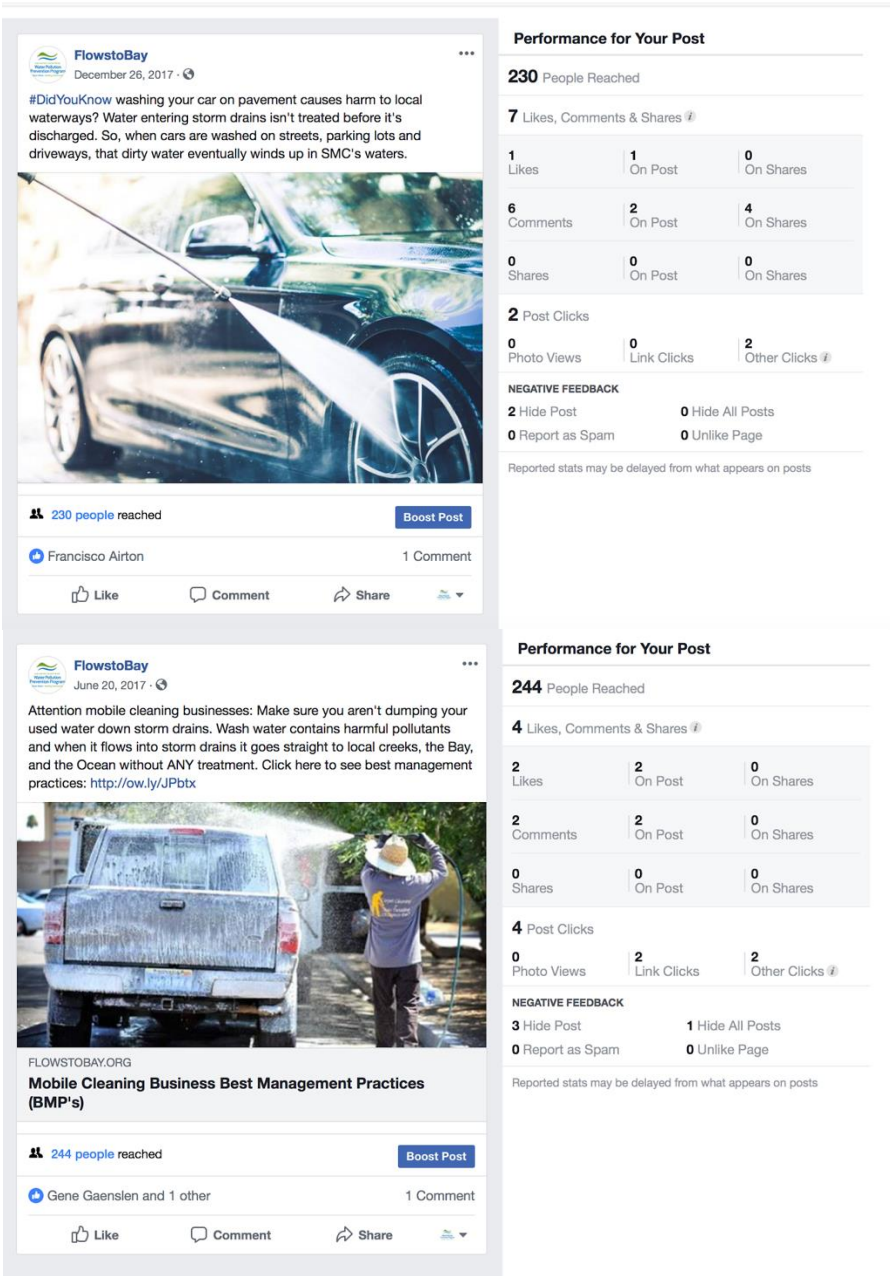


Figure 15-1. Examples of Car Wash Facebook Posts

Provision C.15.b.vi. Irrigation Water, Landscape Irrigation, and Lawn or Garden Watering

SMCWPPP implemented the following outreach activities to promote the use of less-toxic options for pest control and landscape management, and the use of drought tolerant, native vegetation to minimize landscape irrigation demands:

- In FY 2017/18, SMCWPPP conducted outreach to San Mateo County residents to support and promote eco-friendly alternatives to toxic pesticides. This promotion took place on social media and the SMCWPPP quarterly newsletter and blog. Additional messaging was provided through SMCWPPP's point-of-purchase program, where materials from the Our Water Our World (OWOW) point-of-purchase outreach program were distributed that educate residents about eco-friendly pesticide alternatives.
- In FY 2017/18, SMCWPPP promoted planting of drought tolerant, native vegetation through our online media channels, including social media and the SMCWPPP quarterly newsletter and blog. Messaging focused on the environmental benefits of planting native plants, including their tolerance to drought. Resources were included to identify native plants and how to plant and maintain them. Table 15-1 summarizes the reach of Facebook posts made on pesticide pollution prevention. Example posts are shown in Figure 15-2.
- In FY 2017/18, SMCWPPP also continued to promote water-saving tips via social media.

Table 15-1. Summary of Facebook Posts on Pesticide Pollution Prevention Topics

Post Focus	Reach	Engagements	Clicks
Bay Friendly Gardening & Landscaping / Reducing Pesticides	347	13	5
Gardening with Companion Plants and Bees	177	11	7
Toxic Pesticides and Alternatives (5 posts)	1,680	52	39
Monthly Native Gardening	391	24	9
Water Friendly Lawn / Landscaping Maintenance	144	5	0
Lawn Replacement / Drought Landscape Events (3 posts)	894	23	9

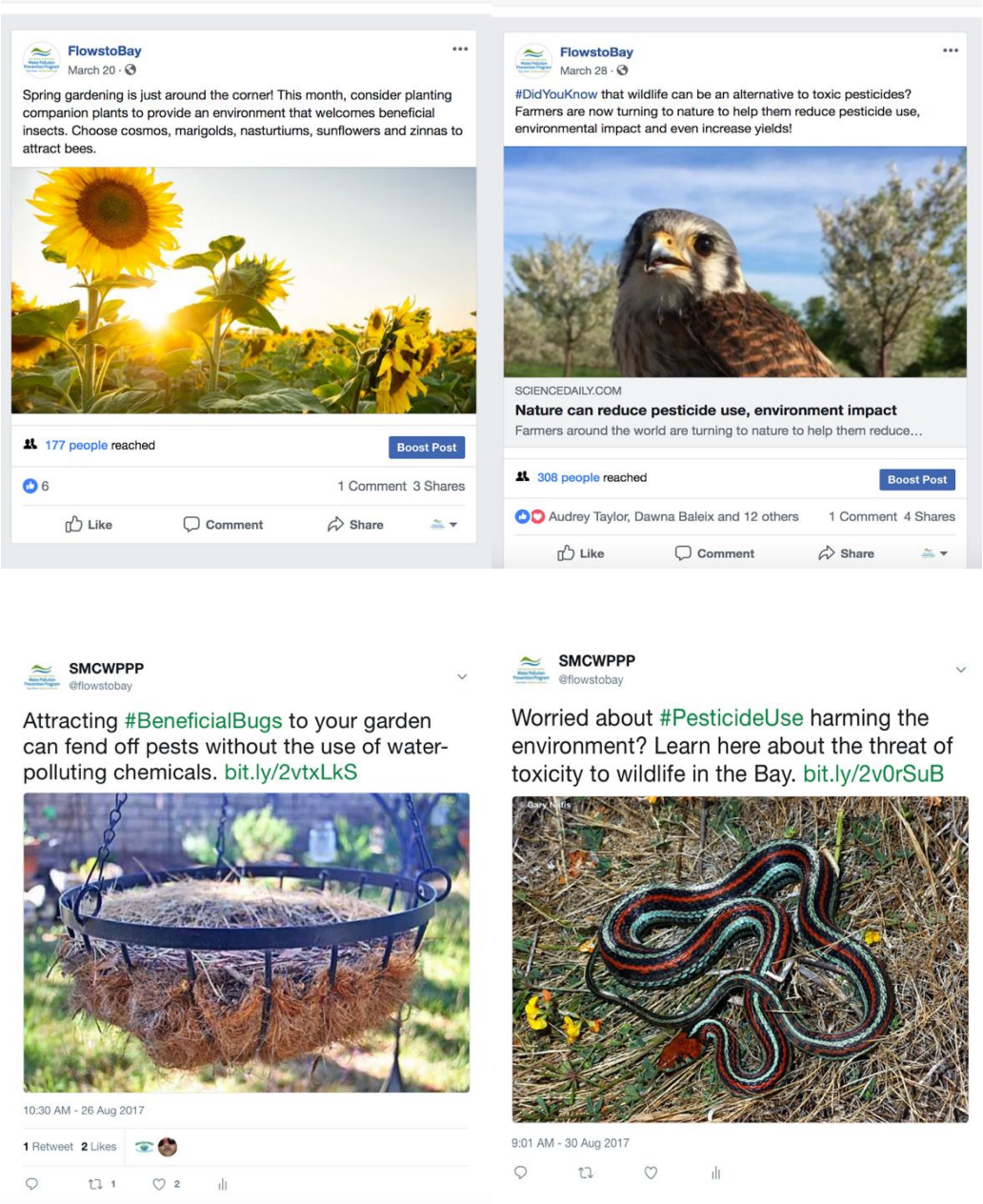


Figure 15-2. Social Media Posts on Pesticide Pollution Prevention

FUTURE ACTIONS

In FY 2018/19, SMCWPPP will continue to assist member agencies comply with MRP Provision C.15 requirements related to conditionally exempt non-stormwater discharges, including conducting selected types of related outreach.

Appendix 1

- Stormwater Committee – Attendance List for FY 2017/18

2017-18 Stormwater Committee Attendance														
Agency	**Representative**	**Position**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**
Atherton	Robert Ovadia	Public Works Director								O		X	X	
Belmont	Afshin Oskoui	Public Works Director			X		X			X		X	X	
Brisbane	Randy Breault	Public Works Director/City Engineer			X		X					O	X	
Burlingame	Syed Murtuza	Public Works Director			O		X			X		X		
Colma	Brad Donohue	Director of Public Works and Planning		C	X	C	X	C	C	X	C	X		C
Daly City	John Fuller	Public Works Director		A	O	A	X	A	A	X	A	X	X	A
East Palo Alto	Kamal Fallaha	City Engineer		N		N		N	N		N	O	X	N
Foster City	Jeff Moneda	Public Works Director		C	X	C		C	C	X	C	X	O	C
Half Moon Bay	Maziar Bozorginia	City Engineer		E	X	E		E	E		E	X		E
Hillsborough	Paul Willis	Public Works Director		L	X	L		L	L	X	L	X	X	L
Menlo Park	Justin Murphy	Public Works Director		E	O	E	X	E	E	X	E	X	X	E
Millbrae	Khee Lim	Public Works Director		D	X	D	X	D	D		D	X		D
Pacifica	Van Ocampo	Public Works Director/City Engineer			O		X			X		X		
Portola Valley	Howard Young	Public Works Director								X				
Redwood City	Saber Sarwary	Supervising Civil Engineer			X		O							
San Bruno	Jimmy Tan	City Engineer					X					X	X	
San Carlos	Grace Le	Public Works Director			X		X			X		O	X	
San Mateo	Brad Underwood	Public Works Director			X		X			X		X	X	
South San Francisco	Eunejune Kim	Public Works Director					X							
Woodside	Sean Rose	Public Works Director					X			X				
San Mateo County	Jim Porter	Public Works Director			X		O			X		X	X	
Regional Water Quality Control Board	Tom Mumley	Assistant Executive Officer			O									

"X" - Committee Member Attended

"O" - Other Jurisdictional Representative Attended

Appendix 2

- Municipal Maintenance Subcommittee – Attendance List for FY 2017/18

SMCWPPP Municipal Maintenance Subcommittee Meetings - FY 2017/18

NAME	MUNICIPALITY	Aug 23, 2017	Apr 26, 2018
Randy Ferrando	Belmont	✓	
Brandon Tyler	Belmont	✓	
Tim Murray	Belmont	✓	
Keegan Black	Brisbane	✓	✓
Kessel Crockeh	Brisbane	✓	
Todd Curtis	Brisbane	✓	
Randall Hayes	Burlingame		✓
Jennifer Lee	Burlingame		✓
Louis Gotelli	Colma	✓	✓
Dan Godwin	Daly City	✓	
Cesar Vasquez	Daly City		✓
Joe Stabile Sr.	Daly City		✓
Sibely Calles	Daly City	✓	✓
Jose Rodrigues	Daly City		✓
Robert Halvelson	Daly City	✓	
Lenin Malgar	East Palo Alto		✓
Jack Schulze	Foster City		✓
Kelly Carroll	Half Moon Bay		✓
Gary Francis	Hillsborough	✓	✓
Irv Meachum	Menlo Park		✓
Christopher Falzon	Millbrae		✓
Chris Junio	Millbrae	✓	
Manny Marquez	Millbrae	✓	✓
Bernie Mau	Pacifica	✓	✓
Chris Martin	Pacifica		✓
Paul Lavorini	Pacifica	✓	✓
Albert Munguis	Redwood City		✓
Victor Castaneda	Redwood City		✓
Eddie Pastrano	Redwood City		✓
Vicki Sherman	Redwood City		✓
Ted Chapman	San Bruno	✓	
Ted Rutledge	San Carlos	✓	✓
Michael Robison	San Carlos	✓	
Justin Erickson	San Carlos		✓
Breann Liebermann	San Mateo County	✓	✓
Rick Pina	City of San Mateo	✓	

NAME	MUNICIPALITY	Aug 23, 2017	Apr 26, 2018
Grant Ligon	City of San Mateo	✓	
Casey Stevenson	San Mateo County Mosquito & Vector Control District	✓	
Kristin Kerr	EOA, Inc.	✓	✓
Reid Bogert	SMCWPPP Staff	✓	

Appendix 3

- New Development Subcommittee – Attendance List for FY 2017/18
- SMCWPPP Biotreatment Soil Mix Supplier List

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
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New Development Subcommittee
FY 2017/18 Meeting Attendance

Representing	Name	Phone Number	Meetings Attended			
			Aug	Nov	Feb	May
Atherton	Nestor Delgado	650-752-0544		X	X	X
	David Huynh			X		
Belmont	Gilbert Yau	650-595-7467		X	X	
	Jana Cadiz		X			X
Brisbane	Ken Johnson	415-508-2120		X	X	X
Burlingame	Jennifer Lee	650-558-7381		X	X	
	Carolyn Critz	650-826-1554		X		X
	Thomas Spankowski		X			
Colma	Jonathan Kwan	650-757-8898	X	X	X	X
	Muneer Ahmed	650-757-8894				
Daly City	Corey Alvin	650-991-8156	X	X		X
	Sibely Calles	650-991-8054		X	X	X
East Palo Alto	Tiffany Deng	650-853-3126	X	X		X
EOA/SMCWPPP	Jill Bicknell	408-720-8811 x1	X	X	X	X
	Peter Schultze-Allen	510-832-2852 x128	X		X	X
Foster City	Vivian Ma	650-286-3270	X	X	X	
Half Moon Bay	Kelly Carroll	650-522-2506	X	X	X	X
Hillsborough	Natalie Asai	650-375-7444	X		X	X
	Misty Bradshaw			X		
Menlo Park	Michael Fu	650-330-6740				X
	Rambod Hakhamaneshi	650-330-6740				X
Millbrae	Andrew Yang	650-259-2339			X	X
	Sam Fielding	650-522-2506	X			X
	Tonya Benedik					X
	Andy Wong					X
Pacifica	Christian Murdock	650-738-7444	X		X	X
Portola Valley	CheyAnne Brown		X		X	
Redwood City	James O'Connell	650-780-5923	X	X	X	X
San Bruno	Matt Neuebaumer	650-616-7042	X	X	X	X
	David Wong					X
	Jason Tang					X
San Carlos	Kathryn Robertson	650-802-4212	X	X	X	X
San Mateo	Ken Pacini	650-522-7333	X	X	X	X
	Grant Ligon	650-522-7296	X		X	X
County of San Mateo	Camille Leung	650-363-1826	X		X	X
	Breann Liebermann	650-599-1514	X	X	X	X
	Ofelia Guner		X			X
	Sherry Lin			X		X
	Helen Gannen		X			
C/CAG	Matt Fabry	650-599-1419				
	Reid Bogert	650-599-1433	X	X	X	
South S.F.	Daniel Garza	650-829-3840		X		X
Woodside	Dong Nguyen	650-851-6790				

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BIOTREATMENT SOIL MIX SUPPLIER LIST

Company	Contact Name	Phone	Address	City	Zip	E-mail	Website
American Soil & Stone Products Inc.	Ryan Hoffman	510-292-3018	Richmond Annex, 2121 San Joaquin Street, Building A	Richmond	94804	ryan@americansoil.com	www.americansoil.com
L.H. Voss Materials, Inc.	Nyoka Corley	925-676-7910	5965 Dougherty Road	Dublin	94568	nyoka.corley@gmail.com	www.lhvoss.com
Lehigh Hanson Aggregates	Chris Stromberg	510-246-0393	4501 Tidewater Avenue	Oakland	94601	chris.stromberg@lehighhanson.com	www.lehighhanson.com
Lyngso Garden Materials, Inc.	Paul Truyts	650-333-1044 650-364-1730	345 Shoreway Road	San Carlos	94070	ptruyts@lyngsogarden.com	www.lyngsogarden.com
Marshall Brothers Enterprises, Inc.	Phillip Marshall	925-449-4020	P.O. Box 2188	Livermore	94551	phillip@mbenterprises.com	www.mbenterprises.com
Pleasanton Trucking Inc.	Tom Bonnell	925-449-5400	P.O. Box 11462	Pleasanton	94588	pleasanton_trucking@yahoo.com	www.pleasantontrucking.com
Recology Blossom Valley Organics	Denette Covarrubias	209-545-7718 209-597-1209	6133 Hammett Court	Modesto	95358	dcovarrubias@recology.com	www.recology.com/blossom-valley-organics-modesto
Redi-Gro Corporation	Sharon Yon	916-381-6063 800-654-4358	8909 Elder Creek Road	Sacramento	95828	redigropro@redi-gro.com	www.redi-gro.com
TMT Enterprises, Inc.	Matt Moore	408-432-9040	1996 Oakland Road	San Jose	95131	info@tmtenterprises.net	www.tmtenterprises.net

As of: 8/11/2017

Disclaimer: SMCWPPP provides this list of biotreatment soil mix suppliers for the use of its member agencies, contractors, designers and others in finding suppliers for their projects. Suppliers are listed based on a general review of their soil mix product including test results, adherence to the Attachment L specification in the MRP and knowledge of the specification. Therefore users of this SMCWPPP list must make the final determination as to the products and adherence to Attachment L of the MRP. Users of the list assume all liability directly or indirectly arising from use of this list. The listing of any soil supplier is not be construed as an actual or implied endorsement, recommendation, or warranty of such soil provider or their products, nor is criticism implied of similar soil suppliers that are not listed. This disclaimer is applicable whether the information is obtained in hard copy or downloaded from the Internet. Check the SMCWPPP website for the “Biotreatment Soil Mix Verification Checklist” and “Biotreatment Soil Mix Supplier Verification Statement” for assistance in reviewing and approving soil mix submittals. www.flowstobay.org/newdevelopment

Appendix 4

- CII Subcommittee – Attendance List for FY 2017/18
- Commercial/Industrial Stormwater Inspector Workshop – February 28, 2018
    - Workshop Agenda
    - Attendance List
    - Evaluations Summary
- Close the Lid on Litter Postcard
- General Dumping into Storm Drain Postcard
- Vehicles Dripping Auto Fluids Postcard

SMCWPPP Commercial/Industrial/Illicit Discharge (CII) Subcommittee Attendance – FY 2017/18

Name	Agency	September 20, 2017	December 20, 2017	April 18, 2018	June 20, 2018
Bozhena Palatnik	City of Belmont		✓	✓	
Craig West	City of Belmont			✓	
John Tallitsch	City of Belmont	✓			
Keegan Black	City of Brisbane		✓		
Carolyn Critz	City of Burlingame			✓	
Jennifer Lee	City of Burlingame	✓	✓	✓	✓
Louis Gotelli	City of Colma	✓	✓		
Ward Donnelly	City of Daly City	✓	✓	✓	✓
Sibely Calles	City of Daly City	✓		✓	✓
Michele Daher	City of East Palo Alto			✓	
June Canter	City of East Palo Alto			✓	
Joaquin Avelino	City of East Palo Alto			✓	
Vivian Ma	City of Foster City				✓
Mark Lander	City of Half Moon Bay		✓		
Pam Lowe	City of Menlo Park	✓	✓	✓	✓
Kevin Cesar	City of Millbrae		✓		✓
Cliff Ly	City of Millbrae		✓		
Raymund Donguines	City of Pacifica	✓		✓	
Howard Young	Town of Portola Valley		✓		
Vicki Sherman	City of Redwood City	✓			✓
Eduardo Pastrano	City of Redwood City			✓	
Kathryn Robertson	City San Carlos	✓	✓	✓	✓
Mark Swenson	City of San Mateo			✓	
Sven Edlund	City of San Mateo		✓		
Grant Ligon	City of San Mateo		✓	✓	
Daniel Garza	South San Francisco	✓	✓	✓	✓
Pat Ledesma	County of San Mateo	✓	✓		✓
Breann Liebermann	County of San Mateo	✓		✓	✓
Norman Domingo	SVCW			✓	✓
Ben Padua Jr	SVCW				✓
Reid Bogert	SMCWPPP Staff	✓		✓	
Kristin Kerr	EOA, Inc.	✓	✓	✓	✓
Katherine Sheehan	CSG/ Colma/ Half Moon Bay	✓	✓		

Name	Agency	September 20, 2017	December 20, 2017	April 18, 2018	June 20, 2018
Kelly Carroll	CSG/ Half Moon Bay/ Colma/ Portola Valley		✓	✓	✓
Paramjit Uppal	CSG		✓		

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Water Pollution Prevention Program
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COMMERCIAL/INDUSTRIAL STORMWATER INSPECTOR WORKSHOP

Sponsored by the Commercial/Industrial/Illicit Discharge (CII) Subcommittee

Wednesday, February 28, 2018

San Mateo Public Library – Oak Room
55 W. 3rd Avenue, San Mateo

WORKSHOP AGENDA

9:00 AM	**Registration and Refreshments**	
9:15 AM	Welcome	Kristin Kerr *EOA, Inc.*
9:20 AM	Facility Stormwater Inspection Basics	Kristin Kerr *EOA, Inc.*
10:20 AM	Case Study: Shared Trash Enclosure	Sven Edlund *City of San Mateo*
10:40 AM	**Break**	
10:55 AM	Case Study: Auto Repair Shop	Daniel Garza *South San Francisco*
11:15 PM	Case Study: Large Retail Facility	Mark Swenson *City of San Mateo*
11:35	Case Study: C.4 Inspection, C.5 Inspection or Mobile Business?	Kristin Kerr *EOA, Inc.*
11:55 PM	Summary Remarks, Adjourn	Kristin Kerr *EOA, Inc.*

*** Attendance at this workshop is acceptable for 2.5 Contact Hours toward maintaining CWEA certifications. ***

SMCWPPP Commercial/Industrial Stormwater Inspector Training Workshop
Wednesday, February 28, 2018

	Last Name	First Name	Agency
1	West	Craig	City of Belmont DPW
2	Lee	Jennifer	City of Burlingame
3	Suarez	Laura	City of Burlingame
4	Villegas	Agripina	City of East Palo Alto
5	Ly	Cliff	City of Millbrae
6	Lavorini	Paul	City of Pacifica
7	Mou	Berni	City of Pacifica
8	Castaneda	Victor	City of Redwood City
9	Claire	Jason	City of Redwood City
10	Munguia	Adalberto	City of Redwood City
11	Peter	Robbie	City of Redwood City
12	Sherman	Vicki	City of Redwood City
13	Edlund	Sven	City of San Mateo
14	Ligon	Grant	City of San Mateo
15	Swenson	Mark	City of San Mateo
16	Garza	Daniel	City of South San Francisco
17	Wu	Zach	City of South San Francisco
18	Yuk	Nelson	City of South San Francisco
19	Siphongsay	Thomas	City of South San Francisco
20	Carroll	Kelly	CSG Consultants, Inc
21	Flanagan	Sean	CSG Consultants, Inc
22	Holt	Lee	CSG Consultants, Inc
23	Rodewald	Rick	CSG Consultants, Inc
24	Sarto	Lisa	CSG Consultants, Inc
25	Sheehan	Katherine	CSG Consultants, Inc
26	Baumgartner	Lori	EOA Inc
27	Lennon	Erin	EOA Inc
28	Byrne	Matt	EOA Inc.
29	Colunga	Erica	Keish Environmental, PC
30	Gonzalez	Selena	Keish Environmental, PC
31	Keish	Rachael	Keish Environmental, PC
32	Landon	Paul	Keish Environmental, PC
33	Sideris	Kristin	Keish Environmental, PC
34	Atkinson	Kian	San Mateo County
35	Casey	Dermot	San Mateo County
36	DeMasi	Amy	San Mateo County
37	Khine	Christine	San Mateo County
38	Liebermann	Breann	San Mateo County
39	Mejia-Barbaran	Liliana	San Mateo County
40	Tong	Edmond	San Mateo County
41	Banning	Monica	San Mateo County Environmental Health

SMCWPPP Commercial/Industrial Stormwater Inspector Training Workshop
Wednesday, February 28, 2018

	Last Name	First Name	Agency
42	Bea	Yvette	San Mateo County Environmental Health
43	Gonzales	Jennifer	San Mateo County Environmental Health
44	Helm	Apollonia	San Mateo County Environmental Health
45	Ip	Yuen Ki	San Mateo County Environmental Health
46	Jensen	Dirk	San Mateo County Environmental Health
47	Ledesma	Patrick	San Mateo County Environmental Health
48	Thomas	Erin	San Mateo County Environmental Health
49	Wong	Ngai	San Mateo County Environmental Health
50	Guevara Delgado	Nestor	Town of Atherton
51	Huynh	David	Town of Atherton
52	Ahmed	Muneer	Town of Colma
53	Gotelli	Louis	Town of Colma
54	Mekala	Sindhi	Town of Woodside
55	Critz	Carolyn	Veolia Water North America

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Summary of Evaluations
Attendance: 55
Evaluations: 45

COMMERICAL/INDUSTRIAL STORMWATER INSPECTOR WORKSHOP

San Mateo, CA Wednesday, February 28, 2018

1. Facility Stormwater Inspection Basics – Kristin Kerr, EOA, Inc.

   Very Useful **43** Somewhat Useful **2** Not useful **0**

   Comments:
   - Good background
   - Good clear overview, wondering about CII members only web page access
   - Good summary of requirement and process to inspect
   - Could go a bit more in-depth about forms
   - Good basic inspection/program overview
   - Comprehensive yet concise
   - Good to learn background on why we conduct inspections
   - Good overview
   - I appreciate that this was directed towards new staff so I greatly benefitted
   - Good overview, helpful for knowing types of facilities/inspections

2. Case Study: Shared Trash Enclosure – Sven Edlund, City of San Mateo

   Very Useful **42** Somewhat Useful **3** Not useful **1**

   Comments:
   - Good topic to think about
   - Interesting information, well presented
   - Good case study, noted follow up on actions going forward
   - Good presentation on evolution of inspection/investigation enforcement
   - Detailed
   - The reality is that some sites take forever to achieve compliance and at the end of the day, the result isn't perfect.
   - Great, realistic example, thanks for sharing.
   - Good example
   - He addressed a lot of issues I encountered in the past, thank you! Very engaging

3. Case Study: Auto Repair Shop – Daniel Garza, South San Francisco

   Very Useful **35** Somewhat Useful **10** Not useful **1**

   Comments:
   - Should speak louder
   - The frustration with the facility was clear, the information well presented
   - Needs to go more in-depth about enforcement or steps they will take going forward

- Liked the real-world issues
- Interesting to see a HazMat example as I have only inspected food.
- Good example of repeat violator

4. Case Study: Large Retail Facility – Mark Swenson, City of San Mateo

Very Useful **35** Somewhat Useful **9** Not useful **1**

Comments:

- Should speak up more
- Interesting information, well presented
- Another useful, different scale talk
- Good info on collaboration between different points of contact
- Typically the property manager is not interested in assisting with the cleanup & many owners are out of the country. Manager contact info was difficult for me to access.
- Issues covered were useful in dealing with facilities that have a shared area

5. Case Study: C.4 Inspections, C.5 Inspection or Mobile Business – Kristin Kerr, EOA, Inc.

Very Useful **42** Somewhat Useful **3** Not useful **0**

Comments:

- Helpful to decipher what permit and what to respond to
- Clear presentation
- Demo or screen shot the table or database and go over another case and what enforcement was taken
- Good, thought provoking cases
- Good to know how to handle an actual discharge we observe that isn't one of the inspections we are doing that day.
- Good to know MRP specific requirements for mobile operations
- I will email you regarding MFFs (Mobile Food Facilities)
- Good information on who should be responsible for correcting violations.

8. **Did this training meet your expectations?** Yes: **44** No: **0**
   - Somewhat: **1**

9. **What parts of the training were most useful to you?**
   - Everything was good
   - All of it (3)
   - The case study about shared trash enclosures was the most useful, followed by the refresher of storm water inspection protocol.
   - Inspection basics
   - Enjoyed the refresher at the beginning and the case studies by individual cities. It was interesting to see different approaches for different cities
   - Overview refresher and case studies
   - Case scenarios allow other inspectors to gather information about what others did in certain scenarios.
   - Case studies & examples of how to proceed at different stages

- Case studies (9)
- Case studies & breaking down the basics
- Case studies, examples of facilities and types of violations observed
- Slides; "hands on"
- First case study
- All of the questions
- A good general introduction to the C.4 program
- Full on summary & case studies
- Overview of conducting an inspection
- Auto Repair Shops
- Being I am new to performing these inspections the basics to identify and special circumstances to look for. It's common sense, but good to hear & see what to ask and look for during the inspections.
- Photos and real-world examples on what works/doesn't work/how to tackle problems.
- Information on program basics, different means of enforcement, and agency collaborations.
- Case studies & how to handle violations & BMP examples.
- MRP-specific information
- Pictures about stormwater violation (2)
- Stormwater history & structures
- What to look for. How inspectors are dealing with the businesses.

10. **What would have made this training more useful?**
    - Hit all the main points; good trainings
    - Talk about the differences and/or problems/benefits of paper inspections vs. those who enter inspections electronically.
    - More information regarding NOI
    - Shorter case studies with wider variety
    - More interactive problem solving – BMP suggestions for case study problems
    - Add slides to go over what agencies are responsible for what
    - More photos of storm drains with do's and don'ts
    - As jurisdictions move ahead with their own C.4 inspection program, it would be helpful to develop a dedicated training/coursework for inspections, follow-ups, enforcement, data tracking, on an ongoing basis
    - More explanation of how cities cite businesses with fines. How do they establish the amount? Does code enforcement get involved? (With different audience City staff who are responsible for higher levels of enforcement.)
    - For the "beginners" maybe more detail/overview for ERP hierarchy and BIP information. ERP vs. code
    - Examples of different scales of enforcement (to level 3/4)
    - Have Pat Ledesma give a presentation on how he conducts inspections; give another anecdote on how inspector deal with businesses that decline or are hesitant to receive an inspection.
    - It was good

- What has helped achieve compliance. What are ways we can standardize – ways to reduce repeat site visits.
- A report or case study of current state of stormwater in each city
- Verifying coordinators, but Mrs. Kerr just covered that. Ensuring Flows to Bay is current/updated.
- More info on illicit discharge procedures for sites that aren't businesses/industrial facilities.
- Can we fine property owners, property management companies, and the tenant businesses for NOVs? Or just the (tenant) businesses we came to inspect?
- It was all good.
- Going over the inspection form and filling one in for each inspection case study.
- Case studies could have used a more definitive approach. Maybe protocol should be put in place of who the contact should be to make impact, to get the work done in one visit rather than waste time fining – and then get results.
- More before/after pictures (especially after)

11. **What topics would you recommend for a future training?**
    - All topics from presenters were good
    - Electronic inspections
    - Different type of NOI sites
    - BMPs in scenario
    - Covering metals, etc., NOI inspections for BMPs
    - What inspection records look like that are transmitted to property manager
    - Getting the property on your side to solve a problem
    - Information about how to deal with illicit dumping discharge from unknown source; field trip
    - Fines and how to enforce them
    - Residential or apartment building illicit discharge
    - ERP variations across the county. Difference between $ amounts for admin penalties. Code backups for action taken.
    - Perhaps a live demo, or on-site practice
    - Will let you know as I experience them
    - Samples of filled out inspection reports with example notes and recommendations
    - Case studies involving special/uncommon circumstances, pollutants, etc.
    - Should we be issuing individual city stormwater permits to the businesses we inspect and charge an inspection fee too? Can we clean up private property and charge the business even if there is no active discharge?
    - BMP maintenance (bioretention basin, etc.)
    - More information on illicit discharge procedures for sites that aren't businesses/industrial facilities.
    - Updated outreach. Provide in Chinese.
    - Stormwater violation and effect
    - What is the department/office that conducts stormwater inspections in each city? What other duties do they have?

- More case studies on compliance. Cost recovery. Fees. BMPs. Referrals for spills, who should take responsibility. Ways to reduce repeat site visits.

12. **General Comments?**
    - Efficient use of time
    - Excellent group of speakers, very useful information
    - Information on various companies who provide inspections to small cities
    - Good class
    - Thanks for an informative class
    - Thank you! (2)
    - Thank you, Water Board must be very happy with the countywide program
    - Please hold this training every year.
    - Interesting case studies today!
    - Good training!
    - Overall, very well done.
    - Thank you for incorporating food facility examples.
    - Great training.

CLOSE THE LID ON LITTER

Cierre la Tapa de la Basura

- Mantenga cerradas las tapas de los contenedores de basura y reciclaje. Mantenga limpia el área alrededor de los mismos. Esto ayuda a prevenir que los residuos de basura lleguen a las calles, desagües pluviales y arroyos.
- No sobrellene los contenedores de basura y de reciclaje. Aumente el servicio de recolección de basura si hay desbordamiento de la misma.
- Verifique regularmente que el perímetro de su propiedad esté limpio. Coloque cualquier desecho en el contenedor respectivo.
- Limpie inmediatamente todo derrame o goteo usando un equipo de limpieza para derrames que contenga absorbente seco.

Đóng Nắp Thùng Rác

- Đóng kín nắp thùng rác và nắp thùng tái chế. Giữ sạch khu vực xung quanh. Việc này giúp ngăn cản để rác rơi xuống đường, cống nước mưa và các rãnh nước.
- Không đổ rác vào thùng rác quá mức. Tăng dịch vụ nếu rác bị tràn ra.
- Thường xuyên kiểm tra rác xung quanh đất quý vị. Bỏ rác vào thùng đựng rác.
- Dọn sạch ngay tất cả chỗ bị chảy tràn và rò rỉ với bộ dọn dẹp có chất thấm khô.

Close the Lid on Litter

- Keep trash and recycling dumpster lids closed. Keep the surrounding area clean. This helps prevent litter from getting into streets, storm drains, and creeks.
- Don't overfill dumpsters. Increase service if there is overflow.
- Regularly check the perimeter of your property for litter. Place any litter in the dumpster.
- Clean up all spills and leaks immediately using spill kit with dry absorbent.

SMCWPPP gratefully acknowledges the Santa Clara Valley Urban Runoff Pollution Prevention Program for developing and sharing the content and artwork of this card.

May 2018

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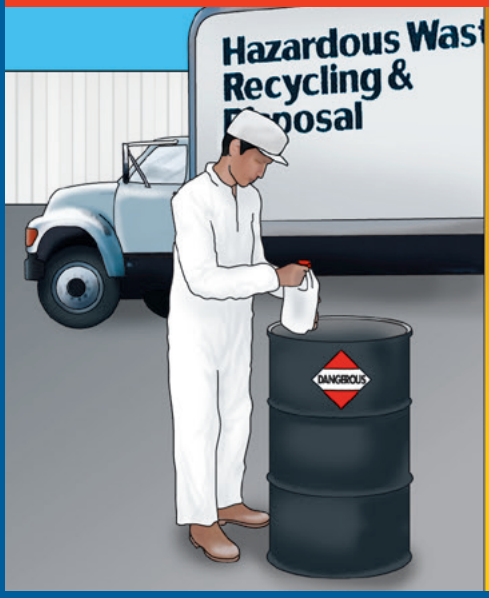
For more information:
www.flowstobay.org
650-599-1406

SI • NÊN LÀM • YES



NO • ĐỪNG LÀM

Desecho de materiales en el drenaje pluvial

- No vierta nada en una cuneta o drenaje pluvial. Los drenajes pluviales fluyen directamente hacia los arroyos locales y posteriormente a la Bahía de San Francisco.
- Tenga en cuenta que aun las sustancias biodegradables son dañinas para la vida silvestre y para el medio ambiente.
- Tirar cualquier tipo de sustancia en los drenajes pluviales es ilegal.
- Nunca deseche líquidos de autos, artículos para la limpieza del hogar, pintura, solventes y otros materiales en los recipientes de la basura. Estos materiales deben ser reciclados o desechados en los sitios de recolección de materiales peligrosos del hogar.

Para obtener información gratis sobre el sitio de recolección de materiales peligrosos del hogar más cercano, llame a los teléfonos: (650) 363-4718.

Vứt và Đổ Bậy Xuống Cống

- Đừng bao giờ đổ bất cứ một thứ gì xuống cống nước mưa. Cống nước mưa chảy thẳng vào những rạch ngòi rồi ra đến Vịnh San Francisco.
- Ngay cả những chất liệu mục rữa theo thời gian (biodegradable) cũng có hại cho muông thú và môi sinh.
- Đổ bất cứ chất liệu gì xuống cống nước mưa cũng trái phép.
- Đừng bao giờ vứt bỏ dung dịch xe hơi, chất tẩy gia dụng, sơn, chất pha và những đồ phế thải gia dụng độc khác vào thùng rác. Những vật liệu này phải cho thu hồi hay bỏ ở một trung tâm thu nhận đồ phế thải độc.

Muốn biết chỗ bỏ đồ phế thải gia dụng độc (miễn phí) gần nhà nhất, xin gọi: (650) 363-4718.

General Dumping into Storm Drain

- Never pour anything into a gutter or storm drain. Storm drains flow directly to local creeks and on to the San Francisco Bay.
- Even biodegradable substances are harmful to wildlife and the environment.
- Dumping any substance in the storm drain is illegal.
- Never dispose of auto fluids, household cleaners, paint, solvents and other household hazardous waste in the trash. These materials must be recycled or disposed of at a household hazardous waste collection facility.

For information on the nearest household hazardous waste drop-off site (free of charge): (650) 363-4718.

SMCWPPP gratefully acknowledges the Santa Clara Valley Urban Runoff Pollution Prevention Program for developing and sharing the content and artwork of this card.

May 2018

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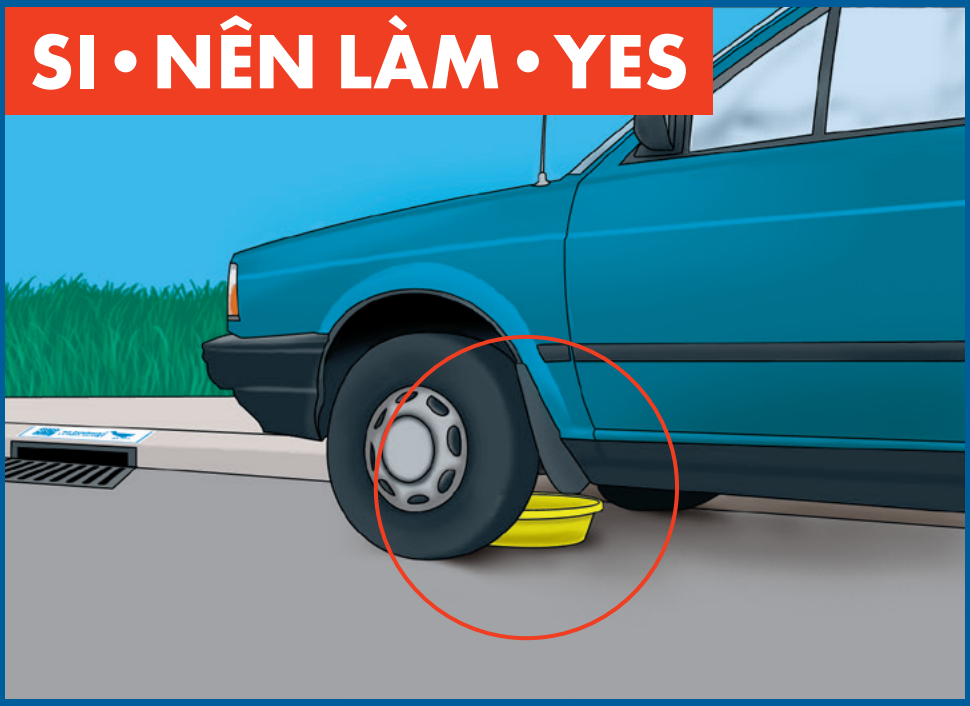
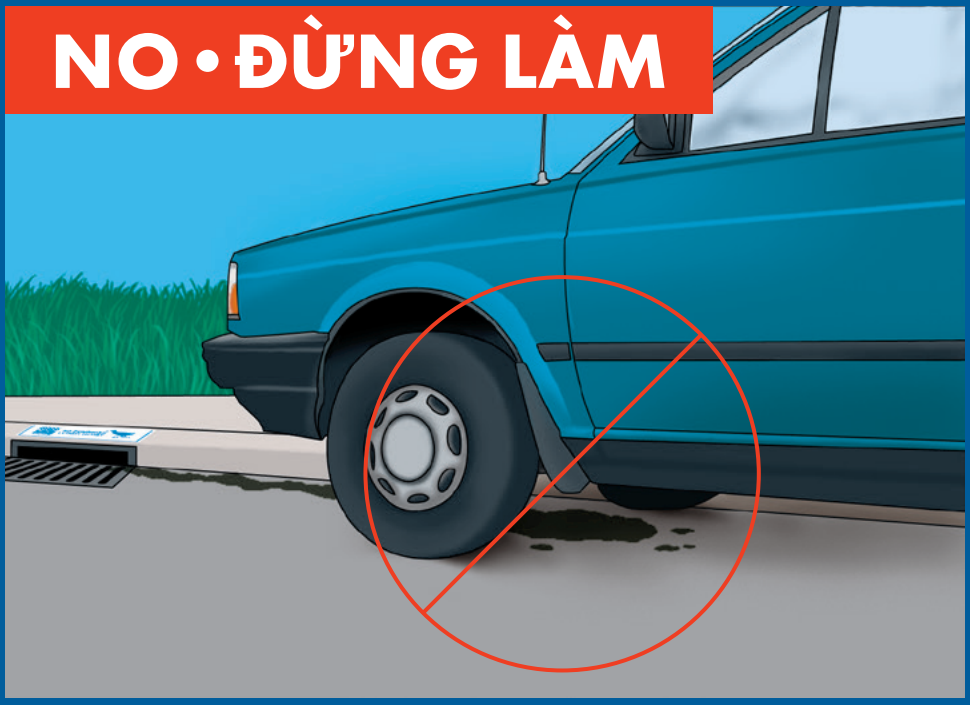
SI • NÊN LÀM • YES



NO • ĐỪNG LÀM



Derrame de líquidos automotrices

- No permita que los vehículos derramen líquidos en la calle, en la cuneta o en el drenaje pluvial.
- Limpie los derrames inmediatamente utilizando absorbente seco tal como arena para gatos. No permita que el absorbente sea arrastrado a la cuneta.
- Coloque un colector de aceite debajo del vehículo.
- Vacíe el colector de aceite periódicamente y protéjalo durante la lluvia.
- Repare el vehículo inmediatamente.

Xe Bị Rỉ Nhớt

- Đừng để xe chảy nhớt xuống đường lộ, rãnh hay cống nước mưa.
- Chùi dọn chỗ chảy đổ ngay bằng chất hút thấm như cát đi cầu của mèo (kitty litter), sau đó quét sạch đem đi bỏ. Đừng để chất thấm trôi xuống cống rãnh.
- Để chậu hứng dầu dưới xe.
- Đổ chậu hứng dầu thường xuyên, và giữ đừng để chậu bị ướt nước mưa.
- Sửa xe ngay.

Vehicles Dripping Auto Fluids

- Do not allow vehicles to drip fluids onto street, or into the gutter or storm drain.
- Clean up leaks immediately using dry absorbent, such as kitty litter, then sweep up and dispose. Do not allow absorbent to be washed down the gutter.
- Place drip pan under vehicle.
- Empty drip pan regularly and protect drip pan when it rains.
- Repair vehicle immediately.

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May 2018

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650-599-1406

Appendix 6

- CALBIG Meeting: Construction Site Stormwater Compliance – October 11, 2017
  - Announcement flyer
  - Agenda
  - Attendance list
- Stormwater Training for Construction Site Inspectors – March 20, 2018
  - Announcement Flyer
  - Agenda
  - Attendance List
  - Summary of Workshop Evaluations

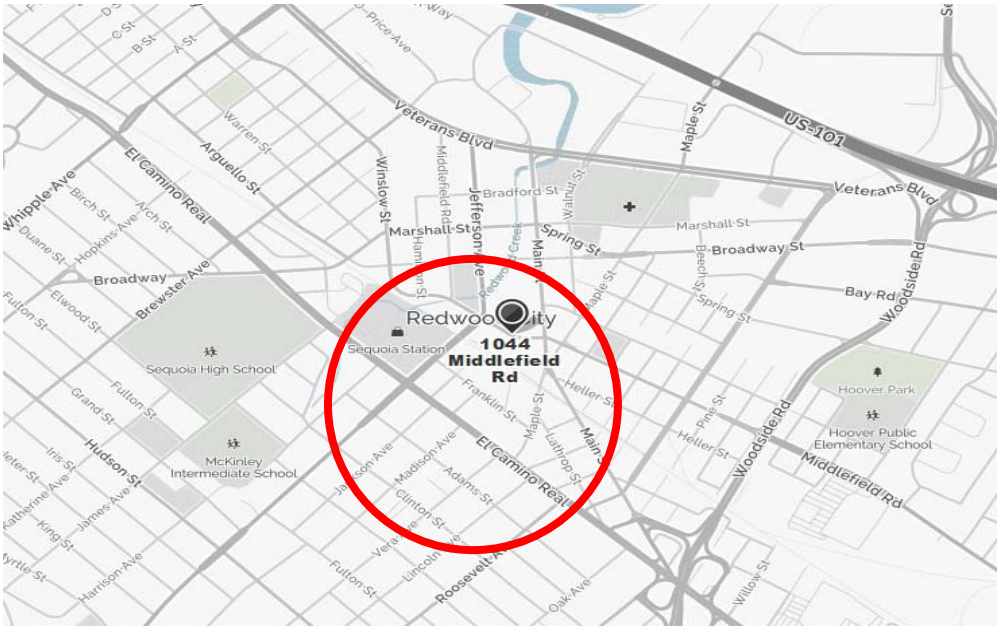
CALBIG MEETING ANNOUNCEMENT

2017 Stormwater Requirements for Construction Sites

(See Below)

This month's CALBIG meeting will be held on Wednesday, October 11, 2017 from 11:30am to 1pm (***please note***) at the Redwood City's Main Library; Second Floor; 1044-Middlefield Road; Redwood City, CA 94063.

For directions see map below:



Directions: Take US 101; Exit at Whipple Ave.; & follow this map to Redwood City's Main Library

Fee: $20 in cash or check payable to: CALBIG … A Free Lunch For All CSM Students!!!

Lunch: Bay Area Corporate Catering – Daily Lunch Delivery Service - (650) 726-1555.

Please RSVP to Michael Gorman at either e-mail addresses: mgorman@smcgov.org ***or*** thegormanfamily@earthlink.net by (please note the earlier deadline) 5:00-PM; Friday, October 8th.

Speaker: Peter Schultze-Allen, BFQP, LEED-AP, EOA, Inc.

Topic: Stormwater Requirements for Construction Sites

Highlights: Review of stormwater requirements for construction sites; documenting and tracking inspections; when to take enforcement actions and when to escalate enforcement; tips for keeping your stormwater program in compliance; and SMCWPPP guidelines / resources.

The RWC Main Library
1044-Middlefield Road
Redwood City, CA
October 11, 2017

Agenda

Registration/Seating	**11:30 - 11:45**
Michael Clarke, President - Welcome and Pledge of Allegiance	**11:45 - 11:48**
Len Matchniff, Vice President - Upcoming, 2018-Topic Schedule	**11:48 - 11:51**
Fred Cullum, Secretary - Motion to Approve: Sept. 13th Minutes	**11:51 - 11:54**
David Brakebill, Treasurer - CALBIG's Account Balance: Sept. 30th	**11:54 - 11:57**
Michael Gorman, Board Director - Upcoming ICC Training	**11:57 - 12:00**
Keynote Speaker: Peter Schultze-Allen, BFQP, LEED-AP, EOA, Inc.	**12:00 - 1:00**
Michael Clarke, President - Coming Attractions & Adjournment	**1:00**

Out of consideration for our restaurant commitment and the potential size of our group, it is imperative that we have an accurate head count.

Please RSVP to Michael Gorman at either (mgorman@smcgov.org ***or*** thegormanfamily@earthlink.net) by **(please note earlier deadline) 5:00 PM, Friday, October 8th.**

Thank you!

Parking Suggestions: Metered Parking is available at the Main Library's lots & the City lot behind Redwood City's City Hall and the U.S. Post Office, & the underground garage below the Cost + World Market's building, and the pay lot behind the Union Bank at Main and Jefferson Streets.

COMING ATTRACTIONS
Consult our web-site @ www.calbig.org
SAVE THESE DATES!!!

- September 18 through 21, 2017 – CALBO EDUCATION WEEK … San Ramon
- October 11, 2017 - Peter Schultze-Allen … Storm Water / Erosion Control Inspections … Venue: RWC Main Library; 1044-Middlefield Road; Second Floor; Red Wood City 94063
- November 8, 2017 – Rick Halloran … 2016-CBC; Chapter 11-A & 11-B "Restrooms" … Venue: CSG Consultants, Inc.; 550-Pilgrim Drive; Foster City 94404
- December 13, 2017 - Douglas Hansen, Editor … "Code Check" Updates … Venue: City of Santa Clara's Building Inspection Division; 1500-Warburton Ave.; City Council Chambers – East Building; Santa Clara 95050

Upcoming 2018 California Building Inspector Group Meeting / Seminar Dates

Currently, the Officers and Board Members are formulating the Key Note Speakers and the Topics that will be brought forth for the memberships' December 13, 2017, ICC / Local Chapter vote.

CALBIG requests your individual input, as members, in choosing the speakers & topics. Match the dates with your suggestions: January 10, 2018 … February 14, 2018 … March 14, 2018 … April 11, 2018 … May 9, 2018 … June 13, 2018 … July 11, 2018 … August 8, 2018 … September 12, 2018 … October 10, 2018 … November 14, 2018 … December 12, 2018. As CALBIG celebrates its Twenty-Fifth Anniversary; thank you for the timely participation and continued support.

CalBIG					
Attendance – October 11, 2017					
First	**Last**	**City or Business**	**Email**	**Initial**	**Paid**
Nick	**Alaimo**	Student-College of San Mateo	nickalaimo.alaimo@gmail.com	NA	X
Sandy	**Alvarez**	City of San Bruno	salvarez@sanbruno.ca.gov		
Brad	**Andersen**	Andersen Associates	andersenassociates@comcast.net		
Dawn	**Anderson**	As It Stands	gonedawning@yahoo.com		
Timothy	**Anderson**	City of Hillsborough	Tanderson@Hillsborough.net		
Kathy	**Anderson**	City of Atherton	Kanderson@ci.atherton.ca.us		
Greg	**Anderson**	City of Los Altos	Greg.anderson@ci.los-altos.ca.us		
Les	**Arias**	City of Redwood City	Larias@redwoodcity.org		
Darcy	**Axiaq**	City of Redwood City	Daxiaq@redwoodcity.org		
Charlie	**Blanchard**	City of San Mateo	cblanchard@cityofsanmateo.org		
Vince	**Badillo**	V.B. Electric	vince@vbelectric.com		
Sachin	**Bajracharya**	City of Santa Clara	SBajracharya@SantaClaraCA.gov		
Kirk	**Ballard**	City of Los Altos	Kirk.Ballard@ci.los-altos.ca.us		
Don	**Bartlett**	City of Foster City	dbartlett@fostercity.org		
Rick	**Bellew**	City of Redwood City	rbellew.redwoodcity.org		
Tanya	**Benedik**	City of Millbrae	Tbenedik@ci.millbrae.ca.us		
Ramon	**Bernardo**	CSG Consultants	ramonb@csgengr.com	RB	X
Gordon	**Blancher**	City of Sunnyvale	Gblancher@ci.sunnyvale.ca.us		
Paul	**Bosman**	City of Los Altos	Paul.bosman@ci.los-altos.ca.us		
David	**Brakebill**	City of Redwood City	dbrakebill@redwoodcity.org	DB	X
Curtis	**Brian**	CSG Consultants	curtisb@csgengr.com	CB	X
Roy	**Bronold**	City of San Bruno	rbronold@sanbruno.ca.gov		
Kirk	**Buckman**	City of Belmont	Kbuckman@Belmont.Gov		
Andrew	**Burke**	Town of Atherton	aburke@ci.atherton.ca.us		
Rini K.	**Bunje**	City of Menlo Park	rkbunje@menlopark.org		
Mike	**Cacci**	Cacci Construction	mike@cacciconstruction.com	MC	X
James	**Caccia**	Caccia Plumbing Inc	Jc@cacciaplumbing.com		
Geno	**Caccia**	Caccia Plumbing Inc	gc@cacciaplumbing.com		
Henry	**Calilong**	City of Burlingame	hcalilong@burlingame.org		
Patty	**Camacho**	County of San Mateo	ppcamacho@smcgov.org		
Benjamin	**Campbell**	County of San Mateo	bcampbell@smcgov.org	BC	X
Hector	**Carlos**	County of San Mateo	hcarlos@smcgov.org		
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				42	

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
Clean Water. Healthy Community.

Construction Site Stormwater Inspections
Training for Municipal Inspectors

Tuesday, March 20, 2018

Coyote Point Recreation Area

Captain's House

1701 Coyote Point Drive, San Mateo

9:00am – 1:00pm

This workshop is for municipal staff who inspect construction sites for compliance with stormwater requirements in MRP Provision C.6. The workshop attendees will be broken up into two groups and will switch locations half way through the morning. An agenda will be emailed to those registered before the workshop with exact times and location details. Workshop sessions and topics include:

- ✓ Classroom session on the Municipal Regional Stormwater Permit (MRP) requirements for construction site inspections including BMP types and recognizing issues, using the site inspection form, and the State Construction General Permit;
- ✓ Field session on installation and inspection of products used on construction sites such as those for sediment and erosion control and stormdrain inlet protection.

Click on the link below to register for the workshop:

https://www.eventbrite.com/e/construction-site-stormwater-inspections-training-for-municipal-inspectors-tickets-43492279579

Registration Questions? Call Lillian Quinata at 510-832-2852 ext. 101

Other Questions? Call Peter Schultze-Allen at 510-832-2852 ext. 128

Please pass this flyer along to appropriate staff within your organization.
This training is FREE and will include lunch.

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
Clean Water. Healthy Community.

Construction Site Stormwater Inspections
Training for Municipal Inspectors

Tuesday, March 20, 2018

Coyote Point Recreation Area, Captain's House
1701 Coyote Point Drive, San Mateo

AGENDA

8:45 AM	**Registration**	
9:00 AM	Break Into Field & Classroom Groups 1 and 2	
9:05 AM	Welcome and Introductions	Peter Schultze-Allen *EOA, Inc.*
9:10 AM	Session 1	
10:25 AM	**Break** - Groups 1 and 2 Switch Locations	
10:40 AM	Session 2	
12:00 PM	**Lunch and Evaluation Form Completion**	
1:00 PM	**Adjourn**	

GROUP 1 AGENDA

9:10 AM	Field Session - Break Into subgroup 1A and 1B	
	Field Station A: Inlet Protection	Dan Toda *Reed & Graham, Inc.*
	Field Station B: Sediment and Erosion Control	Bryan Hoffman and David Franklin *Filtrexx Inc.*
9:45 AM	Field Groups Switch Stations	
10:25 AM	**Break**	
10:40 AM	Classroom: Construction Site Regulations and BMPs	Peter

GROUP 2 AGENDA

9:10 AM	Classroom: Construction Site Regulations and BMPs	Kristin Kerr *EOA, Inc.*
10:25 AM	**Break**	
10:40 AM	Field Session - Break Into Subgroups 2A and 2B	
	Field Station A: Inlet Protection	Dan
	Field Station B: Sediment and Erosion Control	Bryan and David
11:15 AM	Field Groups Switch Stations	

*** Attendance at this workshop is acceptable for 2.5 PDUs toward maintaining CPESC, CESSWI and/or CPSWQ certifications. ***

Construction Site Stormwater Inspections
Training for Municipal Inspectors
March 20, 2018

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2	Ahmed	Muneer	Town of Colma	
3	Alvarez	Priscilla	SMC Parks	
4	Arellano	John	City of Daly City	
5	Azzari	Zack	San Mateo County DPW	
6	Bernardo	Ramon	CSG Consultants, Inc.	
7	Bidokhti	Eman	San Mateo County DPW	
8	Bogert	Reid	C/CAG	
9	Bradshaw	Misty	Town of Hillsborough	
10	Bronold	Roy	City of San Bruno	
11	Burklin	Scott	San Mateo County DPW	
12	Cadiz	Jana	City of Belmont	
13	Carlos	Armando	San Mateo County - DPW	

Construction Site Stormwater Inspections
Training for Municipal Inspectors
March 20, 2018

	LAST NAME	FIRST NAME	COMPANY	SIGNATURE
14	Carroll	Kelly	CSG Consultants	
15	Casagrande	Julie	County of San Mateo	
16	Chan	Alex	City of Redwood City	
17	Chou	Jeffrey	City of Redwood City	
18	~~Conception~~ Concepcion	Jordan	SMC Parks	
19	Critz	Carolyn	Veolia Water North America	
20	Curtis	Brian	CSG Consultants, Inc.	
21	Del Carlo	Matthew	San Mateo County Department of Parks	
22	Delgado	Nestor	Town of Atherton	
23	Edlund	Sven	City of San Mateo, PW Envrn Svcs	
24	Engle	Theresa	San Mateo County DPW	
25	Francis	Aaron	County of San Mateo	
26	Garza	Daniel	City of South San Francisco	

Construction Site Stormwater Inspections
Training for Municipal Inspectors
March 20, 2018

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28	Huynh	Michael	County of San Mateo DPW	
29	Immethun	Joe	San Mateo County Parks	
30	Iwan	Calvin	City of San Bruno	
31	Jackson	Emmett	San Mateo County DPW	
32	LaBruzzo	Patrick	City of Redwood City	
33	Larks	Dennis	City of Oakland	
34	Lee	Jennifer	City of Burlingame	
35	Leung	Camille	County of San Mateo	
36	Lowrie	Mik	City of Burlingame	
37	Lum	Anthony	County of San Mateo	
38	Ma	Vivian	City of Foster City	
39	Manalo	Michelle	San Mateo County DPW	

Construction Site Stormwater Inspections
Training for Municipal Inspectors
March 20, 2018

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43	Ocon	Asahel (Isaac)	Town of Hillsborough	
44	Pacini	Kenneth	City of San Mateo	
45	Pascual	Henry	City of San Carlos	
46	Raman	Monika	County of San Mateo	
47	Ray	Cliff	City of Oakland	
48	Robertson	Kathryn	City of San Carlos	
49	Scott	Kevin	San Mateo County Parks	
50	Sibal	Mariza	City of San Carlos	
51	Siphongsay	Thomas	City of South San Francisco WQCP	
52	Suarez	Laura	Veolia North America	

Construction Site Stormwater Inspections
Training for Municipal Inspectors
March 20, 2018

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54	Vasquez	David	San Mateo County Parks	
55	Voong	Keith	City of Millbrae	
56	Wu	Zachary	City of South San Francisco	
57	Yang	Andrew	City of Millbrae	
58	Young	Johnson	San Mateo County, DPW	
59	Yuen	Alexander	City of Daly City	
60	Yuk	Nelson	City of South San Francisco	
61	Zhang	Alex	County of San Mateo	
62	Magallanes	Karen	City of San Mateo	
63	Rawley	Joshua	County of San Mateo	
64	Kim	Kathy	CSG Consultants	
65				

SAN MATEO COUNTYWIDE
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Evaluation Summary Form

Construction Site Stormwater Inspections
Training for Municipal Inspectors
Wednesday, March 20, 2018
9:00 a.m. – 1:00 p.m.

What Did You Think of the Following Presentations?

- **Field Station A - Inlet Protection –** *Dan Toda, Reed & Graham, Inc*.

33 very helpful **5** somewhat helpful **0** not helpful

- Good discussion about strengths and weaknesses of products
- Should provide more situation use and why to use or not use certain protection types
- Good practical information
- It was good to see the products being installed and listening to the presenter explain typical failures, issues in the field.

2. **Field Station B – Sediment and Erosion Control –**
Bryan Hoffman and David Franklin, Filtrexx, Inc.

35 very helpful **3** somewhat helpful **0** not helpful

- David was extremely competent, experienced and provided good insight
- Liked the demonstration showing different efforts for installation
- Field demonstrations is extremely helpful

3. **Classroom - Construction Site Regulations and BMPs –**
Peter Schultze-Allen & Kristin Kerr, EOA Inc.

30 very helpful **8** somewhat helpful **0** not helpful

- I have seen the presentation a few times before, still very informative for those just being introduced to C.6
- Need to add more value than just reading slides
- Good reminders of what to look for and how to set things up.
- Straight forward and good pacing.

Did this workshop meet your expectations? Yes **38** No **0**

Please submit at the end of the workshop. ***Thank You for Your Comments!***

Suggestions for future workshop topics:

- More hands on field presentations
- Some products (field session) has a "name tag" in front of them, some don't.
- It'd be nice if all products had a "name tag"
- More pictures (examples) in slides
- Quicker slides and show failed BMP's and good BMPs
- Send save the date A.S.A.P
- Field demos better than past group exercises
- Since the MRP will upgrade to 3.0 soon perhaps get some idea of changes the Water Board is looking at and share with us (data needs, funding, staffing, etc.)
- Permit process?
- It was great to have live demonstrations and see the different materials and how they are installed and work.
- Bigger conference room (2)
- I really enjoyed the outdoor presentation. It would be nice to continue doing those.
- BMP's for commercial and industrial sites
- Covering grease barrels, secondary containment, covering of materials (metals etc.)
- Detailed exploration for each BMP

General Comments:

- The inlet protection felt almost like a sales pitch
- The demonstrations were very helpful in putting what was taught in the classroom into perspective.
- Thanks (4)
- Good job! (5)
- Very helpful & Informative!
- Need a bigger room
- Very good workshop.
- Learned a lot!
- Very informative class
- Field Station B, the best I have been to.
- Station A was very good also
- Thought the use of field exercise/tutorials was very effective and would be nice to use the same approach in C.4/C.5 or C.3 workshops (if possible)
- Only drawback was airplane noise at times.
- Field stations felt too much towards selling the product more than informative, but still good, and good seeing a line presentation
- Best field session eve, Even rain!
- Will return
- Good sell on the pros/cons of the materials and supplies
- Very helpful seeing the application in field.
- Understanding application do/don'ts
- Send reminder earlier
- I really learned through the field demonstrations/sessions
- Excellent training, figured out cost of BMP's and what they may be used best for.

Please submit at the end of the workshop. ***Thank You for Your Comments!***

Appendix 7

- Public Information and Participation Subcommittee – Attendance List– FY 2017/18
- Flows to Bay Challenge Promotional Card
- Flows to Bay e-Newsletter Examples and Analytics
- Blog Posts Examples and Metric Analytics
- Social Media Contest and Posts
- Examples of Flows to Bay Website Pages and Analytics Information
- Challenge 1 Event: Rain Barrel Workshop Materials
- Challenge 2: HHW Events Social Media Posts Examples
- Challenge 3: Eco-Day Survey Results
- Flows to Bay Newsletter Examples
- Flows to Bay Website Statistics FY 2017/18

FY 2017/18 Subcommittee Attendance List

Public Information and Participation Subcommittee						
AGENCY	**NAME**	**ALTERNATE**	**ALTERNATE**	**PHONE**	**October 17, 2017**	**March 20, 2018**
C/CAG	Matt Fabry					
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Belmont	Diane Lynn			650-595-7425		X
Brisbane	Shelley Romriell	Keegan Black		415-508-2130		
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Colma	Katherine Sheehan			650-522-2506	X	
Colma	Muneer Ahmed	Jason Chen		650-757-8888		
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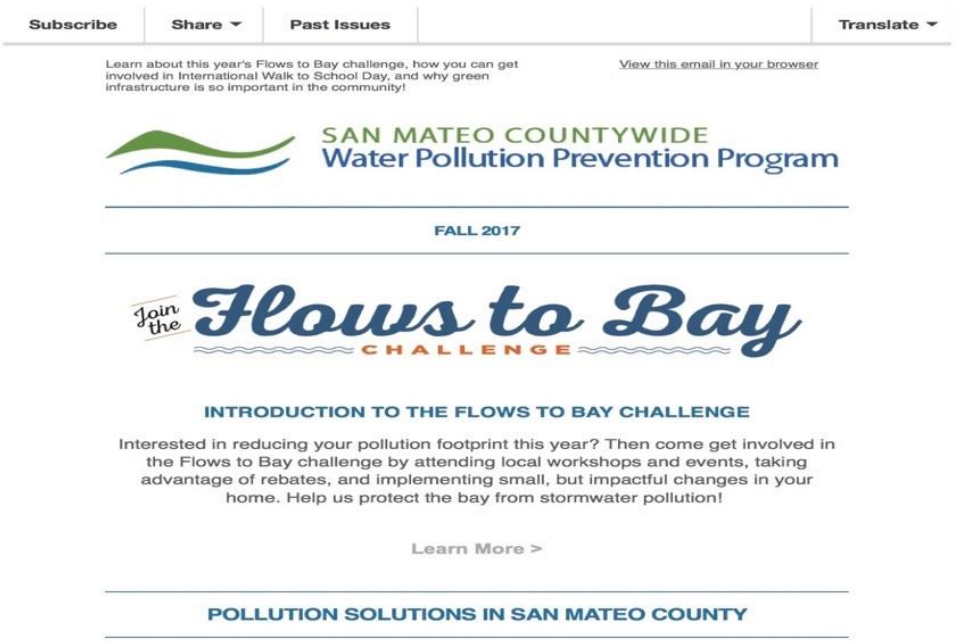
Portola Valley	Ali Taghari			650-851-1700	X	
Portola Valley	Brandi de Garmeaux	Howard Yound	Adrienne Smith	650-851-1700		

Public Information and Participation Subcommittee						
AGENCY	**NAME**	**ALTERNATE**	**ALTERNATE**	**PHONE**	**October 17, 2017**	**March 20, 2018**
Redwood City	Vicki Sherman	Christopher Fajikos	Adrian Lee	650-780-7472		
San Bruno	Jim Burch	Ted Chapman	William Li			
San Carlos	Kathryn Robertson					X
San Mateo City	Grant Ligon (Chair)	Sven Edlund	Mark Swenson/ Sarah Schedit	650-522-7296	X	X
San Mateo Co	Aaron Francis			650-599-1457		X
San Mateo Co	Andrea Chow					X
San Mateo Co	Breann Liebermann	Edelzar Garcia		650-599-1514	X	
So. San Francisco	Daniel Garza			650-829-3880	X	
So. San Francisco	Andrew Wemmer					
Woodside	Dong Nguyen			650-851-6790		
SGA	Whitney Schmucker			415-606-5080	X	X
SGA	Audrey Taylor			714-421-1834	X	X
EOA	Peter Schultz-Allen	Kristin Kerr	Jon Konnan	510-832-2852 x 128		
CSG Committee	Paramjit Uppal					X

Challenge Promotional Card

Flows to Bay Fall 2017 E-Newsletter: Learn about this year's Flows to Bay challenge, how you can get involved in International Walk to School Day, and why green infrastructure is so important in the community!



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Water Pollution Prevention Program

FALL 2017

Join the Flows to Bay CHALLENGE

INTRODUCTION TO THE FLOWS TO BAY CHALLENGE

Interested in reducing your pollution footprint this year? Then come get involved in the Flows to Bay challenge by attending local workshops and events, taking advantage of rebates, and implementing small, but impactful changes in your home. Help us protect the bay from stormwater pollution!

Learn More >

POLLUTION SOLUTIONS IN SAN MATEO COUNTY

INTERNATIONAL WALK TO SCHOOL DAY

Join in on this fun, global event with your children and other families in the neighborhood on October 4th!

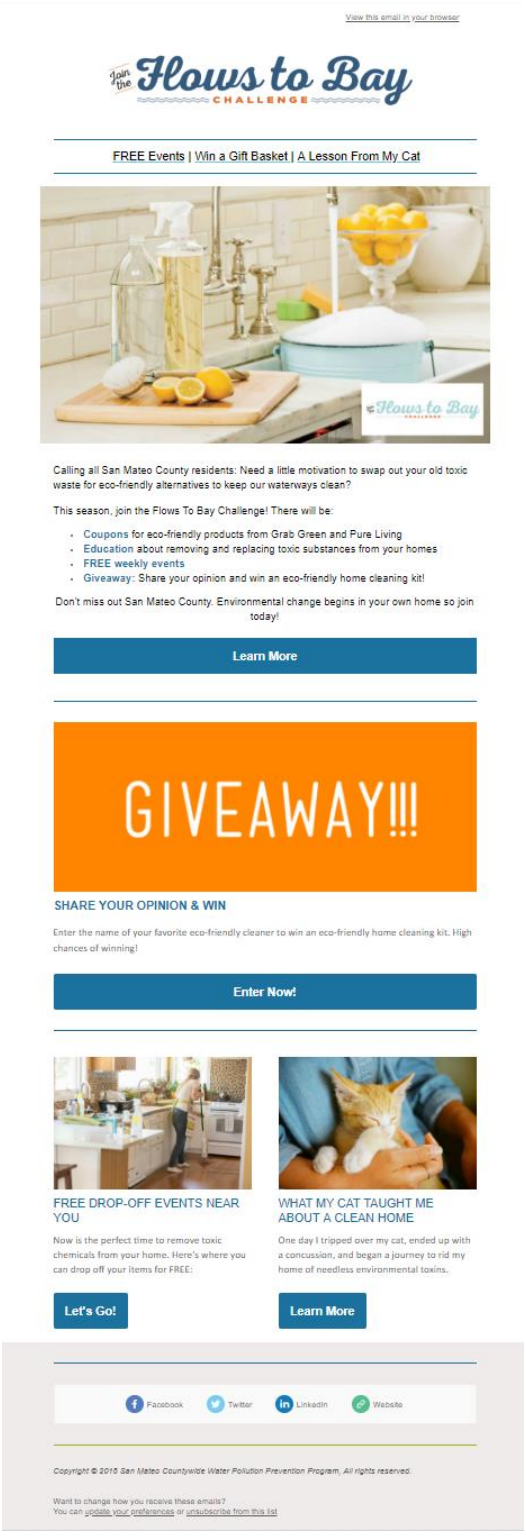
Learn More >

GREEN INFRASTRUCTURE IN YOUR COMMUNITY

Read on to learn about green infrastructure, its benefits in your community, and where you can find it!

Learn More >

Flows to Bay Challenge E-Newsletter: Free Events, Win a Gift Basket & Lessons from My Cat



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Join the Flows to Bay CHALLENGE

FREE Events | Win a Gift Basket | A Lesson From My Cat

Calling all San Mateo County residents: Need a little motivation to swap out your old toxic waste for eco-friendly alternatives to keep our waterways clean?

This season, join the Flows To Bay Challenge! There will be:

- **Coupons** for eco-friendly products from Grab Green and Pure Living
- **Education** about removing and replacing toxic substances from your homes
- **FREE weekly events**
- **Giveaway**: Share your opinion and win an eco-friendly home cleaning kit!

Don't miss out San Mateo County. Environmental change begins in your own home so join today!

Learn More

GIVEAWAY!!!

SHARE YOUR OPINION & WIN

Enter the name of your favorite eco-friendly cleaner to win an eco-friendly home cleaning kit. High chances of winning!

Enter Now!

FREE DROP-OFF EVENTS NEAR YOU

Now is the perfect time to remove toxic chemicals from your home. Here's where you can drop off your items for FREE:

Let's Go!

WHAT MY CAT TAUGHT ME ABOUT A CLEAN HOME

One day I tripped over my cat, ended up with a concussion, and began a journey to rid my home of needless environmental toxins.

Learn More

Facebook Twitter LinkedIn Website

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Flows To Bay Challenge E-Newsletter: Eco-Events, Green Home Giveaways & Exclusive Coupons

Learn how to get involved in community events and how to make your garden more eco-friendly!

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SATURDAY, MAY 19 IS

Flows to Bay ECO-DAY

JOIN US TO LEARN MORE ABOUT OUR ENVIRONMENT AND HAVE FUN

Eco-Day on May 19th will be a day to discover, explore, and participate in eco-friendly activities in San Mateo County. Join us at one of 3 fun-filled events with our partners BAWSCA, Friends of Edgewood, and Pacifica Beach Coalition. For event details and more information click on the links below!

Facebook Event >

INTEGRATING EDIBLES INTO YOUR EXISTING GARDEN WITH BAWSCA

Learn how to incorporate water-efficient edibles into your existing garden and how to incorporate organic maintenance techniques such as compost and cover crops into seasonal vegetable gardening.

1400 Broadway | Redwood City
9am-1pm
Public Works Services

Register Today! >

NATURE WALK WITH THE FRIENDS OF EDGEWOOD

Prepare to explore approximately 3 miles of Edgewood's serpentine grasslands renowned for their lush wildflowers and rich biodiversity.

10 Old Stage Coach Rd | Redwood City
1:30-4pm
Edgewood Park and Natural Preserve

Register Today! >

BEACH CLEAN-UP WITH THE PACIFICA BEACH COALITION

Help clean up Linda Mar State Beach (also known as Pacifica State Beach), one of the most beloved and used beach in Pacifica.

5000 Pacific Coast Hwy I Pacifica
9-11am
Pacifica State Beach

Register Today! >

Challenge E-Newsletter Analytics

Challenge	Subject line	E-newsletter content	Date Sent Out	Total Recipients	Open rate	Click through rate
1: Rainwater as a Resource	Fall 2017 Newsletter: Introduction to Flows to Bay Challenge, International Walk to School Day, & Green Infrastructure in Your Community	• Introduced the Flows To Bay Challenge and the first quarter theme • Published an article explaining what green infrastructure is, why it is critical to infrastructure and where residents can find examples in their community.	9/29/17	2,591	26.2%	13.9%
2: Inside the Home	Flows To Bay Challenge: Eco-Events, Green Home Giveaways & Exclusive Coupons	• Encouraged residents to swap out household toxic waste for eco-alternatives. • Giveaway • Published article on a non-toxic home	2/13/18	2,832	21.5%	22.3%
3: In the Garden and Community	Eco-Events, Green Home Giveaways & Exclusive Coupons	• Promoted 3 Eco-Day events linking to 3 Eco-Day event pages with more information about event and how to sign up/register	5/13/18	2,902	22.7%	3.3%

**Industry average open rate is 24%, average click rate on articles is 2.76%*

Challenge Blog Post Screenshots

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Flows To Bay Challenge: Inside Your Home

With the cold, rainy weather upon us in the Bay Area, we'll be bringing our next challenge indoors! This winter, we challenge you to reduce your pollution footprint from within your home.

There are many unsuspecting sources of hazardous chemicals in our homes that can end up in creeks and ultimately the Ocean and Bay. Common household items like bathroom and kitchen cleaners, batteries, and car wash items all contribute to the buildup of chemicals and toxins in the Ocean. These hazards create problems that put the aquatic environment and human health at risk. Luckily, there are eco-friendly alternatives and proper disposal methods you can use to reduce the amount of chemicals flowing to the Bay.

This season The Flows To Bay Challenge will be providing coupons for eco-friendly products from Grab Green and Pure Living, education about removing and replacing toxic substances from your homes, weekly events and a Facebook photo contest, where we will show the biggest messes we have cleaned using eco-friendly products!

How exactly do chemicals flow to the Bay? When chemicals from soaps and cleaners are washed down the drain, the water goes straight to a water treatment plant where most chemicals are filtered out. Many harsh chemicals, however, are not treated properly and remain in their hazardous states when water is released back to waterways. Hazardous household items like batteries, mercury thermometers and thermostats, paint and vehicle fluids can also contaminate waterways when they are dumped in the trash instead of being recycled.

What can you do to help fix this problem? Start with your own home! Making changes in your own home and lifestyle is the key to preventing water pollution. Swapping out your old cleaners for eco-friendly alternatives and following household hazardous waste disposal procedures will decrease the levels of chemicals entering our local waters. Here are some troublesome household items that may be lurking in your cupboards and storage areas at home:

- Household cleaners and soaps: Household cleaners can be problematic because of all the chemicals these cleaners contain to cut grease and kill bacteria and germs. While they do a great job at disinfecting your floors, toilets, and surfaces, they contain corrosive and harsh chemicals that are harmful to human and environmental health. Surprisingly, hand and dish soaps can also be quite harmful to the environment. Many brands of hand soap contain the chemical triclosan, which can go untreated through wastewater treatment plants, and discharged into the ocean.

  Here are some companies with cleaning and soap alternatives that are better suited for your home and the environment
  - Grab Green Home
  - Dr. Bronner's
  - Method
  - Ecover
  - Seventh Generation

- Batteries: Batteries are essential for our gadgets and daily technology. However, they contain many harmful elements like cadmium, lead, and mercury, which can leach into soils and groundwater if thrown away. Luckily, many local businesses (Best Buy, Home Depot, Staples, Lowes, etc.) have take-back programs to properly dispose batteries at no cost! Alternatively, you can buy rechargeable batteries that can save money and reduce your impact in the long-run.

- Old paint and motor oil: Paint and motor oil lurk in most people's garages and often make their way to the drain or trash. Both paint and oil are classified as a hazardous waste, and need to be taken to a household hazardous waste center to be properly disposed. Just one quart of oil can contaminate one million gallons of water, so every drop counts!

These suggestions are just a start on how you can take action and get involved with fighting water pollution. From January to March, join the Flows To Bay Challenge, where we will be providing you with opportunities to revamp your homes like rebates for eco-friendly cleaning supplies and fun events where you'll to learn how to green your home. Come join us in making your homes safer and kinder to our beloved bay!

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Rain Barrel Workshop Recap

On

December 2nd we hosted a rain barrel workshop at the San Mateo Library. We are happy to say the workshop was a great success and gave new meaning to the phrase - "every drop counts," when it comes to rainwater harvesting. We had a full audience and it was a real treat for us to meet so many community members who are passionate about the health of our Bay. Chris and Brad, our local rain barrel specialists, gave great information about how to get started with installing a rain barrel or cistern at home, and we want to share with everyone some of our favorite takeaways.

Rain Barrels are good for the community and your wallet!
Rain barrels help to keep local waters clean by decreasing runoff when it rains, this means rainwater isn't running down the street, picking up pollutants and debris and taking it down storm drains and into the Ocean and Bay. Besides community health benefits, rain barrels also reap financial benefits as well! On many properties, rainwater travels through the roof gutter, down the rain spout and collects around the sides of the house. The soil around the foundation of the building can expand as it absorbs water then contract as the puddles and soil dry. Over time, this expansion and contraction can weaken the foundation of a home which can result in expensive repairs and many headaches. However, installing a rain barrel diverts the flow of water and captures it for later use instead of potentially causing property damage!! An ounce of prevention is worth a pound of cure. The collected rainwater can then be used to water your garden and lawn saving even more money in the process.

Rain barrels are beautiful!
One of our favorite parts of Chris and Brad's presentation were the pictures of the beautifully decorated rain barrels they have installed. It really opened our eyes to the fact that rain barrels can be a beautiful and unique decorative item for the backyard!

Our favorite is the furtive rain barrel disguised as a rock. We wanted to thank everyone that came to the workshop the past weekend. It was wonderful to meet and speak with like-minded people who care about the environment and the Bay Area community. And for those of you who were unable to make it this time around, we would love to see you at one of our upcoming workshops. You can check out Flows To Bay Challenge calendar to learn more about future workshops and events. And if you're thinking about getting a rain barrel of your own, be sure to take advantage of our rebate, where most San Mateo County residents can oftentimes be reimbursed for the full cost! For those who were not able to attend, we are planning on hosting another rain barrel workshop in the spring-- so stay tuned! Questions? Comments? Please feel free to reach us at anytime at info@flowstobay.org.

What My Cat Taught Me About Household Toxins

Several years ago, we adopted a shelter cat named Zoe, after our 19 year old cat died. Zoe is sweet and despite our best efforts, overweight. Consequently, her clumsy but determined rush to the food bowl can sometimes result in an unexpected collision. One day I tripped over her mid-sprint on the stairs, and with my arms full of groceries I went down hard. Needless to say, I ended up with a concussion. Months after the accident, I was still suffering from what I assumed were concussion-related symptoms. But as the months progressed, I seemed to be adding new symptoms to the list. Unbeknownst to me, though maybe obvious in retrospect, I was actually experiencing ailment after ailment that were linked to years of an unhealthy lifestyle. The concussion was simply the last straw. Daily stress and a poor diet were clear culprits - but after speaking with my doctor, I learned that exposure to certain chemicals can actually cause chronic and in some cases debilitating health problems.

Luckily, I worked with my physician and slowly recovered. Together, we developed a health plan that prioritized diet, sleep, exercise, stress reduction, and reducing my exposure to environmental toxins.

Household Toxins Weren't On My Radar
To be honest, worrying about environmental toxins was not on my radar. When my doctor advised me to reduce my exposure to toxic chemicals in my home, I was surprised and wondered if household toxins could really be hurting my health. I listened carefully to what she had to say and decided she had a point.

Under her direction, I began eating healthier, organic foods and switched to safe cleaning, laundry and personal care products. At first, it was overwhelming. I enlisted the help of my husband, and we began the journey together.

Personal Care Products - Untested & Some Unsafe
To start, we read the labels on our products and were shocked to discover the array of toxins they contained. Since I had chemical sensitivities and was being bothered by perfumed products, I started by emptying the house of the most obvious fragranced products including air fresheners, perfumes, scented candles, and dryer sheets.

I learned that fragranced products can contain any of 3,000 ingredients many untested, unregulated, and some toxic. The problem is that manufacturers do not need to disclose what's in the fragrance, so the fragrance could contain phthalates, a known carcinogen or other toxic chemicals that disrupt hormones.

As we continued to do more research, I realized that the Food and Drug Administration (FDA) has no authority to require companies to do product safety testing; and the FDA has only banned a handful of harmful chemicals from being used in US products while continuing to allow manufacturers to use chemicals which are classified as known or probable carcinogens or hormone disruptors.

It took months to replace my personal care products during which I became knowledgeable about which ingredients to avoid and how to read labels. I avoided products with fragrance and steered clear of many ingredients that can be found on the FlowsToBay Challenge Inventory sheet.

The Story is Even Worse for Cleaning & Laundry Products
After I finished cleaning out my personal care products, I turned my attention to cleaning and laundry products. I was shocked to find that it's even harder to uncover the contents of your products as ingredients aren't listed on cleaning and laundry products, as they are regulated by the Consumer Products Safety Commission (CPSC). Unlike the FDA which requires that all ingredients be listed with the exception of revealing the details of the fragrance, the CPSC does not require that manufacturers list all of the ingredients on product labels.

It's Not All Or Nothing
In the beginning, I set aggressive goals for cleaning up my household toxins, which backfired because I became overwhelmed. Instead of moving forward, I just stopped, paralyzed. I learned that it's better to take a slower approach recognizing that it's not "all or nothing." Any step toward creating a healthier home will pay off.

Essentially, it's up to you to determine if your cleaning and laundry products are safe and you must do this without the benefit of a complete ingredient list. I also discovered that the terms "all natural" or "green" don't guarantee a safer, all natural product. Why? Because no governmental body regulates these terms for marketing purposes. As a result, your products labeled as "green" and "all natural" can contain substances that are harmful to your health and the environment.

In the end, I'm happy with my changes. I switched from toxic dryer sheets to wool dryer balls, began using white vinegar in the rinse cycle as a softener, and found several laundry soaps that had only a handful of safe ingredients without harmful fragrances. The cleaning products were a challenge but ultimately we found vinegar and castile soap based products that do a good job of cleaning and disinfecting.

With my health restored, I became grateful to my cat for the push to wellness. The accident forced me reconsider every aspect of my life and to create a pure living space at home.

Carol Trimmer Bio
Carol is helping to make the world a healthier, happier place by sharing easy ways to live better in this sometimes toxic place we live in. As founder of Pure Living Space, she's on a mission to discover the best and safest home and personal care products. When she's not researching safe products or writing articles, you can find her growing kale or whipping up that perfect smoothie.

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Join Us! Recycle Your Household Chemicals For An Eco-Friendly Home

The first day of spring is Tuesday, March 20 but who says you have to wait until then to have a fresh start? Begin your spring cleaning now and remove and replace toxic chemicals from your home as part of our Flows to Bay Challenge series: "In the Home."

Now is the perfect time to remove toxic chemicals from your home and replace them with safe, eco-friendly products. Old paint, motor oil, batteries, and pesticides not only clutter your home, but pose a toxic risk to your family and the environment. Properly dispose of these items at your local Household Hazardous Waste (HHW) Facility or learn about other locations that collect these materials. Remove and replace these chemicals and create a more eco-friendly home!

Check out these dates below to know when you can drop off your items for FREE:

Saturday - 2/24 Redwood City - PAINT
Is leftover paint taking up space in your garage? Drop it off!

Saturday - 3/03 South San Francisco - OIL
Buckets of used motor oil cluttering your home? Take them here.

Saturday - 3/10 Daly City - PESTICIDES
Don't toss your pesticides away, let us take care of it for you!

Saturday - 3/17 Pacifica - BATTERIES
Batteries can be recycled… What a bright idea!

Follow these 3 easy steps to get started:

1. **Sign Up:** Set up an appointment here to receive location information or call (650) 363-4718, select option 3.
2. **Load Up:** Up to 50 pounds or 10 gallons worth of material are allowed per appointment.
3. **Drop Off:** The facility crew will happily take your items directly from the trunk of your car.

If you can't make these dates, there are other businesses and facilities that will gladly accept your household hazardous waste at anytime:

PAINT
Visit Paintcare's website for locations near you.

MOTOR OIL
Click here to drop off your motor oil and filters.

BATTERIES
Click here to drop off your household batteries at any time.

Good luck and here's to making more room for what matters most. Happy cleaning!

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NO DUMPING FLOWS TO BAY

Chemicals In Your Home

Home is where the heart is, but not everything in your house is safe for your family. Your home may contain many hazardous materials that you use for household chores. Two common though perhaps unassuming household products that can pose threats to your family and the environment are batteries and pesticides.

Batteries have become an essential part of our everyday lives. They power our clocks, remotes, flashlights, and other everyday gadgets. Batteries also contain dangerous chemicals that can harm people and the environment.

- **Health:** Battery contents can be dangerous, but are protected by layers of insulation and an outer plastic seal. Unfortunately, batteries can leak, especially as they age, and the battery acid inside can be harmful if it comes into contact with skin or eyes. This can be especially dangerous to children who might be playing with old batteries. Lithium-ion batteries, while incredibly efficient, can actually explode if they are not properly stored or disposed of.
- **Environment:** Tossing batteries in the trash is a quick way to negatively impact the environment. Leaking batteries, even in a landfill, can lead to water contamination. Not to mention there's a fire risk if lithium-ion batteries are not properly disposed of.
  All batteries should be recycled and not be thrown in the trash. Many local waste haulers collect batteries for recycling. If you do not have curbside battery recycling in your neighborhood, you can drop your batteries off at your local household hazardous waste (HHW) center or a local retailer that provides recycling, like BestBuy.

Pesticides are also a dangerous yet common household item. While they keep your garden and home pest-free, pesticides can have serious effects on human health and the environment.

- **Health:** Pesticides contain all types of chemicals and toxins that are meant to kill pests, but can also affect humans through ingestion or exposure. Studies have found that frequent exposure to pesticides can lead to serious illnesses and cancer. If accidentally ingested, you should call the poison control center immediately and get to the nearest hospital.
- **Environment:** The chemical substances in pesticides often travel once sprayed. Pesticides can ruin fertile soils, contaminate waterways, and affect non-target species, like humans! Indoor pesticides can leave residue on carpets or curtains, where children or animals who are lower to the ground can be impacted. Organic and food-based repellents are a more attractive option for homeowners wishing to keep their gardens and home pest-free. Pesticides used in your garden also pose a risk, as water runoff can create puddles tainted with chemicals, or can be rinsed away into storm drains carrying chemicals directly to the ocean or bay.

As part of our FlowsToBay Challenge we are encouraging you to drop off your HHW items to your local HHW or other outlets. For a complete list of regular HHW drop-off times please click here.

Here are the steps you'll need to follow:

1. Set up an appointment here or call (650) 363-4718, select option 3.
2. Load up to 50 pounds or 10 gallons worth of material.
3. Drop off your materials at the HHW center! The facility crew will take your materials directly from your trunk.

- **Alternative/Retail Disposal Sites:** If you're looking for somewhere to dispose your hazardous material year-round, retail stores and even your local waste management company can help you out!
  - Here is some more information about battery disposal in San Mateo County. Check out the link the see if your local waste management company picks up batteries!
  - Many retail stores such as Home Depot, Best Buy, Lowe's, and Staples all take batteries that need to be recycled. If you have one nearby, you're in luck! Learn more here.
- **Reducing Waste**
  - For batteries, choosing rechargeable batteries over single-use batteries is the way to go to reduce battery waste. Not only does it help the environment, but it will also save you money in the long run!
  - For pesticides, opt for the organic, naturally developed pesticides. These will help keep your family safe and your garden in tip top shape! Learn more about hardware stores who have partnered with Our Water Our World to provide non-toxic pesticide products.

Now that you're well-informed, it's time to take action! Help keep your family and the environment safe from these hazardous materials once and for all.

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Removing Chemicals In Your Garage

Messy, cluttered garages are completely harmless when they're filled with old clothes and toys, but not when they're filled with hazardous materials! Two of the most common hazardous materials found in garages are paint and unused or used motor oil. They can pose significant threats to your family and to the environment if they're not stored or disposed of properly. Here are the basics on how to safely manage these chemicals in your home:

Paint is great for giving your house a makeover and brightening up a room, but it also creates toxic fumes and if improperly disposed can pose an environmental hazard. The Environmental Protection Agency lists paint as one of its top five environmental hazards, highlighting that despite how common paint is, it should be handled and disposed of with care. Here are some tips on how to store and dispose of your old paint properly:

- **Save it for later:** To save paint for future use, you should keep it in its original container, put plastic wrap over the paint lid and hammer the lid shut. Keep stored paintaway from children and pets and in a cool place.
- **Retail Recycling:** If the paint is no longer of use, you can take it to a local household hazardous waste facility, or local hardware stores like Orchard Supply Hardware or Kelly-Moore will accept paint for recycling. Click here to learn more about recycling at retail locations.

Used motor oil left in the garage can contain harmful heavy metals like magnesium, copper, zinc and other chemicals known to cause cancer. Yet, many of us keep containers of used oil in jugs to be hauled off for recycling at a later time. To avoid any harm to yourself or the environment here is what you need to know:

- **Storing:** Keep used motor oil in a clean, leak-proof jug or bottle and store it in a safe, cool place in your garage. Do not mix motor oil with other liquids like antifreeze - once it is mixed it cannot be recycled!
- **Disposal:** To recycle your motor oil you can visit your local HHW facility or search for a certified used oil collection center, which are usually auto supply or repair stores. These locations will safely recycle your motor oil.

As part of our FlowsToBay Challenge we are encouraging you to drop off your HHW items to your local HHW or other outlets. For a complete list of regular HHW drop-off times please click here.

To register for an HHW drop off complete the following steps:

1. Set up an appointment here or call (650) 363-4718, select option 3.
2. Load up to 50 pounds or 10 gallons worth of material.
3. Drop off your materials at the HHW center. The facility crew will take your materials directly from your trunk!

We hope this information will help keep your garage a safe place for your family and the environment!

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#WildlifeWednesday: The Bay area is a critical habitat for endangered species like the California Brown Pelican. Preventing water pollution in the bay is essential for the population of these beautiful birds.

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7 Easy Ways To Make Your Garden And Yard More Eco-Friendly

Hassett Hardware is a family-owned and operated local hardware store that carries a large selection of organics and eco-friendly supplies for your gardening needs. Flows To Bay has partnered with Hassett Hardware for our Flows To Bay Challenge this spring to bring you expert gardening advice on how to make your garden or yard as (eco)green as it can be:

Water at night. When you water at night, less water is lost to evaporation from wind and sunlight. This means you can water less often, and your plants can use that water more efficiently. As a bonus, you'll get to better enjoy the fresh aromas of your garden first thing when you wake up on those hot summer mornings.

Use organic soils and fertilizers. We recommend Dr. Earth Home Grown Concentrated Spray, E.B. Stone Organics Soil, Planting Mix or Bat Guano (yes, bat guano!), Soil Science, Happy Frog, Whitney Farms Organic Bone Meal or Jobes Organics All Purpose Plant Food. These soils and fertilizers are natural and effective, allowing you to give your plants a boost without all the added chemicals. Tip: If you notice an OMRI logo on the packaging, which many of these products have, it means they have been third-party certified as organic.

Consider native plants for your yard. Most native plants are drought tolerant, naturally pest resistant, and generally need much less attention in all areas: watering, pest control and fertilizer. Some examples are yarrow, mallow, mountain lilac, white sage and lupine.

Plant butterfly- and bee-friendly flowers. There are many plants that bees and butterflies and even butterfly larvae like! Bees like lavender, all the basic herbs (like basil, sage, rosemary and thyme), geranium, helianthus, lupine (also native), verbena, zinnia and globe thistle. Butterflies like alyssum, yarrow (also native), cosmos, delphinium, fennel, lavender, marigold and nasturtium. If you don't have a big garden or yard or don't want the work of re-landscaping an area to include these lovelies, you can easily grow them in pots.

Use organic pesticides and fungicides. It's best to use herbicides, pesticides and fungicides as a last resort via Integrated Pest Management. But if you need to switch to chemical controls, we recommend using organic and less-toxic products, like Safer Brand which has a whole range of organics to choose from: Organocide 3-in-1 Garden Spray (fungicide, miticide and insecticide), Bonide Neem Oil (which is also a three-in-one), Monterey Liqui-Cop (the active ingredient is Copper diammonia diacetate complex), Espoma Earth-Tone and Dr. Earth products.

Let your grass grow a bit longer. This helps the roots dive deeper and need less water, strengthening your lawn against pests and disease.

Pull weeds as soon as you see them rather than using a chemical weed killer. This is good exercise and can be fun for kids too.

We encourage you to participate in the Challenge and visit Hassett Hardware for your gardening supplies. Visit hassetthardware.com for more information or check out our Challenge page for a coupon for a Hassett Hardware store near you.

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Flows To Bay Challenge: Tips & Events

We have arrived at the final quarter for the FlowstoBay Challenge! In our last quarter, we are challenging you to take action in your garden and your community. Interested? Read on for great eco-friendly gardening tips and opportunities to get involved in exciting community events.

In the Garden

April showers bring May flowers, and the opportunity to revamp your garden with green products and gardening methods! Gardening is a great way to release stress, beautify your home, and to grow your own produce. Here are some tips to keep your garden eco-friendly and safe for your family and friends!

Eco-Friendly Pesticides:

Pests in the garden are a pain to deal with, so many people resort to harsh pesticides to ward off pests. While sometimes effective at handling pests, pesticides are a threat to your family's safety and the environment. Commonly known pesticides, like Glyphosate (commonly found in Roundup), Atrazine, and Chlorpyrifos, are heavily used throughout large-scale agriculture and even in households. However, the harsh chemicals in these products can cause birth defects, neurological damage, and other milder symptoms like headaches and nausea. These chemicals can also accumulate in water sources and eventually flow to the bay, endangering marine wildlife and the safety of our oceans.

Fortunately, eco-friendly alternatives exist and are a great way to use natural solutions to keep your garden pesticide-free. You can even make some of these natural pesticides, like vinegar spray, at home and save yourself a trip to the local gardening store! Next time you're shopping for pesticides, ask for the natural pest control alternatives and save your family and the environment from exposure to toxic chemicals. There are also great options for managing pests without spraying your plants, like watering and composting properly, planting native species that are pest tolerant, and more.

More Eco-Friendly Gardening Practices:

Aside from finding alternatives to chemical pest control, here are a few additional ways to "green up" your garden this spring.

- Rain Barrels: Rain barrels capture water runoff from your roof and store it for later use on your gardens and lawns. Using rain barrels is a great way to help conserve water use in your home and reduce overall water demand. These are also great for saving money on water bills and if you're operating on a budget we even have a rain barrel rebate!
- Rain Gardens: If you're looking to transform a normal lawn into a beautiful garden, consider building a rain garden. Rain gardens are a depressed area in the landscape that can soak up water from your roof, driveway, or other areas around your home. They are great for reducing and filtering runoff from your property, preventing pollutants in runoff from reaching the bay!
- Mulch: Using mulch or compost in your garden helps soil retain its moisture, fight weed growth, increase soil fertility, and keeps soil cooler, which can help your plants thrive. All you need to do is spread a thin layer of mulch over your soil and let the mulch work its magic!
- Native Plants: When seeking new plants for your garden, native plants are the best way to go! Because these plants are already adapted to the local climate and soil conditions in our region, they require less water, fertilizer and pesticides to thrive in your garden. Not only are they less resource-intensive, but they're also beautiful additions to your home that promote the existence of local flora like butterflies and other pollinators.

In the Community

Volunteering and giving back to the community can be fun for everyone, including the family, and really rewarding. Volunteer gardens, beach cleanups, habitat restoration, and advocacy movements are all great examples of community events you can get involved with. Fortunately, the springtime is filled with these events, where you can go outside, learn more about how to help our planet, and get your hands dirty for a good cause! Check out these local Earth Day events this month that you and your family can attend near you as part of the spring Flows to Bay Challenge:

1. **College of San Mateo Earth Day:** 4/18/18 9:30am-1:30pm, College Center Plaza, San Mateo. This event is focused on helping expose students to sustainable and green jobs. The featured exhibitors and student clubs will be focused on biodiversity, water, waste, energy and social justice issues. Click here for more information!
2. **Pacifica Beach Coalition Ecofest and Earth Day of Action:** 4/21/18 9am-2:30pm, Pacifica: From 9:30 AM to 11:00 AM, there will be cleanups, gardening, and habitat restoration at locations around the city. From 11:00 AM to 2:30 AM, EcoFest will be held at Linda Mar State Beach to highlight and educate residents about our coastal environment. Click here for more information!
3. **Earth Day at the Shoreway Environmental Center:** 4/21/18 10am-1pm, San Carlos: This Earth Day event is fun, family oriented event that includes a petting zoo, free food, recycling silo tours, free compost, face painting, and much more. Click here for more information!
4. **Earth Day Clean-up at Coyote Point:** 4/21/18 9:00am, Coyote Point Recreation Area, San Mateo: This event focuses on cleaning up San Mateo's beaches and coastside parks. There will be volunteers out at 9 AM at the Beach Parking Area. Click here for more information!
5. **Belmont Earth Day Celebration:** 4/21/18 9:00am-12:00pm, Twin Pines Park, Belmont: This event will have environmental booths, informational displays, live music, and fun activities for children. There will also be e-waste drop-off and compost giveaways. Click here for more information!
6. **Tree Workshop & Giveaway:** 4/21/18 9:00am-10:30am, Twin Pines Senior & Community Center, Belmont: Belmont's contract city arborist and parks manager will lead this workshop. They will cover topics on how to select and properly care for trees, what a healthy tree should look like, and the Belmont Tree Ordinance. Click here for more information!
7. **Earth Day Taste and Talk:** 4/18/18 5:30 PM - 8:00 PM, San Mateo Library - Oak Room, San Mateo: This event provides opportunities to join the discussion on transportation priorities, programs, and solutions for other issues in the community. Sample food from San Mateo restaurants will be provided. Commute.Org will present on their 2018 Commute Challenge. This event is a Spare the Air Active Trip incentive event. Click here for more information!
8. **Teen Program - Planting for Earth Day:** 4/21/2018 2:00 PM - 4:00 PM, Downtown Library - Teen Center - 2nd Floor, Redwood City: At this event, participants will decorate a plant pot and use it to plant a flower in celebration of Earth Day. This event is for teens grades 6th through 12th. Click here for more information!
9. **Marine Science Institute's Earth Day on The Bay:** 4/14/2018 10:00 AM - 5:00 PM, Marine Science Institute, Redwood City: The Banana Slug String Band will play from 11:30am - 1:30pm, boat rides will be available at 10:00am, 1:00pm, and 3:00pm, there will be children activities, and an opportunity to touch live sharks! This event is free. Click here for more information!
10. **FREE! "Do the Math" - Earth Day Movie Showing:** 4/17/2018 6:00 PM - 8:30 PM, San Mateo Public Library, San Mateo: This event is open to the public. Light snacks and beverages will be provided. This documentary is about one of America's leading environmentalists, Bill McKibben's battle to fight the fossil fuel industry and change the terrifying math of the climate crisis. Click here for more information!
11. **Spring Cleanup 2018:** 4/21/2018 8:30 AM - 1:00 PM, Public Works Services, Redwood City: Free breakfast will be provided at 8:30am before your cleanup team sets out to one of Redwood City's cleanup sites. A free barbeque lunch will be provided for all volunteers afterwards. There will be free composts for Redwood City community members. Click here for more information!
12. **County of San Mateo Sustainability Film Series - "An Inconvenient Sequel: Truth to Power":** 4/18/18 5:30pm, Century Theater Redwood City, Redwood City: This event is part of a month long initiative aimed at celebrating Earth Day through free Sustainability Film Series, showcasing inspirational award-winning films. Through these films, learn how issues in climate, energy and food have been solved locally and globally. There will be an opportunity to interact with San Mateo County organizations and ask about ways to take action and protect Earth's resources. First 150 registrants receive popcorn and a beverage! Click here for more information!
13. **County of San Mateo Sustainability Film Series - "Happening: A Clean Energy Revolution":** 4/26/18 5:30pm, Daly City Council Chamber, Daly City: This event is part of a month long initiative aimed at celebrating Earth Day through free Sustainability Film Series, showcasing inspirational award-winning films. Through these films, learn how issues in climate, energy and food have been solved locally and globally. There will be an opportunity to interact with San Mateo County organizations and ask about ways to take action and protect Earth's resources. Light refreshments provided. Click here for more information!
14. **County of San Mateo Sustainability Film Series - "Of the Sea":** 5/3/18 5:30pm, Ted Adcock Community Center, Half Moon Bay: This event is part of a month long initiative aimed at celebrating Earth Day through free Sustainability Film Series, showcasing inspirational award-winning films. Through these films, learn how issues in climate, energy and food have been solved locally and globally. There will be an opportunity to interact with San Mateo County organizations and ask about ways to take action and protect Earth's resources. Light refreshments provided. Click here for more information!
15. **Daly City's Earth Day /Recycling Event & Community Clean Up:** 4/21/18 9:00am-12:00pm, City Hall Parking Lot, Daly City: There will be secure document shredding, e-waste drop-off, composting giveaways, used bike tracks, and environmental programs. These free services will be performed in a drive through format. Click here for more information!
16. **Celebrate Earth Day:** 4/21/18 8:00am-11:00am, San Bruno Park, Beckner Shelter Parking Area, San Bruno: There will be FREE compost giveaways available for all San Bruno residents to help enrich their gardens while learning about the benefits of composting. Residents must bring their own bucket. Click here for more information!
17. **Atherton Earth Day Event:** 4/21/18 12:00 PM - 4:00 PM, Menlo-Atherton High School Performing Arts Center, Atherton: There will be a film screening for the film "The New Fire." This film is about how technological advances in nuclear energy can help combat climate change. Admission is free. A light lunch and beverages will be provided. After the film, there will be a panel discussion, desserts, Q & A, and a networking reception. Click here for more information!
18. **East Palo Alto Earth Day:** 4/14/18 10:00 AM - 2:00 PM, Bell Street Park, East Palo Alto: At this event, there will be bike repairs, safety lessons and learning to ride bike lessons, electronics recycling, tree planting, and a bike raffle! Click here for more information!

Additionally, the Flows To Bay team will be co-hosting a joint program on May 19th. We invite you to join us for one of three fantastic opportunities to get outside and enjoy our local environment while getting to know our local community partners who are holding hands-on environmental activities for San Mateo County residents. These activities and partners include:

- **Pacifica Beach Coalition:** This event will be a beach cleanup at Linda Mar State Beach.
- **San Mateo Arboretum:** During this activity, our partner will be holding a native plant talk and planting class at the Greenhouse and Nursery in San Mateo.
- **Friends of Edgewood:** Residents will be able to explore the park through a nature walk at the Edgewood Park and Nature Reserve.

Further details such as event times will be released shortly.

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July 14, 09 am to 05 pm
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July 21, 09 am to 05 pm
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HHW Collection Event - Redwood City
July 28, 09 am to 05 pm
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Eco Gardening Workshops: UC Master Gardeners

UC Master Gardeners are volunteers trained and certified by the University of California to provide community service and educational outreach that helps home gardeners and community organizations garden sustainably and create a healthy environment. Flows To Bay has partnered with the UC Master Gardeners for our current Flows To Bay Challenge to bring you eco-friendly gardening classes with their extensive horticulture expertise. Check out some of their amazing workshops to help you kick off your eco-friendly gardening efforts.

When and Where	Event Type	Why You Should Attend	Details
Date: 4/21/18 9am-1pm Location: San Mateo Co. Event Center – Sequoia Hall (FREE PARKING), 2495 So. Delaware St. San Mateo	Spring Garden Market	The annual Spring Garden Market is a plant sale and educational fair brought to you by the UCCE Master Gardeners of San Mateo and San Francisco Counties.	The Spring Garden Market will offer more than 5,000 vegetable plants, herb starts, and succulents to get your home garden started. You'll discover a wide variety of heirloom tomatoes, sweet and hot peppers, other vegetables and herbs that have been expertly selected and lovingly grown by us for you. We've carefully chosen top-performing varieties for each microclimate, ensuring that you'll have a productive and flourishing garden this year. There will be educational tables to help you select the best plants for your garden, and we'll provide tips on how best to plant, grow and care for your new seedlings. Don't miss our other activities and features too, including our exhibit and sale of beautiful succulent arrangements.
Date: 05/19/18 10am-12pm Location: Lyngso Garden Materials, Inc 345 Shoreway Road, San Carlos 94070	Citrus Trees Care and Maintenance Workshop	Everyone should have at least one citrus in their landscape. You will learn which trees will thrive in our area, how and where to plant them, common problems and diseases, and a discussion about the Huanglongbing disease and the threat it poses to your citrus trees. Register at lyngsogarden.com/community-resources	Co-Presenter Master Gardener Lisa Putnam: Lisa has a BS in Agricultural Economics from UC Davis, and also studied nutrition science. She currently operates a small sustainable organic farm in Woodside and is a lifetime gardener, a UC Master Gardener (2009) and Master Composter (2010). Lisa's passions are composting and the soil food web. She teaches both summer and winter vegetable gardening at Lyngso, Common Ground and several local garden clubs. Co-Presenter Master Gardener Kathleen Putnam: Kathleen is a professional organic vegetable gardener serving the Mid-Peninsula, is an Int'l Society of Arboriculture Certified Arborist, a UC Master Gardener (2008), and has a degree in Environmental Horticulture from City College of San Francisco.
Date: 05/19/18 1pm-3pm Location: Lyngso Garden Materials, Inc 345 Shoreway Road, San Carlos 94070	Backyard Irrigation Workshop	Learn about and participate in a hands-on demo to create a basic drip irrigation system using tubing, fittings and emitters. Register at lyngsogarden.com/community-resources	Presenter Master Gardener Pete Cerri: Pete has over 50 years experience with the Pipefitters & Sprinkle Fitters Union, experience with installing automated irrigation systems for yards, greenhouses and farm fields, loves to garden, and was certified as a UC Master Gardener in 2009.
Date: 06/16/18 10am-12pm Location: Lyngso Garden Materials, Inc 345 Shoreway Road, San Carlos 94070	All About Herbs and Edible Flowers	Learn the basics of growing, harvesting and using culinary herbs and edible flowers. Propagate your plants from seeds, cuttings, transplants and divisions. Integrate your herbs and edible flowers in your native landscapes, vegetable gardens and containers. Maintain your plants with sustainable methods, and harvest your herbs to use them fresh or preserve them for future use. Have fun while sharing the many ideas for using herbs. Register at lyngsogarden.com/community-resources	Presenter Master Gardener Kathy Fleming: Kathy loves creating a balance at her Peninsula home by growing culinary herbs and flowers in containers and her perennial landscape for more than 30 years. She uses the herbs and edible flowers in many recipes, either fresh and/or dried, and loves sharing them with her friends and neighbors. Kathy has been a San Mateo/San Francisco UCCE Master Gardener since 2006 and has always enjoyed speaking and sharing ideas about this passion. Co-presenter Master Gardener Cindi Morris: Cindi's affinity for plants began when she was in the fourth grade. She used to visit Ferry Morse Seed Company where her father worked. She loved peeking into the labs and seeing all of the experiments, and the best part was picking out some seed packets to take home to grow. Cindi was always amazed by the wonderful transformation of seed to flower. Over the years Cindi has continued her interest in growing plants, and today as a Master Gardener she loves assisting the home gardener with their gardens.

Visit smsf.mastergardeners.ucanr.edu for more information and check out the Flows To Bay Challenge to learn more about eco-friendly gardening and community events.

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Flows To Bay Eco-Day

The Flows To Bay Eco-Day on Saturday, May 19th was a resounding success with its hands-on-activities and community engagement. Flows To Bay organized this event as a way for community members to put into practice new knowledge and passion from the Flows To Bay Challenge: *In the Garden and the Community*. The San Mateo county-wide event gave residents the opportunity to come together as a community to learn more about and to make a positive impact on our environment.

The Flows To Bay Eco-Day consisted of three events held by community partners throughout San Mateo County and was open to all residents.

The **Pacifica Beach Coalition** hosted a **beach cleanup** at Linda Mar State Beach in Pacifica. Despite chilly weather, there was a solid turn-out at the beach! Kids, teenagers and adults all braved the weather, picking up piles of small and large trash at one of Pacifica's most popular and beloved beaches. According to this Daily Journal article, it is also the third most polluted beach in California.The ratings are based off of water-quality sampling that give the beaches a rating of A+ through F. If we are to change this, we all must continue to work together do our part in preventing litter pollution.

The Pacifica Beach Coalition is a volunteer-run non-profit that advocates for and practices responsible stewardship of our oceans, beaches, creeks, wildlife and native habitat. They hold events and programs for people of all ages to teach and help community members take care of the environment. You can learn more here.

Friends of Edgewood celebrated the beauty of the peninsula with a **native plant nature walk** at the Edgewood Park & Natural Preserve. With a small group attending, the nature walk was an intimate affair where the participants were led by docents on a 2.5-hour native wildflower journey. Between learning tricks for getting to know native plants and taking in vast views of oak woodlands and the Bay, this was a terrific chance to get outside and up close with nature.

The Friends of Edgewood is a volunteer-run public benefit corporation that works to allow community members to sustainably and thoughtfully enjoy the Edgewood Park & Natural Preserve in a multitude of ways. Some of the those include docent-led interpretive walks, habitat restoration, litter cleanups and running the Education Center. You can learn more here.

The **Bay Area Water Supply & Conservation Agency (BAWSCA)** led an **Integrating Edibles into your Existing Garden class** at Redwood City Public Works. At the class, attendees learned about the benefits of having native and drought-tolerant plants in their homes and gardens. After the talk, they were able to get their hands dirty by planting and learning how to maintain the plants! One fun fact they learned about native plant maintenance? Since native plants are adapted to our cool, wet winters and hot, dry summers, they actually need to be watered less frequently when the temperature warms up in the summer!

BAWSCA was created to speak on the behalf of 24 cities and water districts and two private utilities that buy water from San Francisco Regional Water System. The agency's goals are to have a reliable water supply, to provide high-quality water, and to supply it at a fair price. You can learn more here.

Overall, the Flows To Bay Eco-Day was a fun and learning-filled day! Residents of San Mateo County were able to get outside and get together to learn about different aspects of stormwater pollution prevention. From observing what's often left behind on the beach to getting to know our open spaces and native plants to understanding why native plantings are so great, everyone was able to take away some knowledge of how they can change their behavior to help keep our water and land clean, safe and beautiful.

Challenge Blog Analytics:

Challenge Number	Blog Post Title	Page Views (Total Visits)	Page Views (Unique)	Average Time on Page	Overall Bounce Rate
1: Rainwater as a Resource	Intro to Flows to Bay Challenge blog	111	91	0:02:02	53.06%
	Rain Barrel Workshop Recap blog	32	31	0:01:09	25%
2: Inside the Home	Flows To Bay Inside Your Home blog	58	54	0:05:48	66.7%
	What My Cat Taught Me About Household Toxins blog	39	34	0:01:27	66.67%
	Join Us! Recycle Your Household Chemicals For An Eco-Friendly Home blog	128	103	0:03:02	54.69%
	Chemicals In Your Home blog	107	100	0:03:32	66.18%
	Removing Chemicals In Your Garage blog	154	120	0:03:20	45.35%
	7 Easy Ways To Make Your Garden and Yard More Eco-Friendly blog	27	23	0:01:29	63.64%
3:	Flows To Bay Challenge: Tips and Events blog	56	51	0:04:00	74.42%

In the Garden and Community	Eco Gardening Workshops: UC Master Gardeners	59	51	0:04:25	62.86%
	Flows To Bay Eco-Day blog post	4	4	0:00:40	100%

Challenge Website Pages Analytics:

	Page Views (Total Visits)	Page Views (Unique)	Average Time on Page	Overall Bounce Rate
Challenge 1 Home page flowstobay.org/rainwater-as-a-resource	804	665	04:18	75%
Challenge 2 Home page flowstobay.org/inside-the-home	488	421	02:47	62%
Challenge 3 Home page flowstobay.org/in-the-garden	79	66	01:00	62%
Challenge 1 tools page flowstobay.org/tools-old	158	104	06:49	43%
Challenge 2 tools page flowstobay.org/tools-january_march_2018	73	60	07:50	68%
Challenge 3 tools page flowstobay.org/tools	16	14	03:06	57%

Challenge 1 Poll:

Win a FREE Gift Bag by Taking our Pledge!

Join the Flows to Bay Challenge! What simple lifestyle change would you like to make to live greener this season? Sometimes it's hard to get started, so we've given you some easy options that you can pledge to do this November and December. Whatever you choose to do, your pledge enters you into a contest to win a **FREE green gift bag** with items like a water bottle, bamboo utensils, and some great gardening tools!

Take our poll below and get started making an impact on San Mateo County's creeks, bay, and the ocean.

Here's how to enter the contest and make your pledge today:

1. Take the poll below and choose the image that best describes the action you will take this season to use rainwater as a resource.
2. Fill in your information in the form below.
3. Bonus Points: Take a picture of your pledge in action and tag us on Facebook or Twitter, with #FTBChallenge. Tag us and we may feature your photo on social media!

-

I am going to take advantage of the Challenge rain barrel rebate and install a rain barrel in my yard!

Pledge

I'm going to attend one of the Flows to Bay workshops or events!

Pledge

flowstobay.org

I'm going to visit Flows to Bay's website or tool page to learn how to repurpose rainwater!

Pledge

I'm going to read Flows to Bay's blog and newsletter!

Pledge

Complete the form to enter.

Other (fill in pledge here) — I pledge to...

First & Last Name (required) — First Name — Last Name

Your Email Address (required)

Zip Code (required)

Like Us — Like 14K — FlowstoBay — optional

Enter

*Contest rules & information: The contest will close on **December 31, 2017**. Limit one entry per person. One individual will be selected to receive a "green gift bag" prize that will include items such as a water bottle, bamboo utensils, and gardening materials/tools. Anyone can enter, but **you must be a resident of San Mateo County to win the prize.** By entering your e-mail address you will be opted into the SMCWPP newsletter.*

This promotion is managed by FlowstoBay.

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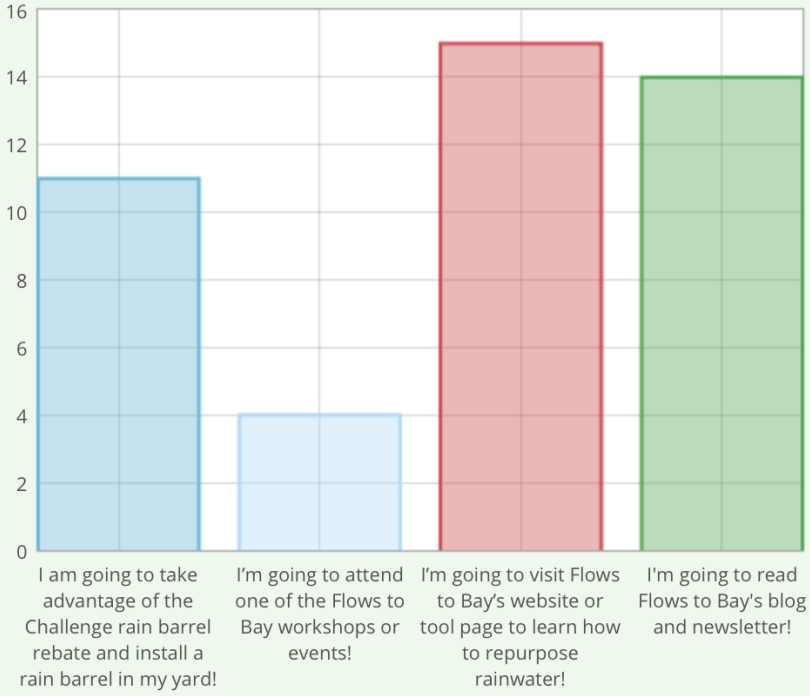
Join the Flows to Bay Challenge for a Chance to Win a FREE Green Gift Bag!

What will you pledge to do this November-December to make an impact on San Mateo County's creeks, rivers, bay, and the ocean?

ENDED

This campaign is ended.

Promote



Challenge 2/ Poll 1:

Win a FREE eco-friendly cleaning kit! Tell us what YOUR favorite eco-friendly cleaner is!

Enter the brand or name of your favorite eco-friendly cleaner that you think is most effective below to enter to win a FREE eco-friendly home cleaning kit:

Like Us — Like 14K — FlowstoBay — optional

My favorite eco-friendly cleaner is:

Your Email Address:

Zip Code:

Enter

Contest rules: You must be a resident of San Mateo County in order to be eligible to win the prize. One winner will be selected for the winter Flows to Bay Challenge to win the prize. Contest will close March 31, 2018 at midnight.

This promotion is managed by FlowstoBay.

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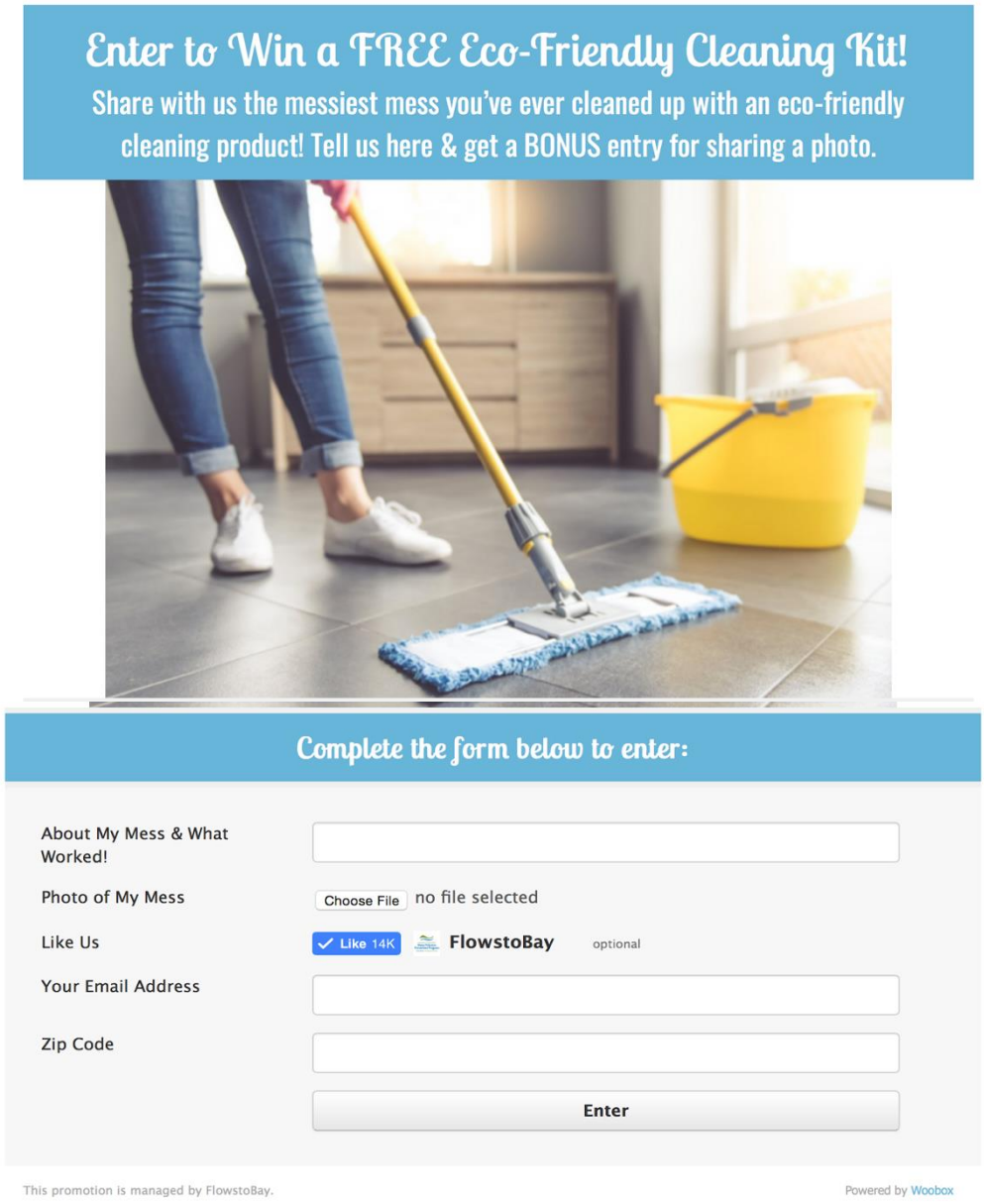
Challenge 2/ Poll 2:



Challenge 2/ Poll 3:

Respond & Enter to Win an Eco-Cleaning Kit!

Which HHW products do you have around your home ready to be recycled? Tell us here and pledge to drop it off at an HHW event near you and you will be entered to win a FREE eco-cleaning kit.

One HHW item I have at home that I pledge to recycle is:

Paint

Motor Oil

Batteries

Light Bulbs

Pesticides

Other (fill in below)

Like Us — Like 14K FlowstoBay optional

Other HHW Item

Your Email Address

Zip Code

Enter

Contest rules: You must be a resident of San Mateo County in order to be eligible to win the prize. One winner will be selected for the winter Flows to Bay Challenge to win the prize. Contest will close March 31, 2018 at midnight.

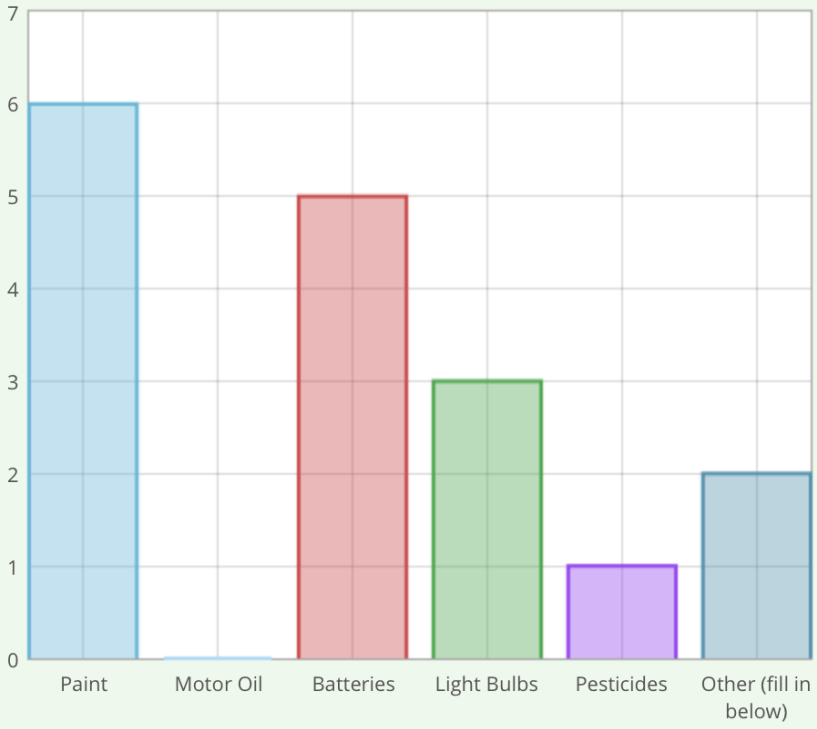
Respond & Win! Which HHW Products Do You Have Ready to Recycle?

Enter to win! Which HHW products do you have around your home ready to be recycled? Tell us here and pledge to drop it off at an HHW event near you and you will be entered to win a FREE eco-cleaning kit.

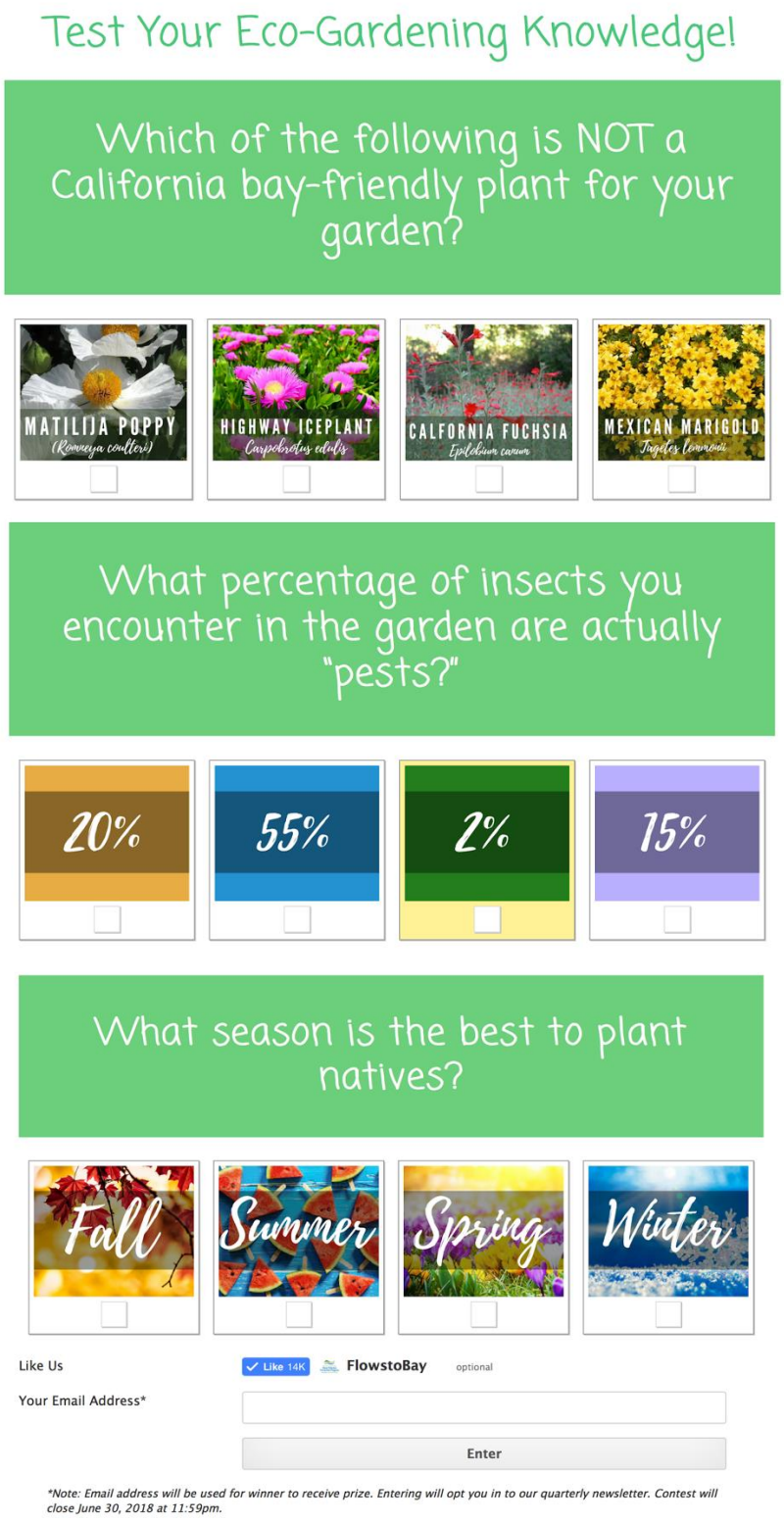
ENDED

This campaign is ended.

Promote



Challenge 3/ Quiz 1:



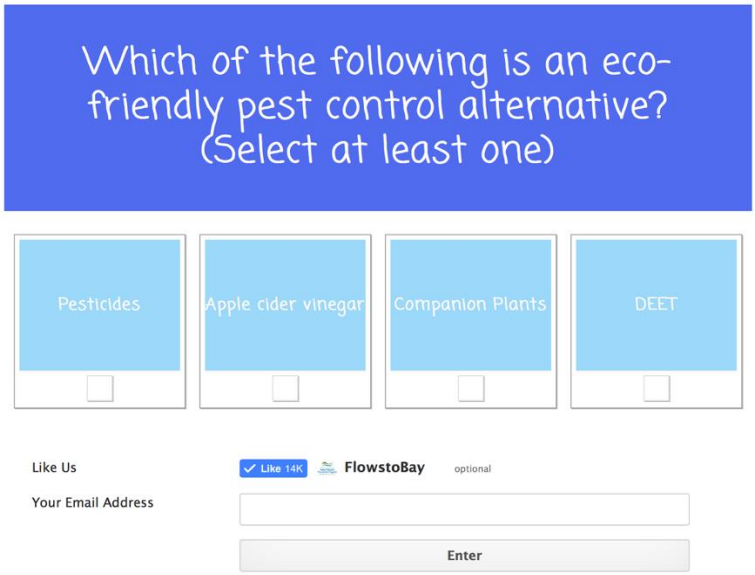
Challenge 3/ Quiz 2:

Test Your Eco-Gardening Knowledge!

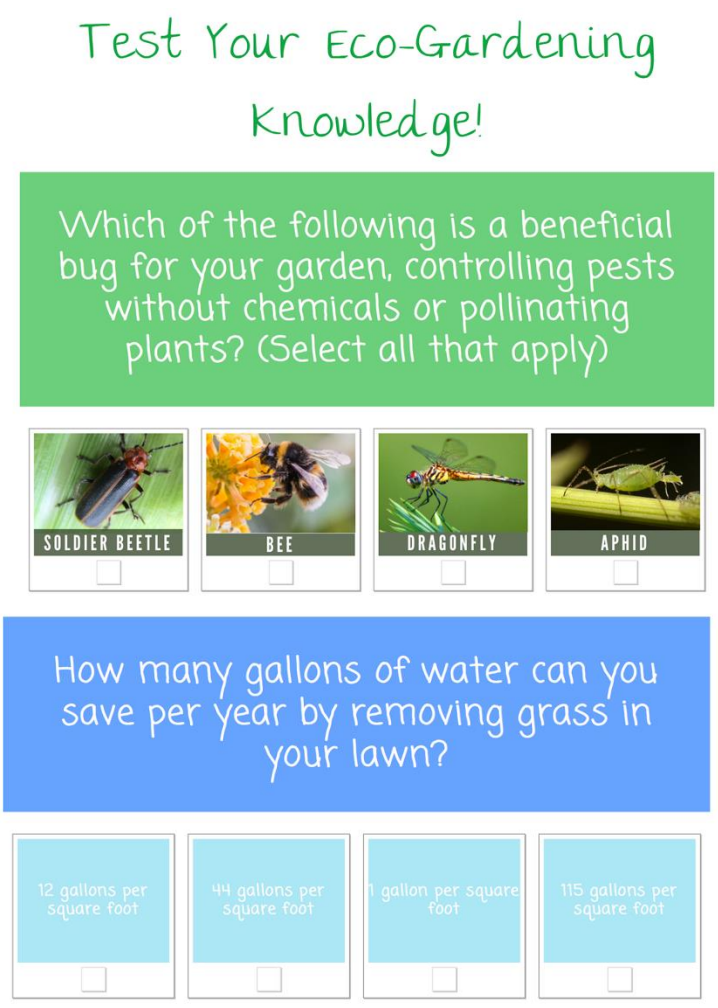
How many inches of mulch should you add to soil to limit water loss to evaporation?

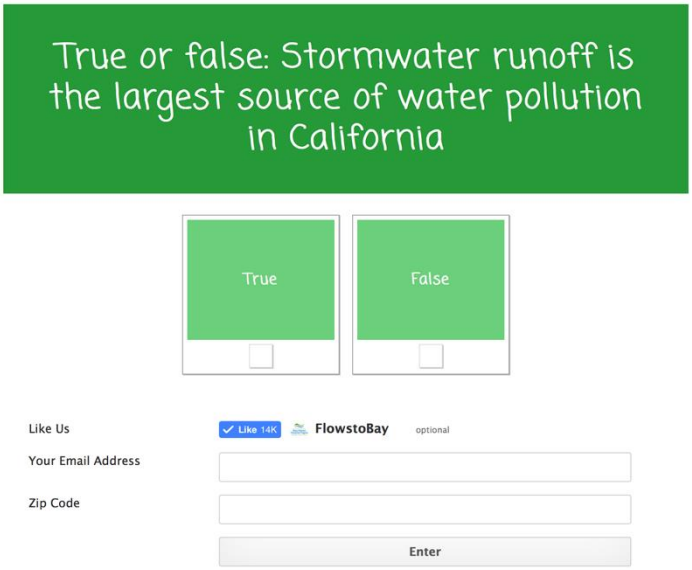
- None
- 1-2 inches
- 2-3 inches
- 4-5 inches

Which of the following purple plants should you pull from your garden?



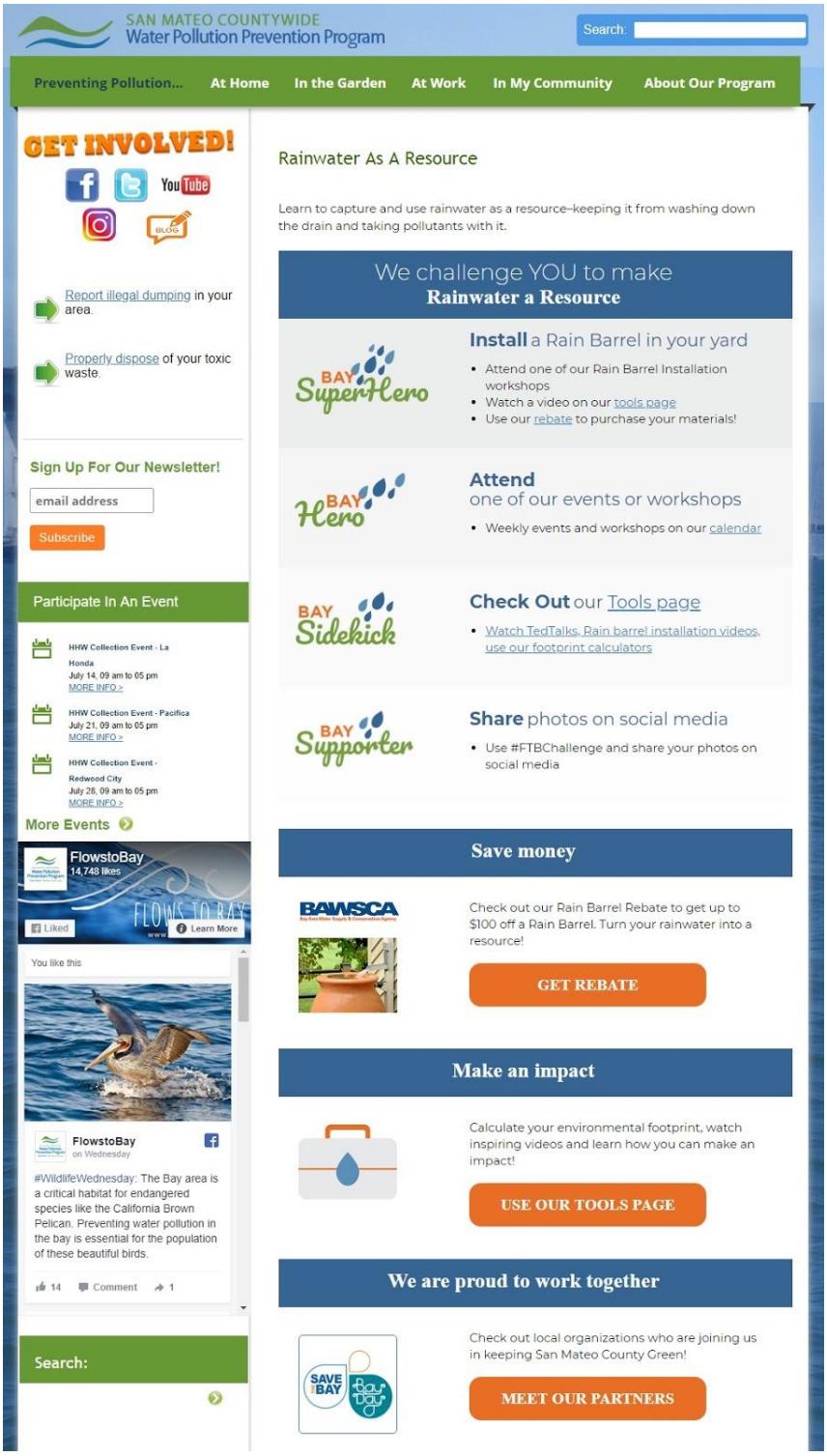
Challenge 3/ Quiz 3:

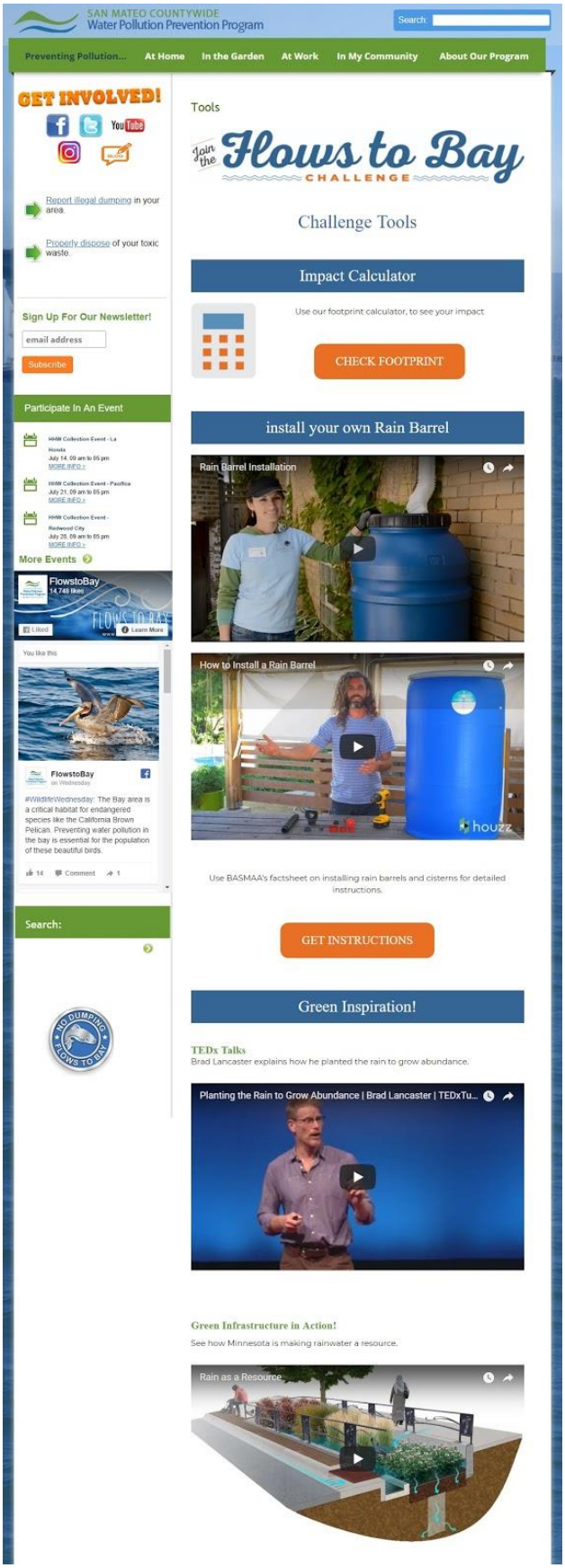



True or false: Stormwater runoff is the largest source of water pollution in California
True
False
Like Us
Like 14K
FlowstoBay
optional
Your Email Address
Zip Code
Enter

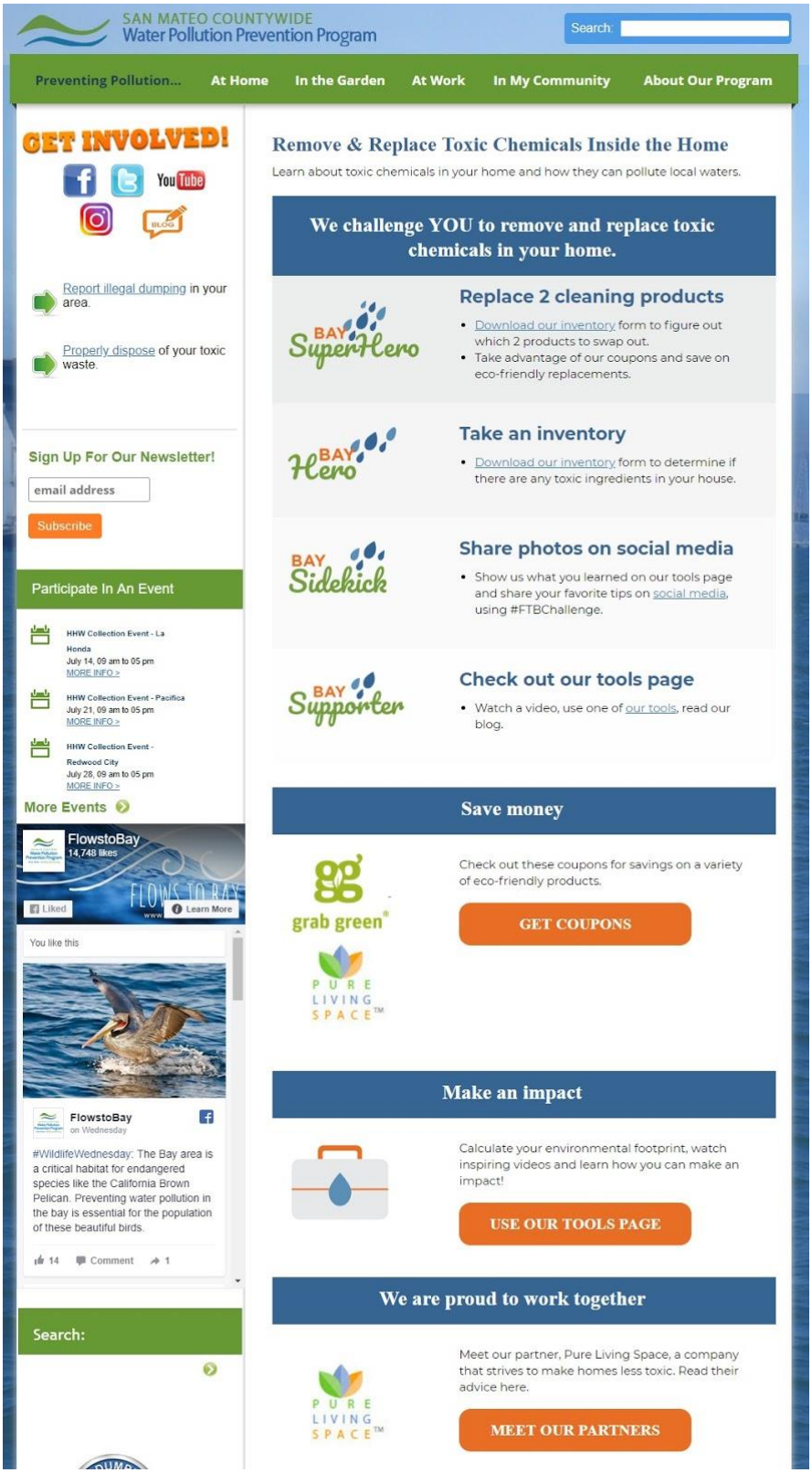
Website screenshots:

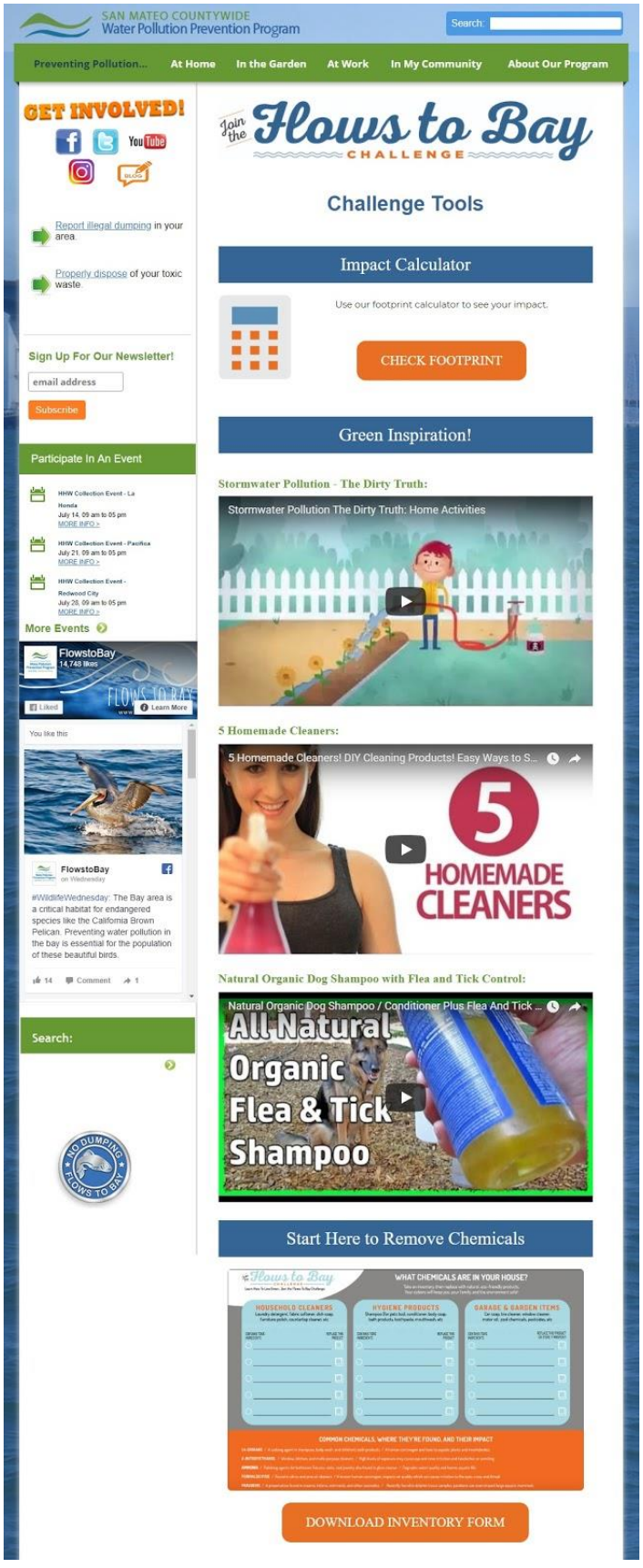
Challenge 1: Rainwater as a Resource




SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
Search:
Preventing Pollution...
At Home
In the Garden
At Work
In My Community
About Our Program
GET INVOLVED!
Report illegal dumping in your area.
Properly dispose of your toxic waste.
Sign Up For Our Newsletter!
email address
Subscribe
Participate In An Event
More Events
FlowstoBay
Search:
Tools
Join the Flows to Bay CHALLENGE
Challenge Tools
Impact Calculator
Use our footprint calculator, to see your impact
CHECK FOOTPRINT
install your own Rain Barrel
Rain Barrel Installation
How to Install a Rain Barrel
houzz
Use BASMAA's factsheet on installing rain barrels and cisterns for detailed instructions.
GET INSTRUCTIONS
Green Inspiration!
TEDx Talks
Brad Lancaster explains how he planted the rain to grow abundance.
Planting the Rain to Grow Abundance | Brad Lancaster | TEDxTu...
Green Infrastructure in Action!
See how Minnesota is making rainwater a resource.
Rain as a Resource

Challenge 2: Inside the Home




SAN MATEO COUNTYWIDE
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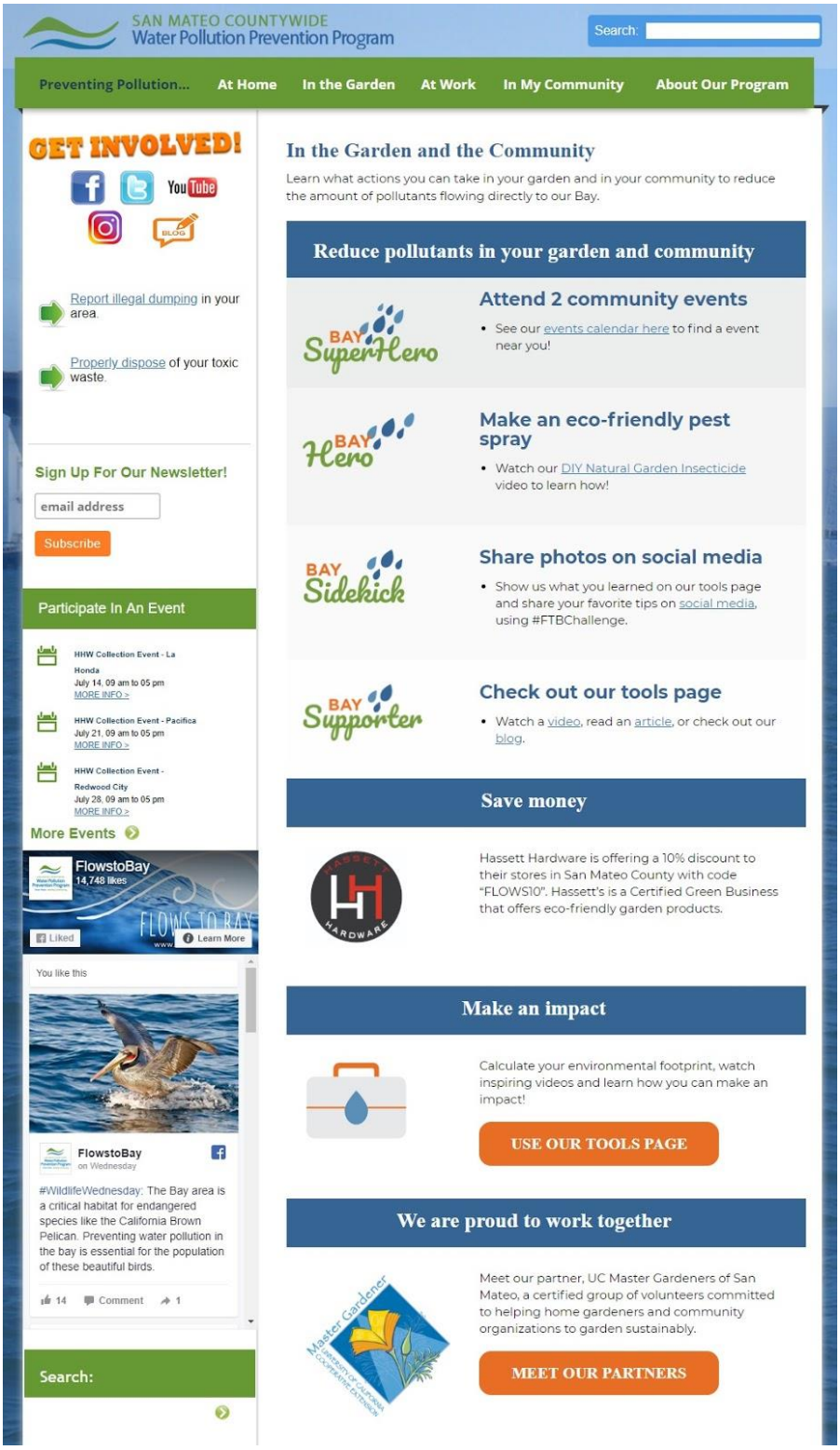
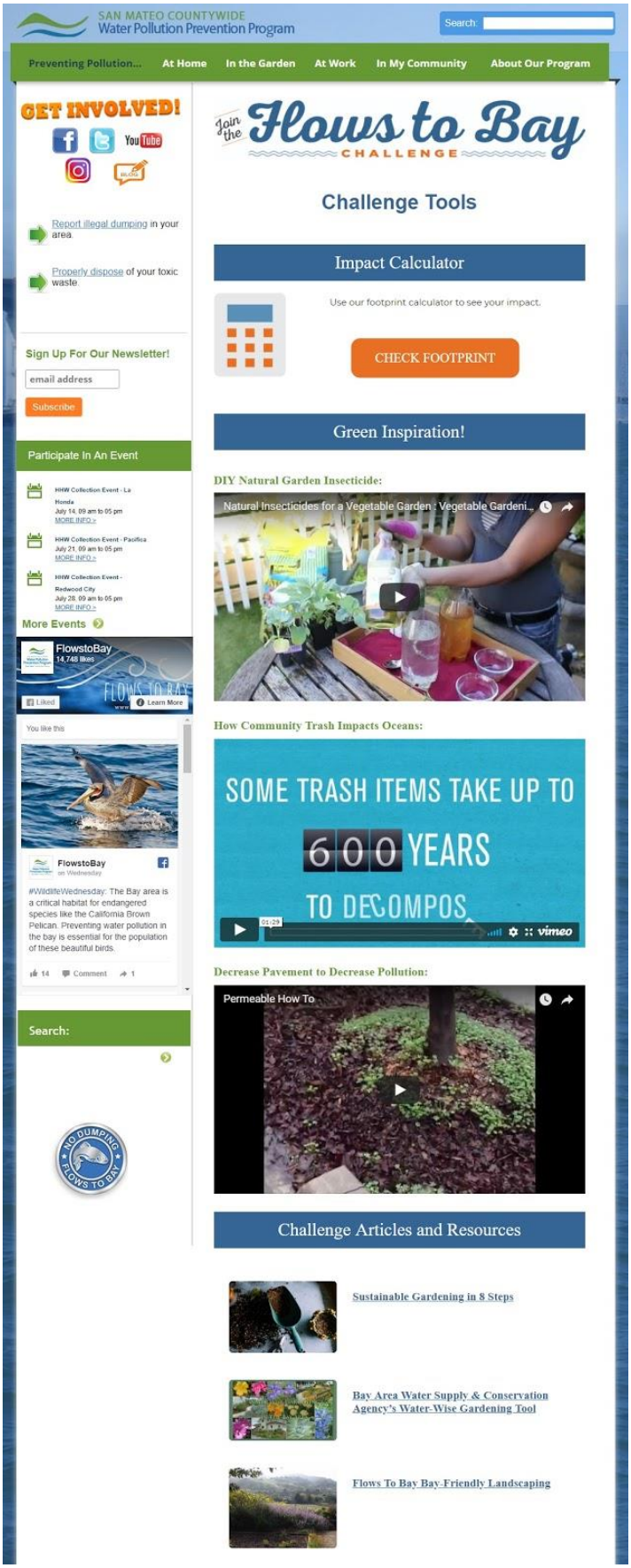
Sign Up For Our Newsletter!
email address
Subscribe
Participate In An Event
More Events
FlowstoBay
14,748 likes
Liked
Learn More
You like this
FlowstoBay
on Wednesday
#WildlifeWednesday: The Bay area is a critical habitat for endangered species like the California Brown Pelican. Preventing water pollution in the bay is essential for the population of these beautiful birds.
14
Comment
1
Search:
NO DUMPING FLOWS TO BAY
Join the Flows to Bay CHALLENGE
Challenge Tools
Impact Calculator
Use our footprint calculator to see your impact.
CHECK FOOTPRINT
Green Inspiration!
Stormwater Pollution - The Dirty Truth:
Stormwater Pollution The Dirty Truth: Home Activities
5 Homemade Cleaners:
5 Homemade Cleaners! DIY Cleaning Products! Easy Ways to S...
5
HOMEMADE CLEANERS
Natural Organic Dog Shampoo with Flea and Tick Control:
Natural Organic Dog Shampoo / Conditioner Plus Flea And Tick ...
All Natural Organic Flea & Tick Shampoo
Start Here to Remove Chemicals
WHAT CHEMICALS ARE IN YOUR HOUSE?
HOUSEHOLD CLEANERS
HYGIENE PRODUCTS
GARAGE & GARDEN ITEMS
COMMON CHEMICALS, WHERE THEY'RE FOUND, AND THEIR IMPACT
DOWNLOAD INVENTORY FORM

Challenge 3: In the Garden and Community

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Properly dispose of your toxic waste.
Sign Up For Our Newsletter!
email address
Subscribe
Participate In An Event
HHW Collection Event - La Honda
July 14, 09 am to 05 pm
MORE INFO >
HHW Collection Event - Pacifica
July 21, 09 am to 05 pm
MORE INFO >
HHW Collection Event - Redwood City
July 28, 09 am to 05 pm
MORE INFO >
More Events
FlowstoBay
14,748 likes
Liked
Learn More
You like this
FlowstoBay
on Wednesday
#WildlifeWednesday: The Bay area is a critical habitat for endangered species like the California Brown Pelican. Preventing water pollution in the bay is essential for the population of these beautiful birds.
14
Comment
1
Search:
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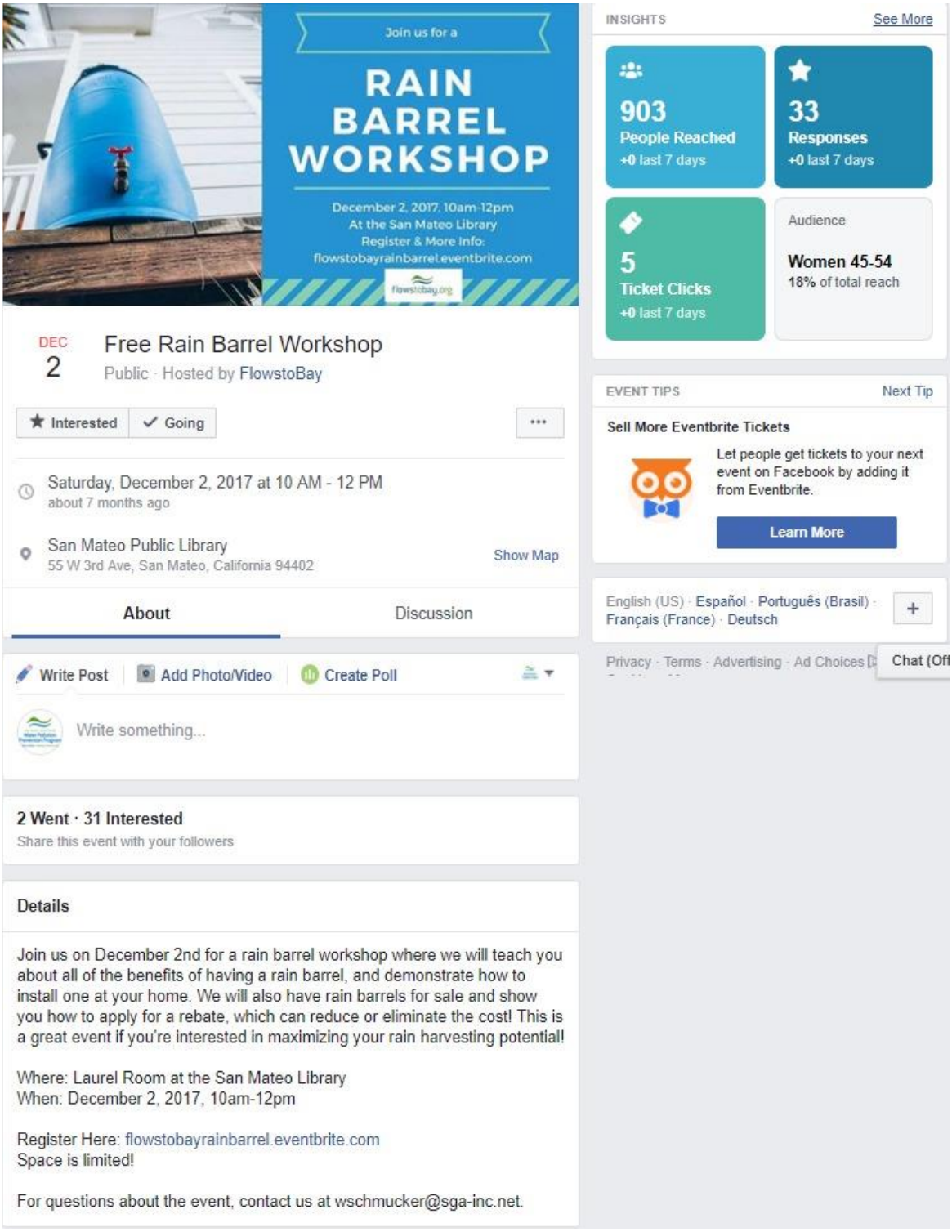
Join the Flows to Bay CHALLENGE
Challenge Tools
Impact Calculator
Use our footprint calculator to see your impact.
CHECK FOOTPRINT
Green Inspiration!
DIY Natural Garden Insecticide:
Natural Insecticides for a Vegetable Garden : Vegetable Gardeni...
How Community Trash Impacts Oceans:
SOME TRASH ITEMS TAKE UP TO
600 YEARS
TO DECOMPOS
01:29
vimeo
Decrease Pavement to Decrease Pollution:
Permeable How To
Challenge Articles and Resources
Sustainable Gardening in 8 Steps
Bay Area Water Supply & Conservation Agency's Water-Wise Gardening Tool
Flows To Bay Bay-Friendly Landscaping

Rain Barrel Workshop Facebook event page:



Rain Barrel Workshop Eventbrite event page:

DESCRIPTION

Join us on December 2nd for a rain barrel workshop where we will have a rain barrel tutorial and demonstration. You can also learn about getting a rebate when you buy a rain barrel. You can even make a rain barrel purchase at the workshop! This is a great event if you're interested in maximizing your rain harvesting potential.

Where: Laurel Room at the San Mateo Library at 10am for this 2 hour event.
When: December 2, 2017, 10am-12pm

Space is limited!

For questions about the event, contact us at wschmucker@sga-inc.net.

DATE AND TIME

Sat, December 2, 2017
10:00 AM – 12:00 PM PST
Add to Calendar

LOCATION

San Mateo Library
55 West 3rd Avenue
Laurel Room
San Mateo, CA 94402
View Map

Rain Barrel Workshop Eventbrite event results:

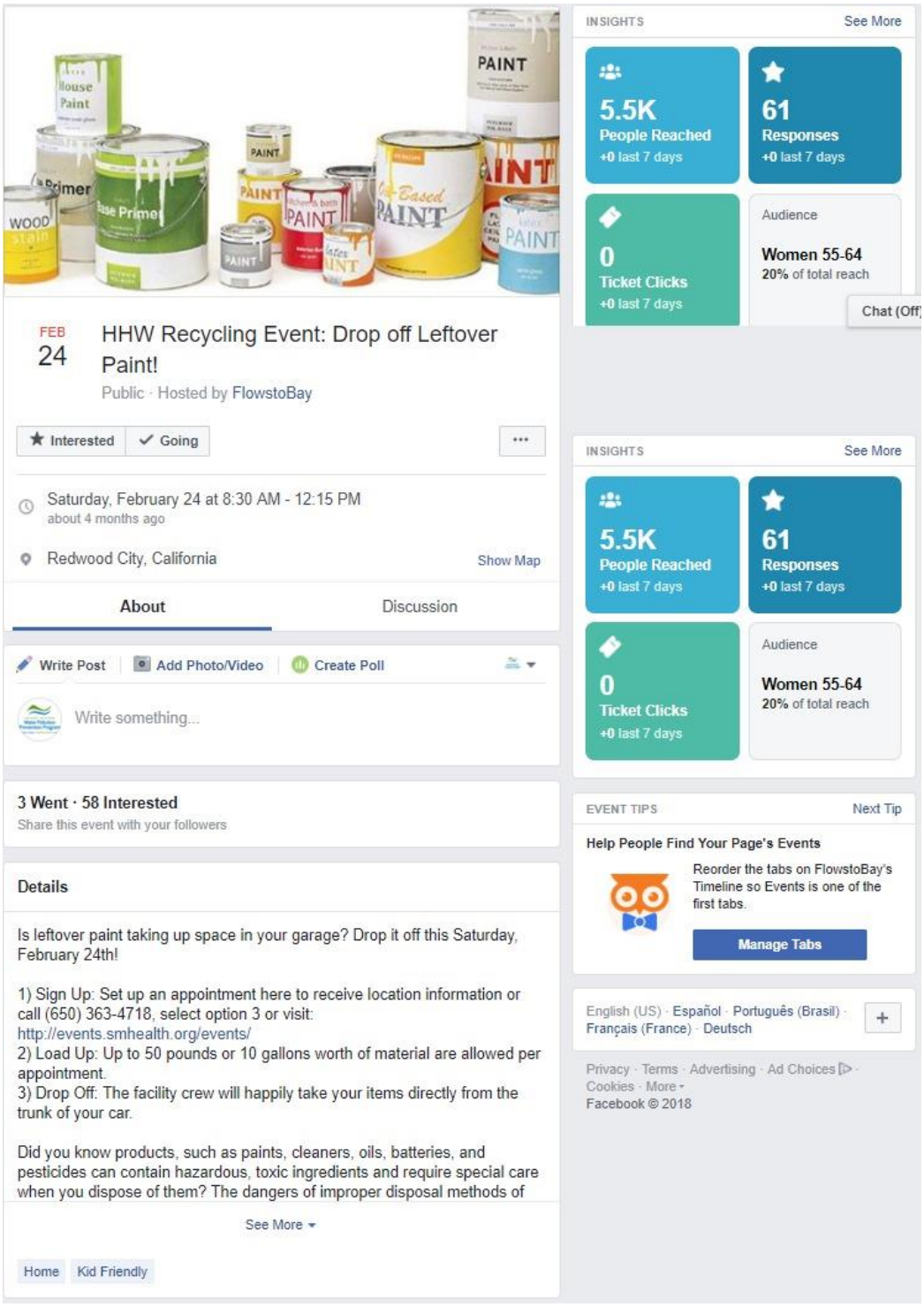
Source	Views	Registrations
EventBrite	537	37

Rain Barrel Workshop Facebook ad results:

Source	Impressions	Unique Impressions/Reach	Clicks
Facebook Ads	28,351	16,498	256

**Impressions are the number of times the advertisement was viewed*
Industry average click through rate is 0.25%

HHW Facebook event screenshots:



MAR
3

HHW Event: Recycle Your Used Motor Oil!

Public · Hosted by FlowstoBay

★ Interested | ✓ Going | ···

Saturday, March 3 at 8:30 AM - 11:30 AM
about 4 months ago

South San Francisco, California — Show Map

About | Discussion

Write Post | Add Photo/Video | Create Poll

Write something...

1 Went · 29 Interested
Share this event with your followers

Details

Buckets of used motor oil cluttering your home? Take them here.

1) Sign Up: Set up an appointment here to receive location information or call (650) 363-4718, select option 3 or visit: http://events.smhealth.org/events/
2) Load Up: Up to 50 pounds or 10 gallons worth of material are allowed per appointment.
3) Drop Off: The facility crew will happily take your items directly from the trunk of your car.

Did you know products, such as paints, cleaners, oils, batteries, and pesticides can contain hazardous, toxic ingredients and require special care when you dispose of them? The dangers of improper disposal methods of HHWs like paint can pollute the environment and pose a threat to human

See More

Home

INSIGHTS — See More

3.6K People Reached +0 last 7 days

30 Responses +0 last 7 days

0 Ticket Clicks +0 last 7 days

Audience
Women 55-
17% of total reach

Chat (Off

EVENT TIPS — Next Tip

Help People Find Your Page's Events

Reorder the tabs on FlowstoBay's Timeline so Events is one of the first tabs.

Manage Tabs

English (US) · Español · Português (Brasil) · Français (France) · Deutsch

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Ticket Clicks +0 last 7 days

17% of total reach

EVENT TIPS — Next Tip

Help People Find Your Page's Events

Reorder the tabs on FlowstoBay's Timeline so Events is one of the first tabs.

MAR
10

HHW Event: Recycle Old Pesticides!

Public · Hosted by FlowstoBay

★ Interested | ✓ Going | ···

Saturday, March 10 at 8:30 AM - 12:15 PM
about 4 months ago

Daly City, California — Show Map

About | Discussion

Write Post | Add Photo/Video | Create Poll

Write something...

0 Went · 26 Interested
Share this event with your followers

Details

Don't toss your pesticides away, let us take care of it for you!

1) Sign Up: Set up an appointment here to receive location information or call (650) 363-4718, select option 3 or visit: http://events.smhealth.org/events/
2) Load Up: Up to 50 pounds or 10 gallons worth of material are allowed per appointment.
3) Drop Off: The facility crew will happily take your items directly from the trunk of your car.

Did you know products, such as paints, cleaners, oils, batteries, and pesticides can contain hazardous, toxic ingredients and require special care when you dispose of them? The dangers of improper disposal methods of HHWs like pesticides can pollute the environment and pose a threat to

See More

Home | Kid Friendly

INSIGHTS — See More

3.8K People Reached +0 last 7 days

26 Responses +0 last 7 days

1 Ticket Clicks +0 last 7 days

Audience
Women 65+
17% of total reach

EVENT TIPS — Next Tip

Help People Find Your Page's Events

Reorder the tabs on FlowstoBay's Timeline so Events is one of the first tabs.

Manage Tabs

English (US) · Español · Português (Brasil) · Français (France) · Deutsch

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Ticket Clicks +0 last 7 days
17% of total reach

EVENT TIPS — Next Tip
Help People Find Your Page's Events
Reorder the tabs on FlowstoBay's Timeline so Events is one of the first tabs.
Manage Tabs
English (US) · Español · Português (Brasil) · Français (France) · Deutsch

MAR
17

HHW Recycling Event: Batteries

Public · Hosted by FlowstoBay

Interested | Going

Saturday, March 17 at 8:30 AM - 12:30 PM
about 3 months ago

Pacifica, California — Show Map

About | Discussion

Write Post | Add Photo/Video | Create Poll

Write something...

1 Went · 50 Interested
Share this event with your followers

Details

Batteries can be recycled… What a bright idea!

1) Sign Up: Set up an appointment here to receive location information or call (650) 363-4718, select option 3 or visit:
http://events.smhealth.org/events/
2) Load Up: Up to 50 pounds or 10 gallons worth of material are allowed per appointment.
3) Drop Off: The facility crew will happily take your items directly from the trunk of your car.

Did you know products, such as paints, cleaners, oils, batteries, and pesticides can contain hazardous, toxic ingredients and require special care when you dispose of them? The dangers of improper disposal methods of HHWs like batteries can pollute the environment and pose a threat to human health.

If you can't make the date for the event, there are other businesses and facilities that will gladly accept your household hazardous waste at anytime:

PAINT
Visit Paintcare's website for locations near you:
https://www.paintcare.org/drop-off-locations/#/find-a-drop-off-site

MOTOR OIL
Click here to drop off your motor oil and filters:
https://www.smchealth.org/general-information/used-motor-oil-and-filter-recycling-locations

BATTERIES
Click here to drop off your household batteries at any time:
https://www.smchealth.org/batteries

See Less

Home

INSIGHTS — See More

3.8K People Reached +0 last 7 days

51 Responses +0 last 7 days

0 Ticket Clicks +0 last 7 days

Audience
Women 55-64
18% of total reach

EVENT TIPS — Next Tip

Create New Event

Have another event by FlowstoBay coming up? Create an event to let people know about it.

Create

English (US) · Español · Português (Brasil) · Français (France) · Deutsch

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Facebook © 2018

Ticket Clicks +0 last 7 days
18% of total reach
EVENT TIPS — Next Tip
Create New Event
Have another event by FlowstoBay coming up? Create an event to let people know about it.
Create
English (US) · Español · Português (Brasil) · Français (France) · Deutsch
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Facebook © 2018

Rain Barrel Workshop Survey:

Questions Key:

1. What were you hoping to learn at the workshop today?
2. Level of knowledge
3. What did you learn from the workshop?
4. Rating on environmental info provided. Scale: 1-5
5. Rating on rain barrel installation instructions. Scale: 1-5
6. Rating on if info was presented in a interesting/fun format. Scale: 1-5
7. Areas of improvement or topics you'd like to see covered

Table 7-7. Rain Barrel Workshop Survey Results

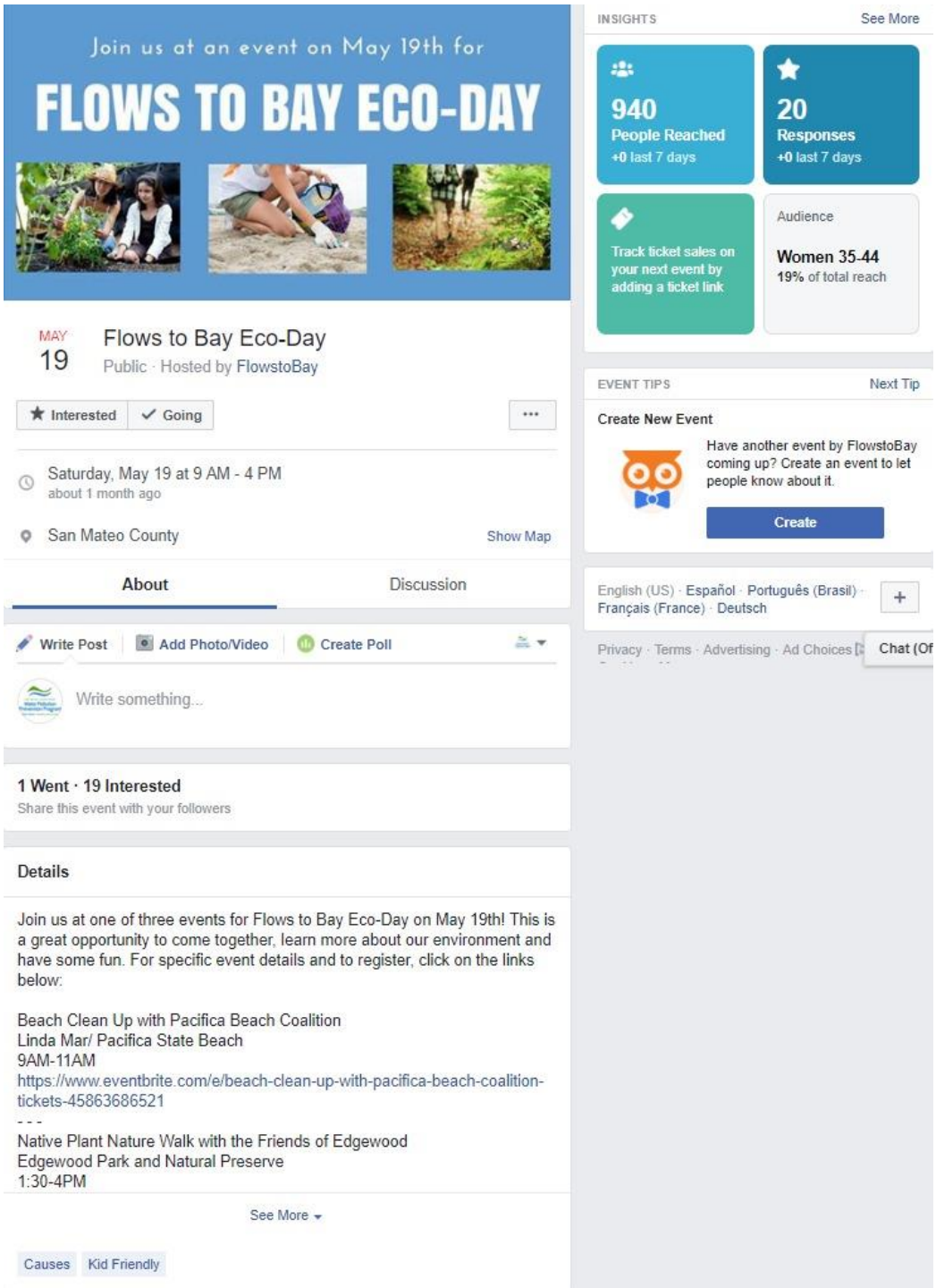
Attendees	Q1	Q2	Q3	Q4	Q5	Q6	Q7
1	Instructions on installation, rebates were a bonus	Some knowledge	• Basic understanding • Preparing you to install your own rain barrel • Environmental benefits • Knowledge of local rebates	5	5	5	None-Great presentation
2	Rain barrel choices, how to install	Some knowledge	• Basic understanding • Preparing you to install your own rain barrel • Environmental benefits • Knowledge of local rebates	5	5	5	N/A
3	How to install a rain barrel	No knowledge	• Basic understanding • Preparing you to install your own rain barrel • Environmental benefits	5	5	5	Great presentation, thank you!
4	Benefits of collecting rain water	No knowledge	• Basic understanding • Preparing you to install your own rain barrel • Environmental	5	5	5	N/A

Attendees	Q1	Q2	Q3	Q4	Q5	Q6	Q7
			benefits • Knowledge of local rebates				
5	To learn how to install a barrel and what options are out there	No knowledge	• Basic understanding • Preparing you to install your own rain barrel • Environmental benefits • Knowledge of local rebates	5	5	5	Doing workshops at local nurseries. I think many gardeners will be interested!
6	Feasibility of using rain barrels for my home/garden	Some knowledge	• Basic understanding • Preparing you to install your own rain barrel • Environmental benefits	5	4	5	Thank you!
7	Where to buy another barrel, ideas of how to use the captured water, maintenance	Good I have a rain barrel installed	• Basic understanding • Preparing you to install your own rain barrel • Environmental benefits • Knowledge of local rebates	5	5	5	Barrel set up workshops, more purchase resources
8	What different types of systems are available	Good I have a rain barrel installed	• Basic understanding • Preparing you to install your own rain barrel • Environmental benefits • Knowledge of local rebates	5	5	5	N/A
9	Any new knowledge about what's available	Good I have a rain barrel installed	• Basic understanding • Preparing you to install your own rain barrel • Environmental benefits • Knowledge of local rebates	5	5	5	N/A

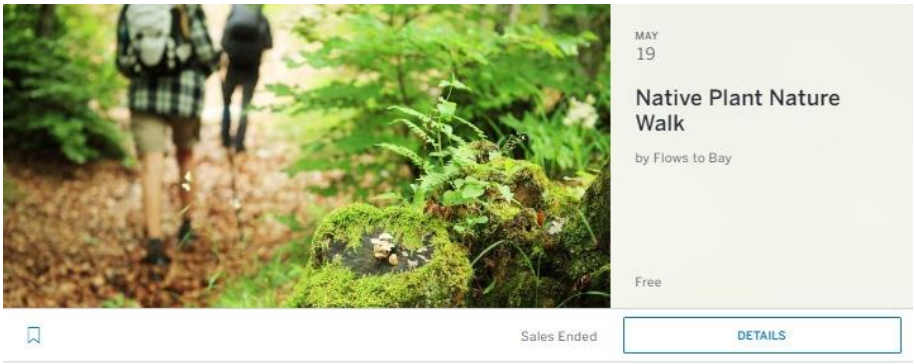
Attendees	Q1	Q2	Q3	Q4	Q5	Q6	Q7
10	About rain barrels, rebates, use	No knowledge	• Basic understanding • Preparing you to install your own rain barrel • Environmental benefits • Knowledge of local rebates	5	4	5	Native plant/low water gardening, another worm bin, drip systems
11	N/a	Some knowledge	• Preparing you to install your own rain barrel • Environmental benefits	5	5	5	N/A
12	More info on how to	No knowledge	• Basic understanding • Preparing you to install your own rain barrel • Environmental benefits • Knowledge of local rebates	5	5	5	N/A
13	Installation info	Some knowledge	• Basic understanding • Preparing you to install your own rain barrel • Environmental benefits • Knowledge of local rebates	4	4	4	N/A
14	Both a general overview and info on more local applications as well as how to apply and install ours	Some knowledge	• Basic understanding • Preparing you to install your own rain barrel • Environmental benefits • Knowledge of local rebates	4	3	4	Maybe send an electronic survey after event

Eco-Day Promotional Flyer:

Eco-Day Facebook event screenshot:



Eco-Day Eventbrite page screenshots:



MAY
19

Native Plant Nature Walk

by Flows to Bay

Free

Sales Ended

DETAILS

DESCRIPTION

Join us for Flows to Bay Eco-Day on a Free Docent-led Wildflower Walk with Friends of Edgewood!

Edgewood's serpentine grasslands are renowned throughout California for their lush wildflower carpets and rich biodiversity. You might see dozens of species of flowers on a single walk! Our free walks vary according to what's in bloom—covering about 3 miles, at a moderate pace, with frequent stops. Meet at the Education Center and make sure to bring water, a hat, sturdy shoes, sunscreen, and a snack if you wish. We don't stop for lunch, but picnic tables are usually available after the walks in the Old Stage Day Camp area. Arrive early to find parking, or ride the free shuttle: http://parks.smcgov.org/parkshuttle

Visit FriendsofEdgewood.org for more information.

DATE AND TIME

Sat, May 19, 2018
1:30 PM – 4:00 PM PDT
Add to Calendar

LOCATION

Edgewood Park & Natural Preserve
6 Old Stage Coach Road
Redwood City, CA 94062
View Map

MAY
19

Beach Clean Up with Pacifica Beach Coalition

by Flows to Bay

Free

Sales Ended | DETAILS

DESCRIPTION

Join us on Flows to Bay Eco-Day at Linda Mar (Pacifica) State Beach for a beach clean up!

Also known as Pacifica State Beach, Linda Mar is a wide crescent-shaped beach favored as a local surfing spot, and one of the most loved and used beach in Pacifica by residents and visitors alike. Located adjacent to Highway 1, it features a coastal trail stretching along the beachfront to enjoy from one end to the other, and is critical habitat for the threatened Western Snowy Plover. In addition to beach cleanups, it is the site of native habitat restoration events providing hands-on learning experiences for participants.

Site Captains: Jim and Ana meet at the southern end of the main parking lot (near Taco Bell).

Visit here for more information.

DATE AND TIME

Sat, May 19, 2018
9:00 AM – 11:00 AM PDT
Add to Calendar

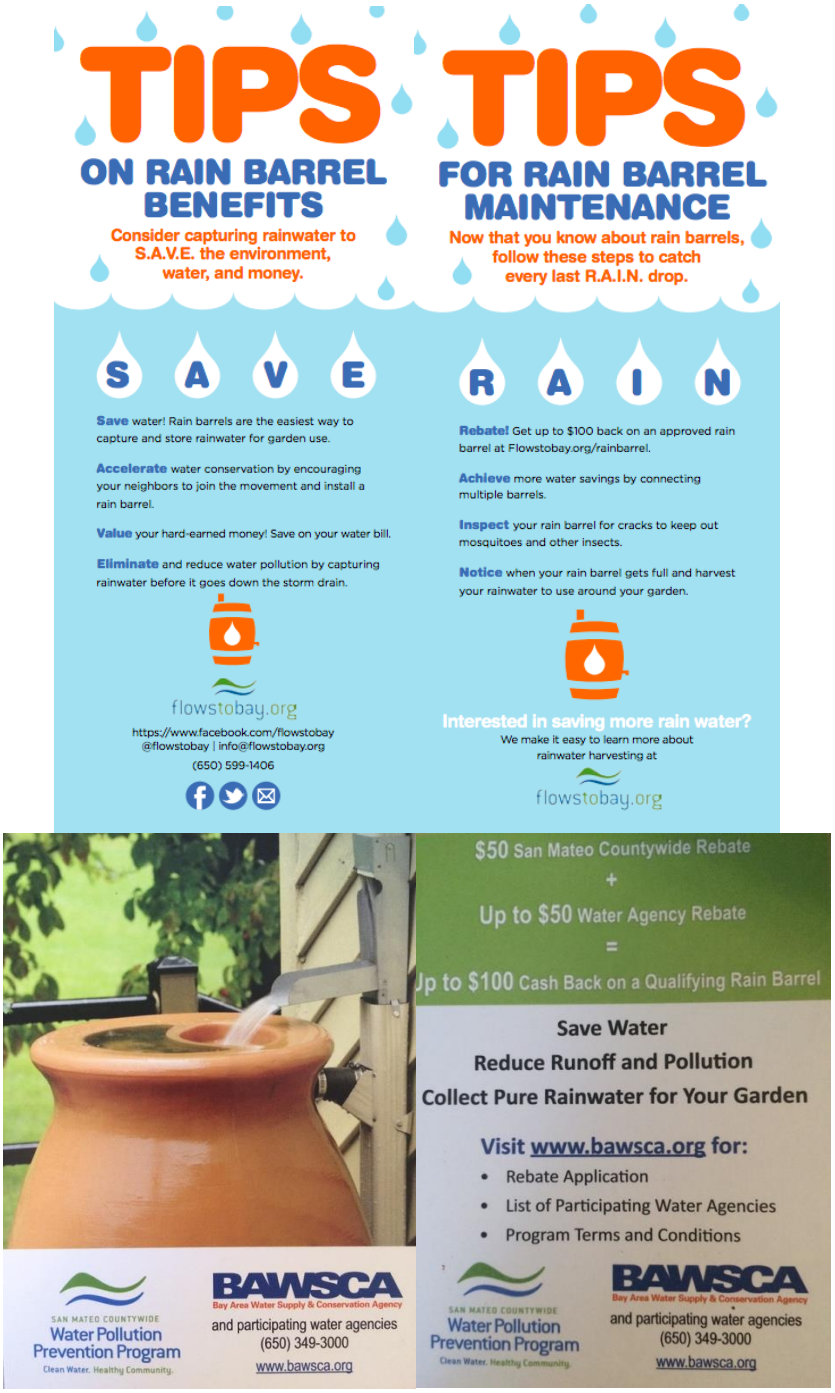
LOCATION

Linda MarState Beach
5000 Pacific Coast Hwy
Pacifica, California 94044
View Map

Eco-Day Partner Post-Event Survey Results:

	Pacifica Beach Coalition	**Friends of Edgewood**	**BAWSCA**
Q1. How many people attended?	25	5	12
Q2. Was the Flows To Bay collateral handed out to attendees?	Yes	Yes	Yes.
Q3. What information was learned by attendees?	No response	With such an intimately-sized group, we were able to focus on individual attendees' specific requests, which was mainly to see wildflowers.	This was a combination lecture and hands-on workshop. Participants learned how to incorporate water-efficient edibles into their existing garden. This class covered how to incorporate organic maintenance techniques such as compost and cover crops into seasonal vegetable gardening.
Q4. How does this event compare to previous ones?	No response	Format ended up being very similar to what we normally offer, but in the afternoon. We had a nice walk.	About the same as usual, 10 – 20 participants. Excellent reviews from the attendees.
Q5. Would you partner with Flows To Bay again in the future?	Yes	Yes	Yes
Q6. Feedback on how the event could have been better promoted?	Companies have had success if they organize a group of employees from the office to come out and do a cleanup. Also, liking our website with all of your social media and giving employees credit for coming out, have been successful strategies.	We appreciated the very clear and prompt communication. Would it be more effective to offer a similar walk for students early in the contest schedule, to give them ideas for native gardens? We have a young native garden around our Education Center. Our garden manager enjoys giving tours discussing the how-to's of how the garden was established. We typically then follow up with a hike. We would also be happy to coordinate walks with you for adult hikes as well, perhaps on the topic of ways native plants are adapted to our dry summer. Perhaps you could help us make the description more appealing to your audience!	No suggestions at this time.

Rain Barrel Rebate Cards:



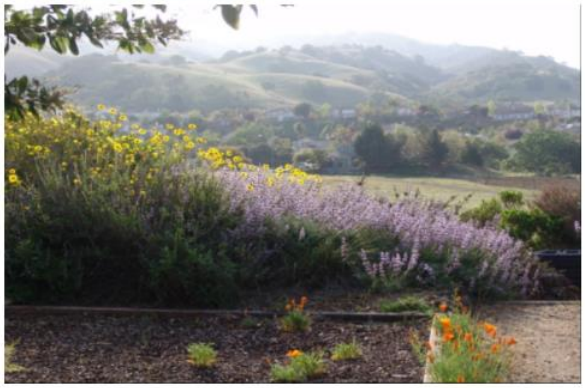
Summer 2017 Newsletter:

Get tips on having a drought-friendly garden that attracts hummingbirds and read about the winning students' stormwater pollution prevention proposal.

View this email in your browser

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program

SUMMER 2017



TIPS FOR A BAY FRIENDLY CALIFORNIA GARDEN

Are you looking to update your garden to be more lush and eco-friendly this summer? We have a few tips to ensure your garden will be healthy and thrive in our northern California climate. Learn all about Bay Friendly Gardening!

Learn More >

POLLUTION SOLUTIONS IN SAN MATEO COUNTY

ATTRACTING HUMMINGBIRDS TO YOUR GARDEN

Learn how attract these beautiful creatures in your backyard with specific plants and rain gardens.

Learn More >

SAN MATEO STUDENTS THINK GLOBALLY & ACT LOCALLY

Student winners of our High School Green Infrastructure Contest designed proposals to prevent stormwater pollution.

Learn More >

Fall 2017 Newsletter:

Learn about this year's Flows to Bay challenge, how you can get involved in International Walk to School Day, and why green infrastructure is so important in the community!

View this email in your browser

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program

FALL 2017

Join the Flows to Bay CHALLENGE

INTRODUCTION TO THE FLOWS TO BAY CHALLENGE

Interested in reducing your pollution footprint this year? Then come get involved in the Flows to Bay challenge by attending local workshops and events, taking advantage of rebates, and implementing small, but impactful changes in your home. Help us protect the bay from stormwater pollution!

Learn More >

POLLUTION SOLUTIONS IN SAN MATEO COUNTY

INTERNATIONAL WALK TO SCHOOL DAY

Join in on this fun, global event with your children and other families in the neighborhood on October 4th!

Learn More >

GREEN INFRASTRUCTURE IN YOUR COMMUNITY

Read on to learn about green infrastructure, its benefits in your community, and where you can find it!

Learn More >

Our mailing address is:
San Mateo Countywide Water Pollution Prevention Program
555 County Center
Redwood City, CA 94063

Winter 2017 Newsletter:

Learn about the Flows to Bay High School Contest, this winter's new challenge theme, our first rain barrel workshop in San Mateo County, and why picking up pet waste will have such a big impact on stormwater pollution!

View this email in your browser

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program

WINTER 2017

TAKE OUR PLEDGE FOR A CHANCE TO WIN A FREE PRIZE

Click here to take our pledge to use rainwater as a resource for a chance to win a free Green Gift Bag and to have an impact within your community!

FLOWS TO BAY HIGH SCHOOL CONTEST

Attention all SMC teachers, parents and students! Join our high school contest and "green up" your schools today! Click here to learn more.

FLOWS TO BAY CHALLENGE: INSIDE YOUR HOME

This winter, we challenge you to consider your pollution footprint in your home. Continue reading to learn more about the main sources of water pollution within homes and how you can reduce your own footprint!

Learn More >

POLLUTION SOLUTIONS IN SAN MATEO COUNTY

OUR FIRST RAIN BARREL WORKSHOP

On December 2nd, we held our very first rain barrel workshop! Learn more about the workshop and how to get involved in future workshops!

Learn More >

PET WASTE AND STORMWATER POLLUTION

What is one of the largest and most unsuspecting sources of contamination in our waters? Pet waste! Learn what is being done to reduce this environmental hazard.

Learn More >

Our mailing address is:
San Mateo Countywide Water Pollution Prevention Program
555 County Center
Redwood City, CA 94063

Add us to your address book

Spring 2018 Newsletter:

Learn how and where to recycle toxic chemicals in your home and how you can be a more eco-friendly camper!

View this email in your browser

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program

SPRING 2018

REMOVING CHEMICALS IN YOUR GARAGE

Two of the most common hazardous materials found in garages are paint and unused or used motor oil. They can pose significant threats to your family and to the environment if they're not stored or disposed of properly. Read here for the basics on how to safely manage these chemicals in your home.

Learn More >

REDUCE, REUSE, RECYCLE

REMOVING CHEMICALS IN YOUR HOME

Your home may contain many hazardous materials that you use for household chores. Two common though, perhaps, unassuming household products that can pose threats to your family and the environment are batteries and pesticides. Learn how and where you can recycle toxic products like solvents and batteries.

Learn More >

BATTERIES: REDUCE, RECHARGE, RECYCLE

Some simple tips for reducing waste from household battery use.

Learn More >

DITCH THIS DISPOSABLE THIS SPRING & SUMMER

Why campers, BBQers, and tailgaters should choose reusable propane cylinders.

Learn More >

Our mailing address is:
San Mateo Countywide Water Pollution Prevention Program
555 County Center
Redwood City, CA 94063

Summer 2018 Newsletter:

Learn about green infrastructure in SMC, see who won the Flows to Bay High School Contest, and see what's going on now with the Flows to Bay Challenge!

View this email in your browser

flowstobay.org

SAN MATEO COUNTYWIDE WATER POLLUTION PREVENTION PROGRAM

Clean Water. Healthy Community.

SUMMER 2018

The Facebook green roof in Menlo Park is just one of many green infrastructure examples found in San Mateo County.

CONNECTING THE DOTS: CLIMATE CHANGE TO GREEN INFRASTRUCTURE

Climate change is happening and its impacts are being seen throughout San Mateo County. With record high temperatures, increasingly intense and less predictable storms, longer periods of drought and rising seas, communities in San Mateo County are recognizing the need to take action.

Learn More >

MORE FROM FLOWS TO BAY

FLOWS TO BAY ECO-DAY EVENT RECAP

Flows To Bay Eco-Day was a great success with fun opportunities to clean the coast, explore nature and learn about native gardening.

Learn More >

FLOWS TO BAY CHALLENGE QUIZ

Take our final Flows To Bay Challenge quiz to test your bay-friendly gardening knowledge and for a chance to win a prize from Hassett Hardware!

Take the Quiz! >

WINNERS OF THE FLOWS TO BAY HIGH SCHOOL CONTEST

Read about how we worked with schools this year using the Flows To Bay teacher toolkit and see who won the contest!

Learn More >

HELPING SAN MATEO COUNTY BEACHES MAKE THE GRADE

This year, four out of ten of the most polluted beaches in California were in San Mateo County. Read more about how we can change this!

Learn More >

Appendix 9

- Parks Maintenance & IPM Work Group Attendance List FY 2017/18
- Landscape Integrated Pest Management Workshop – March 7, 2018
    - Agenda
    - Attendance List
    - Summary of Workshop Evaluations
- Integrated Pest Management (IPM) Workshop – May 15, 2018
    - Agenda
    - Attendance List
    - Summary of Workshop Evaluations
- Letter to Pest Control Professionals

San Mateo Countywide Water Pollution Prevention Program
Parks Maintenance IPM Work Group Attendance List - FY 2017/18

Contact Information			Attendance	
MUNICIPALITY	**REPRESENTATIVE**	**EMAIL**	**9/26/2017**	**1/23/2018**
Atherton	Sally Bentz-Dalton	sbentz@ci.atherton.ca.us		
Belmont	Daniel Ourtiague	dourtiague@belmont.gov		
	Jonathan Gervais	Jgervais@belmont.gov		
	Matt Ward	mward@belmont.gov		
Brisbane	Keegan Black	kblack@ci.brisbane.ca.us		
Burlingame	Rich Holtz	Rholtz@burlingame.org	X	X
	Bob Disco	bdisco@burlingame.org		
Colma	Louis Gotelli	Louis.Gotelli@colma.ca.gov	X	
	Brian Dossey	brian.dossey@colma.ca.gov		
Daly City	Chris Caliendo	ccaliendo@dalycity.org	X	X
	Jeff Fornesi	jfornesi@dalycity.org		
	Sibely Calles	scalees@dalycity.org	X	X
	Dennis Bray	dbray@dalycity.org	X	X
	Nicholas Crescenzi	ncrescenzi@dalycity.org		X
	Paul Thompson	pthompson@dalycity.org		X
	Dennis Bray	dbray@dalycity.org	X	X
East Palo Alto	Jay Farr	jfarr@cityofepa.org		
	Lenin Mecgar			X
	Michelle Daher	mdaher@cityofepa.org		
Foster City	Dorte Drastrup	ddrastrup@fostercity.org	X	retired
	P Chiamos	pchiamos@fostercity.org		
	Frank Fanara	Ffanara@fostercity.org		X
Half Moon Bay	Dan Barros	DBarros@hmbcity.com		
	Katherine Sheehan	katherines@csgengr.com	X	X
	Maziar Bozorginia	MBozorginia@hmbcity.com		
Hillsborough	Garry Francis	gfrancis@hillsca.org		
	Natalie Asai	nasai@HILLSBOROUGH.NET		
Menlo Park	David Mooney	damooney@menlopark.org	X	
	Sheena Ignacio	smignacio.menlopark.org		
Millbrae	Ken Crosetti	kcrosetti@ci.millbrae.ca.us		
	John Gianoli	jgianoli@ci.millbrae.ca.us		
Pacifica	A. Clark	clarka@ci.pacifica.ca.us		
	Estevan Renteria	Lavorinip@ci.pacifica.ca.us	X	
	Raymond Donguines	donguinesr@ci.pacifica.ca.us		
Portola Valley	Howard Young	hyoung@portolavalley.net		
	Tony Macias	tmacias@portolavalley.net		
Redwood City	Valerie Matonis	vmatonis@redwoodcity.org	X	retired
	Terence Kyaw	TKyaw@redwoodcity.org		
	Francisco Espinoza	fespinoza@redwoodcity.org	X	X
San Bruno	Rene Walsh	rwalsh@ci.sanbruno.ca.us		
	Danielle Brewer	DBrewer@sanbruno.ca.gov		
	Kerry Burns	kburns@sanbruno.ca.gov		
	Dan Venezia	Dvenezia@sanbruno.ca.gov		

San Mateo Countywide Water Pollution Prevention Program
Parks Maintenance IPM Work Group Attendance List - FY 2017/18

Contact Information			Attendance	
MUNICIPALITY	**REPRESENTATIVE**	**EMAIL**	**9/26/2017**	**1/23/2018**
San Carlos	Arturo Burgueno	aburgueno@cityofsancarlos.org		
	Chris Zanoni	czanoni@cityofsancarlos.org		X
	Kathryn Robertson	krobertson@cityofsancarlos.org		
City of San Mateo	Mike Blondino	mblondino@cityofsanmateo.org		
	Mark Hulett	mhulett@cityofsanmateo.org	X	
	Bruce Reed	breed@cityofsanmateo.org		
	Sarah Scheidt	sscheidt@cityofsanmateo.org		
	Jim Burch	JBurch@sanbruno.ca.gov		
	Grant Ligon	gligon@cityofsanmateo.org		X
	Dennis Pawl	dpawl@cityofsanmateo.org		
San Mateo Co. Parks	Stephen Kraemer	SKraemer@smcgov.org	X	X
	Sam Herzberg	SHerzberg@co.sanmateo.ca.us		
	Scott Lombardi	slombardi@co.sanmateo.ca.us		
	Andrea Chow	Achow@smcgov.org		
	J Hannen	jhannen@co.sanmateo.org		
	Julie Casagrande	jcasagrande@co.sanmateo.ca.us		
	Michele Laskowski	mlaslowski@smcgov.org		
	Kim Springer	kspringer@smcgov.org		
	Suzanne Bontempo	suzannebontempo@gmail.com		
San Mateo Co. Office of Sustainability	Ramona Arechiga	RArechiga@smcgov.org		
	Breann Liebermann	bliebermann@smcgov.org		X
SM County PW	Jeff Pacini	JPacini@co.sanmateo.ca.us		
	Kevin Lu	khlu@smcgov.org	X	
County Agriculture Weights and Measures	Richard Garcia	rgarcia@co.sanmateo.ca.us	X	X
	Jeremy Wagner	JWagner@smcgov.org		
	M Marelich	mmarelich@smcgov.org		
	Fred Crowder	fcrowder@co.sanmateo.ca.us		
	Maria Mastrangelo	MMastrangelo@smcgov.org		
SSF	Donald Louie	donald.louie@ssf.net	X	X
	Greg Mediati	Greg.Mediati@ssf.net	X	X
Woodside	Dong Nguyen	DNguyen@woodsidetown.org		
	Sean Rose	srose@woodsidetown.org		
UCCE/UC IPM	Andrew Sutherland	amsutherland@ucanr.edu		
EOA	Jon Konnan	jkonnan@eoainc.com		
	Vishakha Atre	vatre@eoainc.com		
SMCWPPP	Matt Fabry	mfabry@smcgov.org		
	Reid Bogert	rbogert@smcgov.org		X
Other Attendees				
	Dorte Drastrup	dortedrastrup@gmail.com		X
Kelly Carrol	CSG	kellyc@csgengr.com		

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
Clean Water. Healthy Community.

AGENDA

Landscape Integrated Pest Management (IPM) Workshop

(Sponsored by SMCWPPP Parks Maintenance and IPM Workgroup)
Wind Room, Library Community Center
1000 E. Hillsdale Blvd.
Foster City, CA 94404
Wednesday, March 7, 2018
10:45 a.m. – 3:00 p.m.

Registration and Lunch	10:45 am – 11:20 am
Welcoming Remarks Richard Holtz, *City of Burlingame*	11:20 am – 11:25 am
Pesticides Toxicity Control Requirements in the Municipal Regional Permit Vishakha Atre, *EOA*	11:25 am – 11:35 am
Gopher, Raccoon, and Bee Control Steven Hebert, *Swat Pest Control*	11:35 am – 12:35 pm
Break	12:35 pm – 12:45 pm
IPM for Municipal Landscapes; Controlling White Grubs and Yellowjackets Andrew Sutherland, *UC Cooperative Extension*	12:45 pm – 1:45 pm
Break	1:45 pm – 1:55 pm
Regulatory Update, Common Violations Carole Holomuzki, Joseph Hannen, *San Mateo County Agriculture/Weights and Measures*	1:55 pm – 2:55 pm
Closing Remarks Richard Holtz, *City of Burlingame*	2:55 pm – 3:00 pm

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SMCWPPP Landscape Integrated
Pest Mangement Workshop
March 7, 2018
Attendance Record

	LAST NAME	FIRST NAME	AGENCY
1	Acevedo	Salvador	City of San Mateo
2	Acker	Alan	City of Menlo Park
3	Aizawa	Brian	City of Redwood City
4	Armenta	Marty	Foster City Parks
5	Bentz	Sally	Town of Atherton
6	Bergstrom	Paul	Loral Landscaping
7	Bixby	Justin	Portola Valley
8	Blondino	Mike	City of San Mateo
9	Bravo	Omar	City of Redwood City
10	Bravo	Tony	City of Redwood City
11	Bray	Dennis	City of Daly City
12	Brosnan	Sean	City of Belmont
13	Brunelli	Brian	City of South San Francisco
14	Caliendo	Chris	City of Daly City
15	Cappa	Chris	City of South San Francisco
16	Cardenas	Jorge	Loral Landscaping
17	Castanedo-Moreno	German	San Mateo County Parks
18	Chiamos	Peter	Foster City Parks
19	Cipres	Hector	City of Menlo Park
20	Clark	Aren	City of Pacifica
21	Coffey	J.J.	City of Belmont
22	Cooper	Mark	City of San Mateo
23	Crescenzi	Nicholas	City of Daly City
24	Cutajar	Brandon	City of South San Francisco
25	Del Carlo	Matthew	San Mateo County Parks
26	Delaney	James	City of Burlingame
27	Deras	Miguel	City of Redwood City
28	Di Lorenzo	Lisa	San Mateo County Parks
29	Dowdell	Keith	City of Menlo Park
30	Drastrup	Dorte	Consultant

SMCWPPP Landscape Integrated
Pest Mangement Workshop
March 7, 2018
Attendance Record

	LAST NAME	FIRST NAME	AGENCY
31	Eastman	Rob	City of Half Moon Bay
32	Echeverria	James	Foster City Parks
33	Escoto	Greg	San Mateo County Parks
34	Espinoza	Jesus	City of Redwood City
35	Fa	Matiu	Foster City Parks
36	Fanara	Frank	City of Foster City
37	Francis	Gary	Town of Hillsborough
38	Friars	Joe	City of Brisbane
39	Fukudome	Glenn	City of Redwood City
40	Garcia	Manuel	City of Foster City
41	Garcia	Richard	County of San Mateo
42	Gardner	Rob	San Mateo County Parks
43	Gossett	Jennifer	San Mateo County Parks
44	Gotthardt	Garrett	City of Foster City
45	Haena	Todd	Foster City Parks
46	Hannen	Joseph	San Mateo Agriculture
47	Hollis	Mike	City of Redwood City
48	Holtz	Domenic Finochiaro	City of Burlingame
49	Holtz	Richard	City of Burlingame
50	Hurtado	Oswaldo	City of Menlo Park
51	Izaguirre-Banda	Luiz	City of Burlingame
52	Johnson	David	City of East Palo Alto
53	Kieffer	Ed	City of Menlo Park
54	Kioa	Lava	City of Foster City
55	Kraemer	Stephen	San Mateo County Parks
56	Lavorini	Paul	City of Pacifica, CA
57	Lehman	Jeremy	Frank and Grossman
58	Louie	Donald	City of South San Francisco
59	Matonis	Valerie	retired
60	Mediati	Greg	City of South San Francisco

SMCWPPP Landscape Integrated
Pest Mangement Workshop
March 7, 2018
Attendance Record

	LAST NAME	FIRST NAME	AGENCY
61	Mejia	Chris	City of Burlingame
62	Melgar	Lenin	City of East Palo Alto
63	Munoz	Genaro	Foster City Parks
64	Nastari	Mario	San Mateo County Parks
65	Neri	Luis	Foster City Parks
66	Ochoa	Jesus	City of redwood city
67	Ortiz	Andres	City of San Mateo
68	Pappas	Stephen	City of Burlingame
69	Penisini	Sharom	City of Redwood City
70	Perez	Leno	City of Menlo Park
71	Perez-Rubio	Elga	City of San Mateo
72	Poss	Nancy	City of Half Moon Bay
73	Puga	Paulo	Castilleja School
74	Reed	Bruce	City of San Mateo
75	Renteria	Estevan	City of Pacifica, CA
76	Richardson	Joshua	City of South San Francisco
77	Rogers	Mark	San Mateo County Parks
78	Ross	Malcolm	City of Belmont
79	Ryan	Matt	Foster City Parks
80	Salazar	Raul	City of Foster City
81	Schaeffer	Kurt	City of Foster City
82	Schroeder	Nazmeen	Foster City Parks
83	Shanahan	Nancy	Frank and grossman
84	Templin	Jeff	City of Daly City
85	Valencia	Alex	City of East Palo Alto
86	Ventrura	Wilber	City of Foster City
87	Weber	Danny	City of Foster City
88	Wheeler	Howard	Loral Landscaping
89	Wilder	Lucas	City of Redwood City
90	Yoshida	Daniel	City of Menlo Park

Evaluation Form Summary
Number of Attendees: 87
Number of Evaluations: 25

Landscape Integrated Pest Management Workshop
SMCWPPP Parks Maintenance and IPM
Wind Room, Library Community Center
1000 E. Hillsdale Blvd., Foster City, CA 94404
Wednesday, March 8, 2017
10:30 a.m. – 3:00 p.m.

What Did You Think of the Following Presentations?

1. **Pesticides and Water Quality** – Vishakha Atre, *EOA*

   17 very helpful **8** somewhat helpful **0** not helpful

2. **IPM for Phytophthora diseases and emerging pests from Southern California** – Igor Lacan, *UC Cooperative Extension*

   21 very helpful **4** somewhat helpful **0** not helpful

3. **IPM for Landscape Management – the New Organic Toolbox –** Thomas Quick, *Growmore, Inc.*

   17 very helpful **8** somewhat helpful **0** not helpful

4. **Bay-Friendly Landscaping Program and Principles for Municipal Landscape Management –** Peter Schultze-Allen, *EOA, BFQP*

   19 very helpful **6** somewhat helpful **0** not helpful

5. **Implementing an IPM Program in the City of Davis –** Martin Guerena, *City of Davis*

   17 very helpful **6** somewhat helpful **0** not helpful

6. **Regulatory Update, Common Violations, and Safe Use and Mixing –** Ione Yuen, *San Mateo County Agriculture/Weights and Measures*

   20 very helpful **3** somewhat helpful **0** not helpful

Did this workshop meet your expectations? **24** Yes **0** No

Suggestions for future workshop topics:

- Composting and uses.
- Drought tolerant planting.
- Research on what the risk is to applicators to the exposure of pesticides.
- Designing out the use of sprays.
- None, keep it the same.
- Water conservation.
- More on biological controls.
- Do not have the same subjects covered by local CAPCA/PAPA seminars.
- More information on staying compliant with Healthy Schools Act regulations.
- Bees and organics.

General Comments:

- New organic toolbox and the commercial-focused presentations could be a bit more concise and centered on municipal practitioners.
- Great class!
- Good food, good talks. Keep up the good work!
- It was great!
- Very good agenda and location.
- Great lunch.
- Good job.
- Thank you for offering this.
- Some presentations were rushed – need more time to impart their information.
- Great speakers.
- We should get 3.5 hours of CEU's if the workshop is 3.5 hours long.

AGENDA

Integrated Pest Management (IPM) Workshop

(Sponsored by SMCWPPP Parks Maintenance and IPM Workgroup)

Working with Pest Control Contractors to Ensure Stormwater Permit Compliance

Wind Room, Library Community Center
1000 E. Hillsdale Blvd.
Foster City, CA 94404
Tuesday, May 15, 2018
9:00 a.m. – 12:00 p.m.

Registration and Refreshments	9:00 am – 9:25 am
Welcoming Remarks Richard Holtz, *City of Burlingame*	9:25 am – 9:30 am
Requirements in the Municipal Regional Permit for Municipal Pest Control Contractors Vishakha Atre, *EOA*	9:30 am – 9:50 am
SMCWPPP Pesticide Tracking Spreadsheet Courtney Siu, *EOA*	9:50 am – 10:15 am
Ins and Outs of IPM Contract Management Tanya Drlik, *Contra Costa County*	10:15 am – 11:00 am
Break	11:00 am – 11:15 am
Capturing Contractor Activities with Creative Compliance Amber Schat, *City of San Jose*	11:15 am – 11:55 am
Closing Remarks Richard Holtz, *City of Burlingame*	11:55 am – 12:00 pm

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SMCWPPP Integrated Pest Management
(IPM) Contractor Management Workshop
Library Community Center, Foster City
May 15, 2018
Attendance Record

Last Name	First Name	Agency
Bixby	Justin	Town of Portola Valley
Black	Keegan	City of Brisbane
Blakley	David	City of San Mateo
Bray	Dennis	City of Daly City
Caliendo	Chris	City of Daly City - Parks
Camfield	Mark	City of Redwood City
Carroll	Kelly	CSG Consultants/Town of Colma/City of Half Moon Bay
Castro	Carlos	Town of Hillsborough
Chiamos	Peter	City of Foster City
Crescenzi	Nicholas	City of Daly City
Del Carlo	Matthew	San Mateo County Parks
Fink	David	City of San Mateo
Gotelli	Louis	Town of Colma
Holtz	Richard	City of Burlingame
Immethun	Joe	San Mateo County Parks
Lee	Jennifer	City of Burlingame
Ligon	Grant	City of San Mateo
Melgar	Lenin	City of East Palo Alto
Moll	Karl	City of Daly City
Oliver	Patrick	County of San Mateo
Ormshaw	Hannah	San Mateo County Parks
Passarelli	Chris	City of San Mateo
Templin	Jeff	City of Daly City
Thompson	Paul	City of Daly City Parks
Tolmasoff	Matthew	San Mateo County Parks
Wilder	Lucas	City of Redwood City
Yee	Daniel	City of Redwood City
Zander	Kurt	City of Foster City

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
Clean Water. Healthy Community.

Evaluation Summary Form

INTEGRATED PEST MANAGEMENT (IPM) WORKSHOP

Working with Pest Control Contractors to Ensure Stormwater Permit Compliance

(Sponsored by SMCWPPP Parks Maintenance and IPM Workgroup)

Foster City, CA

Tuesday, May 15, 2018
Attendance: 28
Evaluations: 17

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1. **Requirements in the Municipal Regional Permit for Municipal Pest Control Contractors –** Given by Vishakha Atre, EOA

   Very Useful 12 **Somewhat Useful 4** **Not useful 0**

   Comments:
   - Good intro, since I am new to IPM!
   - Very good overview, helped me understand the basics and why IPM is important.

2. **SMCWPPP Pesticide Tracking Spreadsheet** – Given by Courtney Siu, EOA

   Very Useful 8 **Somewhat Useful 8** **Not useful 0**

   Comments:
   - I am not gonna be the one filling out the sheet, but it's a great tool!
   - Not as applicable to me, but good to know.
   - I liked the live demo, but didn't understand why the tabs were not in order of steps, seems like it would flow better.

3. **Ins and Outs of IPM Contract Management –** Given by Tanya Drlik, Contra Costa County

   Very Useful 10 **Somewhat Useful 5** **Not useful 1**

   Comments:
   - Good points, just not applicable to me.
   - My wheel house!
   - Great presentation, excellent information.
   - Very knowledgeable.
   - The handout for the points to remember when you're contracting out.
   - Actual contracts in use might be good to use as a guide.

Note: More on back….

4. **Capturing Contractor Activities with Creative Compliance –** Given by Amber Schat, City of San Jose

   Very Useful 12 **Somewhat Useful 5** **Not useful 0**

   Comments:

   - Presentation style was entertaining, I paid more attention.
   - Program I have not seen before.
   - Nice.
   - Engaging great insights.
   - Great presentation, awesome presenter.
   - Well thought out and helpful.
   - I want to know when she is doing her gig at The Improv.
   - Great presentation!
   - Very funny and engaging speaker.
   - Would love to see her again for other SMCWPPP trainings.
   - She is lively speaker which makes watching her presentation enjoyable to watch.

5. **Did this training meet your expectations?** **Yes:** 15 **No:** 0
   - Great overview

6. **What parts of the training were most useful to you?**
   - Ins and outs.
   - Tracking spreadsheet (3).
   - Nuances and reporting requirements.
   - Sharepoint reporting/tracking.
   - How to set up contractor control for IPM compliance.
   - Software available for documentation.
   - Though it may not be interesting knowing the actual requirements are the most useful.
   - Tanya's presentation on contracting.
   - Live demo.

7. **What would have made this training more useful?**
   - Little longer.
   - Everything was perfect.
   - Keep the same.
   - More landscaping less structural.
   - Software availability.

8. **What topics would you recommend for a future training?**
   - Some actual contractors or maintenance.
   - Water conservation in public landscaping.
   - IPM strategies for grasses in iceplant.
   - Common oversights with contractors.

9. **General Comments?**
   - I work to reduce use of chemicals. But we need to have proven example that people can see.
   - Good time.
   - Good talk.
   - Great information.
   - Good venue.
   - Excellent use of my time, thank you.
   - First two topics were covered before at previous meeting. A shorter meeting with the last part be good.

Letter mailed to pest control operators:

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
Clean Water. Healthy Community.

555 County Center
Redwood City, CA 94063

P 650.599.1406
flowstobay.org

March, 13 2018

Pest Control Professionals:

Help Protect San Mateo County Waterways from Pesticides in Stormwater Runoff

Pest control professionals in San Mateo County play an important role in keeping pesticides out of our local creeks, the San Francisco Bay, and the Pacific Ocean. The City/County Association of Governments of San Mateo County – a joint powers agency of the 20 cities and towns and the County – administers the San Mateo Countywide Water Pollution Prevention Program, which assists local governments with reducing pollution in stormwater runoff. **We need your help to protect our waterways** from pesticides that may be mobilized during storm events after being applied in the urban environment.

Water quality monitoring data in San Mateo County show ongoing toxicity impacts in local creeks related to the application of structural pest control products, including pyrethroids and fipronil. Pesticide toxicity is a critical water quality problem, and we hope you will help minimize the negative effects on water quality and aquatic life by **adopting Integrated Pest Management (IPM) practices and becoming a certified IPM pest control operator**. If your business is already certified, please consider having individual employees certified as well.

There are several options for individual or business certifications of your business exist in San Mateo County:

- **EcoWise Certification** – EcoWise Certified is an independent, third-party certification program that focuses on prevention-based pest control. Learn more: http://www.ecowisecertified.com.

- **Green Pro Certification** – Certification offered by the National Pest Management Association (NPMA). Visit http://www.certifiedgreenpro.org for more information.

- **Green Shield Certification** - Operated by the IPM Institute of North America. Learn more: http://www.greenshieldcertified.org.

If you need more information, please contact Reid Bogert at (650) 599-1433 or rbogert@smcgov.org. You can find more information about IPM practices in San Mateo County at www.flowstobay.org/pestcontrol.

Sincerely,

Matthew Fabry, P.E.
Manager, Countywide Water Pollution Prevention Program

A program of the City/County Association of Governments (C/CAG)

Appendix 10

- Trash Subcommittee Attendance List – FY 2017/18
- Litter Work Group Attendance List – FY 2017/18
- FY 2017/18 Litter Work Group Work Plan
- Biotreatment Soil Supplier List
- Litter Reduction Toolkit for Multi-Family Dwellings
- Illegal Dumping Workshop
    - Workshop Flyer
    - Agenda
    - Attendance List
    - Evaluations Summary

Trash Subcommittee Meeting Attendance – FY 2017/18

Name	Agency	Phone	E-Mail	09/07/17	12/07/17	04/16/18	06/07/18
Tim Murray	City of Belmont	(650) 222-6460	tmurray@belmont.gov				
Dianne Lynn	City of Belmont	(650) 595-7425	dlynn@belmont.gov				
Brandon Tyler	City of Belmont	(650) 222-5240	btyler@belmont.gov				
Ryan Moran	City of Belmont	(650) 222-6405	rmoran@belmont.gov				X
Matt Fabry	SMCWPPP Program Manager	(650) 599-1410	mfabry@co.sanmateo.ca.us			X	
Reid Bogert	C/CAG	(650) 599-1433	rbogert@smcgov.org	X		X	
Keegan Black	City of Brisbane	(415) 728-7986	kblack@ci.brisbane.ca.us	X	X		
Randy Breault	City of Brisbane	(415) 508-2131	rbreault@ci.brisbane.ca.us				
Rob Mallick	City of Burlingame	(650) 558-7673	rmallick@burlingame.org				
Rick Horne	City of Burlingame	(650) 558-7672	rhorne@burlingame.org				X
Mike Heathcote	City of Burlingame	(650) 558-7679	mheathcote@brluingame.org				
Jennifer Lee	City of Burlingame	(650) 558-7381	jlee@brluingame.org	X	X	X	X
Louis Gotelli	Town of Colma	(650) 333-0295	louis.gotelli@colma.ca.gov	X			
Muneer Ahmed	Town of Colma	(650) 757-8894	Muneer.ahmed@colma.ca.gov				
Jeff Fornesi	City of Daly City	(650) 991-5752	jfornesi@dalycity.org				
John Fuller	City of Daly City	(650) 991-8039	jfuller@dalycity.org				
John Sanchez	City of Daly City	(650) 991-8265	jsanchez@dalycity.org	X		X	X
Ryan Brunmeier	City of Daly City	(650) 991-8065	rbrunmeier@dalycity.org				
Sibely Calles	City of Daly City	(650) 991-8054	scalles@dalycity.org		X	X	X
Michelle Daher	City of East Palo Alto	(650) 853-3197	mdaher@cityofepa.org				
Jay Farr	City of East Palo	(650) 853-3105	jfarr@cityofepa.org				
Norm Dorais	City of Foster City	(650) 286-3279	ndorais@fostercity.org				
Vivian Ma	City of Foster City	(650) 286-3270	vma@fostercity.org			X	
Daniel Barros	City of Half Moon Bay	(650) 636-3753	dbarros@hmbcity.com				
Mark Lander	City of Half Moon Bay	(650) 522-2562	markl@csgengr.com		X	X	
Gary Francis	Town of Hillsborough	(650) 375-7506	gfrancis@hillsborough.net				
Brian Henry	City of Menlo Park	(650) 330-6799	bphenry@menlopark.org				
Craig Centis	City of Millbrae	(650) 259-2369	ccentis@ci.millbrae.ca.us				
Mike Killigrew	City of Millbrae	(650) 259-2374	mkilligrew@ci.millbrae.ca.us			X	
Raymund Donguines	City of Pacifica	(650) 738-3767	donguinesr@ci.pacifica.ca.us	X		X	
Howard Young	Town of Portola Valley	(650) 851-1700 X214	hyoung@portolavalley.net				
Terrance Kyaw	City of Redwood City	(650) 780-7466	TKyaw@redwoodcity.org				

Name	Agency	Phone	E-Mail	09/07/17	12/07/17	04/16/18	06/07/18
Vicki Sherman	City of Redwood City	(650) 780-7468	vsherman@redwoodcity.org	X	X	X	X
Eddie Pastrano	City of Redwood City	(650) 780-7477	epastrano@redwoodcity.org			X	X
Jason Claire	City of Redwood City	(650) 208-6365	jclaire@redwoodcity.org			X	
Albert Mungria	City of Redwood City	(650) 780-7477				X	
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Dennis Bosch	City of San Bruno		dbosch@sanbruno.ca.gov				
Robert Wood	City of San Bruno	(650) 616-7046	rwood@sanbruno.ca.gov				
Ted Chapman	City of San Bruno	(650) 616-7169	TChapman@sanbruno.ca.gov	X	X	X	X
Joe Ortiz	City of San Bruno	(650) 333-8336	Jortiz@sanbruno.ca.gov			X	
Lou Duran	City of San Carlos	(650) 743-6769	lduran@cityofsancarlos.org				
Kathryn Robertson	City of San Carlos	(650) 802-4212	KRobertson@cityofsancarlos.org		X		X
Sarah Scheidt	City of San Mateo	(650) 522-7385	sscheidt@cityofsanmateo.org			X	
Grant Ligon	City of San Mateo	(650) 823-1285	gligon@cityofsanmateo.org	X		X	
Roxanne Murray	City of San Mateo	(650) 522-7346	rmurray@cityofsanmateo.org		X		
Rick Pina	City of San Mateo	(650) 522-7373	rpina@cityofsanmateo.org		X		
Sven Edlund	City of San Mateo	(650) 522-7342	sedlund@cityofsanmateo.org		X		
Mark Swenson	City of San Mateo	(650) 522-7349	mswenson@cityofsanmateo.org				X
Andrew Wemmer	City of So. San Francisco	(650) 829-3883	andrew.wemmer@ssf.net		X		
Braden Christensen	City of So. San Francisco	(650) 829-3883	braden.christensen@ssf.net	X			
Daniel Garza	City of So. San Francisco	(650) 829-3880	daniel.garza@ssf.net			X	X
Julie Casagrande	County of San Mateo - DPW	(650) 599-1457	jcasagrande@co.sanmateo.ca.us	X		X	X
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Lillian Clark	County of San Mateo		lclark@co.sanmateo.ca.us				
Katherine Sheehan	CSG Consultants	(650) 522-2506	katherines@csgengr.com				
Kelly Carroll	CSG Consultants	(408) 921-4480	kellyc@csgengr.com	X		X	X
Whitney Schmucker	SGA, Inc.	(510) 224-5086	wschmucker@sga-inc.net				
Ian Hull	ERM	(925) 708-0650	hulli@samtrans.com				X
Chris Sommers	EOA, Inc.	(510) 832-2852 X109	csommers@eoainc.com	X	X	X	X
John Fusco	EOA, Inc.	(510) 832-2852 X130	jrfusco@eoainc.com	X	X	X	X
Paul Randall	EOA, Inc.	(510) 832-2852 X126	prandall@eoainc.com		X		
No. Attending				**15**	**15**	**25**	**17**

San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) 2017-18 Litter Work Group						
Name (e-mail)	**Phone**	**Agency**	**8/29/17**	**11/7/17**	**2/6/18**	**5/7/18**
Matt Fabry mfabry@smcgov.org	650-599-1419	CCAG/SMCWPP	X	X		X
Reid Bogert rbogert@smcgov.org			X	X	X	X
Diane Lynn dlynn@belmont.gov	650-595-7425	City of Belmont		X		
Julie Freitas jfreitas@belmont.gov	650-595-7425	City of Belmont				X
Rick Locke rlocke@belmont.gov						
Keegan Black kblack@ci.brisbane.ca.gov	415-508-2131	City of Brisbane	X	X	X	X
Jennifer Lee jlee@burlingame.org	650-558-7381	City of Burlingame	X	X	X	
Rick Horne rhorne@burlingame.org	650-558-7672	City of Burlingame				X
Michael Heathcote mheathcote@burlingame.org						
Louis Gotelli lgotelli@colma.ca.gov		Town of Colma				
Stephen Stolte sstolte@dalycity.org	650-991-8126	City of Daly City			X	X
Michelle Daher mdaher@cityofepa.org	650-853-3197	City of East Palo Alto				
Norm Dorais ndorais@fostercity.org		City of Foster City		X	X	X
Gary Francis gfrancis@hillsborough.net		Town of Hillsborough	X			
Shelly Reider sreider@ci.millbrae.ca.us	650-259-2444	City of Millbrae	X			X
Vicki Sherman vsherman@redwoodcity.ca.us		City of Redwood City	X	X	X	X
Ted Chapman tchapman@sanbruno.ca.gov		City of San Bruno		X	X	
Kathryn Robertson krobertson@cityofsancarlos.org		City of San Carlos	X	X	X	X
Lou Duran lduran@cityofsancarlos.org						
Roxanne Murray rmurray@cityofsanmateo.org	650-522-7346	City of San Mateo	X	X	X	X
Sven Edlund sedlund@cityofsanmateo.org			X			
Grant Ligon gligon@cityofsanmateo.org				X		X

San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) 2017-18 Litter Work Group						
Name (e-mail)	**Phone**	**Agency**	**8/29/17**	**11/7/17**	**2/6/18**	**5/7/18**
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Daniel Garza Daniel.Garza@ssf.net					X	X
Breann Liebermann bliebermann@smcgov.org		San Mateo County Office of Sustainability	X	X		X
Kevin Lu klu@smcgov.org				X	X	
Lillian Clark lclark@smcgov.org	650-599-1447		X	X		
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Julie Casagrande jcasagrande@smcgov.org	650-599-1457	San Mateo County Public Works				
Julia Au jau@rethinkwaste.org	650-802-3509	Rethink Waste			X	X
Gino Gasparini ggasparini@recology.com	650-598-8254	Recology-SM County	X	X	X	
Yvette Madera ymadera@recology.com	650-598-8242		X	X		X
Monica Devincenzi MDevincenzi@republicservices.com	650-756-1130 x224	Republic Services				
Susan Kennedy susan@ssfscavenger.com	925-437-2510	South SF Scavenger	X	X	X	
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Chris Sommers csommers@eoainc.com	510-832-2852 x 109	EOA Inc.	X	X	X	X
Peter Schultze-Allen pschultze-allen@eoainc.com	510-832-2852 x 128		X	X	X	X

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Water Pollution Prevention Program
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SMCWPPP Litter Work Group

FY 2018-19 Work Plan

Recommended by LWG at May 7, 2018 Meeting

May 2018

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INTRODUCTION AND BACKGROUND

Trash Impacts on Water Bodies and Regulatory Responses

Trash (i.e., litter, floatables, gross pollutants, or solid waste) is a serious problem for watersheds where it presents an aesthetic nuisance, and a serious threat to aquatic life in creeks and the oceans. Data suggest that plastic trash in particular persists for hundreds of years in the environment and can pose a threat to wildlife through ingestion, entrapment, as well as harboring chemicals potentially harmful to the aquatic environment. Types of trash commonly observed in watersheds and water bodies include food and beverage containers (e.g., plastic bags and bottles) and packaging, cigarette butts, food waste, construction and landscaping materials, furniture, electronics, tires, and hazardous materials (e.g., paint and batteries). The San Francisco Bay Regional Water Quality Control Board (Water Board) has listed multiple tributaries and shorelines as being impaired for trash.

In response to concerns about urban trash impacts on receiving water bodies in the San Francisco Bay area, in 2009 the Water Board included trash reduction requirements in the Municipal Regional Stormwater (MRP) National Pollutant Discharge Elimination System (NPDES) Permit for Phase I communities in the Bay area (Order R2-2009-0074.) These provisions require applicable Bay Area municipalities (Permittees) to reduce trash from their Municipal Separate Storm Sewer Systems (MS4s) by 40% before July 1, 2014, 70% by 2017, 80% by 2019, and to a point of "no adverse impacts" to water bodies by 2022.

Trash Sources and Pathways

Trash in San Francisco Bay Area creeks and shorelines originates from a variety of sources: pedestrian litter, waste containers, illegal dumping on land areas, and litter from vehicles. Pedestrian litter includes trash sources from high traffic areas near businesses and schools, transitional areas where food/drinks are not permitted (e.g. bus stops), and from public or private special events with high volumes of people. Inadequate waste container management includes sources such as overflowing or uncovered containers and dumpsters as well as the dispersion of household and business-related trash and recycling materials before, during, and after collection. On-land illegal dumping of trash is related to a variety of societal issues including construction activity, inadequate collection services and homeless encampments. Trash from vehicles occurs due to littering from automobiles and uncovered loads of material being transported to transfer stations, processing facilities and landfills.

Types of Trash Control Measures

SMCWPPP Permittees are attempting to address trash load reduction requirements outlined in the MRP by implementing a number of control measures designed to significantly reduce trash in local creeks and the Bay. Control measures implemented to-date include:

- Installation and maintenance of trash capture devices that intercept trash once in the storm drain system;
- Adoption and enforcement of product-related ordinances, such as single-use plastic bag bans;
- Enhanced street sweeping;
- Strategic placement and selection of public trash containers;
- Improvements to inadequately-sized or serviced private containers/bins;
- Public outreach and education campaigns;
- On-land cleanups and illegal dumping prevention;
- Enhanced storm drain inlet maintenance; and,
- Creek and shoreline cleanups and prevention programs.

SMCWPPP Trash Subcommittee and Litter Work Group

The San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) was established in 1990 to reduce the pollution carried by stormwater into local creeks, the San Francisco Bay, and the Pacific Ocean. The program is a partnership of the City/County Association of Governments (C/CAG), each

incorporated city and town in the county, and the County of San Mateo, which share a common municipal stormwater NPDES permit. The SMCWPPP Technical Advisory Committee (TAC) functions as the decision-making body for routine program activities and provides oversight and guidance to five subcommittees.

The SMCWPPP Trash Subcommittee assists member agencies with the implementation of new or enhanced trash control measures and actions required by the MRP. The Trash Subcommittee generally meets four to six times a year. In FY 2013-14, the Subcommittee recommended that a work group be formed to enhance coordination between representatives from the local hauling community and municipal staff focused on stormwater and trash management.

In response, the SMCWPPP Litter Work Group began meeting on regular basis in March of 2014. The meetings are attended by representatives from: Recology San Mateo, South San Francisco Scavenger Company; Rethink Waste (the South Bayside Waste Management Authority); and stormwater and trash program municipal staff from jurisdictions in San Mateo County. The goals of the Litter Work Group are to collectively identify opportunities to reduce the contributions of litter generated from disposal, collection-associated sources and illegal dumping; educate the public and those involved with litter control efforts; and to coordinate and share information with the Zero Litter Initiative (ZLI) in Santa Clara County.

This Work Plan was developed through the SMCWPPP Litter Work Group. The Work Group provided input on the highest priority tasks included in this Work Plan and commented on the Draft version. Response to comment are included as Attachment A.

Work Group Tasks from 2014 through 2018

The Litter Work Group completed the following tasks in previous fiscal years:

- In FY 2013-14, the Work Group coordinated the 1st Litter Roundtable event in June 2014 that focused on various aspects of container management.

- In FY 2014-15, the Work Group organized the 2nd Litter Roundtable event in June 2015 that focused on commercial waste container management and produced:
    - Right Size – Right Service Campaign Outreach Materials

- In FY 2015-16, the Work Group completed:
    - A report on “Litter Practices Recommendations for Solid Waste Franchise Agreements”
    - Compilation of data for the Illegal Dumping and Container Overage maps

- In FY 2016-17, the Work Group completed:
    - Illegal Dumping and Container Overage maps for member agencies staff
    - The 1st draft of the “Litter Reduction Toolkit for Multi-Family Dwellings”

- In FY 2017-18, the Work Group to date has completed:
    - Recommendations to Rethink Waste – Recology San Mateo Contract Extension
    - The final “Litter Reduction Toolkit for Multi-Family Dwellings”
    - Coordination with Caltrans on trash capture efforts
    - Coordinaton with the Zero Litter Initiative in Santa Clara County

  Remaining and on-going tasks for FY 2017-18 include:
    - Coordinating the 3rd Litter Roundtable (Workshop) focusing on illegal dumping and enforcement
    - Drafting and approving a Work Plan for FY 2018-19.

WORK PLAN OBJECTIVES

To assist municipalities with achieving the 70%, 80% and 100% trash/litter reduction goals in the MRP, the SMCWPPP Trash Committee and Litter Work Group developed this work plan to achieve the following objectives:

- **Train the Design Community on Litter Reduction Efforts at Multi-Family Residential Properties** – Using the Litter Work Group's recently developed "Litter Reduction Toolkit for Multi-Family Dwellings" and a fact sheet summarizing the findings, the program will develop and hold a training workshop for the design community (architects, engineers, contractors, municipal staff and haulers) to review design, operational and maintenance issues and corresponding litter management practices that can be used to reduce litter and waste in multi-family dwellings.

  Objective: *Reduce litter generation at Multi-Family residential properties through a targeted training event.*

- **Educate Targeted Sectors of the Community on these Issues** – The SMCWPPP Public Information and Participation (PIP) Subcommittee is conducting outreach of various types to the community in San Mateo County. In the past the Litter Work Group has coordinated with the PIP Subcommittee on efforts related to litter reduction, such as Adopt-a-Block and School outreach efforts. The Work Group can contribute knowledge and resources from municipal staff who coordinate waste reduction and recycling efforts within their jurisdictions and from waste hauler staff operating in the jurisdiction. Leveraging the efforts and resources of multiple programs and franchised companies can increase effectiveness.

  Objective*: Continue to coordinate with the SMCWPPP PIP Subcommittee on the investigation of potential enhanced outreach efforts at schools, multi-family homes, and business communities.*

- **Share Information with the Countywide Recycling Committee Members on these Issues** – The San Mateo County Recycling Committee (SMCRC) meets quarterly and is conducting outreach of various types to the community in San Mateo County. In the past the Litter Work Group has coordinated with the SMCRC on efforts related to litter reduction and reducing waste. Leveraging the efforts and resources of multiple programs and franchised companies can increase effectiveness.

  Objective*: Continue to coordinate with the Countywide Recycling Committee.*

- **Coordinate with Litter Reduction Partners –** The California Department of Transportation (Caltrans) is taking action to reduce litter. This important player in solving the trash problem in San Mateo County is subject to requirements for trash reduction that are separate from the city/county permit requirements. Municipalities are collaborating with Caltrans on educating the public about litter reduction, street sweeping, litter removal (on-land cleanups) and improved trash bin/container management programs. The Santa Clara Valley Zero Litter Initiative (ZLI) was formed in 2010 to bring together stakeholders interested in eliminating litter and its impacts throughout the Santa Clara Valley. The ZLI combats this multi-faceted problem by bringing stakeholders together to identify collaborative solutions. Since forming, ZLI has conducted roundtables about litter associated with garbage/recycling collection including a Right-Size Right-Service campaign for locations where dumpsters are contributing litter to the storm drain, transport and disposal pathways. Other topics of interest identified by ZLI stakeholders include litter reduction solutions via business engagement, law/code enforcement and highway/freeway controls. SMCWPPP agencies can increase the effectiveness of their litter reduction efforts by sharing resources with Caltrans and the ZLI.

  Objective: *Continue to coordinate efforts and share information with the Zero Litter Initiative in Santa Clara County and Caltrans to further reduce litter.*

PROPOSED TASKS FOR FY 2018-19

For FY 2018-19, the Litter Work Group proposes to conduct the following tasks:

1. **Continue to Educate the Design Community on Litter and Waste Reduction Best Management Practices in New Development Projects and at Existing Properties**

    A. **Plan and Coordinate a 4th Roundtable Event Focusing on the Design and Operation of Multi-Family Buildings** – Using the newly developed *Litter Reduction Toolkit for Multi-Family Dwellings*, the Program will coordinate a roundtable event with Permittee stormwater management staff, new development-related staff, hauler staff, architects, engineers and contractors from the private sector to share design, operation and maintenance information and best practices for reducing litter and waste at existing and new multi-family buildings. All communications and outreach regarding the roundtable will be handled through this task, including agenda preparation, speaker identification and coordination, and facility and food/beverage coordination.

    B. **Create a Fact Sheet of the Litter Reduction Toolkit for Multi-Family Dwellings** - Responding to a request from the Litter Work Group, a fact sheet (Executive Summary) will be developed that summarizes the findings and recommendations from the *Litter Reduction Toolkit for Multi-Family Dwellings*.

2. **Education, Communication and Outreach**

    A. **Coordinate with Caltrans –** The Program will continue to communicate with the California Department of Transportation (Caltrans) and discuss improvements on litter reduction and prevention actions, including the installation of trash capture devices and implementation of other control measures. Coordination topics may include illegal dumping response, full capture system installation and maintenance, and on/off ramp litter removal. Meeting coordination, agenda and summary preparation, and action item documentation and follow up will be developed/conducted through this task.

    B. **Coordinate with the PIP Subcommittee –** The Program will continue to coordinate with the PIP Subcommittee on a campaign focusing on the Multi-Family sector in FY 2018-19. As requested and within the budget allotted, the Program will attend meetings/calls, provide feedback on draft materials, and respond to inquiries from PIP consultants.

    C. **Coordinate with the San Mateo Countywide Recycling Committee -** The Program will continue to share information with the SMCRC in FY 2018-19. As requested and within the budget allotted, the Program will attend quarterly meetings, provide feedback on draft outreach materials, and coordinate with the County Office of Sustainability.

    D. **Coordinate with ZLI –** The Program will continue to share information and best practices with the Santa Clara Valley Zero Litter Initiative (ZLI) during FY 2018-19. As requested and within the budget allotted, the Program will attend ZLI meetings and webinars.

3. **Litter Work Group Facilitation -** To support Tasks 1 and 2, the Program will convene up to two meetings of the Litter Work Group. Meeting material preparation, including agendas, and follow up activities (e.g., summaries and action items) will be conducted as part of this task.

Estimated Costs and Schedule

The proposed work plan schedule and associated cost estimates for FY 2018-19 are included in Table 1. Depending on the complexities and challenges associated with implementation of the tasks described in the work plan, the proposed schedule may be revised. Costs associated with each task are estimates. More definition of each task will be necessary once the work plan or a portion thereof is approved by the SMCWPPP TAC.

Table 1. SMCWPPP Trash Committee and Litter Work Group Proposed FY 18-19 Tasks, Schedule and Estimated Costs.

Task #	Task	Description	Start Date	Complete Date	Estimated Program Cost
1.A	Roundtable Event #4	Coordinate and facilitate a 4th Litter Roundtable on the issue of design, operation and maintenance of Multi-Family Dwellings to reduce litter and waste.	July 2018	December 2018	$8,000
1.B	Multi-Family Litter Reduction Toolkit Factsheet	Create and distribute a factsheet summarizing the Litter Reduction Toolkit for Multi-Family Dwellings.	July 2018	December 2018	$4,000
2.A	Enhanced Coordination with Caltrans	Coordinate and facilitate meetings with Caltrans and follow up on action items to enhance the coordination between Caltrans and member agencies.	July 2018	June 2019	$3,000
2.B	Coordinate with the PIP Subcommittee	Attend meetings/calls, provide feedback on draft materials, and respond to inquiries from PIP consultants.	July 2018	June 2019	$1,000
2.C	Coordinate with the San Mateo Countywide Recycling Committee	Share information and best practices at the quarterly San Mateo Countywide Recycling Committee via CRC meetings.	July 2018	June 2019	$2,000
2.D	Coordinate with Santa Clara ZLI	Share information and best practices with the Santa Clara Valley Zero Litter Initiative (ZLI) via ZLI meetings and webinars.	July 2018	June 2019	$1,000
3.	Litter Work Group Facilitation	Convene two Litter Work Group meetings/calls, provide agendas and summaries.	July 2018	June 2019	$7,000
			Total Cost	$26,000	

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BIOTREATMENT SOIL MIX SUPPLIER LIST

Company	Contact Name	Phone	Address	City	Zip	E-mail	Website
American Soil & Stone Products Inc.	Ryan Hoffman	510-292-3018	Richmond Annex, 2121 San Joaquin Street, Building A	Richmond	94804	ryan@americansoil.com	www.americansoil.com
L.H. Voss Materials, Inc.	Nyoka Corley	925-676-7910	5965 Dougherty Road	Dublin	94568	nyoka.corley@gmail.com	www.lhvoss.com
Lehigh Hanson Aggregates	Chris Stromberg	510-246-0393	4501 Tidewater Avenue	Oakland	94601	chris.stromberg@lehighhanson.com	www.lehighhanson.com
Lyngso Garden Materials, Inc.	Paul Truyts	650-333-1044 650-364-1730	345 Shoreway Road	San Carlos	94070	ptruyts@lyngsogarden.com	www.lyngsogarden.com
Marshall Brothers Enterprises, Inc.	Phillip Marshall	925-449-4020	P.O. Box 2188	Livermore	94551	phillip@mbenterprises.com	www.mbenterprises.com
Pleasanton Trucking Inc.	Tom Bonnell	925-449-5400	P.O. Box 11462	Pleasanton	94588	pleasanton_trucking@yahoo.com	www.pleasantontrucking.com
Recology Blossom Valley Organics	Denette Covarrubias	209-545-7718 209-597-1209	6133 Hammett Court	Modesto	95358	dcovarrubias@recology.com	www.recology.com/blossom-valley-organics-modesto
Redi-Gro Corporation	Sharon Yon	916-381-6063 800-654-4358	8909 Elder Creek Road	Sacramento	95828	redigropro@redi-gro.com	www.redi-gro.com
TMT Enterprises, Inc.	Matt Moore	408-432-9040	1996 Oakland Road	San Jose	95131	info@tmtenterprises.net	www.tmtenterprises.net

As of: 8/11/2017

Disclaimer: SMCWPPP provides this list of biotreatment soil mix suppliers for the use of its member agencies, contractors, designers and others in finding suppliers for their projects. Suppliers are listed based on a general review of their soil mix product including test results, adherence to the Attachment L specification in the MRP and knowledge of the specification. Therefore users of this SMCWPPP list must make the final determination as to the products and adherence to Attachment L of the MRP. Users of the list assume all liability directly or indirectly arising from use of this list. The listing of any soil supplier is not be construed as an actual or implied endorsement, recommendation, or warranty of such soil provider or their products, nor is criticism implied of similar soil suppliers that are not listed. This disclaimer is applicable whether the information is obtained in hard copy or downloaded from the Internet. Check the SMCWPPP website for the “Biotreatment Soil Mix Verification Checklist” and “Biotreatment Soil Mix Supplier Verification Statement” for assistance in reviewing and approving soil mix submittals. www.flowstobay.org/newdevelopment

Litter Reduction Toolkit for Multi-Family Dwellings

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February 2018

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PREFACE

This document was prepared by EOA, Inc. on behalf of the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), a program of the City/County Association of Governments of San Mateo County (C/CAG)[1]. SMCWPPP's Trash Subcommittee formed the Litter Work Group in March of 2014. The Participants of the Work Group include representatives from: Recology San Mateo County (RSMC); South San Francisco Scavenger Company (SSFSC); Republic Services; Rethink Waste (aka the South Bayside Waste Management Authority); SMCWPPP Member Agency staff; and consultants working on litter reduction efforts in San Mateo County. The goals of the Litter Work Group are to collectively identify opportunities to reduce the contributions of litter generated from disposal, collection-associated sources and illegal dumping; educate the public and those involved with litter control efforts; and coordinate and share information with the Zero Litter Initiative (ZLI) in Santa Clara County. The program acknowledges the participation of the Litter Work Group members in the preparation and review of the toolkit.

[1] SMCWPPP is a program of C/CAG, and C/CAG is a joint powers agency of the County of San Mateo and the cities and towns of Atherton, Belmont, Brisbane, Burlingame, Colma, Daly City, East Palo Alto, Foster City, Half Moon Bay, Hillsborough, Menlo Park, Millbrae, Pacifica, Portola Valley, Redwood City, San Bruno, San Carlos, San Mateo, South San Francisco and Woodside.

CONTENTS

ACRONYMS

C/CAG	City/County Agency of Governments of San Mateo County
CALGreen	Green Building Standards Code of the California Building Standards Commission
CalRecycle	California Department of Resources Recycling and Recovery
CBSM	Community Based Social Marketing
CofO	Certificate of Occupancy
COA	Conditions of Approval
CY	Cubic Yards
E-waste	Electronic Waste
FEL	Front-End Loading (Vehicle and Container Type)
HHW	Household Hazardous Waste
HOA	Homeowner's Association
LMP	Litter Management Practice
MFD	Multi-Family Dwelling
MRP	Municipal Regional Stormwater Permit
NPDES	National Pollutant Discharge Elimination System
REL	Rear-End Loading (Vehicle Type and Container Type)
RS2	Right Size – Right Service
RSMC	Recology - San Mateo County
SBWMA	South Bayside Waste Management Authority
SL	Side-Loading (Vehicle Type)
SMCWPPP	San Mateo Countywide Water Pollution Prevention Program
SSFSC	South San Francisco Scavenger Company
TCD	Trash Capture Device
TCO	Temporary Certificate of Occupancy
TMA	Trash Management Area
ZLI	Zero Litter Initiative

SECTION 1 Introduction

Purpose and Organization of Toolkit

The purpose of this document is to provide guidance and identify litter management practices (LMPs) and other tools to prevent and reduce litter at existing and newly constructed multi-family dwelling[2] (MFD) properties within San Mateo County. The content can provide information for SMCWPPP program training opportunities for municipal staff. This guidance is intended for the following audiences:

- Municipal staff from various departments;
- Staff from waste management hauling companies that collect, process and dispose of discarded materials from customers within the County;
- Elected officials and other interested community members; and
- The design and construction community of developers, architects, civil engineers, landscape architects and contractors.

The Toolkit is organized in the following manner:

- Section 1: The purpose and background for the toolkit,
- Section 2: The characteristics of multi-family dwellings and existing site considerations,
- Section 3: New buildings and the design review process,
- Section 4: Steps for using the toolkit's litter management practices, and
- Section 5: Detailed elements of each litter management practice.

Litter Impacts and Regulatory Response

Litter (i.e. trash, floatables, gross pollutants, or solid waste) is a serious problem for watersheds where it presents an aesthetic nuisance, and a serious threat to aquatic life and human health. Data suggests that plastic persists for hundreds of years in the environment. Plastics and other litter pose a threat to wildlife through ingestion or entrapment and may harbor chemicals harmful to the aquatic environment. The San Francisco Bay Regional Water Quality Control Board (Water Board) has listed multiple bodies of

Figure 1. Litter in creeks has impacts

[2] This document uses the CalRecycle definition of an MFD being a property with five dwelling units or more.

water including tributaries and shorelines of the San Francisco Bay that are impaired due to litter.

In response to concerns about urban litter impacts on receiving water bodies in the San Francisco Bay area, the Water Board included litter reduction requirements in the 2009 Municipal Regional Stormwater (MRP) National Pollutant Discharge Elimination System (NPDES) Permit for Phase I communities in the Bay Area (Order R2-2009-0074). These provisions require applicable Bay Area municipalities (Permittees) to reduce litter from their Municipal Separate Storm Sewer Systems (MS4s) by 40 percent before July 1, 2014, 70 percent by 2017, and to a point of "no adverse impacts" to water bodies by 2022. MRP 2.0 (Order R2-2015-0049), adopted on November 19, 2015, continues to require these reductions.

Litter Sources and Pathways at Multi-Family Dwellings

Litter in San Francisco Bay Area creeks and shorelines originates from a variety of sources including pedestrians, waste containers, illegal dumping, and vehicle drivers. This document focuses on MFDs due to the complex nature of this type of land use, the potential for higher levels of litter generation, and the challenging management practices related to these issues. Sources of litter at MFDs include:

- Overflowing or uncovered waste containers and dumpsters due to inadequate management of trash removal schedules or facility maintenance;
- Dispersion of household garbage and recyclable materials before, during, and after collection;
- A lack of educational efforts directed towards management and residents, particularly concerning cigarette butts, and cigarette and food packaging.
- Illegal dumping (also known as abandoned waste) is often generated by residents of MFDs – sometimes when collection services are inadequate or unavailable.
- Pet waste disposal can be an issue at MFDs due to the concentration of pets in high density MFDs and inadequate collection services or containers.

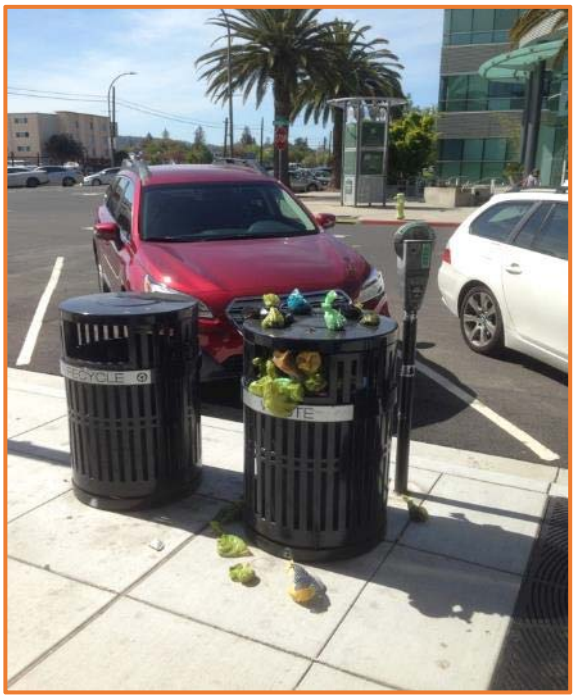


Figure 2. Pet waste disposal litter at an MFD

Housing Trends in San Mateo County

This document focuses on strategies for reducing litter at existing MFDs and also identifies opportunities to address litter during the design of new MFDs. Provision C.3 of the MRP requires new development projects to reduce pollutants, such as litter, by treating on-site

stormwater runoff with biotreatment and other types of systems. Many of the MFDs being built in San Mateo County are high-density transit oriented urban infill projects. High density housing near transit is also being built in response to climate change. The supply of affordable housing is also a major concern that is being addressed by building more MFDs.

According to the US Census Bureau's 2016 American Community Survey, in San Mateo County there are approximately 76,000 MFD units that represent about 28% of the housing units in the County. Approximately 165,000 residents or 22% of the total residents in the County lived in those MFD units. According to estimates taken from ABAG data, the number of MFD units is expected to grow by approximately 20% by 2030. Well-designed new MFD properties have the potential to greatly reduce litter generation; therefore it is important to consider structural and operational litter controls in the municipal design review process. This document will provide guidance on litter related control measures for municipal staff to consider during project reviews.

Other Litter-Related Regulatory Programs Affecting MFDs

The State of California has many regulations directed towards increasing recycling and composting at MFDs properties. There are also state laws related to the disposal of special types of materials such as electronic waste (e-waste), tires, mattresses and household hazardous waste. In 1991 the State began requiring new and expansion construction projects to provide adequate storage space for the collection of recyclables. The California Green Building Standards Code (CALGreen) contains requirements related to waste reduction with new and expanded buildings.

State policy has set a goal of 75% waste diversion by 2020[3], and there are new state laws (AB 341 and AB 1826), for diversion of multifamily recyclables and organic waste. Some agencies such as the Alameda County Waste Management Authority and Recycling Board (StopWaste) have set higher standards, with a goal of no more than 10 percent of compostables and recyclables to be disposed as refuse.

Figure 3. Overflowing containers generate litter

AB 341: As of July 1, 2012 MFD properties are required to provide recycling collection services.

[3] http://www.calrecycle.ca.gov/75Percent/

AB 1826: As of January 1, 2017 MFD properties, who generate 4 cubic yards of organic waste per week, are required to provide collection for plant debris collection services. Beginning on January 1, 2019, MFDs that generate 4 cubic yards of solid waste per week will be required to comply. That could drop to 2 cubic yards per week after January 1, 2020 depending on actions from the California Department of Resources Recycling and Recovery (CalRecycle) and would affect most MFDs at that point. This law doesn't apply to food scrap collection at MFDs – only plant debris.

CALGreen: As of January 1, 2017, the CALGreen building code standards for the issuance of residential building permits require new MFDs to provide adequate space for storage of solid waste, recyclable and compostable materials. Taller MFDs (over three habitable stories), that are being altered by 30% or more of additional habitable space, are also required to comply.

All of these regulations are driving changes in collection practices. Integrating regional litter control efforts with the statewide waste reduction and toxic product control measures will produce the most effective practices. See Appendix 5 for links to more information.

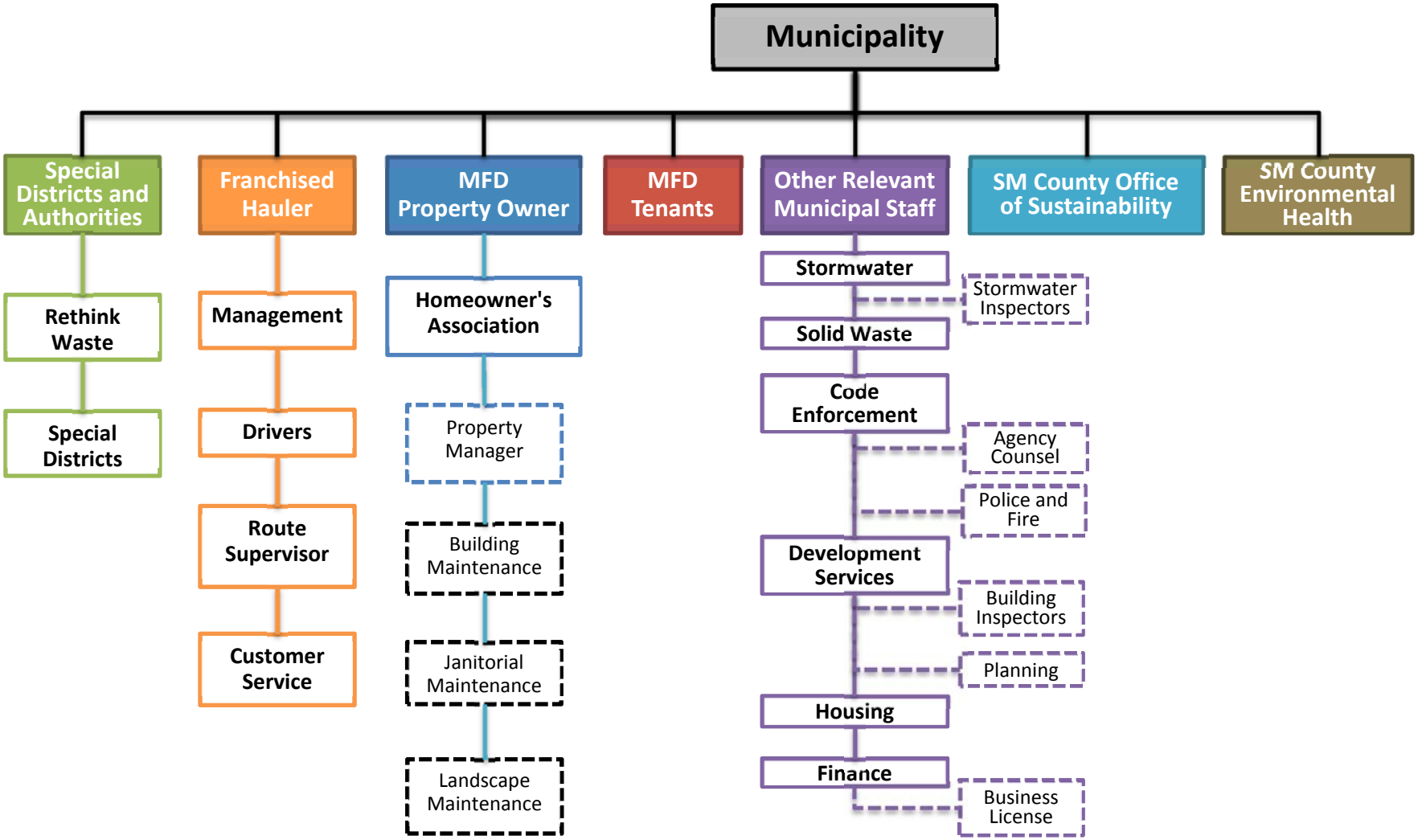


Figure 4. A Typical MFD Project Communications Hierarchy and Participants for Jurisdictions in San Mateo County (dashed lines represent related and sub-categories)

SECTION 2 MFD Characteristics and Challenges

MFD Characteristics Related to Litter

A variety of characteristics of an MFD determine whether it discourages litter proliferation; these are summarized in Table 1 below. The characteristics are divided into Structural, Financial and Operational categories to clarify the differences and organize them for other sections of this Toolkit. The Litter Management Practice (LMP) chosen for a given issue should be considered in light of the characteristics of the property. Litter generation levels on a property can vary significantly depending on the existence of factors described in Table 1. Recommendations for existing MFDs start on page 11. Recommendations for design and construction of new MFDs are found in Section 3 (page 18).

Figure 5. Clockwise from upper left) Townhome MFD, Low-rise Apartment MFD, Mid-rise Apartment MFD (courtesy of SpiritLivingGroup.com), Hi-rise Condo MFD (courtesy of Highrises.com)

Table 1. MFD characteristics that need to be considered for reducing litter at both new and existing properties.

Structural

Building Form and Design for Hauler Access:

- Stacked units (apartments or condominiums)
- Non-stacked, attached or detached units (townhomes)
- Location of loading area for hauler's collection vehicles
  - Exterior parking area
  - Interior (parking garage)
  - Ceiling heights in access and loading areas
  - Distance from street to loading location
  - Grade (slope) and width of driveway and path to containers
  - On public street with driveway or curb ramp
  - Size of doorways
  - Access security (parking gates, doors and locks)
  - Pavement strength in hauler loading area

Building Systems for Disposing of Materials:

- Chutes and chute rooms
- Chute diverter systems
- Wheeled carts, bins and stationary bins/dumpsters
- Compactors
- Storage area & enclosure doors, walls, ceilings etc.
- Situations requiring towing of containers to loading areas (basements)
- Space for towing of containers to hauler loading area
- Space for storing of bulky materials
- Space for collection containers
- Space for discarded materials in residential units
- Signage in all areas for residents for all materials
- Outdoor containers (pet waste, cigarette butts etc.)

Financial

Whole property/site owned by one entity:

- Rental units
  - Market-based rents
  - Income-based rents

Units owned individually (condominiums or townhomes):

- Owner occupied units
- Non-owner occupied units
  - Long-term rental
  - Short-term rental
  - Timeshare

Combination/hybrid Ownership:

- Percentage of units non-owner occupied or rented
- Combined form of ownership such as co-housing

Other Financial Factors:

- Cost of providing sufficient on-site staff to manage problems
- Cost of collection services
- Incentives for property owner to subscribe for sufficient collection services
- Incentives for residents to sort and discard of materials properly
- Incentives to reduce garbage generation
- Incentives to reduce contamination in collection containers
- Investment in equipment that is garbage-oriented
- Reduced rate for compactors

Operational

- Existence of an on-site property manager or owner and degree of support staff on-site and off-site.
- Types of collection containers & vehicles used by hauler
- Number of hauler staff on-board a collection vehicle
- Days of week that services are offered by hauler
- Labor for getting containers to the collection vehicle
- Vehicle, staff & process for towing of containers to loading areas
- Complexities of bulky item collection
- Resident communication challenges
- Resident turnover rate
- Collection containers for residents within units
- Method residents use to bring materials to centralized storage areas
- Levels of landlord management/participation on-site
- Convenience for residents to dispose garbage versus recycling and composting
- Willingness of residents to separate/sort materials

Existing MFDs

Challenges and Example Scenarios

This section discusses various issues with LMPs at existing MFDs and illustrates those challenges using example situations. A suggested strategy and steps for improving existing MFDs is displayed below in Figure 6. These steps are further discussed in Section 4. (Page 37).

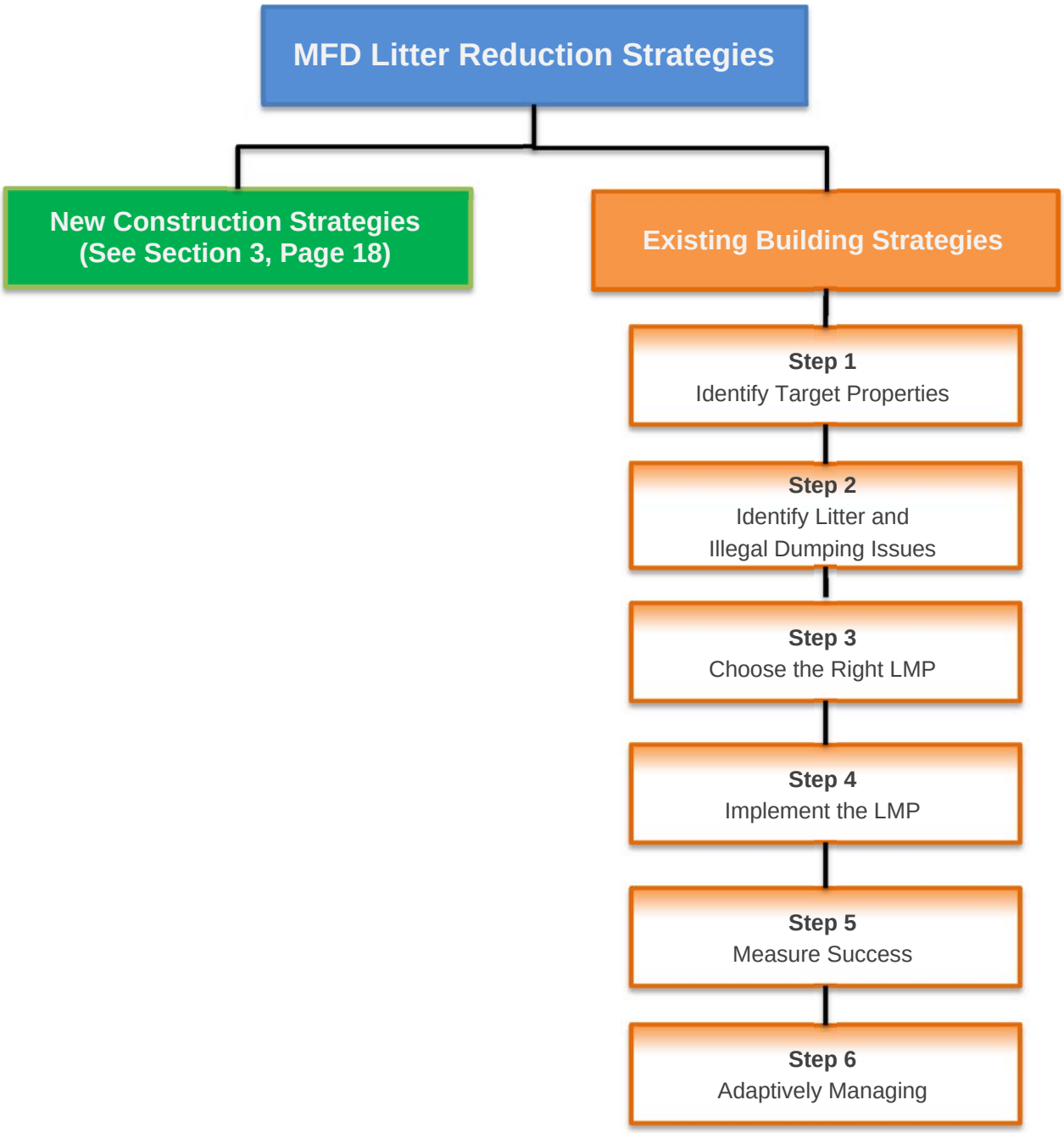


Figure 6. Strategy steps for reducing litter at existing MFDs.

Various structural characteristics of MFDs informed the six types in Figure 7 from the Zero Waste Design Guidelines (ZWDG) developed in 2017 for New York City by the New York Chapter of the American Institute of Architects (AIANY) and their Center for Architecture[4]. The types are based on the existence, location, number and type of chutes & collection containers.

Figure 7. Six types of MFD discard collection systems from the ZWDG (Courtesy of the Center for Architecture)

To illustrate how the characteristics described in Table 1 and the six AIANY ZWDG types in Figure 7 combine to create litter challenges, five MFD properties were created and are presented on the following pages. The examples include language from LMPs, standard conditions of approval (COA), and franchise agreements to reduce litter. Suggestions on how new MFDs can be designed, constructed and operated differently are also given in Section 3 to provide guidance to municipal staff who review and approve new MFD development projects. Below is a key for the abbreviations used in the four scenario descriptions:

SCENARIO KEY
Type: One of six building types described in Figure 7 from the AIANY ZWDG
Materials: G (Garbage), R (Recyclables), C (Compostables)
Total CY Volume Per Week: Material - (# Cubic Yards) for each material and total
Gal per unit Volume: Material - (# Gallons per unit) for each material
Collection Frequency: Material - (Days) for each material
Containers Type: Compactor, Bin or Carts for each material
Container Volume: Material - [(# of containers) x (volume per cont. – Gal or CY)]
Vehicles: Material - (# drivers) x (Type of Vehicle)

[4] www.zerowastedesign.org, Text & graphics: AIANY Zero Waste Design Guidelines, Courtesy of the Center for Architecture, 2017.

Example Scenario A - The View — Hi-rise Apartments

Year: 2016 **Units**: 110 **Type**: 3
Building: 15 story, Apartment
Ownership: Single
Management: On-site, live-in
Parking: Garage
Materials: G, R
Total CY Volume: G-12, R-3 (24+9=33 CY)
Gal. per unit Volume: G-44, R-16
Collection Frequency: G-M/W, R-M/W/F
Containers Type: G-Bins & R-Carts
Container Volume: G-3x4CY, R-6x96Gal
Loading Location: Parking Lot
Vehicles: G-1xFEL, R-1xSL
Collection Structure: 1 Garbage Chute
Bulky/Special Item Service: Management

The View is a 110-unit hi-rise apartment building owned by a large corporation with a unit for the on-site property manager. The parking garage has a ceiling height of 15 feet and a garbage room with a garbage chute. Under the chute is a gray 4-cubic-yard garbage (Front-End Load) FEL wheeled bin. When the first one is full it is swapped out with one of two additional bins. There are also Side-Loading (SL) wheeled carts for recyclables in the garage next to the garbage bin. Residents are encouraged to flatten cardboard boxes and put them in the recyclables carts to avoid chute blockage. Since residents must carry their recyclables to the garage, there are still large amounts of recyclable materials that are disposed of down the chute, reducing the property's diversion rate.

Since the ceiling in the parking garage is less than the 25-foot height required for servicing FEL bins and carts inside the parking garage, the hauler crew parks the collection vehicles in the parking lot. The manager's maintenance staff brings the containers out to the parking lot for service the night before. When bulky materials accumulate the manager contacts a private company to haul the materials to the transfer station.

Example Scenario B - The Riverside — Suburban Townhomes

Year: 2004 **Units:** 50 **Type**: 1
Building: Attached Townhomes
Ownership: HOA/Individual
Management: Off-site
Parking: In-unit and surface
Materials: G, R
Total CY Volume: G-9, R-5 (14 CY)
Gal. per unit Volume: G-36, R-20
Collection Frequency: G-F, R-F
Container Type: G-Bin, R-Cart
Container Volume: G-3x3CY, R-10x96Gal
Loading Location: Next to Enclosures
Vehicles: G-1xFEL, R-1xSL
Collection Structure: External Enclosures
Bulky/Special Item Service: Management

The property's townhomes are individually owned and occupied and the property management firm handles the maintenance and repairs of shared spaces and assets, oversight of a landscape maintenance company, and utilities billing including the garbage and recyclables collection service. A new account representative has to be trained about once every two years.

There are three designated un-roofed external trash enclosures located around the property. There are frequent overages, but the Homeowners Association (HOA) is required to save funds for driveway maintenance and other costs so they do not want to increase the cost of waste disposal service. The litter generated by the overflowing containers piles up in and around the enclosures until the on-site staff or the hauler driver picks it up. In the meantime, much of it blows around or washes off in the rain and ends up in storm drains, streets and nearby creeks.

The side loading refuse collection vehicles pull up to each enclosure and the drivers empty the carts. The enclosures are not quite large enough so the driver often has to move carts out of the enclosure to service them. The SL vehicles reduce litter due to the driver's ability to control the tipping inside the wind-shielded chest-high hopper on the side of the vehicle, increased visibility of the carts during tipping, and ability to shake the carts inside the hopper to fully empty them. (See Step 4 of Section 3 for more information on vehicles and litter.) Residents leave bulky materials such as tires and broken or unwanted furniture in and around the enclosures. The property manager hires a private hauler to dispose of the materials once per year and the cost is billed to the HOA. Plant debris is taken away by the landscape contractor as part of that service contract.

Example Scenario C - The Commons Affordable Apartments

Year: 1982 **Units:** 32 **Type**: 1
Building: 4, 2-story, 8-unit apartment bldgs.
Ownership: Single – County, Affordable Housing
Management: On-site, office
Parking: Surface lots
Materials: G, R, C
Total CY Volume: G-6, R-4, C-1 (11)
Gal per unit Volume: G-38, R-25, C-8
Collection Frequency: G-M, R-W, C-F
Container Type: G-Bins, R-Carts, C-Carts
Container Vol: G-2x3CY, R-8x96Gal, C-4x64Gal
Loading Location: Next to Enclosures
Vehicles: G-1xFEL, R-1xSL, C-1xSL
Collection Structure: External Enclosures
Bulky/Special Item Service: Hauler

The apartment complex for low-income residents consists of four, two-story buildings with eight units in each building and two parking lots with two unroofed trash enclosures. The City has provided the property manager with a supply of durable and washable bags printed with recycling information on them to give to new residents at move-in to store their recyclables in their units. The residents bring their garbage, recyclables and compostable materials to one of two enclosures. The hauler's vehicles park next to each enclosure on the service day.

As part of recent franchise agreement extension, the City added new MFD waste reduction and bulky/special item collection services. The agreement requires hauler staff to: contact the property manager at each MFD in the city and establish a line of communication, visit the property to assess the current level of waste reduction and services provided, suggest improvements, and set up a customized bulky/special item service for each MFD property chosen from two options defined in the franchise agreement.

The Commons has chosen to schedule bulky item collections twice per year. By appointment, the hauler typically delivers a 15 or 30-cubic-yard roll-off container on a Friday and leaves it on-site over the weekend. The tenants and the property manager can drop certain types of bulky items such as broken furniture in the container. The container is open-top and unlocked, so it is only on-site for a few days to avoid it being used for illegal dumping. In addition to removal of the roll-off container, a flatbed truck comes to take away other bulky items that require special handling such as mattresses, tires, large appliances (refrigerators, hot water heaters, dishwashers and ovens) and electronic waste (e-waste). These "special" items are not allowed in roll-off containers because they cannot be landfilled or are delicate e-waste such as televisions with leaded glass and other hazardous contents.

City, property manager and hauler staff work together to set up & adjust the services as needed. The hauler provides the City with annual reports showing diversion rates & services for each MFD property so that waste diversion trends can be measured over several years.

Example Scenario D - The Oaks — Suburban Apartments

Year: 1972 **Units:** 24 **Type**: 1
Buildings: Six, 2-story, 4-plex apartment bldgs.
Ownership: Single
Management: Off-site
Parking: Surface lots
Materials: G, R
Total CY Volume: G-6, R-4 (10)
Gal per unit Volume: G-50, R-32
Collection Frequency: G-M, R-W
Container Type: G-Bin, R-Cart
Container Volume: G-3x2CY, R-12x64Gal
Loading Location: Next to Garage
Vehicles: G-1xFEL, R-1xSL
Collection Structure: Garage & External Area
Bulky/Special Item Service: Hauler

The Oaks is an older market rate apartment complex consisting of six, two-story buildings with four units in each building and three parking lots with three shared trash areas in the parking lot. The residents bring their garbage to FEL containers in unenclosed locations in the parking lot and recyclable materials to one of three areas next to the garages. The hauler's vehicles drive up to each area on the service day and collect the materials. No compostables collection is offered. Since there is no on-site manager, and the property owner does not want to pay the hauler an extra fee to retrieve and return the carts to an indoor garage location, the recycling carts stay outside the garage where litter and overflowing materials accumulate. When the garbage containers overflow they also generate litter, but are sized correctly, so this does not happen frequently. There is a high level of turnover at the Oaks with new residents moving in on a regular basis and departing residents leaving mattresses and other unwanted items haphazardly around the property. Signage and education efforts are minimal. No information is given to residents when they arrive as to the procedures. Other tenants usually fill the newcomers in to the routine.

The Oaks schedules a bulky item collection twice per year. The hauler picks up the bulky materials at the recycling area on the scheduled day. The procedure set by the franchise agreement is for the tenants and the property manager to set out bulky items such as broken furniture, tires, large appliances, e-waste and mattresses the day before collection. But the tenants and manager leave items in the location year round as shown in the photo to the left. Scavengers sometimes arrive before the hauler and search through the materials that can create a mess and generate litter.

Example Scenario E - The Metro — Urban Condominiums

Year: 2010 **Units**: 100 **Type**: 2
Building: 5 story, Condominiums
Ownership: HOA, Individual
Management: On-site, live-in
Parking: Garage
Materials: G, R, C
Total CY Volume: G-6, R-6, C-1 (13x3=39)
Gal per unit Volume: G-32, R-32, C-5
Collection Frequency: All three - M/W/F
Containers Type: Compactor & Bins
Container Volume: G-2x1, R-3x2, C-1x1
Loading Location: Red Curb on Street
Vehicles: G-1xFEL, R-1xFEL, C-1xFEL
Collection Structure: 1 Garbage Chute
Bulky/Special Item Service: Management

The Metro is a lot line condo building. The HOA sets aside one unit for the on-site property manager. The parking garage has a ceiling height of 20 feet and a garbage room with a garbage chute. Under the chute is a gray 1-cubic-yard garbage compactor (3 to 1 compaction) with a wheeled metal bin. A second bin is swapped out when the first one is full. There are also Front-end-load (FEL) containers for recyclables and compostables. Five (5) gallons of compostables collection per unit per week for food scraps is typically sufficient. Resident owners are encouraged to put pizza boxes in the compostables bin to avoid chute blockage.

Since the ceiling in the parking garage is less than the 50-foot height required for servicing FEL bins inside the parking garage, the hauler parks the collection vehicle in a red zone on the street by the driveway. Each morning the maintenance staff pushes the heavy bins from the garbage room, at the far end of the garage, up the 100 feet of slightly graded garage pavement to the street, often hitting the narrow door of the garbage room. When the containers are overfull and the lids can't be completely closed, despite the best efforts of the hauler staff, litter is often blown by the wind down the street during collection. After the containers have been serviced, the maintenance staff returns them. Bulky items such as mattresses and televisions are left in the garage until the manager receives a complaint and she has the items removed by a private hauler. Some owners bring their household hazardous waste, such as batteries, to nearby take-back locations, but most dispose of them illegally down the garbage chute or bring them to the office.

SECTION 3 New MFD Characteristics & Challenges

Design and Construction Challenges

Many of the litter and waste reduction-related design challenges described in Table 1 could be addressed with targeted design review of proposed MFDs. Municipal staff should develop a process to involve the franchised hauler staff in the design review process allowing them to evaluate the draft design for practicability, service-ability and efficiency. Taking advantage of their knowledge and input early in the design review process will likely reduce operational problems for all stakeholders. Design and construction issues to review in the entitlement and building permit approval process include:

- Material disposal systems such as chutes, chute rooms
- The design of indoor and outdoor solid waste materials enclosure areas
- Collection container types
- Collection vehicle types, crew size and access to storage areas
- Bulky and special item disposal, storage and collection
- A Discard Collection Plan with service day collection location(s)
- Providing incentives for reducing waste and contamination

Figure 8 on the next page summarizes the proposed strategy and steps for reviewing new construction project plans, model conditions of approval and incorporating the hauler into the review process.

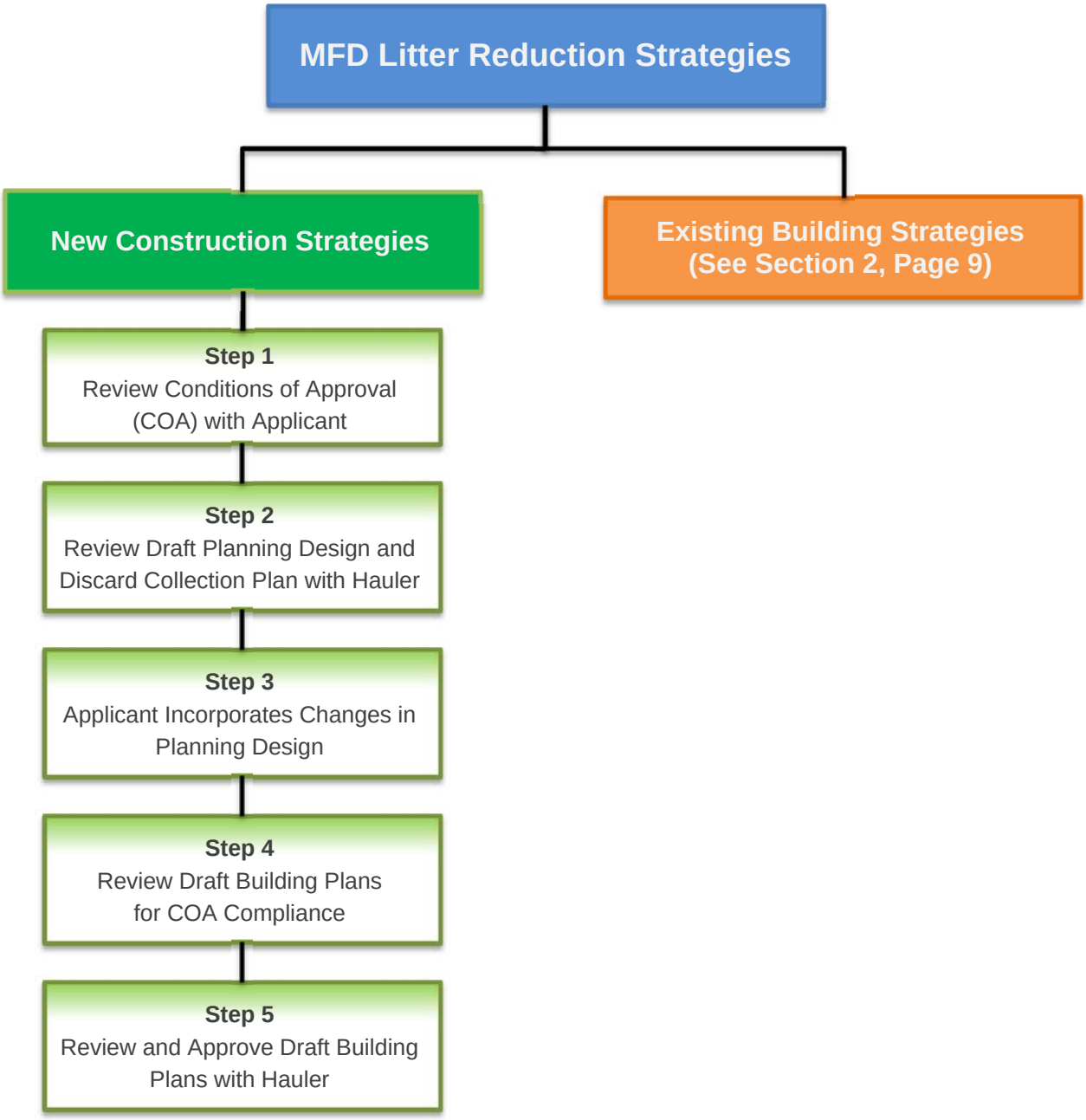


Figure 8. New MFD construction strategies

Use the steps listed above with the four subjects described on the following pages to ensure that all the design issues have been vetted by the various municipal and hauler staff.

- Conditions of Approval and Discard Collection Plan
- Service Day Staging Areas
- Chute Systems
- Design of Garbage Rooms and Enclosures

Conditions of Approval and Discard Collection Plan

A key element of the strategy in Figure 8 is the development, updating, and use of standard Conditions of Approval (COA) that contain language requiring the achievement of design elements discussed in this document. SMCWPPP has developed model conditions of approval[5] that can be used and below are some additional ones to consider. Typically, COA do not go into exhaustive detail, but give enough information to ensure that the most important issues are conveyed to the design team. COA should describe performance standards and metrics to be achieved by the design. Using performance standards lets the design team use creativity to achieve the desired goals of the project as well as the performance standards of the municipality.

It's also important to require and develop COA for both the design phase and the occupancy phase. The design can change during construction so staff should confirm that the COA performance standards have been achieved in the final project before a Certificate of Occupancy (either temporary with a TCO or final with the CofO.)

Below are examples of language for two sections of the COA (prior to building permit issuance and prior to granting a Certificate of Occupancy) that are related to MFD project review and approval:

1. Design Conditions and Site Standards (Prior to Issuance of a Building Permit).
Trash, Recycling and Composting (Discards) Facilities:
[Planning and Public Works]

- Prior to the issuance of a building permit, the Planning Director and Public Works Director shall review and approve a Discards Collection Plan from the applicant with elements required by the City and per below.

- Maintenance and Service: Trash, recycling and composting (Discards) storage areas shall include adequate space for the maintenance and servicing of containers for all materials that are provided by local hauling companies. Sewer drains, fire sprinklers, enclosures, hose bibs and roofing (if outdoors) shall be provided as per City standards.

- Adequate Space for Trash, Recyclables and Compostables: The amount of space provided for the collection and storage of recyclable materials shall be at least as large as the amount of space provided for the collection and storage of trash materials and shall reflect the estimated volumes of trash and recyclable and compostable materials to be generated providing for the separate and dedicated containers for those materials with the goal of 25% or less of the total materials generated going to a landfill. An appropriately sized and designed area for wastes banned from regular trash containers such as electronics, fluorescent lamps and batteries shall be designated. Residential properties will also provide area for bulky item collection such as mattresses, furniture, tires and white goods.

[5] www.flowstobay.org/sites/default/files/Model%20COA%20July%202016%20final.pdf

- Convenience and Accessibility: The recyclables and compostables storage and collection areas shall be equally as accessible and convenient for building users and collection vehicles as the trash collection and storage area. If chutes are planned then separate, properly labeled (as per City standards) and dedicated chutes must be provided for each and every collected stream of materials - not just for trash (non-recyclable and non-compostable materials.) The discarded materials storage rooms shall be located on an exterior wall of the building (if indoors) with adequately-sized door or gate access to the street through the wall so as to minimize distance for the collection vehicle personnel and eliminate temporary outdoor storage of containers on collection days. If the storage area is located outside then it must be easily accessible by the collection vehicles. If the storage area(s) for building users cannot be located adjacent to the street, then service-day locations easily accessible by the collection vehicles & staff, must be provided in an area on-site as per city standards.

- Equipment/Storage: All trash enclosures shall be completely screened and covered from off-site view by a solid fence or masonry wall at least six feet high and in harmony with the architecture of the building(s). Alternatively, the trash facilities may be placed within the building.

- Litter Management: The frontages of the property shall be kept clean and free of litter by the property's management, owners and/or contracted maintenance staff. Public litter containers, adequate in size and number to contain the expected volume of litter being discarded by property tenants, residents, employees, customers or others using, or walking adjacent to, the property, shall be installed, along each public facing frontage per the direction of the Public Works Director as part of the project's public improvements and on-going requirements. Appropriately designed litter containers installed along the property frontages for cigarette butts, pet wastes, retail consumer discards etc. shall be considered during the design phase appropriate to the type of land use being entitled.

2. Design Conditions and Site Standards (Prior to Issuance of a Certificate of Occupancy).
Compliance with Discards Collection Plan:
[Public Works]

- Applicant and its successors and assigns shall implement the approved Discards Collection Plan and report its activities and achievements to the Public Works Director annually as requested.

3. On-going Maintenance Requirements. (On-going during Occupancy).
[Public Works]

- Applicant and its successors and assigns shall empty on a weekly basis or more if needed, and repair or replace as needed, all litter containers installed along the property frontages.

The AIANY Zero Waste Design Guidelines also has the useful graphic shown in Figure 9 below that summarizes many design considerations for new residential construction. These items are also good candidates for COA and performance standards such as item #17 in the Figure: "Provide set out area, coordinate with street, trees, furniture, curb cuts and entrance." A condition of approval of this type triggers review during the plan check phase of these issues and further coordination between municipal staff and departments.

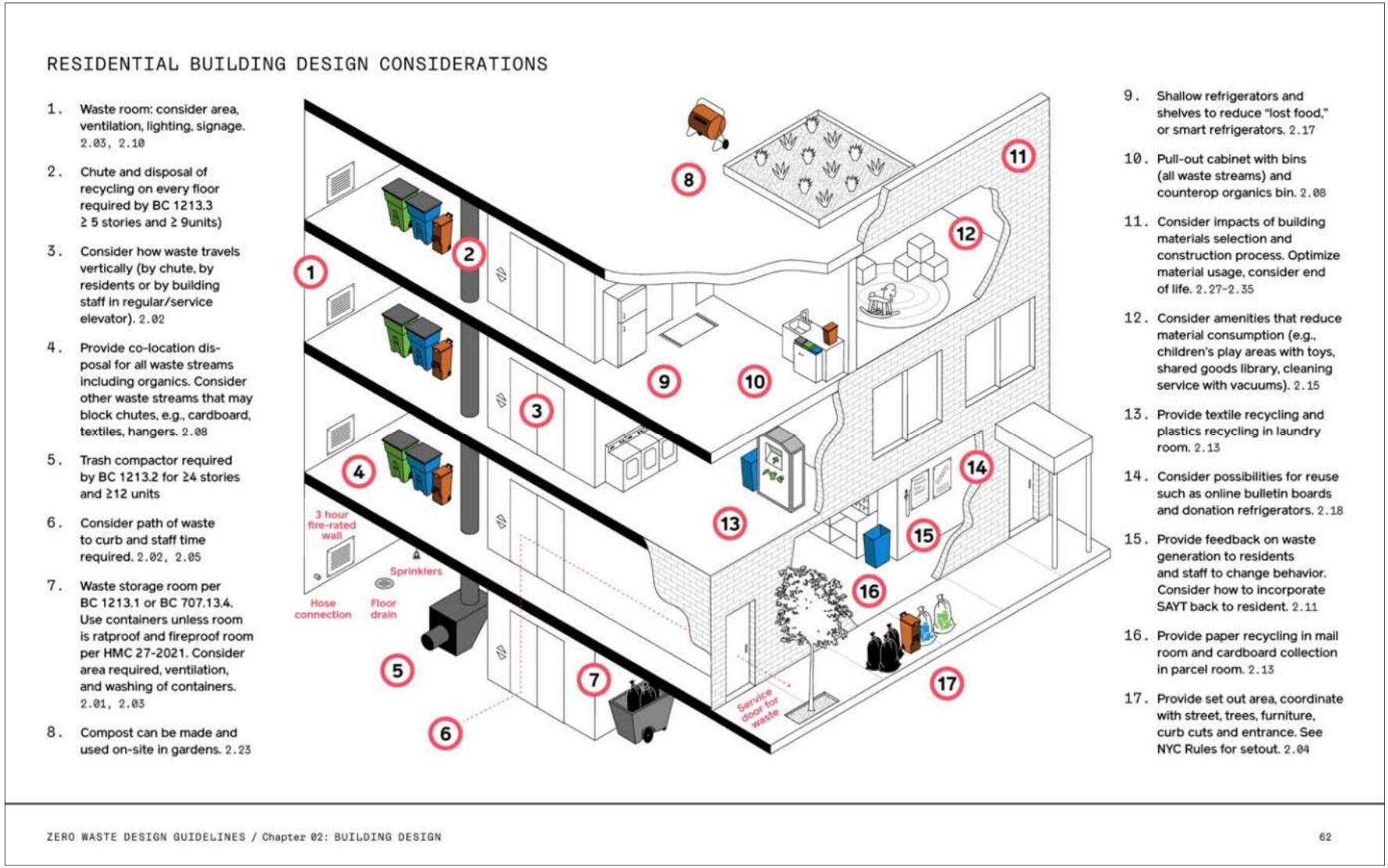


Figure 9. Residential Building Design Considerations (AIANY ZWDG, courtesy of the Center for Architecture).

Rethink Waste (the South Bayside Waste Management Authority) is an organization in San Mateo County consisting of twelve member agencies: ten cities/towns, a sanitary district and the County. The member agencies of Rethink Waste coordinate with Recology - San Mateo County (RSMC) in the design review process of new development projects such as MFDs. RSMC has developed guidelines and a process for reviewing new projects – see Appendix 1. Other municipalities in San Mateo County also work with their franchised haulers to review development plans.[6] Allowing franchised hauler staff to review a draft project plan early in the process can reduce problems and conflicts later. Service day staging areas, chute systems, garbage rooms and enclosures account for the most common design problems and given the trend in San Mateo County towards more dense and taller MFD housing development, issues such as the design, maintenance and operation of chutes systems are likely to become common in the future.

In 2016, StopWaste (the Alameda County Waste Management Authority) published a useful factsheet[7] entitled "Space Guidelines for Recycling, Organics and Refuse Services for Designers of Multi-Family & Commercial Buildings." The factsheet provides the following text and graphic (Figure 10) on sizing of trash rooms and the calculations for providing adequate storage space for the various collection containers:

> "In a multifamily setting, for once-a-week collection (the norm), a reasonable rule of thumb is to **provide 50 gallons or ¼ cubic yard (CY) of container capacity for every three residents**. This would be the sum of the volumes of refuse, recycling and organics carts (or bins), with volumes **in the proportions of 40% for refuse, 40% for recyclables, and 20% for organics**. This does not include plant debris from landscape maintenance at the site; that volume is site-specific and will need to be estimated separately and added, unless the landscapers remove all of the solid waste that they generate." (StopWaste, 2016)

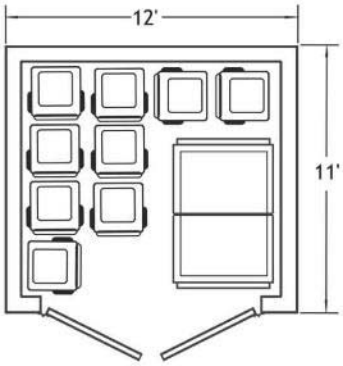
The designer should first contact the franchised hauler or other permitted hauler to determine what types and sizes of containers are available for use at the property in question once it has been built. Using that information, the numbers and calculations above and the information in Figure 10, a designer can determine the space needed for various types of collection containers to produce a Discard Collection Plan for the property and the design of each storage area on the site where collection containers will be located. The Plan will also describe how the collection containers will be brought to the loading area where the collection vehicles will empty the containers into the vehicle. This Plan should be shared with the municipal staff and the hauler(s) for their review and approval as part of the plan check process.

[6] Find haulers for each municipality on the County's interactive map: www.smcsustainability.org/waste-reduction/curbside-collection

[7] http://www.stopwaste.org/sites/default/files/Building-Guidelines-Final-Apr8.pdf

Storage Space Floor Area

Bin sizes can vary in all dimensions; check with the local collection companies for exact dimensions. The typical space needed for a 6 cubic yard bin is about 8' wide, 6' deep (front to back) and 6' tall at the back, sloping down to 4 feet tall at the front[8]. Generally, 4 cubic yard or smaller bins can be provided with wheels, and larger bins cannot, for safety reasons. Bins without wheels will need to be situated so that the collection truck can service them head-on, without moving them. Most 96-gallon carts fit comfortably in a footprint that is 28x36"; they are around 46" tall. Most 64-gallon carts require a 26x30" footprint and are around 42" tall.



Bins and carts typically have hinged lids that must be lifted; these can damage low ceilings. In addition to space for the containers themselves, space is needed to walk among them and shift them around.

Where an enclosure will contain both carts and bins, an area that is 150% of the sum of bin and cart footprints will probably be needed. Enclosures that contain only carts or only bins will require less extra space because the containers fit together more easily.

Average Container Footprints

64-gallon cart	5½ sq. ft.
96-gallon cart	7 sq. ft.
4-cubic yard bin	28 sq. ft.
6-cubic yard bin	48 sq. ft.

Continuing with the example above for a multifamily setting, if the 60 units are in three buildings, each with an outdoor enclosure for discards, then each enclosure should hold one 4-cubic yard bin, five 96-gallon recycling carts and four 64-gallon organics carts. The total comes to 128 sq. ft., or less than one standard parking space.

$$\underbrace{28\ \text{sq. ft.}}_{\text{One 4-Cubic yard garbage bin}} + \underbrace{5 * 7\ \text{sq. ft.}}_{\text{Five 96-gallon recycling carts}} + \underbrace{4 * 5.5\ \text{sq. ft.}}_{\text{Four 64-gallon recycling carts}} = \underbrace{85\ \text{sq. ft.}}_{\text{Total Container Footprint}}$$

$$\underbrace{85\ \text{sq. ft.}}_{\text{Total Container Footprint}} * \underbrace{1.5}_{\text{150% Additional Operation Space}} = \boxed{\underbrace{128\ \text{sq. ft}}_{\text{Total Allocated Space}}}$$

8 Example Bin Sizes: http://www.tigersanitationutah.com/services/commercial/sizes-and-dimensions/
Example Cart Sizes: http://www.sanjoseca.gov/index.aspx?nid=2372
Examples do not consitute an endorsement of any service provider. Sizes vary, check locally.

Figure 10. Guidelines for calculating the required storage area for discards. (Courtesy of Stopwaste)

A site-specific Discard Collection Plan for the property should be developed and submitted as part of the planning stage documents. The waste management collection plan will cover the following topics discussed at the beginning of this section with maps of the site and descriptions of services provided by the hauler and property management staff: Additional resources are included in Appendix 1 and are further discussed below.

An example Discard Collection Plan (Waste Management Plan) is shown below in the graphic from the AIANY ZWGD:

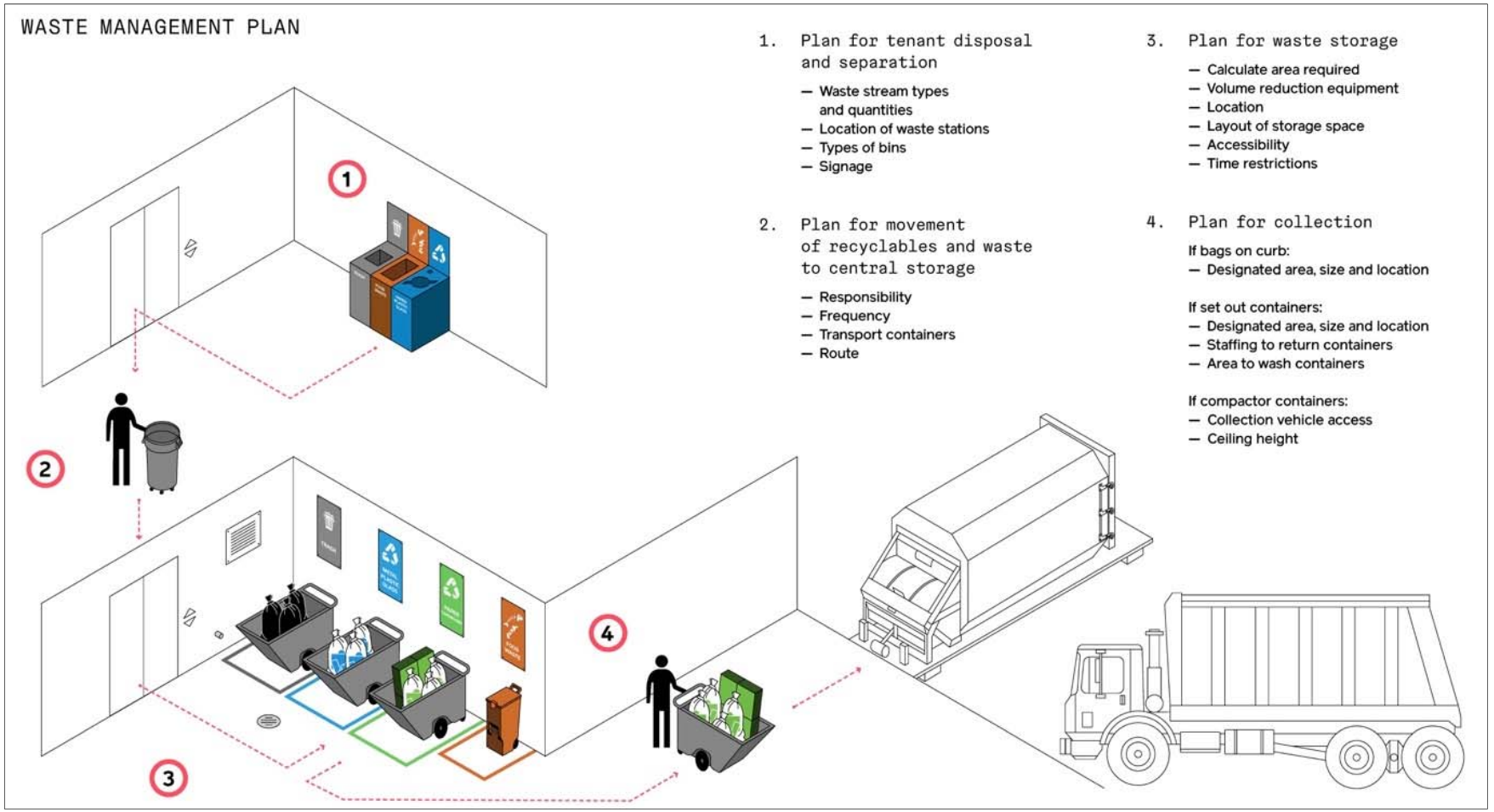


Figure 11. Some typical elements of a Discard Collection Plan (or Waste Management Plan), (Courtesy of AIANY Zero Waste Design Guidelines).

Service Day Staging Areas

Problem: Containers set out for service can block sidewalks and roadways and generate litter when stored outside for collection. Wind can blow litter from containers that are overflowing and scavengers sometimes create litter by rifling through waste and recycling collection containers.

Considerations: The best-designed buildings allow the collection vehicle to drive directly up to the area where the containers are stored – preferably indoors. This situation allows the driver access to the containers without having to move them a long distance and minimizes the risk of litter generation. If that is not possible and the collection vehicle can't drive directly up to the indoor garbage room or outdoor garbage enclosure where containers are located, then the property could be built with a designated staging area where full containers can be serviced more easily on the day of collection by hauler staff and vehicles without blocking the street or sidewalks.

Staging areas are often needed at properties where the building takes up most or all of the site and there is no option to service containers inside the building. At these types of buildings (typically in a more urban location) the containers could be brought by the property manager, maintenance staff or a contracted service day bin-moving company to a designated service day storage location at the property boundary next to the public right of way where a sidewalk and public roadway with a curb ramp and yellow-curb loading zone are located. The full containers could be brought to the staging area the night before the service day and returned to the garbage room or enclosure accessible to residents on the evening of the collection day after they are emptied.

For lot-line buildings, a designated room with exterior roll-up or large double doors facing the sidewalk could be provided where the containers can be accessed easily by the hauler staff on the service day. A good example of this type of design is shown on the following page in Figure 12. This MFD has a chute room located directly behind the roll-up door with a clear pathway and smooth level surface to the street with a curb cut. This makes moving heavy containers easier - reducing worker injuries. More photographs of the MFD are on page 32 in Figures 17 and 18.

The building design documents could clearly show the location of the staging area with calculations demonstrating that the staging area is large enough to accommodate the containers set out on each service day.

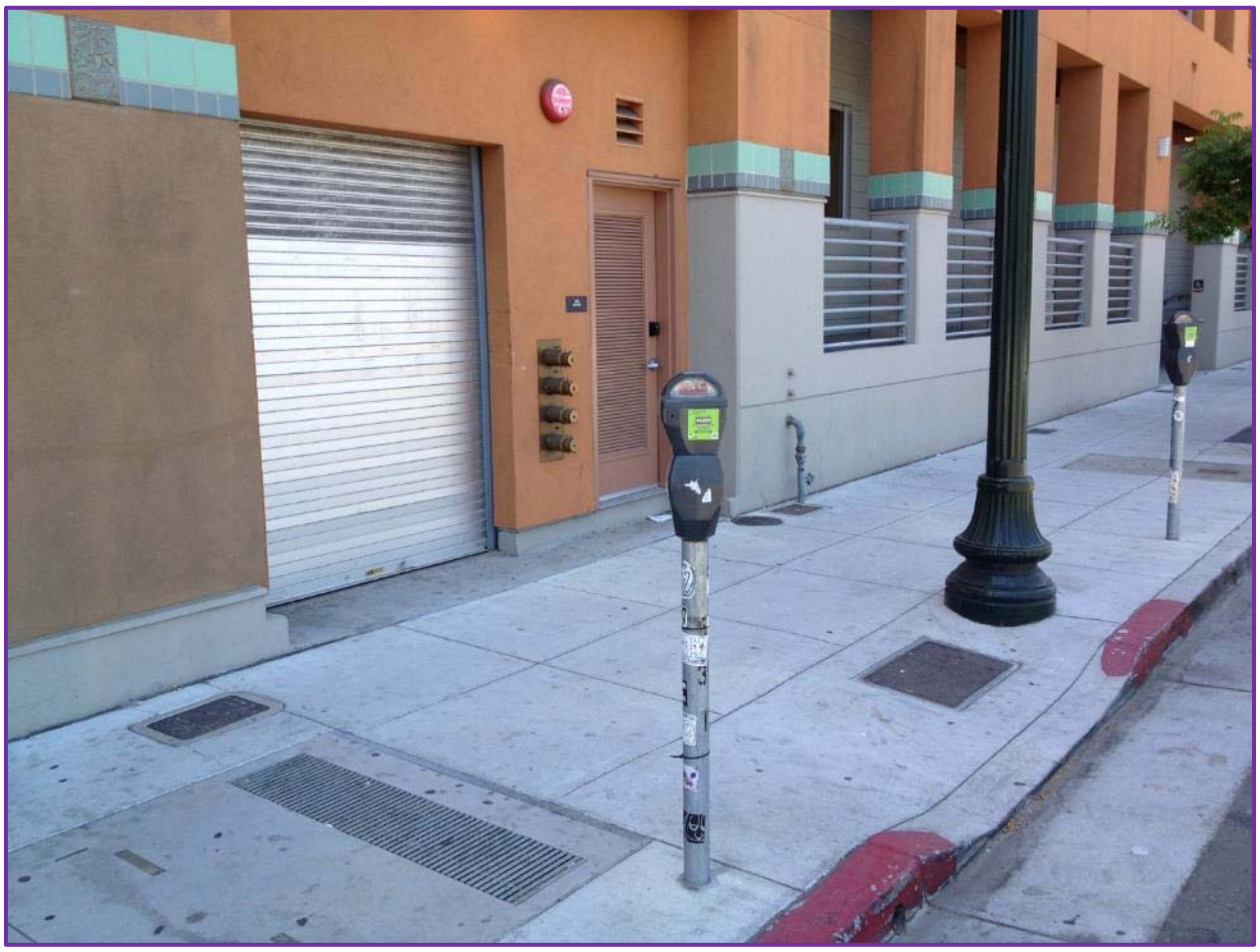


Figure 12. Well-designed trash room access with curb cut and red zone.

Another option for new buildings being designed with interior parking garages and garbage rooms is to increase the ceiling height and space so that hauler collection vehicles can enter the building, service the containers, turn around and exit. Check with the hauler for vehicle specifications such as the ceiling height needed for FEL-type containers and vehicles. The additional ceiling height needed may work well in tandem with designs for stacked residential vehicle parking systems that are becoming more common in urban MFD construction. Keys, electronic codes and/or remote control fobs/cards could be provided to hauler staff as needed to access gated/secured buildings.

Full containers can be heavy and hard to move, especially on slopes, so containers can be brought to the staging area using equipment such as towing systems and “bin movers.”

The Discard Collection Plan discussed above can also cover the subjects of storing, staging and servicing of bulky and special items for each MFD in partnership with the hauler. This can involve the use of flatbed trucks and roll-off containers and associated vehicles. If indoor

collection of these items is planned it needs to be thought through carefully with vehicle height, maneuvering and space requirements.

Chute Systems

Problem: What is the most effective, convenient and non-litter-generating way for disposed materials to be transported to collection containers in an MFD?

Figure 13. Chute room with one garbage chute door and no recycling or composting options

Considerations: Chute systems that allow for the gravity-based transportation of disposed materials through a multi-floor MFD are an attractive and convenient design option. They have been used for disposal of garbage, ashes and used linens for over 120 years in residential buildings in larger cities around the nation and in the last 20-30 years for recyclables as well. However, chutes have operational, financial and design challenges:

- They can be a maintenance challenge to keep clean and operational
- Bulky or rigid materials, such as small furniture and cardboard boxes, can jam the chute
- Multiple chutes can be a design challenge for inexperienced architects
- They can take up valuable real estate on each floor of the building
- They cost more up front in the design and construction phase, but are usually cheaper in the long run than other labor intensive options
- Educating and motivating residents to prevent contamination can be difficult
- Multiple chute systems are still relatively new, so many people are not familiar with how they work

Requiring multiple chutes or no chutes at all can be considered a mandatory design condition of approval by the permitting jurisdiction so that when disposal chutes are proposed by the applicant's design team, they are well aware of the requirement to provide multiple chutes and do not base their design on a single chute for garbage alone. Developers may be reluctant to include the space for multiple dedicated chutes if it's not mandatory. The 1st chute is typically for garbage, the 2nd chute is dedicated to recyclables and a 3rd chute is sometimes provided for compostables. While compostables collection through a chute can have maintenance and other challenges, even if a chute is not going to be used immediately for compostables collection, having the option to use it in the future is important since post-construction addition of a 3rd chute is not practical. Zero waste goals may not be attainable without this kind of infrastructure available in MFDs.

Design guidance:

- If chutes are going to be provided, consider requiring three, or a minimum of two, separate, dedicated and equally convenient chutes - one for each material to be collected: garbage, recyclables and compostables.
- The chutes should be a minimum of 24 inches in diameter and cylindrical to minimize jamming of material.
- If possible, the chutes should be completely vertical all the way from top to bottom to reduce cleaning and maintenance.
- Provide separation space between each chute from the top floor to the bottom: Consider requiring that the design have a minimum of 12 inches of separation on each side of each chute as they pass through each floor of the building and at the bottom of the system to ensure that the chutes can remain in a 90 degree vertical position at the base where containers of various sizes and shapes need separation under each chute. Therefore the opening (chamber) on each floor for a row of three side by side chutes will need to be approximately 10 feet in length and a require a chute room of at least 10 feet by 8 feet.
- The chamber for the chutes needs to be centered in the wall of chute room so that the collection containers can fit underneath the chutes.
- Chutes need to have fire suppression equipment such as sprinklers and a set of automatic chute trap doors to cut off oxygen flow to burning materials in the chute.
- Trap doors at the bottom of the chute can be used so that material does not fall on the floor when the collection container is out for service.
- A 2nd set of containers can be used under the chute on service days if the 1st set of containers is out by the street for extended periods for collection. However, some haulers charge monthly for the use of each container even if they are only being used for this temporary purpose and not being filled for service. Another solution is for the property owner to purchase a 2nd set of containers for this purpose that belong to the property.
- Proper signage: color-code and label each chute door with appropriate signage for residents to distinguish between the different streams of material for each chute. Provide information on what can and cannot be disposed through that chute door.

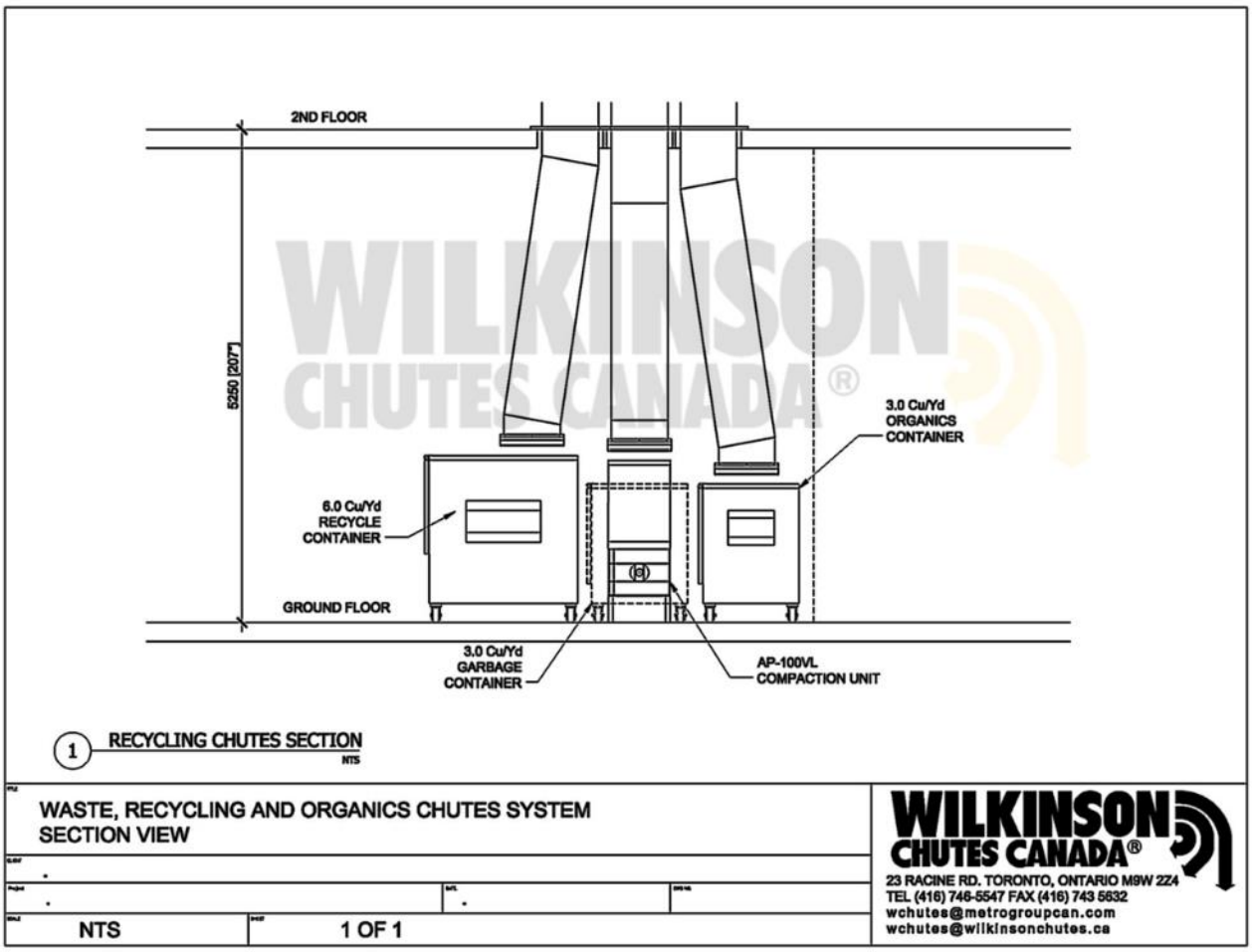


Figure 14. Dedicated three chute system (Wilkinson, 2012)

Dual Chute Systems:

In Figures 15 and 16 below are photographs of a dual chute system for garbage and recyclables collection at an MFD. The system is well designed but could have provided a bit more space under the chutes for the FEL containers to allow for easier maneuverability by the hauler crew. It can be difficult to squeeze between the containers which would allow for a push movement. Instead the hauler crew uses a pulling motion which is not ideal from a worker injury perspective. However, the enclosure does provide a short, level and smooth path to the loading location for the collection vehicle and plenty of air circulation and light through the gated entrance. The only negative factor of the gated entrance is that wind can blow litter out of the enclosure into the private street adjacent to it.

Figure 15. Chute Room with dual chutes for recycling and garbage

Figure 16. Dual chute enclosure with access gates for hauler

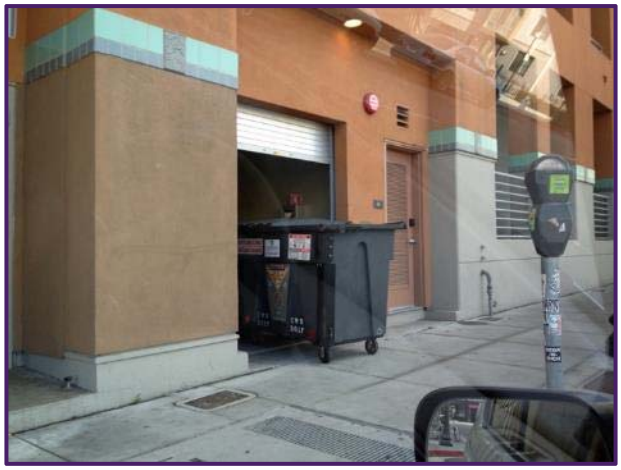


Figure 17. Access from chute room to street for hauler

Figure 18. Trash room with dual chutes

Access to the street from the chute room is crucial when you are moving large and heavy containers. These examples show chute rooms with well thought out Discard Collection Plans so that the hauler has easy access to the containers on the day of service. In Figure 17, the property maintenance staff is bringing the recycling container the short and level distance from under the chute (Figure 18) to the street for collection. An even better solution would be to give the hauler crew access to the chute room by providing them with a key or fob to open the rollup door on their own so that the bin doesn't need to be left out in the street for long periods of time that can block sidewalks and roadways.

Alternatives to Multiple Chutes:

For retrofits and other situations where multiple chutes are not possible, mechanical material separation systems at the bottom of a chute such as "Tri-sorters", "Bi-sorters" and "Carousels" have been used. There have not been many installations of these systems in the Bay Area to provide local performance data; however, they have not been proven to perform well over the long term.

Figure 19 shows a photograph of a Tri-Sorter system that was installed in San Francisco with a compactor on the left for garbage and two uncompacted metal bins for recycling and compostables on the right. Figure 20 shows the control system in the chute room that residents use to choose which material they are disposing of before they open the single chute door. The chute door is supposed to remain locked until they select the material they want to dispose. The Tri-sorter then moves a flap at the bottom of the chute to direct the materials coming down the chute to the proper container. This image was taken a year after construction at which time the chute door was not locking correctly, so residents could put any material down the chute without selecting the material type. This resulted in contamination in the metal bins and all the material being landfilled. Maintenance staff should keep a close eye on the system and call for repairs quickly if the system is not functioning properly.

Figure 19. Tri-Sorter with compactor for garbage.

Figure 20. Button controls in chute room

Figures 21 and 22 show how the design and construction of chutes for an MFD can go wrong. The design did not leave enough space in the chamber that the chutes need to pass through on each floor. The design did not take into account the space needed between each chute and the location of the chute room on the ground floor also was not located correctly under the chute chamber. These mistakes resulted in a construction quandary – either all the chutes had to be abandoned, only two chutes could be installed, or one chute with a sorting device would have to be installed. This MFD ended up using a chute sorting system. Figure 22 shows the location with a Tri-Sorter system with uncompacted FEL containers for each stream.


Figure 21. Problems during construction.


Figure 22. Final construction with Tri-Sorter.

One or No-Chute Options (instead of multiple chutes):

Here are three options that do not use multiple chutes. Each has pros and cons to consider:

- An expensive long-term operational option is to provide three containers for each of the separate streams of materials in collection rooms on each floor of the building. This usually requires maintenance staff to bring full containers down to the ground floor, typically in a freight elevator, on a regular basis which is time and labor intensive.
- A second option is to not provide any collection system on each floor and instead require residents to bring all materials to the ground floor for disposal. However, in general, the less convenient the system becomes for residents the lower the diversion rate will be as they have to do more work in separating and transporting materials a longer distance. Leaks and spillage from bags of materials transported by residents to the ground floor can also prove to be a maintenance cost especially where hallways are carpeted.
- A third option is a hybrid of these systems. A garbage chute, with recyclables containers and/or compostables containers in each chute room is also convenient for the residents.

The photos below from one retrofitted Bay Area high-rise complex show the third option:

Figure 23. Clockwise from upper left: (1) Entrance to chute room on 4th floor, (2) recyclables cart behind closed door in chute room, (3) recyclables carts being cleaned after coming down the freight elevator, (4) compostables collection carts in the parking garage next to elevator where all residents pass on the way to their cars, and (5) close-up of recyclables cart showing the small wheels that were added to the bottom of the front of the cart increase maneuverability in a small space.

Design of Garbage Rooms and Enclosures

Problem: Lack of sufficient space:

- In an enclosure or room for storing the required collection containers;
- For room to access, move around and remove specific containers on the day of service;
- For storing special and bulky items until they can be collected.

This can lead to litter generation as materials can overflow into areas outside of the intended storage room or enclosure. The design of outdoor enclosure walls and inclusion of roofing can also have litter effects. Figure 24 below shows how the lack of an enclosure and organized system can lead to litter and operational challenges:

Figure 24. Open and overflowing containers without an enclosure area.

Considerations:

One of the most common problems at MFDs is the provision of adequate storage space for disposed materials, even though California state law has required since 1993[8] that no building permit be issued for new development and expansion projects without adequate storage space for collection of garbage and recyclables. In order to prevent buildings from being constructed without adequate space and access, municipal staff could have the plans reviewed by hauler staff and can ask that calculations and diagrams be provided by the project designer on the building plans showing the following:

- The different types of containers for each stream of material;
- The arrangement of the containers within the enclosure or garbage room;
- How access to the different types of containers will be accomplished by the hauler staff;
- The path of travel from the enclosure area, garbage or chute room to the vehicle loading location;

[8] See www.calrecycle.ca.gov/publications/Documents/LocalAsst/31000012.doc

- The path of travel and turning movements of the collection vehicle through the property (collection vehicles typically need about the same space as fire engines for driving and turn movements); and
- Location and size of space for bulky and special item storage; consider how the materials will be hauled away and the location for that procedure (if a roll-off container is going to be used to take away bulky items, the ceiling height will have to accommodate the vehicle that will drop off and pick up the roll-off container. (Check with your hauler for dimensions.) RSMC's guidelines require a clear height of 50 feet inside buildings.[9]

Outdoor garbage enclosures can also be designed to minimize litter if designed with the following wall and roof features:

- Walls with no gaps at the pavement surface,
- Roofing to prevent wind and water from entering the enclosure.

Collection containers typically have lids which is used as a reason by designers not to provide a roof on the enclosure. However, in practice, lids are often left open by users and hauler drivers. Additionally, if containers leak or garbage is on the ground inside the enclosure, rain can wash away litter and pollution. A roof is an effective measure to prevent these problems. Various organizations in the Bay Area and beyond have developed guidance to assist with the design and sizing of enclosures. These are listed in Appendix 1.

Recommendation Summary for New MFD Design and Construction

It's important for cities to adequately review new MFD construction designs. Once the structure is built, it can be prohibitively expensive to modify chute systems, enlarge enclosures, install staging areas or include other strategies and designs listed above. Stand-alone garbage chutes can be removed or left in place and sealed off, but alternatives can be expensive or difficult to accomplish because of space constraints or reluctance on the part of property owner or residents to change the way materials are collected. Some cities have instituted or are considering policies to require property owners to remove single chute garbage systems if they cannot be modified to provide multiple chutes. With or without such an ordinance or requirement, it is important for municipal staff to develop partnerships with property owners, residents and haulers to work together to find mutually agreeable solutions.

- Use the SMCWPPP Model Stormwater Conditions of Approval[10]
- Consider incorporating the Conditions of Approval as described in pages 20 and 21 of the Toolkit
- Require a Discard Collection Plan for every new MFD project
- Involve the Franchised Hauler staff in the design review process and require that designs meet their needs.

Additional resources for strategies to improve the long-term performance of MFDs are listed in Appendix 1.

[9] https://www.recology.com/recology-san-mateo-county/new-development-projects/

[10] http://www.flowstobay.org/sites/default/files/Model%20COA%20July%202016%20final.pdf

SECTION 4 Implementing Litter Management Practices

Implementation Steps

This section lays out a step-wise approach for implementing the Litter Management Practices (LMPs) in several commonly encountered situations at existing MFDs. The six steps are displayed in Figure 6 on page 11 and further described below:

Step 1 – Identifying target MFDs

Step 2 – Identifying specific litter issues

Step 3 – Choosing the appropriate LMP

Step 4 – Implementing the LMP

Step 5 – Measuring success

Step 6 – Adaptively Managing

Step 1 – Identifying Target MFDs in Your Community

Most permittees have constrained resources to address litter problems at MFDs. The first step in reducing litter at MFDs is to prioritize which properties can yield the most effective results. Here are some tips:

- Start Small:
  Target a small number of properties at first. If the process yields good results, move on to the next property or group. Build on success and learn along the way.
- Use Available Data:
  Start with whatever data or maps are available from your hauler, county, other municipal staff or other sources and then consider which of the following strategies makes the most sense for your situation. If possible obtain an up to date list of all MFDs in your jurisdiction that contains the site address, property owner name, contact information and number of units.
- Group by Location:
  If one of the strategies below yields a list with multiple properties, attempt to find several that are near each other and start with those.
    - There might be one hauler route servicing all the properties in a localized area. Working with the smallest number of drivers and routes can make adjustments faster and easier.
    - Targeting enforcement in one focused area can be easier than when problem areas are spread out over several areas.
    - Surveillance equipment or methods can be shared or might overlap in a focused area increasing effectiveness.

- Inspections are close together and take less staff time.

Below are seven strategies for identifying properties depending on what data and resources are available to municipal staff.

MFDs with Container Overages

Frequent container overages are an excellent indicator of problems at an MFD and an opportunity to correct several issues at once. Correcting the issues can have impacts on the property owner's and/or residents' garbage bill, so contact your hauler and go over the problems. Get a map or list from the hauler of MFD customers that have had repeated overages during the last twelve months. They may have ideas about which properties are problematic in ways that do not show up on data reports or maps. SMCWPPP may have generated maps for your agency with this information.

MFDs with Abandoned Waste

You may be able to work with your hauler and municipal staff from code enforcement, police, municipal maintenance, recycling and other departments to create a list or map of illegal dumping hot spots on public and/or private property in your jurisdiction to focus your efforts. SMCWPPP may have generated maps for your agency with this information.

MFD Demographics

Some properties may have challenges because of owner or resident demographics. Frequent turnover of residents, income levels, absentee landlords, cultural challenges, low levels of investment by the property owner and/or lack of on-site management can all contribute to litter problems on a property.

MFD Structure or Age

MFDs can be difficult to maintain when the systems and structures begin to age. Even new MFDs that were poorly designed or constructed can pose challenges. Obtain a list of all the MFD properties in your jurisdiction and sort them by structure type such as townhome, apartment, condominium, height, density, style and/or percent of the property dedicated to outdoor surface parking.

MFD Operations

As described in Section 2 of the Toolkit, there are different factors that can affect the operations on a given site. Look at your list of properties and if possible think about the different operational categories that each property has and see if some are similar. You may need to make some site

visits to see the properties, or use Google Street View to sort the MFDs into some initial categories.

MFDs with Low Waste Reduction Metrics

If you have a list of properties and diversion rates for each, consider targeting low diversion properties first. Sometimes these properties have low diversion rates for the same reasons that cause high litter generation.

MFDs in Trash Management Areas with Full Trash-Capture Devices

If the MRP is not requiring additional work in an area of your jurisdiction because full trash capture devices have been installed in catch basins or other locations downstream from the MFD properties, you may want to consider other problem MFDs. While visible litter can still be a blight issue in these neighborhoods, from the stormwater perspective, if the litter is being captured downstream in a device or through effective street sweeping, then the presence of litter on a street may not be the highest priority.

Step 2 - Identifying Specific MFD Litter Issues

Below are strategies for identifying which litter issues are most pressing at a particular MFD.

Communication with Affected Parties
The first step may be to communicate with property owners or managers. It is best to communicate before an on-site inspection is considered. An official letter on the jurisdiction's letterhead from a manager or mayor can be very helpful. The letter can describe the purpose of the site visit and goals of the program to inform property owners and managers of the issues and objectives of inspections.

Off-site Inspections
Before you enter a private property on a site visit, you may want to do some preliminary investigative work including the number of units that are on the property, the mailing addresses or other information before an official site inspection. (See Communication Tools in Section 4 for more details on this issue.)

On-site Inspections
Site visits can be very helpful in determining what issues are present on a property. Google Street View can reduce the time needed to survey properties, but if there are a limited number of views on a street or interior parking areas are not visible from the street, its usefulness can be reduced. Inspecting a site on the day of service before, during and after materials are collected by the hauler, or on the day before street sweeping is conducted, can often yield the best insights. If you are going to be entering the site, it is best to contact the property owner(s), HOA, or property management first and make an appointment.

Documentation

Once on-site, go to the property manager's office, if there is one, and identify yourself and gain permission to inspect the site and take photographs. Without permission from the owner or manager, any evidence that is collected, including photographs, will not be allowed in court if an issue results in legal proceedings. Use the date-time stamp function on your camera or phone-camera. This will prove useful when writing up inspection reports or using the photos as evidence. Use an inspection form and have the property owner sign the form as evidence of permission to enter the site. Give the site contact your business card and ask for theirs.

Step 3 – Selecting the Litter Management Practice

Matching LMPs with Litter Issues

Once you have identified your initial list of properties and you've categorized and characterized the sites, you can begin to match LMPs with the targeted properties. The LMPs may depend on the strategy chosen in Section 2 above. If you are targeting properties that have container overages, then your primary LMP will be to work with the hauler and the property manager/owner to come up with possible modifications to the collection container size, service frequency for each service commodity on-site. Adjustments may need to be made to the weekly volume of garbage, recyclables or compostables, if those services are offered. These adjustments will most likely affect the monthly billing rate for the property. Your hauler should be able to give you before and after billing summaries to share with the customer and consider before the changes are made. Sometimes different containers need to be delivered to the site and other containers removed which can take time to accomplish.

Identifying Constraints

Financial and physical constraints in addition to constraints on time need to be identified before they can be addressed. In order to identify constraints, gather as much information from municipal staff and the hauler. Meet with the property owner(s) and managers to hear what they perceive as the problems on the site. Finally, meet with residents to listen to their concerns and ideas for improvement before proposing any changes.

Anticipating Problems and Providing Options

There are patterns and issues that come up repeatedly at MFDs. For example, wheeled carts and bins are often left out on the curb for extended periods of time when most municipalities require them to be taken in within 24 hours after being set out. If the building has an on-site property manager, that should be taken into account. If their garbage enclosure or enclosed staging area is close to the curb, that is also a factor. If they have collection services on multiple days of the week, and are also leaving out containers beyond the time allowed, then the issue becomes a blight or nuisance. Piece together the customized approach for that MFD. There are almost always several options for each property. Some options may be more effective, more practical or less costly than others.

In the example above, there are several options that may address the problem.

- The hauler may offer an option to retrieve, service and return containers to an appropriate location on the day of service. This usually entails an additional charge, but it can solve the problem for the property.
- The hauler could combine and/or coordinate many service days for one or more streams of material into a smaller number of service days so that containers are out less frequently.
- The property could provide larger containers that can be serviced less frequently. Sometimes this option can save the property money and it also is generally more desirable for the hauler. The property owner may have been considering hiring an on-site manager or part time maintenance person. Adding the duty of bringing containers in and out on service days may encourage the hiring process.

It is not typically the role of the municipal staff person to choose the solution for the MFD, but to outline the concerns and requirements of the jurisdiction and then let the property owner determine what needs to be done. This is also the role of the municipal design reviewer for new MFDs. If the property owner is resistant due to the financial impacts of a rate change in their service or other impact from modifying their operations, first try to find different options with the hauler. It's generally not a good idea to bring up non-compliance enforcement until all other options are exhausted, but if needed, reminding an owner or manager that fines and legal action could be a costly and time-consuming result of non-compliance, can be a useful way of moving the implementation forward.

Step 4 - Implementing Litter Management Actions

Successful implementation of LMPs takes concerted and sustained effort from the municipality, hauler, property owner and/or residents, especially in larger properties. Every property is different and what works in one location may not work in another.

Working with Other Affected Municipal Staff and Contractors
Using the Communications Hierarchy in Figure 4, determine which stakeholders are appropriate for the LMP that you are considering implementing. Other staff may have valuable knowledge related to the property at hand or may know of other programs and resources available to assist with implementation.

Contractors who work with the municipality can also be important parties for coordination. For example, street sweeping is an important part of litter collection in most jurisdictions and is often contracted out to a sweeping company. An effective street sweeping program allows the sweeper access to the curb and gutter area of the street, therefore if on-street motor vehicle parking is allowed on a given street during the week, then parking should be prohibited during street sweeping times. Retractable inlet screens can be installed on catch basins and inlets to keep litter on the street for sweeping. Working together with the hauler to coordinate sweeping and collection days of service can increase the effectiveness of sweeping if sweeping can take place after collection.

Working with Franchised Haulers

The effectiveness of a LMP is constrained by the situation in which it is employed. For litter control at MFDs the franchised hauler and the franchise agreement are often the biggest constraining factors. If the franchise agreement is not well designed, is not enforced, or doesn't offer the services and programs that are needed to reduce litter, then standard LMPs may be less effective and may need constant vigilance.

Understanding the issue from the perspective of the hauler is important. One common problem with modern franchise agreements is that they don't incentivize the hauler to reduce waste or litter. Rates are usually based on the size of the garbage can, cart or bin; recycling and organics collection is usually included in the cost. In the future the best option may be to separate out the cost for each service and itemize these costs on the customer's bill. As garbage levels drop, the hauler can still receive revenue from the other services. Other incentives are often inserted into franchise agreements to make up for the rate problem and these can work to a certain degree depending on the hauler and how strong the partnership is between the hauler and municipalities.

If there is no requirement in the franchise agreement to pick up litter from overflowing and overloaded containers during collection and there is no assistance from the jurisdiction to enforce overage charges on the customer, the hauler may become frustrated when that service is requested by the municipality. Building a relationship with hauler staff can be productive. If there is trust between the parties that all sides are working towards a common goal, then positive solutions can be developed.

The number one concern for hauling companies is safety. Sanitation workers, according to the US Bureau of Labor Statistics, are three times as likely to die on the job as are police officers, and fifteen times as likely as firefighters. And handling waste is one of the greatest sources of occupational injury for building maintenance staff.

Therefore haulers want to reduce risk such as in situations where a driver has to push or pull a bin in a repetitive way three hundred times per day. Automation has reduced the number of people on collection crews; there is now typically only one driver instead of two or three. The number of people per crew determines their ability to safely move containers beyond a certain size and weight and will need to be factored in when considering LMPs. The hauler management will typically have to approve any requested service change and determine new rates for service before the change can be implemented.

For problem sites, ask the hauler about the vehicle that is being used to service the MFD. The vehicle can generate litter especially when conditions are windy and the customer's containers are overloaded. Side-loading refuse collection vehicles are often the best for preventing wind-blown litter, but can only be used for wheeled cart containers. The driver empties the carts by pushing each one up to the truck and then pulling a lever to raise the cart and tip it upside down inside the hopper areas. A hopper that is shielded from the wind and is at chest-height on the side of the vehicle provides several benefits: the tipping process is less likely to generate litter, the driver can visually inspect the contents of the cart for contamination during tipping, can shake the cart inside the hopper to fully empty it, and has the ability to manually throw bags of extra materials from overloaded carts into the hopper when needed. These capabilities are limited when the

materials are tipped on the top of the truck as with a FEL type vehicle. The two types of vehicles are show in the figures below.

Figure 25. Side-loading vehicle tipping carts into hopper with good wind protection

Figure 26. FEL (Front-End-Loading) vehicles tip bins into a hopper on top of the vehicle with poor wind protection

Coordinating with a Local Waste Management Authority or Special District

In San Mateo County there are two special districts and one joint powers authority (JPA) that manage franchise agreements for solid waste collection. Additionally some municipalities have individual agreements with hauling companies. The two special districts are the Granada Sanitary District, and the Montara Sanitary District; they also manage the sewer services for their respective areas on the San Mateo County Coast. The JPA is the South Bayside Waste Management Authority (SBWMA, and also known as Rethink Waste) and is comprised of twelve public agencies that manage disposed material collection franchise agreements. The SBWMA is comprised of ten cities, the County (for certain service areas) and the Westbay Sanitary District. Special Districts and Waste Management Authorities often have access to hauler data and other information that can be valuable towards reducing litter. The SBWMA also provides outreach, oversight and coordination with the franchised hauler (Recology San Mateo County) and oversees contracts with processors for the collected recyclable and compostable materials and landfill disposal.

Using SMCWPPP Tools

SMCWPPP has developed many tools related to litter reduction for municipal staff to use related to the MFD toolkit. These include maps of illegal dumping and container overages, trash management area maps, full trash capture device maps, litter survey and assessment protocols[11] and model forms, and litter tracking guidance.

Franchise Agreement Language Practices for Litter Reduction

This document produced by SMCWPPP's Litter Work Group in 2016 contains model language and examples of existing language from franchise agreements in San Mateo County and the

[11] The Litter Assessment Protocol for Streets and Sidewalks is available at: http://eoainc.com/wp-content/uploads/2017/09/OVTA-Protctol-A-Street-and-Sidewalk-Surveys-w-Appd-v-2.0-Sept-2017.pdf and videos are at: http://eoainc.com/ovta_fc/

Bay Area related to litter reduction. Many of the examples in the document pertain directly to work with MFDs such as LMPs for reducing container overages, new types of rate structures and examples of how collection vehicle types and technologies can impact litter control.

Maps and Data from Haulers
Haulers typically maintain lists of all the customers they service including data on container overages, billing issues, changes in service, owner and manager contact information, mailing addresses for sites and owners and communications from their drivers servicing those customers. This data can be sorted for MFD properties and is usually available to municipal staff. SMCWPPP has done one example of this on behalf of the permittees with the SBWMA and produced maps displaying litter related data points.

Trash Management Area maps
Trash management area maps have important information related to MFDs and litter. If problem MFDs are located within the watershed of an existing full trash capture device, that is an important data point for prioritization. MFDs can be included as a layer in the maps to see where litter hot spots overlap with MFDs yielding targets for outreach. The maps can also provide geographical guidance on locating areas where several problematic MFDs might be considered for a campaign targeting several properties at once. Another layer that can be added to the maps are the routes of the hauler's collection vehicles to see how they overlap and can be coordinated with for any given MFD that is targeted.

Follow-up and Inspection
Once an MFD or group of MFDs are targeted and LMPs have been implemented, coordinate with the SBMWA (if applicable), the hauler's management and drivers, and other involved municipal staff to collect information on the success of the LMP. Evaluate and address problems that have occurred and provide recommended actions as part of enforcement or inspection at the property.

Enforcement
There are different types of enforcement activities that can be used to gain compliance and create successful reductions in litter at an MFD. Municipal staff have the most tools at their disposal when it comes to enforcement with Code Enforcement staff, Stormwater Program staff, Solid Waste Program staff and Planning Division staff potentially playing a role.

Code enforcement can usually be used on any section of the municipal code, but typically operates in the areas of litter abatement, illegal dumping reduction, nuisance violations, permitting compliance and vehicle controls. Stormwater, Solid Waste and Planning staff deal most often with their related section of the code, but can coordinate efforts when overlapping issues come up. The County Health Department can also be involved as they perform inspections once every four years at MFDs as part of health and safety requirements. In addition, various parts of the Franchised Hauler's operations can be involved including collection vehicle drivers and management staff such as route supervisors. In this case, the hauler can only enforce violations of customer practices or requirements that are in the franchise agreement (and any local or state laws that are related to the hauler's operations) so they sometimes have less leverage in a situation than the jurisdiction staff.

Step 5 - Measuring Success

It is important for the jurisdiction to consider what metrics are going to be used for determining progress and success during and after the MFD litter reduction effort. Setting baselines and using litter assessment protocols are an important part of that process. In order to measure the success of a litter reduction campaign, data on the past number of overages can be collected from the hauler. A statistically significant data set over a long enough time period (usually at least 12 months) is recommended for establishing the baseline depending on the frequency of overage violations and number of MFDs within the jurisdictions boundaries. In relation to the MRP, the trash management area map for each jurisdiction is the key compliance indicator. If generation levels reflected on trash management areas around problem MFDs can be lowered, that success will be reflected in the calculated litter reduction percentage that is reported to the Regional Water Board.

Example Metrics that can be used:

- Number of container overages before, during and after LMP implementation
- Results of street litter assessments before, during and after LMP implementation
- Diversion percentage before and after LMP implementation
- Amount of litter in full Trash Capture Devices (TCDs) before, during and after LMP implementation

Step 6 – Adaptively Managing

Once the first effort has been completed, take stock of the results, lessons learned, metrics used in the project and the overall effort to results ratio. Consider if changes are needed to improve the project, or if another approach altogether is needed to make the program more cost-or-labor-effective. If the project is providing results and no changes are needed, then use the prioritization process to find new target MFDs or use the next property or group of properties on the list from the initial process. Consider what types of target properties were generated from the initial prioritization process and if the criteria need to be adjusted in the sorting procedure.

Depending on how many MFDs are located within the jurisdiction consider how much impact the first round of the effort generated and how many cycles or years of effort will be needed to get to the last of the properties on the list that are deemed to be of enough value to act upon. Consider the 80/20 rule that contends that the first 80% of an effort may yield the most effective portion of the success while attempting to achieve success at the last 20% of a target sector may yield declining results with a disproportionately increased level of effort. This can also be reflected in an MFD campaign by the number of total units within the jurisdiction where a few large properties can contain most of those units.

SECTION 5 Litter Management Practices

Table 2: Litter Management Practices organized by type.

Educational and Informational
1. Identifying a Communication Hierarchy 2. Communication Strategies with Residents, Owners and Managers 3. Site-specific Outreach and Community Based Social Marketing 4. Coordinating and Sharing Information with the Hauler 5. Jurisdiction-wide Education 6. Measuring Success
Structural
7. Garbage Enclosure Modifications 8. Selecting Container Types – Both In-unit and Shared
Financial
9. Identifying and Resolving Billing Issues with Haulers 10. Diversion-based Franchise Agreement Rate Structures
Operational
11. Partnering with Other Municipal Staff and Stakeholders 12. Right Size – Right Service 13. Service Day Collection Logistics 14. Ensuring Good Housekeeping Practices 15. Minimum Service Requirements 16. Move-in and Move-out Procedures 17. Managing Bulky Items, Special Items, Universal Waste, Medicine, Sharps, Paint, Freon and Household Hazardous Waste 18. Abandoned Waste Prevention and Reduction 19. Individual Cart Set-out Procedures
Legal
20. Coordination of Enforcement Efforts 21. Examples of Updated Municipal Code Sections Related to Litter

Educational and Informational LMPs

1. Identifying a Communication Hierarchy

Implementation Process: Develop a communications hierarchy for the litter reduction effort. The hierarchy demonstrates who is leading the effort, who the stakeholders are, how they fit into the project, and what their role is, advising or leading. Figure 4 on page 8 displays some typical participants and possible additional stakeholders for an MFD litter reduction project. Crucial information, data and assistance in resolving litter problems, implementing LMPs and ultimately achieving success can be dependent on the involvement of the players in the hierarchy.

2. Communication Strategies with Residents, Owners and Managers

Implementation Process: Devise one or more communication strategies for the litter reduction effort. Depending on your budget for expenses and labor, decide what communication tools the strategy will utilize such as direct mail to residents, managers and owners, phone calls, on and off site meetings, tail gate trainings with hauler staff, internal meetings with relevant municipal and County staff, on-site community based social marketing efforts, surveys to residents and/or owners, on-site posters and/or signage, letters on official City letterhead to owners/residents, and direct emails to residents and/or owners. All of these communication tools can be effective to varying degrees.

One challenge with MFDs can be obtaining mailing addresses for each unit for direct mail outreach. Many address databases, such as one from the County assessor's office or one from the hauler, may only have one site address and one mailing address for each property, usually the property owner and/or manager.

If the property owner or manager is unable to provide individual unit numbers, here are some tips for acquiring them. Get whatever address information you can from the hauler, the County and other staff. If you can get hauler information, ask for the day(s) of service and types, numbers and commodities of collection services that are provided to the property. Checking the information from the hauler, if the property has multiple wheeled carts for service, check the number of containers – it might equal the number of units on the property since smaller properties often will provide one garbage cart for each unit. Check the days that the property has garbage service and make a site visit on that day to confirm the number of wheeled carts. Sometimes each unit will write their unit number of the lid or side of the cart. Make a site visit - but you don't need to meet with property owners, residents or managers necessarily. Save time by just dropping by and not going on the property. You can often see from the sidewalk, the number of meters for different utilities such as natural gas, water, electricity, or communication systems such as phone, but also the number of mail boxes. The number of gas meters or mail boxes will usually be the same as the number of units. Once you have the unit numbers/addresses you can directly mail each tenant information as part of an outreach campaign.

Using email to communicate with residents can be effective, but obtaining email addresses for each resident can be difficult. Some municipalities may have email lists of residents who have

signed up on their city website for agency e-newsletters or other communications. Check also for email addresses from other partners on your communication hierarchy such as the franchised hauler and other municipal staff such as planning, housing, solid waste etc.

Condominium and townhome owners can sometimes be more easily communicated with as they have Homeowners Associations (HOAs) and boards of trustees who have meetings and their own communication networks. Property managers may have methods for communicating with residents that can be harnessed.

When issues come up that involve the franchised hauler, it's good to begin first with management. There is usually a staff person from the hauler assigned to each jurisdiction who has regular meetings to go over any issues with the franchise agreement. This person can be very helpful getting information on an MFD customer such as collection services, billing issues, contact names and telephone numbers, number of units etc. Once you have checked with management about a service issue, ask them to get input from drivers that service the customer as they may also have experience with the property and can provide additional information on issues that have come up such as overflowing containers or other problems.

Waste management authorities and special districts can also be a source of information and assistance for reducing litter at MFDs. The SBWMA has data on customers within their service area and does outreach and campaigns of their own in partnership with Recology of San Mateo County (Recology). The SBWMA also oversees the franchise agreement with Recology and can act as an intermediary with the hauler if any issues come up regarding the franchise agreement and what responsibilities or services are covered. For efforts at MFDs, the SBWMA may be able to provide resources such as brochures on recycling and bulky item collection that can be related to litter reduction. Special districts such as a Sanitary Sewer district often provide collection services to their area, or they contract with a franchised hauler to provide those services. Reach out to them in a similar way to the waste management authority.

Additional Resources:
Databases of MFD addresses from the hauler, waste authority, county or local municipality.

3. Site-specific Outreach and Community Based Social Marketing

Implementation Process: Community Based Social Marketing (CBSM) and similar research have shown that social norms can be useful in influencing behavior. When people see their peers using behaviors they perceive as accepted and "normal" they begin to model those behaviors as well. This practice of "norming" was used in a comparison with outreach efforts by in a pilot project in Livermore at three MFDs in 2014. The project compared results from norming (accomplished by paying a resident to perform regular daily pickups of litter) at one MFD with an "outreach" approach at a second site and a third "control" site. The outreach approach used printed materials, signage, newsletter articles and pledge posters to encourage litter reduction, the norming site was kept litter free, to test if it would result in less litter generated. The outreach site was the most successful of the three in short term and long term litter reduction. The pledge posters were among the most effective outreach measures. See

Appendix 2 for more details on the project and links to a website where example and customizable outreach materials can be downloaded and used for MFD sites in your jurisdiction. Below are some excerpts from the lessons learned summary:

1. "At the norming site, regular litter pickup has not been continued beyond the pilot phase. A few weeks after the pilot ended, the resident volunteer reported the amount of litter to be close to pre-pilot levels."
2. "Before conducting outreach, place as many garbage cans, butt cans and other litter-preventing receptacles on the property - especially in areas where high levels of litter are observed, e.g., near walkways, parking lots, etc. Not surprisingly, convenience and availability of garbage cans increase the likeliness of participation in a litter prevention program."
3. "During the pilots, buy-in and hands-on support from property managers proved a key to success. We therefore recommend choosing sites for replication that have a property manager who is onsite at least partially and is interested in collaborating on litter prevention. Frequent check-ins throughout the campaign ensure that any negative developments are quickly noticed and corrected…"
4. "HOAs appear to be particularly well suited for replication of the project, as their boards meet regularly (by law at least every 3 months, but often more frequently). They also tend to have their own communication channels such as regular newsletters, email groups and websites to connect with residents - all vehicles that can be leveraged for litter prevention outreach."
5. "In our work with the "outreach" pilot site, it proved very advantageous to connect and collaborate with one resident who felt strongly about litter prevention and was also fairly connected with other residents. These allies can help support the campaign by sharing observations, influencing fellow residents and modeling (i.e. norming) the desired behavior. When pledges are used, they can also "seed" the pledge poster with their signature."

Additional Resources:
https://www.cleanwaterprogram.org/index.php/multi-family-litter-prevention.html

4. Coordinating and Sharing Information with the Hauler

Implementation Process: A franchise agreement typically spells out what data the hauler is required to collect, process and report to the municipality. When needed, municipal staff can be the conduit for this information with MFD owners, managers and residents. Hauler staff can work together with municipal staff to present the information to the customers and offer options for litter problems and/or service issues. Franchise agreements can have requirements to collect data on litter such as overages, on-site litter and materials that block driver access to containers, under-subscribed services, contamination, bulky items collection issues, poor housekeeping practices by management and abandoned waste problems.

Additional resources:
See the Operational LMPs below.

5. Jurisdiction-wide Education

Implementation Process: If there are several MFDs that have problems within a jurisdiction, then a city-wide approach may be effective and needed. Adopt a block, adopt-a-drain, shoreline cleanups, creek cleanups, green business programs are all examples that have been used to reduce litter jurisdiction wide. Other examples include foodware ordinances and single-use plastic shopping bag bans that can be combined with outreach efforts.

Step 1: Determine what measures, campaigns and outreach efforts have previously been done in your jurisdictions.
Step 2: Find out what direction elected officials have given to management regarding litter and blight around the jurisdiction. There may be sub-areas within a municipality that all agree need work.
Step 3: Reach out to the SBWMA (if you are a member agency), SMCWPPP and your hauler to find out what resources are available for a community outreach effort.

Additional resources:
City of Belmont – Adopt-a-Drain Program
http://www.belmont.gov/city-hall/public-works/environmental/adopt-a-storm-drain
City of San Mateo – "Team Up to Clean Up" and Adopt-a-Drain Programs:
http://www.cityofsanmateo.org/3009/Team-Up-to-Clean-Up
https://www.cityofsanmateo.org/3715/Adopt-A-Drain
City of South San Francisco – Adopt-a-Storm-Drain Program:
http://www.ssf.net/services/adopt-a-storm-drain
County of San Mateo – Adopt-a-Block Program
http://www.smcsustainability.org/hazardous-waste-illegal-dumping-litter/#adopt
City/County of San Francisco – Adopt-a-Drain Program:
https://adoptadrain.sfwater.org/

6. Measuring Success

Implementation Process: This LMP applies to all the other LMPs. When outreach efforts begin, if possible, the team should define what success means for the project and how it will be measured. Metrics for measuring progress can vary depending on the project, but some useful ones for litter may be:

- Reduction in volume or item-count of litter collected at trash capture devices downstream from the targeted MFD
- Reduction in litter surveyed in trash assessments in the targeted MFD's TMA
- Reduction in collection container overages at targeted MFD
- Reduction in contamination of collected materials at targeted MFD
- Increase in diversion at targeted MFD
- Increase in good housekeeping practices on-site at targeted MFD by management
- Reduction in resident, management or owner complaints to hauler and/or city

Additional resources:
The Litter Assessment Protocol for Streets and Sidewalks is at:

http://eoainc.com/wp-content/uploads/2017/09/OVTA-Protctol-A-Street-and-Sidewalk-Surveys-w-Appd-v-2.0-Sept-2017.pdf

Structural LMPs

Larger MFDs (20 units or more) typically either have chutes or they require residents to bring their materials to an outdoor garbage enclosure or an internal garbage room for centralized storage and collection from the hauler. Buildings with a garbage chute also usually require the residents to bring their recyclable and compostable materials by hand to the garbage room (see section 2 for more details on chutes). MFDs with under 20 units (and townhome MFDs) often have individual garbage carts for each unit and shared carts for recyclables and compostables. There may be outdoor garbage enclosures, indoor garbage rooms or individual garages for each of these types of MFD.

7. Garbage Enclosure Modifications

Implementation Process: Garbage enclosures are typically the most important aspect of the on-site storage and collection system. Enclosures are where most of the litter is generated and either captured or released to the environment, and structural issues can make the difference. Old style garbage enclosures are often no more than a fence and a gate surrounding the collection containers.

Newer enclosures usually have a roof, solid walls, lockable gates, hose-bibs with a water connection, sanitary sewer drains and sometimes fire suppression equipment such as sprinklers. Walls that extend all the way down to the pavement are important for litter control. Sometimes enclosures are designed with gaps at the bottom of the fence to allow for easier cleaning and to make the bottom of the enclosure visible to management to discourage people from sleeping in the enclosure, but that allows litter to blow out. A roof also prevents water and wind from mobilizing litter. Storm drains outside enclosures can have trash capture devices installed.

Getting a property owner to modify an existing enclosure can be difficult. If the property owner needs a building permit for other work on-site or some other permit is needed, the jurisdiction can sometimes use the municipal code or other regulatory mechanisms to require upgrades to enclosures at the same time. Sometimes property owners will voluntarily upgrade enclosures if a litter problem is identified on-site. Some agencies such as StopWaste in Alameda County, have in the past provided grants to property owners that were used to upgrade enclosures to allow for additional diversion and reduce litter. The municipality may be able to use their stormwater ordinance to require upgrades at MFDs if the trash enclosure and on-site operations are causing or contributing to an illicit discharge as defined by the ordinance.

Additional Resources:
See Sections 2 and 3 above and Appendix 1.

8. Selecting Container Types – Both In-unit and Shared

Implementation Process: Property owners and management can take advantage of events that trigger a review of collection containers – both for the MFD as a whole and for each dwelling unit. Triggering events can include: new construction, Right Size - Right Service (RS2) campaigns, audits, new management and other municipal outreach efforts. Selection of the containers for the whole building should be considered in consultation with the hauler, the municipal staff and property representatives in order to fully understand implications of the container choice on diversion, monthly cost, operations, and convenience for residents and receive buy-in from the customer. Containers for each dwelling unit can sometimes be provided by the hauler, waste management authority or municipality and sometimes with grant funds from state agencies or private companies. In-unit containers can be rigid containers or flexible bags. These containers should be washable, re-usable, convenient to use and be designed to fit in small spaces such as under countertops or in closets. Compactors can generate litter when the removable section is emptied by the collection vehicle or when it is set out for service. A flap on the container and on the compactor section can leak litter especially when overloaded or on windy service days if the compactor is outside or if the container is set outside for service. The flap on the side of the compactor container shown in the image to the left may be leaking litter into the street. This is a small compactor container – probably for a garbage chute inside the MFD.

Figure 27. Compactor container that may be leaking litter.

Additional resources:
See Appendix 1.

Financial LMPs

9. Identifying and Resolving Billing Issues with Haulers

Implementation Process: Some issues at MFDs can trigger a customer rate review, a route audit, or review of the rates in the franchise agreement. Having the correct rates for services provided informs the customer and the hauler of issues for RS2 efforts to maximize efficiency and other issues that can lead to litter reduction. For example:

- If a customer has been charged incorrectly, the account history can be checked to see how far back in history the billing mistake began and a credit or charge due can be calculated. Customers care more about litter when they are being charged correctly.
- In some more urban jurisdictions with development causing changing land uses, a mistake can occur when a property is redeveloped from commercial to residential. It is common for franchise agreements to have different rates and services for residential

accounts compared with commercial accounts, which can lead to billing complications. If the hauler's finance department is unaware that a property has changed from commercial to residential, they will not know to begin charging under the residential rate structure.

- Other issues with billing can occur when complicated service changes are made and the results are not clearly communicated to the hauler's finance department.

A route audit is usually included in the franchise agreement as a regular practice (every year or two). Billing audits can also be included as an option for a particular customer. If the jurisdiction or the customer requests audits that exceed the provisions of the franchise agreement, sometimes the hauler has the option to request payment for the additional work involved.

Step 1: When litter issues in a neighborhood or at a particular property have gained the attention of municipal staff, a route audit can be useful for confirming that the rate customers are paying matches the service levels that the hauler's database has them subscribed to. Route audits can also measure driver performance and compliance with the franchise agreement and contamination levels at an MFD.

Step 2: After the route audit is complete, the results can be shared with municipal staff for discussion and suggested changes.

Step 3: The agreed-upon changes, if any, can be shared with the MFD property owner, management and/or HOA for feedback and/or acceptance.

Step 4: The changes recommended by the route audit can be implemented into training, signage, operational and/or structural changes.

10. Diversion-based Franchise Agreement Rate Structures

Implementation Process: Most franchise agreement rate structures are based on the level of monthly garbage service that the property subscribes to. State and local regulations may require service minimums. Newer state and regional regulations are beginning to require minimum recyclables and/or compostables collection services for MFDs to reduce waste to landfills and meet state environmental goals. San Francisco and their franchised hauler, Recology, have developed a new rate structure that is not solely based on the refuse service, but instead has a base rate for all services and a variable rate based on waste reduction. Here are some steps to use when considering a move to a diversion-based rate structure:

Step 1: Review the current franchise agreement rate structure.

Step 2: Gather example rate structures from jurisdictions that have already implemented some or all of the steps here. The City of San Francisco is the most prominent local example.

Step 2: Discuss these new rate structure concepts with elected officials, municipal staff, haulers, waste authorities and others to get consensus when agreement negotiations are being initiated.

Additional Resources:
City and County of San Francisco and Recology Inc. Collection Service Rates:
https://www.recology.com/recology-san-francisco/rates/
http://sfpublicworks.org/refuserates

Operational LMPs

11. Partnering with Other Municipal Staff and Stakeholders

Implementation Process: Elected officials and municipal staff from varying departments may have involvement with MFDs, but with different objectives or purposes. Stormwater program staff may be interested in reducing litter and illicit discharges, while waste reduction program staff will likely be more involved in increasing recycling and composting activities. Code Enforcement staff may not typically deal with litter or waste reduction issues, but may instead be working on reducing blight or noise disturbances. Police and firefighters typically deal with life, health, safety and property crimes. Councilmembers and mayors often respond to concerns of residents, but are not always aware of environmental compliance issues. Sharing of resources and information can improve the effectiveness of all the programs mentioned above. MFD garbage enclosure improvements can provide an excellent example of a municipality acting as a partnership.

Example scenario:

> An MFD has a garbage enclosure next to one of its residential buildings. After cleaning some flammable chemicals, a maintenance employee wrongly disposes of the rags in a recycling container. An hour later a resident rushing to work mistakenly tosses a still smoldering cigarette butt into the same recycling container lighting the rags and starting a large fire with the newspapers in the bin. The poorly designed and constructed garbage enclosure with no roof or fire suppression equipment is built into the exterior wall of the one story structure with windows and a flammable overhanging roof above it. Luckily the fire department responds quickly to a smoke alarm within the building and prevents extensive damage.

This case demonstrates both the need for proper design and construction of garbage enclosures, but also the need to train staff and educate residents. Several departments from the municipality joined together to prevent future fires by requiring the property owner to construct a new garbage enclosure with the correct design and construction. The Fire Marshal can provide appropriate requirements for the enclosure design related to roofing and fire suppression equipment. Staff from planning and building, stormwater, waste reduction and housing can share integrated design requirements and ideas. During its review, the hauler provides information on how their staff and vehicles will service the containers within the enclosure and other design criteria. The partnership improves the operation and maintenance of the new garbage enclosure; reduces litter and waste; and increases safety and the serviceability of the collection containers.

In San Mateo County, environmental health inspectors visit MFDs to ensure compliance with other municipal codes and may be a source of information regarding litter issues at these properties. Additionally, code enforcement and community housing (i.e., non-profit organizations) staff could assist in implementing an integrated approach to reducing illegal dumping by housing individuals currently living outdoors, around creeks and other public spaces. Housing developers, property managers and residents can also participate in developing LMPs on their properties and in their community outreach.

Additional Resources:
SMCWPPP Model Stormwater Conditions of Approval:
www.flowstobay.org/sites/default/files/Model%20COA%20July%202016%20final.pdf
Various:
Enclosure Design Criteria and Requirements – See Appendix 1.

12. Right Size - Right Service

Implementation Process: One of the most-utilized LMPs is called “Right Size – Right Service” or “RS2”. Collection containers should be managed in a way that reduces litter and waste while providing operational efficiency for the franchised hauler and the best value for the customer. There are several LMPs related to containers and the collection of materials both within the property and by the hauler. This LMP optimizes the operational aspects of the collection containers either through changes in the number, size and/or type of containers and/or the frequency of service. Overflowing containers are an indicator of a need for an RS2 review.

Step 1: Catalogue the containers on-site that are provided by the hauler, the days of the week that they are serviced, and the gallons of service per residential unit per week for each stream of material can be calculated. If the number of gallons of refuse per unit is less than 32 gallons and the garbage bins are regularly overflowing, then the service level for refuse should probably be increased. Another option would be to increase the recyclables and/or compostables collection service level either through increased container size or increased frequency of collection. This may increase the diversion level on paper, but it can become a more complicated calculation. Contamination levels need to be monitored carefully if sufficient refuse service is not provided or if the residents do not have convenient access to recyclables and/or compostables collection containers. One chute for refuse-only is the most common way that recyclables and compostables are given unequal footing. Assess litter generation on the surrounding streets before service changes are made to establish a baseline.

Step 2: If it is determined that a service change is needed, an analysis should be completed by the municipal staff and/or the hauler describing the other available options for service for the customer under the franchise agreement.

Questions to ask are:

- How many days of service are offered for each stream of material and under what circumstances? Some contracts only allow certain services for the highest volume customers. One example of that is Saturday and/or Sunday compostables collection service is only available for businesses or MFDs that already have a minimum of three day a week service (Monday, Wednesday and Friday, for example). Figure 28 below shows the 2nd service of the day in the evening in an older commercial area where space for containers is limited. The hauler made the service available at the request of businesses.
- What types of service containers and collection vehicles can the site accommodate?
- Are compactors a possible option?
- Should existing compactors be replaced with uncompacted bins or wheeled containers?

- Can garbage rooms, chutes, outdoor garbage enclosures or other storage locations accommodate the new containers and/or service days?
- What are the monthly rate impacts associated with the proposed change of service? Are there new or additional monthly fees for distance, keys, locks, container rental, container cleaning etc.?
- What are the logistical impacts to drivers and on-site maintenance staff with the proposed change of service? Are they acceptable?

Figure 28. Twice per day commercial collection service with a rear loading vehicle.

- Are there interim steps that will need to be taken to phase in the new service such as container changes made and dealt with by the hauler?
- Are there internal collection containers and signage that need to be installed and used on the site to increase the efficiency, access and/or reduce the contamination of materials?
- Are there training needs for haulers or on-site staff to achieve the goals of the new program?
- Can the Waste Management Authority, municipality or hauler provide containers, signage, training or other resources to the drivers or on-site staff?

Step 3: Write up a “before and after” service proposal with a comparison of rate information. Share the proposed change in service with other municipal staff shown in Figure 4 to see if they have any comments on the proposed changes. Get approval from the property owner, manager, HOA (if needed), hauler and municipal staff.

Step 4: Implement the approved service change and measure the post-change reduction in litter, if possible.

Additional Resources:
ZLI Best Management Practices for Right Size – Right Service
http://scvurppp-w2k.com/pdfs/1314/Final_BMP-Litter-Trash_Recommendations_060314.pdf

13. Service Day Collection Logistics

Implementation Process: Occasionally the main problem regarding litter generation is not related to the containers or on-site management, but is due to the way that containers are serviced by the hauler or that non-authorized personnel are accessing the containers. It could be that containers are not stored in a convenient location or the type of vehicle that the hauler is using is not the best at reducing litter impacts. Containers can be locked to prevent unwanted access by scavengers or neighbors using the containers instead of paying for their own service.

Step 1: Meet with the hauler management and driver to determine if changes can be made on their end.

Step 2: Meet with the property owner and management to determine if there are issues with the service day location for containers. If so, is the location modifiable? Can lockable containers be used such as in the figures shown to the right? Some containers have locking lids to prevent litter from blowing away when the lid is open. Other containers are locked to prevent unauthorized access - either from humans or other animals that can increase litter problems in the container area.

Figure 29. Locking lid

Step 3: Are there changes in the franchise agreement that need to be addressed, either in an immediate change to the agreement or in the future when there are negotiations for an extension or a new agreement is being considered? Immediate changes are typically negotiated with the hauler and sometimes lead to an impasse or a rate increase to pay for the impact to the hauler. Sometimes an agreeable cost-neutral solution can be found when all parties negotiate in good faith.

Figure 30. Locking lid on Front End Load (FEL) container.

Additional Resources:
Hauler Franchise Agreements
Vendor websites:
www.toter.com
www.rehrigpacific.com
www.otto-usa.com
www.con-fab.com/pitch-tops

14. Ensuring Good Housekeeping Practices

Implementation Process: As shown by the Livermore pilot study, collection of litter by maintenance staff alone may not be the most efficient long-term solution for reducing litter at MFDs. Examples of LMPs include:

- An integrated solution combining more litter containers for residents (and cigarette butt collection cans, if needed), increased litter pick-up by staff, increased signage, pledge posters for residents to sign, move-in/move-out kits with waste and litter reduction information etc. can be effective.
- Another common problem related to good housekeeping is the breaking down of cardboard boxes. As more residential cardboard is generated from on-line shopping (the so-called “Amazon effect”) whole boxes that are not flattened by residents are becoming a large problem in recyclables collection containers. The non-flattened boxes quickly take up a large amount of space in the collection container causing overflows and overages resulting in on-site litter generation. Non-recyclable packaging materials inside boxes (foam, plastic bags etc.) are also contaminants in the recycling programs when not removed and disposed of properly. Instructions with photos on how to flatten boxes can be included with outreach materials to residents.
- Haulers can assist property owners/managers with housekeeping issues by providing the right size and type of collection containers for the property, signage and container labeling. They may also be able to provide containers for indoor areas depending on the franchise agreement specifications.
- Municipal and/or Waste Management Authority staff may also have containers available for indoor areas.

Additional Resources:
See Livermore information in LMP #3 and in Appendix 2.

15. Minimum Service Requirements

Implementation Process: Some jurisdictions have minimum service levels for MFDs to avoid allowing property owners to under-subscribe to garbage service in order to lower their bills, reducing garbage service to the point where it does not reflect the actual on-site generation. When onsite garbage generation exceeds collection container capacity, increases in recyclables and compostables contamination can result as well as overflowing containers and increased litter. RSMC requires 96 gallons of solid waste service for every five units in MFDs. San Mateo County has a 32 gallon per unit minimum for solid waste. San Francisco also has a requirement for a minimum level of recycling service per unit.

Step 1: Notify the property owner that the service level has fallen below the minimum service level.
Step 2: An audit of the site including an RS2 process can be developed.
Step 3: Implement the results of the RS2 process and/or audit.

Jurisdictions that do not have minimum service levels for MFDs often rely on audits, enforcement, outreach and property owner communication to control service levels, contamination and litter.

Additional Resources:
RSMC Franchise Agreement – Article 5.02.B.2

16. Move-in and Move-out Procedures

Implementation Process: Containers often overflow when residents are moving in or out of their homes in MFDs. Wrapping and boxing materials used for shipping and transporting goods are often thrown away when residents move in and bulky item items and boxes of old food and other garbage are thrown away when residents move out. Municipal staff and haulers can work with Property Owners/Managers on the following actions:

Step 1: Consider providing a "Move-in and move-out guide" for new residents with information on recycling of boxes and other moving supplies. Brochures are available with move-in and move-out tips for reducing waste that in turn can reduce litter. RSMC and Rethink Waste have developed one example (see link below).

Step 2: Work with the hauler to order extra service for recyclables, compostables and/or refuse if at certain times of the year, such as at the end and beginning of the school year, the MFD will have overflowing containers. Ordering extra service is less expensive typically than paying for overages on or after the regular day of service.

Step 3: Work with the hauler on providing bulky item collection services for the MFD.

Additional Resources:
www.rethinkwaste.org/residents/multi-family-residences/property-owners-managers

17. Managing Bulky Items, Special Items, Universal Waste, Medicine, Sharps, Paint, Freon and Household Hazardous Waste

Implementation Process: Collection of Bulky Items, Special Items, Universal Waste, Medicine and Household Hazardous Waste at MFDs can be difficult and complex - the services offered by the hauler can make a difference. There are also a variety of other methods for dealing with these items besides collection at the MFD. Some stores participate in national take back programs for items such as rechargeable batteries. There are state-wide collection systems for paint and there are local take-back programs by some retailers. Some counties and/or waste management authorities operate HHW drop-off programs at fixed locations, curbside collection programs and/or drop-off collection programs through mobile collection vehicles. MFD property managers, residents and owners can arrange for these services and coordinate with the hauler, jurisdiction, county, waste management authority and businesses. See Section 2 and Appendix 4 for more details. It is important to understand the different types of materials and how they must be handled.

Bulky Items: These are typically materials that are too large to fit in a wheeled cart or bin or that may cause problems during regular collection services. Examples are couches, other large furniture, bicycles and Christmas trees. The hauler may have services to collect these materials either by appointment for a particular property individually or on a set day for a neighborhood.

Special Items: This category includes tires, mattresses, e-waste and some types of large appliances. These products cannot be landfilled and must be collected and processed. Some of the materials like mattresses, televisions, computer screens and tires have California-legislated advance recycling fees assessed at the time of purchase and therefore there are programs from the state and other organizations that collect those materials. There are also businesses that collect, process and recycle e-waste and may solicit property managers for the pickup of materials.

Universal Waste: Batteries and fluorescent lights are in this category. In San Mateo County there are local retail stores (such as Ace Hardware) that can accept these items. However, if the resident has more than just universal waste, they can use the County's HHW program.

Medicine: Residents may dispose of medicine (including pet medicine) using MED-Project's collection kiosks located at over 37 pharmacies and police stations throughout the County. www.smchealth.org/RXDisposal. Homebound residents are eligible to utilize a mail-back service by visiting www.med-project.com.

Sharps: The County has a disposal bin at Tower Road for residents to dispose of sharps waste. Over 10 additional disposal bin locations are available for residents to safely dispose of sharps in the County https://www.smchealth.org/sharps. Sharps are not accepted through the HHW program. Check www.calrecycle.ca.gov/homehazwaste/sharps/ for more options and info.

Paint: Paint containers with intact labels can be taken by residents to locations participating in California's PaintCare Program. The Property Manager/Owner may also be responsible for this material if used for a rental unit. See the resources list below.

Appliances with Freon: Freon is a potent ozone-layer-depleting chemical when released into the atmosphere, therefore appliances that may contain Freon, such as refrigerators and air-conditioners need special disposal handling. In rental units, these products often fall under the responsibility of the property owner/manager for disposal as the appliances are provided by them. Large refrigerators should be disposed of by a licensed refrigerator recycler in order to capture the Freon.

Household Hazardous Waste: Wastes from your home that are toxic, corrosive, flammable or reactive, based on their chemical properties, are considered Household Hazardous Waste (HHW). Products such as paint thinner, toilet bowl cleaner, and rat bait exhibit these hazardous characteristics. It is illegal to dispose of such dangerous wastes in the regular trash or dump them down the drain, so use the San Mateo County's HHW Program for proper disposal.

MFD property managers, residents and owners can arrange for these services and coordinate with the hauler, jurisdiction, county, waste management authority and businesses.

Additional Resources:
www.recology.com/recology-san-mateo-county/bulky-items/
www.smcsustainability.org/download/waste-reduction/Reduce-Reuse-and-Recycling-Guide-2017-Final-Web.pdf
www.smcsustainability.org/waste-reduction/reduce-reuse-recycle/

www.smchealth.org/hhw
https://earth911.com/recycling-guide/how-to-recycle-rechargeable-batteries/
www.paintcare.org/paintcare-states/california/#/everyone
www.calrecycle.ca.gov/HomeHazWaste/Info/
Or contact the Office of Sustainability 1-888-442-2666 for more information.

18. Abandoned Waste Prevention and Reduction

Implementation Process: Abandoned waste, also known as illegal dumping, is a growing problem in San Mateo County and the Bay Area. A partnership between the hauler, the community, property owners and code enforcement is needed to create change. Some haulers will take away and dispose of abandoned waste as part of a franchise agreement, but unless the source issues are addressed, the amount of illegally dumped material and associated resources needed to deal with that practice, can increase as a result. When haulers pick up the materials it affects all residents and business owners with increased garbage rates.

MFDs often contribute to the problem of abandoned waste for a variety of reasons. Insufficient bulky item collection, increased disposal costs and regulations, residents' lack of resources and income to transport unwanted materials to the proper facility can all be reasons for increased abandoning of waste. Property owners need to ensure adequate collection of these items. In addition if vermin or insects are found in dwelling units all abandoned items should be safely disposed of in order to avoid spreading of vectors to other units and tenants.

Additional Resources:
See Appendix 3
Residents in unincorporated County can use Report It! SMC to report illegal dumping. Scroll down on this website to "report illegal dumping":
http://www.smcsustainability.org/hazardous-waste-illegal-dumping-litter/

19. Individual Cart Set-out Procedures

Implementation Process: For properties that require each unit to set out their individual carts, there are recommended litter practices that are similar to single family home situations. Carts should have their lids fully closed and not be overloaded such that litter can blow out from the cart. All materials must be contained within the cart and not be placed on the ground except per hauler acceptable rules such as for pre-scheduled or pre-paid overages. Styrofoam peanuts, shredded paper and other materials than can easily escape a container and become litter should be bagged and tied shut. The HOA and/or property manager can walk the property on set out days to check that procedures are followed. Hauler drivers should clean up spills and litter per the franchise agreement requirements. In-unit containers can be provided by management to the residents. These containers and bags can help transport recyclable and compostable materials to the carts and prevent litter. The jurisdiction, hauler, waste management authority and/or County may have resources for this program.

Additional Resources:
See Appendix 3 for proper set-out guidance and resources.

Legal LMPs

20. Coordination of Enforcement Efforts

Implementation Process: A successful program to reduce the prevalence of abandoned waste can involve many stakeholders. Staff from code enforcement, police, County environmental health, solid waste, stormwater and the franchise hauler can all have a role to play. The City of San Mateo has been successful in reducing the amount of illegally dumped material and the corresponding number of pickups done by the hauler, through a targeted enforcement and multi-departmental concentrated effort.

Additional Resources:
Contact the City of San Mateo's Solid Waste and Recycling Program for more information.
www.cityofsanmateo.org/2076/Recycling-Compost-and-Garbage

21. Examples of Updated Municipal Code Sections Related to Litter

Implementation Process: The County of San Mateo has made changes to its municipal code in order to more effectively enforce violations related to occurrences of illegally dumped material in the unincorporated sections of the County.

Additional Resources:
Administrative Citation
https://library.municode.com/ca/san_mateo_county/codes/code_of_ordinances?nodeId=TIT1GEPR_CH1.40ADRE_1.40.050ADCIENOR
Illegal Dumping/Littering
https://library.municode.com/ca/san_mateo_county/codes/code_of_ordinances?nodeId=TIT3PUSAMOWE_CH3.50ILDULI_3.50.050CRPEAVILDU

APPENDICES

Appendix 1: New Development and Garbage Enclosure Guidance

www.recology.com/recology-san-mateo-county/new-development-projects/
www.stopwaste.org/resource/space-guidelines-recycling-organics-and-refuse-services
https://fremont.gov/DocumentCenter/Home/View/1528
www.zerowastedesign.org
http://www.cityofpaloalto.org/civicax/filebank/documents/59536
www.flowstobay.org/sites/default/files/Model%20COA%20July%202016%20final.pdf

Appendix 2: Outreach and Behavior Change

www.recology.com/recology-san-mateo-county/sorting-guides-signage/
Livermore MFD Litter Reduction Pilot:
www.cleanwaterprogram.org/residents/multi-family-litter-prevention/item/litter-prevention-in-multi-family-buildings.html

Sample documents:
Letters to residents, property owners, managers, drivers etc.
Posters for residents

Appendix 3: Set-out rules, Bulky & Special Item Collection & Abandoned Waste

www.recology.com/recology-san-mateo-county/bulky-items/
www.ssfscavenger.com/residential/bulky-item-collection-program/
www.republicservices.com/residents/bulk-waste
www.recology.com/recology-of-the-coast/pacifica/
www.greenwaste.com/
www.smcsustainability.org/waste-reduction/
www.cityofsanmateo.org/2174/Illegal-Dumping

Appendix 4: Franchise Agreements

Examples of LMP language for franchise agreements can be found in the following documents:
SMCWPPP:
www.flowstobay.org/sites/default/files/Franchise%20Agreement%20Litter%20Practices%20Recommendations%20-%20Jan%202016.pdf
SCVURPPP's Zero Litter Initiative:
http://scvurppp-w2k.com/pdfs/1314/Final_BMP-Litter-Trash_Recommendations_060314.pdf
http://scvurppp-w2k.com/pdfs/1516/Franchise_Agreement_Litter_Practices_Recommendations-Jan_2016.pdf

Appendix 5: State Regulations

Information on AB 341, AB 1826 and AB 2176:
www.calrecycle.ca.gov/Laws/

SMCWPPP Litter Work Group: Illegal Dumping Workshop: May 30, 2018			
	First Name	**Last Name**	**Organization**
1	Siosifa	Aholelei	City Of Redwood City
2	Julia	Au	RethinkWaste
3	Joaquin	Avelino	City of East Palo Alto CSA
4	Tracie	Bills	SCS Engineers
5	Keegan	Black	City of Brisbane
6	Reid	Bogert	C/CAG
7	John	Bologna	City of San Mateo, Code Enforcement
8	Sibely	Calles	City of Daly City
9	June	Canter	City of East Palo Alto
10	Hector	Carlos	City of San Mateo, Code Enforcement
11	Luis	Carlos	County of San Mateo - Department of Public Works
12	Kelly	Carroll	CSG/ HMB
13	Ted	Chapman	City of San Bruno
14	Jessica	Chen	Republic Services
15	Christine	Civiletti	City of San Mateo, Code Enforcement
16	Lillian	Clark	County of San Mateo-OOS
17	Kathryn	Cooke	County of San Mateo
18	Monica	Devincenzi	Republic Services
19	Matthew	Fabry	C/CAG
20	Brian	Ferenz	County of San Mateo - Department of Environmental Health
21	Sean	Flanagan	CSG Consultants
22	Gary	Francis	Town of Hillsborough
23	John	Fuller	City of Daly City
24	Gino	Gasparini	Recology San Mateo County
25	Louis	Gotelli	Town of Colma
26	Brent	Guier	County of San Mateo - Department of Environmental Health
27	Lee	Holt	CSG Consultants
28	Kenneth	Ho	City of Foster City
29	Rick	Horne	City of Burlingame
30	Ian	Hull	ERM
31	Ron	Kasper	City of San Mateo
32	Susan	Kennedy	South San Francisco Scavenger Company
33	Michael	Killigrew	City of Millbrae
34	Joan	Kling	City of San Mateo, Code Enforcement
35	Ohai	Latu	City of East Palo Alto
36	Jennifer	Lee	City of Burlingame
37	Jaclyn	Lee	Recology San Mateo County
38	Breann	Liebermann	County of San Mateo-OOS
39	Rick	Locke	City of Belmont
40	Andra	Lorenz	City of Foster City
41	Stephen	Low	County of San Mateo
42	Pam	Lowe	City of Menlo Park
43	Kevin	Lu	County of San Mateo-OOS
44	Steven	Machida	City of San Carlos
45	Lamonte	Mack	CSG Consultants

	First Name	Last Name	Organization
46	Yvette	Madera	Recology San Mateo County
47	Lenin	Melgar	City of East Palo Alto
48	Allison	Milch	County of San Mateo - Department of Environmental Health
49	Michelle	Moneda	City of Brisbane
50	Teresa	Montgomery	South San Francisco Scavenger Company
51	Ryan	Moran	City of Belmont
52	Tim	Murray	City of Belmont
53	Roxanne	Murray	City of San Mateo
54	Rachel	Norwitt	City of Burlingame
55	Jeff	Pacini	County of San Mateo - Department of Public Works
56	Larry	Patterson	City of San Mateo
57	Chris	Rasmussen	City of Redwood City Police
58	Ryan	Rasmussen	County of San Mateo - Department of Public Works
59	Faiyaz	Razak	City Of Redwood City
60	Shelly	Reider	City of Millbrae
61	Martin	Romero	City Of Redwood City
62	Sarah	Scheidt	City of San Mateo
63	Nicole	Scott	City of San Carlos
64	Vicki	Sherman	City of Redwood City
65	Dillon	Smith	CSG Consultants
66	Ann	Stillman	County of San Mateo - Department of Public Works
67	Stephen	Stolte	City of Daly City
68	Tim	Sullivan	County of San Mateo, Code Enforcement
69	Jimmy	Tan	City of San Bruno
70	james	Tanner	County of San Mateo - Department of Environmental Health
71	Hannah	Towne	Recology San Mateo County
72	Agripina	Villegas	City of East Palo Alto
73	Andrew	Wemmer	City of South San Francisco
74	Waymond	Wong	County of San Mateo - Department of Environmental Health
75	Kikei	Wong	Republic Services
76	Henry	Wu	Public Works

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
Clean Water. Healthy Community. www.flowstobay.org

Illegal Dumping Workshop

This workshop is for:
- ✓ Staff from Municipal Waste Reduction, Stormwater, Code Enforcement, and Public Safety programs and staff from Municipal Waste Haulers

San Mateo Public Library – Oak Room
55 East 3rd Avenue, San Mateo

Wednesday, May 30, 2018
9:00 am – 12:00 pm

*There will be **no charge** for the workshop. Refreshments will be provided.*
Please pass this flyer to appropriate staff within your organization.

Workshop Highlights

- **Overview of Illegal Dumping and Regulations**
- **Approaches for Community Involvement**
- **Municipal Code Enforcement**
- **Illegal Dumping Best Management Practices**
- **Panel Discussion with Stakeholders**

REGISTRATION LINK:

https://illegaldumpingworkshop.eventbrite.com

Registration Questions? Email Lillian Quinata at lquinata@eoainc.com

Workshop Content Questions? Email Peter Schultze-Allen at pschultze-allen@eoainc.com

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
Clean Water. Healthy Community.

Illegal Dumping Workshop

May 30, 2018 – 9:00am to 12:00pm

San Mateo Public Library – Oak Room

55 E. 3rd Ave, San Mateo, CA

AGENDA

8:45-9:00	**Registration and Refreshments**
9:00-9:10	**Welcoming Remarks** Matt Fabry, Program Manager - SMCWPPP
9:10-9:30	**Getting Buy-in from Elected Officials and Upper Management** Larry Patterson, City Manager - City of San Mateo
9:30-10:00	**City of San Mateo: Nuts and Bolts of the Illegal Dumping Program** Roxanne Murray, Solid Waste Program Manager Ron Kasper, Recycling Coordinator Christine Civiletti, Code Enforcement Manager
10:00-10:30	**City of Brisbane: Illegal Dumping and Litter Management Program** Keegan Black, Maintenance Program Manager
10:30-11:00	**City of Daly City: Building Community Together with Your Hauler** Stephen Stolte, Sustainability Coordinator Monica Devincenzi, Republic Services
11:00-11:45	**Panel Discussion** Roxanne Murray, Ron Kasper and Christine Civiletti – City of San Mateo Keegan Black – City of Brisbane Stephen Stolte – City of Daly City Monica Devincenzi - Republic Services Gino Gasparini - Recology San Mateo Teresa Montgomery - South San Francisco Scavenger
11:45-12:00	**Closing Remarks and Next Steps** Chris Sommers - EOA/SMCWPPP

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
Clean Water. Healthy Community.

Evaluation Form

Illegal Dumping Workshop

San Mateo, CA

Wednesday, May 30, 2018
Attendance: 72
Evaluations: 42

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1. **Getting Buy-in from Elected Officials and Upper Management –**
   Given by Larry Patterson, City Manager – City of San Mateo

   Very Useful 23 **Somewhat Useful 16** **Not useful 0**

   Comments:

   - Great to hear what they are doing (2)
   - Nice to hear from the core men directly
   - Set the tone of the session
   - Great perspective – city managers mean well but could reinforce bad behavior by asking city staff to remove litter

2. **City of San Mateo: Nuts and Bolts of the Illegal Dumping Program –**
   Given by Roxanne Murray, Solid Waste Program Manager,
   Ron Kasper, Recycling Coordinator,
   Christine Civiletti, Code Enforcement Manager

   Very Useful 33 **Somewhat Useful 9** **Not useful 0**

   Comments:

   - Ron needs to correct spelling on slides
   - Good real world examples from Ron
   - Good data, maybe break down information by having different speakers
   - Good to see data to back up actions
   - Will help with On-land Visual Trash Assessment (OVTA) Program
   - Best practices and knowing what works and doesn't work is great
   - Very good
   - Appreciated leaning about their program and how only addressed the problem with letter, cameras, designated staff and lessons learned
   - Nice to see what works – cameras
   - Difficult to hear Ron speak
   - Presenter was a little hard to hear and presentation pace was a little slow, but content was good.
   - Helpful to see how different enforcement procedures help.
   - Helpful to hear about the use of letters being sent to property owners

3. **City of Brisbane: Illegal Dumping and Litter Management Program –**
   Given by Keegan Black, Maintenance Program Manager

   Very Useful 23 **Somewhat Useful 16** **Not useful 2**

   Comments:

   - More data instead of examples
   - Lessons learned
   - Interesting lessons learned
   - I like the before/after photos
   - Interesting to see what doesn't work – public dumpsters
   - Useful to see tactics for roadways and shoreline
   - Very insightful to take a different approach at looking at the illegal dumpling solutions; it may stem from outside the city/hauler
   - Good to turn back to community pride/involvement
   - Information about covered containers was interesting

4. **City of Daly City: Building Community Together with Your Hauler –**
   Given by Stephen Stolte, Sustainability Coordinator
   Monica Devincenzi, Republic Services

   Very Useful 37 **Somewhat Useful 5** **Not useful 0**

   Comments:

   - Very engaging and informative presentation
   - I appreciated both speaker's visuals and experiences.
   - Great and engaging - great use of sharing example of long-term and usable/transferable ideas
   - Great to see the problem from a different perspective.
   - Community engagement is so important. (2)
   - Loved hearing different perspective (2)
   - Good ideas
   - Solve the problem as "we"
   - Appreciated their openness in sharing what they've done and learned in understanding why people are doing illegal dumping
   - Very good presenters, interesting subject matter that I did not expect this workshop to cover
   - Change the community culture/pride of ownership
   - Interesting experiences, research, strategies, community involvement, and alignment with community /public. It will be interesting to have follow-up presentations on programs and successes.

5. **Did this training meet your expectations? Yes: 39 No: 1**
   - Very helpful
   - Beyond my expectations!
   - Still looking for the solutions, but many more ideas were expressed to lead to success?

6. **What parts of the training were most useful to you?**
    - Daly City presentation was good – would have wanted to hear more on how other cities can use their model. Community involvement. (6)
    - Lessons learned, examples and best practices (6)
    - Strategies used, successes and failures (3)
    - Nice to see what other nearby jurisdictions are doing and sharing information (5)
    - San Mateo presentation good with lots of data and useful information (2)
    - All the different ideas to handle illegal dumping (2)
    - All presentations were great (2)
    - Hearing from those presenters who use these provisions on a daily basis.
    - Good information on how to deal with problems from the front end and back end.
    - Having multiple departments – code, public works, etc.
    - Dumpsters use and place
    - Always good to think outside the box.
    - Different but holistic approaches to tackling one big issue.
    - Community behavior changes
    - Pride in community
    - Public art/gardens/etc.
    - Hard facts and numbers proving working methods of reducing illegal dumping.
    - Building community together with your hauler
    - Great speakers, real-life issues
    - Seeing multiple efforts an successes towards problem
    - Learning the various programs in place in the different communities and their challenges and successes. There are tips from each talk that we all can take away for our communities.
    - I thought very good organized, very good speakers

7. **What would have made this training more useful?**
    - Group discussion with all participants break out groups on direct issues
    - Adding a scheduled break would be nice (3)
    - More about the community, fines, where do we go from there
    - More time and more meetings
    - Understanding how cities are managing funds to support programs, as well as what the costs are.
    - How do they finance through haulers
    - More cities presenting their successful methods in shorter bursts.
    - I think if the training added on top with the panel an interactive group discussion to find attainable goals/solutions/next steps.
    - Name tags/place cards for panel

8. **What topics would you recommend for a future training?**
    - Update on progress
    - Use this as a driving point to more sessions with more hands on and engaging instead of just listening.
    - Code enforcement, next stage and time
    - Location for dumping

- This would be great, maybe add more on what more cities are doing and have a broad overview
- Shopping carts? Not pickup, but have community education/prevention
- Cigarette butt littering
- More detail about legality of camera use.
- Could Daly City present all of their research – Newark, NJ, Scotland, etc.
- Termite abatement
- Actual cases where people/residents were prosecuted
- Community engagement (2)
- Movement towards a region-wide – anti-littering message (media, etc.)
- Incorporation of region-wide anti-littering message to schools.
- Ordinances in effect in the county and Bay Area

9. **General Comments?**
    - Countywide approach/messaging
    - Invest in media ads (radio, tv, local news)
    - Good training
    - Community activities
    - Great workshop – thanks for putting this together (6)
    - Should have a follow-up event to see if presenters have any updates or if jurisdictions saw any change after trying their methods.
    - Helpful to share experiences and learn from other agencies.
    - Countywide efforts to educate the public about litter and illegal dumping could help the cities and county. Countywide messages/messaging.
    - I like the panel discussion
    - Microphone needs to be better
    - Great information, keep it clean
    - Good training, good turnout (2)
    - Put bollards by water and landscaping in row to limit access of truck dumping.
    - Lillian's idea of a countywide approach and message is a good idea. Everyone is dealing with this use on the same level.

Appendix 11

- Annual Reporting for FY 2017-2018, Regional Supplement for PCBs and Mercury Load Reductions, BASMAA, September 2018
- Annual Reporting for FY 2017-2018, Regional Supplement for Quantitative Relationship Between Green Infrastructure Implementation and PCBs/Mercury Load Reduction, August 2018
- Updated Control Measures Plan for PCBs and Mercury in San Mateo County Stormwater Runoff, SMCWPPP, September 30, 2018

September 30, 2018

REGIONAL PCBs AND MERCURY LOAD REDUCTIONS

Introduction

MRP 2.0 requires Permittees to develop and implement control measures to reduce PCBs and mercury in stormwater runoff to San Francisco Bay throughout the permit area (Table 1). For PCBs, Permittees are collectively required to reduce loads by a minimum of 500 grams per year (g/yr) by June 30, 2018, and 3,000 g/yr by June 30, 2020. At least 120 g/yr of PCBs load reduction must be achieved through implementation of green stormwater infrastructure (GSI) projects on public and private lands. The June 30, 2020 date may be extended to December 31, 2020 if Permittees provide documentation that control measures that will attain the load reduction will be implemented by that date. For mercury, Permittees are collectively required to reduce stormwater loads by 48 g/yr by June 30, 2020 through implementation of GSI projects on public and private lands. These load reduction performance criteria may be met regionally. However, should regional load reductions not be achieved, MRP 2.0 requires each Permittee to achieve load reductions on a county-wide basis.

Table 1. PCBs and Mercury Load Reductions Required by MRP 2.0 by 2018 and 2020.

PCBs (g/year)			**Mercury (g/yr)**
By July 2018	By July 2020		By July 2020
All Control Measures	All Control Measures	Green Stormwater Infrastructure	Green Stormwater Infrastructure
500	3,000	120	48

The PCBs and mercury performance criteria in Table 1 can be achieved through implementation of a variety of control measures, including the following:

1. Source property ID and Abatement
2. Green Stormwater Infrastructure and Treatment Controls, including:
   - Parcel-based new/re-development/Green Streets/Regional Retrofits
   - Public Hydrodynamic Separator Units (trash full capture)
3. Enhanced Operation and Maintenance (O&M) Measures, including:
   - Street Sweeping or Flushing
   - Inlet-based Trash Full Capture Devices
   - Other MS4 Cleaning
4. Managing PCBs in Building Materials
5. Managing PCBs in Infrastructure
6. Diversions to Publicly Owned Treatment Works (POTWs)
7. Source Controls/Other Actions

The control measures implemented to-date are described in more detail in "Control Measures Plans" prepared by individual Bay Area countywide stormwater programs. The PCBs and mercury load reductions that have been achieved to-date were calculated using the methodologies presented in the *Interim Accounting Methodology for PCBs and Mercury Loads Reduced Report*, which was developed by

BASMAA and approved by the Regional Water Board's Executive Officer in March 2017. The data reported here on regional PCBs and mercury loads reduced by all Permittees were provided by the following countywide stormwater programs and municipal agencies:

- Alameda Countywide Clean Water Program
- Contra Costa Clean Water Program
- Santa Clara Valley Urban Runoff Pollution Prevention Program
- San Mateo Countywide Water Pollution Prevention Program
- Fairfield-Suisun Urban Runoff Management Program
- City of Vallejo and the Vallejo Flood and Wastewater District

The load reductions reported here are based on the best available information at the time this was written, and may not reflect the most up-to-date accounting of all reductions achieved through all control measures that have been implemented in the region. These data will be updated in future annual reports as additional information is gathered.

Regional PCBs Loads Reduced

The cumulative PCBs loads reduced by MRP Permittees from FY 2013/14 through FY 2017/18 are presented in Table 2. A total of 691 g/yr of PCBs were reduced across the permit area over that time period, demonstrating that the MRP performance criterion of 500 g/yr of PCBs loads reduced by July 2018 has been achieved.

Table 2. PCBs loads reduced by MRP Permittees (FY 2013/14 – FY 2017/18)[1, 2]

Control Measure Category	PCBs Load Reduction (g/yr)
Source Property Identification and Abatement	424
Green Stormwater Infrastructure (i.e., Parcel-Based New/Re-Development or Green Street/Regional Retrofit)	156
Large Full Trash Capture (i.e. HDS Units)	100
Enhanced O&M Measures	9
Stormwater Diversion to Sanitary Sewer	2
TOTAL - All Control Measures	**691**

1 - Loads reduced reported for each control measure are based on the available information provided by the countywide stormwater programs and municipal agencies at the time this report was written; updates and corrections (if needed) will be provided in future annual reports.

2 - Load reductions have not yet been calculated for the following control measures: Manage PCBs in Building Materials; Manage PCBs in Infrastructure; Source Controls/Other. Not all enhanced O&M measures have been included in the load reductions reported here. These will be added as updates in future annual reports.

The PCBs loads reduced by control measure category each fiscal year and the cumulative total for the region are presented in Figure 1. In total, source property identification and referral or abatement has reduced PCBs loads by 424 g/yr, accounting for 61% of the total PCBs loads reduced to-date. Source property identification and abatement remains the most effective control measure currently available for reducing PCBs loads to the Bay. GSI has been the second largest contributor to load reductions, providing 156 g/yr of PCBs loads reduced and accounting for 22% of the total PCBs loads reduced to-date. These data demonstrate the MRP performance criterion of 120 g/yr of PCBs loads reduced through GSI by July 2020 has already been met across the region. An additional 100 g/yr have been reduced by large, full trash capture devices (i.e., HDS Units). The remaining < 2% of the regional PCBs loads reduced during the permit to date have come from enhanced O&M practices and stormwater diversions. However, not all enhanced O&M practices have been accounted for to-date. Further, any load reductions achieved through other control measures (i.e., managing PCBs in infrastructure, Source Controls, Others) have not yet been reported. Additional information will be compiled and presented in future annual reports to update and correct (if needed) the PCBs load reductions that that are reported here.

The MRP stipulates that PCBs in building materials program will result in 2,000 g/yr PCBs load reduction if all Permittees successfully implement the program, which is 66% of the MRP July 2020 performance criterion. The remaining 1,000 g/yr must be achieved through all other control measures. Given the PCBs load reductions of 691 g/yr achieved to-date, an additional 309 g/yr of PCBs must be reduced across the region by the end of the permit term. Assuming the 2020 PCBs performance criterion is met, an additional 11.4 kilograms per year (kg/yr) would need to be reduced to achieve the PCBs TMDL load reduction target of 14.4 kg/yr that has been allocated to Permittees. A small portion of this may have already been reduced during earlier permit terms (i.e., between July 1, 2002 and July 1, 2013). However, the bulk of the remaining 11.4 kg/yr will need to be reduced in future permit terms to achieve the PCBs TMDL load reduction target.

Regional Mercury Loads Reduced

The cumulative mercury loads reduced by MRP Permittees from FY 2013/14 through FY 2017/18 are presented in Table 3. An estimated total of 2,987 g/yr of mercury were reduced across the permit area over that time period. The mercury loads reduced by control measure category each fiscal year and the cumulative total for the region are presented in Figure 2. GSI has been the largest contributor to mercury load reductions during the permit term. Total mercury loads have been reduced by 1,874 g/yr through GSI, accounting for 63% of the total loads reduced. These data demonstrate the MRP performance criterion of 48 g/yr of mercury loads reduced through GSI by 2020 has already been met across the region. An additional 907 g/yr of mercury have been reduced by large, full trash capture devices (i.e., HDS Units), accounting for 31% of the total loads reduced. Source property identification and referral or abatement has reduced mercury loads by 123 g/yr, accounting for only 4% of the total mercury loads reduced to date. The remaining < 3% of the regional mercury loads reduced during the permit to date have come from enhanced operation and maintenance practices and stormwater diversions. However, not all enhanced O&M practices or source controls have been accounted for to date. Additional information will be compiled and presented in future annual reports to update and correct (if needed) the mercury load reductions that that are reported here.

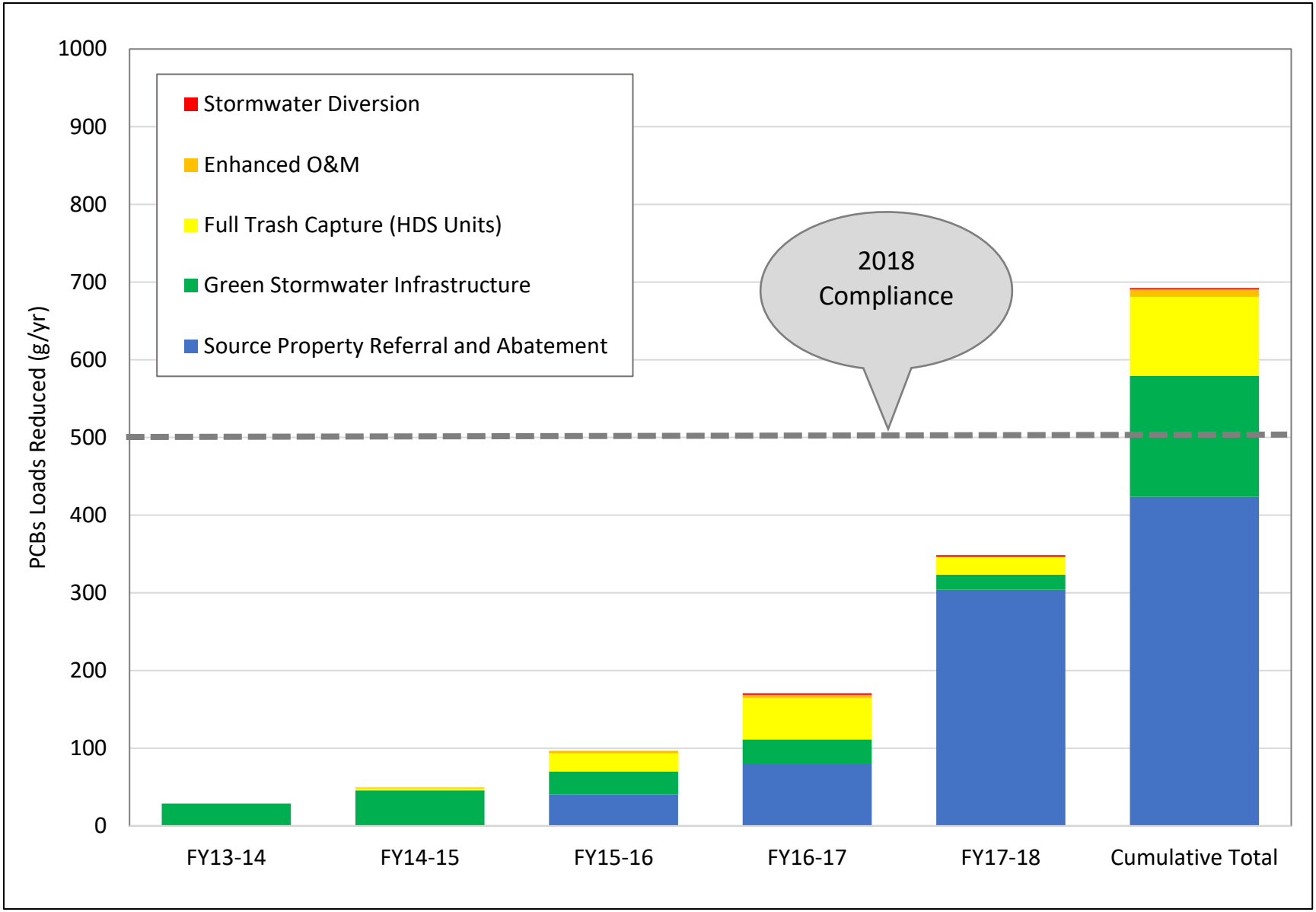


Figure 1. PCBs Load reductions achieved by MRP Permittees by fiscal year and the cumulative total.

Table 3. Mercury loads reduced by MRP Permittees (FY 2013/14 – FY 2017/18)[1, 2]

Control Measure Category	Mercury Load Reductions (g/yr)
Source Property Identification and Abatement	123
Green Stormwater Infrastructure (i.e., Parcel-Based New/Re-Development or Green Street/Regional Retrofit)	1,874
Large Full Trash Capture (i.e. HDS Units)	907
Enhanced O&M Measures	78
Stormwater Diversion to Sanitary Sewer	5
TOTAL - All Control Measures	**2,987**

1 - Loads reduced reported for each control measure are based on the available information provided by countywide stormwater programs and municipal agencies at the time this report was written; updates and corrections (if needed) will be provided in future annual reports.

2 - Load Reductions have not yet been calculated for the following control measures: Source Controls/Other. Not all enhanced O&M measures have been included in the load reductions reported here. These will be added as updates in future annual reports.

Regional Source Property List

Table 4 provides a current listing of all of the source properties that have been identified throughout the region and referred to the Regional Water Board or were self-abated during the permit term. In total, 21 source properties comprising nearly 172 acres have been referred to the Regional Water Board for abatement or were self-abated. This list will continue to be updated in future annual reports as additional source properties are referred or abated.

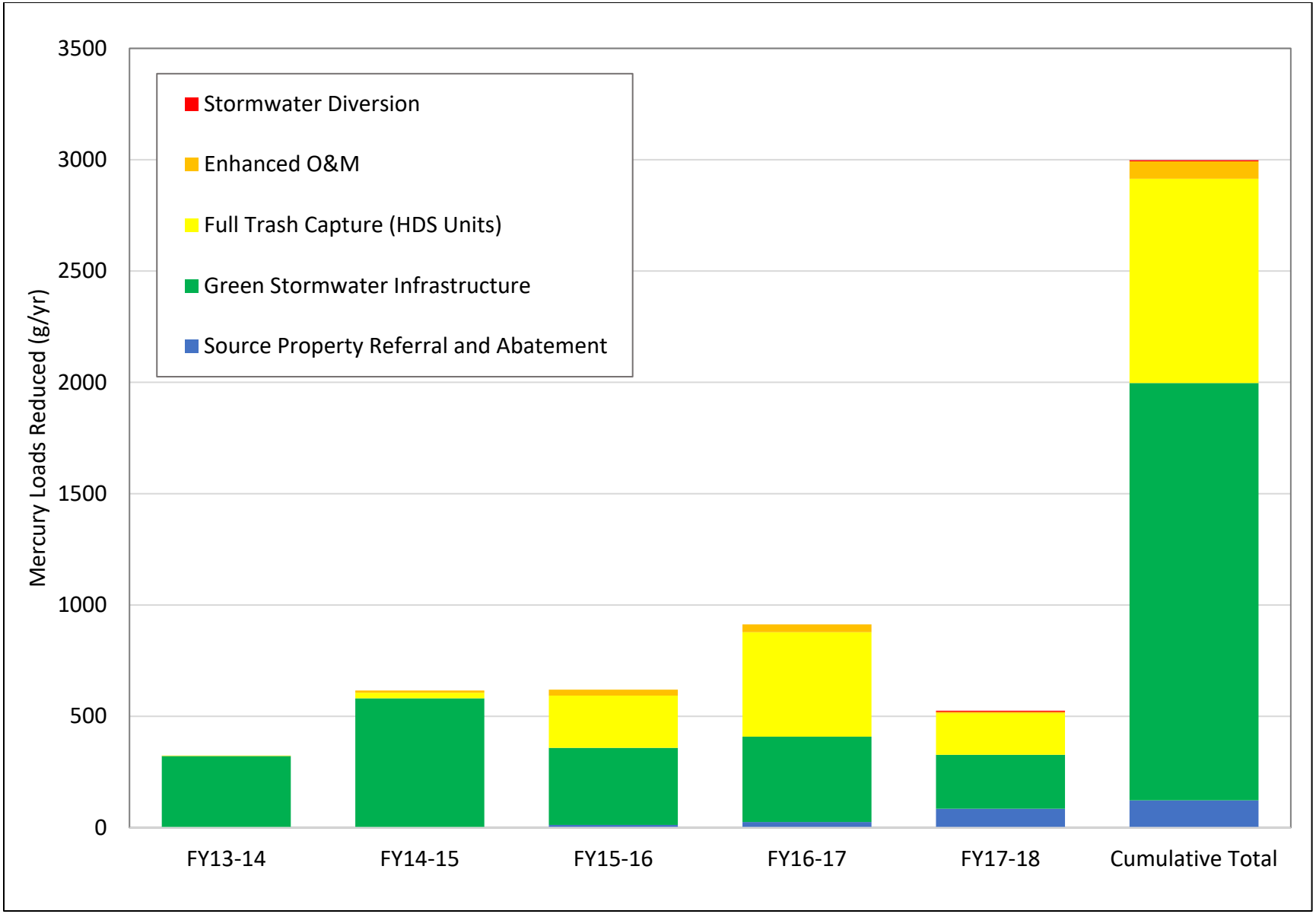


Figure 2. Mercury load reductions achieved by MRP Permittees by fiscal year and the cumulative total.

Table 4. List of PCBs source properties across the MRP region that have been referred to-date to the Regional Water Board or self-abated.

Countywide Program	Site Name	Location/APN	Type of Source Property	Referral Date	Abatement Date	Area (Acres)
ACCWP	Asbestos Abatement Mgmt Group of CA (AMG)	3438 Helen Street (APN 7-609-26-2)	Referral	FY 17-18		0.43
ACCWP	Custom Alloy Scrap Sales (Cass)	2601 Peralta St (APN 7-586-2)	Referral	FY 17-18		7.65
ACCWP	Former Giampolini Property	2847 Peralta Street and 2847 Peralta Street (APN 7-589-28 &7-589-29)	Self-Abatement		FY 17-18	1.93
ACCWP	Former South SPRR/Novartis Site	4560 Horton Street (APN 49-1041-61)	Self-Abatement		FY 17-18	0.03
ACCWP	General Electric Company - Oakland	5441 East 14th Street (APN 41-3848-1)	Self-Abatement		FY 17-18	10.1
ACCWP	Lawrence Berkeley National Lab	One Cyclotron Road, Berkeley	Self-Abatement		FY 17-18	1.0
ACCWP	OAB Transformer Spill	10th and Maritime St (APN 18-507-1-8)	Self-Abatement		FY 17-18	0.02
ACCWP	Precision Cast Products	1549 32nd Street and 2868 Hannah Street (APN 7-589-1 & 7-589-24)	Referral	FY 17-18		0.79
ACCWP	Union Pacific Railroad – Oakland Coliseum	700 73rd Avenue (APN 041 390100703, APN 041 390100705, APN 041 390100706, APN 41-3901-7-5)	Referral	FY 17-18		0.4
CCCWP	Sims Metal Management Facility	600 South 4th Street, Richmond	Referral	FY 17-18		19.3
CCCWP	World Corp	1014 Chesley, Richmond	Referral	FY 17-18		10.4
CCCWP	Port of Richmond	Point Potrero Marine Terminal, Richmond	Self-Abatement		FY 17-18	0.72
CCCWP	Larkey Pool Renovation Project	2771 Buena Vista Ave., Walnut Creek	Self-Abatement		FY 17-18	0.0006
CCCWP	Radiant Avenue	Radiant Avenue, North Richmond	Self-Abatement		FY 16-17	19.5
CCCWP	Former Molino Enterprises. Inc.	1215 Willow Pass Rd., Pittsburg	Referral	FY 15-16		6
CCCWP	Rumrill Sports Complex (Former BNSF Railyard Site)	1509 Rumrill Blvd, San Pablo	Self-Abatement		FY 15-16	4.45
SCVURPPP	Union Pacific Railroad	Leo Avenue Cul-de-Sac Railroad Right-Of-Way, San Jose	Referral	FY 15-16		5
SCVURPPP	Westinghouse Electric Federal Superfund	401 East Hendy Avenue, Sunnyvale; APNs: 204-47-001, 204-47-002, 204-48-028, 204-46-008	Referral	FY 17-18		73
SMCWPPP	977 and 1007/1011 Bransten Rd	977 and 1007/1011 Bransten Rd, San Carlos	Referral	FY 17-18		3
SMCWPPP	Delta Star / Tiegel	270 Industrial Rd/495 Bragato Rd, San Carlos	Referral	FY 17-19		7.7
CCCWP	San Diego Street	San Diego Street	Self-Abatement		FY17-18	0.08
					TOTAL ACRES	**171.5**

To:	Matt Fabry, San Mateo Countywide Water Pollution Prevention Program
From:	Stephen Carter, Paradigm Environmental
Date:	9/11/2018
Re:	Quantitative Relationship Between Green Infrastructure Implementation and PCBs/Mercury Load Reduction

1 INTRODUCTION

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

Per the MRP (Provision C.11.c.iii and C.12.c.iii), as part of the 2018 Annual Report SMCWPPP must provide a report on the approach to be used in the RAA to establish the quantitative relationship between GI implementation and PCBs and mercury load reductions. This submittal shall include all data used and a full description of models and model inputs relied on to establish this relationship. The purpose of this memorandum is to provide a preliminary report on the countywide RAA approach currently supporting GI planning efforts by Permittees in San Mateo County. As the 2018 Annual Report precedes the completion and documentation of the RAA, this memorandum provides a preliminary description of the models supporting the RAA, methods for using the model to determine stormwater improvement goals to be met with GI, and RAA output that will be used to demonstrate the relationship between GI implementation and pollutant load reduction and set goals for municipal GI planning. Based on further development of the RAA, the methods described in this memorandum may be revised to better align with MRP and/or TMDL assumptions, guidance documents intended to provide regional consistency, or the perspectives of Permittees, Regional Water Quality Control Board (Water Board) staff, or peer reviewers. Revisions to the methods and assumptions described in this memorandum will be documented in the RAA technical report that will be submitted as part of the Control Measures Implementation Plans.

1.1 MRP/TMDL Requirements for PCBs and Mercury Load Reduction from Municipal Stormwater Discharges

To address TMDLs for both PCBs (SFBRWQCB 2008) and mercury (SFBRWQCB 2006), the MRP (Provisions C.11 and C.12) requires the development of Control Measure Implementation Plans that outline the control measures that are expected to be implemented to meet interim and final pollutant

reductions to address the WLAs assigned to municipal stormwater discharges. The MRP outlines schedules for phased pollutant load reductions over time, as summarized in Table 1-1. The PCBs TMDL assigns a total WLA of 2 kg/year to MRP Permittees, of which 0.2 kg/year is allocated to Permittees within San Mateo County (SFBRWQCB 2008). The mercury TMDL assigns an 82 kg/year WLA to all MRP Permittees (collectively), with 8.4 kg/year allocated to Permittees within San Mateo County (SFBRWQCB 2006).

Table 1-1. PCBs and Mercury TMDL Interim and Final Wasteload Allocation (WLA) Schedules

Year	Aggregate WLA for All Sources of Urban Runoff to San Francisco Bay	
	PCBs (kg/yr)	Mercury (kg/yr)
2003 (TMDL baseline)	20	160
2018 (MRP interim)	19.5[1]	120
2020 (MRP interim)	17[2]	--
2028 (TMDL final)	--	82[4]
2030 (TMDL final)	2[3]	--

[1] 0.5 kg/yr aggregate load reduction required via MRP (2.0) from all MRP Permittees, with 60 g/yr load reduction specific to San Mateo County Permittees.
[2] 3 kg/yr aggregate load reduction required via MRP (2.0) from all MRP Permittees, with 370 g/yr load reduction specific to San Mateo County Permittees.
[3] 18 kg/yr load reduction for all sources of urban runoff to the Bay, with 14.4 kg/yr aggregate load reduction from urban runoff sources within the boundaries of MRP Permittees. Urban runoff sources within San Mateo County are allocated 0.2 kg/yr of the total WLA of 2 kg/yr assigned sources within the boundaries of all MRP Permittees.
[4] Urban runoff sources within the boundaries of Permittees within San Mateo County are allocated 8.4 kg/yr of the total WLA of 82 kg/yr assigned to urban runoff sources within the boundaries of all MRP Permittees.

GI will play an integral role in the Control Measure Implementation Plans and reduction of mercury and PCBs to address TMDL load reduction goals and WLAs. The MRP outlines a specific PCBs and mercury load reduction schedule attributable to GI, as summarized in Table 1-2.

Table 1-2. PCBs and Mercury Load Reduction Schedules for Green Infrastructure (GI) Implementation Outlined in the MRP

Year	Aggregate Load Reduction Required Through Implementation of GI by all MRP Permittees	
	PCBs (kg/yr)	Mercury (kg/yr)
2020	0.120[1]	0.048[2]
2040	3	10

[1] 0.015 kg/yr load reduction specific to San Mateo County Permittees.
[2] 0.006 kg/yr load reduction specific to San Mateo County Permittees.

1.2 Purpose of the Reasonable Assurance Analysis

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

for PCBs and mercury, and support GI planning. The EPA RAA Guide and Bay Area RAA Guidance both outline essential steps for performing an RAA, as depicted in Figure 1-1.

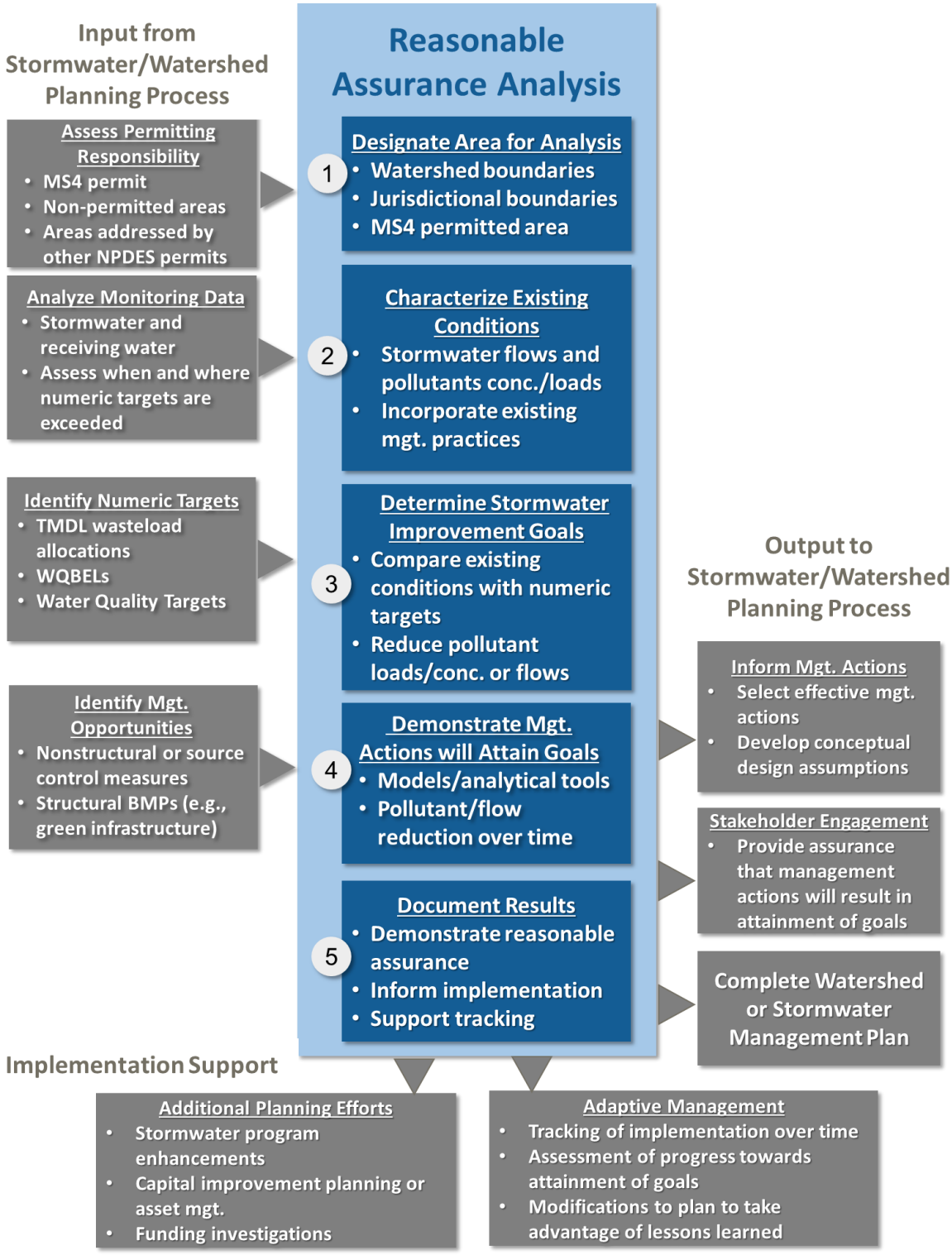


Figure 1-1. RAA Process Flow Chart (USEPA 2017).

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

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

As a result, each of the steps of the RAA shown in Figure 1-1 may have varying levels of interest for different audiences in terms of providing reasonable assurance. To streamline RAAs performed in the Bay Area and to standardize expectations of each of the RAA steps, the Bay Area RAA Guidance sought to provide greater details regarding the methods and goals for each of the RAA steps. A summary of the outcomes of the Bay Area RAA Guidance are summarized below (BASMAA 2017a):

1. **Identifying the Area of Analysis** - The area of analysis should be consistent with the regulatory area covered by the TMDL and the MRP. The MRP defines areas contributing permitted discharges as Permittee areas (i.e., within the boundaries of the Permittee's jurisdiction) that discharge stormwater runoff from storm drains and watercourses within their jurisdictions. Federal, State, and regional entities within Permittees' boundaries that are not subject to the MRP are not the responsibility of the Permittees. Non-urban land areas also do not need to be incorporated into the area of analysis. Areas that are hydrologically connected to regulated areas that may not be subject to the TMDL and/or the MRP should be included in the area of analysis to adequately calibrate the model. Areas that are not subject to the TMDL and/or the MRP should be accounted for in RAA models, but do not require control measure implementation or load reduction calculations.
2. **Calculating the Baseline Pollutant Loading (Characterizing Existing Conditions)** - The baseline pollutant loading for use in the RAA can be selected or calculated using one of the following three methods: (1) utilize the baseline loading presented in the TMDL Staff Reports (SFBRWQCB 2006; SFBRWQCB 2008); (2) utilize the baseline loading produced by the Regional Watershed Spreadsheet Model (RWSM) output; or (3) recalculate the baseline loading using a calibrated model of the baseline period for the area of analysis.
3. **Identifying Stormwater Improvement Goals** - The pollutant load reduction goals are the loads that must be reduced to achieve the MRP load reduction requirements (Provisions C.11.c/C.12.c) and demonstrate quantitatively that planned control measures will result in load reductions sufficient to attain the TMDL WLAs (Provisions C.11.d/C.12.d). The MRP load reductions required to be achieved through GI (C.11.c/C.12.c) are interpreted as a total mass required to be reduced as a proportion of the required load reduction. The required total load reduction for MRP permittees for mercury is 62 kg/yr and for PCBs is 14.4 kg/yr. In the case that a new baseline load has been computed using a calibrated model (method #3 in Step 2 above) and a new load reduction goal has been calculated, the percent of the permittee load reduction can be used as the stormwater improvement goal for guiding planning and implementation of GI measures. Table 1-3 provides a summary of the MRP required PCB and

mercury load reductions and the interpretation of the percent of Permittee load reductions to be attained through GI implementation, as reported by the Bay Area RAA Guidance.

Table 1-3. MRP Required Pollutant Load Reductions Achieved through GI

Pollutant	MRP Required Load Reduction (kg/yr)	Percent of Permittee Load Reduction Achieved through GI
PCBs	3.0	20.8%
Mercury	10.0	16.1%

4. **Estimating Load Reduction Achieved by Controls (Demonstrating Management Actions Will Attain Goals)** – The RAA will include methods for estimating pollutant load reductions associated with source controls and GI. Load reductions associated with source controls will be based on methods provided in the approved refinement of the Interim Accounting Methodology (BASMAA 2017b). The source control component of the RAA will be discussed through a separate coordinated effort and regional discussion on acceptable methods and assumptions for the accounting methodology. The focus of this memorandum is to provide early documentation of the approach to be used to address the RAA for GI. Load reductions from GI can include: (1) land use change associated with redevelopment, (2) low impact development (LID) and non-LID treatment controls on land development projects as required by MRP Provision C.3, and (3) retrofit of existing streets and developed sites with GI features and LID treatment controls (e.g., green streets and regional projects). The Bay Area RAA Guidance states that "GI performance should be simulated directly using a process-based model, or simulated using a combination of continuous simulation-based volume performance and empirically based concentration performance to estimate load reductions."
5. **Documentation** – Documentation of RAA results is critical to the demonstration that GI Plans and Control Measure Implementation Plans will result in attainment of pollutant load reduction goals. The documentation can serve various purposes, including providing: (1) reasonable assurance to stakeholders and regulators that the plans will lead to effective implementation, (2) information to support next steps for implementation (e.g., capital improvement planning, investigation of funding options), and (3) quantitative results to support an adaptive management process, tracking of implementation over time, and/or assessment of progress towards attainment of pollutant reduction goals (USEPA 2017). The 2020 Annual Report will include all documentation associated with the RAA. The Bay Area RAA Guidance provides recommendations for minimum requirements for RAA documentation, including summaries of model input (e.g., model parameters, data sources, or other assumptions), calibration results, model processes and procedures, key model outputs (e.g., baseline loads, load reduction goals), modeled GI and source control measures, and modeled load reductions by control measure category.

1.3 Preliminary Identification of Opportunities for GI Projects

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

- **LID for New Development and Redevelopment** – The MRP includes a Provision (C.3) for the integration of LID within new development and redevelopment. As LID techniques are implemented as new development and redevelopment occurs throughout the County, the benefits of such practices in terms of reducing urban runoff flows and associated pollutant

loads can be considered as part of the pollutant load reductions attributed to implementation of GI. C/CAG has been working with San Mateo County Permittees to compile information on LID practices that have been implemented within new development and redevelopment since water year 2003 (baseline year for the TMDL). C/CAG has also performed analysis to project the number of acres of future new development and redevelopment to be addressed by the Provision C.3 regulated development by 2040. The RAA will consider existing LID practices and projections of LID in future new development and redevelopment areas to estimate anticipated PCBs and mercury load reductions from 2003 to 2040.

- **Countywide Stormwater Resource Plan (SRP)** – The SRP is a comprehensive plan that identifies and prioritizes 1000's of GI project opportunities throughout San Mateo County and within each municipal jurisdiction. Prioritized project opportunities include: (1) large regional projects within publicly owned parcels (e.g., public parks) that infiltrate or treat stormwater runoff generated from surrounding areas (e.g., diversion from neighborhood storm drain system; diversions from creeks draining large urban areas); (2) retrofit of publicly owned parcels with GI that provide demonstration of onsite LID designs; and (3) retrofit of public street rights-of-way with GI, or "green streets." The SRP included a multi-benefit scoring and prioritization process that ranks GI project opportunities based on multiple factors beyond pollutant load reduction (e.g., proximity to flood prone channels, potential groundwater basin recharge). Figure 1-2 provides an example of green street opportunities identified, scored, and prioritized by the SRP throughout San Mateo County (SMCWPPP 2017).

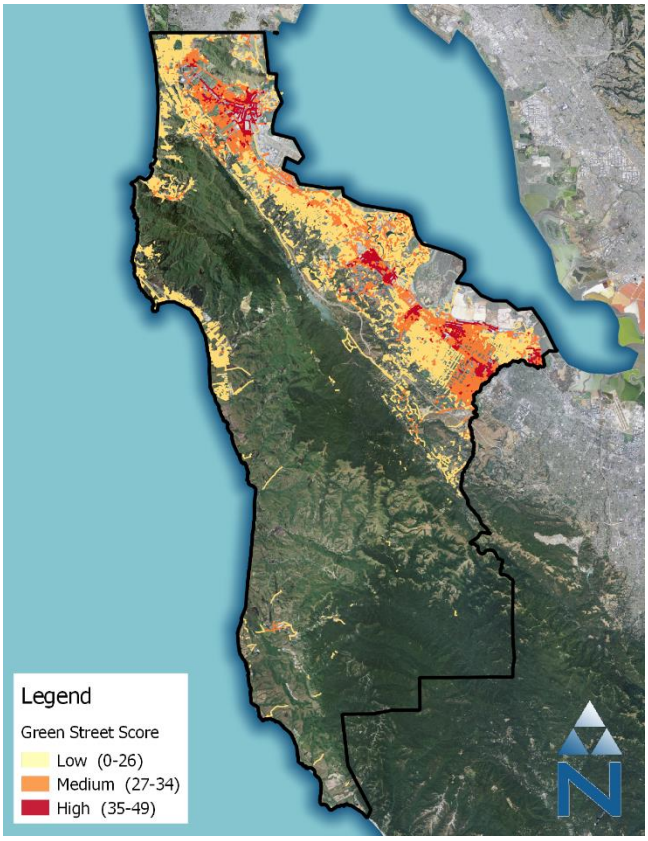


Figure 1-2. SRP Prioritized Green Street Opportunities.

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

2 DESCRIPTION OF THE RAA MODEL

C/CAG has initiated a comprehensive, countywide modeling effort to provide: (1) simulation of baseline loads of PCBs and mercury for each of the County's watersheds and municipal jurisdictions discharging to San Francisco Bay; (2) estimation of necessary GI implementation that is needed to meet load reduction goals and TMDL WLAs; and (3) determination of the amount of GI needed to meet load reduction goals based on project opportunities identified Section 1.3. The RAA will also provide analysis of alternative implementation scenarios through cost-benefit optimization that can

inform cost-effective GI implementation within each municipal jurisdiction. Results can be used to set goals for GI Plans developed by each Permittee.

2.1 RAA Model Overview

The analytical framework selected to support the San Mateo Countywide RAA is based on a linked system of models (Figure 2-1). Component models of the linked system include:

- **Loading Simulation Program C++ (LSPC)** – The hydrologic and water quality model selected for the baseline model of San Mateo County watersheds was the Loading Simulation Program in C++ (LSPC) (Shen et al., 2004), a watershed modeling system that includes Hydrologic Simulation Program – FORTRAN (HSPF) (Bicknell et al. 1997) algorithms for simulating watershed hydrology, erosion, water quality, and in-stream fate and transport processes. The model can simulate upland loading and transport of sediment, mercury, and PCBs. LSPC is built upon a relational database platform, making it easier to collate diverse datasets to produce robust representations of natural systems. LSPC integrates GIS outputs, comprehensive data storage and management capabilities, the original HSPF algorithms, and a data analysis/post-processing system into a convenient PC-based Windows environment. The algorithms of LSPC are identical to a subset of those in the HSPF model with selected additions, such as algorithms to address land use change over time. LSPC is an open-source public-domain watershed model available from EPA.
- **System of Urban Stormwater Treatment & Analysis Integration (SUSTAIN)** – Developed by EPA's Office of Research and Development, SUSTAIN was primarily designed as a decision-support system for selection and placement of GI projects at strategic locations in urban watersheds. It includes a process-based continuous project simulation module for representing flow and pollutant transport routing through various types of GI projects. A distinguishing feature of SUSTAIN is a robust cost-benefit optimization model that incorporates dynamic, user-specified project unit-cost functions to quantify the costs associated with project construction, operation, and maintenance. The cost-benefit optimization model runs iteratively to generate a cost-effectiveness curve that is sometimes comprised of millions of GI project scenarios representing different combinations of projects throughout a watershed. Those results are used to make cost-effective management recommendations by evaluating the trade-offs between different scenarios. The "benefit" component can be represented in several ways: (1) reduction in flow volume (2) reduction in load of a specific pollutant or (3) other conditions including numeric water quality targets, frequency of exceedances of numeric water quality targets, or minimizing the difference between developed and pre-developed flow-duration curves (USEPA 2009, Riverson et al. 2014).

The LSPC model will provide a characterization of existing conditions and determination of necessary pollutant load reductions to meet requirements of TMDLs and the MRP. SUSTAIN will be used to provide analysis of the amount of GI needed to provide the portion of the load reduction assigned to GI by the MRP (Table 1-2). The models, as planned, will not account for pollutant load reductions associated with source/institutional controls such as source property referrals, enhanced operation and maintenance, etc. This accounting approach will be developed as part of a BASMAA regional project, with results incorporated into a Control Measures Implementation Plan that includes both the RAA modeling of GI and methods for accounting for load reductions associated with sources/institutional controls.

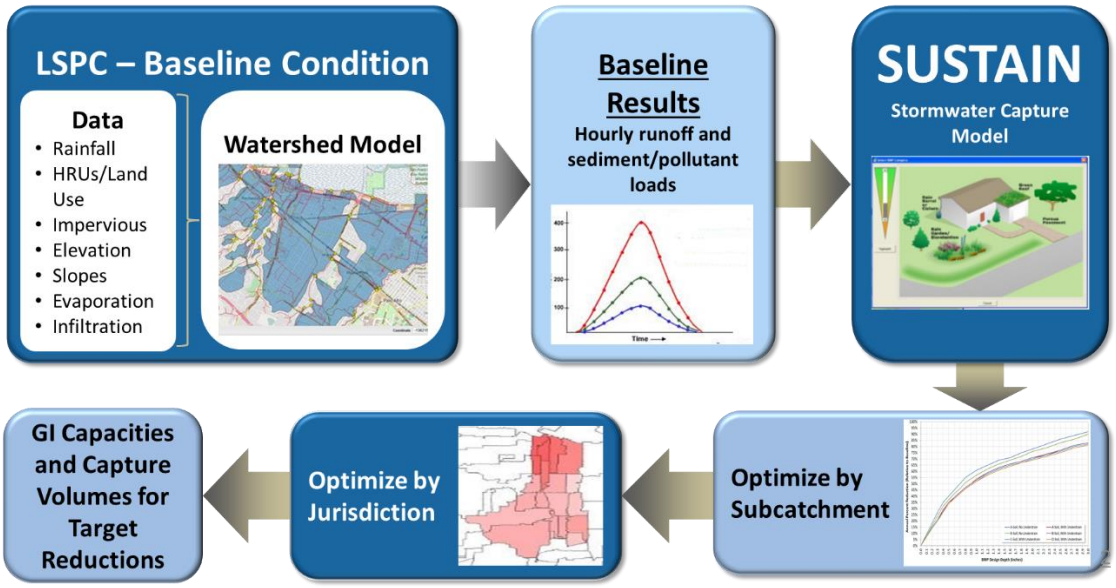


Figure 2-1. Modeling System Supporting the RAA.

2.2 Baseline Model

A draft LSPC model has been developed for San Mateo County watersheds to represent the baseline condition and determine the PCBs and mercury load reduction goal associated with the implementation of GI. As stated in the Bay Area RAA Guidance, if such a model is used to recalculate the baseline loading, the model should be calibrated for hydrology and water quality using local data, to the extent data are available, to ensure the model reliably captures the characteristics and conditions of the watersheds (BASMAA 2017). The following sections provide an overview of the approach used to develop the LSPC hydrology and water quality model and the use of the model for determining stormwater improvement goals for GI.

2.2.1 Hydrologic Model

The LSPC hydrology model includes a comprehensive method for representing the various processes associated with the various pathways of water through a watershed. Figure 2-2 is a generalized schematic of the underlying hydrology model (Stanford Watershed Model) used in HSPF and LSPC. The schematic represents land-based processes for a single land unit in the model. Meteorological data are the driver for modeled hydrologic processes. As shown in the schematic, precipitation is the primary input, while total actual evapotranspiration (TAET) and streamflow are the primary outputs in the water budget. Potential evapotranspiration (PEVT; not explicitly shown in the schematic) is another key meteorological boundary condition for the model. The interaction of model parameters shown below in Figure 2-2 will ultimately determine how much PEVT becomes TAET. There are several pathways that water can take as it makes its way through the network. For each land unit, process-based parameters that reflect differences in geology, soils, vegetation, and land cover will govern the rates and volumes of water at each stage throughout the schematic.

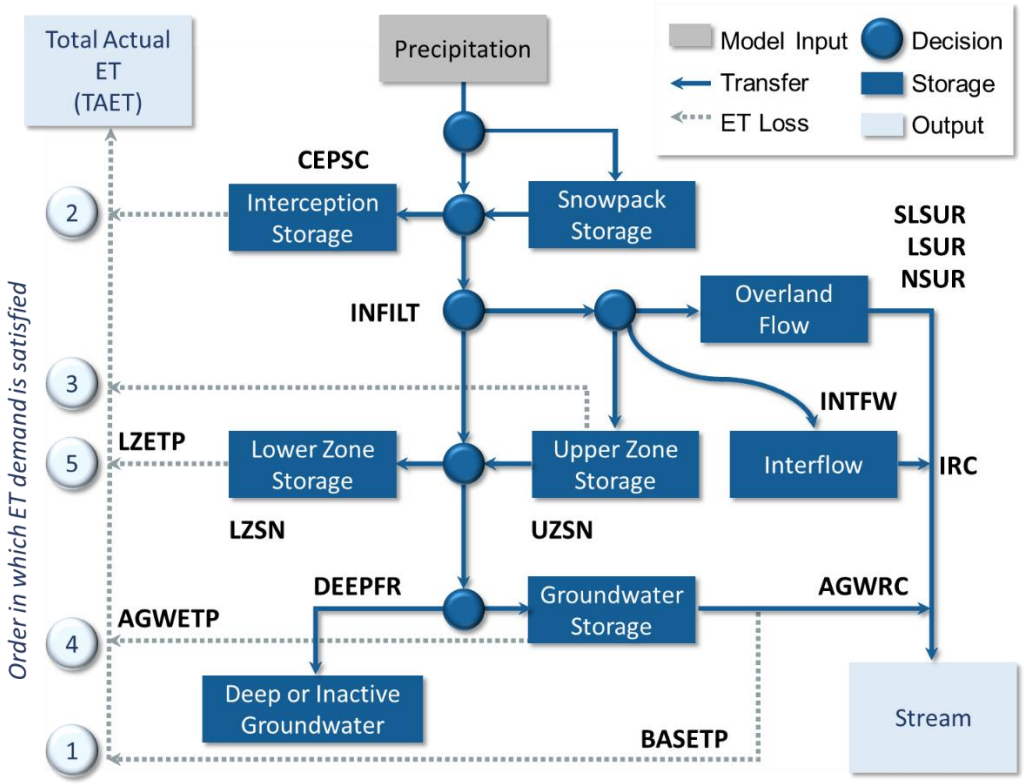


Figure 2-2. Hydrologic Model Schematic (based on the Stanford Watershed Model).

2.2.1.1 Model Subwatershed Delineation

Subwatershed delineation was based primarily on the National Hydrography Dataset (NHD) Plus v2 catchments. This layer provided a good starting point because the subwatersheds were at a relatively fine resolution that captured orographic changes and stream connectivity. For segments where orographic variability was relatively small and stream connectivity was minimally impacted, smaller subwatersheds were aggregated into larger ones. Where necessary, subwatersheds were also adjusted to reflect the locations of streamflow monitoring gages used for calibration. Figure 2-3 shows delineated subwatersheds for all San Mateo County watersheds and those used for model calibration. The Guadalupe River watershed in nearby Santa Clara County was included in the model development due to the amount of flow and water quality data available for model calibration and validation. Much of these data also served as the basis for extrapolating total sediment and pollutant loads for the Bay TMDLs (SFBRWQCB 2006 and 2008). Therefore, modeling the Guadalupe River watershed alongside San Mateo County watersheds allows for comparison of modeled results with assumptions used in the TMDLs for the calculation of WLAs.

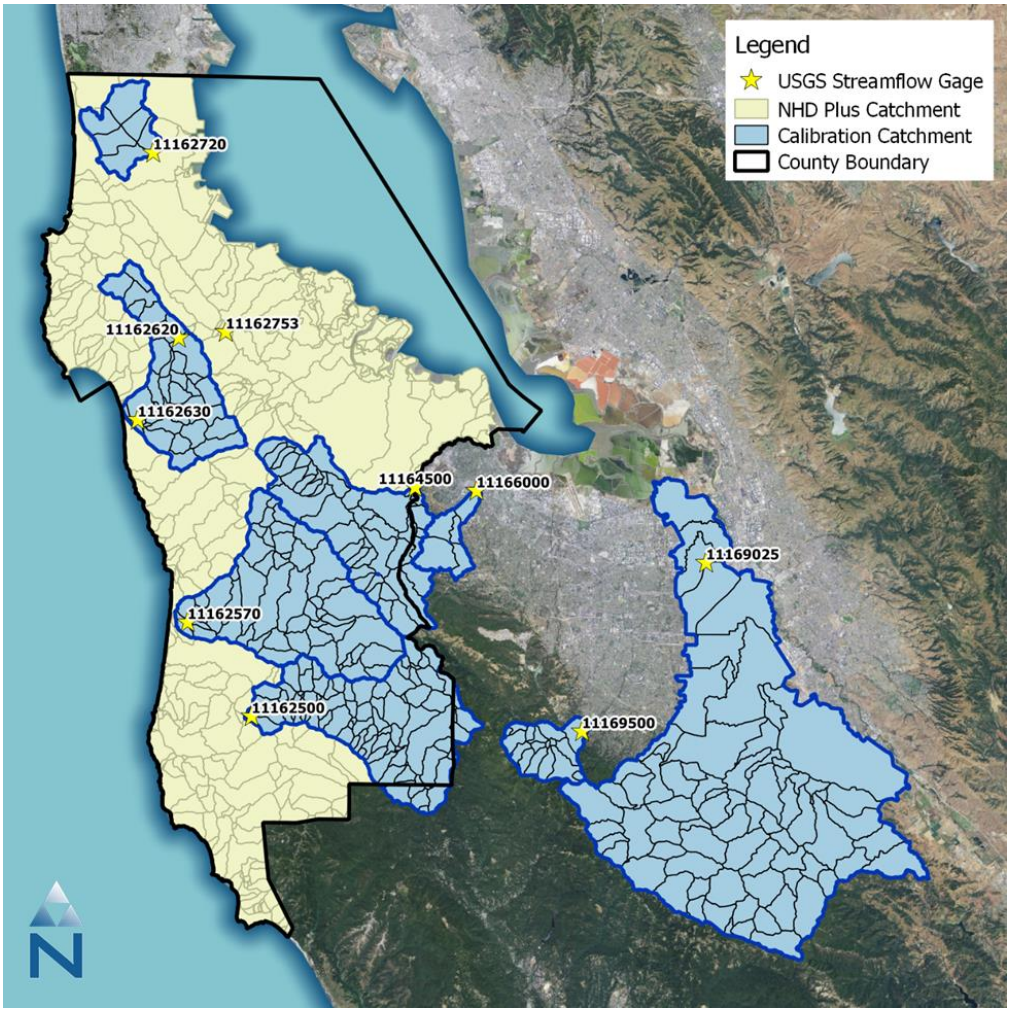


Figure 2-3. LSPC Model Subwatershed Delineation.

2.2.1.2 Hydrologic Response Units

In a watershed model, land unit representation should be sensitive to the features of the landscape that most affect hydrology. In urban areas, land is divided into pervious and impervious components; in less developed areas, vegetative cover and soil type are the most influential factors. Irrigation can also be an important factor in some portions of the County. Hydrologic soil groups are rarely homogeneous in a watershed; therefore, pervious land cover will typically be further subdivided into soil hydrologic groups so that infiltration processes are better represented. Slope is also an important factor in portions of the County where steep slopes are prevalent; runoff and moisture-storage vary between low and high sloped areas. The combination of land use, soil hydrologic group, and slope was used to define hydrologic response units (HRUs).

Table 2-1 provides a summary of HRU component data layers and approximate dates for each source, which are representative of the period between 2010 to 2016. The HRU provides a physical basis for parameterizing and representing hydrologic processes in the model. Figure 2-4 shows an example spatial distribution of land cover for the study area.

Table 2-1. Summary of Hydrologic Response Unit (HRU) Components and Source Datasets

HRU 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 Cover	National Land Cover Dataset (NLCD)	2011

1: NRCS SSURGO dataset was downloaded in March 2016

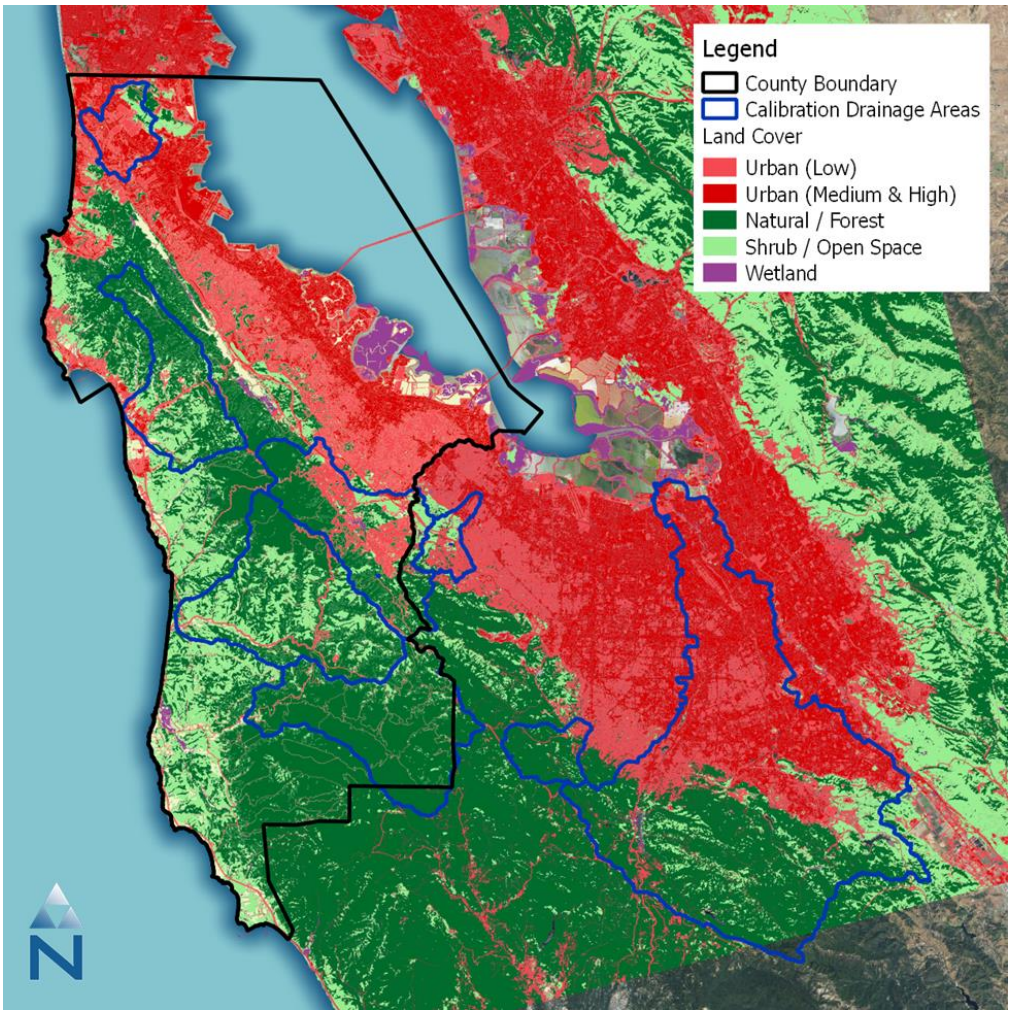


Figure 2-4. Land cover (NLDC).

2.2.1.3 Meteorological Boundary Condition

Meteorological data such as precipitation, evapotranspiration, temperature, and other climate time series are the primary forcing functions of the model—analytical considerations include data quantity and quality. Primary meteorological data products compiled and reviewed for this effort included two observed precipitation data products from the National Climatic Dataset Center (Global Historical Climatology Network – GHCN Daily and Local Climatic Data). Secondary meteorological data, which are derived or interpolated from primary sources, included monthly precipitation totals from the Parameter-elevation Regressions on Independent Slopes Model (PRISM), hourly precipitation distributions and potential evapotranspiration (ET) estimates from the North American Land Data Assimilation System (NLDAS2), a quality-controlled spatiotemporal dataset supported by the National Aeronautics and Space Administration (NASA), and reference ET rates from the California Irrigation Management Information System (CIMIS).

Table 2-2 is a summary of available meteorological data by source that were reviewed as part of model development. Table icons indicate the temporal resolution of the data by source. NLDAS2 also includes the full suite of hourly meteorological timeseries that the model uses, except for dewpoint temperature, which is a function of air temperature, station pressure, and specific humidity and was computed from those NLDAS2 timeseries. The recommended approach was to intersect NLDAS2 and PRISM and scale the NLDAS2 hourly rainfall timeseries distributions with PRISM timeseries. The resulting intersect is an hourly 4-km spatial distribution of PRISM timeseries (based on NLDAS2 rainfall distributions) for the San Mateo County watersheds—there are 94 unique sets of meteorological timeseries available for assignment to the modeled subwatersheds.

Table 2-2. Summary of the Climate Parameters Evaluated During the Initial Inventory

Meteorological Data	Temporal Resolution of Meteorological Data by Source (Timestep: ● Hourly, ○ Daily, ☐ Monthly)			
	(a) **GHCN**	(b) **LCD**	(c) **PRISM-M**	(d) **NLDAS2**
Precipitation	○	●	☐	●
Potential Evapotranspiration	--	--	--	●
Daily Air Temperature (Min/Max)	○	--	☐	--
Hourly Air Temperature	--	●	--	●
Solar Radiation	--	●	--	●
Cloud Cover	--	●	--	●
Wind Speed	--	●	--	●
Wind Direction	--	●	--	●
Station Pressure	--	--	--	●
Specific Humidity	--	--	--	●[1]
Dewpoint Temperature	--	●	--	●[2]

Acronyms: (a) Global Historical Climatology Network, (b) Local Climatic Data, (c) Parameter-elevation Regressions on Independent Slopes Model-Monthly aggregated timeseries, (d) North American Land Data Assimilation System.
1: *Specific Humidity* converted to *Relative Humidity* as a function of *Air Temperature* and *Station Pressure*
2: *Dewpoint Temperature* calculated as a function of *Air Temperature* and *Relative Humidity*

In the LSPC model, one set of meteorological timeseries are assigned to each of the delineated model subwatersheds—it is also assumed that the associated precipitation falls uniformly within each subwatershed. Figure 2-5 shows long-term historical average distribution of annual average PRISM rainfall for the region overlaid with modeled subwatersheds, PRISM, and NLDAS2 data centroids. Meteorological boundary conditions were associated with subwatersheds by assigning the grid that covered most of the subwatershed area.

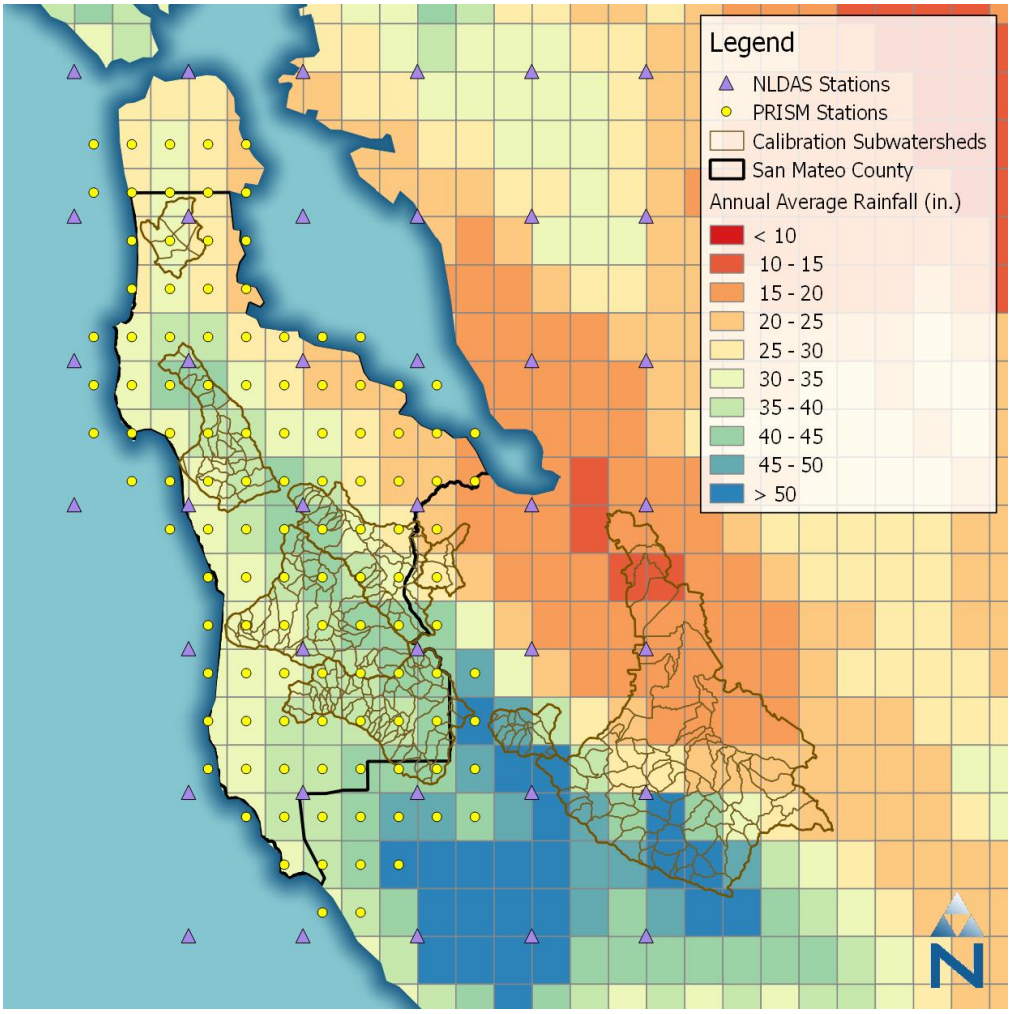


Figure 2-5. Annual Average PRISM Rainfall Depths with Associated PRISM and NLDAS2 Data Centroids.

2.2.1.4 Hydrologic Model Calibration

The model calibration process follows recommendations from both the EPA RAA Guide and the Bay Area RAA Guidance. Table 2-3 presents recommended model performance metrics for hydrology and sediment (BASMAA 2017). The Bay Area RAA Guidance specifies annual percent difference calibration metrics, which align with the spatial and temporal scales of the Bay TMDLs. For additional resolution regarding the timing of flow and pollutant loads, monthly and seasonal model hydrology performance were also evaluated as part of the calibration effort.

Table 2-3. Hydrologic Model Calibration Performance Targets (Bay Area RAA Guidance, Table 4-2).

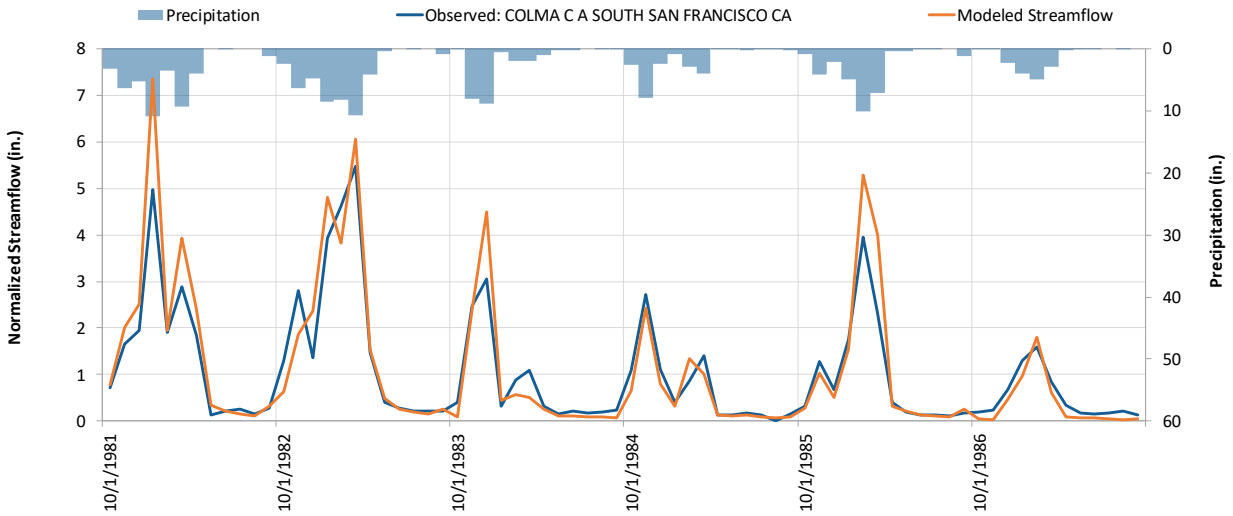
Model Parameters	%-Difference (Annual Simulated vs. Observed)		
	Very Good	Good	Fair
Hydrology/Flow[1]	< 10%	10-15%	15-25%

1: Reference: Donigian 2000 as cited in LARWQCB 2014.

A phased weight-of-evidence approach was used for hydrology calibration. First, an initial set of model parameters were selected from the Bay Area Hydrologic Model (BAHM) (Clear Creek Solutions 2014) and refined and stratified by HRU with guidance from the BASINS Technical Note 6: *Estimating Hydrology and Hydraulic Runoff Parameters* (USEPA 2000). The goal was to characterize the relative hydrologic response of the various HRU combinations of land cover, soil type, and slope such that the routed aggregate response of the model was representative of observed trends at the flow monitoring gages. When model results diverged from observed data, Google Earth was used to further investigate and identify unrepresented features such as impoundments, concrete-lined channels, or other hydraulic features that may be attributable to the divergent model results. Finally, wherever it was possible to represent those notable features, model parameters were fine-tuned so that the calculated error statistics fell within the targeted model performance ranges.

Figure 2-6 shows example calibration results for USGS gage 11162720 at Colma Creek. The figure shows a comparison of monthly observed vs. modeled flow in the top panel, calibration statistics in the middle panel, and a seasonal aggregate comparison in the lower panel. The model captures year-to-year variability as well as seasonal hydrograph swings. The Bay Area RAA Guidance performance metric of ≤10% error in total annual volume (Table 2-3) corresponds to the first row in the calibration statistics shown in the middle panel. Results show that model performance of 5.9% relative error in annual volume is well within the recommended performance metric. Three additional metrics that are commonly evaluated for hydrology (highest 10% flows, lowest 50% flows, annual storm volume) were also assessed to test the robustness of model predictions during varying hydrologic regimes and to better understand periods and hydrologic processes that may cause model error.

Similar analyses were performed for each of the nine USGS gages utilized for model calibration and validation. Final documentation of the RAA will provide a full discussion of the model hydrologic calibration and validation process and demonstration of results at each location, providing reasonable assurance that the model is sufficient for representing baseline conditions.



Calibration Metrics (10/01/1981 - 09/30/1987)	Relative Mean Error	Recommended Error Criteria			
		Very Good	Good	Fair	Poor
Total Annual Volume	5.9%	≤ 5%	5 - 10%	10 - 15%	>15%
Highest 10% of Flows	8.6%	≤ 10%	10 - 15%	15 - 25%	>25%
Lowest 50% of Flows	9.2%	≤ 10%	10 - 15%	15 - 25%	>25%
Annual Storm Volume	12.2%	≤ 10%	10 - 15%	15 - 25%	>25%

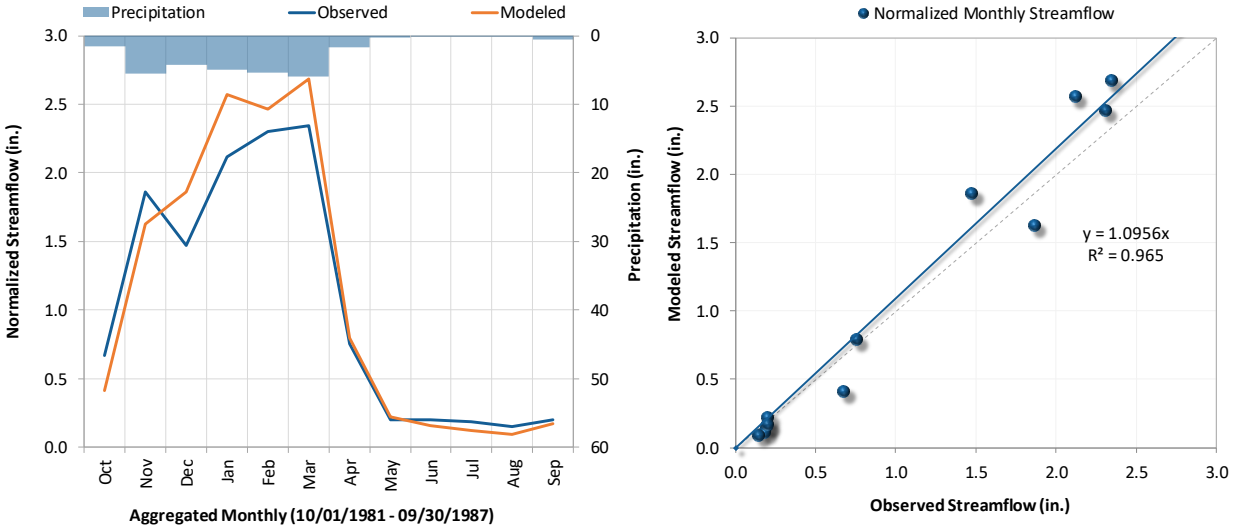


Figure 2-6. Hydrology Calibration Summary for Colma Creek.

2.2.2 Water Quality Model

During development of the Bay Area RAA Guidance, it was acknowledged through multiple discussions between Permittees, EPA and Water Board staff, and researchers (e.g., SFEI) that limited local water quality data may impact the robustness of any new computational method developed by an individual Bay Area Permittee or stormwater program to represent PCB or mercury loading.

Although Bay-wide tools such as RWSM are deemed acceptable through model calibration utilizing monitoring data collected throughout Bay watersheds, there is often not enough data within a single County jurisdiction to provide the same level of resolution needed to calibrate a model within that jurisdiction. As demonstrated in the previous sections, sufficient data are available to calibrate a model for simulating the hydrology of San Mateo County watersheds. Similar efforts were performed to configure, calibrate, and validate the LSPC model to simulate sediment transport, which will be fully documented later. The modeling approach used for the RAA combines this LSPC hydrology and sediment loading model with the RWSM, using RWSM values for pollutant concentrations representative of various land use and PCB source categories. The Bay Area RAA Guidance states that "if RWSM is used to represent pollutant concentrations or loads, this calibration is assumed to be conducted as part of the RWSM process," and "if sufficient concentration and loading data are available, these data should be used as part of model validation."

An example validation combining LSPC and RWSM for simulating PCBs is shown in Figure 2-7. As part of the Small Tributaries Loading Strategy (STLS) conducted by SFEI, nine storm events were sampled for PCBs at the Pulgas Creek Pump Station North and South Gages between 2011 and 2014. Figure 2-7 presents a summary of observed versus modeled PCB concentrations at the Pulgas Creek South station, where most of the data were collected. Matching concentrations during storms can be challenging because of factors including: (1) the flashiness of the system, (2) a mismatch in the timing of a localized storm event that was not reflected in the rainfall gage used in the model, or (3) obstructions or inefficiencies in the collection system upstream of the sampling location. For this reason, modeled concentrations that coincided with ±1 day of the sampling date were summarized and paired for comparison with the samples. Figure 2-7 shows five summaries for comparison: (1) all observed samples, (2) observed samples excluding 2 potential outliers, (3) modeled results using runoff concentrations for ±1 day of the sampling date, (4) modeled results using sediment concentrations for ±1 day of the sampling date, and (5) modeled results using sediment concentrations for the 2011-2014 simulation period.

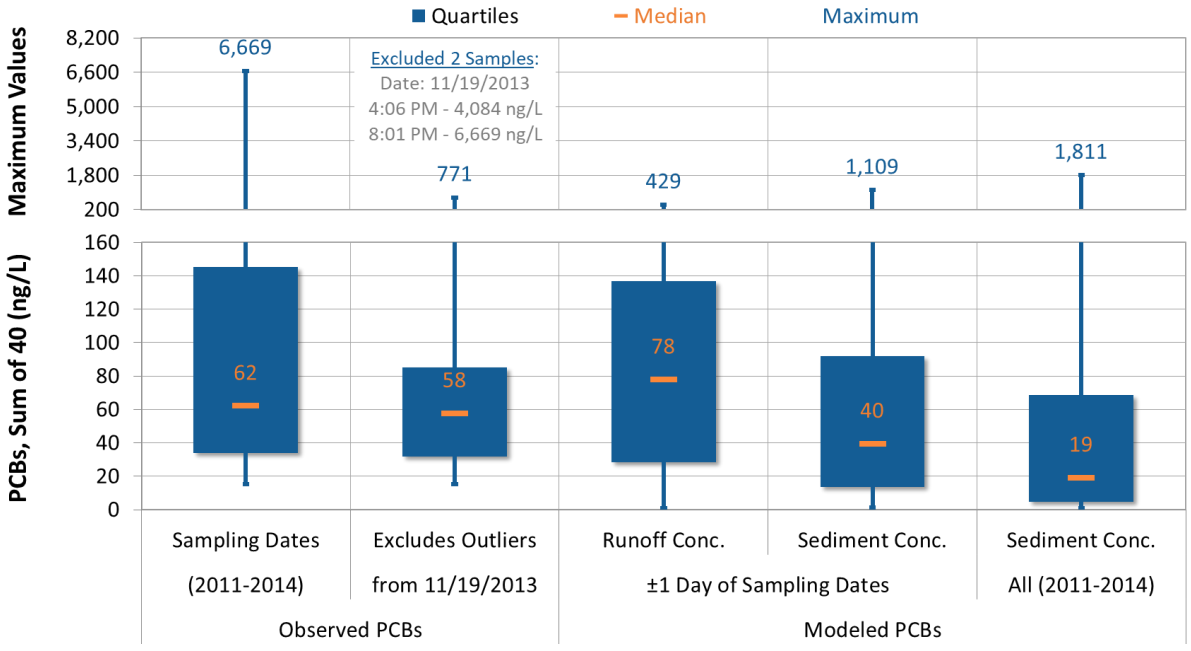


Figure 2-7. Observed vs. modeled PCB concentrations at the Pulgas Creek monitoring stations.

2.2.3 Determination of Overall and GI Stormwater Improvement Goals

The baseline model reported in the previous sections was developed for all areas within County watersheds and provides a complete estimate of all PCBs and mercury loads delivered to the Bay via stormwater, including loads from urban and non-urban sources. However, for the determination of stormwater improvement goals and those associated with GI, the RAA is performed to provide direct comparison to TMDL WLAs assigned to permitted municipal stormwater discharges addressed by the MRP. The Bay Area RAA Guidance states that "consistent with TMDL accounting, areas within the boundaries of the Permittee's jurisdiction that do not need to be incorporated into the area of analysis include non-urban land areas, including non-urban areas upstream from dams, which are not needed for calibration or validation of the RAA model." The EPA RAA Guide and Bay Area RAA Guidance also both outline the following factors for consideration in defining the area for analysis:

- If multiple municipal jurisdictions are addressed by the RAA, the analysis should be capable of distinguishing among jurisdictions in terms of relative contributions of wet weather flow and pollutant loads.
- If areas not subject to municipal jurisdiction are included, their flows and loads should be distinguishable.
- The area of analysis should make sense in terms of hydrologic function and connectivity, and for some approaches flows and loads may require routing through the modeled area of analysis.

To provide direct comparison to WLAs assigned to municipal stormwater discharges to the Bay, the pollutant loadings associated with non-urban areas or areas addressed by other NPDES permits were separated from loads addressed by the MRP. Table 2-4 summarizes the MRP and non-MRP land areas and their pollutant loads. The MRP pollutant loads in Table 2-4 can be directly compared to respective TMDL WLAs to determine stormwater improvement goals.

Table 2-4. Summary of Total Area and Baseline Pollutant Loading for MRP-Associated Land Areas and Non-MRP Areas

Permitted and Other Areas		Area (acres)	PCBs[1] (g/year)	Mercury[1] (g/year)
MRP		56,943	1,373	1,686
Non-MRP	*Open Space*	44,958	3	1,025
	Caltrans	2,992	95	100
	Industrial (NPDES)	1,796	215	77
	Industrial (General)	828	91	23

1 Per the Bay Area RAA Guidance, the baseline period used for model simulation is Water Year 2002 (BASMAA 2017).

As an example, Table 2-5 provides a summary of the calculation of stormwater improvement goals, or pollutant load reductions, to meet WLAs for PCBs. The table summarizes values reported in the TMDL for existing pollutant and sediment loads for all stormwater sources to the Bay, the sediment target, and the WLA and PCBs reduction assigned to all urban stormwater discharges to the Bay; the San Mateo County portion of the WLA associated with stormwater sources; and the existing PCBs and sediment loads and load reductions estimated by the RAA model for MRP areas designated in Table 2-4. An 84.6% reduction in annual loads is estimated for municipal discharges within San Mateo County to meet the San Mateo County portion of the PCBs WLA.

Table 2-5. Calculation of Stormwater Improvement Goals to Address PCBs TMDL

TMDL Component		Area Addressed		
		Bay-wide (based on TMDL)	San Mateo Co. (based on TMDL)	San Mateo Co. (based on RAA model)[3]
1	Existing PCB Load (kg/year)	20[1]	n/a	1.37
2	Existing Sediment Load (t/year)	2,000,000[1]	n/a	8,107
3	Target Sediment Concentration (µg/kg)	1[1]	n/a	n/a
4	WLA for Urban Stormwater Discharges(kg/year)	2[1]	0.2[1]	n/a
5 = 1 - 4	Load Reduction for Urban Stormwater Discharges (kg/year)	18[1]	n/a	1.17[2]
6 = 5 / 1	Percent Reduction	90[1]%	n/a	85.4[2]%

1 Reference: SFBRWQCB 2008
2 Calculated based on the difference between the RAA modeled Existing PCB Load (blue = 1.37 kg/yr) and the WLA (green = 0.2 kg/yr)
3 Per the Bay Area RAA Guidance, the baseline period used for model simulation is Water Year 2002 (BASMAA 2017).

The MRP outlines PCBs (3 kg/yr) and mercury (10 kg/yr) load reduction goals to be achieved through the implementation of GI by all MRP Permittees by 2040. When the Bay Area RAA Guidance was developed, it was agreed that if a new baseline model is developed and it results in a revised calculation of the baseline load and the load reduction required to meet WLAs, the percent of the Permittee load reduction can be used as the stormwater improvement goal to guide GI planning. Table 1-3 provided a summary of the MRP required PCBs and mercury load reductions and the interpretation of percent of Permittee load reductions to be achieved through GI implementation. Based on the total load reductions calculated for PCBs (Table 2-5), and the percentage of the load reductions to be achieved through GI (Table 1-3), the PCBs load reduction target can be calculated for GI implementation. Summarized in Table 2-6, this load reduction serves as a goal for GI Plans to be achieved by 2040.

Table 2-6. PCB Load Reduction by 2040 Based on GI Implementation

Achieved Through GI Implementation by 2040	San Mateo County (Based on RAA Model)
Load Reduction (kg/yr)	0.24[1]
Percent Reduction	17.8[2]%

1: Bay Area RAA Guidance reports 20.8% of the permittee load reduction associated with the MRP GI requirements. Calculated based on 20.8% of the PCB Load Reduction (1.17 kg/yr).
2: Calculated based on difference of Load Reduction reported above (0.24 kg/yr) and Existing PCB Load (1.37 kg/yr).

2.3 GI Performance Model

The SUSTAIN model will be used to establish relationships between the overall amount of GI implementation and the quantity of stormwater runoff volume captured, infiltrated, and/or treated to

achieve incremental reductions of mercury and PCBs loadings. The SUSTAIN model establishes a robust quantitative linkage between the level of GI implementation, runoff volumes managed, and associated mercury and PCBs loads to demonstrate phased reductions to meet TMDL WLAs. SUSTAIN includes a process-based continuous project simulation module for representing flow and pollutant transport routing through various types of GI projects.

2.3.1 GI Modeling Assumptions

Due to the requirements outlined by the MRP that affect the design of LID for new and redevelopment (Provision C.3), the modeling assumptions used in the SUSTAIN model will reflect the minimum requirements of the permit. The MRP outlines several methods for sizing GI projects that will be used in the RAA. The SMCWPPP (2016) has also developed a technical guidance document tailored for San Mateo County that aids developers of stormwater projects in their efforts to address Provision C.3 requirements. This guidance document specifies preferred methods and design criteria for stormwater treatment systems that fulfill MRP requirements while addressing local standards. The methods suggested by the SMCWPPP technical guidance document are proposed as the basis for SUSTAIN modeling assumptions. Modeling assumptions are organized into subsequent sections according to the three project types identified in the SRP: Regional Projects, Green Streets (bioretention, permeable pavement), and LID.

2.3.1.1 Regional Stormwater Capture Projects

Regional stormwater capture projects (regional projects) are assumed to be subsurface infiltration systems. These types of projects are typically implemented on publicly owned parcels within parks, open space, and/or recreational facilities. Depending on specific site constraints, these facilities can capture stormwater diverted from adjacent channels or storm drains, which often results in increased captured drainage area. These situations require inclusion of a diversion structure and may require pumping at additional cost. Modeling assumptions regarding diversion will be determined on a case-by-case basis for each regional project. Based on the SMCWPPP technical guidance, these facilities will be represented using a storage depth that facilitates a 72-hour drain-down time. The modeling assumptions for regional projects are listed in Table 2-7.

Table 2-7. Modeling Assumptions for Regional Projects

Groups	Item Description	Value	Units	Source
Storage	Design Drainage Area	*Sized for capture of 80% of the annual runoff volume*		[1] C.3.d.i.(1).(b) pg.22
	Structure Footprint			
	Storage Depth	3	ft	[2] Section 6.11 pg.6-55
	Minimum Infiltration	0.5	in/hr	[2] Section 6.11 pg.6-55
Diversion	*Diversion assumptions will be made on a case-by-case basis for each regional project*			

[1] Reference: SFBRWQCB 2015
[2] Reference: SMCWPPP 2016

2.3.1.2 Green Streets

Green streets are implemented in public rights-of-way and typically capture runoff contributed from the street and adjacent parcels. Suitable green street locations were identified through a screening process during the development of the SRP (Figure 1-2). Green streets will be represented using primarily bioretention, however on a case-by-case basis some projects may include a combination of bioretention and permeable pavement. These two components are conceptually implemented in

unison, although permeable pavement can be limited or removed in areas where implementation is not feasible or determined too costly. The modeling assumptions for both the bioretention and permeable pavement components of green streets are listed in Table 2-8.

Table 2-8. Modeling Assumptions for Green Streets

Groups	Item Description	Value	Units	Source
Bioretention				
Surface	Design Drainage Area	*Sized for runoff from 0.2 inches per hour intensity rainfall event*		[1] C.3.d.i.(2).(c) pg.22
	Project Footprint	*4% of drainage area*		[2] Section 5.1 pg.5-6
	Ponding Depth	6	in	[2] Section 6.1 pg.6-4
Media	Depth	1.5	ft	[2] Section 6.1 pg.6-5
	Soil Porosity	0.35	-	[3] Appendix A
	Soil Infiltration Rate	5	in/hr	[1] C.3.c.i.(2).(c).(ii) pg.20
Underdrain	Use if soil infiltration rate is less than	0.5	in/hr	
	Depth	1	ft	[2] Section 6.1 pg.6-5, [3]
	Media Porosity	0.4	-	[3] Appendix A
	Pollutant Filtration	*98% PCBs / 45% Hg Reductions*		[4] Table 4-2, pg.36
	Background Infiltration	*Match underlying soils*		
Permeable Pavement				
Surface	Design Drainage Area	*Sized for capture of 80% of the annual runoff volume*		[1] C.3.d.i.(1).(b) pg.22
	Project Footprint	*1/3 of the drainage area*		[2] Section 6.6 pg.6-33
	Ponding Depth	0.12	in	
Underdrain	Use if soil infiltration rate is less than	0.5	in/hr	
	Depth	1	ft	[2] Section 6.6 pg.6-33
	Media Porosity	0.4	-	[3] Appendix A
	Pollutant Filtration	*No significant filtration through underdrain*		
Media	Depth	2	ft	[5] Appendix B
	Media Porosity	0.4	-	[3] Appendix A
	Media Infiltration Rate	10	in/hr	[1] C.3.c.i.(2).(c).(ii) pg.20
	Background Infiltration	*Match underlying soils*		

[1] Reference: SFBRWQCB 2015
[2] Reference: SMCWPPP 2016
[3] Reference: ULAR WMG 2016
[4] Reference: BASMAA 2015
[5] Reference: SFPUC 2016

Both bioretention and permeable pavement consist of three components: a surface layer, media layer, and underdrain layer. The surface layer consists of captured runoff that can pond above the treatment surface and is treated as storage. The media layer is the primary component of treatment and storage. The media layer must be a minimum of 18 inches for bioretention (SMCWPPP 2016). For permeable pavement, the media layer depth is dependent on expected traffic load, runoff depth, and soil conditions (Caltrans 2014). According to design guidance in San Francisco, a minimum depth between 18 and 28 inches is required for the media layer, depending on soil conditions and expected traffic load (SFPUC 2016). A depth of 2 feet will be used for permeable pavement as an intermediate assumption to account for a variety of street usage and expected runoff depths. The media infiltration rate should not be a limiting factor for permeable pavement and a rate of 10 inches per hour will be assumed, compared to the minimum of 5 inches per hour specified by the MRP. Underdrains are typically required for either component when the underlying soils have low infiltration capacity below a specific threshold. In most of San Mateo County, underdrains will generally be required unless exempted by the local jurisdiction on a case-by-case basis depending on soil permeability (SMCWPP 2016). According to several regional design resources across the United States, underdrains should be included when underlying soils have an infiltration rate below 0.5 inches per hour (DOEE 2013; VA DEQ 2011; SF DPW Order No. 178,493) and will be used in the model to determine which projects include underdrains. For bioretention, the underdrain layer can be a minimum of 12 inches (SMCWPPP 2016; SFPUC 2016). For permeable pavement, an underdrain can have a diameter of at least 4 inches with a minimum 4 inches of aggregate on all sides (SMCWPPP 2016), resulting in an underdrain layer of 12 inches. Underdrains in permeable pavements are typically placed above the media layer (the primary component of storage) to maximize infiltration (BASMAA 2015; SMCWPPP 2016). Pollutant removal estimates for PCBs and mercury are from influent and underdrain concentration summary statistics reported by BASMAA (2015).

2.3.1.3 Low Impact Development

Assumptions for LID will be incorporated in the model and linked to future projections of new and re-development to represent implementation of Provision C.3. LID may also be considered on public parcels, as identified in the SRP. LID typically treats runoff generated onsite. This means that the drainage area for LID is typically no larger than the parcel size. In SUSTAIN, these features will be represented as bioretention, though implementation will vary with individual site constraints. The components for bioretention are discussed in Section 2.3.1.2. The modeling assumptions for LID are listed in Table 2-9. Underdrains are typically required for bioretention when the underlying soils have low infiltration capacity below a specific threshold. According to several regional design resources across the United States, underdrains should be included when underlying soils have an infiltration rate below 0.5 inches per hour (DOEE 2013; VA DEQ 2011; SF DPW Order No. 178,493). Using infiltration estimates for the proposed GI locations, the 0.5 inches/hour threshold will be used to determine which projects include underdrains. Pollutant removal estimates for PCBs and mercury are from influent and underdrain concentration statistics reported by BASMAA (2015).

Table 2-9. Modeling Assumptions for Low Impact Development

Groups	Item Description	Value	Units	Source
Bioretention				
Surface	Design Drainage Area	*Sized for runoff from 0.2 inches per hour intensity rainfall event*		[1] C.3.d.i.(2).(c) pg.22
	Project Footprint	*4% of drainage area*		[2] Section 5.1 pg.5-6
	Ponding Depth	6	in	[2] Section 6.1 pg.6-4
Media	Depth	1.5	ft	[2] Section 6.1 pg.6-5
	Soil Porosity	0.35	-	[3] Appendix A
	Soil Infiltration Rate	5	in/hr	[1] C.3.c.i.(2).(c).(ii) pg.20
Underdrain	Use if soil infiltration rate is less than	0.5	in/hr	
	Depth	1	ft	[2] Section 6.1 pg.6-5
	Media Porosity	0.4	-	[3] Appendix A
	Pollutant Filtration	*98% PCBs / 45% Hg Reductions*		[4] Table 4-2, pg.36
	Background Infiltration	*Match underlying soils*		

[1] Reference: SFBRWQCB 2015
[2] Reference: SMCWPPP 2016
[3] Reference: ULAR WMG 2016
[4] Reference: BASMAA 2015

2.4 Model Considerations to Inform GI Plans

As discussed in Section 1.3, C/CAG has initiated preliminary planning efforts to: (1) identify LID practices that have been implemented within new development and redevelopment since 2003 (baseline year for the TMDL; (2) develop estimates of future new development and redevelopment and the number of acres that will be addressed by the Provision C.3 regulated development by 2040; and (3) identify and prioritize GI retrofit opportunities on public parcels and within street rights-of-way through the development of SRP (SMCWPPP 2017). An important consideration for the RAA was the ability to track costs and benefits of different categories of GI projects within the model. This tracking can be performed for GI project categories within each model subwatershed and municipal jurisdiction, and can aid in the selection of the most cost-effective implementation strategy to attain pollutant reduction goals. The RAA builds upon the previous planning efforts and utilizes the following categories of GI projects for model representation:

1. **Existing Projects**: Stormwater treatment and GI projects that have been implemented since FY-2004/05. This primarily consists of all of the regulated projects that were mandated to treat runoff via Provision C.3 of the MRP, but also includes any public green street or other demonstration projects that were not subject to Provision C.3 requirements. For regulated projects in the early years of C.3 implementation, stormwater treatment may have been achieved through non-GI means, such as underground vault systems or media filters.
2. **Future New and Redevelopment:** All the regulated projects that will be subject to Provision C.3 requirements to treat runoff via LID and is based on spatial projections of future new and redevelopment tied to regional models for population and employment growth.
3. **Regional Projects (identified)**: The SRP identified three projects within public parks to provide regional capture and infiltration/treatment of stormwater, and included conceptual

designs to support further planning and designs. C/CAG is currently working with agencies to identify additional regional project opportunities for conceptual design and inclusion in the RAA.

4. **Green Streets**: The SRP identified and prioritized opportunities throughout San Mateo County for retrofitting existing streets with GI in public rights-of-way. Green streets were ranked as high, medium, and low priority based on a multiple-benefit prioritization process developed for the SRP.
5. **Other GI Projects (to be determined)**: Other types of GI projects on publicly owned parcels, representing a combination of either additional parcel-based GI or other Regional Projects. The SRP screened and prioritized public parcels for opportunities for onsite LID and Regional Projects. These opportunities need further investigation to determine the best potential projects.

GI Plans prepared for each Permittee will need to consider the numerous GI project opportunities that exist within their respective jurisdiction, and select a suite or "recipe" of projects that can most cost-effectively result in attainment of the pollutant load reductions. The amount and combination of those GI projects can be determined through analysis of estimated load reductions and implementation costs. Figure 2-8 presents an example GI recipe showing the distribution of selected GI project categories versus incremental reductions in pollutant loading and increasing cost. To build upon preliminary C/CAG planning efforts above, and to properly inform and set meaningful goals for GI Plans, it was determined to be beneficial for the countywide RAA approach to include the capability of performing cost-benefit optimization of GI project opportunities. For multiple combinations of GI projects, SUSTAIN provides an estimate of pollutant load reduction and implementation costs, allowing for the comparison of various GI implementation scenarios and the selection of the most cost-effective implementation plan to meet the pollutant reduction goals.

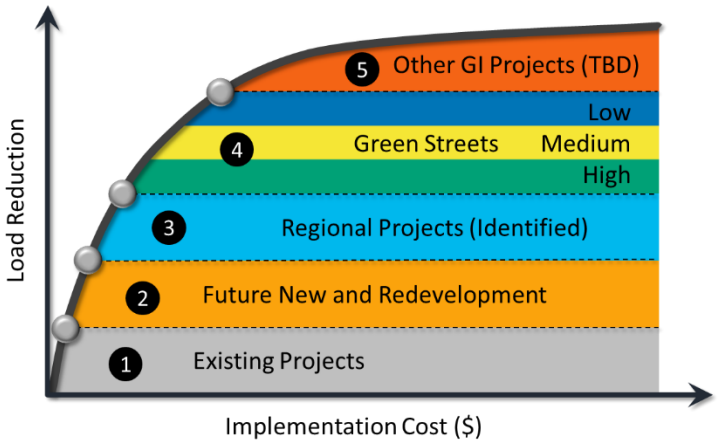


Figure 2-8. Example Implementation Recipe Showing General Sequencing of GI Projects.

3 RAA OUTPUT THAT DEMONSTRATES THE RELATIONSHIP BETWEEN GI IMPLEMENTATION AND POLLUTANT REDUCTION

As discussed in Section 1.2, depending on the perspective of the regulators, stakeholders, or Permittees, the purpose and expectations of the RAA can vary in terms of how reasonable assurance is demonstrated. As a result, the output from the RAA must consider multiple perspectives and strike the right balance between detail and specificity while still leaving ample opportunity to allow for future adaptive management. The following are key considerations for the RAA output:

- **Demonstrate PCBs and Mercury Load Reductions** – The primary goal of the RAA is to quantitatively demonstrate that GI Plans and Control Measure Implementation Plans will result in load reductions of PCBs and mercury sufficient to attain their respective TMDL WLAs and stormwater improvement goals associated with GI. Ongoing regional discussions between Permittees and Water Board staff are further defining Water Board expectations for the RAA and methods to demonstrate reasonable assurance that pollutant load reductions are met. For example, preliminary results of the RAA were recently presented to key Water Board staff at the MRP 2.0 Pollutants of Concern (POC) Steering Committee, in conjunction with separate presentations also provided by other countywide programs on the status and methods used for their RAAs.
- **Develop Metrics to Support Implementation Tracking** – The MRP (Provision C.3.j) also requires tracking methods to provide reasonable assurance that TMDL WLAs are being met. Provision C.3.j states that the GI Plan "shall include means and methods to track the area within each Permittee's jurisdiction that is treated by green infrastructure controls and the amount of directly connected impervious area", and a "process for tracking and mapping completed projects, public and private, and making the information publicly available (e.g., SFEI's GreenPlanIT tool)." Preliminary RAA results presented at the POC Steering Committee introduced concepts for discussion on quantifiable metrics to be reported by the RAA and potentially tracked in the future.
- **Support Adaptive Management** – Given the relatively small scale of most GI projects (e.g., LID on an individual parcel, a single street block converted to green street), the number of GI projects needed countywide to meet the pollutant reduction goals will be in the thousands. All the GI projects will require site investigations to assess feasibility and costs. As a result, the RAA provides a preliminary investigation of the amount of GI needed spatially (e.g., by subwatershed and municipal jurisdiction) to achieve the countywide pollutant load reduction target. The RAA sets the "goals" in terms of the amount of GI implementation, which can be incorporated within each Permittee's GI Plan. As GI Plans are implemented and more comprehensive municipal engineering analyses (e.g., masterplans, capital improvement plans) are performed, the adaptive management process will be key to ensuring that goals are met. In summary, the RAA inform GI implementation goals, but the pathway to meeting those goals is subject to adaptive management and can potentially change based on new information or engineering analyses performed over time.

C/CAG has invested much effort into preliminary modeling and preparation of example RAA output in an attempt to identify the appropriate balance in terms of detail and specificity needed to address the above considerations. As mentioned above, example output has been presented to key Water Board staff, and further meetings and discussions are expected to reach final agreement on the expectations of the reported RAA output. Figure 3-1 provides a summary of preliminary RAA results for the City of South San Francisco that was presented at the POC Steering Committee for discussion. The following provides an explanation of each of the steps corresponding to those depicted in the figure.

First: Based on GI project categories defined in Section 2.4, SUSTAIN is used to simulate effectiveness/load reductions and estimate planning-level costs for various combinations of GI projects within the City's jurisdiction (along the x-axis, from low pollutant reduction/effectiveness to high reduction/effectiveness). "Existing Projects" were locked in the model and included those GI projects included in the FY 2016-17 MRP Annual Report to the Water Board. "Future New & Redevelopment" is an estimation of the LID that will likely be implemented in the future in redevelopment areas (based on Provision C.3). "Green Streets" were based on prioritized and ranked (High, Medium, and Low) street retrofit opportunities reported in the SRP. For South San Francisco, the "Regional Project (Identified)" refers to the regional project located within Orange Memorial Park

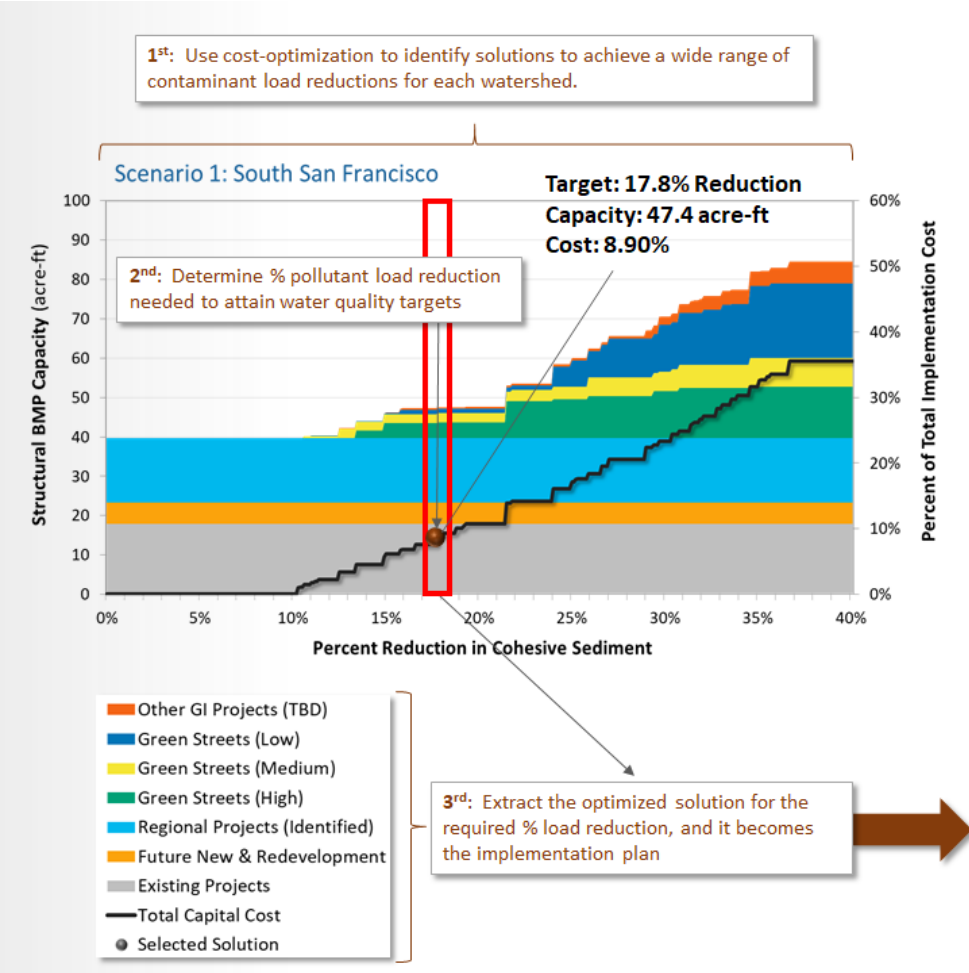
that is currently funded by Caltrans for design and construction. "Other GI Projects" refer to additional GI projects needed, but specific locations for project opportunities within certain subwatersheds yet to be determined.

Second: As discussed in Section 2.2.3 and depicted in Figure 3-1, a 17.8% reduction of PCBs was was identified as the target reduction to be attained through the implementation of GI (for this scenario, cohesive sediment reduction is used as a surrogate to represent load reduction of PCBs).

Third: SUSTAIN is used to provide cost-optimization and selection of the most cost-effective combination of GI projects to attain the target reduction. This solution is depicted in the plot as the vertical slice that intersects the point on the x-axis at 17.8% reduction. The combination of GI structural capacities in that slice at the 17.8% load reduction represents the proposed GI implementation plan for South San Francisco. The table to the right provides details on that implementation plan for the 10 subwatersheds within the City's jurisdiction (represented by each row in table). Optimization results recommend that varying amounts of GI capacity in different subwatersheds (different rows) are needed to achieve the most cost-effective solution, but the overall PCBs load reduction equals 17.8% (bottom row of table).

As can be seen in the results in Figure 3-1, the cost-optimization favored implementation of different combinations of GI projects within each subwatershed. These combinations were based on: (1) number and type of GI project opportunities identified within each subwatershed, and (2) cost-effectiveness given various characteristics associated with GI control measure efficiency (typically governed by infiltration rates), higher sediment (or PCBs) generation in upstream areas, etc. During implementation, it is almost certain that the actual implementation of GI will not follow the RAA output exactly. Dimensions and location of GI projects will vary based on on-the-ground feasibility and site-specific constraints. At the same time, all GI project capacity is not created equal in terms of effectiveness. For these reasons, tracking implementation using implemented *GI capacity* is not recommended.

Instead of relying on GI capacity as the metric for implementation tracking and reporting, the effective PCBs load reduction and stormwater volume managed are proposed as tracking metrics. At the left side of the table in Figure 3-1 are columns under the header "Management Metrics for GI," which include performance metrics for "% Load Reduction PCBs (Annual)" or "Annual Volume Managed (acre-ft)." Both metrics are based on annualized results represented in the RAA modeling system that are directly comparable to TMDL WLAs. The "% Load Reduction PCBs (Annual)" provides a relative comparison of the load reduction to be achieved within each subwatershed. The "Annual Volume Managed (acre-ft)" shows the acre-feet of water captured and infiltrated and/or treated within each subwatershed, resulting in a total annual volume of 792.0 acre-feet of stormwater managed in South San Francisco for an average year. This 792.0 acre-feet of stormwater managed could serve as the primary metric to be tracked for GI implementation. In other words, stormwater volume managed is being used as a unifying metric to evaluate GI effectiveness. As a result of adaptive management, the implementation plan may change over time and alternative GI projects can be substituted without having to re-run the RAA, as long as the volume managed remains on track. This same stormwater volume managed could be correlated with other multiple benefits related to flood control and water supply, among others.



Subwatershed ID	Management Metrics for GI		Green Infrastructure Capacity to Achieve 17.6% Reduction Target (Capacity expressed in units of acre-feet)							
			Existing/Planned			Green Streets				
	% Load Reduction PCBs (Annual)	Annual Volume Managed (acre-ft)	Existing Projects	Future New & Redevelopment	Regional Projects (Identified)	High	Medium	Low	Other GI Projects (TBD)	Total BMP Capacity (acre-ft)
232519	42%	6.9	0.15	0.05	--	0.08	0.01	0.10	0.01	**0.4**
232619	55%	0.42	--	0.00	--	--	0.01	0.01	0.01	**0.0**
240119	15%	338	10.40	2.60	--	3.70	--	--	--	**16.7**
240219	10%	34	0.18	0.60	3.93	--	--	--	--	**4.7**
240319	19%	149	0.74	0.74	7.89	0.20	--	--	--	**9.6**
240419	16%	15.6	0.05	0.11	0.99	--	--	--	--	**1.1**
240519	16%	56	0.14	0.28	3.56	--	--	--	--	**4.0**
250119	33%	166	5.91	0.66	--	0.02	1.85	0.98	0.11	**9.5**
250219	31%	19.5	0.30	0.32	--	0.00	0.47	0.01	0.06	**1.2**
250319	31%	5.4	--	0.04	--	--	--	0.02	0.15	**0.2**
Total	**17.8%**	**792.0**	**17.9**	**5.4**	**16.4**	**4.0**	**2.3**	**1.1**	**0.3**	**47.4**

RED = Subwatersheds with highest required % load reductions
BLUE = Subwatersheds with highest BMP capacities within a BMP category

Figure 3-1. Preliminary RAA Output Introducing Concepts for Trackable Metrics.

4 REFERENCES

BASMAA (Bay Area Stormwater Management Agencies Association). 2015. *"White Paper" on Provision C.3 in MRP 2.0*. Bay Area Stormwater Management Agencies Association, Oakland, CA.

BASMAA (Bay Area Stormwater Management Agencies Association). 2017a. *Bay Area Reasonable Assurance Analysis Guidance Document*. Bay Area Stormwater Management Agencies Association, Oakland, CA.

BASMAA (Bay Area Stormwater Management Agencies Association). 2017b. *Interim Accounting Methodology for TMDL Loads Reduced*. Bay Area Stormwater Management Agencies Association, Oakland, CA.

Bicknell, B. R., , J. C. Imhoff, A. S. Donigian, R. C. Johanson. 1997. *Hydrological Simulation Program – FORTRAN (HSPF), User's Manual For Release 11*. EPA – 600/R-97/080. U.S. Environmental Protection Agency, Athens, GA.

Caltrans (California Department of Transportation). 2014. *Caltrans Pervious Pavement Design Guidance*. California Department of Transportation, Division of Design, Office of Storm Water Management, Sacramento, CA. <dot.ca.gov>

Clear Creek Solutions. 2014. *Bay Area Hydrology Model 2013 (BAHM2013) User Manual*. Prepared for Alameda Countywide Clean Water Program, San Mateo Countywide Water Pollution Prevention Program and Santa Clara Valley Urban Runoff Pollution Prevention Program.

DOEE (District of Columbia Department of Energy and Environment). 2013. *District of Columbia Stormwater Management Guidebook.* DOEE, Washington, D.C. <doee.dc.gov>

Donigian, A.S. Jr. 2000. *HSPF Training Workshop Handbook*. Lecture #15. Watershed Model Calibration and Verification: Issues and Procedures. Prepared for U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, DC.

LARWQCB (Los Angeles Regional Water Quality Control Board). 2014. *Guidelines for Conducting Reasonable Assurance Analysis in a Watershed Management Program, Including an Enhanced Watershed Management Program*. Los Angeles Regional Water Quality Control Board, Los Angeles, CA.

Riverson, J., K. Alvi, J. Zhen, R. Murphy. 2014. *SUSTAIN Application User's Guide for EPA Region 10*. U.S. Environmental Protection Agency Region 10, Office of Water and Watersheds, Seattle, WA.

Shen, J., A. Parker, and J. Riverson. 2004. A New Approach for a Windows-based Watershed Modeling System Based on a Database-supporting Architecture. *Environmental Modeling and Software*, July 2004.

SFBRWQCB (San Francisco Bay Regional Water Quality Control Board). 2006. *Mercury in San Francisco Bay: Proposed Basin Plan Amendment and Staff Report for Revised Total Maximum Daily Load (TMDL) and Proposed Mercury Water Quality Objectives*. San Francisco Bay Regional Water Quality Control Board, San Francisco, CA.

SFBRWQCB (San Francisco Bay Regional Water Quality Control Board). 2008. *Total Maximum Daily Load for PCBs in San Francisco Bay: Final Staff Report for Proposed Basin Plan Amendment*. San Francisco Bay Regional Water Quality Control Board, San Francisco, CA.

SFBRWQCB (San Francisco Bay Regional Water Quality Control Board). 2015. *NPDES Phase I MS4 Municipal Regional Stormwater Permit (MRP) for San Francisco Bay Region*. Order No. R2-2015-0049. San Francisco Bay Regional Water Quality Control Board, San Francisco, CA.

SF DPW (City and County of San Francisco Department of Public Works). *DPW Order 178,493, Approving the Use of Permeable Paving Systems*. City and County of San Francisco Department of Public Works, San Francisco, CA. <sfpublicworks.org>

SFPUC (San Francisco Public Utilities Commission). 2016. *San Francisco Stormwater Management Requirements and Design Guidelines*. San Francisco Public Utilities Commission, San Francisco, CA. <sfwater.org>

SMCWPPP (San Mateo Countywide Water Pollution Prevention Program). 2016. *C.3 Stormwater Technical Guidance, version 5*. San Mateo Countywide Water Pollution Prevention Program, City, Redwood City, CA. <flowstobay.org>

SMCWPPP (San Mateo Countywide Water Pollution Prevention Program). 2017. *Stormwater Resource Plan for San Mateo County*. Prepared by Paradigm Environmental and Larry Walker Associates for San Mateo Countywide Water Pollution Prevention Program, Redwood City, CA.

ULAR WMG (Upper Los Angeles River Watershed Management Group). 2016. *Enhanced Watershed Management Program for the Upper Los Angeles River Watershed*. <waterboards.ca.gov>

USEPA (U.S. Environmental Protection Agency). 2000. *BASINS Technical Note 6: Estimating Hydrology and Hydraulic Parameters for HSPF*. Office of Water 4305. EPA-823-R00-012. July 2000.

USEPA (U.S. Environmental Protection Agency). 2009. *SUSTAIN—A Framework for Placement of Best Management Practices in Urban Watersheds to Protect Water Quality*. EPA/600/R-09/095. U.S. Environmental Protection Agency, Office of Research and Development, Edison, NJ.

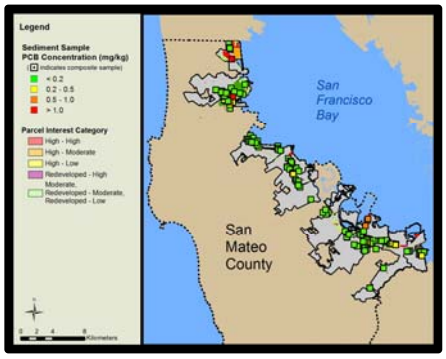
USEPA (U.S. Environmental Protection Agency). 2017. *Developing Reasonable Assurance: A Guide to Performing Model-Based Analysis to Support Municipal Stormwater Program Planning*. U.S. Environmental Protection Agency Region 9, San Francisco, CA.

VA DEQ (Virginia Department of Environmental Quality). 2011. *Virginia DEQ Stormwater Design Specification No. 7, Permeable Pavement: version 1.8*. Virginia Department of Environmental Quality, Richmond, VA.

SAN MATEO COUNTYWIDE
Water Pollution
Prevention Program

Updated Control Measures Plan

for PCBs and Mercury in San Mateo County Stormwater Runoff



September 30, 2018

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LIST OF ABBREVIATIONS

BASMAA	Bay Area Stormwater Management Agencies Association
BMPs	Best Management Practices
CW4CB	Clean Watersheds for a Clean Bay
CWA	Clean Water Act
FY	Fiscal Year
GI	Green Infrastructure
MPC	Monitoring and Pollutants of Concern
MRP	Municipal Regional Permit
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollution Discharge Elimination System
PCBs	Polychlorinated Biphenyls
POC	Pollutant of Concern
POTW	Publically Owned Treatment Works
RAA	Reasonable Assurance Analysis
RMP	Regional Monitoring Program for Water Quality in San Francisco Bay
SMCWPPP	San Mateo Countywide Water Pollution Prevention Program
TMDL	Total Maximum Daily Load
WY	Water Year
WMA	Watershed Management Area

1.0 INTRODUCTION

1.1. Background

Fish tissue monitoring in San Francisco Bay (Bay) has revealed bioaccumulation of polychlorinated biphenyls (PCBs), mercury, and other pollutants. The levels found are thought to pose a health risk to people consuming fish caught in the Bay. As a result of these findings, an interim advisory has been issued on the consumption of fish from the Bay. The advisory led to the Bay being designated as an impaired water body on the Clean Water Act (CWA) "Section 303(d) list" due to elevated levels of PCBs, mercury, and other pollutants. In response, the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) has developed Total Maximum Daily Load (TMDL) water quality restoration programs targeting PCBs and mercury in the Bay. The general goals of the TMDLs are to identify sources of PCBs and mercury to the Bay, implement actions to control the sources, and restore water quality.

The PCBs and mercury TMDLs stipulate that a 90% reduction in PCBs and 50% reduction in mercury found in discharges from urban stormwater runoff to the Bay are needed to achieve water quality standards and restore beneficial uses. Provisions C.11 and C.12 of the first Bay Area Municipal Stormwater National Pollutant Discharge Elimination System (NPDES) Permit (Municipal Regional Permit, or MRP 1.0; Order R2-2009-0074) required Permittees to implement pilot-scale control measures during the permit term to reduce PCBs and mercury discharges from Municipal Separate Storm Sewer Systems (MS4s) to the Bay. These pilot studies were intended to enhance the collective knowledge about the costs and benefits of different Best Management Practices (BMPs) to control PCBs and mercury.

The reissued permit (MRP 2.0, Order R2-2015-0049) requires municipal agencies to move from pilot-scale work to focused implementation and defined load reduction goals (e.g., 3 kg/year PCBs across the MRP 2.0 area by June 30, 2020). The strategies and BMPs that will be applied to meet the load reduction goals are anticipated at a minimum to include:

- Stormwater green infrastructure (GI);
- Source property identification and referral for investigation and abatement; and
- Management of PCBs in building materials during demolition.

Permittees may also implement additional types of controls to address the PCBs and mercury reduction goals, such as enhancements to municipal operation and maintenance (O&M) activities that remove sediments containing PCBs and/or mercury.

In compliance with Provisions C.11 and C.12, the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) is continuing to work with San Mateo County municipal agencies to identify control measures for PCBs and mercury that reduce discharges from their MS4s. This plan documents the approaches taken and progress made to-date, including summaries of:

- The pertinent MRP 2.0 permit requirements;
- Progress to-date identifying sources of and controls for PCBs and mercury discharges in San Mateo County stormwater runoff;
- The types of control measures typically used to control PCBs and mercury discharges in stormwater runoff from local watersheds surrounding San Francisco Bay;

- Documentation of existing and planned PCBs and mercury control measures for each San Mateo County MRP 2.0 Permittee;
- Updated estimates of the reductions in PCBs and mercury loads from San Mateo County stormwater runoff during the MRP 2.0 term that have been quantified to-date, calculated using the interim accounting methodology described later (see Section 5.0); and
- Next steps.

This plan provides an update to the plan that was submitted with the FY 2016/17 Annual Report in September 2017 (SMCWPPP 2017b), including updated estimates of the PCBs and mercury load reductions achieved in San Mateo County this permit term (including a period immediately preceding the permit term, as explained later, see Section 4.0) that have been quantified to-date. Consistent with the Provision C.11/12 requirements, the information contained within this plan will continue to be updated periodically during MRP 2.0 as new information is developed about control measures and associated pollutant load reductions.

1.2. Summary of Permit Requirements

MRP 2.0 Provisions C.11.a.iii and C.12.a.iii required Permittees to submit with their FY 2015/16 Annual Reports a prioritized list of watersheds and management areas where control measures for PCBs and mercury are currently implemented or will be implemented during the term of permit along with an implementation schedule (accomplished by SMCWPPP 2016b).[1] Permittees were also required to provide the monitoring data and other information used to select the management areas. In addition to the list of management areas, Permittees were also required to report on the following:

- The number, type and locations and/or frequency (if applicable) of control measures;
- A cumulative listing of all potentially PCBs-contaminated sites Permittees have discovered and referred to the Regional Water Board to-date, with a brief summary description of each site and where to obtain further information;
- The description, scope and start date of control measures;
- For each structural control and non-structural control BMP, interim implementation progress milestones and a schedule for milestone achievement; and
- Clear statements of the roles and responsibilities of each participating Permittee for implementation of pollution prevention or control measures identified by Permittees.

In subsequent Annual Reports, Permittees are required to provide updates to the initial information presented with the FY 2015/16 Annual Report.

The MRP also requires that Permittees demonstrate and report on achievement of PCBs load reductions and ancillary load reduction benefits for mercury during the term of the Permit. As part of this requirement to report load reductions, MRP Provisions C.11/12.b., Assess Mercury/PCBs Load Reductions from Stormwater, required Permittees to submit with their FY 2015/16 Annual Report for Executive Officer approval an assessment methodology (which was referred to as the interim accounting methodology (BASMAA 2017), that updates the load reduction accounting system outlined in the MRP 2.0 factsheet. Permittees were required to use the assessment methodology to quantify in a technically

[1] The MRP also required submittal of an initial progress report by April 1, 2016 (accomplished by SMCWPPP 2016a).

sound manner PCBs and mercury loads reduced through implementation of pollution prevention, source control, and treatment control measures, including source control, stormwater treatment, GI, and other measures. Beginning with their FY 2016/17 Annual Report, Permittees are required to report on the use of the methodology to demonstrate progress toward achieving the PCBs and mercury load reductions required this permit term (accomplished by SMCWPPP 2017b), with updates provided in subsequent Annual Reports.

2.0 PROGRESS TO-DATE IDENTIFYING PCBS AND MERCURY SOURCES AND CONTROLS

The below sections briefly summarize progress to-date identifying sources of and controls for PCBs and mercury discharges in San Mateo County stormwater runoff and related efforts such as developing the interim accounting methodology.

In addition to the efforts described in the below sections, during the past several years the Regional Monitoring Program for Water Quality in San Francisco Bay (RMP) has conducted stormwater runoff monitoring in San Mateo County and other parts of the Bay Area through its Small Tributary Load Strategy (STLS). The monitoring in San Mateo County has been coordinated with SMCWPPP, with SMCWPPP staff often assisting with selection of sampling stations and coordination with staff from local agencies. Monitoring objectives have included characterizing PCBs and mercury concentrations in stormwater runoff from the bottom of selected urban catchments with potential pollutant source areas (referred to as Watershed Management Areas or WMAs, see below discussion for further details) and estimating pollutant loading rates from some catchments. SMCWPPP (2017a and 2018) include additional information on the STLS efforts in San Mateo County.

2.1. 2000 through 2015

From 2000 to 2015, SMCWPPP and others conducted periodic sediment sampling programs in San Mateo County to begin to characterize the distribution of PCBs in various land uses throughout the urban landscape and identify catchments and properties within catchments that are potential sources of PCBs to the MS4. During this period, over 270 sediment samples were collected in San Mateo County, mainly from streets and MS4s in the public right-of-way (e.g., storm drain lines accessed via manholes, storm drain inlets, drainage channels, and pump station sumps). The samples were analyzed for PCBs congeners, total mercury, and ancillary analytes (KLI and EOA 2002; SMSTOPPP 2002, 2003, 2004; Yee and McKee 2010; SMCWPPP 2015; and CW4CB 2017a).

The initial step in the sediment sampling programs was a 2000 and 2001 collaborative project among SMCWPPP and other Bay Area countywide stormwater programs referred to as the Joint Stormwater Agency Project (JSAP). The JSAP measured concentrations of PCBs, mercury and other pollutants in embedded sediments collected from stormwater conveyance systems in San Mateo County and other parts of the Bay Area (KLI and EOA 2002). The primary goal was to characterize the distribution of pollutants among land uses in watersheds draining to the Bay.

In follow-up to the JSAP regional survey, SMCWPPP and other Bay Area countywide stormwater programs began performing “case studies” in some areas where relatively elevated PCBs were found during the JSAP. The primary goals were to develop methods to identify PCBs sources and begin to identify measures to address any controllable sources found. The techniques employed included collection and analysis of embedded stormwater conveyance sediment samples and research on historical and current land use. In the early 2000s, SMCWPPP completed PCBs case study work in four San Mateo County areas where elevated levels of PCBs were found during the JSAP survey. The case studies investigated the Bradford and Broadway pump station drainages in Redwood City, the South Maple pump station drainage in South San Francisco, an area in the vicinity of Colma Creek, and the Pulgas Creek pump station drainage in San Carlos (SMSTOPPP 2002, 2003, and 2004).

In 2007, a State of California Proposition 13 grant-funded study by the San Francisco Estuary Institute (SFEI) collected street dirt and MS4 sediment samples in the City of San Carlos in San Mateo County and other parts of the Bay Area (Yee and McKee 2010). In addition, beginning in 2010 SMCWPPP partnered with the Bay Area Stormwater Management Agencies Association (BASMAA) in the USEPA grant-funded Clean Watersheds for a Clean Bay (CW4CB) project to conduct additional investigation of PCBs sources to the MS4 in the Pulgas Creek pump station drainage in San Carlos (CW4CB 2017a).

In 2014, SMCWPPP worked with San Mateo County MRP Permittees to conduct a process to screen for "high interest parcels" for PCBs in the county. The screening covered all land areas in the county that drain to the Bay. The process was generally consistent with a framework developed through a collaboration of SMCWPPP and the other Bay Area countywide stormwater programs in consultation with Regional Water Board staff. Parcels were identified that were industrialized in 1980 or earlier (i.e., old industrial parcels) or have other land uses associated with PCBs (i.e., electrical, recycling, and military). SMCWPPP then worked with municipal staff to prioritize these parcels based on the evaluation of existing information on current land uses and practices (e.g., redevelopment status, extent and quality of pavement, level of current housekeeping, any history of stormwater violations, and presence of electrical or heavy equipment, tanks, or stormwater treatment) identified via land use analysis, local institutional/historical knowledge, and surveys of site conditions (windshield, Google Street View, and/or aerial photograph). The result of the prioritization was a list of about 1,600 high interest parcels for PCBs in San Mateo County.

In January and February 2015, SMCWPPP designed a monitoring plan based on the above screening for high interest parcels and then collected 101 sediment samples from the urban storm drainage system (e.g., beneath manholes, storm drain inlets) and public right-of-way surfaces (e.g., street gutters). The general goal was to continue attempting to identify potential source areas for PCBs. Samples were distributed among the nine municipalities that collectively encompass 93% of the old industrial land use in San Mateo County that drains to San Francisco Bay.

2.2. FY 2015/16

In FY 2015/16, SMCWPPP implemented a process to identify Watershed Management Areas (WMAs) and prioritize them based on the potential cost-effectiveness of implementing controls within each WMA. WMAs were defined as all catchments with high interest parcels and/or existing or planned pollutant controls (e.g., GI implemented per Provision C.3 requirements or retrofitted into the public right-of-way (ROW)). Stormwater runoff hydrologic catchments were generally chosen as the initial geographical scale at which WMAs were identified. This scale is consistent with the intention of MRP 2.0 Provision C.11/12.a.ii and allows Permittees to more easily track control measure implementation. WMAs are generally urban catchments that drain to 24-inch or larger diameter outfalls, which were originally delineated as part of SMCWPPP's program to help local agencies develop trash controls in San Mateo County (SMCWPPP 2014).[2] The process identified 110 catchments with high densities of high

[2] The WMA numbering system retains the simple numerical designations (ranging from 0 to 408) used for hydrologic catchments during the 2014 delineation. For this project, additional WMAs were delineated for areas that contain parcels of interest but were not delineated in 2014, with numerical designations ranging from 1000 to 1017. These 18 WMAs are not necessarily hydrologic catchments, but are instead a combination of areas that drain to outfalls less than 24-inches or directly to natural waterways or the Bay, or private drainages. Finally, to facilitate pollutant reduction planning and accounting, additional WMAs were delineated that encompass remaining areas that lack parcels of interest but include pollutant controls (mainly GI/redevelopment in old urban areas). These WMAs are not hydrologic catchments and were delineated for each San Mateo County Permittee that drains to the Bay. They were designated "Other –" followed by three letters representing the jurisdiction (e.g., Other – SSF for South San Francisco).

interest parcels (and generally with existing pollutant controls), and an additional 26 catchments with pollutant controls only, for a total of about 130 WMAs (SMCWPPP 2016a and b).

In FY 2015/16, SMCWPPP also participated in a BASMAA regional project to develop an interim accounting methodology to account for PCBs and mercury load reductions during MRP 2.0 associated with all control measures. The methodology is fully described by BASMAA (2017), a report that was approved by the Regional Water Board's Executive Officer in April 2017. Per MRP 2.0 requirements, the interim accounting methodology will eventually be replaced by more robust accounting methods, including a modeling approach for estimating pollutant loads reduced via GI and stormwater treatment, via development later in this permit term of a Reasonable Assurance Analysis (RAA).

Also in FY 2015/16, SMCWPPP worked with San Mateo County MRP Permittees to develop a database of existing and planned public and private GI and stormwater treatment projects in San Mateo County, including Low Impact Development (LID) measures at redevelopment sites. The database includes existing and planned GI and treatment facilities constructed in 2005 or later (SMCWPPP 2016b).

Finally, during the 2015/16 rainy season SMCWPPP collected eight composite samples of stormwater runoff. The samples were collected from outfalls at the bottom of WMAs that contain high interest parcels (i.e., with land uses associated with PCBs such as old industrial, electrical and recycling, as described above). Composite samples consisting of six to eight aliquots collected during the rising limb and peak of the storm hydrograph (as determined through field observations) were analyzed for PCBs congeners, total mercury, and other analytes (SMCWPPP 2017a).

2.3. FY 2016/17

SMCWPPP's major FY 2016/17 efforts related to PCBs and mercury load reduction included the following:

- Worked with San Mateo County MRP Permittees to update the database of existing and planned public and private GI and stormwater treatment projects in San Mateo County, including Low Impact Development (LID) measures at redevelopment sites. The database includes existing GI and treatment facilities constructed in 2005 or later and all known planned facilities (SMCWPPP 2017b).
- Collected 17 composite samples of stormwater runoff from outfalls at the bottom of WMAs that contain high interest parcels with land uses associated with PCBs such as old industrial, electrical and recycling. Composite samples consisting of six to eight aliquots collected during the rising limb and peak of the storm hydrograph (as determined through field observations) were analyzed for PCBs congeners, total mercury, and other analytes. SMCWPPP (2018) provides further details.
- Collected 68 sediment samples as part of the program to attempt to identify source properties within WMAs. These samples were collected in the public ROW, including locations adjacent to high interest parcels. Individual and composite sediment samples collected from manholes, storm drain inlets, driveways, and sidewalks were analyzed for PCBs congeners, total mercury, and other analytes. SMCWPPP (2018) provides further details.
- Continued updating and prioritizing the list of WMAs in San Mateo County (SMCWPPP 2017b).

- Summarized the preliminary PCBs and mercury load reductions achieved this permit term that had been quantified to-date (SMCWPPP 2017b).

2.4. FY 2017/18

During FY 2017/18, SMCWPPP continued identifying areas of interest and opportunity for PCBs and mercury controls, including refining the list of WMAs and their prioritization. This is a multi-year process designed to identify the land areas in San Mateo County that contribute relatively higher loads of PCBs and mercury to MS4s. Consistent with MRP requirements, the focus remained on PCBs, with ancillary/secondary benefits assumed to be realized for controlling mercury. SMCWPPP's major FY 2017/18 efforts related to PCBs and mercury load reduction included the following:

- Continued working with San Mateo County MRP Permittees to update the database of existing and planned public and private GI and stormwater treatment projects in San Mateo County, including LID measures at redevelopment sites. The database includes existing GI and treatment facilities constructed in 2005 or later and all known planned facilities (see Section 4.0).
- Submitted two source property referrals (both in San Carlos) to the Regional Water Board concurrent with its FY 2017/18 Annual Report (see Section 4.15):
    - 270 Industrial Road / 495 Bragato Road, San Carlos
    - 977 and 1007/1011 Bransten Road, San Carlos
- Summarized the preliminary PCBs and mercury load reductions achieved this permit term that had been quantified to-date (see Section 5.0).
- Collected 12 composite samples of stormwater runoff from outfalls at the bottom of WMAs that contain high interest parcels with land uses associated with PCBs such as old industrial, electrical and recycling. Composite samples consisting of six to eight aliquots collected during the rising limb and peak of the storm hydrograph (as determined through field observations) were analyzed for PCBs congeners, total mercury, and other analytes. The full results of this WY 2018 Pollutants of Concern (POC) monitoring program will be reported with the Urban Creeks Monitoring Report that is due March 2019.
- Collected 50 sediment samples as part of the program to attempt to identify source properties within WMAs. These samples were collected in the public ROW, including locations adjacent to high interest parcels. Individual and composite sediment samples collected from manholes, storm drain inlets, driveways, and sidewalks were analyzed for PCBs congeners, total mercury, and other analytes. The full results of this WY 2018 POC monitoring program will be reported with the Urban Creeks Monitoring Report that is due March 2019.
- Evaluated opportunities to take credit for PCBs and/or mercury loads avoided due to contaminated site cleanups (referred to as "self-abatements") in San Mateo County that were initiated during 2005 or later, typically a result of enforcement actions to remediate sites overseen by federal or state regulatory agencies. Cleanups completed during the MRP 2.0 permit term that prevent the discharge of PCBs to storm drains should result in credit towards MRP 2.0 load reduction requirements. This evaluation may also lead to opportunities to identify additional PCBs source properties that could be referred to the Regional Water Board for further investigation and abatement, either because cleanup at a site was never completed, or because the cleanup standards applied were not adequate relative to TMDL goals for reducing pollutant loads in stormwater runoff.

- Worked with San Mateo County Permittees to evaluate new or enhanced municipal O&M activities implemented in 2005 or later that may remove sediments containing PCBs and/or mercury, including any opportunities to monitor existing activities (e.g., via analysis of sediments removed for PCBs and mercury) and/or readily enhancing existing actions to reduce pollutant loads (i.e., "no missed opportunities"). The types of municipal O&M evaluated include maintenance of MS4 infrastructure (e.g., channel desilting and cleanout and/or retrofit of detention ponds, flood control basins, pump stations or storm drain inlets).

The PCBs load reduction credited when a source property is referred to the Regional Water Board is directly proportional to the area of the referred property (acres is the unit used in the calculation). SMCWPPP recently completed an analysis of total industrial area and average industrial parcel size among the four most populous counties in the MRP area, based on county assessor parcel data. Table 2.1 and Figure 2.1 show the results (it is important to note that the y-axis of Figure 2.1 is on a log scale). The total industrial acreage and average industrial parcel size are much lower in San Mateo County relative to the other counties, illustrating the challenge for San Mateo County Permittees to achieve PCBs load reductions via source property referrals compared to the other counties. In particular, even though the total population of Contra Costa County is roughly only 50% greater than San Mateo County, the total industrial acreage and average industrial parcel size in Contra Costa County exceeds San Mateo County by roughly a factor of four and six, respectively.

Table 2.1 Total Industrial Acreage and Average Industrial Parcel Size in Most Populous MRP Counties

	San Mateo County	Alameda County	Contra Costa County	Santa Clara County
Total Industrial Area (acres)	3,043	14,034	12,833	16,039
Average Industrial Parcel Size (acres)	1.25	2.03	7.55	3.00

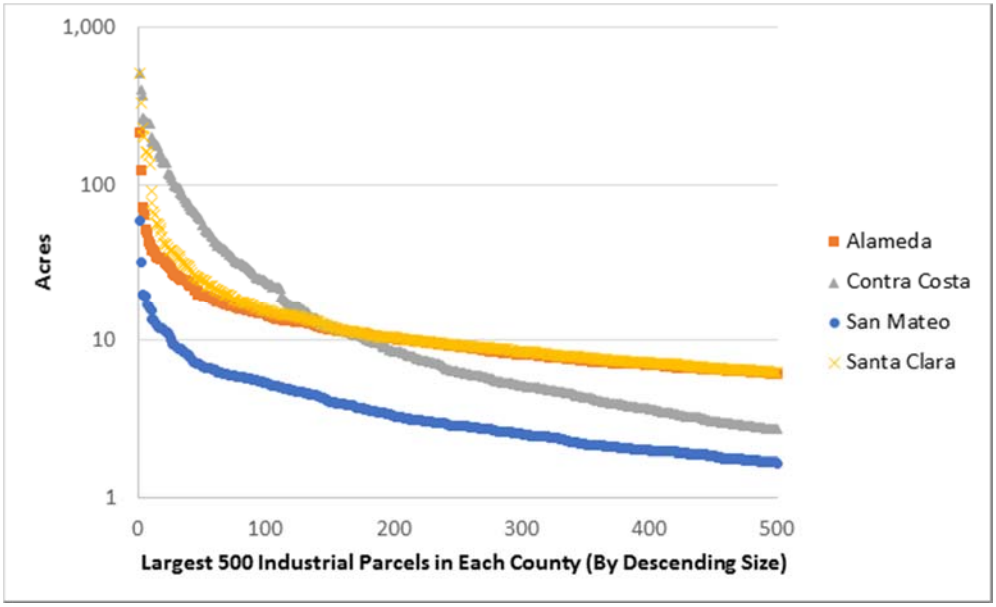

Figure 2.1. Area of 500 Largest Industrial Parcels in Most Populous MRP Counties

3.0 SUMMARY OF CONTROL MEASURES

Permittees have implemented a variety of control measures since the development of PCBs and mercury urban stormwater loading estimates incorporated into the TMDLs. Control measures were implemented to reduce PCBs and/or mercury in stormwater and/or other impacts of stormwater runoff. The control measures that have a direct benefit towards reducing the impacts of PCBs and mercury on the Bay are documented in this plan.

The types of control measures implemented to control PCBs and mercury in stormwater runoff generally fall into the following three categories:

- **True Source Controls (Load Avoidance)** – Controls that focus on the original source or use of a potential pollutant. True source controls include regulations and laws adopted to minimize or eliminate the use of a pollutant for specific activities and pollution prevention activities, such as inspections, that identify high risk practices that could release PCBs or mercury into the environment. The one true source control for mercury is the reduction of mercury in devices and equipment as a result of legislation or voluntary reduction by manufacturers. No additional true source controls are currently available for PCBs due to the production of these organic compounds being banned in the 1970s and the tight regulation of PCBs still in use.
- **Source Controls (Load Reduction)** – Source controls are load reduction control measures that reduce the risk of the pollutant entering the environment after it has already been used in devices/materials/equipment, or that intercept the pollutant before it is discharged to a receiving water body. The control measure types that fall into this category include: source property abatement, enhanced street sweeping, MS4 and flood control facility maintenance, mercury device recycling, and the control of PCBs-containing material during building demolition/renovation.
- **Treatment Controls (Load Reduction)** – Treatment controls are load reduction control measures that remove pollutants via physical, biological, or chemical processes. The control measure types that fall into this category include stormwater treatment measures, GI, and diversions of stormwater to Publicly Owned Treatment Works (POTWs).

Control measures needed to address PCBs and mercury load reduction criteria included in MRP 2.0 are currently under development by Permittees based on continued evaluations of sources of these contaminants and load reduction benefits associated with existing control measures. To the extent possible with the available information, control measures implemented to-date and those planned for implementation within each WMA during the term of MRP 2.0 are summarized in Section 4.0, consistent with MRP requirements.

Descriptions of each control measure type that Permittees may implement or cause to be implemented by other responsible parties to control PCBs and/or mercury are provided below.

3.1. Source Property Identification and Abatement

Source Property Investigation and Referral Process

PCBs and mercury source properties discharge these pollutants to the MS4s. One typical mechanism is for on-site contaminated surface soils to be mobilized by stormwater runoff, wind and/or vehicles and enter on-site or off-site storm drains. Identification and subsequent abatement of these properties

and/or focused control measure implementation in the public ROW around source properties can provide an opportunity for PCBs and mercury stormwater load reductions. Reductions occur through the abatement of properties via available mechanisms, including referrals to the Regional Water Board or through enforcement actions brought against property owners by Permittees.

SMCWPPP Permittees continue to implement a program to attempt to identify source properties in priority WMAs. These investigations typically include the following tasks:

1) Property records and aerial photography review;
2) Public ROW surveys and/or property inspections;
3) Private property and public ROW soil/sediment sampling; and
4) Reporting and planning/identifying control measures (including planning referrals).

As source properties are identified, information regarding pollutant concentrations observed, evidence of transport to the MS4, property ownership, previous stormwater violations, and any other pertinent information is documented. Additionally, the location and geographical extent of the property is delineated in GIS to facilitate the calculation of PCBs and mercury load reductions.

SMCWPPP is submitting two source property referrals (both in San Carlos) to the Regional Water Board concurrent with its FY 2017/18 Annual Report (Section 4.15). In addition, SMCWPPP and San Mateo County Permittees will continue attempting to identify source properties for referral to the Regional Water Board, based on the evaluation of the results of the WY 2018 POC monitoring program and other appropriate data, as it becomes available.

Review of Contaminated Site Cleanups (Potential Self-Abatements)

In addition to the source property investigations and referral process described above, SMCWPPP has also been evaluating opportunities to take credit for PCBs and mercury loads avoided due to contaminated site cleanups in San Mateo County that were initiated during 2005 or later, since these cleanups are assumed to reduce urban runoff pollutant loads relative to the PCBs TMDL baseline urban runoff load. The cleanups are referred to as “self-abatements” and are typically a result of enforcement actions with cleanup oversight by federal, state and local regulatory agencies, including United States Environmental Protection Agency (USEPA), California Department of Toxic Substance Control (DTSC), the Regional Water Board, and/or local municipal agencies. In addition, cleanups completed during the MRP 2.0 permit term should result in credit towards MRP 2.0 load reduction requirements. Investigation of contaminated site cleanups may also lead to opportunity to identify additional PCBs source properties that could be referred to the Regional Water Board for further investigation and abatement, either because cleanup at a site was never completed, or because the cleanup standards applied were not adequate relative to TMDL goals for reducing pollutant loads in stormwater runoff.

Regional Water Board staff has compiled a list of contaminated sites that were or are targeted for cleanup of soil and/or groundwater impacts under USEPA, DTSC, Regional Water Board, or local municipal agency oversight. The list was compiled primarily from a review of online databases, including DTSC’s Envirostor and the State Water Resource Control Board’s GeoTracker, and targeted sites that may have been associated with PCBs. The purpose in compiling this list was so that Regional Water Board staff could follow-up with the oversight agencies to ensure stormwater runoff concerns were or will be adequately addressed as part of the cleanups. The list has been updated periodically as new

information becomes available. SMCWPPP is reviewing the latest versions of the Regional Water Board list to help identify PCBs and mercury cleanup sites in San Mateo County. SMCWPPP is also in the process of reviewing online databases (Envirostor and GeoTracker) to review site histories and cleanup records, and compile the information needed to determine the cleanup status of the site, justify calculating any pollutant load reductions for the site cleanup, and document the data inputs needed to calculate loads avoided. The following information is being collected, as available:

- Area of the site;
- Current cleanup status;
- Date of cleanup;
- Evidence of PCBs on the site prior to cleanup (i.e., pre-cleanup PCBs concentrations in soils or groundwater);
- Cleanup/abatement methods;
- Evidence of adequate PCBs cleanup at the site (e.g., post-cleanup PCBs concentrations in soils or groundwater);
- Available evidence to justify designation as a potential PCBs source property for referral to Regional Water Board; and
- Documentation of any follow-up needed at the site.

3.2. Green Infrastructure (GI) and Treatment Control Measures

Green Infrastructure

In addition to source property abatement, the installations of GI facilities on private property or public lands has and will continue to provide significant benefits to stormwater quality and PCBs and mercury loads over time in San Mateo County. GI facilities include infrastructure that uses vegetation, soils, and natural processes to manage water and create healthier urban environments. Examples of GI include bioretention, LID, green/complete streets, and other systems that generally use the natural filtration or infiltration of stormwater.

MRP 2.0 requires that a 370 grams/year PCBs load reduction is achieved in San Mateo County by the end of this permit term. Of this, at least 15 grams/year must be achieved via GI. For the purposes of tracking and crediting pollutant load reductions achieved through GI and stormwater treatment, During FY 2015/16, SMCWPPP staff worked with San Mateo County MRP Permittee staff to begin developing a database of existing and planned public and private GI and stormwater treatment projects in San Mateo County, including LID measures at redevelopment sites (SMCWPPP 2016b). The database includes existing and planned GI and treatment facilities constructed in 2005 or later since these facilities are assumed to reduce urban runoff pollutant loads relative to the PCBs TMDL baseline urban runoff load. In addition, 2005 was the year that San Mateo County's municipal stormwater permit was amended to include more stringent Provision C. 3 requirements; thus most new or redevelopment projects constructed in 2005 or later include stormwater treatment.

The types of information in the database of existing and planned public and private GI and stormwater treatment projects in San Mateo County include the following:

- Project name

- Description of GI and stormwater treatment system(s)
- Location - street address or location description and coordinates
- Whether the facility is located on private property or in public ROW
- Area treated by facility (acres)
    - For LID at redevelopment or new developments sites, this is generally assumed to be the project area
    - For Green Street or other retrofits in public ROW, estimated drainage area to facility
- Hydraulic sizing criteria
- Date of construction
    - Existing facilities: date of construction completion (e.g., initial inspection sign-off)
    - Planned facilities: estimated construction completion date

During FYs 2016/17 and 2017/18, SMCWPPP staff continued working with municipal staff to update the GI database with available new or revised information. For each San Mateo County Permittee with urban areas that drain to San Francisco Bay, a summary of the information gathered to-date on existing and planned GI and stormwater treatment facilities is presented in Section 4.0 of this report. Preliminary load reductions calculated for all GI and stormwater treatment implemented in San Mateo County during the MRP 2.0 permit term are reported in Section 5.0.

The information in this section and Section 4.0 also fulfills the requirement in MRP Provision C.3.j.iv to report on progress on development and implementation of methods to track and report implementation of GI. In addition, C/CAG recently received an Adaptation Planning Grant from Caltrans that will be used to develop the "San Mateo Countywide Sustainable Streets Master Plan" to prioritize locations for integrating green stormwater infrastructure into roadways. This project will include developing a San Mateo County tracking tool that will meet the requirements in MRP Provision C.3.j.iv for development and implementation of methods to track and report implementation of GI. See Section 3 of SMCWPPP's 2017/18 Annual Report for more information about the project.

Trash Full Capture Systems

Trash full capture systems are devices or series of devices that trap all particles retained by a 5mm mesh screen and have a design treatment capacity of not less than the peak flow rate resulting from a one-year, one-hour, storm in the tributary drainage catchment area. Examples of full capture systems include storm drain inlet screening devices that treat relatively small areas to hydrodynamic separators and netting devices treating hundreds or thousands of acres.

To-date, large public trash full capture systems have not been installed in urban areas of San Mateo County that drain to the Bay. If these systems are installed in the future, the project information and subsequent loads reduced will be reported in future reports.

3.3. Municipal O&M Activities that Potentially Remove Sediments with PCBs and/or Mercury

SMCWPPP is working with San Mateo County MRP Permittees to continue evaluating new or enhanced

municipal O&M activities that may remove sediments containing PCBs and/or mercury. SMCWPPP is tracking actions implemented in 2005 or later since these actions are assumed to reduce urban runoff pollutant loads relative to the PCBs TMDL baseline urban runoff load. The types of municipal O&M evaluated are described below. As part of this evaluation SMCWPPP is assessing whether new or enhanced municipal O&M activities were implemented or planned for implementation during the MRP 2.0 permit term.

Street Sweeping and Flushing

Most San Mateo County Permittees conduct street sweeping, which along with trash and debris also removes sediments and particle-bound pollutants such as PCBs and mercury to some extent. If enhancements are made by SMCWPPP Permittees to street sweeping programs that would increase PCBs and mercury removal from stormwater runoff, the associated pollutant load reductions will be documented.

In addition to traditional street sweeping, street flushing may also provide pollutant reduction benefits in stormwater runoff. Street flushing includes pressure washing and/or the use of water to flush streets of sediment, trash and sediment-associated pollutants, then collecting and properly disposing of the water, sediments and pollutants. A street flushing pilot project was conducted in San Carlos during MRP 1.0 (CW4CB 2017b). However, additional street flushing projects have not occurred in San Mateo County under MRP 2.0 to-date. If street flushing projects are implemented by SMCWPPP Permittees in the future, pollutant load reductions associated with this control measure will be documented.

MS4 Line Flushing

Occasionally, opportunities present themselves to remove PCBs or mercury associated sediment deposited in MS4 lines. These opportunities typically do not occur often because the traditional MS4 is designed to convey stormwater (and associated sediments) effectively though the system. MS4 line flushing pilot projects have been conducted in the Bay Area, but not in San Mateo County to-date. If MS4 line flushing projects are implemented by SMCWPPP Permittees, load reductions associated with this control measure will be documented.

Storm Drain Inlet Maintenance

Municipalities periodically conduct storm drain inlet maintenance (e.g., clean-outs of catch basins). Most SMCWPPP Permittees inspect and maintain their inlets annually. Through these efforts, sediment and organic material (and associated pollutants) are removed from the MS4. If enhancements are made by SMCWPPP Permittees to inlet maintenance programs that would increase PCBs and mercury removal from stormwater runoff, the associated pollutant load reductions will be documented.

Channel and Pump Station Maintenance

SMCWPPP Permittees periodically remove sediment from storm drain channels and pump stations as part of their ongoing maintenance programs. As sediment and organic material are removed, sediment-associated pollutants such as PCBs and mercury are also removed. If enhancements are made by SMCWPPP Permittees to channel and pump station maintenance programs that would increase PCBs and mercury removal from stormwater runoff, the associated pollutant load reductions will be documented.

3.4. Managing PCBs in Building Materials

PCBs were used in many applications and materials in buildings, especially those constructed from about 1950 through 1980. MRP 1.0 required the implementation of a pilot project to assist in developing management practices that address legacy caulks containing PCBs. Permittees complied with this requirement by participating in a regional project led by the San Francisco Estuary Partnership (SFEP) that: 1) evaluated PCBs levels in caulk in buildings; and developed preliminary BMPs, a Model Implementation Process, and associated model policies and ordinances to reduce or prevent the release of PCB-laden caulks to the environment during demolition of Bay Area buildings.

Building upon the requirements in MRP 1.0, MRP 2.0 Provision C.12.f requires Permittees to develop and implement (or cause to be developed and implemented) an effective protocol for managing materials with PCBs concentrations of 50 ppm or greater in applicable structures at the time such structures undergo demolition so that PCBs do not enter municipal storm drain systems. Applicable structures include, at a minimum, commercial, public, institutional and industrial structures constructed or remodeled between the years 1950 and 1980 with building materials with PCBs concentrations of 50 ppm or greater. Single-family residential and wood frame structures are exempt.

SMCWPPP Permittees are currently participating in a BASMAA regional project that is developing guidance materials, tools, protocols and training materials and conducting outreach. The goal is to assist Permittees to develop local programs to prevent PCBs from being discharged to municipal storm drains due to demolition of applicable buildings. Local agencies will need to tailor the BASMAA products for local use and train local staff to begin implementing the new programs by July 1, 2019. The MRP stipulates a collective PCBs load reduction credit of 246.67 grams/year for San Mateo County Permittees, if all Permittees implement a program consistent with the permit requirements.

3.5. Managing PCBs in Storm Drain or Roadway Infrastructure

Studies in areas outside of the Bay Area have shown that PCBs may be present in storm drain and/or roadway infrastructure due to their use in caulks and sealants in the mid to late 20th century. Provision C.12.e of MRP 2.0 requires Permittees to evaluate the presence of PCBs in caulks/sealants used in storm drain or roadway infrastructure in public ROWs by collecting samples of caulk and other sealants used in storm drains and between concrete curbs and street pavement. BASMAA recently completed a regional project to address this permit requirement on behalf of all Permittees. The results of the study are documented in a project report that was submitted with SMCWPPP's FY 2017/18 Annual Report.

3.6. Diversions of Urban Runoff to Wastewater Treatment Facilities

The diversion of urban runoff (i.e., dry weather or stormwater) to wastewater treatment facilities can reduce PCBs and mercury loads in stormwater to the Bay. A temporary diversion of urban runoff to wastewater treatment facilities was conducted in the City of San Carlos as part of a pilot project during MRP 1.0. Although additional diversions are not currently planned, should any diversions be implemented the associated pollutant load reductions will be documented.

3.7. Addressing Illegal Dumping

This source control measure category entails addressing illegal dumping of waste (e.g., construction and demolition debris, stockpiles, spilled materials) containing PCBs or mercury to prevent it from entering MS4s. If enhancements are made by SMCWPPP Permittees to programs that address illegal dumping

and would prevent PCBs or mercury removal from entering stormwater runoff, the associated pollutant load reductions will be documented.

3.8. Mercury Reduction via Hazardous Waste Collection Programs

Many types of devices and equipment (e.g., thermometers, switches, and fluorescent lamps) can contain mercury. When these devices are not adequately managed at their end-of-life, mercury can be released into the environment and become available to stormwater runoff. Control measures currently implemented by Permittees that address the potential for mercury releases include: 1) the support of policies and laws that reduce the mass of mercury in specific devices/equipment; and 2) the implementation of recycling programs that reduce the risk of mercury from being released at the end-of-life of these devices and equipment.

San Mateo County municipalities participate in San Mateo County Health Department's Household Hazardous Waste (HHW) Program and Very Small Quantity Generator Business Collection (VSQG) Program. The HHW Program offers residents the opportunity to drop-off mercury-containing devices and equipment and other hazardous wastes at designated drop-off points or drop-off events free of charge. The VSQG Program provides an inexpensive hazardous waste disposal option to eligible businesses, non-profits, and other government agencies that generate less than 100 kilograms of waste per month. It operates by appointment only and charges a fee to cover the cost of transportation and disposal. Many member agencies promote the availability of the HHW Program and VSQG Program on their agency websites. The estimated mass of mercury collected in FY 2017/18 via these programs is presented in Section 5.0.

4.0 EXISTING AND PLANNED CONTROL MEASURES

SMCWPPP is tracking all existing and planned control measures that should result in pollutant load reduction credits towards meeting the San Mateo County portion of the PCBs and mercury TMDL wasteload allocations and MRP 2.0 load reduction requirements. All existing controls that commenced or were enhanced in 2005 or later are assumed to reduce urban runoff pollutant loads relative to the PCBs TMDL baseline urban runoff load. This year was selected because load reductions due to controls fully implemented before 2005 were already accounted for in the PCBs TMDL baseline urban runoff load estimate. As part of the evaluation SMCWPPP is assessing whether each existing or planned control would represent a new action or an enhancement during the MRP 2.0 permit term, including a period immediately preceding the permit term.[3] In addition to credit towards TMDL goals, such controls should result in credit towards the MRP 2.0 requirement that a 3,000 grams/year PCBs load reduction is achieved across the MRP 2.0 area by the end of the permit term. Of this, an interim 500 grams/year reduction is required by June 2018. This interim load reduction has been achieved (see Section 5.2) In addition, MRP 2.0 requires that at least 15 grams/year PCBs load reduction in San Mateo County is achieved via GI by the end of the permit term. The permit also requires a 6 grams/year mercury load reduction in San Mateo County via GI by the end of the permit term. The GI load reductions have already been achieved (see Sections 5.2 and 5.3).

The WMAs identified in San Mateo County and the associated control measures currently implemented (i.e., existing) or the control measures under development (i.e., planned) within these WMAs to-date are described for each San Mateo County Permittee in Sections 4.1 through 4.19. Each WMA and the GI/LID facilities within it are mapped in Appendix A, Figures A-1 through A-19. The Cities of Half Moon Bay and Pacifica drain to the Pacific Ocean and therefore were not included below, since this plan is focused on the PCBs and mercury TMDLs for San Francisco Bay. The inventory is organized alphabetically by Permittee and includes information on control measures in each WMA compiled by SMCWPPP to-date. It is important to note that the below summaries may not include all existing or planned control measures. The inventory will continue to be updated and refined as additional information becomes available. The land uses referenced in this report, including Sections 4.1 through 4.19, are described in Appendix B.

4.1. Town of Atherton

Watershed Management Areas

Table 4.1 lists the one WMA identified to-date in the Town of Atherton, and its total land area and associated land uses.

Table 4.1. Atherton WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
ATH	--	2,315	0%	95%	5%	0%	0%

[3] Based on language in the permit and discussions with Regional Water Board staff, it is assumed that applicable controls implemented from July 1, 2013 through the end of the permit term should result in credit towards these load reduction requirements.

Existing and Planned Control Measures Summary

Table 4.2 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the Town of Atherton.

Table 4.2. Existing (E) and planned (P) PCBs and mercury control measures in Atherton WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
ATH		E/P		P		E	E			E

Source Property Investigation

Source property investigative work has not been conducted in WMAs in the Town of Atherton to-date.

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in Atherton treat **14 acres** of land comprised of old urban land use. Of this total, **1.16 acres** were built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.3). It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

During FY 2017/18, Atherton continued pursuing a new potential GI facility in Holbrook-Palmer Park to help reduce existing flooding issues in the lower reaches of Atherton Creek and reduce pollutant loads. The Town hired a consultant that developed a preliminary project design in early 2018. The project was presented at the Town's Park and Recreation Committee and Town Council multiple times. The project received significant public opposition with respect to siting the project in the Town's only park. As a result, the Council directed Town staff to evaluate other potential project locations at which a facility could be sited and still take advantage of the $13.6 million funding commitment for the project from Caltrans. Efforts to identify an alternative location are currently ongoing. The Town has created a page on their website that includes details on the proposed project.

Table 4.3 Land area in the Atherton WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	ATH	1.16	0	1.16	0	0	0
	Total	**1.16**	**0**	**1.16**	**0**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

The Town of Atherton conducted a one-time desilting of the Atherton Channel at Watkins Avenue and Station Lane in 2004/2005. Approximately 25 cubic yards of sediment was removed during this activity. However, the sediment was not tested for PCBs and mercury. If the Town were to repeat this enhanced municipal O&M activity in the future it may be possible to test the sediment removed for PCBs and mercury and estimate the pollutant loads avoided.

SMCWPPP is also continuing to evaluate whether other relevant PCBs and mercury control measures are present in Atherton or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.2. City of Belmont

Watershed Management Areas

Table 4.4 lists the four WMAs identified to-date in the City of Belmont, and their total land areas and associated land uses.

Table 4.4. Belmont WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
60	City of San Mateo	298	2%	85%	1%	13%	0%
77	Unincorporated San Mateo County	86	5%	89%	0%	6%	0%
1011	Redwood City & San Carlos	507	12%	50%	10%	20%	8%
BEL		2,511	0%	74%	24%	2%	0%

Existing and Planned Control Measures Summary

Table 4.5 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of Belmont.

Table 4.5. Existing (E) and planned (P) PCBs and mercury control measures in Belmont WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
1011	E	E		P		E	E			E
60	E	P		P		E	E			E
77		P		P		E	E			E
BEL		E/P		P		E	E			E

Source Property Investigation

Source property investigative work has been conducted in the City of Belmont to-date in WMAs 1011 and 60. Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in Belmont treat **16.25 acres** of land, of which **10.87 acres** is comprised of old urban land use. Of this total, **4.03 acres** were built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.6). An additional **8.48 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. Belmont is also planning to construct regional green streets on public lands or ROWs that will treat **1.42 acres** of land. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Table 4.6 Land area in the Belmont WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	BEL	4.03	0	4.03	0	0	0
	Total	**4.03**	**0**	**4.03**	**0**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in Belmont or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.3. City of Brisbane

Watershed Management Areas

Table 4.7 lists the three WMAs identified to-date in the City of Brisbane, and their total land areas and associated land uses.

Table 4.7. Brisbane WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
17		1,639	3%	29%	68%	0%	0%
1004		804	70%	11%	19%	0%	0%
BRI		245	0%	17%	57%	25%	0%

Existing and Planned Control Measures Summary

Table 4.8 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of Brisbane.

Table 4.8. Existing (E) and planned (P) PCBs and mercury control measures in Brisbane WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
17	E	E/P		P		E	E			E
1004	E	E		P		E	E			E
BRI		P		P		E	E			E

Source Property Investigation

Source property investigative work has been conducted in the City of Brisbane to-date in WMAs 17 and 1004. Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in Brisbane treat **38.43 acres** of land which is comprised of old industrial land use. All of this GI was built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.6). It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Table 4.9 Land area in the Brisbane WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	17	21.02	21.02	0	0	0	0
	1004	17.41	17.41	0	0	0	0
	Total	**38.43**	**38.43**	**0**	**0**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

Brisbane may cleanout sediment in mixing basins that are downstream of an area where elevated PCBs in storm drain sediments have been observed. If the City were to conduct this enhanced municipal O&M activity it may be possible to test the sediment removed for PCBs and mercury and estimate the pollutant loads avoided.

SMCWPPP is also continuing to evaluate whether other relevant PCBs and mercury control measures are present in Brisbane or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.4. City of Burlingame

Watershed Management Areas

Table 4.10 lists the 10 WMAs identified to-date in the City of Burlingame, and their total land areas and associated land uses.

Table 4.10. Burlingame WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
16		24	31%	0%	69%	0%	0%
85		121	10%	89%	0%	0%	0%
138		15	30%	50%	20%	0%	0%
139		63	3%	97%	0%	0%	0%
141		62	7%	93%	0%	0%	0%
142		20	44%	56%	0%	0%	0%
149	City of San Mateo	480	1%	98%	1%	0%	0%
164		241	33%	67%	0%	0%	0%
1006		313	16%	68%	5%	11%	0%
BUR		1,827	0%	95%	4%	1%	0%

Existing and Planned Control Measures Summary

Table 4.11 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of Burlingame.

Table 4.11. Existing (E) and planned (P) PCBs and mercury control measures in Burlingame WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
16	E	P		P		E	E			E
85	E			P		E	E			E
138				P		E	E			E
139		E		P		E	E			E
141	E	E		P		E	E			E
142	E	E		P		E	E			E
149	E	P		P		E	E			E
164	E	E		P		E	E			E
1006	E	E/P		P		E	E			E
BUR	E	E/P		P		E	E			E

Source Property Investigation

Source property investigative work has been conducted in the City of Burlingame to-date in the eight WMAs indicated by Table 4.11. Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in Burlingame treat **16.14 acres** of land which is comprised of **7.57 acres** of old industrial and **8.57 acres** of old urban land uses. Of this, **9.2 acres** was built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.12). An additional **38 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. Burlingame also has four existing regional green street projects on public lands and ROWs that treat at least **2.2 acres** of old urban land use. Two of these project were completed during FY 2017/18, including the Carolan Avenue Complete Streets Project featuring rain gardens, and reconstruction of the U.S. 101 / Broadway interchange featuring bioretention areas. The Downtown Burlingame Streetscape Project

featuring curb extensions and rain gardens was completed in 2014. The Donnelly Avenue Sustainable Streets and Parking Lot Demonstration project also featuring curb extensions and rain gardens was completed in 2011. Burlingame is currently planning two additional green street projects, including the Public Parking Lot H on El Camino Real and Ralston Avenue featuring rain gardens, and the California Drive Roundabout project with bioretention facilities. Additional information will be documented when it becomes available. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Table 4.12 Land area in Burlingame WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	139	0	0	0.04	0	0	0
	164	4.57	4.39	0.18	0	0	0
	1006	2.79	0	2.79	0	0	0
	BUR	1.84	0	1.84	0	0	0
	Total	**9.2**	**4.39**	**4.81**	**0**	**0**	**0**
Green Streets or Regional Retrofit	139	0.04	0	0.04	0	0	0
	1006	0.81	0	0.81	0	0	0
	BUR	0.02	0	0.02	0	0	0
	Total	**0.87**	**0**	**0.87**	**0**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in Burlingame or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.5. Town of Colma

Watershed Management Areas

Table 4.13 lists the two WMAs identified to-date in the Town of Colma, and their total land areas and associated land uses.

Table 4.13. Colma WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
329	Daly City	806	1%	91%	8%	0%	0%
COL		1,139	0%	15%	84%	0%	0%

Existing and Planned Control Measures Summary

Table 4.14 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the Town of Colma.

Table 4.14. Existing (E) and planned (P) PCBs and mercury control measures in Colma WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
329		E		P		E	E			E
COL	E	E/P		P		E	E			E

Source Property Investigation

Source property investigative work has been conducted in the Town of Colma to-date in WMA COL (Table 4.14). Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in Colma treat **31.37 acres** of land which includes **23.82 acres** of old urban land uses. Of this, **16.42 acres** was built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.15). An additional **8.46 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. Colma also has one existing regional green street project on public lands or ROWs that was constructed in 2015 and treats **0.93 acres** of old urban land use. Colma is currently planning to construct a second regional green street project on Mission Road. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Table 4.15 Land area in Colma WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	COL	16.42	0	9.56	0	6.86	0
	Total	**16.42**	**0**	**9.56**	**0**	**6.86**	**0**
Green Streets or Regional Retrofit	COL	0.93	0	0.93	0	0	0
	Total	**0.93**	**0**	**0.93**	**0**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in Colma or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.6. City of Daly City

Watershed Management Areas

Table 4.16 lists the four WMAs identified to-date in the City of Daly City, and their total land areas and associated land uses.

Table 4.16. Daly City WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
181	Unincorporated SM County	75	16%	64%	20%	0%	0%
329	Colma	806	1%	91%	8%	0%	0%
350		317	5%	60%	35%	0%	0%
DCY		1,096	1%	85%	14%	0%	0%

Existing and Planned Control Measures Summary

Table 4.17 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of Daly City.

Table 4.17 Existing (E) and planned (P) PCBs and mercury control measures in Daly City WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
181		E/P		P		E	E			E
329		E/P		P		E	E			E
350	E	E		P		E	E			E
DCY		E/P		P		E	E			E

Source Property Investigation

Source property investigative work has been conducted in the City of Daly City to-date in WMA 350 (Table 4.17). Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in Daly City treat **105.41** acres of land, all of which is comprised of old urban land use. All of this GI was built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.18). An additional **56.92 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Table 4.18 Land area in the Daly City WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	329	103.24	0	103.24	0	0	0
	DCY	2.17	0	2.17	0	0	0
	Total	**105.41**	**0**	**105.41**	**0**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in Daly City or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.7. City of East Palo Alto

Watershed Management Areas

Table 4.19 lists the six WMAs identified to-date in the City of East Palo Alto, and their total land areas and associated land uses.

Table 4.19. East Palo Alto WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
67		95	12%	75%	13%	0%	0%
68		317	0%	96%	4%	0%	0%
70		490	3%	94%	3%	0%	0%
72		26	44%	47%	9%	0%	0%
1015		52	93%	7%	1%	0%	0%
EPA		274	1%	79%	19%	0%	0%

Existing and Planned Control Measures Summary

Table 4.20 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of East Palo Alto.

Table 4.20. Existing (E) and planned (P) PCBs and mercury control measures in East Palo Alto WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
1015	E	E/P		P		E	E			E
67	E	E/P		P		E	E			E
68		E		P		E	E			E
70	E	E/P		P		E	E			E
72	E	P		P		E	E			E
EPA	E	E		P		E	E			E

Source Property Investigation

Source property investigative work has been conducted in the City of East Palo Alto to-date in the five WMAs indicated by Table 4.11. Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in East Palo Alto treat **35 acres** of land which includes **13.5 acres** of old industrial and **16.5 acres** of old urban land uses. Of this, **17.2 acres** was built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.21). An additional **1.62 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. The City also has six green street projects on public lands and/or in public ROW that are either under construction or in the planning stages. Additional information will be documented when it becomes available. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Table 4.21 Land area in East Palo Alto WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	67	1.20	1.20	0	0	0	0
	68	1.77	0	1.77	0	0	0
	70	8.91	4.98	0.98	0	2.95	0
	1015	2.70	2.70	0	0	0	0
	EPA	2.62	0	0.62	0	2.00	0
	Total	**17.20**	**8.88**	**3.37**	**0**	**4.95**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

The City of East Palo Alto has reported preliminary information about potential opportunities to conduct sediment removal activities from locations that may have elevated PCBs concentrations. A large volume of soil (~150,000 cubic yards) resulting from past remediation activities (e.g., on the Stanford Campus) and believed to contain PCBs had been stockpiled on a private property at 391 Demeter Street in East Palo Alto. The owner had stockpiled soils there for decades and the site was under Regional Water

Board order until 2008. The City had asked for the order to be reopened and for the sediment to be addressed. The City is not responsible for removing this material but believes soils may be migrating into nearby wetlands. In general, the City is addressing this old industrial area as part of its Ravenswood Specific Plan Area. The site may be redeveloped in the next few years and the soil stockpiles may have been removed recently with testing of the soils for PCBs and other pollutants. SMCWPPP is currently in the process of obtaining more information from East Palo Alto staff.

SMCWPPP is also continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M, including channel desilting projects and cleanout of a stormwater pump station located at the east end of O'Connor Street and adjacent stormwater basin) are present in East Palo Alto or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.8. City of Foster City

Watershed Management Areas

Table 4.22 lists the two WMAs identified to-date in the City of Foster City, and their total land areas and associated land uses.

Table 4.22. Foster City WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
1010		273	3%	36%	11%	50%	0%
FCY		2,065	0%	60%	8%	31%	0%

Existing and Planned Control Measures Summary

Table 4.23 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of Foster City.

Source Property Investigation

Source property investigative work has not been conducted in WMAs in the City of Foster City to-date.

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in Foster City treat **39.48 acres** of land, of which **16.36 acres** is comprised of old urban land use. Of this total, **30.24 acres** were built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.24). An additional **47.30 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. It should be noted that the acres treated

by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Table 4.23. Existing (E) and planned (P) PCBs and mercury control measures in Foster City WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
1010		E/P		P		E	E			E
FCY		E/P		P		E	E			E

Table 4.24 Land area in Foster City WMAs treated by GI built from July 1, 2013 to June 30, 2017.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	1010	17.98	0	0	17.98	0	0
	FCY	12.26	0	7.12	3.30	1.84	0
	Total	**30.24**	**0**	**7.12**	**21.28**	**1.84**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

Foster City conducted dredging in their lagoon in 2005 and removed about 100,000 cubic yards of sediment. The sediment may have been tested for PCBs, and efforts to track down these data are currently underway. This activity could be repeated in the future, presenting a potential opportunity to again test the sediment removed for PCBs and calculate loads avoided.

SMCWPPP is also continuing to evaluate whether other relevant PCBs and mercury control measures are present in Foster City or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.9. Town of Hillsborough

Watershed Management Areas

Table 4.25 lists the one WMA identified to-date in the Town of Hillsborough, and its total land area and associated land uses.

Table 4.25. Hillsborough WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
HIL		3,974	0%	84%	15%	0%	0%

Existing and Planned Control Measures Summary

Table 4.26 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the Town of Hillsborough.

Table 4.26. Existing (E) and planned (P) PCBs and mercury control measures in Hillsborough WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
HIL		E/P		P		E	E			E

Source Property Investigation

Source property investigative work has not been conducted in WMAs in the Town of Hillsborough to-date.

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in Hillsborough treat **0.12 acres** of land, all of which is comprised of old urban land use. All of this GI was built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.27). An additional **5.63 acres** will be treated by new or redevelopment projects that are currently under

construction or planned for construction. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Table 4.27 Land area in Hillsborough WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	HIL	0.12	0	0.12	0	0	0
	Total	**0.12**	**0**	**0.12**	**0**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in Hillsborough or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.10. City of Menlo Park

Watershed Management Areas

Table 4.28 lists the 11 WMAs identified to-date in the City of Menlo Park, and their total land areas and associated land uses.

Table 4.28. Menlo Park WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Indus-trial	% Old Urban	% New Urban	% Open Space	% Other
66		64	30%	36%	1%	34%	0%
71	East Palo Alto / Uninc. SM County	1,394	2%	92%	2%	4%	0%
238		345	24%	74%	1%	0%	0%
239	Redwood City	36	29%	71%	0%	0%	0%
247	Unincorporated SM County	239	9%	91%	1%	0%	0%
252		108	5%	94%	1%	0%	0%
332	Redwood City	17	5%	95%	0%	0%	0%
378		138	3%	97%	0%	0%	0%
1012		54	84%	16%	0%	0%	0%
1014	Redwood City	176	11%	89%	0%	0%	0%
MPK		2,487	1%	84%	14%	1%	0%

Existing and Planned Control Measures Summary

Table 4.29 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of Menlo Park.

Table 4.29. Existing (E) and planned (P) PCBs and mercury control measures in Menlo Park WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
1012	E	E		P		E	E			E
1014	E	E		P		E	E			E
238	E	E		P		E	E			E
239	E	E/P		P		E	E			E
247		E/P		P		E	E			E
252		E/P		P		E	E			E
66	E	E/P		P		E	E			E
71	E	E/P		P		E	E			E
332	E			P		E	E			E
378				P		E	E			E
MPK	E	E/P		P		E	E			E

Source Property Investigation

Source property investigative work has been conducted in the City of Menlo Park to-date in the eight WMAs shown in Table 4.29. Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in Menlo Park treat **243.19 acres** of land, of which **105.56 acres** is comprised of old industrial and **69.29acres** is comprised of old urban land use. Of this total, **131.08 acres** were built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.30). An additional **60.84 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Table 4.30 Land area in Menlo Park WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	66	15.06	3.76	0.00	11.30	0	0
	71	10.96	6.52	4.44	0	0	0
	238	20.30	16.71	3.59	0	0	0
	239	9.69	9.69	0	0	0	0
	247	12.99	0	12.99	0	0	0
	252	1.55	1.55	0	0	0	0
	1012	47.35	47.35	0	0	0	0
	1014	9.12	5.19	3.93	0	0	0
	MPK	4.06	0	4.06	0	0	0
	Total	**131.08**	**90.77**	**29.01**	**11.30**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

Menlo Park removed sediment from a section of the Atherton Channel at Haven Avenue and Bayfront Expressway (Highway 84) in 2007, 2008, 2009, 2011, 2013 and 2015. Each of these years the City removed about 500 cubic yards of sediment, except that only vegetation was removed in 2015. Since 2009, this cleaning has been performed every other year and the City anticipates continuing this schedule. Although the sediment has not been tested for PCBs to-date, the ongoing cleanout schedule provides a potential opportunity for future testing and calculation of load avoidance.

The Facebook West Campus is a 22 acre property located at 312-314 Constitution Avenue in Menlo Park. This site was identified in Envirostor as a voluntary PCBs cleanup site overseen by DTSC. The property is a former Raychem Corporation Facility, which later became Raychem/Tyco. The property was purchased by Facebook in 2011. Initial remedial actions at the site completed in 2007 included the excavation and off-site disposal of 6,561 cubic yards of contaminated soil and installation of a multi-media cap. Further remediation was conducted between 2012 and July 2013, and included excavation and off-site disposal of 1,800 cubic yards of PCBs contaminated soil with > 50 mg/Kg PCBs, and excavation and off-site disposal of 10,600 cubic yards of soil with < 50 mg/Kg PCBs. PCBs concentrations in the soil were as high as 2,600 mg/Kg prior to cleanup. The remediated soil cleanup concentration of <0.74 mg/Kg was achieved except for 100 cubic yards of soil with PCBs > 50 mg/Kg and 500 cubic yards of soil with PCBs < 50 mg/Kg that were left buried in place at 27 - 37 feet below the ground surface. SMCWPPP is evaluating whether a PCBs load reduction credit could be estimated as a self-abatement site.

SMCWPPP is also continuing to evaluate whether other relevant PCBs and mercury control measures are present in Menlo Park or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.11. City of Millbrae

Watershed Management Areas

Table 4.31 lists the four WMAs identified to-date in the City of Millbrae, and their total land areas and associated land uses.

Table 4.31. Millbrae WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
395		480	2%	94%	5%	0%	0%
401		52	13%	85%	2%	0%	0%
1005	San Bruno	791	7%	65%	27%	0%	1%
MIL		1,309	0%	85%	13%	0%	2%

Existing and Planned Control Measures Summary

Table 4.32 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of Millbrae.

Table 4.32. Existing (E) and planned (P) PCBs and mercury control measures in Millbrae WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
395				P		E	E			E
401				P		E	E			E
1005	E	E		P		E	E			E
MIL		E/P		P		E	E			E

Source Property Investigation

Source property investigative work has been conducted in the City of Millbrae to-date in WMA 1005 (Table 4.11). Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in Millbrae treat **15 acres** of land, all of which is comprised of old urban land use. None of this GI was built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18). Millbrae is currently planning to construct a green street project on Taylor Blvd and Almenar Street that will treat 0.5 acres with bioretention facilities. An additional **20.53 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Other PCBs and Mercury Controls

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in Millbrae or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.12. Town of Portola Valley

Watershed Management Areas

Table 4.33 lists the one WMA identified to-date in the Town of Portola Valley, and its total land area and associated land uses.

Table 4.33. Portola Valley WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
PVY		5,790	0%	51%	36%	14%	0%

Existing and Planned Control Measures Summary

Table 4.34 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the Town of Portola Valley.

Source Property Investigation

Source property investigative work has not been conducted in WMAs in the Town of Portola Valley to-date.

Table 4.34. Existing (E) and planned (P) PCBs and mercury control measures in Portola Valley WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
PVY		E/P		P		E	E			E

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in Portola Valley treat **1.67 acres** of land, all of which is comprised of old urban land use. All of this total was built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.35). An additional **11.6 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. It should be noted that the information on GI reported in this section is preliminary and may be revised in the future as additional information becomes available.

Table 4.35 Land area in Portola Valley WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	PVY	1.67	0	1.67	0	0	0
	Total	**1.67**	**0**	**1.67**	**0**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in Portola Valley or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.13. City of Redwood City

Watershed Management Areas

Table 4.36 lists the 24 WMAs identified to-date in the City of Redwood City, and their total land areas and associated land uses.

Table 4.36. Redwood City WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
253	Unincorporated SM County	280	6%	93%	1%	0%	0%
254		39	11%	83%	6%	1%	0%
261	Atherton	1,679	0%	99%	1%	0%	0%
266	Unincorporated San Mateo County	91	4%	92%	0%	4%	0%
267		75	21%	54%	2%	23%	0%
269		45	9%	0%	16%	74%	0%
323		185	1%	99%	0%	0%	0%
324		44	2%	98%	0%	0%	0%
325		21	5%	95%	0%	0%	0%
327		126	5%	94%	1%	0%	0%
333		15	29%	18%	0%	53%	0%
334		19	18%	33%	10%	39%	0%
335		24	0%	96%	4%	0%	0%
336		66	7%	93%	1%	0%	0%
337		138	11%	89%	0%	0%	0%
379	Unincorporated SM County	802	14%	85%	1%	0%	0%
388		42	1%	99%	0%	0%	0%
405		22	100%	0%	0%	0%	0%
407		18	53%	20%	9%	19%	0%
1000		148	75%	4%	9%	12%	0%
1011	Belmont/San Carlos	507	12%	50%	10%	20%	8%
1013		40	9%	76%	14%	0%	0%
1014	Menlo Park	176	11%	89%	0%	0%	0%
RCY		6,030	0%	64%	15%	21%	0%

Existing and Planned Control Measures Summary

Table 4.37 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of Redwood City.

Source Property Investigation

Source property investigative work has been conducted in the City of Redwood City to-date in the 15 WMAs indicated by Table 4.37. Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Table 4.37. Existing (E) and planned (P) PCBs and mercury control measures in Redwood City WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
253	E	E		P		E	E			E
254	E	E		P		E	E			E
261		E/P		P		E	E			E
266	E	E		P		E	E			E
267	E			P		E	E			E
269				P		E	E			E
323	E			P		E	E			E
324	E	E/P		P		E	E			E
325		P		P		E	E			E
327	E	E/P		P		E	E			E
333	E			P		E	E			E
334				P		E	E			E
335				P		E	E			E
336		E/P		P		E	E			E
337	E	E		P		E	E			E
379	E	E/P		P		E	E			E
388	E	E		P		E	E			E
405				P		E	E			E
407	E			P		E	E			E
1000	E	E		P		E	E			E
1011	E	E		P		E	E			E
1013				P		E	E			E
1014	E	E		P		E	E			E
RCY	E	E/P		P		E	E			E

Source Property Investigation

Source property investigative work has been conducted in the City of Redwood City to-date in the 16 WMAs indicated by Table 4.37. Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline

year) in Redwood City treat **195.33 acres** of land, of which **24.48 acres** is comprised of old industrial and **93.12 acres** is comprised of old urban land use. Of this total, **90.49 acres** were built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18)(Table 4.38). An additional **53 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Redwood City has three existing regional green street projects on public lands and ROWs, one that was constructed in 2008 and treats **3.55 acres**, and two that were constructed in 2014 and treat **2.4 acres** of old industrial and new urban land use (Table 4.38). These projects include bioretention facilities and vegetated swales. The City is also planning to construct four additional regional green streets on public lands or ROWs that will treat 5.39 acres of land. These include two green street projects awarded funding via a Proposition 1 stormwater implementation grant administered by the State Water Resources Control Board: Middlefield Road Streetscape and Kennedy Middle School Safe Routes to School. During FY 2017/18, Redwood City continued designing these two green street projects, which were originally included as a project concept in the Stormwater Resource Plan that SMCWPPP developed to ensure San Mateo County MRP Permittees would be eligible to compete for this type of funding. SMCWPPP also prepared the successful grant proposal for the City. The two projects are currently out to bid and scheduled to be constructed in 2019.

SMCWPPP also developed a concept for regional stormwater retention facilities beneath playing fields at the City's Red Morton Park that would potentially manage runoff from up to 1,650 acres. The concept was presented to the City's Utilities Subcommittee, but there is currently no funding to move the project forward. City staff are evaluating options to further study the project's feasibility.

Other PCBs and Mercury Controls

SMCWPPP has also begun to evaluate the load reduction opportunity available through potential future sediment removal actions at a small stormwater detention pond in Redwood City. Areas draining to the pond include a portion of San Carlos with old industrial land uses that are associated with elevated PCBs in street and storm drain sediments, including the Delta Star / Tiegel site, a PCBs source property (see Section 4.15). There are currently no sediment removal actions conducted at the pond.

The stormwater detention pond is located within the Redwood Shores Ecological Reserve (Figure 4.1), which is owned and managed by the California Department of Fish and Wildlife. However, the Redwood City Public Works Department operates a pump station at the pond, including providing daily management of water levels in the pond and pump station maintenance as needed. As water levels in the pond rise, the pumps are turned on and water from the pond is pumped through a discharge pipe at the south-eastern edge of the pond into the adjacent Steinberger slough at discharge point A (Figure 4.1). A second discharge pipe conveys gravity-fed flow from the north-eastern edge of the pond into the Steinberger Slough at discharge point B (Figure 4.1). Both discharge pipe outfalls typically remains below the water surface in the slough, except at low tide.

Table 4.38 Land area in Redwood City WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	253	0.50	0	0.50	0	0	0
	254	3.91	3.91	0	0	0	0
	261	6.73	0.99	5.74	0	0	0
	266	7.17	4.65	2.52	0	0	0
	324	2.24	2.24	0	0	0	0
	327	5.47	0	5.47	0	0	0
	336	5.88	0	5.88	0	0	0
	337	0.61	0	0.61	0	0	0
	379	8.84	8.84	0	0	0	0
	388	1.19	1.19	0	0	0	0
	1009	0.14	0	0.14	0	0	0
	1014	1.09	1.09	0	0	0	0
	RCY	46.72	0	21.27	15.43	10.02	0
	Total	**90.49**	**22.91**	**42.13**	**15.43**	**10.02**	**0**
Green Streets or Regional Retrofit	1000	1.66	1.66	0	0	0	0
	RCY	0.77	0	0	0.77	0	0
	Total	**2.43**	**1.66**	**0**	**0.77**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

SMCWPPP previously conducted a site visit to the pond with representatives from Redwood City Public Works and the California Fish and Wildlife Department. Based on the observations made during the visit, SMCWPPP identified several potential tasks that could be implemented as initial steps that would help inform the costs and benefits of implementing enhanced sediment removal activities at the site. The tasks under consideration include:

- Characterizing concentrations of PCBs and mercury in sediments that have accumulated in the pond;
- Characterizing concentrations of PCBs and mercury in sediments that have accumulated in the adjacent slough near the pond's outfalls and upstream and downstream, to better understand whether polluted sediment are transported from the pond to the slough;
- Monitoring stormwater flows into and out of the pond for PCBs and mercury to estimate loads into the pond, and subsequently into the slough form the pond.
- Estimate annual stormwater loads of PCBs and/or mercury that flow to the pond from the adjacent old industrial source areas;

- Estimating pollutant loads avoided via one-time or periodic sediment removal actions (e.g., sediment dredging) and the costs of those actions;
- Estimate the mass of PCBs and mercury in annual stormwater flows that are deposited within the pond and could be removed through ongoing sediment-removal actions;

If such monitoring and evaluation indicates that sediment removal actions at the pond would be a cost-effective control for PCBs and mercury, SMCWPPP and/or the City would work with the appropriate agencies (e.g., California Department of Fish and Wildlife) to further identify logistical considerations (e.g., methods, permits, schedules).

SMCWPPP is also continuing to evaluate whether other relevant PCBs and mercury control measures are present in Redwood City or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

Figure 4.1. Drainage catchment and storm drain lines for the Redwood Shores Ecological Reserve Stormwater Detention Basin in Redwood City (shown in blue). Point A is the pump station discharge pipe location. Point B is the gravity fed discharge pipe location. Both discharge pipes empty to the Steinberger Slough.

4.14. City of San Bruno

Watershed Management Areas

Table 4.39 lists the five WMAs identified to-date in the City of San Bruno, and their total land areas and associated land uses.

Table 4.39. San Bruno WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
290	Unincorporated San Mateo County	2,017	0%	76%	24%	0%	0%
291	South San Francisco	194	33%	65%	2%	0%	0%
292	South San Francisco	220	17%	83%	1%	0%	0%
296	South San Francisco	1,272	1%	77%	23%	0%	0%
SBO		542	0%	74%	26%	0%	0%

Existing and Planned Control Measures Summary

Table 4.40 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of San Bruno.

Table 4.40. Existing (E) and planned (P) PCBs and mercury control measures in San Bruno WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
290		E/P		P		E	E			E
291	E			P		E	E			E
292	E			P		E	E			E
296	E			P		E	E			E
307[1]		E								
1005[2]		P								
SBO				P		E	E			E

[1]This WMA is predominantly in Daly City, but a small portion is located within San Bruno.
[2]This WMA is predominantly in Millbrae but a portion is located within San Bruno.

Source Property Investigation

Source property investigative work has been conducted in the City of San Bruno to-date in the three WMAs indicated by Table 4.40. Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in San Bruno treat **22 acres** of land, of which **7 acres** is comprised of old industrial and **15 acres** is comprised of old urban land use. Of this total, **11.5 acres** were built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18)(Table 4.41). An additional **11.4 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

SMCWPPP also developed a project concept for a regional retention facility on Caltrans property between the I-280 and I-380 interchange. The project concept was responsive to an identified need for upstream retention in San Bruno's Storm Drain Master Plan to alleviate downstream flooding. The project concept was submitted to Caltrans for consideration for funding given that approximately 40 acres of Caltrans rights-of-way are in the project drainage area. The concept is currently on a list for Caltrans consideration in late 2018-19 for future funding, but it is currently anticipated to be a low priority project for Caltrans due to low overall benefit relative to Caltrans interests (primarily trash load reduction and then TMDL load reductions).

Table 4.41 Land area in San Bruno WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit Subtotal	290	11.54	7.00	4.54	0	0	0
	Total	**11.54**	**7.00**	**4.54**	**0**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in San Bruno or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.15. City of San Carlos

Watershed Management Areas

Table 4.42 lists the 11 WMAs identified to-date in the City of San Carlos, and their total land areas and associated land uses.

Table 4.42. San Carlos WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
31		99	27%	72%	0%	0%	0%
32	Belmont	67	3%	96%	0%	0%	0%
57		63	6%	92%	2%	0%	0%
59		28	32%	68%	0%	0%	0%
75		66	58%	42%	0%	0%	0%
80		21	5%	95%	0%	0%	0%
207		82	8%	90%	2%	0%	0%
210		141	23%	77%	0%	0%	0%
1011	Redwood City	507	12%	50%	10%	20%	8%
1016		142	19%	44%	3%	0%	34%
SCS		2,517	0%	85%	15%	0%	0%

Existing and Planned Control Measures Summary

Table 4.43 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of San Carlos.

Source Property Investigation

Source property investigative work has been conducted in the City of San Carlos to-date in the 8 WMAs indicated by Table 4.44. WMA 31 and WMA 210, referred to respectively as the Pulgas Creek pump station north and south drainages, have been a particular focus areas for source property investigation work over the past 15 years. These primarily old industrial catchments have the most elevated concentrations of PCBs in MS4 sediment and stormwater runoff samples collected to-date from WMAs in San Mateo County. Collectively they were designated as a “pilot watershed” for the grant funded Clean Watershed for a Clean Bay (CW4CB) project (CW4CB 2017a). Two potential source properties that have been identified in these WMAs to-date are: (1) 977 and 1007/1011 Bransten Road in WMA 31 and (2) 1411 Industrial Road in WMA 210. SMCWPPP and the City of San Carlos are referring the 977 and 1007/1011 Bransten Road Bransten Road property to the Regional Water Board, as described below. SMCWPPP and the City of San Carlos are working with the property owner on next steps at the 1411 Industrial Road property. The property owner has retained a consultant to investigate potential sources of PCBs associated with the property. The consultant has contacted Regional Water Board staff about this site.

Table 4.43. Existing (E) and planned (P) PCBs and mercury control measures in San Carlos WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
31	E	E/P		P		E	E			E
32	E			P		E	E			E
57		E/P		P		E	E			E
59	E	E		P		E	E			E
75	E			P		E	E			E
80				P		E	E			E
207		P		P		E	E			E
210	E			P		E	E			E
1011	E	E		P		E	E			E
1016	E	E/P		P		E	E			E
SCS	E	E/P		P		E	E			E

Based on the spatial distribution of PCBs in MS4 and street dirt sediments collected in WMA 31 and WMA 210, it appears that other source(s) remain unidentified in WMA 210. PCBs from unknown sources were previously found in inlets and manholes in the vicinity of Center, Washington and Varian Streets and Bayport Avenue in WMA 210. The PCBs in these samples could have originated from any of about 20 small industries on these streets. During WY 2017, seven additional samples were collected in this area. The results suggested that three small properties could be PCBs sources. Two samples collected from the driveways of 1030 Washington Street, a construction business, had elevated PCBs (1.29 and 3.73 mg/kg). A sample from the driveway of 1029 Washington Street was also elevated with a concentration of 5.64 mg/kg. In addition, samples from the driveway of 1030 Varian Street, an unpaved lot used for storage, had an elevated PCBs concentration of 1.84 mg/kg. It should be noted that all of the buildings in this area appear to be of the type and age that may have PCBs in building materials. SMCWPPP is currently working with the City of San Carlos to determine next steps for these properties.

Another source property identified through SMCWPPP's investigations is located at 270 Industrial Road / 495 Bragato Road in WMA 1011 in San Carlos. 270 Industrial Road is occupied by the Delta Star facility where transformers are manufactured, including transformers with PCBs historically (from 1961 to 1974). Adjacent to 270 Industrial Road is 495 Bragato Road (Tiegel Manufacturing), a roughly three acre site that is largely unpaved. PCBs appear to have migrated to this property from the Delta Star property.

SMCWPPP and the City of San Carlos are submitting two source property referrals (both in San Carlos) to the Regional Water Board concurrent with its FY 2017/18 Annual Report:

- 270 Industrial Road / 495 Bragato Road, San Carlos (Delta Star / Tiegel)

- 977 and 1007/1011 Bransten Road, San Carlos

The total combined acreage of these properties is about 11 acres, resulting in an estimated about 22 g/year load reduction (see Section 5.1 for the calculation methods) when these properties are formally referred and the associated enhanced municipal O&M is implemented, per MRP requirements.

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in San Carlos treat **42.32 acres** of land, of which **33.02 acres** is comprised of old industrial and **9.30 acres** is comprised of old urban land use. Of this total, **39.93 acres** were built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18)(Table 4.44). An additional **15.84 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

San Carlos also has an existing regional green street project that was constructed in 2014 in the public ROW along Bransten Road, which is located in an old industrial area (CW4CB 2017c). These bioretention facilities were constructed within curb extensions and treat **0.54 acres** of old industrial land use.

Table 4.44 Land area in San Carlos WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit	57	0.37		0.37			
	59	18.22	18.22	0	0	0	0
	1011	13.39	13.39	0	0	0	0
	SCS	7.95	0	7.95	0	0	0
	Total	**39.93**	**31.61**	**8.32**	**0**	**0**	**0**
Green Streets or Regional Retrofit	31	0.54	0.54	0	0	0	0
	Total	**0.54**	**0.54**	**0**	**0**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

As part of the CW4CB project, in 2013 San Carlos conducted a street flushing pilot project to test the effectiveness of this type of control measure in reducing PCBs and mercury in stormwater runoff

(CW4CB 2017b). Additional street flushing is not currently planned in San Carlos or other locations in San Mateo County.

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in San Carlos or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.16. City of San Mateo

Watershed Management Areas

Table 4.45 lists the 18 WMAs identified to-date in the City of San Mateo, and their total land areas and associated land uses.

Table 4.45. City of San Mateo WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
25		219	3%	97%	0%	0%	0%
89		98	10%	88%	1%	0%	0%
90		21	1%	99%	0%	0%	0%
92		136	3%	97%	0%	0%	0%
101		221	4%	96%	0%	0%	0%
111		95	5%	93%	2%	0%	0%
114		85	9%	91%	0%	0%	0%
120		10	5%	95%	0%	0%	0%
149	Burlingame	480	1%	98%	1%	0%	0%
156		40	17%	82%	1%	0%	0%
399		32	5%	95%	0%	0%	0%
403		48	1%	99%	0%	0%	0%
408		43	16%	82%	2%	0%	0%
1007		87	8%	90%	2%	0%	0%
1008		111	0%	98%	1%	0%	0%
1009	Redwood City	175	24%	75%	0%	0%	0%
1017		19	21%	78%	1%	0%	0%
SMO		5,800	1%	85%	9%	4%	0%

Existing and Planned Control Measures Summary

Table 4.46 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of San Mateo.

Table 4.46. Existing (E) and planned (P) PCBs and mercury control measures in City of San Mateo WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
25	E			P		E	E			E
89	E	E		P		E	E			E
90		E		P		E	E			E
92		E/P		P		E	E			E
101	E			P		E	E			E
111	E	E		P		E	E			E
114	E			P		E	E			E
120		E		P		E	E			E
149	E	E		P		E	E			E
156	E	E		P		E	E			E
399				P		E	E			E
403	E			P		E	E			E
408	E			P		E	E			E
1007	E	E		P		E	E			E
1008		E		P		E	E			E
1009	E	E/P		P		E	E			E
1017				P		E	E			E
SMO	E	E/P		P		E	E			E

Source Property Investigation

Source property investigative work has been conducted in the City of San Mateo to-date in the 12 WMAs shown in Table 4.46. Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in the City of San Mateo treat **49.65 acres** of land which is comprised of **13.69 acres** of old industrial and **30.94 acres** of old urban land uses. Of this, **34.45 acres** was built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.47). An additional **122 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Due to escalating construction costs and unforeseen budget items, the City of San Mateo withdrew from its State Water Resources Control Board Proposition 1 stormwater implementation grant for two green streets and a green parking lot. These projects were originally included as project concepts in the Stormwater Resource Plan and SMCWPPP prepared the successful grant proposal for the City of San Mateo. The City still plans to build two green street projects with curb extensions and bioretention at 4th Avenue and as part of the San Francisco Estuary Partnership / BASMAA Urban Greening Bay Area grant from U.S. EPA through its San Francisco Bay Water Quality Improvement Fund. Both projects are in the design phase.

Table 4.47 Land area in City of San Mateo WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/ Redevelopment or Retrofit Subtotal	90	1.12	1.12	0	0	0	0
	111	0.28				0.28	
	149	3.08	3.08	0	0	0	0
	156	3.31	0	3.31	0	0	0
	1007	0.29	0.29	0	0	0	0
	1008	3.20	3.20	0	0	0	0
	1009	4.37	4.37	0	0	0	0
	SMO	18.8	0	14.76	1.17	2.87	0
	Total	**34.45**	**12.06**	**18.07**	**1.17**	**3.15**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in the City of San Mateo or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.17. Unincorporated San Mateo County

Watershed Management Areas

Table 4.48 lists the ten WMAs identified to-date in unincorporated County of San Mateo, and their total land areas and associated land uses.

Table 4.48. Unincorporated County of San Mateo WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
71	Menlo Park	1394	2%	92%	2%	4%	0%
77	Belmont	86	5%	89%	0%	6%	0%
149	San Mateo City/Burlingame	480	1%	98%	1%	0%	0%
181	Daly City	75	16%	64%	20%	0%	0%
247	Menlo Park	239	9%	91%	1%	0%	0%
253	Redwood City	280	6%	93%	1%	0%	0%
266	Redwood City	91	4%	92%	0%	4%	0%
290	San Bruno	2,017	0%	76%	24%	0%	0%
379	Redwood City	802	14%	85%	1%	0%	0%
1001	South San Francisco	439	27%	67%	6%	0%	0%
SMC		18,203	4%	33%	43%	0%	20%
SMO	City of San Mateo	5,800	1%	85%	9%	4%	0%

Existing and Planned Control Measures Summary

Table 4.49 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in unincorporated County of San Mateo.

Table 4.49. Existing (E) and planned (P) PCBs and mercury control measures in unincorporated San Mateo County WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
71	E	E/P		P		E	E			E
77		E		P		E	E			E
149		E								
181		E		P		E	E			E
247				P		E	E			E
253	E			P		E	E			E
266	E			P		E	E			E
290		P		P		E	E			E
379	E	E/P		P		E	E			E
1001	E	P		P		E	E			E
SMC	E	E/P		P		E	E			E
SMO		E								

Source Property Investigation

Source property investigative work has been conducted in unincorporated County of San Mateo to-date in the six WMAs indicated by Table 4.49. Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in unincorporated County of San Mateo treat **492 acres** of land which includes **3.63 acres** of old industrial and **160 acres** of old urban land uses. Of this, **449.22 acres** were built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.50). An additional **5,719 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

Unincorporated County of San Mateo also has five existing regional green street projects on public lands and ROWs that treat **3.30 acres** of old urban land use. The County is also constructing or planning to construct two additional green street projects on public lands. The first project is the reconstruction of 7th Avenue from Middlefield Road to Edison Way in the North Fair Oaks area in Menlo Park. The second project is the Middlefield Road Improvement Project which is currently planned to feature 20 curb bulb outs with bioretention facilities and flow-through planters.

Table 4.50 Land area in Unincorporated County of San Mateo WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/Redevelopment or Retrofit Subtotal	71	8.48	0	8.48	0	0	0
	77	2.19	2.19	0	0	0	0
	149	3	0	3	0	0	0
	181	0.99	0	0.99	0	0	0
	379	7.82	1.44	6.38	0	0	0
	SMC	425.93	0	114.88	0	311.80	0
	SMO	0.81	0	0.81	0	0	0
	Total	**449.22**	**3.63**	**133.79**	**0.00**	**311.80**	**0**
Green Streets or Regional Retrofit Subtotal	SMC	3.30	0	3.30	0	0	0
	Total	**3.30**	**0**	**3.30**	**0**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

Other PCBs and Mercury Controls

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in unincorporated County of San Mateo or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

4.18. City of South San Francisco

Watershed Management Areas

Table 4.51 lists the 27 WMAs identified to-date in the City of South San Francisco, and their total land areas and associated land uses.

Table 4.51. City of South San Francisco WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
291	San Bruno	194	33%	65%	2%	0%	0%
292	San Bruno	220	17%	83%	1%	0%	0%
293		654	9%	77%	14%	0%	0%
294		67	31%	69%	0%	0%	0%
295		25	12%	70%	4%	0%	14%
297		30	7%	93%	0%	0%	0%
298		122	3%	87%	10%	0%	0%
306		37	18%	82%	0%	0%	0%
307	Daly City and San Bruno	1,277	0%	84%	15%	1%	0%
311		111	3%	96%	1%	0%	0%
313		77	14%	82%	4%	0%	0%
314		66	5%	89%	6%	0%	0%
315		108	32%	68%	0%	0%	0%
316		117	22%	78%	0%	0%	0%
317		32	27%	73%	0%	0%	0%
318		70	45%	54%	1%	0%	0%
319		99	31%	69%	0%	0%	0%
352		40	17%	83%	0%	0%	0%
354		10	45%	55%	0%	0%	0%
356		10	18%	81%	1%	0%	0%
357		17	18%	78%	3%	0%	0%
358		32	22%	78%	0%	0%	0%
359		23	51%	49%	0%	0%	0%
362		18	52%	45%	1%	0%	2%
1001	Unincorporated SM County	439	27%	67%	6%	0%	0%
1002		316	23%	70%	5%	2%	0%
SSF		1,554	0%	75%	12%	1%	12%

Existing and Planned Control Measures Summary

Table 4.52 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the City of South San Francisco.

Table 4.52. Existing (E) and planned (P) PCBs and mercury control measures in South San Francisco WMAs.

WMA ID	Control Measure Categories									
						Operation and Maintenance Practices				
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Street Sweeping or Flushing	Inlet Cleaning	Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
291	E	E		P		E	E			E
292	E	E		P		E	E			E
293	E	E/P		P		E	E			E
294	E			P		E	E			E
295	E			P		E	E			E
296		E/P								
297		E/P		P		E	E			E
298				P		E	E			E
306	E	E		P		E	E			E
307		E		P		E	E			E
311				P		E	E			E
313	E	E/P		P		E	E			E
314	E			P		E	E			E
315	E	E		P		E	E			E
316	E	E/P		P		E	E			E
317	E			P		E	E			E
318	E	E/P		P		E	E			E
319	E	E		P		E	E			E
352				P		E	E			E
354	E			P		E	E			E
356	E			P		E	E			E
357	E	P		P		E	E			E
358	E	E		P		E	E			E
359	E	E		P		E	E			E
362	E	E		P		E	E			E
1001	E	E/P		P		E	E			E
1002	E	E/P		P		E	E			E
SSF	E	E/P		P		E	E			E

Source Property Investigation

Source property investigative work has been conducted in the City of South San Francisco to-date in the 22 WMAs indicated by Table 4.52. Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites built since 2005 (the PCBs TMDL loading baseline year) in the City of South San Francisco treat **297.89 acres** of land which includes **226.45 acres** of old industrial and **65.49 acres** of old urban land uses. Of this, **83.36 acres** was built from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) (Table 4.53). An additional **195.29 acres** will be treated by new or redevelopment projects that are currently under construction or planned for construction. It should be noted that the acres treated by GI reported in this section are preliminary and may be revised in the future as additional information becomes available.

The City of South San Francisco continues to pursue a regional retention facility at Orange Memorial Park with $9.5 million in funding from Caltrans. The City is in the design phase for a stormwater capture facility that will remove sediment and associated pollutants from Colma Creek before flowing into San Francisco Bay, and potentially provide for parkland irrigation at Orange Memorial Park. This regional stormwater capture project would potentially capture flows from a large multi-jurisdictional area of primarily old urban land uses. The City is exploring various project alternatives for initial community engagement in September 2018 and anticipates starting construction in 2019.

Other PCBs and Mercury Controls

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in the City of South San Francisco or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

Table 4.53 Land area in City of South San Francisco WMAs treated by GI built from July 1, 2013 to June 30, 2018.[1,2,3,4]

Project Type	WMA ID	Total Area (Acres)	Land Use Category (Acres)				
			Old Industrial	Old Urban	New Urban	Open Space	Other
Parcel-based New/ Redevelopment or Retrofit	291	5.32	5.32	0	0	0	0
	292	26.49	26.49	0	0	0	0
	293	3.55	2.86	0.69	0	0	0
	307	10.02	0.00	10.02	0	0	0
	313	7.63	7.63	0	0	0	0
	316	8.42	8.42	0	0	0	0
	318	4.80	4.80	0	0	0	0
	319	5.0	5.0	0	0	0	0
	359	3.36	3.36	0	0	0	0
	1001	7.92	6.66	1.26	0	0	0
	1002	0.85	0.85	0	0	0	0
	Total	**83.36**	**71.39**	**11.97**	**0**	**0**	**0**

1 – Preliminary - may not include all acres currently treated by GI and treatment controls.

2 – GI includes (1) parcel-based new development, redevelopment, or retrofit projects; and (2) green street projects or regional retrofit projects.

3 – GI and treatment controls may include proprietary vault-based systems.

4 – The land use at the point location for each project provided by Permittees was assumed to represent the land use for the entire project.

4.19. Town of Woodside

Watershed Management Areas

Table 4.54 lists the one WMA identified to-date in the Town of Woodside, and its total land area and associated land uses.

Table 4.54. Woodside WMAs and associated land uses.

WMA ID	Other Permittees in WMA	Total Area (Acres)	% Old Industrial	% Old Urban	% New Urban	% Open Space	% Other
WDE		7,286	0%	55%	5%	40%	0%

Existing and Planned Control Measures Summary

Table 4.55 provides a preliminary list of PCBs and mercury control measures currently in place or planned for future implementation in the Town of Woodside.

Table 4.55. Existing (E) and planned (P) PCBs and mercury control measures in Woodside WMAs.

WMA ID	Control Measure Categories									
	Source Property Investigation	Green Infrastructure and Treatment Control Measures	Trash Full Capture Systems	Managing PCBs during Building Demolition	Managing PCBs in Stormwater Conveyance Infrastructure	Operation and Maintenance Practices		Diversion to Wastewater Treatment Facilities	Addressing Illegally Dumped PCBs-containing Wastes	Reduction/Recycling of Mercury-containing Devices & Products
						Street Sweeping or Flushing	Inlet Cleaning			
WDE	E	E		P		E	E			E

Source Property Investigation

Source property investigative work has been conducted in the Town of Woodside to-date in WMA WDE. Results of SMCWPPP's POC monitoring program will be discussed in future reports (e.g., the Urban Creeks Monitoring Report due in March 2019).

Green Infrastructure

Applicable public and private properties undergoing new or redevelopment are subject to MRP requirements to treat stormwater via LID techniques or equivalent. Based on the information compiled to-date, GI at new and redevelopment project sites have not been built since 2005 (the PCBs TMDL loading baseline year) in Woodside, and there are no projects under construction or planned. It should be noted that the information on GI reported in this section is preliminary and may be revised in the future as additional information becomes available.

Other PCBs and Mercury Controls

SMCWPPP is continuing to evaluate whether other relevant PCBs and mercury control measures (e.g., enhanced municipal O&M) are present in Woodside or should be planned there. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports.

5.0 PCBs AND MERCURY LOADS REDUCED

Preliminary PCBs and mercury loads reduced through stormwater control measures implemented in San Mateo County during the current MRP term are reported in this section. The loads reduced were quantified for those control measures and projects reported in Section 4.0 that were implemented and/or completed from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18).

In general, the load reductions reported in this section are preliminary and do not include all existing and planned control measures. For example, the load reductions reported in this section do not account for any contamination site cleanups (referred to as "self-abatements) or municipal O&M enhancements (e.g., channel desilting, enhanced street sweeping, inlet cleaning, inlet-based trash capture systems) implemented by Permittees during the permit term. Any load reductions during the permit term associated with these controls will be reported in future reports. SMCWPPP will continue to track all relevant control measures and update the associated load reduction calculations as additional information becomes available and as new or enhanced actions are implemented.

5.1. Summary of Loads Reduced Accounting Methodology

The accounting methodologies used to calculate the load reductions reported in this section were developed by BASMAA and approved by the Executive Officer of the Regional Water Board for the purpose of load reduction reporting during MRP 2.0. These methods and data inputs are described fully in the BASMAA *Interim Accounting Methodology Report* (BASMAA 2017). The equations and default data inputs that are used to calculate load reductions are summarized below. The data on acres addressed by each type of control measure that were reported in Section 4.0 were used in the equations below to calculate the PCBs and mercury load reductions.

Source Property Identification and Abatement

The projected POC loads reduced through source property identification and abatement were calculated using the equation below:

$$Load\ of\ POC\ Reduced = SP_A \bullet (SP_Y - OU_Y)$$

Where:

SP_A = Source property area (acres)
SP_Y = Source property POC yield
OU_Y = Old Urban land use POC yield

Default inputs:

PCBs Source property yield = 4,065 mg/acre/year
PCBs Old urban land use yield = 30.3 mg/acre/year
Mercury Source property yield = 1,300 mg/acre/year
Mercury Old urban land use yield = 215 mg/acre/year

Fifty percent of the load reduced is projected here for each anticipated source property referral that was identified in Section 4.0. (Per the MRP, the remaining 50% will be credited upon completion of the abatement process, or at ten years, whichever occurs first.)

Green Infrastructure and Treatment Controls

Parcel-Based New Development, Redevelopment and Retrofit

The POC loads reduced through parcel-based new development, redevelopment, and retrofit projects were calculated using the equation below:

$$Load\ of\ POC\ Reduced = P_A \bullet (P_Y - NU_Y)$$

Where:

P_A	=	New development/redevelopment/parcel-based retrofit project area (acre)
P_Y	=	Existing PCBs or mercury yield (mg/acre/year)
NU_Y	=	New Urban PCBs or mercury yield (mg/acre/year)

Default inputs:

PCBs New Urban land use yield = 3.5 mg/acre/year
Mercury New Urban land use yield = 33 mg/acre/year

Green Streets and Regional Retrofit Projects

The POC loads reduced due to green streets and regional retrofit projects were calculated using the equation and inputs provided below:

$$Annual\ Mass\ of\ PCB\ Reduced = P_A \bullet P_Y \bullet E_f$$

Where:

P_A	=	Tributary area treated by green infrastructure/retrofit treatment measure (acres)
P_Y	=	Area-weighted PCBs or mercury yield (mg/acre-year)
E_f	=	Efficiency factor for green infrastructure/retrofit treatment control measure (assumed to be 70%)

5.2. PCBs Loads Reduced

Preliminary Estimated PCBs Loads Reduced from July 1, 2013 through June 30, 2018

The preliminary estimated PCBs loads reduced by San Mateo County Permittees from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) are shown in Table 5.1. Table 5.2 shows the PCBs loads reduced, itemized by control measure category. New and re-development projects have been and continue to be ongoing across all San Mateo County municipalities. Over the permit term to-date, more than 1,064 acres have undergone new or redevelopment, including more than 291 acres of old industrial and 387 acres of old urban land uses. An additional 8 acres of green streets and regional retrofit projects have been constructed. It is important to emphasize that the PCBs loads reduced that are reported here are preliminary, and do not include all control measures that have been implemented by San Mateo County Permittees to-date. SMCWPPP will report on any additional controls and associated pollutant load reductions in future reports. Table 5.2 also illustrates that the 15 g/year PCBs load reduction through GI by the end of the permit term required by the MRP has already been achieved.

In addition, as described in Section 4.15, SMCWPPP is submitting two source property referrals (both in San Carlos) to the Regional Water Board concurrent with its FY 2017/18 Annual Report. The total combined acreage of these properties is about 11 acres, resulting in an estimated about 22 g/year load

reduction (see Section 5.1 for the calculation methods) when these properties are formally referred and the associated enhanced municipal O&M is implemented, per MRP requirements.

Table 5.1. Preliminary estimates of PCBs loads reduced by San Mateo County Permittees from July 1, 2013 through June 30, 2018 (FY 2013/14 through FY 2017/18).

Permittee	PCBs Loads Reduced (g/year)					
	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	Cumulative Load Reduced
Atherton	0.031	0	0	0	0	**0.031**
Belmont	0	0	0	0.010	0.10	**0.11**
Brisbane	0.75	0	0	0	2.44	**3.19**
Burlingame	0	0.15	0.013	0.27	0.081	**0.51**
Colma	0.0047	0.020	0	0.001	0.26	**0.28**
Daly City	0.024	0.18	0	0.43	2.20	**2.84**
East Palo Alto	0.12	0.24	0.025	0.54	0	**0.93**
Foster City	0.070	0	0.12	0.0005	0.0012	**0.19**
Hillsborough	0	0	0.0027	0	0.0005	**0.0032**
Menlo Park	2.08	0.21	1.68	0.65	3.71	**8.32**
Millbrae	0	0	0	0	0	**0**
Portola Valley	0	0	0	0	0.045	**0.04**
Redwood City	0.16	1.13	0.84	0.36	0.66	**3.15**
San Bruno	0.12	0	0.58	0	0	**0.70**
San Carlos	1.74	0	0.75	0	21.96	**24.45**
San Mateo City	0.52	0.47	0.26	0.21	0.017	**1.49**
San Mateo County	3.37	0.34	0.42	0.05	0.037	**4.22**
South San Francisco	3.45	1.47	0	0.29	1.05	**6.25**
Woodside	0	0	0	0	0	**0**
TOTAL	**12.44**	**4.22**	**4.69**	**2.81**	**32.56**	**56.72**

Regional PCBs Loads Reduced from July 1, 2013 through June 30, 2018

The estimated cumulative mercury and PCBs loads reduced by all MRP Permittees over the time period of FY 2013/14 through FY 2017/18 are described in a document entitled *Regional PCBs and Mercury Load Reductions* (included in Appendix 11 of SMCWPPP's FY 2017/18 Annual Report). The estimated PCBs load reduction across the permit area over this time period is 691 g/yr, indicating that the MRP regional performance criterion of 500 g/yr of PCBs load reduced by July 2018 has been achieved.[4]

[4] It is important to note that the MRP allows Permittees to meet the regional criterion as a group – criteria for individual counties would only have been applicable if the regional group criterion had not been met.

Table 5.2. Preliminary estimates of PCBs loads reduced in San Mateo County by control measure category from July 1, 2013 through June 30, 2017 (FY 2013/14 through FY 2017/18).

Control Measure Category		PCBs Loads Reduced (g/year)					
		FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	Cumulative Load Reduced
Source Property Identification and Abatement[1]		0	0	0	0	21.58	**21.58**
Green Infra-structure and Treatment Controls	**Parcel-Based New or Redevelopment[2]**	12.33	4.14	4.68	2.81	10.96	**34.92**
	Green Streets or Regional Retrofit[2]	0.11	0.077	0.015	0	0.018	**0.22**
	Trash Full Capture[3, 4]	0	0	0	0	0	**0**
Enhanced O&M Measures[4]		0	0	0	0	0	**0**
Manage PCBs in Building Materials[4]		0	0	0	0	0	**0**
Manage PCBs in Infrastructure[4]		0	0	0	0	0	**0**
Diversion to POTW[4]		0	0	0	0	0	**0**
Source Controls/Other[4]		0	0	0	0	0	**0**
TOTAL		**12.44**	**4.22**	**4.69**	**2.81**	**32.56**	**56.72**

1. Load Reduced = (Source Property Area (acre)) x (4.065 – 0.0303 (g/acre/year)).
2. For parcel-based projects, Load Reduced = (Project Area (acre)) x (Existing Yield – 0.0035 (g/acre/year)). For green street or regional retrofit projects, Load Reduced = (Project Drainage Area (ac)) x (area-weighted PCBs yield (g/acre/year)) x 0.70. See Section 4.0 for acres associated with this control measure.
3. Load Reduced = (Project Drainage Area (acre)) x (area-weighted PCBs yield (g/acre/year)) x 0.20.
4. Loads reduced for these control measures will be provided in future reports, as appropriate.

5.3. Mercury Loads Reduced

Preliminary Estimated Mercury Loads Reduced from July 1, 2013 through June 30, 2018

The preliminary estimated mercury loads reduced by Permittee from July 1, 2013 through June 30, 2018 (i.e., FY 2013/14 through FY 2017/18) are shown in Table 5.3. Table 5.4 shows the mercury loads reduced by control measure category. New and re-development projects currently account for 99% of the mercury load reduction reported to-date. Green streets and regional retrofit projects account for the remaining 1% (Table 5.4). Table 5.4 also illustrates that the 6 g/year mercury load reduction through GI by the end of the permit term required by the MRP has already been achieved.

Table 5.3. Preliminary estimates of mercury loads reduced by San Mateo County Permittees from July 1, 2013 through June 30, 2018 (FY 2013/14 through FY 2017/18).

Permittee	Mercury Loads Reduced (g/year)					
	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	Cumulative Load Reduced
Atherton	0.21	0	0	0	0	**0.21**
Belmont	0	0	0	0.071	0.66	**0.73**
Brisbane	11.42	0	0	0	37.28	**48.69**
Burlingame	0	1.39	0.091	4.04	1.05	**6.57**
Colma	0	0.14	0	0	1.74	**1.88**
Daly City	0.16	1.24	0	2.90	14.88	**19.18**
East Palo Alto	1.63	3.53	0.17	7.17	0	**12.50**
Foster City	0.48	0	0.82	0	0	**1.30**
Hillsborough	0	0	0.018	0	0.0036	**0.022**
Menlo Park	30.83	2.48	22.24	8.98	55.76	**120.29**
Millbrae	0	0	0	0	0	**0**
Portola Valley	0	0	0	0	0.30	**0.30**
Redwood City	1.93	14.86	10.98	5.10	5.36	**38.22**
San Bruno	0.83	0	8.87	0	0	**9.69**
San Carlos	24.61	0	11.36	0	11.48	**41.65**
San Mateo City	7.99	7.06	1.99	1.43	0.10	**18.57**
San Mateo County	24.34	2.21	2.10	0.36	0.25	**29.26**
South San Francisco	50.44	22.34	0	3.98	15.87	**92.63**
Woodside	0	0	0	0	0	**0**
TOTAL	**154.86**	**55.25**	**58.65**	**34.03**	**144.72**	**447.52**

Table 5.4. Preliminary estimates of mercury loads reduced in San Mateo County by control measure category from July 1, 2013 through June 30, 2018 (FY 2013/14 through FY 2017/18).

Control Measure Category		Mercury Loads Reduced (g/year)					
		FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	Cumulative Load Reduced
Source Property Identification and Abatement[1]		0	0	0	0	5.81	**5.81**
Green Infra-structure and Treatment Controls	**Parcel-Based New or Redevelopment[2]**	153.27	54.70	58.54	34.03	138.78	**439.33**
	Green Streets or Regional Retrofit[2]	1.59	0.55	0.11	0	0.13	**2.38**
	Trash Full Capture[3, 4]	0	0	0	0	0	**0**
Enhanced O&M Measures[4]		0	0	0	0	0	**0**
Diversion to POTW[4]		0	0	0	0	0	**0**
Source Controls/Other[4]		0	0	0	0	0	**0**
TOTAL		**154.86**	**55.25**	**58.65**	**34.03**	**144.72**	**447.52**

1. Load Reduced = (Source Property Area (acre)) x (1.033 – 0.215 (g/acre/year)).
2. For parcel-based projects, Load Reduced = (Project Area (acre)) x (Existing Yield – 0.033 (g/acre/year)). For green street or regional retrofit projects, Load Reduced = (Project Drainage Area (ac)) x (area-weighted mercury yield (g/acre/year)) x 0.70. See Section 4.0 for acres associated with this control measure.
3. Load Reduced = (Project Drainage Area (acre)) x (area-weighted mercury yield (g/acre/year)) x 0.20.
4. Loads reduced for these control measures will be provided in future reports, as appropriate.

Mercury Mass Collected via Countywide Hazardous Waste Collection Program

San Mateo County municipalities participate in San Mateo County Health Department's Household Hazardous Waste (HHW) Program and Very Small Quantity Generator Business Collection (VSQG) Program (see Section 3.8). The estimated mass of mercury collected in FY 2014/15 through FY 2017/18 via these programs is shown in Table 5.5. It should be noted that these mass estimates are not directly comparable to pollutant load reductions in stormwater runoff discharges.

Table 5.5. Estimated mercury mass collected via the San Mateo County Health Department's Household Hazardous Waste (HHW) Program and Very Small Quantity Generator Business Collection (VSQG) Program

Mercury Containing Device/Equipment	FY 2014-15		FY 2015-16		FY 2016-17		FY 2017-18	
	Total Amount of Devices Collected	Estimated Mass of Mercury Collected (kg)	Total Amount of Devices Collected	Estimated Mass of Mercury Collected (kg)	Total Amount of Devices Collected	Estimated Mass of Mercury Collected (kg)	Total Amount of Devices Collected	Estimated Mass of Mercury Collected (kg)
Fluorescent Lamps (linear feet)[1,2]	25,532	0.05	89,662	0.19	93,896	0.19	125,582	0.26
CFLs (each)[3]	1,881	0.01	17,211	0.08	17,354	0.08	18,689	0.08
Thermostats (each)[4]	26	0.10	12	0.05	10	0.04	11	0.04
Thermometers (each)[5]	313	0.19	13	0.01	19	0.01	0	0.00
Switches (each)	18	0.05	0	0.00	0	0.00	0	0.00
Total Mass of Mercury Collected (Kg)		**0.40**		**0.32**		**0.32**		**0.39**

[1]The County HHW Program reported the number of circle tubes and U-bent lights. A conservative assumption was made that all U-bent tubes were 22 inches and all circle tubes were 8 inches based on the most available, smallest sizes found on Internet searches.

[2]The average mercury content for a four-foot linear fluorescent lamp is 8.3 milligrams (mg). This is equal to 2.075 mg per linear foot. Source: NEMA 2005. Fluorescent and Other Mercury-Containing Lamps and the Environment: Mercury Use, Environmental Benefits, Disposal Requirements. National Electrical Manufacturers Association. March 2005. 14p.

[3]The National Electrical Manufacturers Association (NEMA) announced that under the new voluntary commitment, effective October 1, 2010, participating manufacturers will cap the total mercury content in CFLs that are under 25 watts at 4 mg per unit, and CFLs that use 25 to 40 watts of electricity will be capped at 5 mg per unit. Each CFL recycled is assumed to have an average mass of 4.5 mg mercury. New CFLs are also assumed to have 4.5 mg mercury on average. Source: NEMA 2010. NEMA Lamp Companies Agree to Reduction in CFL Mercury Content Cap. Available at http://www.nema.org/media/pr/20101004a.cfm. Accessed April 11, 2012.

[4]The amount of mercury in a thermostat is determined by the number of ampoules. There are generally one or two ampoules per thermostat (average is 1.4) and each ampoule contains an average of 2.8 grams (g) of mercury. Therefore, each thermostat recycled is assumed to contain approximately 4.0 g of mercury. Source: TRC 2008. Thermostat Recycling Corporation's Annual Report for the U.S. Prepared by the Thermostat Recycling Corporation. http://www.thermostat-recycle.org/files/u3/2008 TRC Annual Report.pdf.

[5]USEPA reports that glass mercury fever thermometers contain about 0.61 g of mercury. Source: USEPA 2012. Thermometers. Available at http://www.epa.gov/mercury/thermometer-main.html. Accessed April 11, 2012.

6.0 DISCUSSION AND NEXT STEPS

The selection of WMAs and feasible and cost-effective control measures will be an ongoing and evolving process during the MRP 2.0 permit term as new data become available. Building on the efforts described in this report, SMCWPPP and San Mateo County MRP Permittees plan to continue to work together to conduct a variety of activities to continue addressing MRP 2.0 requirements for PCBs and mercury. The general categories of activities are summarized as follows:

- SMCWPPP will continue identifying areas that will be the focus of PCBs and mercury control measure implementation over the course of MRP 2.0, including refining and prioritizing the current list of WMAs, identifying new priority WMAs, and identifying source areas within WMAs. As part of these efforts, SMCWPPP is currently evaluating the results of its WY 2018 POC monitoring program (stormwater runoff and sediment sampling for PCBs and mercury) that targeted selected catchments and parcels of interest. SMCWPPP is also evaluating the results of PCBs and mercury samples collected in San Mateo County by the RMP during the STLS WY 2018 stormwater runoff monitoring program.
- During WY 2019 SMCWPPP plans to conduct an additional program of POC monitoring (25 sediment samples for PCBs and mercury) that target selected catchments and parcels of interest. SMCWPPP is also continuing to evaluate the cost-effectiveness of conducting additional POC monitoring efforts in future years (e.g., sediment and stormwater runoff sampling for PCBs and mercury, including the use of remote sediment samplers during storms) that would further inform implementation of controls in priority WMAs.
- SMCWPPP and San Mateo County Permittees will continue planning scenarios for control measure implementation in priority WMAs in San Mateo County. High priority will continue to be given to the Pulgas Creek pump station north and south drainages (WMA 31 and WMA 210), which are the two WMAs in San Mateo County with the greatest number of samples with elevated concentrations of PCBs in sediment and stormwater runoff samples to-date.
- SMCWPPP and San Mateo County Permittees will continue attempting to identify source properties for referral to the Regional Water Board, based on the evaluation of the results of the WY 2018 POC monitoring program and other appropriate data, as it becomes available.
- SMCWPPP will continue to evaluate opportunities to take credit for PCBs and mercury loads avoided due to "self-abatement" of existing PCBs contamination sites in San Mateo County.
- SMCWPPP will continue to work with San Mateo County Permittees to look for opportunities to take credit for PCBs and mercury loads avoided due to planned removals of sediments with elevated levels of pollutants. SMCWPPP will also continue to evaluate opportunities to optimize existing municipal O&M activities, enhance planned sediment removals, and/or identify new removal actions, as cost-effective.
- SMCWPPP will continue to work with San Mateo County Permittees to update the existing San Mateo County GI and stormwater treatment tracking database described in this report and calculate associated load reductions. The ongoing effort to fill data gaps will focus especially on information needed to calculate pollutant load reductions (e.g., treatment areas).
- With assistance and guidance from SMCWPPP, San Mateo County Permittees will continue developing GI Plans that integrate with the planning for the use of GI to reduce loads of PCBs and mercury. The MRP requires that the GI plans are submitted by September 2019 along with documentation of legal mechanisms to ensure implementation of the Plans.

- C/CAG received a $986,300 Adaptation Planning Grant from Caltrans (C/CAG will match with $145,185) that will be used to develop the "San Mateo Countywide Sustainable Streets Master Plan" to prioritize locations for integrating green stormwater infrastructure into roadways. This project will include a variety of tasks, including developing a San Mateo County tracking tool that will meet the requirements in MRP Provision C.3.j.iv for development and implementation of methods to track and report implementation of GI. See Section 3 of SMCWPPP's 2017/18 Annual Report for more information about the project.
- SMCWPPP will complete the RAA to support green infrastructure plan development and demonstration of mercury and PCBs load reductions to meet goals set by the MRP and TMDLs. The modeling system supporting the RAA will be used to test various combinations of green infrastructure projects within each city and unincorporated county jurisdiction, and will provide output that will support decision-making and the development of green infrastructure plans.
- As described in more detail in Section 11 of the SMCWPPP FY 2017/18 Annual Report, MRP Provisions C.11/12.d require that Permittees prepare a plan and schedule for mercury and PCBs control measure implementation and a corresponding RAA demonstrating quantitatively that sufficient control measures will be implemented to attain the mercury and PCBs TMDL wasteload allocations by 2028 and 2030, respectively. The plan and schedule are due in September 2020. SMCWPPP has begun developing modeling approaches for quantifying mercury and PCBs loads in San Mateo County and conducting the RAA. SMCWPPP will continue these efforts into FY 2018/19, along with beginning to develop a longer-term control measures plan to attain the San Mateo County portions of the mercury and PCBs TMDL wasteload allocations.
- SMCWPPP will continue to participate in the BASMAA regional project to develop guidance materials, tools and training materials and conduct outreach to assist Permittees in developing programs to manage PCBs-containing materials and wastes during building demolition in compliance with Provision C.12.f. SMCWPPP will also assist San Mateo County Permittees to use the BASMAA project products to prepare for adoption of the new program and begin implementation as of July 1, 2019, per the requirements of C.12.f.
- SMCWPPP will continue to participate in the RMP PCBs Work Group to help oversee RMP studies concerning the fate, transport, and biological uptake of PCBs discharged from urban runoff to San Francisco Bay margin areas. One focus will be the conceptual model under development for Steinberger Slough in San Mateo County.
- SMCWPPP will continue to work with the San Mateo County Environmental Health Department on education and outreach efforts to San Mateo County residents likely to consume locally-caught fish from the Bay (e.g., maintenance of strategically placed signs, training of healthcare workers to disseminate information, and targeted social media posts).

7.0 REFERENCES

BASMAA (2017). *Interim Accounting Methodology for TMDL Loads Reduced*. Prepared by Geosyntec Consultants and EOA, Inc. for the Bay Area Stormwater Management Agencies Association (BASMAA). March 23, 2017.

CW4CB (2017a). *Source Property Identification Pilot Study, Pulgas Creek Pump Station Watershed, San Carlos, California.* A Pilot Project of the Clean Watersheds for a Clean Bay (CW4CB) USEPA Grant-Funded Project. May 2017.

CW4CB (2017b). *Street Flush and Capture Pilot Study, Pulgas Creek Pump Station Watershed, San Carlos, California.* A Pilot Project of the Clean Watersheds for a Clean Bay (CW4CB) USEPA Grant-Funded Project. May 2017.

CW4CB (2017c). *Stormwater Runoff Treatment Retrofit Pilot Projects, Bransten Road Bioretention Facilities, Pulgas Creek Pump Station Watershed, San Carlos, CA*. A Pilot Project of the Clean Watersheds for a Clean Bay (CW4CB) USEPA Grant-Funded Project. May 2017.

SMCWPPP (2014). *Draft Delineation of Storm Drain Catchments and Prioritization for Trash Controls.* Prepared for the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) by EOA, Inc., Oakland, California. April 28, 2014.

SMCWPPP (2015). *PCBs and Mercury Source Area Identification, Water Year 2015 POC Monitoring Report*. Prepared for San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) by EOA, Inc., Oakland, California. September 2015.

SMCWPPP (2016a). *Progress Report: Identification of Watershed Management Areas for PCBs and Mercury*. Prepared for San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) by EOA, Inc., Oakland, California. April 1, 2016.

SMCWPPP (2016b). *Identifying Management Areas and Controls for Mercury and PCBs in San Mateo County Stormwater Runoff*. Prepared for San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) by EOA, Inc., Oakland, California. September 30, 2016.

SMCWPPP (2017a). *Urban Creeks Monitoring Report, Water Quality Monitoring, Water Year 2016 (October 2015 – September 2016).* Prepared for San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) by EOA, Inc., Oakland, California. March 31, 2017.

SMCWPPP (2017b). *Control Measure Plan for PCBs and Mercury in San Mateo County Stormwater Runoff*. Prepared for San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) by EOA, Inc., Oakland, California. September 30, 2017.

SMCWPPP (2018). *Urban Creeks Monitoring Report, Water Quality Monitoring, Water Year 2017 (October 2016 – September 2017).* Prepared for San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) by EOA, Inc., Oakland, California. March 31, 2018.

SMSTOPPP (2002). *Case Study Investigating Elevated Levels of PCBs in Storm Drain Sediments in San Mateo County*. Prepared for San Mateo Countywide Stormwater Pollution Prevention Program (SMSTOPPP) by EOA, Inc., Oakland, California. April 15, 2002.

SMSTOPPP (2003). *Case Study Investigating Elevated Levels of PCBs in Storm Drain Sediments in the Pulgas Creek Pump Station Drainage, San Carlos, California*. Prepared for San Mateo Countywide Stormwater Pollution Prevention Program (SMSTOPPP) by EOA, Inc., Oakland, California. June 2003.

SMSTOPPP (2004). *Case Study Investigating PCBs in Storm Drain Sediments from Colma Creek, Colma, California.* Prepared for San Mateo Countywide Stormwater Pollution Prevention Program (SMSTOPPP) by EOA, Inc., Oakland, California. May 2004.

Yee, D., and McKee, L.J. (2010). *Concentrations of PCBs and Mercury in Soils, Sediments and Water in the Urbanized Bay Area: Implications for Best Management.* A technical report of the Watershed Program. SFEI Contribution 608. San Francisco Estuary Institute, Oakland, California. March 31, 2010.

Appendix A

Maps for each San Mateo County Permittee showing WMAs and GI/LID facilities

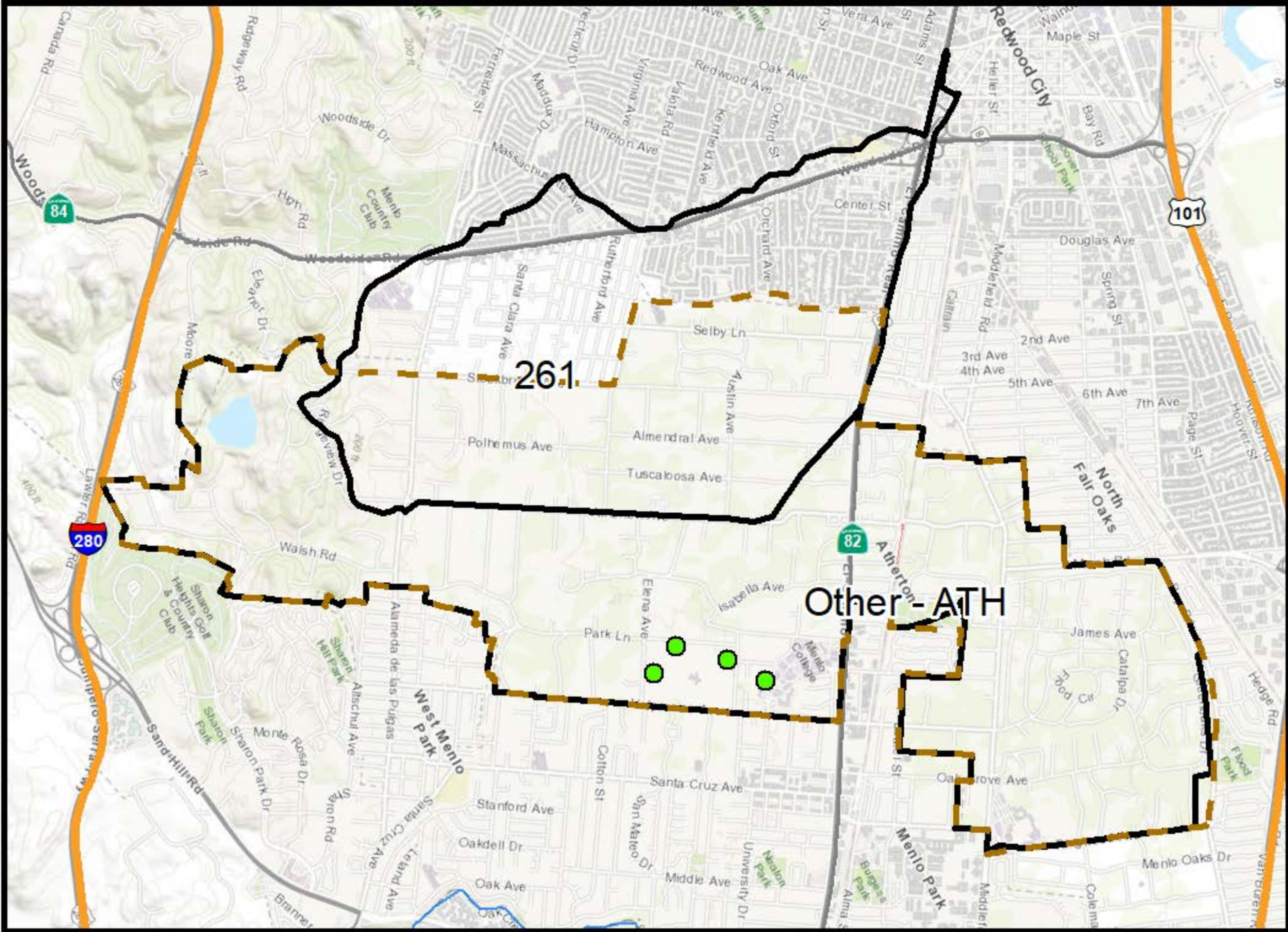

Figure A-1. WMAs and GI/LID in Atherton

Atherton Watershed Management Area Map

- GI/LID Location
- High Interest Areas
- Watershed Management Area (WMA)
- Permittee Boundary

N

0 0.35 0.7 1.4 Miles

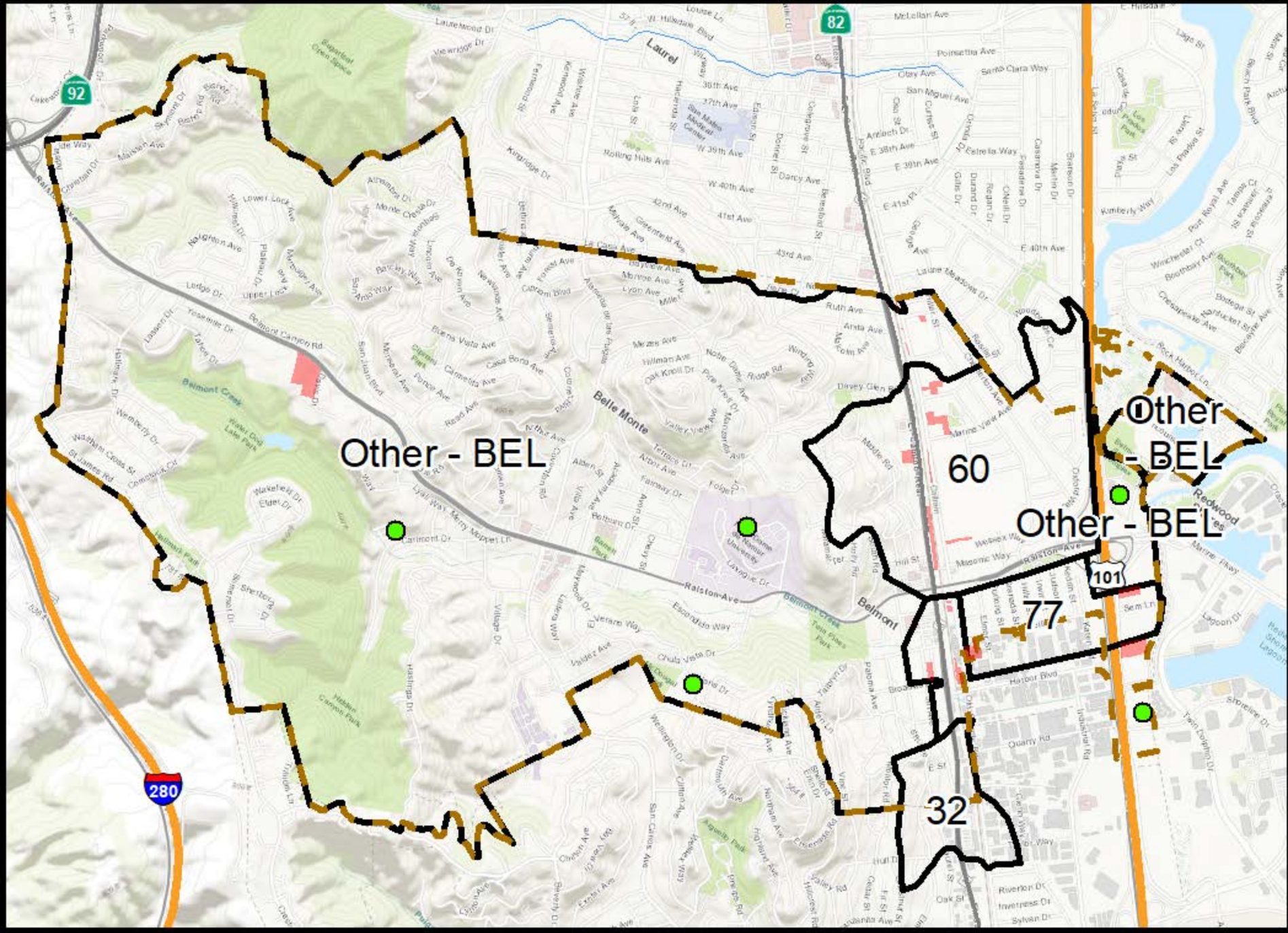

Figure A-2. WMAs and GI/LID in Belmont

Belmont Watershed Management Area Map

- GI/LID Location
- High Interest Areas
- Watershed Management Area (WMA)
- Permittee Boundary

0 0.25 0.5 1 Miles

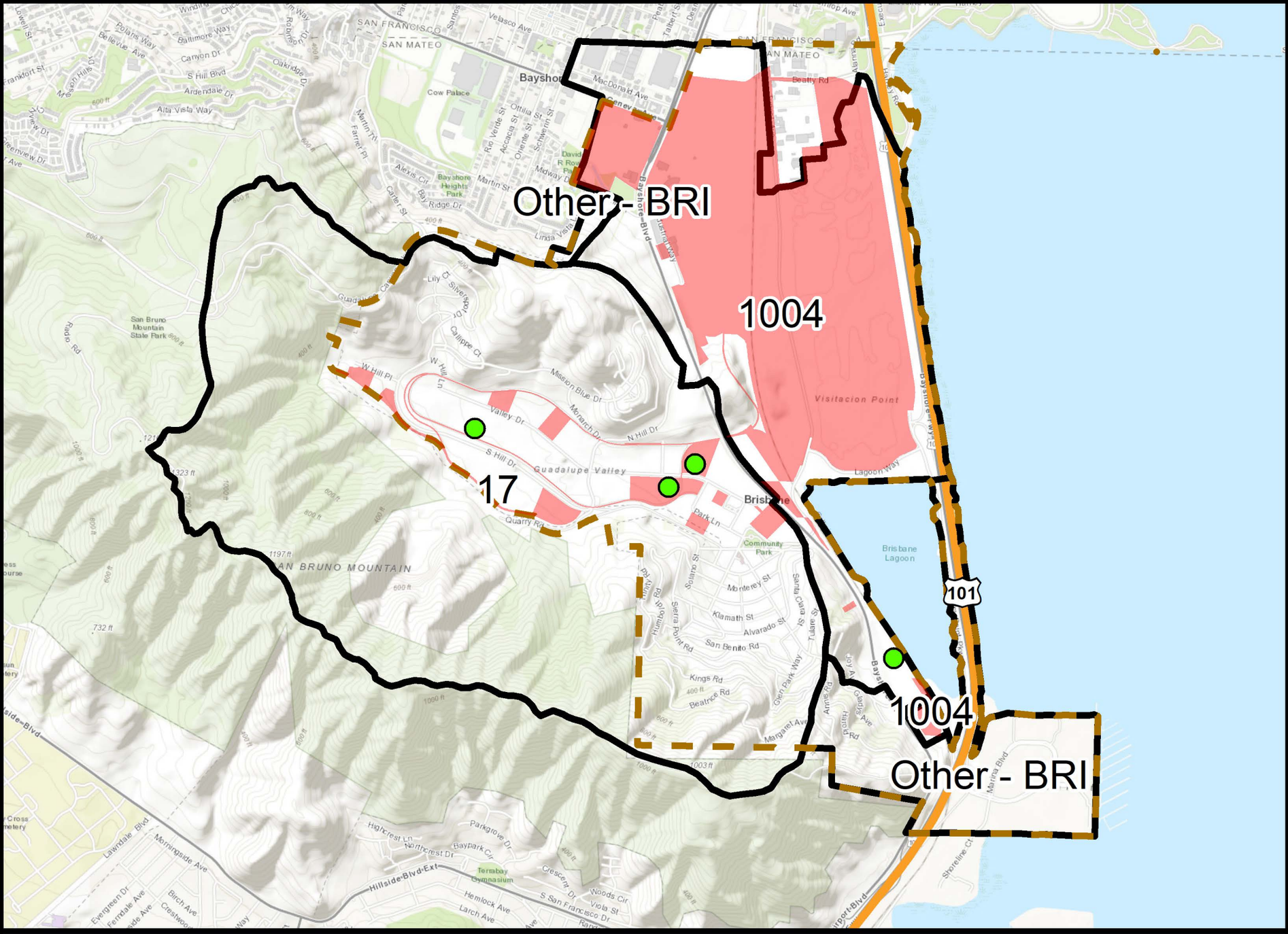

Figure A-3. WMAs and GI/LID in Brisbane

Brisbane Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

N

0 0.275 0.55 1.1 Miles

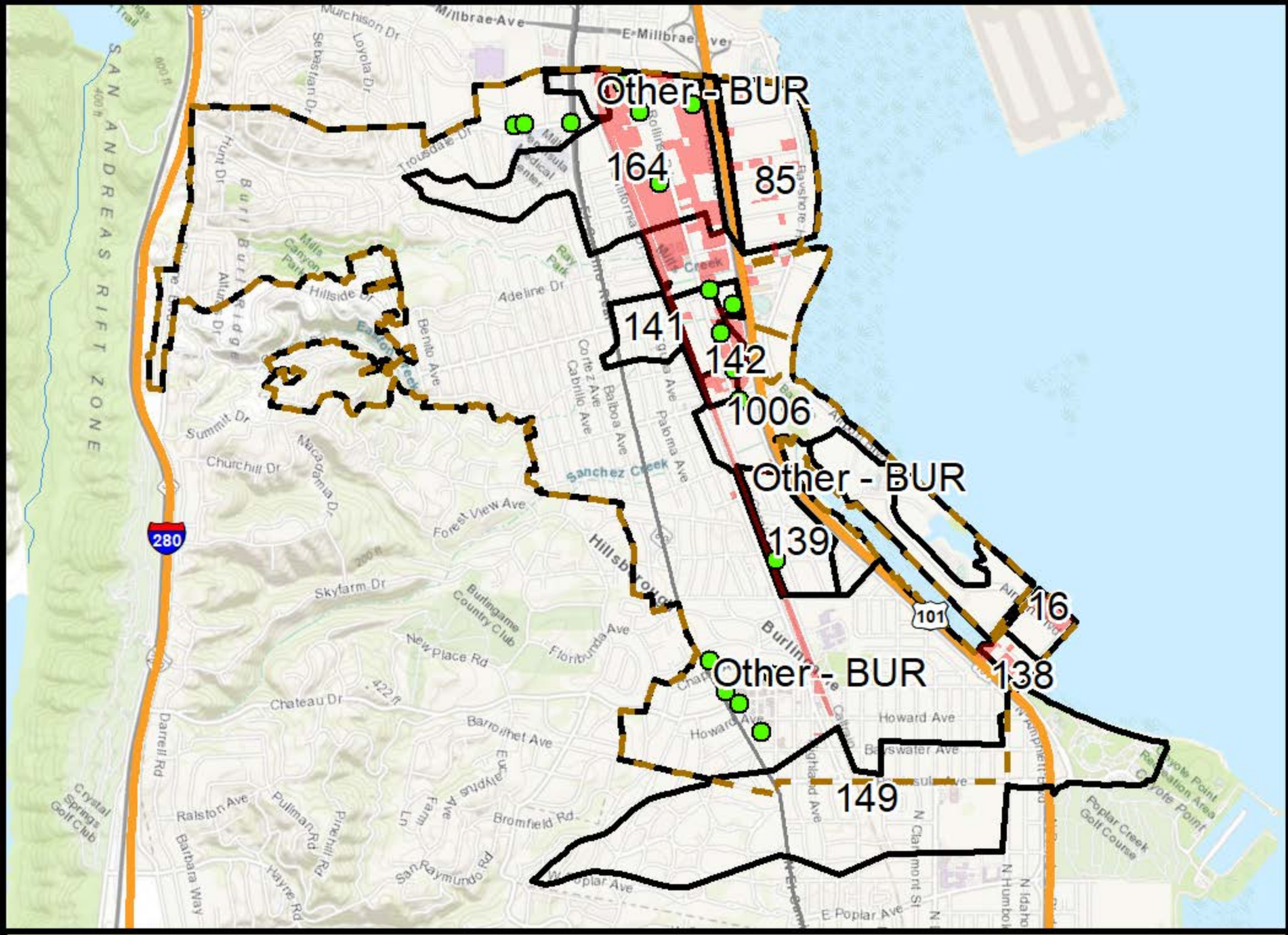

Figure A-4. WMAs and GI/LID in Burlingame

Burlingame Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

0 0.325 0.65 1.3 Miles

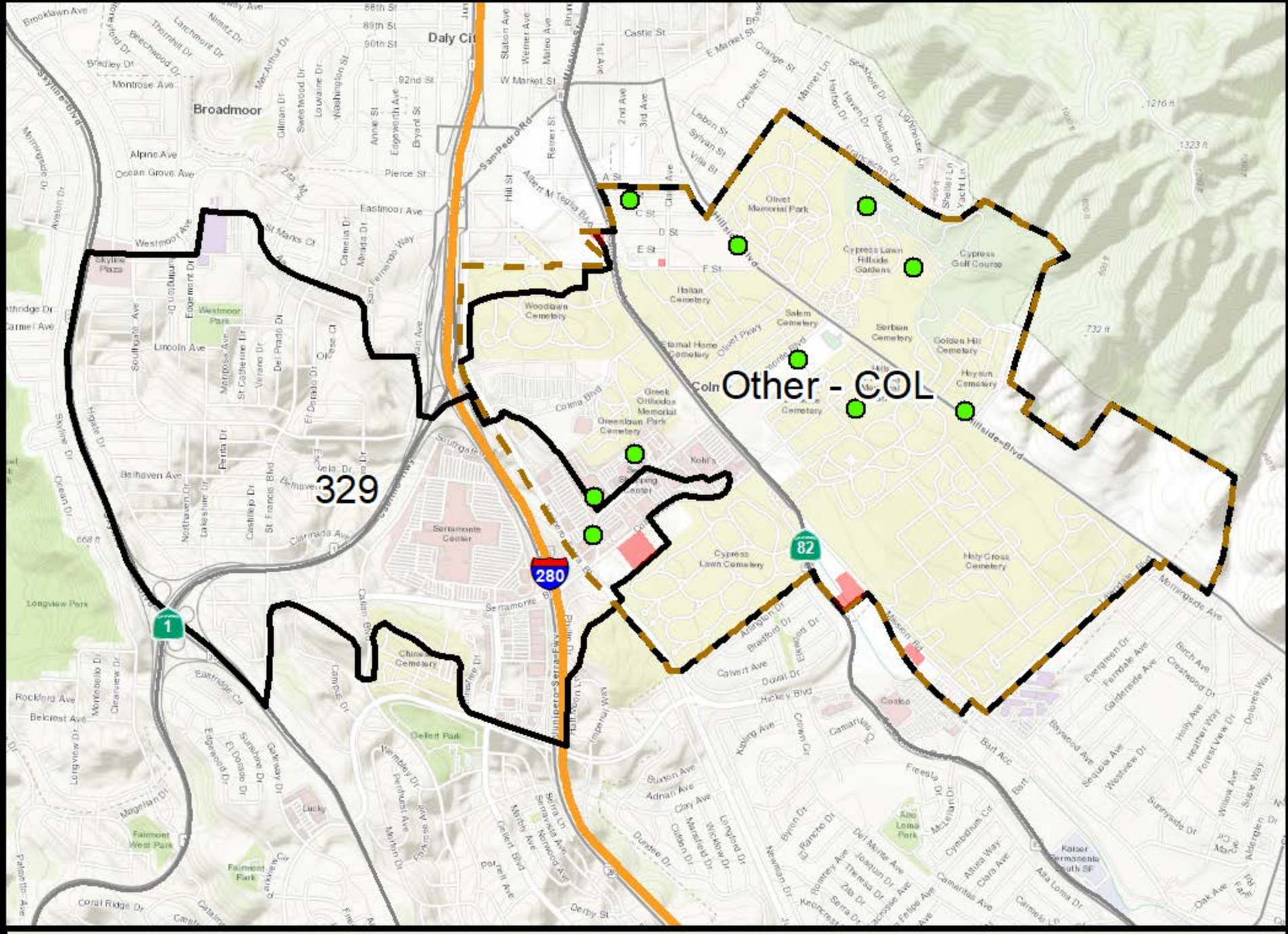

Figure A-5. WMAs and GI/LID in Colma

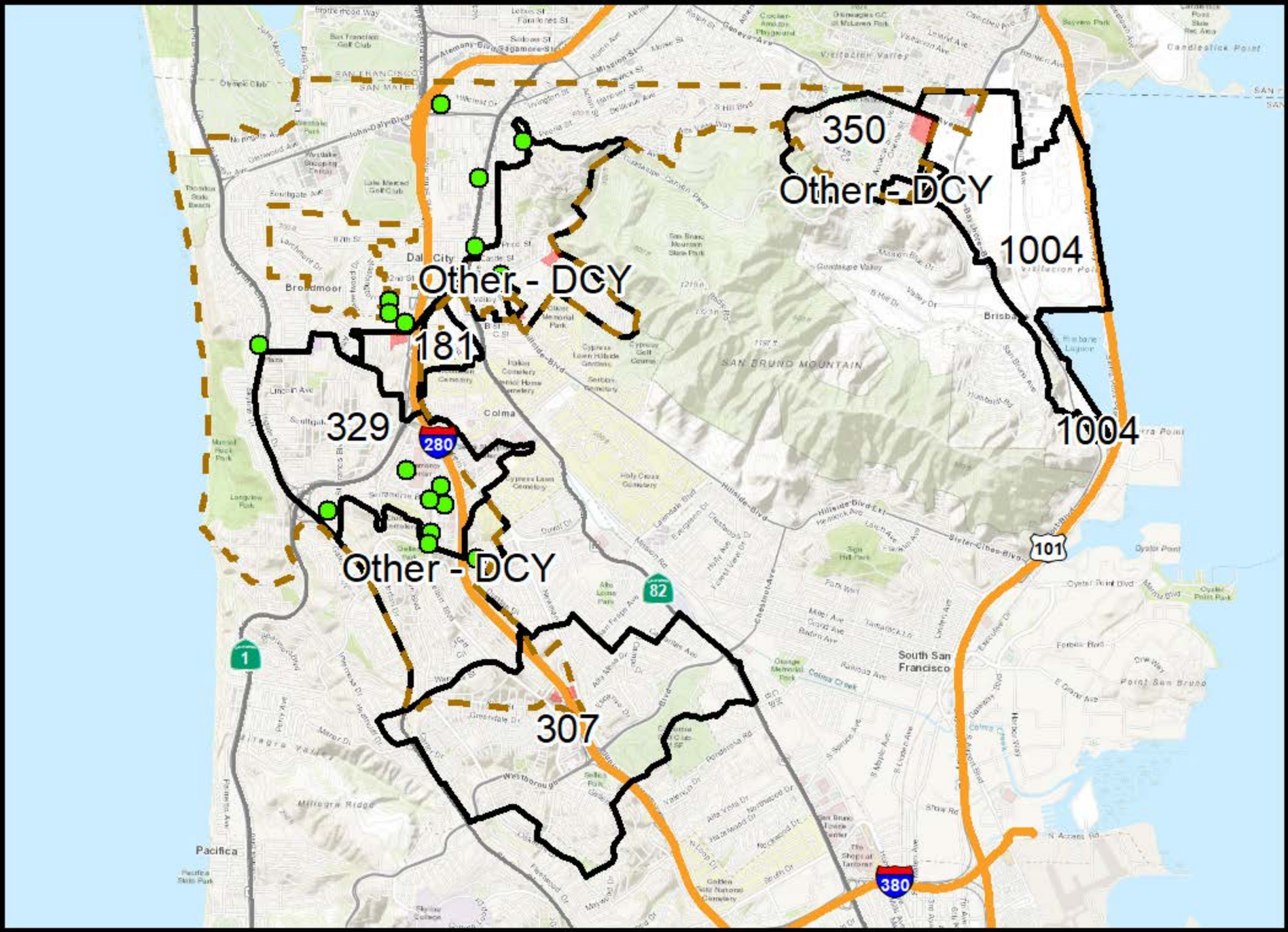

Figure A-6. WMAs and GI/LID in Daly City

Daly City Watershed Management Area Map

- GI/LID Location
- High Interest Areas
- Watershed Management Area (WMA)
- Permittee Boundary

N

0 0.5 1 2 Miles

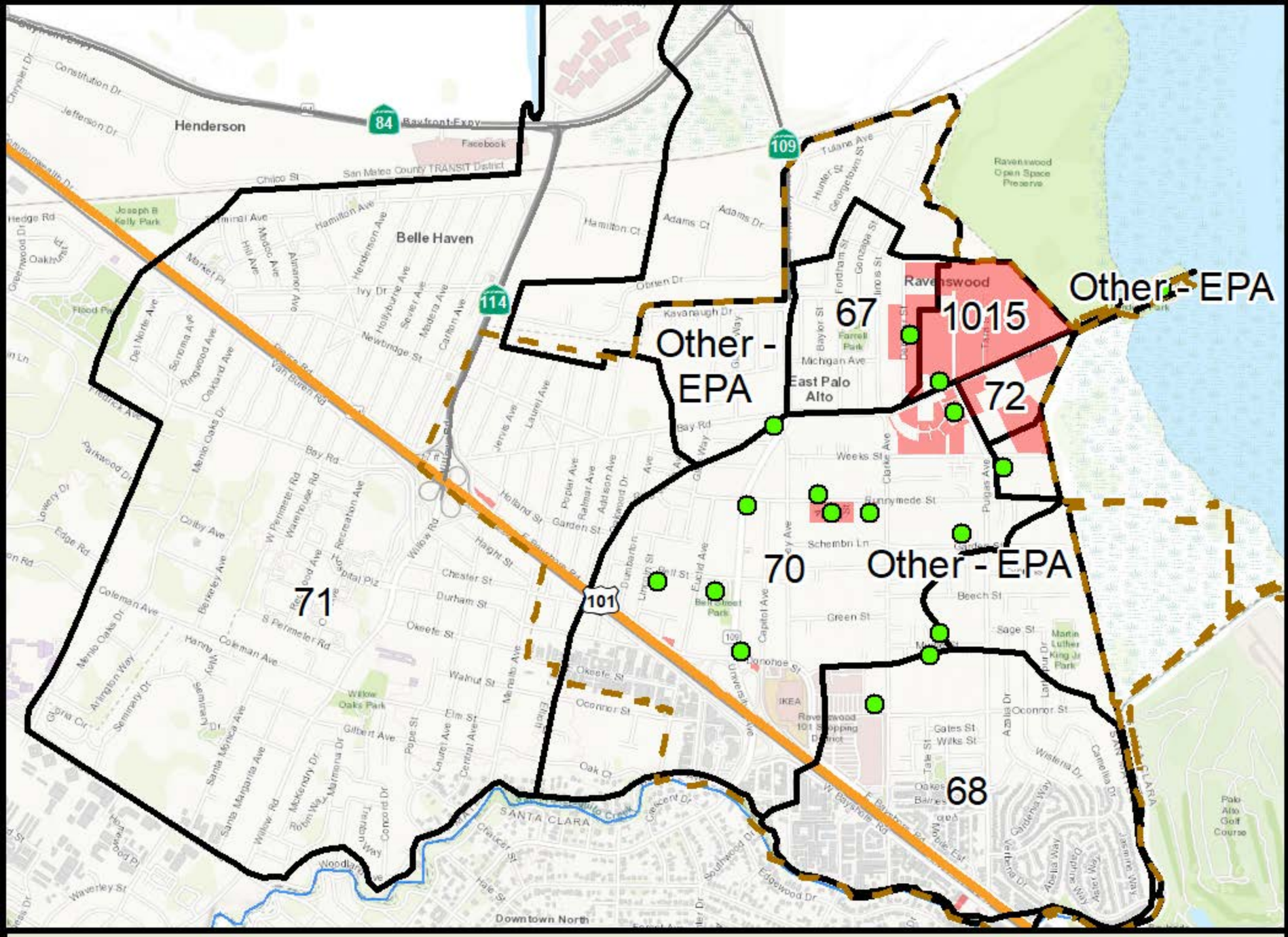

Figure A-7. WMAs and GI/LID in East Palo Alto

East Palo Alto Watershed Management Area Map

- GI/LID Location
- High Interest Areas
- Watershed Management Area (WMA)
- Permittee Boundary

N

0 0.225 0.45 0.9 Miles

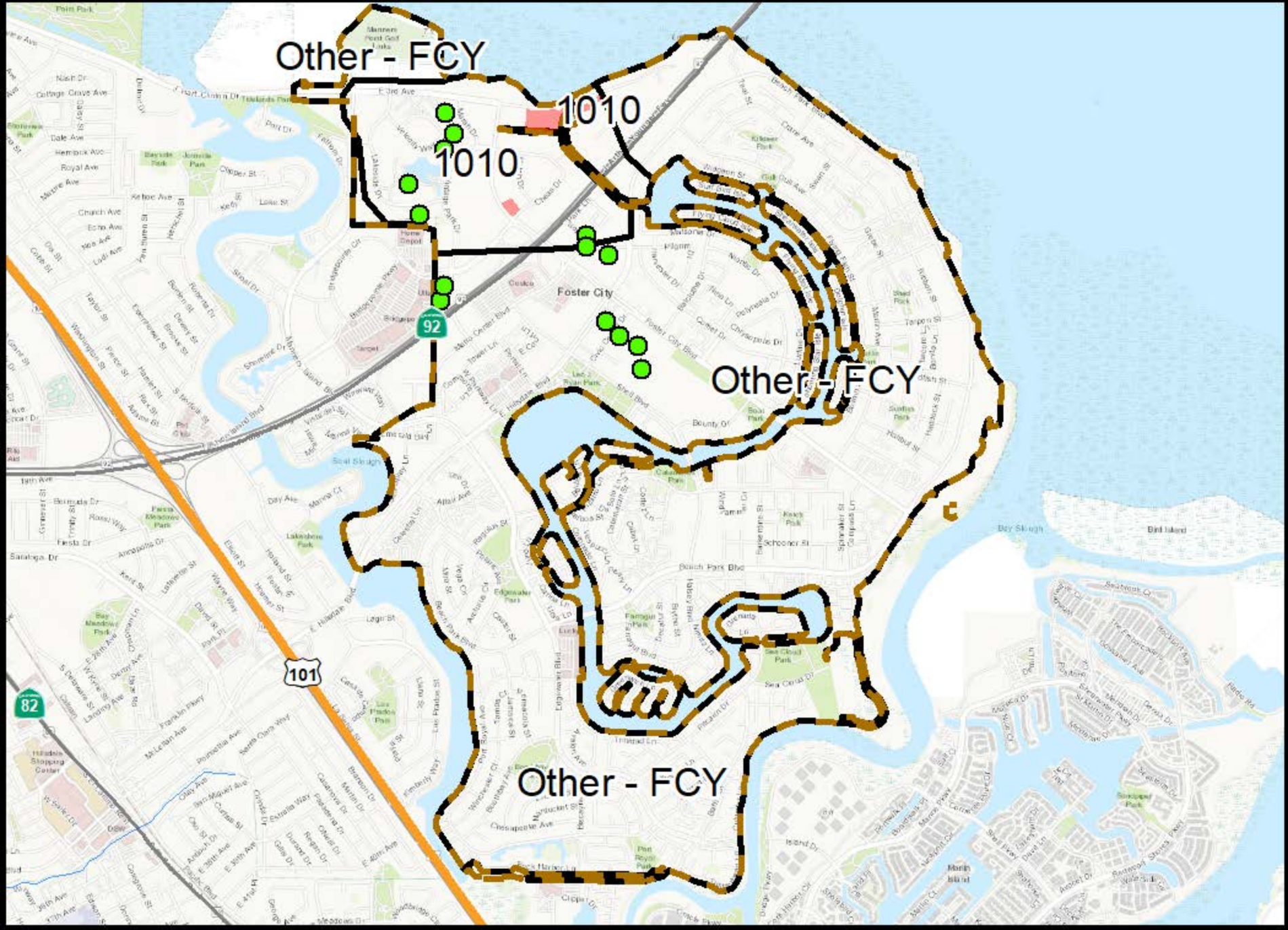

Figure A-8. WMAs and GI/LID in Foster City

Foster City Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

N

0 0.275 0.55 1.1 Miles

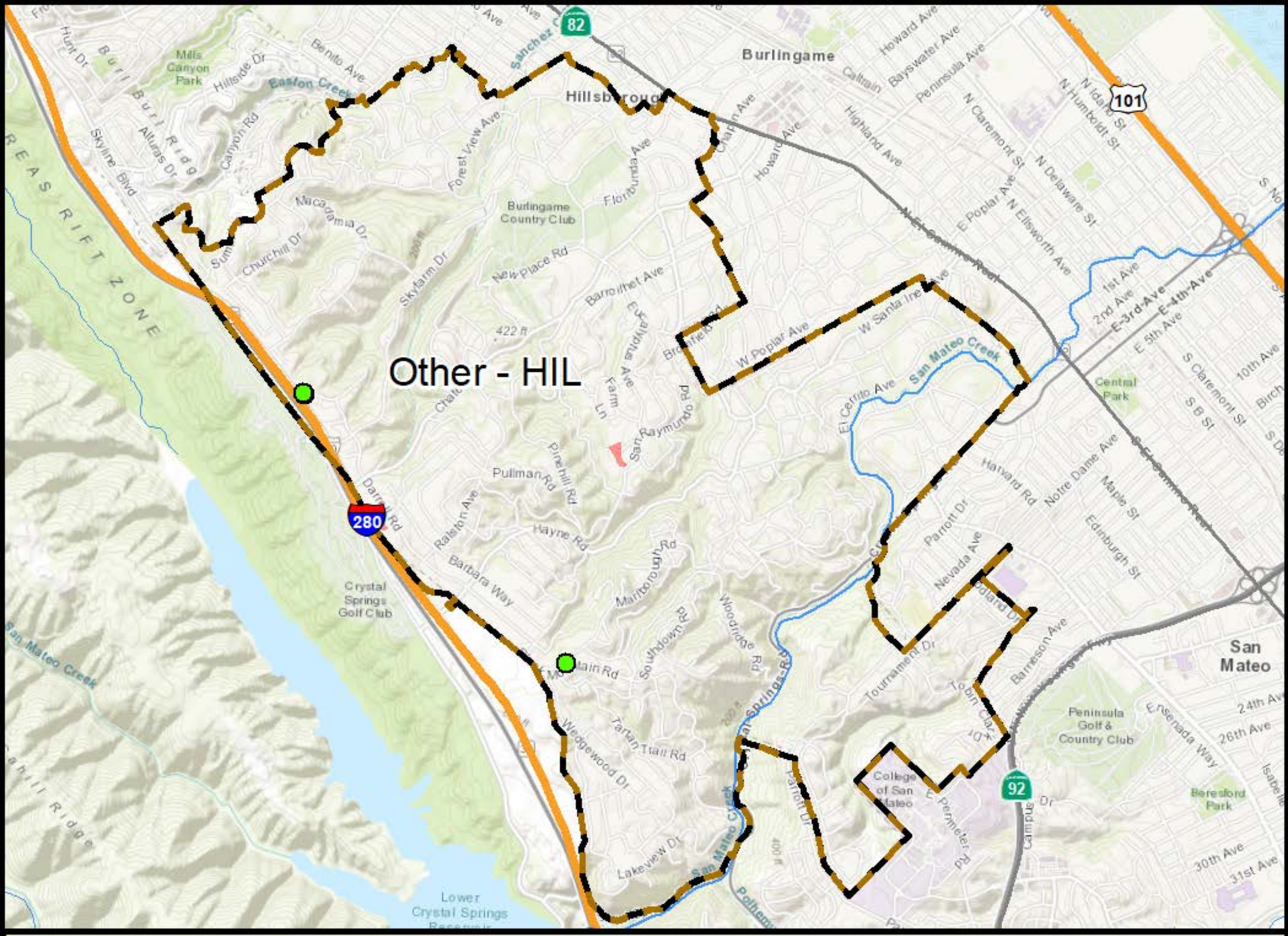

Figure A-9. WMAs and GI/LID in Hillsborough

Hillsborough Watershed Management Area Map

- GI/LID Location
- High Interest Areas
- Watershed Management Area (WMA)
- Permittee Boundary

N

0 0.35 0.7 1.4 Miles

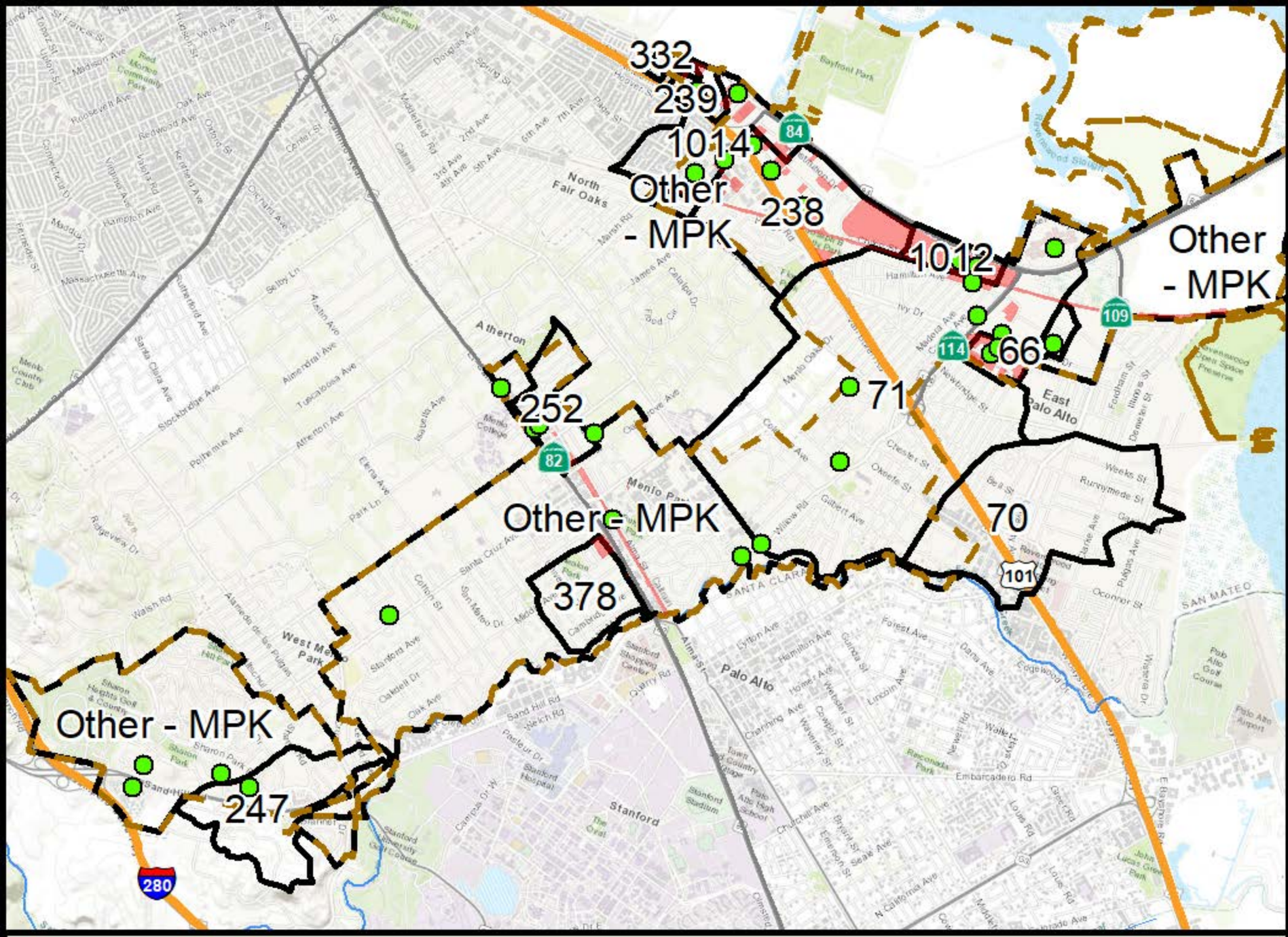

Figure A-10. WMAs and GI/LID in Menlo Park

Menlo Park Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

N

0 0.4 0.8 1.6 Miles

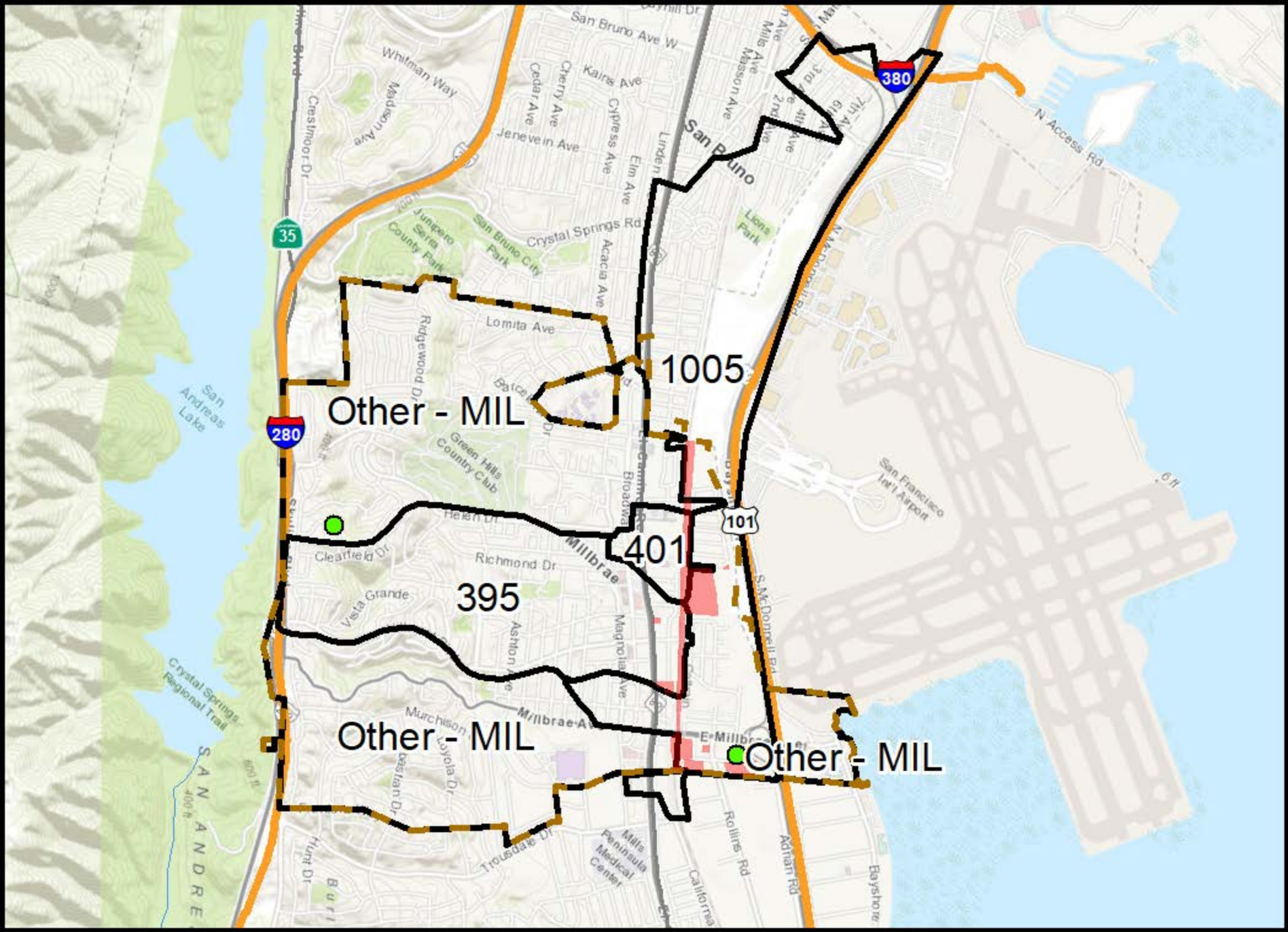

Figure A-11. WMAs and GI/LID in Millbrae

Millbrae Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

N

0 0.325 0.65 1.3 Miles

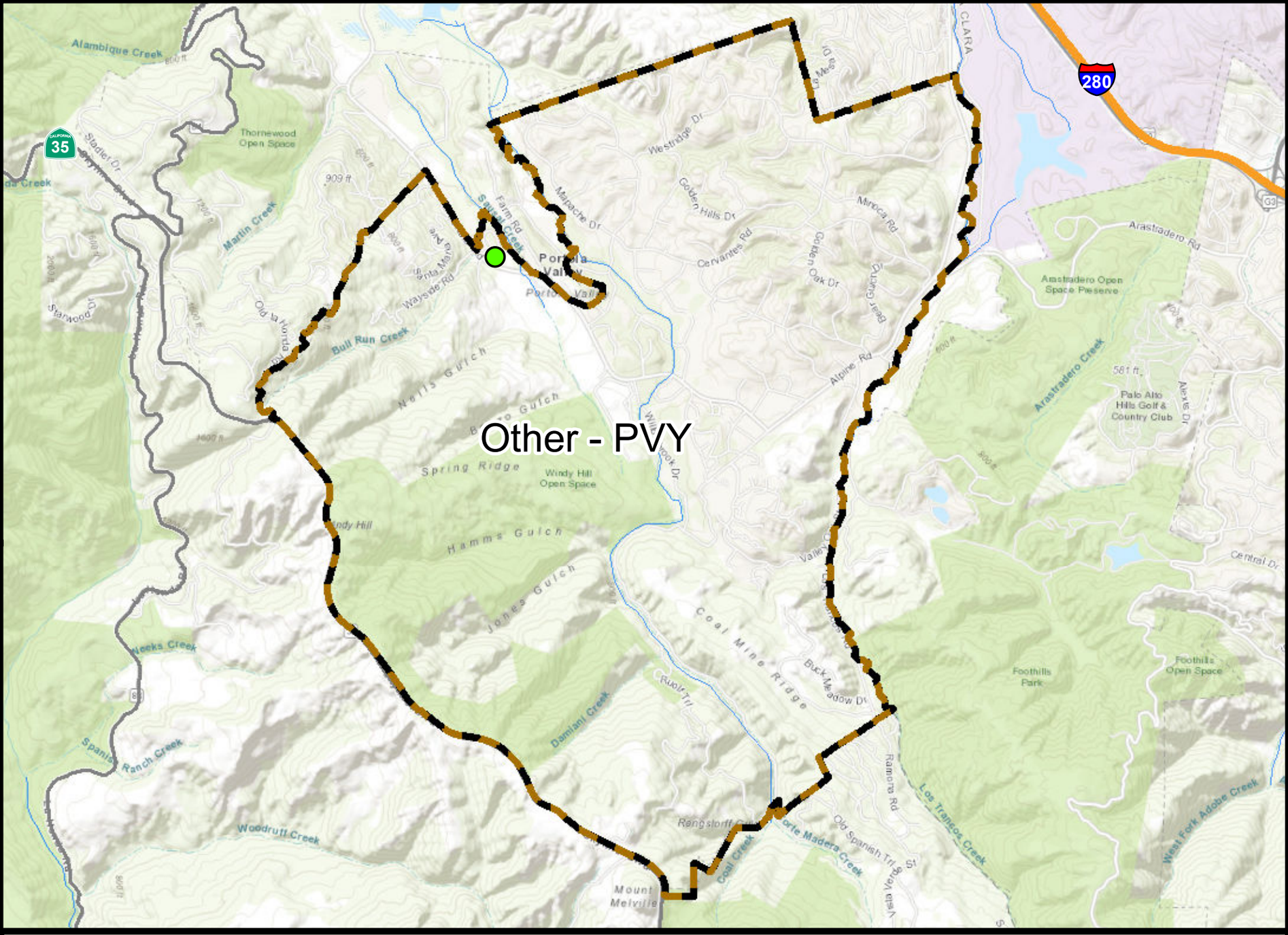

Figure A-12. WMAs and GI/LID in Portola Valley

Portola Valley Watershed Management Area Map

- GI/LID Location
- High Interest Areas
- Watershed Management Area (WMA)
- Permittee Boundary

N

0 0.4 0.8 1.6 Miles

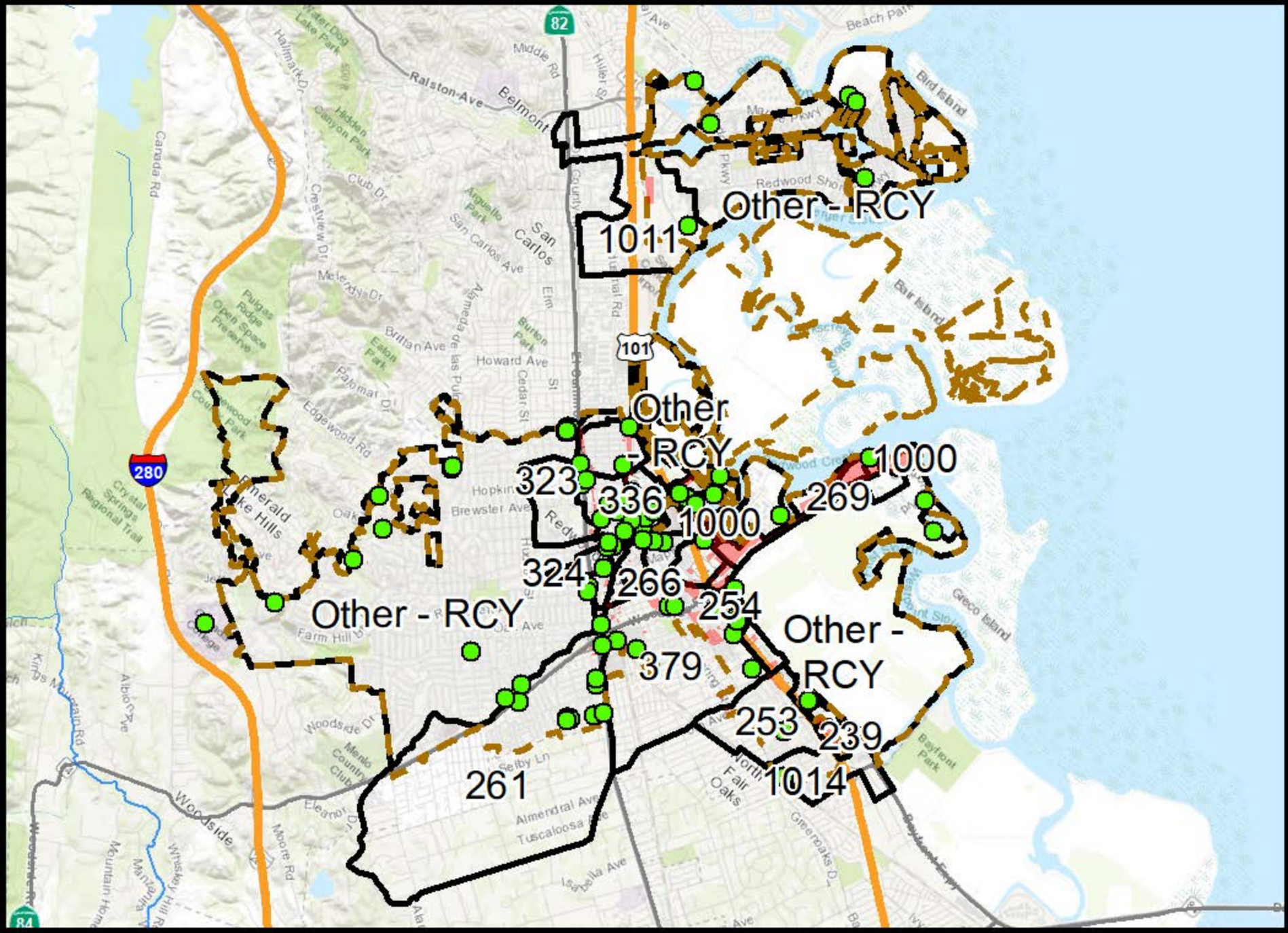

Figure A-13. WMAs and GI/LID in Redwood City

Redwood City Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

N

0 0.5 1 2 Miles

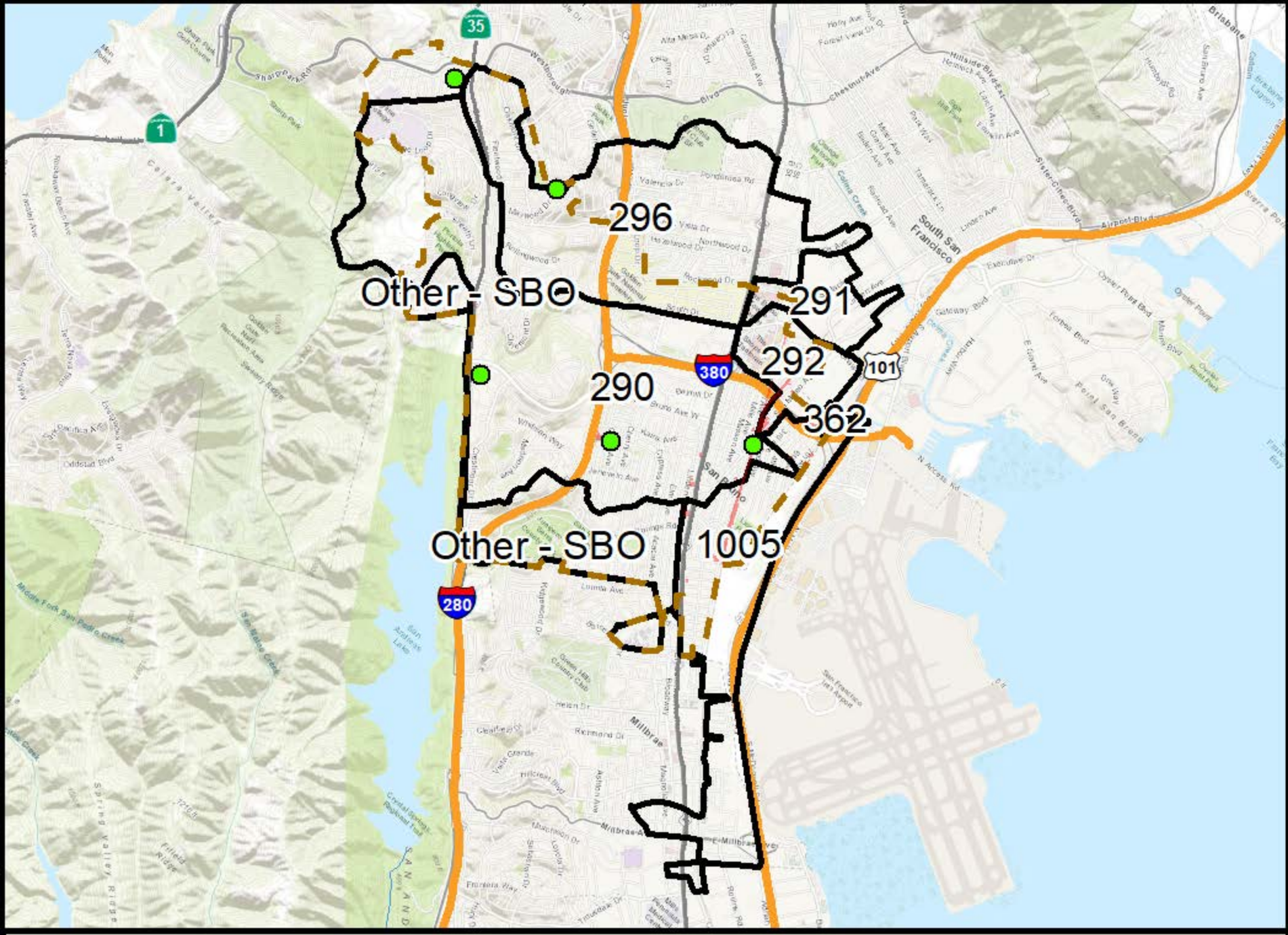

Figure A-14. WMAs and GI/LID in San Bruno

San Bruno Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

0 0.5 1 2 Miles

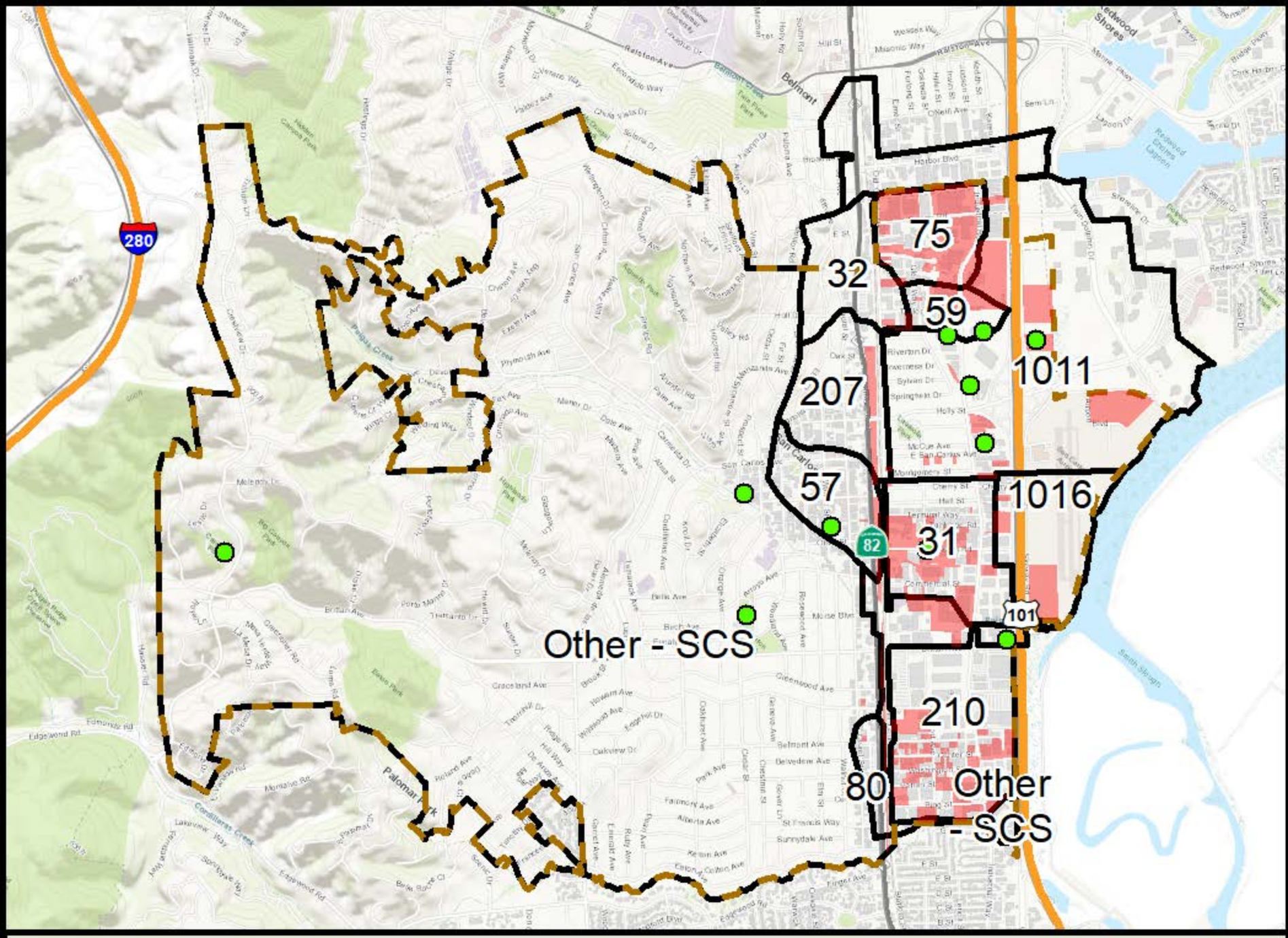

Figure A-15. WMAs and GI/LID in San Carlos

San Carlos Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

0 0.275 0.55 1.1 Miles

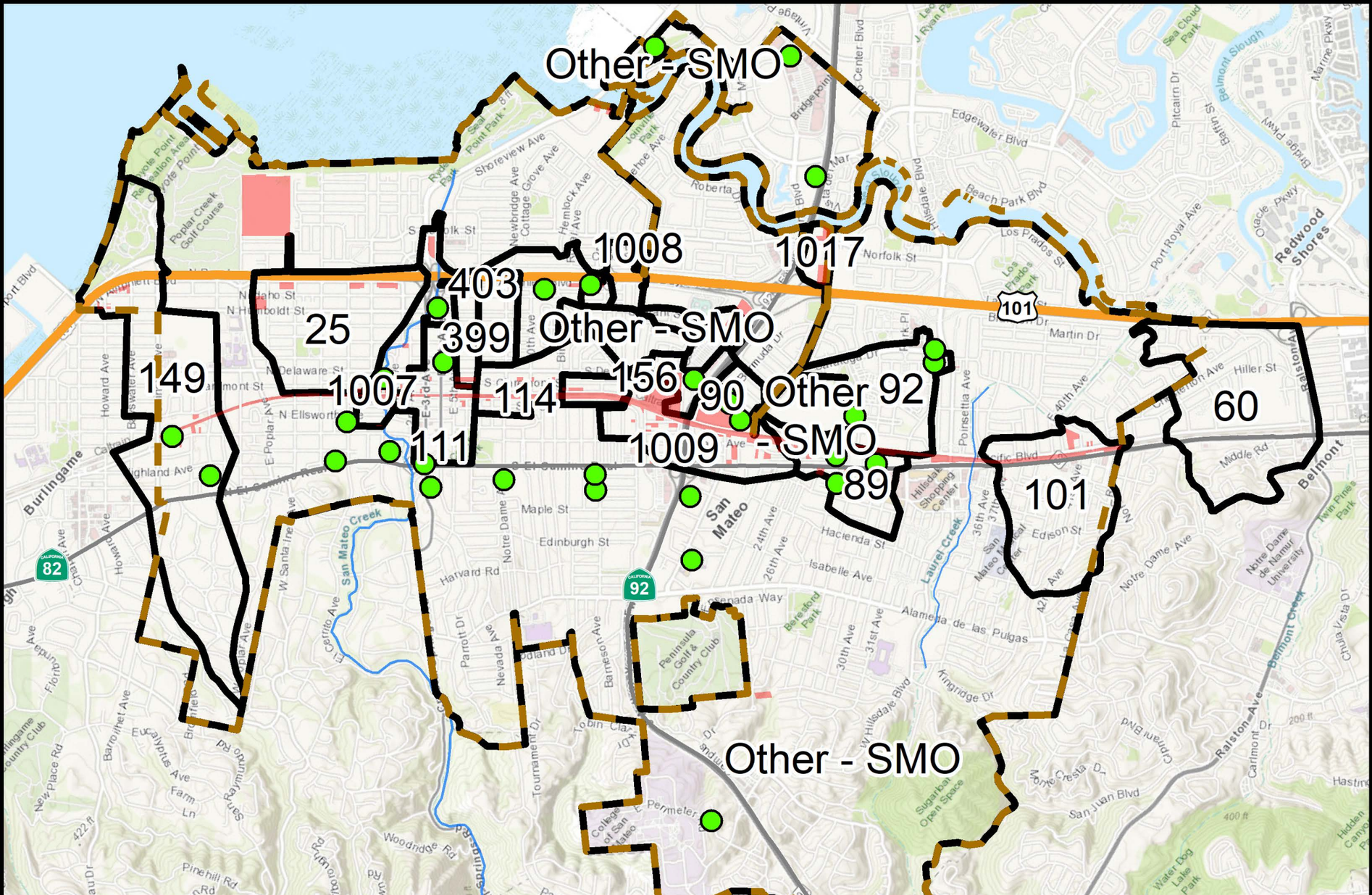

Figure A-16. WMAs and GI/LID in San Mateo

San Mateo Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

N

0 0.425 0.85 1.7 Miles

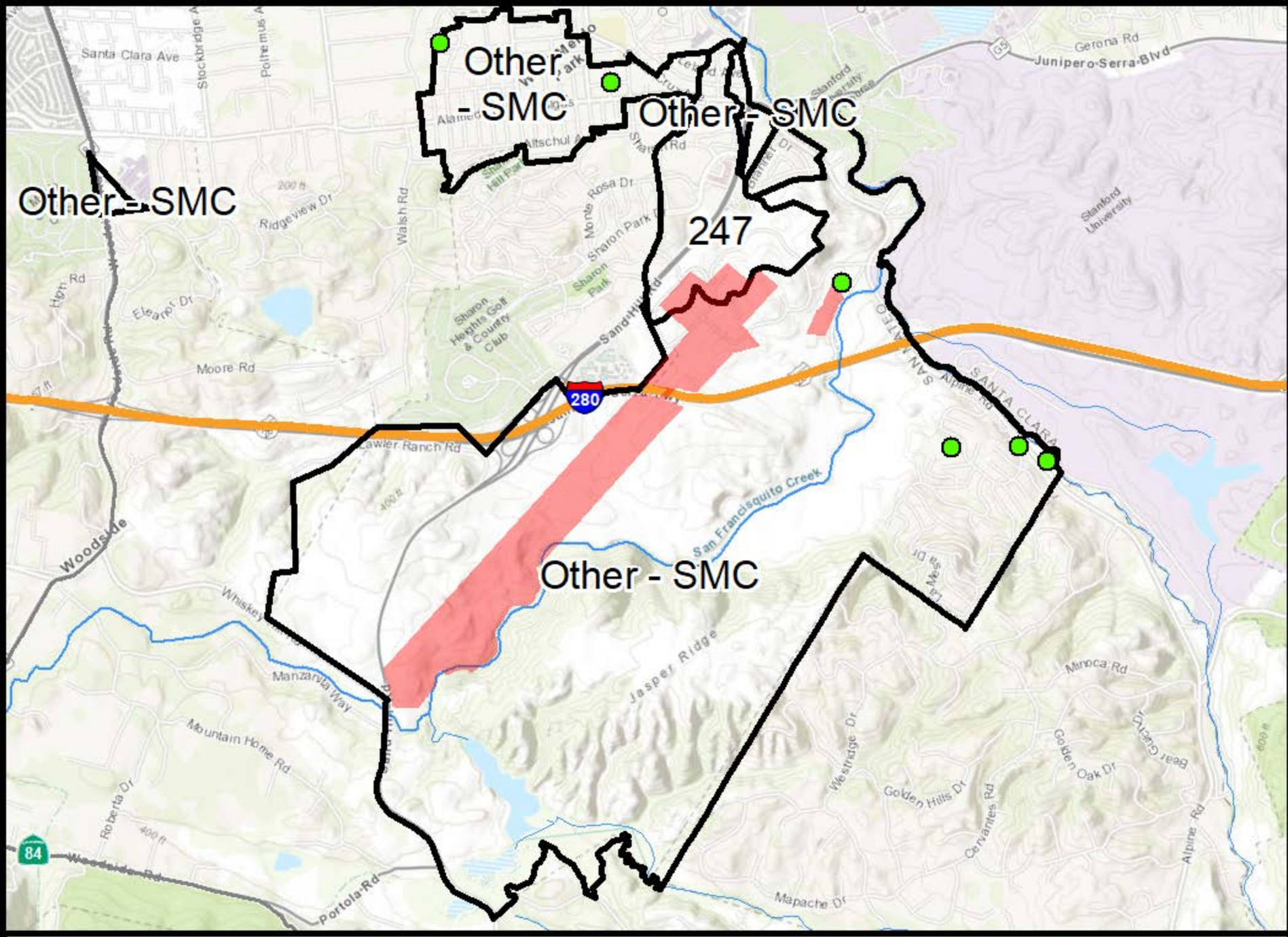

Figure A-17a. WMAs and GI/LID in San Mateo County

San Mateo County Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

N

0 0.35 0.7 1.4 Miles

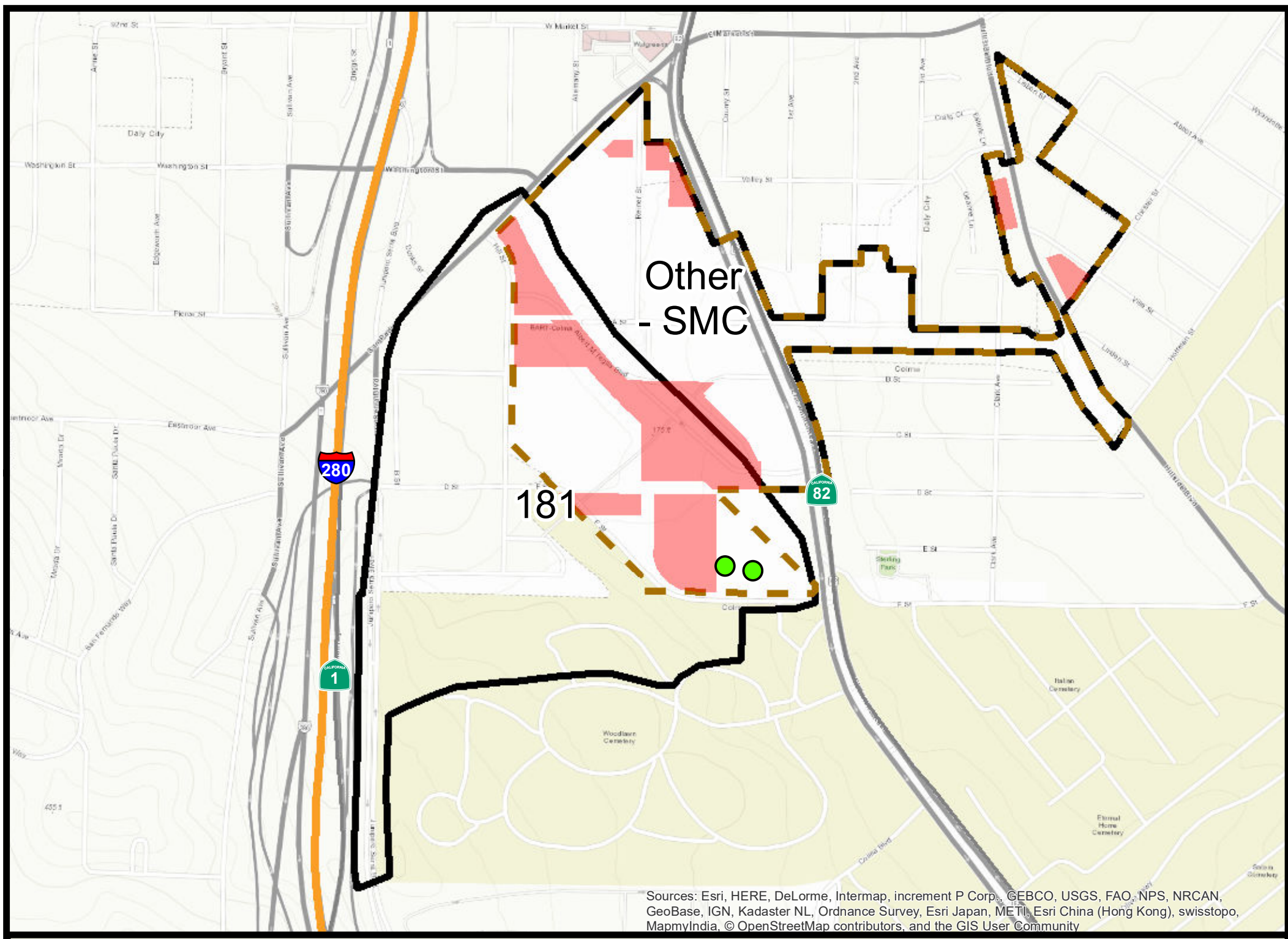

Figure A-17b. WMAs and GI/LID in San Mateo County

San Mateo County Watershed Management Area Map

- GI/LID Location
- High Interest Areas
- Watershed Management Area (WMA)
- Permittee Boundary

N

0 0.075 0.15 0.3 Miles

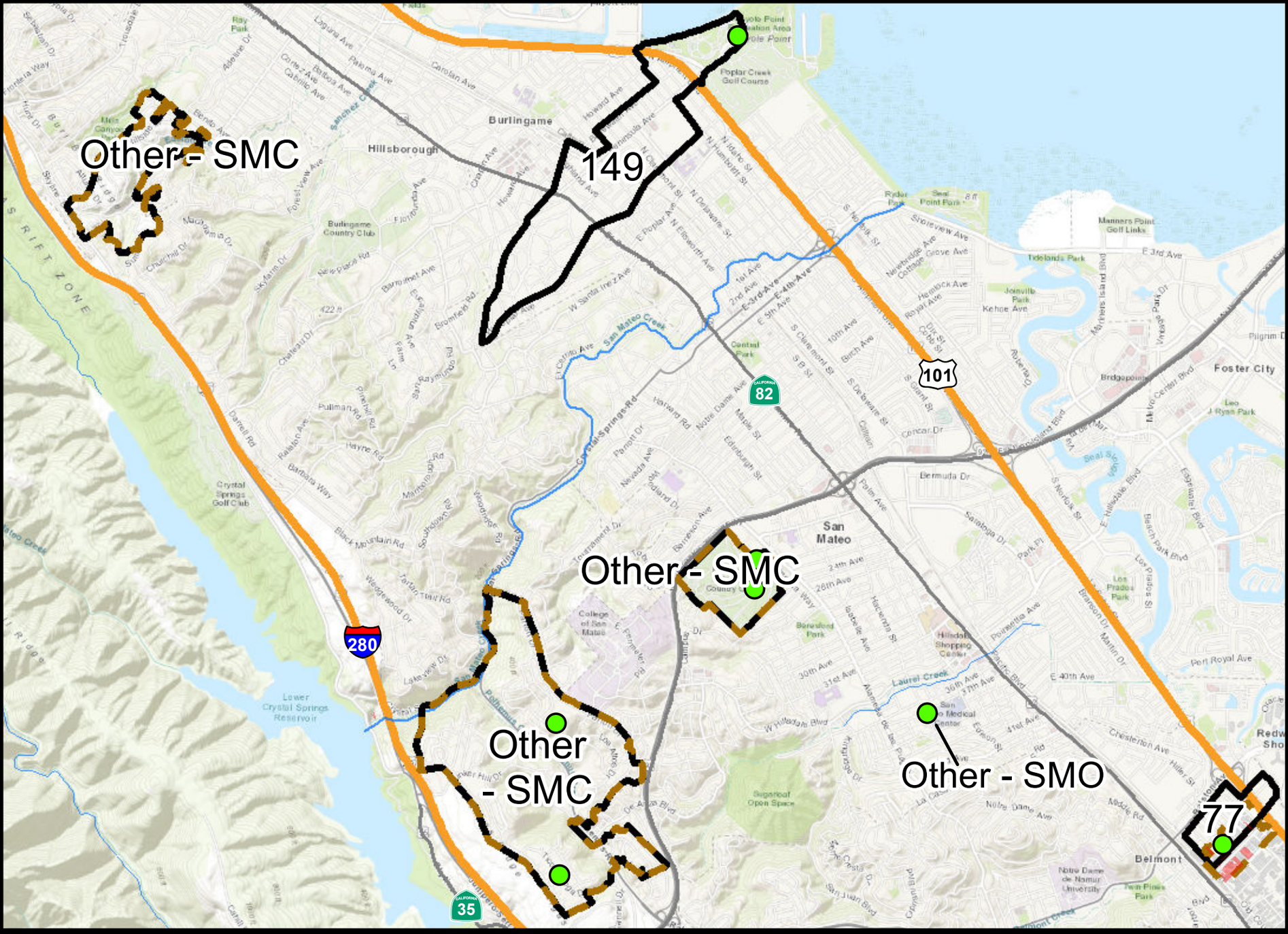

Figure A-17c. WMAs and GI/LID in San Mateo County

San Mateo County Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

N

0 0.5 1 2 Miles

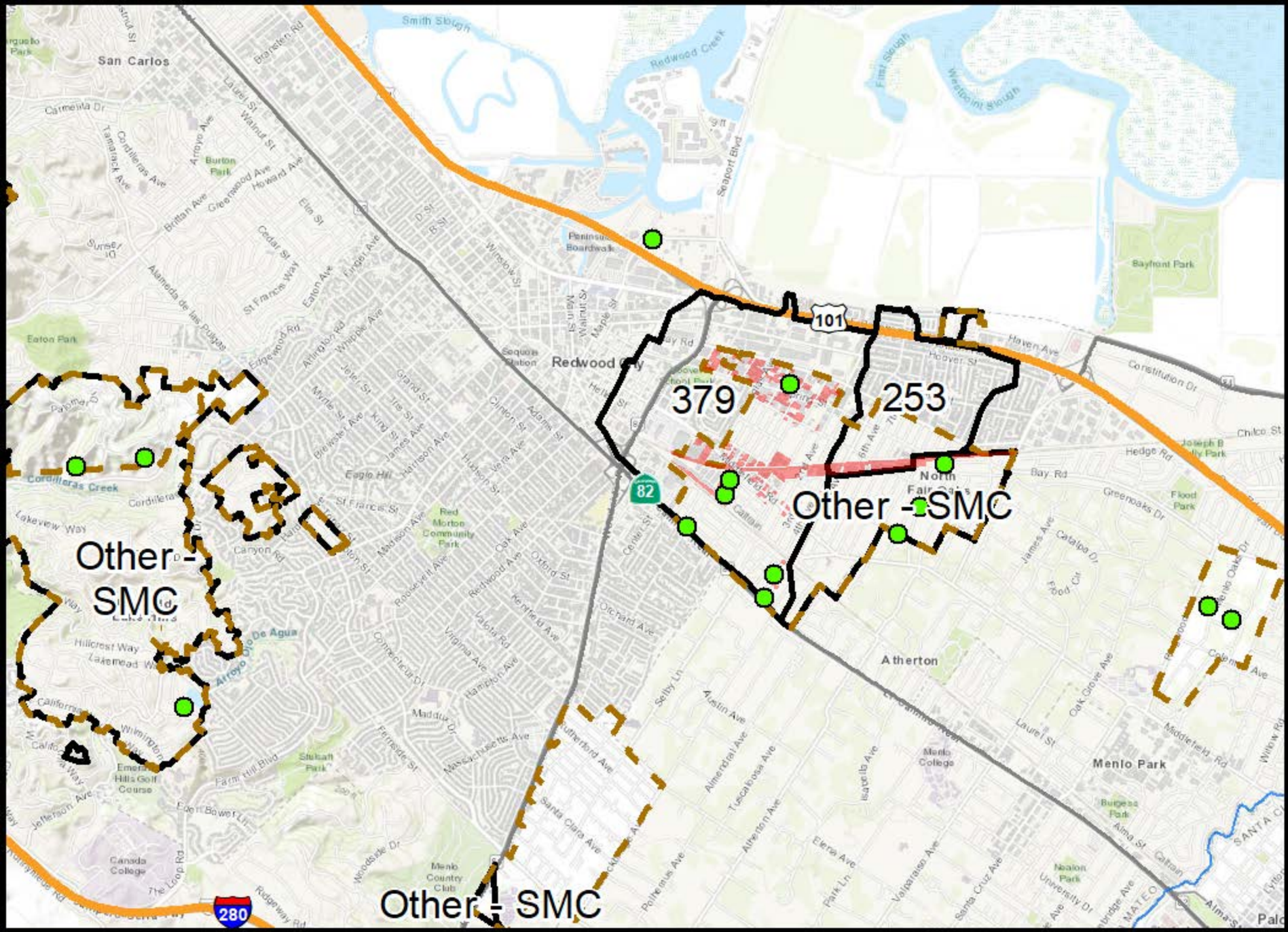

Figure A-17d. WMAs and GI/LID in San Mateo County

San Mateo County Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

N

0 0.4 0.8 1.6 Miles

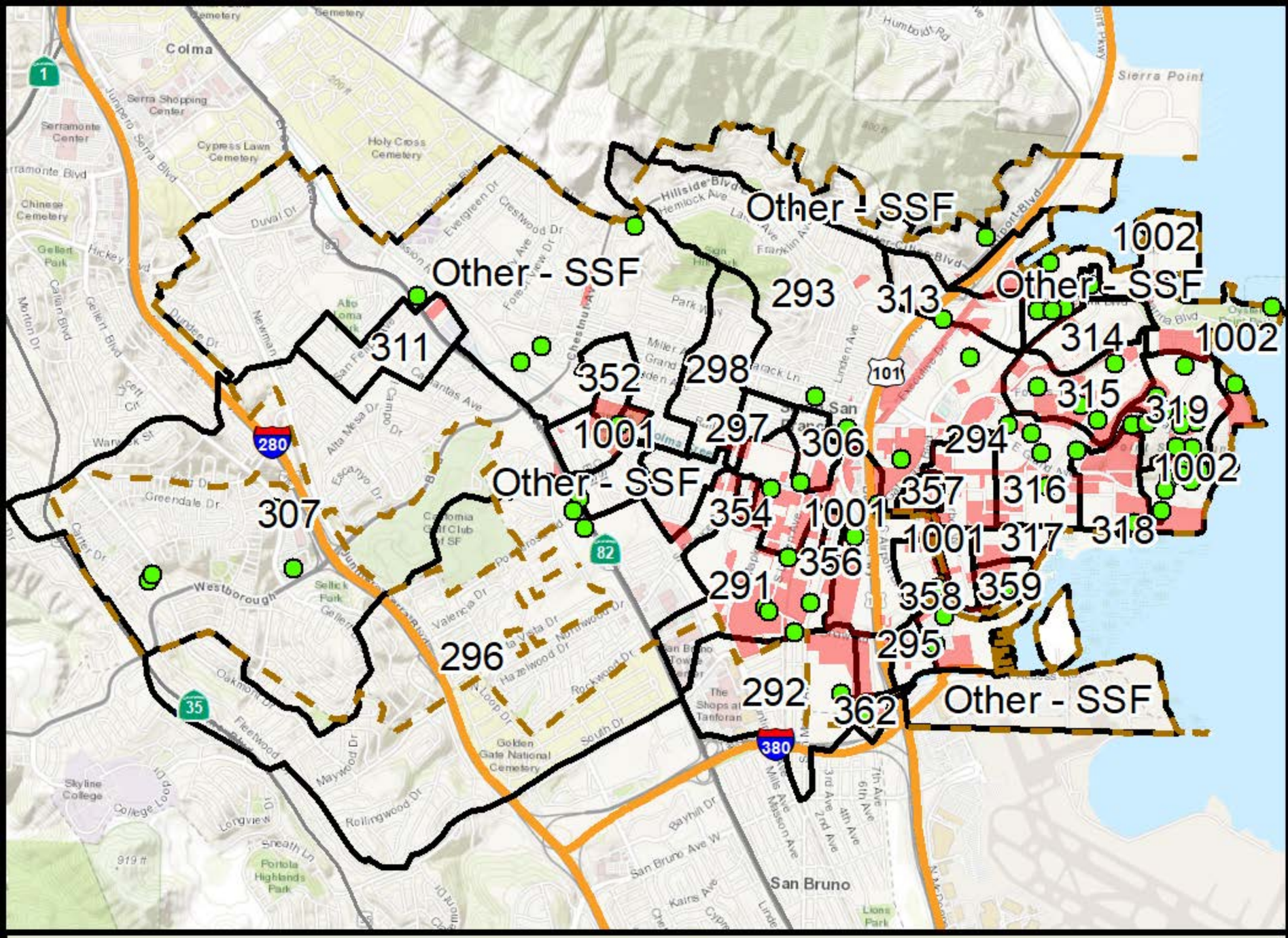

Figure A-18. WMAs and GI/LID in South San Francisco

South San Francisco Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

N

0 0.375 0.75 1.5 Miles

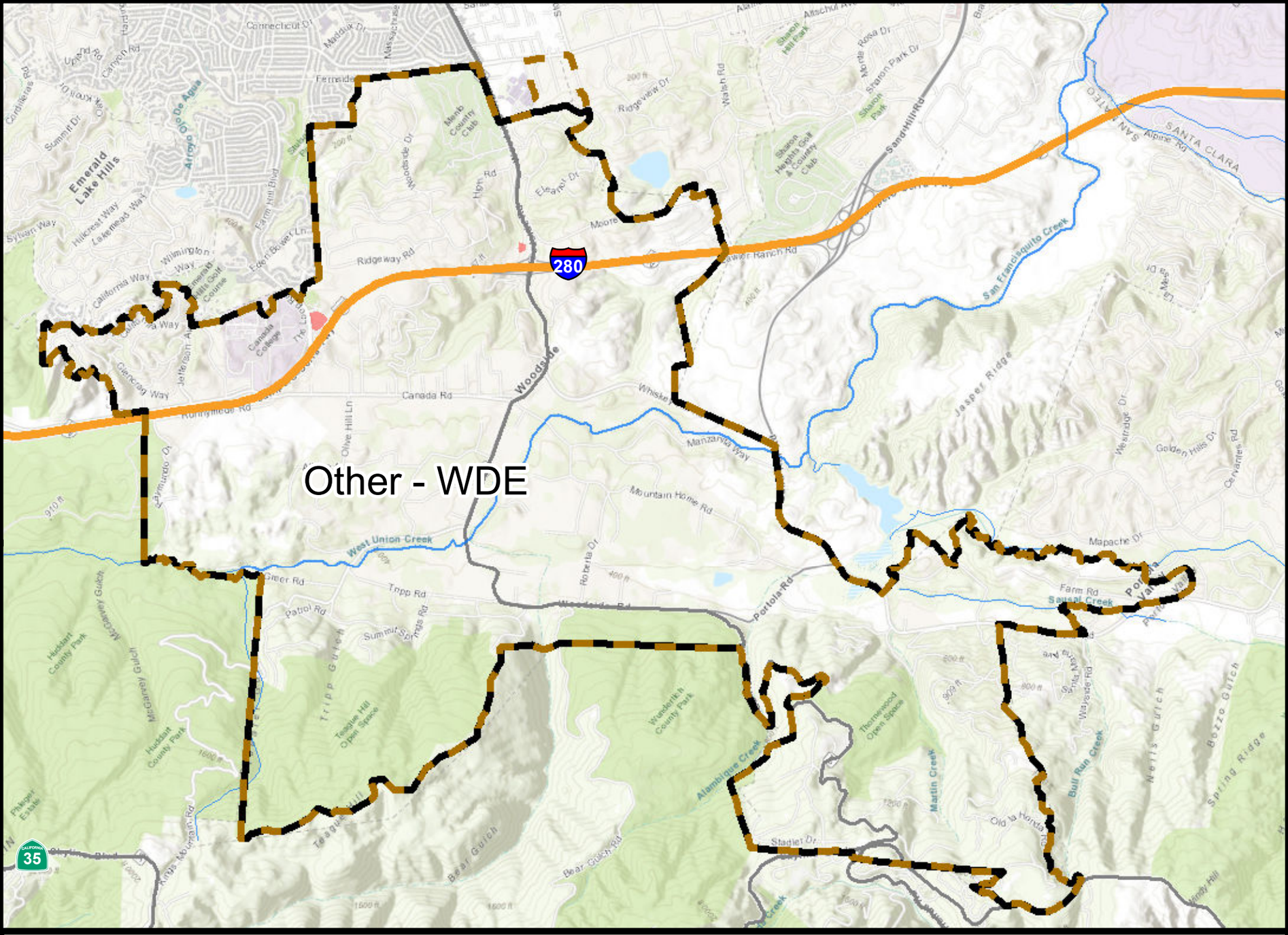

Figure A-19. WMAs and GI/LID in Woodside

Woodside Watershed Management Area Map

GI/LID Location

High Interest Areas

Watershed Management Area (WMA)

Permittee Boundary

N

0 0.475 0.95 1.9

Miles

Appendix B

Descriptions of Land Uses Referenced in this Report

Descriptions of Land Uses Referenced in this Report

Old industrial: Area developed as an industrial land use before 1980 and not redeveloped before 2002, including railroads.

Old urban: Area developed before 1980 as any land use other than industrial or airport.

New urban: Area developed or redeveloped after 1980.

Open space: Area that is not developed or mostly pervious including large urban parks, channels, golf courses, and cemeteries.

Other: Airports.

Appendix 12

- Evaluation of PCBs in Caulk and Sealants in Public Roadway and Storm Drain Infrastructure Project Report – August 16, 2018

Evaluation of PCBs in Caulk and Sealants in Public Roadway and Storm Drain Infrastructure

Project Report

Prepared for:

Bay Area Stormwater Management Agencies Association

Prepared by:

EOA inc.

SFEI

KINNETIC LABORATORIES INCORPORATED

FINAL

August 16, 2018

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LIST OF ACRONYMS

ACCWP	Alameda Countywide Clean Water Program
BASMAA	Bay Area Stormwater Management Agency Association
CCCWP	Contra Costa Clean Water Program
CEH	Center for Environmental Health
EPA	Environmental Protection Agency
FSURMP	Fairfield-Suisun Urban Runoff Management Program
GC/MS-SIM	Gas Chromatography/Mass Spectroscopy-Selective Ion Monitoring
KLI	Kinnetic Laboratories, Inc.
LCS	Laboratory Control Sample
MDL	Method Detection Limit
MRL	Method Reporting Limits
MRP	Municipal Regional Stormwater NPDES Permit
MS	Matrix Spike
n/r	not reported
ND	Non-Detect
NPDES	National Pollutant Discharge Elimination System
PCBs	Polychlorinated Biphenyl
PMT	Project Management Team
POC	Pollutants of Concern
ppb	parts per billion
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
ROW	Right-of-Way
SAP	Sampling and Analysis Plan
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SFEI	San Francisco Estuary Institute
SMCWPPP	San Mateo Countywide Water Pollution Prevention Program
TMDL	Total Maximum Daily Loads
VSFCD	City of Vallejo and the Vallejo Sanitation and Flood Control District
XRF	X-ray Fluorescence

EXECUTIVE SUMMARY

The Municipal Regional Stormwater National Pollutant Discharge Elimination System (NPDES) Permit (MRP; Order No. R2-2015-0049) implements the municipal stormwater portion of the polychlorinated biphenyls (PCBs) Total Maximum Daily Loads (TMDLs) for the San Francisco Bay. Provision C.12.e of the MRP requires Permittees collect at least 20 composite samples (throughout the permit area) to investigate PCBs concentrations in caulk and sealants from public roadway and storm drain infrastructure. To achieve compliance with this permit requirement, the Bay Area Stormwater Management Agencies Association (BASMAA[1]) implemented a regional sampling program on behalf of its member agencies. The goal of the ***BASMAA Regional Infrastructure Caulk and Sealant Sampling Program*** was to evaluate, at a limited screening level, whether and in what concentrations PCBs are present in caulks or sealants in public roadway and storm drain infrastructure in the portions of the Bay Area subject to the MRP. This sampling program also contributes to partial fulfillment of pollutants of concern (POC) monitoring required in Provision C.8.f of the MRP to address source identification, one of the five management information needs identified in the MRP. Source identification monitoring focuses on identifying which sources or watershed source areas provide the greatest opportunities for reductions of POCs in urban stormwater runoff.

The ***BASMAA Regional Infrastructure Caulk and Sealant Sampling Program*** was conducted between February 2017 and August 2018 in the portion of the San Francisco Bay Area subject to the MRP. The sampling program was implemented by a project team comprised of EOA Inc., Kinnetic Laboratories, Inc. (KLI), and the San Francisco Estuary Institute (SFEI). A BASMAA Project Management Team (PMT) consisting of representatives from BASMAA stormwater programs and municipalities provided oversight and guidance to the project team throughout the sampling program. Anonymous municipal partners also provided assistance during sampling.

The sampling program was designed to specifically target roadway and storm drain structures that were constructed during the most recent time period when PCBs were potentially used in caulk and sealant materials (i.e., prior to 1980, with a focus on the 1960's and 1970's). Field reconnaissance was conducted in areas within participating municipalities that were developed during the time period of interest to identify structures with caulk or sealant applications. A total of 54 caulk and sealant samples were collected from ten different types of roadway and storm drain structures in the public right-of-way (ROW). Structures sampled included concrete bridges/overpasses, sidewalks, curbs and gutters, roadway surfaces, above and below ground storm drain structures (i.e., flood control channels and

[1] BASMAA is a 501(c)(3) non-profit organization that coordinates and facilitates regional activities of municipal stormwater programs in the San Francisco Bay Area. BASMAA programs support implementation of the MRP (Order No. R2-2015-0049). BASMAA is comprised of all 76 identified MRP municipalities and special districts, the Alameda Countywide Clean Water Program (ACCWP), Contra Costa Clean Water Program (CCCWP), the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), the Fairfield-Suisun Urban Runoff Management Program (FSURMP), the City of Vallejo and the Vallejo Sanitation and Flood Control District (VSFCD).

storm drains accessed from manholes), and electrical utility boxes or poles attached to concrete sidewalks. The individual samples were grouped by structure type and sample appearance (color and texture). The groups were combined into 20 composites. Composites were analyzed for the RMP-40 PCBs congeners[2] using a modified EPA Method 8270C (Gas Chromatography/Mass Spectroscopy-Selective Ion Monitoring, GC/MS-SIM), with a detection limit of ≤ 0.5 ppb (0.0005 ppm).

Total PCBs concentrations across the 20 composite samples ranged from non-detect (ND) to > 4,000 ppm. The majority of the composites had PCBs concentrations that were below 0.2 ppm. PCBs were not detected in ten of the composite samples, representing nearly 60% of the individual samples collected during this program. PCBs in twenty-five percent (5 of 20) of the composites were above 1 ppm. Of these, two composites had very high PCBs concentrations (> 1,000 ppm) that indicate PCBs were likely part of the original caulk or sealant formulations. Both of these composites were comprised of black, pliable joint filler materials that were collected from concrete bridges/overpasses. These results demonstrate that PCBs-containing caulks and sealants were used in some capacity on Bay Area roadway and storm drain infrastructure in the past, but the full extent and magnitude of this usage is unknown. The conclusions from this sampling program are primarily limited by the small number of structures that were sampled (n=54), compared with the vast number of roadway and storm drain structures throughout the Bay Area that were originally constructed during the peak period of PCBs production and use (1950 – 1980).

Given the limitations of the project, much more information would be needed to estimate the total mass of PCBs in infrastructure caulk and sealant materials, to better understand the fate and transport of PCBs in these materials, and to calculate stormwater loading estimates. Nevertheless, this screening-level sampling program was the first step towards understanding if infrastructure caulk and sealants are a potential source of PCBs to urban stormwater. Although limited by the small sample number, the results of this sampling program indicate:: (1) the majority of roadway and storm drain structure types that were sampled in this project did not have PCBs-containing caulks or sealants at concentrations of concern, and (2) only black, pliable joint fillers found on concrete bridges/overpasses sampled had PCBs concentrations of potential concern to stormwater. If further investigation is conducted, focus on this type of application may be a reasonable place to continue such efforts.

[2] The 40 individual congeners routinely quantified by the Regional Monitoring Program (RMP) for Water Quality in the San Francisco Estuary include: PCBs 8, 18, 28, 31, 33, 44, 49, 52, 56, 60, 66, 70, 74, 87, 95, 97, 99, 101, l05, 110, 118, 128, 132, 138, 141, 149, l51, 153, 156, 158, 170, 174, 177, 180, 183, 187, 194, 195, 201, and 203. These are referred to as the RMP-40 PCB congeners throughout this report.

1 INTRODUCTION

1.1 BACKGROUND

Until banned from production in 1979, polychlorinated biphenyls (PCBs) were commercially produced and used in a variety of products in the U.S., including caulk compounds and joint sealants. PCBs were added to these materials primarily to increase elasticity, but also to extend the lifespan of the materials and improve adherence to various structures (Kohler et al. 2005, Erickson and Kaley 2011). The use of PCBs in caulk and sealants is categorized as an open application that allows for potential release of PCBs into the environment during use, compared with closed applications (e.g., PCBs as dielectric fluid in transformers) that do not allow release to the environment during normal use (WHO 1993). Because of the open application of caulks and sealants in outdoor settings, exposed locations can come into direct contact with stormwater, and therefore has been identified as a potential direct source of PCBs in urban stormwater.

Globally, PCBs concentrations as high as 55% by mass have been measured in caulk or sealant materials that were used on the exteriors of public and private buildings constructed prior to 1979 (Herrick et al. 2004, Kohler et al. 2005, Robson et al. 2010). In the San Francisco Bay Area (Bay Area), PCBs have been measured in caulks used around the exterior of windows and door frames of tilt-slab style public and private buildings constructed prior to 1979 (Klosterhaus et al. 2014). PCBs-containing caulks and sealants have also been found on public roadway and storm drain infrastructure. In 2013, the City of Tacoma, Washington conducted a source-tracking program after elevated PCBs were detected in stormwater from a residential neighborhood that drains to the Thea Foss Waterway (City of Tacoma 2013, 2016). The City of Tacoma determined the source of PCBs was a black tar sealant in a storm drain catch basin. The sealant had been applied between asphalt and concrete surfaces in the catch basin during a 1975 road construction project. A sample of the sealant collected in 2013 had PCBs concentrations up to 260 parts per million (ppm). Although most of the sealant had worn away by 2013, residual PCBs likely contaminated the soil within the catch basin as the sealant material disintegrated over the years.

In the Bay Area, several open applications of PCBs-containing caulks have been identified in public infrastructure, including in the sealant that was used in the gaps between concrete slabs of the road deck on the old eastern span of the San Francisco-Oakland Bay Bridge (Caltrans 2013), and in caulk used in the joints of concrete drinking water storage reservoirs located in Alameda County (Sykes and Coate 1995). These examples represent the limited extent of local information that is currently available on PCBs in caulks and sealants used in storm drain and roadway infrastructure. There is no information available on PCBs concentrations in caulk or sealant applications on other local roadways, parking garages, bridges, dams, storm drain pipes, catch basins or inlets, or pavement joints (e.g., curb and gutter). Although the mass of PCBs contained in roadway and storm drain infrastructure caulks and sealants in the Bay Area is currently unknown (and we are not aware of any other published study that has completed an inventory in urban infrastructure in the U.S.), this potential PCBs source may warrant further investigation. .

1.2 PROJECT GOAL

The primary goal of this project was to evaluate, at a limited screening level, whether and in what concentrations PCBs are present in public roadway and storm drain infrastructure caulk and sealants in the portions of the Bay Area subject to the regulatory requirements of the Municipal Regional Stormwater National Pollutant Discharge Elimination System (NPDES) Permit (MRP; Order No. R2-2015-0049). The MRP implements the municipal stormwater portion of the PCBs Total Maximum Daily Loads (TMDLs) for the San Francisco Bay. This project fulfills Provision C.12.e of the MRP that requires Permittees collect at least 20 composite samples (throughout the permit area) to investigate PCBs concentrations in caulk and sealants from public roadway and storm drain infrastructure. This project also contributes to partial fulfillment of pollutants of concern (POC) monitoring required in Provision C.8.f of the MRP to address source identification, one of the five management information needs identified in the MRP. Source identification monitoring focuses on identifying which sources or watershed source areas provide the greatest opportunities for reductions of POCs in urban stormwater runoff.

To accomplish the project goal, the Bay Area Stormwater Management Agencies Association (BASMAA[3]) implemented a regional sampling program on behalf of its member agencies that included the following objectives:

- Collect caulk and sealant samples from up to 60 public roadway and storm drain infrastructure locations across the MRP area;
- Combine individual samples into 20 composites and analyze each for PCBs using laboratory methods that can detect a minimum PCBs concentration of 200 parts per billion (ppb, or µg/Kg); and
- Present the results of the sampling program in MRP Permittees' 2018 Annual Reports to the San Francisco Bay Regional Water Quality Control Board (Regional Water Board).

It is important to note that this regional sampling program was not designed to fully characterize the range of PCBs concentrations in Bay Area infrastructure caulk and sealants, but rather to provide a limited, screening level survey of concentrations of PCBs that may be found in roadway and storm drain infrastructure caulk and sealants. This limited screening level monitoring is a first step towards understanding if this is a potential source of PCBs to urban stormwater that may require further attention.

[3] BASMAA is a 501(c)(3) non-profit organization that coordinates and facilitates regional activities of municipal stormwater programs in the San Francisco Bay Area. BASMAA programs support implementation of the MRP (Order No. R2-2015-0049). BASMAA is comprised of all 76 identified MRP municipalities and special districts, the Alameda Countywide Clean Water Program (ACCWP), Contra Costa Clean Water Program (CCCWP), the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), the Fairfield-Suisun Urban Runoff Management Program (FSURMP), the City of Vallejo and the Vallejo Sanitation and Flood Control District (VSFCD).

This report presents the results of the ***BASMAA Regional Infrastructure Caulk and Sealant Sampling Program*** that was conducted during 2017 and 2018 in the portion of the San Francisco Bay Area subject to the MRP. The sampling program was implemented by a Project Team comprised of EOA Inc., Kinnetic Laboratories, Inc. (KLI), and the San Francisco Estuary Institute (SFEI). A BASMAA Project Management Team (PMT) consisting of representatives from BASMAA stormwater programs and municipalities provided oversight and guidance to the Project Team throughout the sampling program.

Section 2 of this report presents the overall approach and detailed methods that were used to implement the regional sampling program. Section 3 presents the results of the sampling program, including a summary of the types of locations where samples were collected and the measured PCBs concentrations. Section 4 summarizes the conclusions drawn from the results of the sampling program. Additional documents developed for this project, including the study design and the Sampling and Analysis Plan and Quality Assurance Project Plan (SAP/QAPP) are provided in Appendices A and B, respectively. Individual PCBs congener data are reported in Appendix C.

2 METHODS

This section presents the overall approach and methods that were used to implement the ***BASMAA Regional Infrastructure Caulk and Sealant Sampling Program***. Under the guidance and oversight of the PMT, the project team developed a study design (Appendix A) and a SAP/QAPP (Appendix B), which were followed throughout implementation of the sampling program.

2.1 Sampling Program Approach

The overall approach to the ***BASMAA Regional Infrastructure Caulk and Sealant Sampling Program*** was to work cooperatively with multiple Bay Area municipal agencies to identify public right-of-way (ROW) locations where PCBs were potentially used in caulk or sealant applications on roadway and storm drain infrastructure. These locations were identified primarily based on the time period that the infrastructure was originally constructed and/or repaired, with a focus on the 1970's- the most recent time period PCBs were still in widespread use. The project team collected 54 caulk or sealant samples from public infrastructure in these locations. Each sample was screened for chlorine content using portable X-ray Fluorescence (XRF) technology. This was done to evaluate whether this non-destructive, inexpensive, and portable screening technique could be applied to identify samples that contain high concentrations of PCBs. Following XRF screening, the Project Team then reviewed the information collected about each sample to determine how to group the samples for compositing prior to PCBs analysis. A total of 20 composite samples were then analyzed for PCBs concentrations. All municipal participants in the project remained anonymous. All chemical analyses and reporting were also conducted blind to the specific locations where caulk or sealant samples were collected. Additional details about the methods used to conduct this sampling program are provided below.

2.2 Recruitment of Municipal Partners

The first step of this sampling program was to recruit Bay Area municipal agencies to participate in the project. Participation in the project entailed assisting the project team to identify potential sample locations and allowing the project team to collect samples in public ROW areas within their jurisdictions.

As part of the study design development, the project team prepared a memorandum to help recruit municipalities to participate in the sampling program (Appendix A). The memo described the planned monitoring program, outlined desirable attributes for municipal partners, and described the roles of the monitoring program partners. The primary criterion for sampling program partners was municipalities that had public infrastructure that was constructed or repaired prior to 1980, when PCBs were still in common use. To identify appropriate partners, the project team identified the following desirable attributes:

- Cities that were significantly urbanized prior to 1980. All newer urban areas were excluded from sampling because they were not expected to contain PCBs in caulk or sealants.
- Cities that conducted their own road and storm drain infrastructure maintenance. Information about maintenance and repairs to all potential sample site locations, as well as site-specific information on potential structures was needed to identify appropriate sampling sites.
- Cities that had available records of structure installation or repair and/or knowledgeable staff that provided such information as far back as the 1970's. Site selection relied heavily on the availability of information about the age of existing roadway and storm drain infrastructure within partner jurisdictions.
- Cities that had the available resources and willingness to assist the project team in identifying potential sampling sites within their jurisdictions.

Stormwater Program staff from each of the five Bay Area counties subject to the MRP conducted outreach to their municipalities to recruit participants for the sampling program.

2.3 Screening Criteria for Sample Site Selection

The initial population of sampling sites included the universe of publicly maintained roadways, sidewalks and storm drain structures containing caulk or sealants located within participating Bay Area municipalities. Based on literature review and best professional judgement, the project team developed additional screening criteria for sample site selection to assist project partners in identifying locations that were more likely to contain caulk or sealants with PCBs. These criteria also accounted for logistical and safety considerations during sample collection. The screening criteria that were used to identify potential sample sites included the following:

1. **Public Property in Participating Jurisdictions**: All sample sites were located in public ROWs within the jurisdiction of a participating municipality.
2. **Structure Types**: The structures sampled included concrete and asphalt roadways, bridges and overpasses, sidewalks, pavement joints (e.g., curbs and gutters), below ground storm drain structures accessed through manholes, catch basins or inlets, storm drain outfalls, above ground storm drain structures (i.e., flood control channels), and utility boxes or poles attached to concrete sidewalks.
3. **Open Applications of Caulk/Sealant**: All sampled structures had open applications of caulk or sealants that were exposed and readily available for sample collection. Examples included: sites

of roadway or storm drain infrastructure repairs, such as filled cracks that had formed on the surface after installation; joints between concrete curbs and street pavement; joints between concrete paving; sidewalks or bridge decks; and joints between sections of storm drain pipes or culverts.

4. **Structure Age**: Preferred sampling sites included structures (or portions of structures) that were constructed prior to 1980, with a preference given to more recent structures. Although PCBs were likely present in caulk and sealants used throughout the 1950's, 1960's and 1970's (and possibly earlier), these materials are expected to break-down and disintegrate over time due to normal wear. The older caulks/sealants are more likely to have worn away and/or to have been replaced. To increase the likelihood of finding PCBs, this project focused on identifying structures that were constructed (or repaired) between the late 1960's through the late 1970's. This period is the most recent decade during which PCBs were still used regularly in caulks and sealants.

5. **Structure Repair Status**: Sampling sites were selected from structures (or portions of structures) that had not undergone repair since the 1980's. Because PCBs were not used from about 1980 onward, any structures, or portions of structures that were repaired after 1980, including removal and replacement of caulk/sealant, and/or addition of caulk/sealant, were excluded from sampling.

6. **Road Materials**: Portland cement concrete structures are more durable than asphalt-based pavements, thus less likely to have been replaced or resurfaced since 1980. Therefore, sample site selection favored concrete structures because they were more likely to contain PCBs in caulk/sealants.

7. **Accessibility**: Field personnel only collected samples from sites that were deemed to be safe and accessible for sample collection. None of the sites that were sampled required confined space entry or other special equipment. Traffic controls were implemented in the few locations that required such measures for safety reasons.

8. **Ongoing Capital Projects:** In-progress storm drain infrastructure repair, roadway repaving or repair projects could have provided an opportunity to collect caulk or sealant samples from locations that would otherwise not be safely accessible. However, no such projects were identified during the regional sampling program.

Participating municipal agency staff were asked to review the screening criteria above to help the project team identify potential sampling locations. The initial focus was on locations within participating municipalities that were developed during the 1950's through 1970's. The project team then worked with the municipal staff to further identify locations within these areas that met additional site selection criteria. Available information was reviewed, including GIS map layers, satellite imagery, or records from tracking systems used by cities to document roadway/storm drain infrastructure construction and/or repair dates. Knowledgeable municipal staff were queried for information about open applications of caulk or sealants. Existing records were used to verify the criteria above for a given location. However, because records for the time period of interest were not always available or complete, anecdotal

information from knowledgeable agency staff was also considered. The project team also conducted field reconnaissance within the areas of interest to further identify potential sample locations.

2.4 Sample Collection

All sample collection was conducted following the detailed methods and procedures described in the project SAP/QAPP (Appendix B). The project field teams visited the areas that had been identified as potential sample locations. In a number of cases, specific sampling sites that met the selection criteria were identified during field reconnaissance. However, for much of the sampling effort, the field crews had to search the appropriate roadway and storm drain structures within areas of interest to identify exposed applications of caulk or sealant that could be collected in a safe way. The types of applications that were sampled included the following:

- Materials used to fill cracks in concrete or asphalt roadways or sidewalk surfaces;
- Tar-like sealant materials within storm drain structures or on roadway surfaces;
- Caulking used between concrete structures and asphalt pavement, such as gutters and catch basins; and
- Fillers between the joints of concrete blocks on bridges and overpasses, roadways, or storm drain channels.

A variety of techniques were used to collect samples, depending on the specific location and the condition of the caulk or sealant material. Stainless steel knives/spoons were used as sample collection tools for scraping material from structure surfaces and inside cracks. Other collection techniques included carefully chiseling hardened material from surfaces or from within cracks/joints using appropriate tools. Field notes and photographs were taken to ensure proper documentation of collection method(s) used at each site, the structure type, the type of caulk or sealant usage, and other relevant factors. The field sampling form is available in the SAP/QAPP provided in Appendix B. To ensure all municipal partners remained anonymous, information that could be used to identify specific locations where individual samples were collected was not recorded by the field crews. All photographs avoided inclusion of any identifying features of the area such as road signs, heritage trees or other landmarks.

2.5 XRF Screening Procedures

Following collection, all samples were sent to the Center for Environmental Health (CEH) for XRF analysis to measure chlorine content. Because PCBs are highly chlorinated, samples with high chlorine content are more likely to contain PCBs. Previous projects have used portable XRF technology to evaluate the chlorine content of caulk samples (Klosterhaus et al. 2014). This screening was done to provide an additional factor that could be used to determine how to group individual samples for compositing. Moderate chlorine concentrations may provide information on whether the presence of chlorine is driven primarily by PCBs or instead by other chlorine containing compounds. Chlorine content as measured by XRF screening was one of several factors that was considered in determining how to group samples for compositing purposes prior to PCBs analysis.

2.6 Composite Grouping

Following XRF screening, the project team reviewed all of the information gathered about each sample to determine how individual samples would be grouped for compositing. The project team determined that combining samples with similar characteristics (e.g., structure type and sample appearance) into composites could potentially provide information on how PCBs concentrations vary across different types of structures, usage, etc. Although limited by the small sample size (i.e., 20 samples), this type of information was considered potentially important for future efforts to identify infrastructure caulk or sealants that are more likely to contain PCBs. The primary factors that were used to group individual samples for compositing included:

- Structure type,
- Caulk or sealant appearance and texture,
- Age of the infrastructure, and
- Chlorine content.

Other factors were also considered, but based on the information collected about each sample, the above four factors provided sufficient differentiation among the individual samples to create 20 composite samples.

2.7 Laboratory Methods

To prepare the samples for compositing, the laboratory first had to reduce the material in each sample to a very fine powder. The techniques used varied according to the character of each sample, but generally involved first drying the material if needed (oven-dry or freeze-dry), then grinding to the desired particle size using a pulverizer and ring and puck mill. Composite samples were created by combining equal masses of ground particles from individual samples using representative sub-sampling techniques. All composites were created according to the composite groupings assigned by the project team. Composite samples were then extracted using EPA Method 3540C and analyzed for the RMP-40 PCB congeners[4] using a modified EPA Method 8270C (Gas Chromatography/Mass Spectroscopy-Selective Ion Monitoring, GC/MS-SIM). Samples with high concentrations relative to calibration standards were diluted and reanalyzed as needed. Method Reporting Limits (MRLs) for each of the RMP-40 PCB Congeners was ≤ 0.5 ppb (0.0005 ppm). Additional details on the laboratory methods that were used, the data quality objectives, and procedures that were implemented to ensure data quality during laboratory analysis are provided in the project SAP/QAPP Appendix B.

2.8 Data Analysis and Reporting

As the final step of this sampling program, the results of the sampling effort, compositing decisions, and PCBs concentrations measured were analyzed and reported. PCBs concentrations in this report are presented as the sum of the RMP-40 congeners; individual congener data is available in Appendix C. The composite sample results were divided into five categories based on PCBs concentration ranges of

[4] The 40 individual congeners routinely quantified by the Regional Monitoring Program (RMP) for Water Quality in the San Francisco Estuary include: PCBs 8, 18, 28, 31, 33, 44, 49, 52, 56, 60, 66, 70, 74, 87, 95, 97, 99, 101, l05, 110, 118, 128, 132, 138, 141, 149, l51, 153, 156, 158, 170, 174, 177, 180, 183, 187, 194, 195, 201, and 203. These are referred to as the RMP-40 PCB congeners throughout this report.

interest. These categories were identified primarily based on the concentrations observed in caulk or sealants measured in other studies, and in public ROW surface soils and storm drain sediment from the Bay Area. The five PCBs concentration categories included the following:

1. **Very High (PCBs ≥1,000 ppm):** These concentrations (> 0.1% PCBs by weight) indicate PCBs were likely used in the original caulk or sealant formulation at concentrations high enough to impart the desired qualities of increased flexibility, durability, and adherence. PCB-containing caulks or sealants from building materials are typically greater than 10,000 ppm PCBs (i.e., 1 % PCBs).
2. **High (PCBs ≥ 50 ppm but < 1,000 ppm)**: These concentrations are above the federal hazardous waste threshold of 50 ppm but remain below the concentrations expected if PCBs were added to the original caulk or sealant formulations. More likely, this category includes materials that have been contaminated with PCBs. Removal of caulks or sealants with concentrations at or above 50 ppm requires hazardous waste handling and disposal procedures. However, no composites had PCBs concentrations in this category. Examples of materials in this category that were likely contaminated with PCBs include:
    a. Caulk/sealants that were in contact with older PCB-containing materials that remained in place when the newer caulks/sealants were applied over the existing material.
    b. Caulk/sealants that were in contact with surfaces that had residual PCBs left behind from PCB-containing materials used in the past. This could occur even if the original PCB-containing materials have largely disintegrated over time or were removed and replaced.
    c. Caulk/sealant materials that were in contact with unknown PCBs sources, which could include any past use or release of PCBs in the surrounding area.
3. **Moderate (PCBs ≥ 1 ppm but < 50 ppm):** As with the high PCBs category, materials with PCBs concentrations in this range more likely resulted from contamination, rather than addition of PCBs to the original formulation. BASMAA agencies currently use sediment PCBs concentrations above 1 ppm to identify watershed areas (both public ROW areas and private properties) that are potential sources of PCBs to stormwater. When PCB concentrations above 1 ppm are observed, further investigation and source abatement may be needed to protect stormwater quality. Caulks/sealants in this category have potentially been contaminated by the same sources that contribute to elevated soil/sediment concentrations in the surrounding area.
4. **Low (PCBs ≥ 0.2 ppm but < 1 ppm):** These PCBs concentrations are above the urban background concentration for PCBs that has been observed in Bay Area surface soils and storm drain sediment and may indicate proximity to a source. Caulks/sealants in this category likely result from contamination by other sources of PCBs, as described above.
5. **Very Low/Non-Detect (PCBs < 0.2 ppm):** This category includes all samples that had PCBs concentrations below < 0.2 ppm, including samples that did not detect any of the RMP-40 PCB congeners. Caulk or sealants in this category do not suggest proximity to a PCBs source. PCBs concentrations in Bay Area public ROW surface soils and storm drain sediment that are below 0.2 ppm suggest lack of proximity to a PCBs source (SCVURPPP 2018; SMCWPPP 2018).

Although compositing a mixture of higher and lower concentration samples can dilute the concentration detected in the composite sample, the number of samples included in each composite (8 at most)

suggests that none of the individual samples in a given composite has a concentration that is more than one PCBs concentration category higher than the composite.

The information gathered during sample collection for the individual samples included in each composite was further assessed. Features of the samples in each PCBs category were identified, including the types of structures sampled, the appearance of the caulk or sealant, etc. Although limited to a qualitative assessment due to the small sample number, this review was done to identify common factors (if any) about samples within each category that may suggest an association (or lack thereof) with elevated PCBs.

The XRF screening results were also compared with the measured PCBs concentrations to better understand the usefulness of XRF screening procedures in identifying PCBs-containing caulks or sealants. The infrastructure caulk/sealant concentrations observed during this project were then compared to PCBs concentrations measured in caulk or sealants in other studies, and to PCBs concentrations found in Bay Area public ROW surface soils and storm drain sediment.

3 RESULTS

This section presents the results of the ***BASMAA PCBs in Infrastructure Caulk and Sealant Sampling Program***. Although specific municipal partners remain anonymous in this report, at least ten different municipalities across the Bay Area participated in the project. Participants included one or more municipalities from each of the following countywide stormwater programs:

- Alameda Countywide Clean Water Program
- Contra Costa Clean Water Program
- Santa Clara Valley Urban Runoff Pollution Prevention Program
- San Mateo Countywide Water Pollution Prevention Program

3.1 Sample Collection And Compositing Decisions

Field sampling was conducted between September 2017 and January 2018. Prior to conducting field reconnaissance and sampling, the project team identified areas within participating municipalities that had been developed prior to 1980, with a focus on the 1960's and 1970's. The field team conducted reconnaissance in these areas and identified structures with caulk or sealant applications that could be sampled. This effort was both challenging and time consuming because of the lack of information available on specific structures where caulk or sealant applications were located. During reconnaissance, field crews noted that caulks and sealants were generally absent or rare in the targeted structures (i.e., a considerable effort was required to locate sampleable materials that met the criteria).

The sampling program collected a total of 54 individual caulk or sealant samples from public roadway and storm drain infrastructure within the jurisdictions of partner municipalities. Additional information about the samples that were collected, including the types and ages of structures sampled, the appearance and texture of the materials collected, the XRF screening results, and the results of the compositing scheme are presented below.

3.1.1 Structures Sampled

Samples were collected from ten different types of roadway or storm drain structures that were originally constructed prior to 1980, as presented in Table 3.1. The ten structure types sampled comprise a large portion of the existing roadway and storm drain infrastructure in the Bay Area. The majority of samples (65%) were collected from concrete structures, including bridges, sidewalks, storm drain manholes, and flood control channels.

Although the information on specific construction dates for each structure sampled was not always available, all of the structures sampled were located in areas that were originally developed prior to 1980. General construction time-frames could be approximated for most of the structures based on the time period when the surrounding neighborhood was initially developed. In most cases (61%), the structures sampled were constructed during the 1960's and 1970's. Approximately 19% of the structures sampled were constructed prior to 1960. The original construction dates for the remaining 20% of the structures sampled were unknown, although all areas selected for sampling were in older urban neighborhoods (i.e., developed prior to 1980).

Table 3.1 Sample counts collected from roadway and storm drain structures by structure type and original construction date for the BASMAA Regional Infrastructure Caulk and Sealant Sampling Program.

Structure Type	Original Construction Date of Structure			Total Sample Count
	Pre-1960	1960's - 1970's	Unknown (pre-1980)	
1. Asphalt Road Surface			1	**1**
2. Concrete Bridge/Overpass	5	6		**11**
3. Concrete Road Surface			5	**5**
4. Concrete sidewalk/curb/gutter	2	4	4	**10**
5. Below-ground Concrete Storm Drain Structure		1		**1**
6. Above-ground Concrete Storm Drain Structure (i.e., flood Control Channel)	1	7		**8**
7. Metal Electrical Utility Box attached to concrete sidewalk	2	6		**8**
8. Metal Outfall Pipe		4	1	**5**
9. Metal Pipes exposed at bridge crossing		3		**3**
10. Wood Electrical Utility Pole attached to concrete sidewalk		2		**2**
Total Sample Count	**10**	**33**	**11**	**54**

3.1.2 Appearance of Materials Sampled

The materials that were collected as part of this sampling program varied by color and texture as presented in Table 3.2. The caulk or sealant materials collected were black, white/gray, or brown in color. The textures of these materials ranged from pliable rubbery, foam, or fiber materials, to hard and brittle rock-like materials. The most common type of sample collected was a black material that had a very hard and brittle rock-like texture (43%).

Table 3.2 Caulk or sealant collected from roadway and storm drain infrastructure by sample color and texture for the BASMAA Regional Infrastructure Caulk and Sealant Sampling Program.

Sample Color	Sample Texture				Total Counts
	Pliable/Rubbery	*Pliable/Foam*	*Hard/Brittle*	*Fibrous*	
Black	7	2	23		**32**
White/Gray	8		10		**18**
Brown				4	**4**
Total Counts	**15**	**2**	**33**	**4**	**54**

3.1.3 XRF Screening of Individual Samples

The XRF screening of individual samples for chlorine content only identified 4 samples (out of the 54 collected) that had positive detection of chlorine. The XRF screening results for these four samples are presented in Table 3.3. The chlorine content measured by XRF in these samples ranged from 18,000 ppm up to nearly 500,000 ppm. Because of the limited number of positive chlorine results, XRF analysis could not be used for the majority of the samples as a factor in determining how to group samples for

compositing. All composites that included individual samples with positive chlorine detection by XRF are identified and discussed in more detail in Section 3.2.

Table 3.3 XRF chlorine screening results for samples collected for the BASMAA Regional Infrastructure Caulk and Sealant Sampling Program. Only samples with chlorine detected are included in this table.

Sample ID	Type of Structure	Structure Date	Caulk/Sealant Application	Sample Color and Texture	Chlorine Ion Concentration (ppm)
5	Wood Electrical Utility Pole attached to concrete sidewalk	1960-70's	Wood sealant	Black Hard/brittle	18,100 - 18,400
12	Concrete Bridge	<1960	Pre-fabricated joint filler	Black Pliable	159,500 - 189,100
48	Concrete Flood Control Channel	1960-70's	Pre-fabricated joint filler	White/Gray Hard/brittle	108,700 - 142,200
49	Concrete Flood Control Channel	1960-70's	Pre-fabricated joint filler	White/Gray Hard/brittle	95,900 - 489,800

3.1.4 Compositing Scheme

Based on the information recorded about the 54 individual samples that were collected, two major factors were identified that differentiated the majority of the samples, including: (1) the structure type the sample was collected from; and (2) the appearance of the sample, which was a combination of color and texture. The samples were grouped for compositing based primarily on these two factors, resulting in one to eight individual samples being included in each of the 20 composites. This compositing scheme resulted in grouping samples together that had similar caulk or sealant applications on specific structure types. Figure 3.1 presents the sample groupings included within each composite by structure type and sample appearance (color and texture). Each of the 20 composite samples was assigned a Composite ID which was a random letter designation from A to T. For three of the samples, the combination of structure type and sample appearance was unique enough to warrant analysis as an individual sample rather than a composite. Although XRF analysis results were limited, composites that contained individual samples with positive XRF results for chlorine were noted.

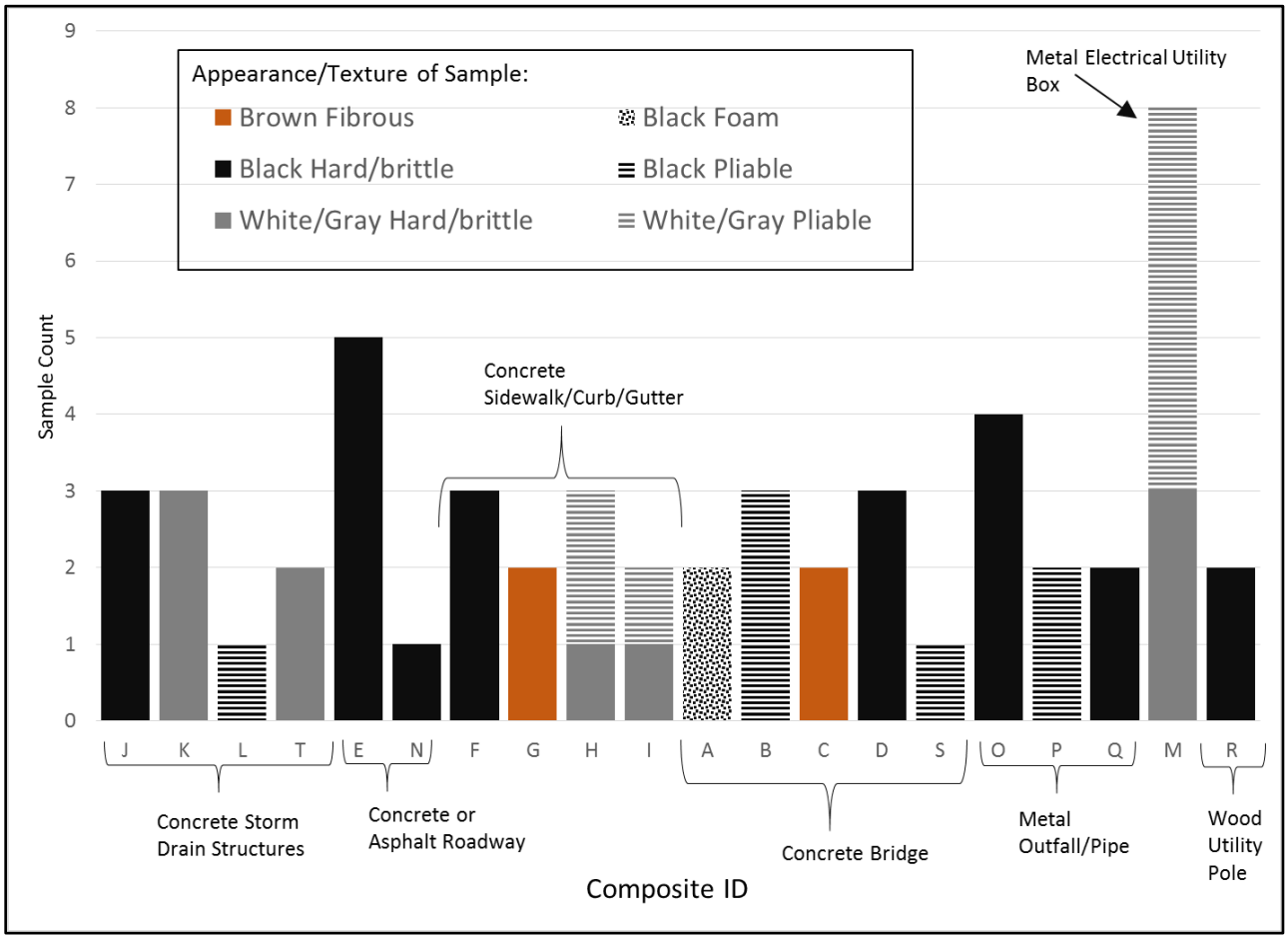

Figure 3.1 Structure types and sample appearance (color and texture) for the caulk and sealant samples included in each composite. Concrete Storm Drain Structures include samples collected from above ground flood control channels and below ground structures that were sampled via manhole access.

3.2 LABORATORY ANALYSIS

3.2.1 Quality Assurance and Quality Control

Data Quality Assurance (QA) and Quality Control (QC) was performed in accordance with the project's SAP/QAPP (Appendix B). The SAP/QAPP established Data Quality Objectives (DQOs) to ensure that data collected are sufficient and of adequate quality for their intended use. These DQOs include both quantitative and qualitative assessments of the acceptability of data. The qualitative goals include representativeness and comparability, and the quantitative goals include completeness, sensitivity (detection and quantization limits), precision, accuracy, and contamination. Measurement Quality Objectives (MQOs) are the acceptance thresholds or goals for the data.

The dataset included 20 composite field samples, with 1 blank, 1 laboratory control sample (LCS), and 2 matrix spikes (MSs), meeting the minimum number of QC samples required. All samples were analyzed within < 216 days, which is well within the recommended hold time of 1 year. Results were reported for the RMP 40 PCB congeners (with their coeluters). Two of the 40 congeners had poor recovery (>70% deviation from target values in LCS samples) and were rejected, so 95% of the field sample results were

reportable. In more than 50% of the samples, all PCBs congeners were non-detect (ND). Additionally, all congeners were ND in both MS samples, with consequent 0% recovery. Even adjusting for dilution factor, expected values of the target analytes were often < MDL reported. This suggests that MS samples were spiked at too low a level, and/or the method may have been insufficient to resolve interferences from the target analytes at the concentration ranges of interest. As the MS samples were the only ones analyzed in replicate, with all results ND, precision could not be calculated. The data, however, are usable for evaluating presence/absence or qualitative/order-of-magnitude comparison of concentration differences. However, due to highly uncertain measurement accuracy and no detectable replicate results to evaluate precision for any PCBs congeners, these data are not usable for finer differentiation. Additional details about the data quality review are presented below. The laboratory QA/QC data are available upon request.

Representativeness – The representativeness of data is the ability of the sampling locations and the sampling procedures to adequately represent the true condition of the sample sites. For this project, all samples are assumed to be representative as they were performed according to the protocols specified in the project SAP/QAPP (Appendix B). All field and laboratory personnel received and reviewed the SAP/QAPP and followed prescribed protocols, including laboratory methods, to ensure the collection of representative, uncontaminated samples.

Comparability – Comparability is the degree to which data can be compared directly to other relevant studies. Maximum concentrations were generally quite low in comparison to the maximums in the previous caulk study conducted in the region (Klosterhaus et. al 2014). However, the NDs/low spiking level/ 0% recovery in MSs mean that we do not have a good direct indicator of measurement accuracy in the caulk matrix.

Completeness – Completeness is the percentage of valid data collected and analyzed, compared to the total expected to be obtained under normal operating conditions. Overall completeness accounts for both sampling (in the field) and analysis (in the laboratory). In this project, the minimum number of field samples planned for collection was 40, which would be combined into 20 composite samples for PCBs analysis. The final dataset included 20 composites, comprised of 54 field samples, with 1 blank, 1 LCS, and 2 MSs, which achieves the number of samples planned for collection as part of the project (including QC samples). Data for two of the 40 PCBs congeners were rejected, so overall 95% of the field sample results were reportable.

Sensitivity – Different indicators of the sensitivity of an analytical method to measure a target parameter are often used including instrument detection limits (IDLs), method detection limits (MDLs), and reporting limits (RLs). For this Project, MDLs are the measurement of primary interest. The target MDL identified in MRP Provision C.12.e for PCBs analysis is 200 ppb (or µg/Kg). The PCBs analysis method that was used in this project (modified GC/MS-SIM) was selected to achieve this level of sensitivity. For this project, all samples that did not require dilution had MDLs well below the 200 ppb MDL target. For five samples that were analyzed at a secondary dilution, the MDL was elevated above this target. To evaluate the impact of the higher MDL on data interpretation (i.e., identifying the PCBs concentration category for each sample), ½ MDL was used for all congeners that were reported at ND in these samples, and a corrected total PCBs concentration was then calculated. In two of the five samples, the corrected PCBs concentration did not change the PCBs concentration category of the composite. For

the other three samples, the corrected PCBs concentration moved these composites from the low or very low category to the moderate PCBs category (< 50 ppm). The corrected concentrations did not result in any samples moving to the High or Very High PCBs categories.

Precision – Precision is used to measure the degree of agreement among individual measurements of the same property under prescribed similar conditions. Overall precision usually refers to the degree of agreement for the entire sampling, operational, and analysis system. For this project, precision was evaluated via matrix spikes and matrix spike duplicates (MS and MSD). The Project SAP/QAPP MQO for RPD is 25% for both laboratory and field duplicates. However, precision could not be evaluated, as no replicates of field samples were run, and all the MS results were ND.

Accuracy - Accuracy describes the degree of agreement between a measurement (or the average of measurements of the same quantity) and an acceptable reference or true value. For this project, accuracy of PCBs congener analysis was evaluated with MSs and laboratory control samples (LCS, spiked blanks). All congeners were ND in both MS samples. Thus, accuracy on MS samples could not be evaluated. LCS recoveries were within 70% relative to the target value for 38 of the 40 PCB congeners, which is an acceptable level of accuracy. However, LCS recoveries were >70% off (higher or lower) relative to the target value for two of the 40 PCBs congeners, and these results were rejected. The overall quantitativeness of the samples is therefore not robust.

Contamination - Blank samples help assure that analytes measured in samples originated from the target matrix in the sampled environment and are not contaminated artifacts of the analytical process. Per the Project SAP/QAPP, a method (laboratory) blank was run in the same batch as the samples and analyzed in a manner identical to the samples. The Project SAP/QAPP specifies that all blanks should not exceed the reporting limit. None of the target analytes were detected in the method blank.

3.2.2 PCBs Concentrations

Tables 3.4 – 3.6 present the PCBs concentrations measured in each composite during the ***BASMAA Regional Infrastructure Caulk and Sealant Sampling Program.*** The results are presented by PCBs category (Non-Detect/Very Low, Low, Moderate, High, and Very High). Additional information about the samples included in each composite is also presented, such as the structure type(s), sample appearance, and XRF screening results. Within each table, the composite results are presented in order of highest to lowest PCBs concentrations.

Total PCBs concentrations across the 20 composite samples ranged from non-detect (ND) to > 4,000 ppm (Tables 3.4-3.6). Twelve of the 20 composite samples (60%), had non-detect or very low PCBs concentrations that were well below the urban background for Bay Area public ROW surface soils and sediment (<0.2 ppm). In ten of the twelve composites with very low concentrations, all RMP-40 PCBs congeners were below detection limits. PCBs were detected above 0.2 ppm in the remaining eight composite samples, ranging from 0.43 ppm to 4,967 ppm. Composites A and B were in the Very High PCBs category (≥ 1,000 ppm). No composites were in the High PCBs category (≥50 ppm but <1,000 ppm). Composites Q, R and S were in the Moderate PCBs category (≥ 1 ppm but < 50 ppm). Composites C, D and K were in the Low PCBs category (≥ 0.2 ppm but < 1 ppm). Additional discussion about the types of samples in each PCBs concentration category is provided below.

3.2.2.1 No PCBs Detected

A total of 32 individual samples were included in the ten composite samples that had no PCBs detected (Table 3.4). The samples in these composites were collected from a variety of structure types, including asphalt and concrete roadway surfaces, concrete sidewalks, curbs and gutters, electrical utility boxes attached to concrete sidewalks, storm drain manholes, flood control channels, metal pipes and metal outfalls (Figure 3.2). The majority of these structures were constructed during the 1960's and 1970's. XRF screening did not detect any samples with chlorine in this category.

Table 3.4 Sample descriptions and PCBs concentrations for composites that had No PCBs Detected from the BASMAA Regional Infrastructure Caulk and Sealant Sampling Program. None of the RMP-40 PCB congeners were detected in any of the composite samples in this table.

Composite ID	Total PCBs (mg/Kg)	Type of Structure(s) Sampled	Caulk or Sealant Application	Sample Appearance (Color/ Texture)	# of Samples in Composite	Sample ID's in Composite	Structure Construction Date
E	ND	Concrete Roadway Surface	Caulk between expansion joints	Black Hard/brittle	5	35	<1980
						36	<1980
						37	<1980
						38	<1980
						39	<1980
F	ND	Concrete sidewalk	Caulk between joints	Black Hard/brittle	3	2	<1960
						7	<1960
						46	<1980
G	ND	Concrete sidewalk /curb/gutter	Caulk between joints	Brown Fibrous	2	16	1960-70's
						17	1960-70's
H	ND	Concrete sidewalk /curb/gutter	Crack Sealant	White/Gray Hard/brittle or Pliable	3	1	<1980
						8	1960-70's
						18	1960-70's
J	ND	Concrete Storm Drain Structure: Flood Control Channel	Caulk between joints	Black Hard/brittle	3	50	1960-70's
						53	1960-70's
						54	1960-70's
L	ND	Concrete Storm Drain Structure: Inside Manhole opening	Sealant between concrete surfaces	Black Pliable	1	34	1960-70's
M	ND	Metal Electrical Utility Box attached to concrete sidewalk	Caulk around base	White/Gray Pliable or White Hard/Brittle	8	11	<1960
						14	1960-70's
						15	1960-70's
						19	1960-70's
						21	1960-70's
						22	1960-70's
						25	<1960
						45	1960-70's
N	ND	Asphalt Roadway Surface	Surface adhesive	Black Hard/brittle	1	4	<1980
O	ND	Metal Outfall	Interior and Exterior Pipe Sealant	Black Hard/brittle	4	33	1960-70's
						41	1960-70's
						42	1960-70's
						43	1960-70's
P	ND	Metal Pipes adjacent to bridge and Metal Outfall	Exterior Pipe wrap	Black Pliable	2	3	1960-70's
						40	<1980

Figure 3.2 Examples of structures that were sampled and caulk or sealant materials that were included in the composites that had No PCBs Detected. Not all structures or samples included in the No PCBs Detected category are pictured here.

3.2.2.2 Very Low PCBs

A total of four individual samples were included in the two composites in the Very Low PCBs category (< 0.2 ppm, Table 3.5). The samples in these composites were collected from concrete sidewalks and concrete flood control channels (Figure 3.3). Samples in Composite T were collected from structures that were constructed in the 1960's and 1970's. The majority of these structures were constructed during the 1960's and 1970's. XRF screening detected chlorine concentrations in both samples included in Composite T, ranging from 100,000 to 500,000 ppm. However, chemical analysis results found PCBs in this composite were less than 0.02 ppm. The two samples included in this composite were both pre-fabricated materials that could have contained chlorine that was not from PCBs.

Table 3.5 Sample descriptions and PCBs concentrations for all composites in the Very Low PCBs concentration category (i.e., < 0.2 ppm) from the BASMAA Regional Infrastructure Caulk and Sealant Sampling Program. Results are presented in order from highest to lowest PCBs concentrations.

Composite ID	Total PCBs (mg/Kg)	Type of Structure(s) Sampled	Caulk/Sealant Application	Sample Appearance (Color/Texture)	# of Samples in Composite	Sample ID's included in Composite	Structure(s) Construction Date
I	0.06	Concrete sidewalk/curb/gutter	Surface adhesive	White Hard/brittle or White Pliable	2	23	<1980
						24	<1980
*T	0.03	Concrete Storm Drain Structure: Flood Control Channel	Pre-fabricated joint filler	White/Gray Hard/brittle	2	48	1960-70's
						49	1960-70's

*XRF screening estimated the chlorine content of these sample was 100,000 – 500,000 ppm. XRF screening did not identify chlorine content in any other samples in this table.

Figure 3.3 Examples of structures that were sampled and caulk or sealant materials that were included in composites that had Very Low PCBs (< 0.2 ppm). Not all structures or samples included in the Very Low PCBs category are pictured here.

3.2.2.3 Low PCBs

Three composite samples (Composites C, D and K) had low PCBs concentrations ranging from 0.43 ppm to 0.78 ppm. All of the materials within each of these composites were used as joint fillers in the gaps between concrete structures, including bridges and flood control channels (Figure 3.4). Composite C was comprised of samples of brown fibrous materials from concrete bridges. Composite D was comprised of black, hard/brittle materials from concrete bridges. Composite K was comprised of samples of gray, hard materials from concrete flood control channels. The observed PCBs concentrations suggest proximity to a PCBs source. However, given the relatively low concentrations, the PCBs in these samples likely resulted from contamination by a source other than the sampled materials. For example, older PCB-containing caulks or sealants may have been used previously at these locations, and there may be residual PCBs from these past sources.

Figure 3.3 Examples of structures that were sampled and caulk or sealant materials that were included in the composites that had Low PCBs (≥ 0.2 ppm and < 1 ppm). Not all structures or samples included in the Low PCBs category are pictured here.

Table 3.6 Sample descriptions and PCBs concentrations for all composite samples in the Very High, Moderate and Low PCBs concentration categories (i.e., above 0.2 ppm) from the BASMAA Regional Infrastructure Caulk and Sealant Sampling Program. None of the composites in this sampling program had PCBs concentrations in the High PCBs category. Results are presented in order from highest to lowest PCBs concentrations.

PCBs Category	Composite ID	Total PCBs (mg/Kg)	Type of Structure(s) Sampled	Caulk/Sealant Application	Sample Appearance (Color/ Texture)	# of Samples in Composite	Sample ID's in Composite	Structure Construction Date
VERY HIGH	A	4,967	Concrete Bridge	Caulk between expansion joints	Black Pliable Foam	2	10	1960-70's
							13	<1960
	B	4,150	Concrete Bridge	Caulk between expansion joints	Black Pliable	3	9	1960-70's
							30	1960-70's
							31	<1960
MODERATE	Q	24	Metal Pipes adjacent to bridge	Exterior Pipe Sealant	Black Hard/brittle	2	28	1960-70's
							44	1960-70's
	*R	2.8	Wood Electrical Utility Pole attached to concrete sidewalk	Wood sealant	Black Hard/brittle	2	5	1960-70's
							6	1960-70's
	*S	2.5	Concrete Bridge	Pre-fabricated joint filler	Black Pliable	1	12	<1960
LOW	C	0.78	Concrete Bridge	Caulk between expansion joints	Brown Fibrous	2	20	1960-70's
							26	1960-70's
	D	0.70	Concrete Bridge	Sealant between concrete surfaces or between concrete and wood surface	Black Hard/brittle	3	27	<1960
							29	1960-70's
							32	<1960
	K	0.43	Concrete Storm Drain Structure: Flood Control Channel	Caulk between joints	Gray Hard/brittle	3	47	1960-70's
							51	<1960
							52	1960-70's

*XRF screening chlorine content of these samples ranged from 18,000 ppm to 189,000 ppm. XRF screening did not identify chlorine content in any other samples in this table.

3.2.2.4 Moderate PCBs

Three composite samples (Composites Q, R and S) had Moderate PCBs concentrations, ranging from 2.5 ppm to 24 ppm (Table 3.6). Composite Q (24 ppm) was comprised of black, pliable sealant materials used on the exterior surfaces of exposed metal pipes (e.g., gas, water, or sewage pipelines) that ran adjacent to concrete bridges (Figure 3.5). Composite R was comprised of black sealant materials collected from wooden utility poles attached to concrete sidewalks. Composite S consisted of black filler materials used in expansion joints or between adjacent surfaces on concrete bridges. The concentrations found in these composites were all within the range of concentrations considered high for surface soil and storm drain sediments during investigations conducted to identify watershed-based PCBs sources, but much lower than the concentrations that would be expected if PCBs were a component of the caulk or sealant formulation. Given the elevated, but still relatively low concentrations, the sources of PCBs in these samples more likely result from contamination by residual PCBs remaining at these locations from past sources.

Figure 3.4 Examples of structures that were sampled and sealant materials that were included in the composites that had Moderate PCBs (≥ 1 ppm and < 50 ppm). Not all structures/samples in the Moderate PCBs category are pictured here.

3.2.2.5 Very High PCBs

Only two composite samples (Composites A and B), comprising 9% of the individual samples collected during this program had Very High PCBs concentrations (≥ 1,000 ppm). All of the samples within these composites were of black, pliable joint filler materials that were collected from concrete bridges (Figures 3.6 – 3.7). PCBs concentrations in this category indicate that PCBs were likely part of the original caulk or sealant formulations to impart desired characteristics such as elasticity. This finding is consistent with a previous sampling effort that found elevated PCBs in the black, pliable expansion joint filler that was used on the old eastern span of the San Francisco-Oakland Bay Bridge (Caltrans 2013).

Figure 3.5 Examples of structures that were sampled and caulk materials that were included in Composite A, which had Very High PCBs (≥ 1,000 ppm).

Figure 3.6 Examples of structures that were sampled and caulk materials that were included in Composite B, which had Very High PCBs (≥ 1,000 ppm).

3.2.3 Utility of XRF Screening

Composite R and S were the only samples that had PCBs above urban background and that also had chlorine detected by XRF analysis (Tables 3.3 and 3.6). However, given the 5 orders of magnitude difference between the chlorine concentration determined by XRF analysis and the PCBs concentrations determined by GC/MS analysis, even when chlorine is detected, the vast majority is often not from PCBs. More critically however, although all of the composites with no PCBs detected in this study also never had chlorine detected by XRF, some composites with very high PCBs (A & B), also had no detectable chlorine by XRF. Thus the results provided no evidence that XRF screening was useful for identifying samples with PCBs, nor for conclusively identifying samples that would not have PCBs.

3.2.4 Comparison with Other Studies

Table 3.7 presents a comparison of the PCBs concentrations measured in caulk and sealants collected during this sampling program with concentrations measured in caulk and sealants from previous studies in the Bay area, across the United States, and globally. Previous studies found very high, high and moderate concentrations of PCBs in caulk and sealant materials used on the exteriors of buildings, between concrete structures, in storm drain infrastructure, and in a drinking water reservoir (Sykes and Coates 1995, Herrick et al. 2004, Kohler et al. 2005, Robson et al. 2010, Tacoma 2013, 2016, Klosterhaus et al. 2014). PCBs concentrations detected in these studies ranged from the low parts per million up to 55% PCBs by mass. All of the PCBs concentrations detected in the current study are within the range of concentrations found in these other studies.

For additional context, Table 3.7 also includes the range of PCBs concentrations that have been measured to-date in public ROW surface soils and storm drain sediments in the Bay Area. In public ROW surface soils and sediments, PCBs above 1 ppm are considered high, and indicate proximity to a source. However, the highest concentrations that have been observed to date in public ROW surface soils and storm drain sediment in the Bay Area are below 200 ppm, or < 0.02% PCBs. By comparison, the highest concentrations found in caulks and sealants in this study were at least one order-of-magnitude greater than the highest storm drain sediment concentrations. Further, the highest concentrations of PCBs in caulks and sealants from this study were also one order-of-magnitude greater than the PCBs concentrations found in storm drain sealant in Tacoma, Washington (Tacoma 2013, 2016), and three orders-of-magnitude greater than the previous finding of PCBs in joint filler materials from the old eastern span of the San Francisco-Oakland Bay Bridge (Caltrans 2013).

About one-third of the samples of caulk or sealant materials collected during previous studies from building exteriors had PCBs concentrations above 50 ppm, which is the U.S. federal regulatory threshold for hazardous waste. In this BASMAA study, approximately one-tenth of the samples were above 50 ppm. The highest PCBs detected however, were much lower (one or two orders of magnitude lower) than the highest PCBs concentrations found in building caulks and sealants during previous studies. Compositing may have resulted in the dilution of higher concentration samples in the current study, however, at most this would result in dilution by one-half or one-third (given the number of samples included in each composite). Therefore, even accounting for potential dilution by one or more low concentration samples in each composite, the concentrations found in this study remain much lower than those observed in previous studies of PCBs in caulks or sealants from building exteriors.

Table 3.7 Comparison of PCBs concentrations measured in caulk and sealant materials collected from buildings and public roadway or storm drain infrastructure in the BASMAA Regional Infrastructure Caulk and Sealant Sampling Program, and other studies in the Bay Area, the United States and globally.

Study Location		Study Authors	Number of Samples	PCBs Concentrations	Materials Sampled
San Francisco Bay Area		*Numerous*[a]	*> 1,200*	*ND – 193 ppm*	*Public ROW surface soils or storm drain infrastructure sediment*
		BASMAA 2018	**20**[b]	**<4,967 ppm (up to 0.5%)**	**Caulk and sealants from public roadway/storm drain infrastructure**
		Klosterhaus et al. 2014	29	1 - 220,000 ppm (up to 22%)	Exterior building caulk
		Caltrans 2013	n/r[c]	0.7 - 3.7 ppm (0.0004%)	Black rubber sealant between expansion joints on old eastern span of San Francisco-Oakland Bay Bridge
		Sykes and Coate 1995	n/r	~200,000 ppm (20%)	Caulk lining a drinking water reservoir
Other Locations	**Tacoma, WA**	Tacoma 2013, 2016	n/r	260 ppm (0.026%)	Black tar sealant from a storm drain catch basin
	Boston, MA	Herrick et al. 2004	24	0.56-32,000 ppm (up to 3.2%)	Exterior building caulks
	Toronto, Canada	Robson et al. 2012	95	570-82,000 ppm (up to 8.2%)	Exterior building caulks
	Switzerland	Kohler et al. 2005	1,348	20-550,000 ppm (up to 55%)	Building joint sealants

[a]Gunther et al. 2001; KLI and EOA Inc. 2002; EOA Inc. 2002, 2004, 2007a, 2007b; City of San Jose and EOA Inc. 2003; SMSTOPPP 2002, 2003; Kleinfelder 2005, 2006; Salop et al. 2002a, 2002b; Yee and McKee 2010; SCVURPPP 2018; SMCWPPP 2018.

[b]The Samples were composites containing samples from 1 to 8 sites each.

[c]Not Reported (n/r)

4 CONCLUSIONS AND RECOMMENDATIONS

The ***BASMAA Regional Infrastructure Caulk and Sealant Sampling Program*** found PCBs at concentrations < 0.2 ppm for the majority of caulk and sealant samples collected from a variety of Bay Area public roadway and storm drain infrastructure. Forty percent (8 of 20) of the composite samples analyzed during this sampling program were above 0.2 ppm. Of these, only two composite samples had very high PCBs concentrations (> 1,000 ppm). Concentrations in this category indicate that PCBs were likely part of the original caulk or sealant formulations to impart desired characteristics such as elasticity. These results demonstrate that PCBs-containing caulks and sealants were used in some capacity on Bay Area roadway and storm drain infrastructure in the past, but the full extent and magnitude of this usage is unknown. All of the individual samples included within the two composite samples with very high PCBs consisted of black, pliable caulking materials that were used as joint fillers on concrete bridges or overpasses constructed prior to 1980. This finding, combined with previous findings in Tacoma and the Bay Area of PCBs in black filler materials, suggests that future characterization efforts might provide somewhat greater focus on these types of materials and applications.

No samples contained PCBs in the high category (50 - 1,000 ppm) and three composite samples only contained moderate (1 - 50 ppm) PCBs concentrations. For comparison purposes, soil/sediment samples collected in the public ROW that have concentrations within the moderate category (> 1 ppm), are typically investigated further and may indicate proximity to a PCBs "source property" that can be referred to the Regional Water Board for further evaluation. That said, the fate and transport processes of caulk/sealants in roadways and storm drain infrastructure likely differ greatly from sediment collected in public ROWs. Furthermore, the moderate concentrations observed during this study are well below the concentrations that would be expected if PCBs were a significant component of the original caulk/sealant material. The PCBs observed in samples with the moderate or low (>0.2 – 50 ppm) categories may be due to contamination from other sources, which could include residual PCBs associated with source materials that are no longer present. For example, the past use of PCBs-containing caulks or sealants that have since been removed or simply disintegrated over time may have left behind residual PCBs that contaminated surrounding surfaces.

Of the ten structure types that were sampled during this study, only concrete bridges/overpasses had PCBs at levels approaching the very high concentrations expected for PCBs-containing caulks and sealants. Thus, these results provide no indication that caulk and sealants present in the other nine types of structures that were sampled during this program would be expected to contain PCBs at levels above those observed in sediments/soils within the public ROW or on private properties in the Bay Area. There may be other types of materials that were not observed or collected during this sampling program that contain higher concentrations of PCBs.

The conclusions from this sampling program are limited by the small number of structures that were sampled (n=54), compared with the vast number of roadway and storm drain structures throughout the Bay Area that were originally constructed during the peak period of PCBs production and use (1950 – 1980). Many questions remain about infrastructure caulks and sealants as potential sources of PCBs to

stormwater. The data from this sampling program are not adequate to address these questions, including:

- Do PCBs migrate from infrastructure caulks and sealants into urban stormwater? If so, what are the processes involved?
- What are the PCBs concentrations of concern in infrastructure caulks and sealants?
- What is the mass of infrastructure caulk and sealants in the Bay Area that has PCBs concentrations of concern?
- How much PCBs mass is transported from infrastructure caulks and sealants to stormwater annually?

Given the limitations of the project, more information would be needed to estimate the mass of PCBs in infrastructure caulk and sealant materials, to better understand the fate and transport of PCBs in these materials, and to calculate stormwater loading estimates. Nevertheless, this screening-level sampling program was the first step towards understanding if infrastructure caulk and sealants are a potential source of PCBs to urban stormwater. Although limited by the small number of samples, the results of this sampling program indicate: (1) the majority of roadway and storm drain structure types that were sampled in this project did not have PCBs-containing caulks or sealants at concentrations of concern, and (2) only black, pliable joint fillers found on concrete bridges/overpasses sampled had PCBs concentrations of potential concern to stormwater. If further investigation is conducted, focusing on this type of application may be a reasonable place to continue such efforts.

5 REFERENCES

Caltrans 2013. Email communication from Hardeep Takhar, Caltrans District 4 Division of Environmental Planning and Engineering to Derek Beauduy, Environmental Specialist, San Francisco Bay Regional Water Quality Control Board. Oakland, CA, November 20, 2013.

City of San Jose and EOA Inc., 2003. Year Two Case Study Investigating Elevated Levels of PCBs in Storm Drain Sediments in San Jose, California. July 2003.

City of Tacoma, 2013. East Tacoma PCB Cleanup Project Draft Remedial Action Workplan. Appendix A: OF237B 2013 PCB Source Tracing Investigation. Prepared by City of Tacoma.

City of Tacoma, 2016. Thea Foss and Wheeler-Osgood Waterways 2015 Source Control and Water Year 2015 Stormwater Monitoring Report. Prepared by City of Tacoma for the Washington State Department of Ecology and United States Environmental Protection Agency.

EOA Inc., 2002. Final Report: Joint Stormwater Agency Project to Study Urban Sources of Mercury, PCBs, and Organochlorine Pesticides. April 2002a. Prepared for: Santa Clara Valley Urban Runoff Pollution Prevention Program; San Mateo Countywide Stormwater Pollution Prevention Program; Contra Costa Clean Water Program; Marin County Stormwater Pollution Prevention Program; Vallejo Flood Control and Sanitation District; and Fairfield Suisun Sewer District, April 2002.

EOA Inc., 2004. Case Study Investigating PCBs in Storm Drain Sediments from Colma Creek. Prepared for San Mateo Countywide Stormwater Pollution Prevention Program. May 2004.

EOA Inc., 2007a. Concentrations of PCBs in Stormwater Conveyance Systems in the Cutting Boulevard and Wright Avenue Drainage Areas (Richmond, CA). Prepared for the Contra Costa Clean Water Program, May 2007.

EOA Inc., 2007b. Summary of Polychlorinated Biphenyls (PCBs) Data in Sediment Collected from Richmond, California Streets and Storm Drains. Prepared for City of Richmond: 23 pp. October 2007.

EOA Inc., 2011. Work Plan – PCBs Source Identification Pilot Project: Leo Avenue Watershed, San Jose, California. Prepared for SCVURPPP and the City of San Jose. June 2011.

Erickson MD and Kaley II RG. 2011. Applications of polychlorinated biphenyls. Environmental Science Pollution Research 18, 135-51.

Gunther, A. J., P. Salop, D. Bell, A. Feng, J. Wiegel and R. Wood, 2001. Initial Characterization of PCB, Mercury, and PAH Contamination in the Drainages of Western Alameda County, CA, Alameda Countywide Clean Water Program: 43 pp.

Herrick, R. F.; McClean, M. D.; Meeker, J. D.; Baxter, L. K.; Weymouth, G. A. 2004. An unrecognized source of PCB contamination in schools and other buildings. Environ. Health Perspectives. 2004, 112, 1051-1053.

Kleinfelder, 2005. Sediment Sampling Report, Ettie Street Pump Station Watershed, Oakland, California. Prepared for City of Oakland PWA - ESD by Kleinfelder, Inc. July 29, 2005.

Kleinfelder, 2006. Final Project Report, Ettie Street Pump Station Watershed, Oakland, California. Prepared for City of Oakland PWA - ESD by Kleinfelder, Inc. September 29, 2006.

Klosterhaus, S., McKee, L.J., Yee, D., Kass, J.M., Wong, A. 2014. Polychlorinated biphenyls in the exterior caulk of San Francisco Bay Area buildings, California, USA. Environment International 66, 38-43.

Kohler M, Tremp J, Zennegg M, Seiler C, Minder-Kohler S, Beck M, Lienemann P, Wegmann, L, Schmid P. 2005. Joint caulk: an overlooked diffuse source of polychlorinated biphenyls in buildings. Environ Sci Technol 39: 1967-1973.

Robson M, Melymuk L, Csiszar SA, Giang A, Diamond ML, Helm PA. 2010. Continuing sources of PCBs: the significance of building caulk. Environ Int. 36(6):506-13.

Salop, P., Hardin, D., Abu-Saba, K., Gunther, A., and Feng, A., 2002a. Source Investigations in Ettie Street Pump Station and Glen Echo Creek Watersheds Oakland California. Prepared for: Alameda Countywide Clean Water Program. August 2002. Pg 33

Salop, P., Abu-Saba, K., Gunther, A., and Feng, A., 2002b. Alameda County Watershed Sediment Sampling Program: Two-Year Summary and Analysis. Prepared for: Alameda Countywide Clean Water Program. September 12, 2002.

SCVURPPP, 2018. Pollutants of Concern Monitoring Data Report. Water Year 2017. Santa Clara Valley Urban Runoff Prevention Program. March 31, 2018.

SMCWPPP, 2018. Pollutants of Concern Monitoring Data Report. Water Year 2017. San Mateo Countywide Water Pollution Prevention Program. March 29, 2018.

SMSTOPPP, 2002. PCBs Use and/or Release Sites in San Mateo County. Prepared for the San Mateo Countywide Stormwater Pollution Prevention Program by EOA Inc. February 25, 2002.

SMSTOPPP, 2003. Case Study Investigating Elevated Levels of PCBs in Storm Drain Sediments in the Pulgas Creek Pump Station Drainage, San Carlos, California, Prepared for: San Mateo Countywide Stormwater Pollution Program: 21 pp.

Sykes, R.G., and Coate, A., R. PCBs in sealants in water distribution reservoirs. Journal of the American Water Works Association 87, April 1995, pp. 96-100

World Health Organization (WHO), 1993. Polychlorinated biphenyls and terphenyls. In: Dobson S., and van Esch G.J. (Eds) Environmental Health Criteria 140, 2nd Edition. World Health Organization, Geneva Switzerland.

Yee, D., McKee, L.J., 2010. 3.5: Concentrations of PCBs and Mercury in Soils, Sediments and Water in the Urbanized Bay Area: Implications for Best Management. A technical report of the Watershed Program. SFEI Contribution 608. San Francisco Estuary Institute, Oakland, CA. March 31, 201.

APPENDIX A: FINAL STUDY DESIGN

Evaluation of PCBs in Caulk and Sealants in Public Roadway and Storm Drain Infrastructure

Final Study Design

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1 INTRODUCTION

1.1 BACKGROUND

Until banned from production in 1979, polychlorinated biphenyls (PCBs) were commercially produced and used in a variety of products in the U.S., including caulk compounds and joint sealants. In addition to uses in public and private buildings of tilt-slab style constructed prior to 1979 (Klosterhaus et al. 2014), PCBs-containing caulks and sealants may also be found between the expansion joints in public infrastructure such as roadways, parking garages, bridges, dams, storm drain pipes, and pavement joints (e.g., curb and gutter). PCB use in caulk or sealant is categorized as an open-ended application that allows potential release of PCBs to the environment during use, compared with closed applications (e.g., PCBs as dielectric fluid in transformers) that do not allow release to the environment during normal use (WHO, 1993). Because open application of caulks and sealants in such public roadway and storm drain infrastructure can come into direct contact with stormwater as it flows over and through these systems, this can be a direct source of PCBs in urban stormwater.

In 2013, the City of Tacoma conducted a source-tracing program after elevated PCBs were detected in stormwater from a residential neighborhood that drains to the Thea Foss Waterway (City of Tacoma 2013, 2016). The city determined that the source of PCBs was a black tar crack sealant in a storm drain catch basin in the neighborhood that was applied during a 1975 road construction project. A sample of the sealant collected between the asphalt and concrete catch basin had PCB concentrations up to 260 ppm. Although most of the sealant had worn away by 2013, the soil underneath the sealant was likely contaminated with PCBs as the sealant material disintegrated over the years.

In the Bay Area, several open applications of PCB-containing caulks have been identified previously, including caulks used around windows and door frames of buildings (Klosterhaus et al., 2014), in the sealant that was used in the gaps between concrete slabs of the road deck on the Old East Span of the San Francisco Oakland Bay Bridge, and in caulk used in the joints of concrete drinking water storage reservoirs located in Alameda County (Sykes and Coate, 1995). These examples represent the limited extent of local information that is currently available on PCBs in storm drain and roadway infrastructure, and demonstrate that additional monitoring data are needed to evaluate the importance of this potential source of PCBs to urban stormwater runoff. Although the reservoir of PCBs contained in roadway and storm drain infrastructure caulks and sealants in the Bay Area is currently unknown (and we are not aware of any other published study that has completed an inventory in urban infrastructure in the US), this source is potentially large enough to warrant further investigation.

1.2 REGULATORY REQUIREMENTS

Provision C.12 of the Municipal Regional Stormwater NPDES Permit (MRP; Order No. R2-2015-0049) implements the PCB Total Maximum Daily Loads (TMDLs) for the San Francisco Bay Area. Provision C.12.e of the MRP specifically requires that Permittees collect at least 20 composite samples (throughout the permit area) to investigate PCB concentrations in caulk and sealants from public roadway and storm drain infrastructure, and report the results in the 2018 Annual Report. Laboratory

analysis methods must be able to detect a minimum PCBs concentration of 200 parts per billion (ppb, or µg/Kg). To achieve compliance with Provision C.12.e, MRP Permittees have agreed to collectively conduct this sampling via the Bay Area Stormwater Management Agencies Association (BASMAA). This effort will also contribute to partial fulfillment of pollutants of concern (POC) monitoring required in Provision C.8.f of the MRP to address source identification, one of the five management information needs identified in the MRP. Source identification monitoring focuses on identifying which sources or watershed source areas provide the greatest opportunities for reductions of POCs in urban stormwater runoff.

1.3 Project Goal

The overall goal of this project is to evaluate, at a limited screening level, whether and in what concentrations PCBs are present in public roadway and storm drain infrastructure caulk and sealants in the Bay Area. To accomplish this goal, this study design presents a regional sampling plan to collect and analyze PCBs in 20 composite samples of caulk and sealants from public roadway and storm drain infrastructure. Implementation of this sampling plan will result in Permittee compliance with MRP Provision C.12.e, and partial fulfillment of the Provision C.8.f monitoring requirements aimed at finding PCBs sources. The results of this project will be reported in each countywide stormwater program's 2018 Annual Report, and will be used to guide next steps.

2 Study Design

2.1 Approach

The overall approach is to collect, analyze and report on PCB concentrations measured in Bay Area roadway and storm drain infrastructure caulk and sealants. The project team, in coordination with participating municipalities, will collect up to 50 samples of caulk and other sealants from storm drain structures and between concrete curbs and street pavement in public right-of-ways. These samples will be composited and a total of 20 composite samples will be analyzed for PCB concentrations. The results will be reported in the 2018 Annual Report.

Participation of Bay Area municipal partners is a critical factor for success of this project. To ensure willingness to participate, municipal partners will remain anonymous in all project reporting. Further, a blind sampling approach will be applied such that no information will be retained or reported that identifies the specific locations where PCB concentrations were measured. Only generic information that does not identify sample locations will be retained, including the type of structure or material collected, type of usage, age of structure, etc. These factors may be used to guide selection of samples for compositing and PCBs analysis. Moreover, this information may provide clues about where PCBs are more likely to be found in infrastructure caulk or sealants in the Bay Area. Additional information about each sampling site that may be useful for future efforts to estimate the PCBs inventory in these materials may also be documented, including crack dimensions, the length and/or width of the caulk bead sampled, spacing of expansion joints in a particular type of application, etc.,.

Over-sampling across multiple municipalities may also be conducted, as resources allow, such that only a subset of those samples, selected blind to their location, will be sent to the lab for PCBs analysis. This approach was deemed appropriate because the goal of this project is not to identify specific locations with elevated PCBs, but rather, to better understand if roadway/storm drain infrastructure caulk or sealants are potential sources of PCBs to urban stormwater runoff in the Bay Area. The regional sampling plan presented below is divided into two phases, including:

1. Identification of Structures for Sampling and Sample Collection
2. Selection of Samples for Compositing, PCBs Analysis and Reporting

Detailed descriptions of all sampling and analysis methods that will be used, the data quality objectives, and the procedures that will be implemented to ensure data quality during this project will be provided in the Quality Assurance Project Plan and Sampling and Analysis Plan (QAPP/SAP, *in preparation*). If PCBs are found to be present in infrastructure in the Bay Area, a protocol may be developed in the future to identify and manage PCBs-containing materials during infrastructure improvement projects to reduce potential discharges to the MS4. If PCBs are found, some municipalities may wish to perform immediate abatement rather than waiting for the next infrastructure improvement project at that location.

2.2 Phase 1: Identification of Structures for Sampling and Sample Collection

Phase 1 includes recruitment of Bay Area municipal partners, identification of structures within partner municipalities' jurisdictions for sampling, and sample collection. Each of the steps required to implement Phase 1 are described below.

2.2.1 Recruitment of Municipal Partners

The first step in implementing Phase I of this monitoring program is to recruit participation from Bay Area municipalities. Stormwater Program staff from each of the five Bay Area counties subject to the MRP will conduct outreach to municipalities in their countywide program and request participation in the project. The project team has prepared a memo that can be used to inform potential municipal partners about the project and request for participation. The role of the municipal partners will be to assist the project team in identifying appropriate structures for sampling, and to assist the monitoring contractor during sample collection, as needed. This assistance will entail working with the project team to identify appropriate sites by providing municipal staff that have working knowledge of roadways and storm drain infrastructure in the city, including the general condition and location of appropriate structures, maintenance and repair issues, and access to records or knowledge of the information needed to apply the screening criteria for sample site selection (defined below).

The municipal staff will be asked to review the screening criteria with the project team, provide information on the location of structures that may meet these criteria, and (as needed) accompany project team members during field visits to potential sample locations to verify structure conditions and identify specific locations where caulk/sealant are available for sample collection. Municipal staff may also be requested to provide logistical support to the monitoring contractor during sample collection, if needed, which may involve providing permits, traffic controls or other safety measures that may be required.

Interested municipal staff will be asked to look for opportunities (described in more detail in Sections 2.1.2 and 2.2) to collect caulk or sealant samples independent of the project monitoring contractor. All necessary information for municipal staff to perform such sample collection will be provided in the project QAPP/SAP (*in preparation*).

Desirable attributes of municipal partners include one or more of the following characteristics:

- Cities that were significantly urbanized prior to 1980. All newer urban areas will be excluded from sampling, as these are not expected to contain PCBs in caulk or sealants.
- Cities that conduct their own road and storm drain infrastructure maintenance. Information about maintenance and repairs to all potential sample site locations, as well as site-specific information on potential structures will be needed to identify appropriate sampling sites.
- Cities that have available records of structure installation or rehabilitation and/or knowledgeable staff that can provide such information as far back as the 1970's. Site selection will rely heavily on the knowledge of roadway and storm drain infrastructure provided by municipal staff.
- Cities that have the available resources and willingness to assist the project team in identifying sampling sites, and during sample collection. The project team will ask participating municipal staff to review the screening criteria for sample site selection (provided below) and identify potential locations that meet the criteria. Municipal staff will also be asked to participate in field reconnaissance during site selection and logistical support during sample collection, as described below.
- Larger cities are more likely to have the desirable attributes described above. However, cities of any size that have these attributes are also desirable municipal partners.

2.2.2 Sample Site Selection Criteria

The sample population for this project is the universe of publicly maintained roadways, sidewalks and storm drain structures containing caulk or sealants located within participating Bay Area municipalities. Based on literature review and best professional judgement, the screening criteria for sample site selection provided below were developed to target structures for sampling that are more likely to contain PCBs in caulk or sealants, while also balancing logistical and safety considerations for sample collection. After the municipal partners have been identified, these criteria may be modified or refined based on input from knowledgeable municipal staff and to address any municipal-specific issues. Any modifications to the initial screening criteria presented below will be documented in the final project report. Initial screening criteria for sample site selection include the following:

1. **Public Property**: All sample sites must be located within the public right-of-way
2. **Structure Types**: The following concrete or asphalt structures may be selected: roadways, parking lots, bridges, sidewalks, pavement joints (e.g, curbs and gutters), storm drain catch basins or inlets, and storm drain pipes or culverts.
3. **Structure Age**: Sampling will focus on structures (or portions of structures) installed or rehabilitated during the 1970's. Although PCBs were likely present in caulk and sealants used prior to the 1970's, these materials are expected to break-down and disintegrate over time due to normal wear. So, the older caulks/sealants are more likely to have worn away and/or to have

been replaced. To reduce this possibility, this project will focus on sampling efforts on the 1970's as the most recent decade during which PCBs were used in caulk and sealants.

4. **Structure Rehabilitation Age**: Sampling will focus on structures (or portions of structures) that have not undergone rehabilitation since the 1980's. Because PCBs were not used from at least 1980 onward, any structures, or portions of structures that were rehabilitated, including removal and replacement of caulk/sealant, and/or addition of caulk/sealant from 1980 onwards are excluded from sampling.
5. **Road Materials**: Portland cement concrete roads are more durable than asphalt-based pavement; thus, existing concrete roads are more likely to contain caulk/sealants applied during the 1970's because they are less likely to have been replaced or resurfaced since 1980.
6. **Open Application of Caulk/Sealant**: Sampling will focus on open applications of caulk or sealants that are exposed and available for sample collection. Examples include: sites of roadway or storm drain infrastructure repairs, such as filled cracks that formed on the surface after installation, joints between concrete curbs and street pavement, joints between concrete paving, sidewalks or bridge decks, and joints between sections of storm drain pipes or culverts.
7. **Accessibility**: All sample sites must be safely accessible to the monitoring team for sample collection. Sites that do not require confined space-entry or other special equipment are preferred.
8. **Ongoing Capital Projects:** Storm drain infrastructure rehabilitation or roadway repaving or repairs that are happening during the study period (July 2017 through December 2017) may provide an opportunity for municipal staff to collect samples of caulk or sealants (independent of the project monitoring contractor) that would otherwise not be accessible.
9. **Other Opportunities**: During field reconnaissance or sampling, additional unplanned/opportunistic sites may be identified that are good candidates for sampling, including locations observed to have older crack sealants that may be present from past repairs, locations where cracks between asphalt and concrete gutters may contain older caulks/sealants, etc. Municipal staff may have knowledge of such locations where old crack sealant may be present, or may identify such locations during their normal operation and maintenance activities throughout the course of the project.

The project team will work with municipal staff to identify potential sampling sites that meet the above criteria within the jurisdiction of each partner municipality. To identify sites, the first step will entail review of available information such as GIS map layers, satellite imagery, or records from tracking systems used by cities to document roadway/storm drain infrastructure construction and/or repairs to identify areas of interest within each partner municipality. Knowledgeable municipal staff will be queried for information about open applications of caulk or sealants based on their familiarity with municipal structures in the areas of interest. To the extent possible, the criteria above will be verified for a given location with existing records that document these factors. However, because records for the time period of interest may not be available or may be difficult to track, anecdotal information from knowledgeable municipal staff will also be considered during site selection.

2.2.3 Field Reconnaissance and Initial Sample Collection

The next step is to conduct field reconnaissance in the areas of interest to identify specific structures that meet all of the above criteria, and if feasible, to begin initial sample collection. Project team

members and appropriate municipal staff will work together, as needed, to conduct these visits. During field reconnaissance, the project team and/or municipal staff will identify specific structures that are sample site candidates within the areas of interest, document and confirm conditions at each site, identify specific areas of caulk or sealant that are available for collection, and collect caulk or sealant samples if feasible. If necessary, the logistics of collecting samples at a later date at sites that may require additional planning and/or equipment prior to sample collection (e.g., confined space entry sites) will be evaluated. Field notes and photo documentation will be used to record information gathered during the field reconnaissance and initial sample collection. Field sheets and instructions will be detailed in the project QAPP/SAP.

During these field visits, or at any time during the project sampling phase (July 2017 – December 2017), municipal staff will be asked to look for opportunities to collect caulk or sealant samples independent of the project monitoring contractor. For example, capital improvement projects that occur during the project sampling period may provide access to locations that would not otherwise be feasible for sample collection. Municipal staff may also observe caulk or sealant in roadway and storm drain infrastructure during the course of their regular operations and maintenance activities. All of the necessary information on how to collect caulk/sealant samples, the field notes and other documentation that should be recorded during sample collection, and all proper sample handling and storage procedures will be provided to municipal staff in the project QAPP/SAP. The project monitoring contractor will also be available to provide additional training on sample collection to any interested municipal staff during the initial field reconnaissance.

2.2.4 Follow-Up Sampling

The project team will review all of the information gathered during field reconnaissance and initial sample collection and identify any additional locations that are good candidates for follow-up sample collection. Follow-up sample site selection will be biased towards sites that are considered more likely to contain PCBs in caulk or sealants. Other factors considered will include the information on the types of samples already collected, the number of additional appropriate sites that have been identified, the type of structures identified, the types of caulk/sealant usages at the sites, logistical factors associated with sampling each structure, and available resources.

2.2.5 Field Sampling Methods

In-situ caulk or sealant samples will be collected from selected locations in public storm drain infrastructure or roadways following the methods and procedures detailed in the project QAPP/SAP. Materials that will be sampled include:

- caulk used to fill cracks in concrete or asphalt roadways or sidewalk surfaces,
- tar-like sealant material observed within storm drain structures or roadway surfaces,
- materials used to seal concrete structures such as gutters and catch basins to asphalt pavement,
- joint sealants between concrete blocks, etc.

Depending on the location and the condition of the caulk or sealant material available, samples may be collected using a variety of techniques ranging from stainless steel knives/spoons used to scrape material from structure surfaces or collect material from inside cracks, or by carefully chiseling hardened

material from surfaces or from within cracks/joints using appropriate tools. Field notes and photographs will be taken to document the sample collection method(s) used at each site, as well as to document the structure type, the type of caulk or sealant usage, and other relevant factors (but being careful to avoid any identifying features of the area such as road signs, heritage trees or other landmarks). Samples of caulk/sealant will be selected for compositing based on factors such as: structure type, structure age, particular caulk/sealant usage, multiple samples from a single structure, and percent chlorine based on XRF screening results (described below). Composite samples collected from multiple locations would allow PCBs analysis of caulk/sealant from across a wider geographic extent within the available analysis budget. All samples will be collected as one-time events.

2.3 Phase 2: Selection of Samples for Compositing, PCBs Analysis and Reporting

During Phase 2, the project team will review the information gathered on all samples that were collected, perform screening procedures in order to group samples for compositing purposes, select a sub-set of samples that will be sent to the laboratory for PCBs analysis, and report the results. Each of these steps are described in more detail below.

2.3.1 Selection of Samples for Compositing and PCBs Analysis

Once all the samples have been collected, the project team will decide which samples will be sent to the laboratory, and how those samples will be grouped for compositing prior to PCBs analysis. Selection of the sub-set of samples for PCBs analysis will not be random, but will remain blind to specific site location. Samples will be grouped for compositing based on a number of potential factors such as geographic area, structure type (e.g., catch basin, roadway, etc.), or material usage (e.g., sealant used to fill cracks on roadways, etc.). Multiple samples from a single structure may also be composited. Decisions on how samples will be composited will be made after the samples have been collected based on the types of sites that are sampled and other information gathered about each site. X-ray Fluorescence (XRF) technology will also be used to screen samples for chlorine content and guide selection and compositing decisions, as described below (Section 2.3.1.1). Composite samples will potentially allow the monitoring program to cover a greater geographic area with a limited number of samples that will be analyzed for PCBs, and may also provide some data on how concentrations vary across the different categories of structures, usage, etc. Although limited by the small sample size (i.e., 20 samples), this type of information may be important for future efforts to identify infrastructure caulk or sealants associated with PCBs.

2.3.2 XRF Screening Procedures

Because PCBs are highly chlorinated, samples with high chlorine content are more likely to contain PCBs. Previous projects have used portable XRF technology to evaluate the chlorine content of caulk samples (Klosterhaus et. al., 2014). Each sample collected in this project will be screened for chlorine content using portable XRF technology. Based on the range of chlorine content observed, the samples will be divided into high, moderate, and low chlorine content. Samples from the high and moderate chlorine content categories will be prioritized for PCBs analysis, as these have a higher probability of containing PCBs. Moderate chlorine concentrations may provide information on whether the presence of chlorine is driven primarily by PCBs or instead by other chlorine containing compounds. However, chlorine content as determined by XRF screening, will only be one of several factors that will be considered in

determining how to select samples for PCBs analysis and how to group those samples for compositing purposes. The XRF screening results will be compared with the PCBs analysis results to better understand the usefulness of this procedure in identifying PCB-containing caulks or sealants.

2.3.3 Laboratory Methods

Prior to PCBs analysis, the laboratory will composite samples per the direction of the project team. All composited samples will be analyzed for the RMP 40 PCBs following modified EPA Method 8270C (GCMS-SIM), which provides congener specific PCB concentrations at an acceptably low detection limit for the purposes of this project (MRL = 0.5 µg/Kg). All laboratory QA/QC procedures will follow the methods detailed in the project QAPP/SAP (*in preparation*).

2.3.4 Reporting

The range of total PCB concentrations measured in roadway and storm drain infrastructure caulk and sealant will be reported. If possible, PCBs concentrations will also be reported by appropriate sub-categories, such as structure type, age of installation/repair, caulk or sealant usage, percent chlorine, or other factors. The infrastructure caulk/sealant concentrations observed during this project may also be compared to PCB concentrations in other media, such as soil/sediment or caulk from building materials in the Bay Area. The project team will prepare a final project report of the sampling data that may also include recommendations for additional information needed to support future development of stormwater loading estimates and to develop appropriate control measures for this source. The final project report will be available for submittal to the Regional Water Board with the 2018 MRP Annual Reports due in September 2018.

2.4 Study Assumptions and Limitations

This regional sampling plan was not designed to characterize the full range of PCB concentrations in Bay Area caulk and sealants, but rather, to provide a limited, screening level survey of concentrations of PCBs that may be found in Bay Area roadway and storm drain infrastructure caulk in order to understand if this is a potential source to urban stormwater that requires further attention. Resources limit the project to collecting up to 50 samples, and only analyzing 20 composite samples for PCBs. The primary risk with such a small sample size is that the monitoring may not identify sites that have high concentrations of PCBs in caulk or sealants, even if such sites exist in the Bay Area. The study design attempts to minimize this limitation through targeted sample site selection, which focuses on locations that have a higher likelihood of containing PCBs in caulk and sealants. The assumption of this targeted sampling approach is that PCBs will not be found in high concentrations at sites that do not meet the site selection criteria identified in Section 2.2.2. XRF screening techniques may also increase the likelihood of selecting samples for lab analysis that have a higher likelihood of containing PCBs. Inclusion of composite samples can also extend the geographic coverage of the limited number of samples that will be analyzed for PCBs. However, given the small sample size and lack of definitive information on where PCB-containing caulks were used in Bay Area infrastructure, it is still possible that high concentrations will not be observed even if there are locations in the Bay Area that have high enough PCB concentrations in infrastructure caulk or sealants to warrant implementation of controls for this source of PCBs to urban stormwater.

3 SCHEDULE

- Draft and Final study design. (Draft Due May 2017; Final Due June 2017)
- Draft and Final Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP). (Draft Due June 2017; Final Due August 2017)
- Draft and Final Cost Estimates (Draft Due June 2017; Final Due August 2017)
- Project team discussions with municipal partners to facilitate information exchange and begin sample site selection (July/August, 2017)
- Field reconnaissance and Initial Sample Collection (August/September 2017)
- Additional Sample Collection (September 2017 – November 2017)
- XRF Screening (October - December 2017)
- Laboratory Analysis (December 2017 – February 2018)
- Data QA/QC Review (March 2018)
- Data Analysis and Reporting (April-May 2018)
- Final Summary Report (Draft due June 2018, Final Due September 2018)

4 REFERENCES

City of Tacoma, 2013. East Tacoma PCB Cleanup Project Draft Remedial Action Workplan. Appendix A: OF237B 2013 PCB Source Tracing Investigation. Prepared by City of Tacoma.

City of Tacoma, 2016. Thea Foss and Wheeler-Osgood Waterways 2015 Source Control and Water Year 2015 Stormwater Monitoring Report. Prepared by City of Tacoma for the Washington State Department of Ecology and United States Environmental Protection Agency.

Klosterhaus, S., McKee, L.J., Yee, D., Kass, J.M., Wong, A. 2014. Polychlorinated biphenyls in the exterior caulk of San Francisco Bay Area buildings, California, USA. Environment International 66, 38-43.

Sykes, R.G., and Coate, A., R. PCBs in sealants in water distribution reservoirs. Journal of the American Water Works Association, April 1995, pp. 96-100

World Health Organization (WHO), 1993. Polychlorinated biphenyls and terphenyls. In: Dobson S., and van Esch G.J. (Eds) Environmental Health Criteria 140, 2nd Edition. World Health Organization, Geneva Switzerland.

APPENDIX B: SAMPLING AND ANALYSIS PLAN AND QUALITY ASSURANCE PROJECT PLAN

BASMAA
Regional Monitoring Coalition

Pollutants of Concern Monitoring for Source Identification and Management Action Effectiveness, 2017-2018

Sampling and Analysis Plan and Quality Assurance Project Plan

Prepared for:

The Bay Area Stormwater Management Agencies Association (BASMAA)

Prepared by:

EOA inc.
1410 Jackson Street
Oakland, CA
94612

WATER PROGRAMS
SACRAMENTO STATE
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Sacramento, CA
95819

SFEI
4911 Central Avenue
Richmond, CA
94804

KINNETIC LABORATORIES INCORPORATED
307 Washington Street
Santa Cruz, CA
95060

Version 2
September 29, 2017

Title and Approval Sheet

Program Title	Pollutants of Concern (POC) Monitoring for Source Identification and Management Action Effectiveness
Lead Organization	Bay Area Stormwater Management Agencies Association (BASMAA)
	P.O. Box 2385, Menlo Park, CA 94026, 510-622-2326
	info@basmaa.org
Primary Contact	Geoff Brosseau
Effective Date	September 29, 2017
Revision Number	Version 2

Approval Signatures:

A signature from the BASMAA Executive Director approving the BASMAA POC Monitoring for Source Identification and Management Action Effectiveness is considered approval on behalf of all Program Managers.

Geoff Brosseau	Date

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List of Acronyms

ACCWP	Alameda Countywide Clean Water Program
ALS	ALS Environmental Laboratory
BASMAA	Bay Area Stormwater Management Agencies Association
BSM	Bioretention Soil Media
CCCWP	Contra Costa Clean Water Program
CCV	continuing calibration verification
CEDEN	California Environmental Data Exchange Network
CEH	Center for Environmental Health
COC	Chain of Custody
Consultant-PM	Consultant Team Project Manager
CRM	Certified Reference Material
CSE	Confined Space Entry
ECD	Electron capture detection
EDD	Electronic Data Deliverable
EOA	Eisenberg, Olivieri & Associates, Inc.
EPA	Environmental Protection Agency (U.S.)
FD	Field duplicate
Field PM	Field Contractor Project Manager
FSURMP	Fairfield-Suisun Urban Runoff Management Program
GC-MS	Gas Chromatography-Mass Spectroscopy
IDL	Instrument Detection Limits
ICV	initial calibration verification
KLI	Kinnetic Laboratories Inc.
LCS	Laboratory Control Samples
Lab-PM	Laboratory Project Manager
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MDL	Method Detection Limit
MQO	Measurement Quality Objective
MRL	Method Reporting Limit
MRP	Municipal Regional Permit
NPDES	National Pollutant Discharge Elimination System
OWP-CSUS	Office of Water Programs at California State University Sacramento
PCB	Polychlorinated Biphenyl
PM	Project Manager
PMT	Project Management Team
POC	Pollutants of Concern
QA	Quality Assurance
QA Officer	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
ROW	Right-of-way
RPD	Relative Percent Difference
RMC	Regional Monitoring Coalition
RMP	Regional Monitoring Program for Water Quality in the San Francisco Estuary
SFRWQCB	San Francisco Regional Water Quality Control Board (Regional Water Board)
SAP	Sampling and Analysis Plan
SCCVURPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SCVWD	Santa Clara Valley Water Department
SFEI	San Francisco Estuary Institute

SMCWPPP	San Mateo County Water Pollution Prevention Program
SOP	Standard Operating Procedure
SWAMP	California Surface Water Ambient Monitoring Program
TOC	Total Organic Carbon
TMDL	Total Maximum Daily Load
VSFCD	Vallejo Sanitation and Flood Control District

1. Problem Definition/Background

The Bay Area Stormwater Management Agencies Association (BASMAA) member agencies will implement a regional monitoring program for Pollutants of Concern (POC) Monitoring for Source Identification and Management Action Effectiveness (Monitoring Program). The Monitoring Program is intended to fulfill components of the Municipal Regional Stormwater NPDES Permit (MRP; Order No. R2-2015-0049), which implements the polychlorinated biphenyls (PCBs) and Mercury Total Maximum Daily Loads (TMDLs) for the San Francisco Bay Area. Monitoring for Source Identification and Management Action Effectiveness are two of five monitoring priorities for POCs identified in the MRP. Source identification monitoring is conducted to identify the sources or watershed source areas that provide the greatest opportunities for reductions of POCs in urban stormwater runoff. Management action effectiveness monitoring is conducted to provide support for planning future management actions or to evaluate the effectiveness or impacts of existing management actions.

BASMAA developed two study designs to implement each component of the Monitoring Program. The ***Evaluation of PCBs Presence in Public Roadway and Storm Drain Infrastructure Caulk and Sealants Study Design*** (BASMAA 2017a) addresses the source identification monitoring requirements of Provision C.8.f, as well as requirements of Provision C.12.e to investigate PCBs in infrastructure caulk and sealants. The ***POC Monitoring for Management Action Effectiveness Study Design*** (BASMAA 2017b) addresses the management action effectiveness monitoring requirements of Provision C.8.f. The results of the Monitoring Program will contribute to ongoing efforts by MRP Permittees to identify PCB sources and improve the PCBs and mercury treatment effectiveness of stormwater control measures in the Phase I permittee area of the Bay Area. This Sampling and Analysis Plan and Quality Assurance Project Plan (SAP/QAPP) was developed to guide implementation of both components of the Monitoring Program.

1.1. Problem Statement

Fish tissue monitoring in San Francisco Bay (Bay) has revealed bioaccumulation of PCBs and mercury. The measured fish tissue concentrations are thought to pose a health risk to people consuming fish caught in the Bay. As a result of these findings, California has issued an interim advisory on the consumption of fish from the Bay. The advisory led to the Bay being designated as an impaired water body on the Clean Water Act "Section 303(d) list" due to PCBs and mercury. In response, the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board) has developed TMDL water quality restoration programs targeting PCBs and mercury in the Bay. The general goals of the TMDLs are to identify sources of PCBs and mercury to the Bay and implement actions to control the sources and restore water quality.

Since the TMDLs were adopted, Permittees have conducted a number of projects to provide information that supports implementation of management actions designed to achieve the wasteload allocations described in the Mercury and PCBs TMDL, as required by Provisions of the MRP. The Clean Watersheds for a Clean Bay project (CW4CB) was a collaboration among BASMAA member agencies that pilot tested various stormwater control measures and provided estimates of the PCBs and mercury load reduction effectiveness of these controls (BASMAA, 2017c). However, the results of the CW4CB project identified a number of remaining data gaps on the load reduction effectiveness of the control measures

that were tested. In addition, MRP Provisions C.8.f. and C.12.e require Permittees to conduct further source identification and management action effectiveness monitoring during the current permit term.

1.2. Outcomes

The Monitoring Program will allow Permittees to satisfy MRP monitoring requirements for source identification and management action effectiveness, while also addressing some of the data gaps identified by the CW4CB project (BASMAA, 2017c). Specifically, the Monitoring Program is intended to provide the following outcomes:

1. Satisfy MRP Provision C.8.f. requirements for POC monitoring for source identification; and Satisfy MRP Provision C.12.e.ii requirements to evaluate PCBs presence in caulks/sealants used in storm drain or roadway infrastructure in public ROWs;
    a. Report the range of PCB concentrations observed in 20 composite samples of caulk/sealant collected from structures installed or rehabilitated during the 1970's;
2. Satisfy MRP Provision C.8.f. requirements for POC monitoring for management action effectiveness;
    a. Quantify the annual mass of mercury and PCBs captured in HDS Unit sumps during maintenance; and
    b. Identify bioretention soil media (BSM) mixtures for future field testing that provide the most effective mercury and PCBs treatment in laboratory column tests.

The information generated from the Monitoring Program will be used by MRP Permittees and the Regional Water Board to better understand potential PCB sources and better estimate the load reduction effectiveness of current and future stormwater control measures.

2. Distribution List and Contact Information

The distribution list for this BASMAA SAP/QAPP is provided in Table 2-1.

Table 2-1. BASMAA SAP/QAPP Distribution List.

Project Group	Title	Name and Affiliation	Telephone No.
BASMAA Project Management Team	BASMAA Project Manager, Stormwater Program Specialist	Reid Bogert, SMCWPPP	650-599-1433
	Program Manager	Jim Scanlin, ACCWP	510-670-6548
	Watershed Management Planning Specialist	Lucile Paquette, CCCWP	925-313-2373
	Program Manager	Rachel Kraai, CCCWP	925-313-2042
	Technical Consultant to ACCWP and CCCWP	Lisa Austin, Geosyntec Inc. CCCWP	510-285-2757
	Supervising Environmental Services Specialist	James Downing, City of San Jose	408-535-3500
	Senior Environmental Engineer	Kevin Cullen, FSURMP	707-428-9129
	Pollution Control Supervisor	Doug Scott, VSFCD	707-644-8949 x269
Consultant Team	Project Manager	Bonnie de Berry, EOA Inc.	510-832-2852 x123
	Assistant Project Manager SAP/QAPP Author and Report Preparer	Lisa Sabin, EOA Inc.	510-832-2852 x108
	Technical Advisor	Chris Sommers, EOA Inc.	510-832-2852 x109
	Study Design Lead and Report Preparer	Brian Currier, OWP-CSUS	916-278-8109
	Study Design Lead and Report Preparer	Dipen Patel, OWP-CSUS	
	Technical Advisor	Lester McKee, SFEI	415-847-5095
	Quality Assurance Officer	Don Yee, SFEI	510-746-7369
	Data Manager	Amy Franz, SFEI	510-746-7394
	Field Contractor Project Manager	Jonathan Toal, KLI	831-457-3950
Project Laboratories	Laboratory Project Manager	Howard Borse, ALS	360-430-7733
	XRF Laboratory Project Manager	Matt Nevins, CEH	510-655-3900 x318

3. Program Organization

3.1. Involved Parties and Roles

BASMAA is a 501(c)(3) non-profit organization that coordinates and facilitates regional activities of municipal stormwater programs in the San Francisco Bay Area. BASMAA programs support implementation of the MRP (Order No. R2-2015-0049), which implements the PCBs and Mercury TMDLs for the San Francisco Bay Area. BASMAA is comprised of all 76 identified MRP municipalities and special districts, the Alameda Countywide Clean Water Program (ACCWP), Contra Costa Clean

Water Program (CCCWP), the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), the Fairfield-Suisun Urban Runoff Management Program (FSURMP), the City of Vallejo and the Vallejo Sanitation and Flood Control District (VSFCD) (Table 3-1).

MRP Permittees have agreed to collectively implement this Monitoring Program via BASMAA. The Program will be facilitated through the BASMAA Monitoring and Pollutants of Concern Committee (MPC). BASMAA selected a consultant team to develop and implement the Monitoring Program with oversight and guidance from a BASMAA Project Management Team (PMT), consisting of representatives from BASMAA stormwater programs and municipalities (Table 3-1).

Table 3-1. San Francisco Bay Area Stormwater Programs and Associated MRP Permittees Participating in the BASMAA Monitoring Program.

Stormwater Programs	MRP Permittees
Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP)	Cities of Campbell, Cupertino, Los Altos, Milpitas, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, Sunnyvale, Los Altos Hills, and Los Gatos; Santa Clara Valley Water District; and, Santa Clara County
Alameda Countywide Clean Water Program (ACCWP)	Cities of Alameda, Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Newark, Oakland, Piedmont, Pleasanton, San Leandro, and Union City; Alameda County; Alameda County Flood Control and Water Conservation District; and, Zone 7 Water District
Contra Costa Clean Water Program (CCCWP)	Cities of, Clayton, Concord, El Cerrito, Hercules, Lafayette, Martinez, , Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon, Walnut Creek, Danville, and Moraga; Contra Costa County; and, Contra Costa County Flood Control and Water Conservation District
San Mateo County Wide Water Pollution Prevention Program (SMCWPPP)	Cities of Belmont, Brisbane, Burlingame, Daly City, East Palo Alto, Foster City, Half Moon Bay, Menlo Park, Millbrae, Pacifica, Redwood City, San Bruno, San Carlos, San Mateo, South San Francisco, Atherton, Colma, Hillsborough, Portola Valley, and Woodside; San Mateo County Flood Control District; and, San Mateo County
Fairfield-Suisun Urban Runoff Management Program (FSURMP)	Cities of Fairfield and Suisun City
Vallejo Permittees (VSFCD)	City of Vallejo and Vallejo Sanitation and Flood Control District

3.2. BASMAA Project Manager (BASMAA-PM)

The BASMAA Project Manager (BASMAA-PM) will be responsible for directing the activities of the below-described PMT, and will provide oversight and managerial level activities, including reporting status updates to the PMT and BASMAA, and acting as the liaison between the PMT and the Consultant Team. The BASMAA PM will oversee preparation, review, and approval of project deliverables, including the required reports to the Regional Water Board.

3.3. BASMAA Project Management Team (PMT)

The BASMAA PMT will assist the BASMAA-PM and the below described Consultant Team with the design and implementation of all project activities. PMT members will assist the BASMAA-PM and Consultant Team to complete project activities within scope, on-time, and within budget by having specific responsibility for planning and oversight of project activities within the jurisdiction of the BASMAA agency that they represent. In addition, the PMT will coordinate with the municipal project partners and key regional agencies, including the Regional Water Board. The PMT is also responsible for reviewing and approving project deliverables (e.g., draft and final project reports).

3.4. Consultant Team Project Manager (Consultant-PM)

The Consultant Team Project Manager (Consultant-PM) will be responsible for ensuring all work performed during the Monitoring Program is consistent with project goals, and provide oversight of all day-to-day operations associated with implementing all components of the Monitoring Program, including scheduling, budgeting, reporting, and oversight of subcontractors. The Consultant-PM will ensure that data generated and reported through implementation of the Monitoring Program meet measurement quality objectives (MQOs) described in this SAP/QAPP. The Consultant -PM will work with the Quality Assurance Officer as required to resolve any uncertainties or discrepancies. The Consultant -PM will also be responsible for overseeing development of draft and final reports for the Monitoring Program, as described in this SAP/QAPP.

3.5. Quality Assurance Officer (QA Officer)

The role of the Quality Assurance Officer (QA Officer) is to provide independent oversight and review of the quality of the data being generated. In this role, the QA Officer has the responsibility to require data that is of insufficient quality to be flagged, or not used, or for work to be redone as necessary so that the data meets specified quality measurements. The QA Officer will oversee the technical conduct of the field related components of the Monitoring Program, including ensuring field program compliance with the SAP/QAPP for tasks overseen at the programmatic level.

3.6. Data Manager (DM)

The Data Manager will be responsible for receipt and review of all project related documentation and reporting associated with both field efforts and laboratory analysis. The Data Manager will also be responsible for storage and safekeeping of these records for the duration of the project.

3.7. Field Contractor Project Manager (Field-PM)

The Field Contractor Project Manager (Field-PM) will be responsible for conduct and oversight of all field monitoring- and reporting-related activities, including completion of field datasheets, chain of custodies, and collection of field measurements and field samples, consistent with the monitoring methods and procedures in the SAP/QAPP. The Field-PM will also be responsible for ensuring that personnel conducting monitoring are qualified to perform their responsibilities and have received appropriate training. The Field-PM will be responsible for initial receipt and review of all project related documentation and reporting associated with both field efforts and laboratory analysis.

The Field-PM will also be responsible for receiving all samples collected opportunistically by participating municipalities, including all caulk/sealant samples, initial review of sample IDs to ensure there are no duplicate sample IDs, and shipping the samples under COC to the appropriate laboratory (CEH for the caulk/sealant samples; ALS for all other samples). Participating municipalities should ship all samples they collect to the Field PM at the following address:

Jon Toal
Kinnetic Laboratories, Inc.
307 Washington Street
Santa Cruz, CA 95060
Reference: BASMAA POC Monitoring Project
(831)457-3950

3.8. Laboratory Project Manager (Lab-PM)

The Laboratory Project Manager (Lab-PM) and chemists at each analytical laboratory will be responsible for ensuring that the laboratory's quality assurance program and standard operating procedures (SOPs) are consistent with this SAP/QAPP, and that laboratory analyses meet all applicable requirements or explain any deviations. Each Lab-PM will also be responsible for coordinating with the Field-PM and other staff (e.g., Consultant -PM, Data Manager, QA Officer) and facilitating communication between the Field-PM, the Consultant -PM, and analytical laboratory personnel, as required for the project.

The Center for Environmental Health (CEH) will provide chlorine content screening of all caulk/sealant samples collected using X-Ray Fluorescence (XRF) technology to assist in selection of samples for further laboratory analysis of PCBs. This XRF-screening will also provide additional information on the utility of XRF in prioritizing samples for chemical PCBs analyses.

All other laboratory analyses will be provided by ALS Environmental.

3.1. Report Preparer

The Report Preparer (RP) will be responsible for developing draft and final reports for each of the following components of the Monitoring Program: (1) Source identification; and (2) Management action effectiveness. All draft reports will be submitted to the PMT for review and input prior to submission for approval by the BASMAA Board of Directors (BOD).

4. Monitoring Program Description

4.1. Work Statement and Program Overview

The Monitoring Program consists of the following three major tasks, each of which has a field sampling component:

- **Task 1. Evaluate presence and possible concentrations of PCBs in roadway and storm drain infrastructure caulk and sealants**. This task involves analysis of 20 composite samples of caulk/sealant collected from public roadway and storm drain infrastructure throughout the permit

area to investigate PCB concentrations. The goal of this task is to evaluate, at a limited screening level, whether and in what concentrations PCBs are present in public roadway and storm drain infrastructure caulk and sealants in the portions of the Bay Area under the jurisdiction of the Phase I Permittees identified in Table 3-1 (Bay Area).

- **Task 2. Evaluate Annual mass of PCBs and mercury captured in Hydrodynamic Separator (HDS) Unit sumps during maintenance.** This task involves collecting sediment samples from the sumps of public HDS unit during maintenance cleanouts to evaluate the mass of PCBs and mercury captured by these devices. The goal of this task is to provide data to better characterize the concentrations of POCs in HDS Unit sump sediment and improve estimates of the mass captured and removed from these units during current maintenance practices for appropriate TMDL load reduction crediting purposes.

- **Task 3. Bench-scale testing of the mercury and PCBs removal effectiveness of selected BSM mixtures enhanced with biochar.** This task involves collecting stormwater from the Bay Area that will then be used to conduct laboratory column tests designed to evaluate the mercury and PCBs treatment effectiveness of various biochar-amended BSM mixtures. Real stormwater will be used for the column tests to account for the effect of influent water quality on load removal. The goal of this task is to identify BSM mixtures amended with biochar that meet operational infiltration requirements and are effective for PCBs and mercury removal for future field testing.

All monitoring results and interpretations will be documented in BASMAA reports for submission to the Regional Water Board according to the schedule in the MRP.

4.2. Sampling Detail

The Monitoring Program includes three separate sampling tasks that involve collection and analysis of the following types of samples: caulk/sealants (Task 1); sediment from HDS units (Task 2); and stormwater collected and used for column tests in the lab (Task 3). Additional details specific to the sampling design for each task are provided below.

4.2.1. Task 1 - Caulk/Sealant samples

The PMT will recruit municipal partners from within each stormwater program to participate in this task. All caulk/sealant samples will be collected from locations within public roadway or storm drain infrastructure in the participating municipalities. Exact sample sites will be identified based on available information for each municipal partner, including: age of public infrastructure; records of infrastructure repair or rehabilitation (aiming for the late 1960s through the 1970s); and current municipal staff knowledge about locations that meet the site selection criteria identified in the study design (BASMAA, 2017a). Field crews led by the Field-PM and/or municipal staff will conduct field reconnaissance to further identify specific sampling locations and if feasible, will collect caulk/sealant samples during these initial field visits. Follow-up sampling events will be conducted for any sites that require additional planning or equipment for sample collection (e.g., confined space entry, parking controls, etc.). Sample locations will include any of the following public infrastructure where caulk/sealant are present: roadway or sidewalk surfaces, between expansion joints for roadways, parking garages, bridges, dams, or storm drain pipes, and/or in pavement joints (e.g., curb and gutter). Sampling will only occur during periods of dry weather when urban runoff flows through any structures that will be sampled are minimal, and do not

present any safety hazards or other logistical issues during sample collection. Sample collection methods are described further in Section 9.

As opportunities arise, municipal staff will also collect samples following the methods and procedures described in this SAP/QAPP during ongoing capital projects that provide access to public infrastructure locations with caulk/sealant that meet the sample site criteria. All samples collected by participating municipal staff will be delivered to the Field PM under COC. The Field-PM will be responsible for storing all caulk/sealant samples and shipping the samples under COC to CEH for XRF screening analysis.

All caulk/sealant samples collected will be screened for chlorine content using XRF technology described in Section 9. Samples will be grouped for compositing purposes as described in the study design (BASMAA, 2017a). Up to three samples will be included per composite and a total of 20 composite caulk/sealant samples will be analyzed for the RMP 40 PCB congeners[1]. All compositing and PCBs analysis will be conducted blind to the location where each sample was collected. Laboratory analysis methods must be able to detect a minimum PCBs concentration of 200 parts per billion (ppb, or µg/Kg). Laboratory analytical methods are described further in Section 12. The range of PCB concentrations found in caulk based on this documented sampling design will be reported to the Regional Water Board within the Permittees' 2018 Annual Reports.

4.2.2. Task 2 - Sediment samples from HDS Units

The PMT will recruit municipal partners that maintain public HDS units to participate in this task. All sediment samples will be collected from the sump of selected HDS units during scheduled cleaning and maintenance. Selection of the HDS units for sampling will be opportunistic, based on the units that are scheduled for maintenance by participating municipalities during the project period. Field crews led by the Field-PM and municipal maintenance staff will coordinate sampling with scheduled maintenance events. As needed, municipal staff will dewater the HDS unit sumps prior to sample collection, and provide assistance to field crews with access to the sump sediment as needed (e.g., confined space entry, parking controls, etc.). All sump sediment samples will be collected following the methods and procedures described in this SAP/QAPP. Sampling will only occur during periods of dry weather when urban runoff flows into the HDS unit sumps are minimal, and do not present any safety hazards or other logistical issues during sample collection. Sample collection methods are described further in Section 9.

All sediment samples collected will be analyzed for the RMP 40 PCB congeners, total mercury, total organic carbon (TOC), particle size distribution (PSD), and bulk density. Laboratory analytical methods are described further in Section 12. The range of PCB and mercury concentrations observed in HDS Unit sump sediments and the annual pollutant masses removed during cleanouts will be reported to the Regional Water Board in March 2019.

4.2.3. Task 3 - Storm Water and Column Test Samples

This task will collect stormwater from Bay Area locations that will then be used as the influent for column tests of biochar-amended BSM. Bay Area stormwater samples will be collected from locations

[1] The 40 individual congeners routinely quantified by the Regional Monitoring Program (RMP) for Water Quality in the San Francisco Estuary include: PCBs 8, 18, 28, 31, 33, 44, 49, 52, 56, 60, 66, 70, 74, 87, 95, 97, 99, 101, l05, 110, 118, 128, 132, 138, 141, 149, l51, 153, 156, 158, 170, 174, 177, 180, 183, 187, 194, 195, 201, and 203

within public roadway or storm drain infrastructure in participating municipalities. Field personnel lead by the Field PM will collect stormwater samples during three qualifying storm events and ensure all samples are delivered to the lab of OWP at CSUS within 24-hours of collection. Stormwater will be collected from one watershed that has a range of PCB concentrations and is considered representative of Bay Area watersheds (e.g. the West Oakland Ettie Street Pump Station watershed). Storms from the representative watershed should be targeted randomly without bias, thereby accounting for the effects of storm intensity and ensuring variability in contaminant concentration, proportion of dissolved contaminants, particle size, particle size distribution, and particle density. To achieve this, minimal mobilization criteria should be used to ensure predicted storm intensity and runoff volume are likely to yield the desired volume. Sample collection methods are described further in Section 9.

The stormwater collected will be used as the influent for column tests of various BSM mixtures amended with biochar. These tests will be implemented in three phases. First, hydraulic screening tests will be performed to ensure all amended BSM mixtures meet the MRP infiltration rate requirements of 12 in/h initial maximum infiltration or minimum 5 in/h long-term infiltration rate. Second, column tests will be performed using Bay Area stormwater to evaluate pollutant removal. Third, additional column tests will be performed using lower concentration (e.g., diluted) Bay Area stormwater to evaluate relative pollutant removal performance at lower concentrations. Further details about the column testing are provided in Section 9.3.

All influent and effluent water samples collected will be analyzed for the RMP 40 PCB congeners, total mercury, suspended sediment concentrations (SSC), TOC, and turbidity. Laboratory analytical methods are described further in Section 12. The range of PCB and mercury concentrations observed in influent and effluent water samples and the associated pollutant mass removal efficiencies for each BSM mixture tested will be reported to the Regional Water Board in March 2019.

4.3. Schedule

Caulk/sealant sampling (Task 1) will be conducted between July 2017 and December 2017. HDS Unit sampling (Task 2) will be conducted between July 2017 and May 2018. Stormwater sample collection and BSM column tests (Task 3) will occur between October 2017 – April 2018.

4.4. Geographical Setting

Field operations will be conducted across multiple Phase I cities in the San Francisco Bay region within the counties of San Mateo, Santa Clara, Alameda, and Contra Costa, and the City of Vallejo.

4.5. Constraints

Caulk/sealant sampling and HDS unit sampling will only be conducted during dry weather, when urban runoff flows through the sampled structures are minimal and do not present safety hazards or other logistical concerns. Caulk/sealant sampling will be limited to the caulk/sealant available and accessible at sites that meet the project site criteria (described in the Study Design, BASMAA 2017a). HDS unit sampling will be limited by the number of public HDS units that are available for maintenance during the project period. Extreme wet weather may pose a safety hazard to sampling personnel and may therefore impact wet season sampling.

5. Measurement Quality Objectives (MQO)

The quantitative measurements that estimate the true value or concentration of a physical or chemical property always involve some level of uncertainty. The uncertainty associated with a measurement generally results from one or more of several areas: (1) natural variability of a sample; (2) sample handling conditions and operations; (3) spatial and temporal variation; and (4) variations in collection or analytical procedures. Stringent Quality Assurance (QA) and Quality Control (QC) procedures are essential for obtaining unbiased, precise, and representative measurements and for maintaining the integrity of the sample during collection, handling, and analysis, as well and for measuring elements of variability that cannot be controlled. Stringent procedures also must be applied to data management to assure that accuracy of the data is maintained.

MQOs are established to ensure that data collected are sufficient and of adequate quality for the intended use. MQOs include both quantitative and qualitative assessment of the acceptability of data. The qualitative goals include representativeness and comparability, and the quantitative goals include completeness, sensitivity (detection and quantization limits), precision, accuracy, and contamination.

MQOs associated with representativeness, comparability, completeness, sensitivity, precision, accuracy, and contamination are presented below in narrative form.

5.1. Representativeness and Comparability

The representativeness of data is the ability of the sampling locations and the sampling procedures to adequately represent the true condition of the sample sites. The comparability of data is the degree to which the data can be compared directly between all samples collected under this SAP/QAPP. Field personnel, including municipal personnel that collect samples, will strictly adhere to the field sampling protocols identified in this SAP/QAPP to ensure the collection of representative, uncontaminated, comparable samples. The most important aspects of quality control associated with chemistry sample collection are as follows:

- Field personnel will be thoroughly trained in the proper use of sample collection equipment and will be able to distinguish acceptable versus unacceptable samples in accordance with pre-established criteria.
- Field personnel are trained to recognize and avoid potential sources of sample contamination (e.g., dirty hands, insufficient field cleaning).
- Samplers and utensils that come in direct contact with the sample will be made of non-contaminating materials, and will be thoroughly cleaned between sampling stations.
- Sample containers will be pre-cleaned and of the recommended type.
- All sampling sites will be selected according to the criteria identified in the project study design (BASMAA, 2017a)

Further, the methods for collecting and analyzing PCBs in infrastructure caulk and sealants will be comparable to other studies of PCBs in building material and infrastructure caulk (e.g., Klosterhaus et al., 2014). This SAP/QAPP was also developed to be comparable with the California Surface Water Ambient Monitoring Program (SWAMP) Quality Assurance Program Plan (QAPrP, SWAMP 2013). All sediment

and water quality data collected during the Monitoring Program will be performed in a manner so that data are SWAMP comparable [2].

5.2. Completeness

Completeness is defined as the percentage of valid data collected and analyzed compared to the total expected to being obtained under normal operating conditions. Overall completeness accounts for both sampling (in the field) and analysis (in the laboratory). Valid samples include those for analytes in which the concentration is determined to be below detection limits.

Under ideal circumstances, the objective is to collect 100 percent of all field samples desired, with successful laboratory analyses on 100% of measurements (including QC samples). However, circumstances surrounding sample collections and subsequent laboratory analysis are influenced by numerous factors, including availability of infrastructure meeting the required sampling criteria (applies to both infrastructure caulk sampling and HDS Unit sampling), flow conditions, weather, shipping damage or delays, sampling crew or lab analyst error, and QC samples failing MQOs. An overall completeness of greater than 90% is considered acceptable for the Monitoring Program.

5.3. Sensitivity

Different indicators of the sensitivity of an analytical method to measure a target parameter are often used including instrument detection limits (IDLs), method detection limits (MDLs), and method reporting limits (MRLs). For the Monitoring Program, MRL is the measurement of primary interest, consistent with SWAMP Quality Assurance Project Plan (SWAMP 2013). Target MRLs for all analytes by analytical method provided in Section 13.

5.4. Precision

Precision is used to measure the degree of mutual agreement among individual measurements of the same property under prescribed similar conditions. Overall precision usually refers to the degree of agreement for the entire sampling, operational, and analysis system. It is derived from reanalysis of individual samples (laboratory replicates) or multiple collocated samples (field replicates) analyzed on equivalent instruments and expressed as the relative percent difference (RPD) or relative standard deviation (RSD). Analytical precision can be determined from duplicate analyses of field samples, laboratory matrix spikes/matrix spike duplicates (MS/MSD), laboratory control samples (LCS) and/or reference material samples. Analytical precision is expressed as the RPD for duplicate measurements:

$$RPD = ABS([X1 - X2] / [(X1 + X2) / 2])$$

Where: X1 = the first sample result
X2 = the duplicate sample result.

[2] SWAMP data templates and documentation are available online at http://waterboards.ca.gov/water_issues/programs/swamp/data_management_resources/templates_docs.shtml

Precision will be assessed during the Monitoring Program by calculating the RPD of laboratory replicate samples and/or MS/MSD samples, which will be run at a frequency of 1 per analytical batch for each analyte. Target RPDs for the Monitoring Program are identified in Section 13.

5.5. Accuracy

Accuracy describes the degree of agreement between a measurement (or the average of measurements of the same quantity) and its true environmental value, or an acceptable reference value. The "true" values of the POCs in the Monitoring Program are unknown and therefore "absolute" accuracy (and representativeness) cannot be assessed. However, the analytical accuracy can be assessed through the use of laboratory MS samples, and/or LCS. For MS samples, recovery is calculated from the original sample result, the expected value (EV = native + spike concentration), and the measured value with the spike (MV):

$$\% \text{ Recovery} = (MV-N) \times 100\% / (EV-N)$$

Where: MV = the measured value
EV = the true expected (reference) value
N = the native, unspiked result

For LCS, recovery is calculated from the concentration of the analyte recovered and the true value of the amount spiked:

$$\% \text{ Recovery} = (X/TV) \times 100\%$$

Where: X = concentration of the analyte recovered
TV = concentration of the true value of the amount spiked

Surrogate standards are also spiked into samples for some analytical methods (i.e., PCBs) and used to evaluate method and instrument performance. Although recoveries on surrogates are to be reported, control limits for surrogates are method and laboratory specific, and no project specific recovery targets for surrogates are specified, so long as overall recovery targets for accuracy (with matrix spikes) are achieved. Where surrogate recoveries are applicable, data will not be reported as surrogate-corrected values.

Analytical accuracy will be assessed during the Monitoring Program based on recovery of the compound of interest in matrix spike and matrix spike duplicates compared with the laboratory's expected value, at a frequency of 1 per analytical batch for each analyte. Recovery targets for the Monitoring Program are identified in Section 13.

5.6. Contamination

Collected samples may inadvertently be contaminated with target analytes at many points in the sampling and analytical process, from the materials shipped for field sampling, to the air supply in the analytical laboratory. When appropriate, blank samples evaluated at multiple points in the process chain help assure that compound of interest measured in samples actually originated from the target matrix in the sampled environment and are not artifacts of the collection or analytical process.

Method blanks (also called laboratory reagent blanks, extraction blanks, procedural blanks, or preparation blanks) are used by laboratory personnel to assess laboratory contamination during all stages of sample preparation and analysis. The method blank is processed through the entire analytical procedure in a manner identical to the samples. A method blank concentration should be less than the RL or should not exceed a concentration of 10% of the lowest reported sample concentration. A method blank concentration greater than 10% of the lowest reported sample concentration will require corrective action to identify and eliminate the source(s) of contamination before proceeding with sample analysis. If eliminating the blank contamination is not possible, all impacted analytes in the analytical batch shall be flagged. In addition, a detailed description of the likely contamination source(s) and the steps taken to eliminate/minimize the contaminants shall be included in narrative of the data report. If supporting data is presented demonstrating sufficient precision in blank measurement that the 99% confidence interval around the average blank value is less than the MDL or 10% of the lowest measured sample concentration, then the average blank value may be subtracted.

A field blank is collected to assess potential sample contamination levels that occur during field sampling activities. Field blanks are taken to the field, transferred to the appropriate container, preserved (if required by the method), and treated the same as the corresponding sample type during the course of a sampling event. The inclusion of field blanks is dependent on the requirements specified in the relevant MQO tables or in the sampling method.

6. Special Training Needs / Certification

All fieldwork will be performed by contractor staff that has appropriate levels of experience and expertise to conduct the work, and/or by municipal staff that have received the appropriate instruction on sample collection, as determined by the Field PM and/or the PMT. The Field-PM will ensure that all members of the field crew (including participating municipal staff) have received appropriate instructions based on methods described in this document (Section 9) for collecting and transporting samples. As appropriate, sampling personnel may be required to undergo or have undergone OSHA training / certification for confined space entry in order to undertake particular aspects of sampling within areas deemed as such.

Analytical laboratories are to be certified for the analyses conducted at each laboratory by ELAP, NELAP, or an equivalent accreditation program as approved by the PMT. All laboratory personal will follow methods described in Section 13 for analyzing samples.

7. Program Documentation and Reporting

The Consultant Team in consultation with the PMT will prepare draft and final reports of all monitoring data, including statistical analysis and interpretation of the data, as appropriate, which will be submitted to the BASMAA BOD for approval. Following approval by the BASMAA BOD, Final project reports will be available for submission with each stormwater program's Annual Report in 2018 (Task 1) or in the March 31, 2019 report to the Regional Water Board (Tasks 2 and 3). Procedures for overall management of project documents and records and report preparation are summarized below.

7.1. Field Documentation

All field data gathered for the project are to be recorded in field datasheets, and scanned or transcribed to electronic documents as needed to permit easy access by the PMT, the consultant team, and other appropriate parties.

7.1.1. Sampling Plans, COCs, and Sampling Reports

The Field-PM will be responsible for development and submission of field sampling reports to the Data Manager and Consultant-PM. Field crews will collect records for sample collection, and will be responsible for maintaining these records in an accessible manner. Samples sent to analytical laboratories will include standard Chain of Custody (COC) procedures and forms; field crews will maintain a copy of originating COCs at their individual headquarters. Analytical laboratories will collect records for sample receipt and storage, analyses, and reporting. All records, except lab records, generated by the Monitoring Program will be stored at the office of the Data Manager for the duration of the project, and provided to BASMAA at the end of the project.

7.1.2. Data Sheets

All field data gathered by the Monitoring Program will be recorded on standardized field data entry forms. The field data sheets that will be used for each sampling task are provided in Appendix A.

7.1.3. Photographic Documentation

Photographic documentation is an important part of sampling procedures. An associated photo log will be maintained documenting sites and subjects associated with photos. If an option, the date function on the camera shall be turned on. Field Personnel will be instructed to take care to avoid any land marks when taking photographs, such as street signs, names of buildings, road mile markers, etc. that could be used later to identify a specific location. A copy of all photographs should be provided at the conclusion of sampling efforts and maintained for project duration.

7.2. Laboratory Documentation

The Monitoring Program requires specific actions to be taken by contract laboratories, including requirements for data deliverables, quality control, and on-site archival of project-specific information. Each of these aspects is described below.

7.2.1. Data Reporting Format

Each laboratory will deliver data in electronic formats to the Field-PM, who will transfer the records to the Data Manager, who is responsible for storage and safekeeping of these records for the duration of the project. In addition, each laboratory will deliver narrative information to the QA Officer for use in data QA and for long-term storage.

The analytical laboratory will report the analytical data to the Field-PM via an analytical report consisting of, at a minimum:

1. Letter of transmittal
2. Chain of custody information
3. Analytical results for field and quality control samples (Electronic Data Deliverable, EDD)
4. Case narrative

5. Copies of all raw data.

The Field-PM will review the data deliverables provided by the laboratory for completeness and errors. The QA Officer will review the data deliverables provided by the laboratory for review of QA/QC. In addition to the laboratory's standard reporting format, all results meeting MQOs and results having satisfactory explanations for deviations from objectives shall be reported in tabular format on electronic media. SWAMP-formatted electronic data deliverable (EDD) templates are to be agreed upon by the Data Manager, QA Officer, and the Lab-PM prior to onset of any sampling activities related to that laboratory.

Documentation for analytical data is kept on file at the laboratories, or may be submitted with analytical results. These may be reviewed during external audits of the Monitoring Program, as needed. These records include the analyst's comments on the condition of the sample and progress of the analysis, raw data, and QC checks. Paper or electronic copies of all analytical data, field data forms and field notebooks, raw and condensed data for analysis performed on-site, and field instrument calibration notebooks are kept as part of the Monitoring Program archives for a minimum period of eight years.

7.2.2. Other Laboratory QA/QC Documentation

All laboratories will have the latest version of this Monitoring Program SAP/QAPP in electronic format. In addition, the following documents and information from the laboratories will be current, and they will be available to all laboratory personnel participating in the processing of samples:

1. Laboratory QA plan: Clearly defines policies and protocols specific to a particular laboratory, including personnel responsibilities, laboratory acceptance criteria, and corrective actions to be applied to the affected analytical batches, qualification of data, and procedures for determining the acceptability of results.

2. Laboratory Standard Operation Procedures (SOPs): Contain instructions for performing routine laboratory procedures, describing exactly how a method is implemented in the laboratory for a particular analytical procedure. Where published standard methods allow alternatives at various steps in the process, those approaches chosen by the laboratory in their implementation (either in general or in specific analytical batches) are to be noted in the data report, and any deviations from the standard method are to be noted and described.

3. Instrument performance information: Contains information on instrument baseline noise, calibration standard response, analytical precision and bias data, detection limits, scheduled maintenance, etc.

4. Control charts: Control charts are developed and maintained throughout the Program for all appropriate analyses and measurements for purposes of determining sources of an analytical problem or in monitoring an unstable process subject to drift. Control charts serve as internal evaluations of laboratory procedures and methodology and are helpful in identifying and correcting systematic error sources. Control limits for the laboratory quality control samples are ±3 standard deviations from the certified or theoretical concentration for any given analyte.

Records of all quality control data, maintained in a bound notebook at each workstation, are signed and dated by the analyst. Quality control data include documentation of standard calibrations, instrument

maintenance and tests. Control charts of the data are generated by the analysts monthly or for analyses done infrequently, with each analysis batch. The laboratory quality assurance specialist will review all QA/QC records with each data submission, and will provide QA/QC reports to the Field-PM with each batch of submitted field sample data.

7.3. Program Management Documentation

The BASMAA-PM and Consultant-PM are responsible for managing key parts of the Monitoring Program's information management systems. These efforts are described below.

7.3.1. SAP/QAPP

All original SAP/QAPPs will be held by the Consultant-PM. This SAP/QAPP and its revisions will be distributed to all parties involved with the Monitoring Program. Copies will also be sent to the each participating analytical laboratory's contact for internal distribution, preferably via electronic distribution from a secure location.

Associated with each update to the SAP/QAPP, the Consultant-PM will notify the BASMAA-PM and the PMT of the updated SAP/QAPP, with a cover memo compiling changes made. After appropriate distributions are made to affected parties, these approved updates will be filed and maintained by the SAP/QAPP Preparers for the Monitoring Program. Upon revision, the replaced SAP/QAPPs will be discarded/deleted.

7.3.2. Program Information Archival

The Data Manager and Consultant-PM will oversee the actions of all personnel with records retention responsibilities, and will arbitrate any issues relative to records retention and any decisions to discard records. Each analytical laboratory will archive all analytical records generated for this Program. The Consultant-PM will be responsible for archiving all management-level records.

Persons responsible for maintaining records for this Program are shown in Table 7-1.

Table 7-1. Document and Record Retention, Archival, and Disposition

Type	Retention (years)	Archival	Disposition
Field Datasheets	8	Data Manager	Maintain indefinitely
Chain of Custody Forms	8	Data Manager	Maintain indefinitely
Raw Analytical Data	8	Laboratory	Recycling
Lab QC Records	8	Laboratory	Recycling
Electronic data deliverables	8	Data Manager	Maintain indefinitely
Reports	8	Consultant-PM	Maintain indefinitely

As discussed previously, the analytical laboratory will archive all analytical records generated for this Program. The Consultant-PM will be responsible for archiving all other records associated with implementation of the Monitoring Program.

All field operation records will be entered into electronic formats and maintained in a dedicated directory managed by the BASMAA-PM.

7.4. Reporting

The Consultant team will prepare draft and final reports for each component of the Monitoring Program. The PMT will provide review and input on draft reports and submit to the BASMAA BOD for approval. Once approved by the BASMAA BOD, the Monitoring Program reports will be available to each individual stormwater program for submission to the Regional Water Board according to the schedule outlined in the MRP and summarized in Table 7.2.

Table 7-2. Monitoring Program Final Reporting Due Dates.

Monitoring Program Component	Task	MRP Reporting Due Date
Source Identification	Task 1 - Evaluation of PCB concentrations in roadway and storm drain infrastructure caulk and sealants	September 30, 2018
Management Action Effectiveness	Task 2 - Evaluation of the annual mass of PCBs and mercury captured in HDS Unit sump sediment	March 31, 2019
	Task 3 - Bench-scale testing of the mercury and PCBs removal effectiveness of selected BSM mixtures.	

8. Sampling Process Design

All information generated through conduct of the Monitoring Program will be used to inform TMDL implementation efforts for mercury and PCBs in the San Francisco Bay region. The Monitoring Program will implement the following tasks: (1) evaluate the presence and concentrations of PCB in caulk and sealants from public roadway and stormdrain infrastructure; (2) evaluate mass of PCBs and mercury removed during HDS Unit maintenance; and (3) evaluate the mercury and PCBs treatment effectiveness of various BSM mixtures in laboratory column tests using stormwater collected from Bay Area locations. Sample locations and the timing of sample collection will be selected using the directed sampling design principle. This is a deterministic approach in which points are selected deliberately based on knowledge of their attributes of interest as related to the environmental site being monitored. This principle is also known as "judgmental," "authoritative," "targeted," or "knowledge-based." Individual monitoring aspects are summarized further under Field Methods (Section 9) and in the task-specific study designs (BASMAA 2017a,b).

8.1. Caulk/Sealant Sampling

Caulk/sealant sampling will support the Monitoring Program's Task 1 to evaluate PCBs in roadway and stormdrain infrastructure caulk/sealant, as described previously (see Section 4). Further detail on caulk/sealant sampling methods and procedures are provided under Field Methods (Section 9).

8.2. Sediment Quality Sampling

Sediment sampling will support the Monitoring Program's Task 2 to evaluate the mass of mercury and PCBs removed during HDS unit maintenance, as described previously (see Section 4). Further detail on

sediment sampling methods and procedures are provided under Field Methods (Section 9).

8.3. Water Quality Sampling

Water sampling will support the Monitoring Program's Task 3 to evaluate the mercury and PCBs treatment effectiveness of various BSM mixtures, as described previously (see Section 4). Further detail on water sampling methods and procedures are provided under Field Methods (Section 9).

8.4. Sampling Uncertainty

There are multiple sources of potential sampling uncertainty associated with the Monitoring Program, including: (1) measurement error; (2) natural (inherent) variability; (3) undersampling (or poor representativeness); and (4) sampling bias (statistical meaning). Measures incorporated to address these areas of uncertainty are discussed below:

(1) Measurement error combines all sources of error related to the entire sampling and analysis process (i.e., to the measurement system). All aspects of dealing with uncertainty due to measurement error have been described elsewhere within this document.

(2) Natural (inherent) variability occurs in any environment monitored, and is often much wider than the measurement error. Prior work conducted by others in the field of stormwater management have demonstrated the high degree of variability in environmental media, which will be taken into consideration when interpreting results of the various lines of inquiry.

(3) Under- or unrepresentative sampling happens at the level of an individual sample or field measurement where an individual sample collected is a poor representative for overall conditions encountered given typical sources of variation. To address this situation, the Monitoring Program will be implementing a number of QA-related measures described elsewhere within this document, including methods refined through implementation of prior, related investigations.

(4) Sampling bias relates to the sampling design employed and whether the appropriate statistical design is employed to allow for appropriate understanding of environmental conditions. To a large degree, the sampling design required by the Monitoring Program is judgmental, which will therefore incorporate an unknown degree of sampling bias into the Project. There are small measures that have been built into the sampling design to combat this effect (e.g., homogenization of sediments for chemistry analyses), but overall this bias is a desired outcome designed to meet the goals of this Monitoring Program, and will be taken into consideration when interpreting results of the various investigations.

Further detail on measures implemented to reduce uncertainty through mobilization, sampling, sample handling, analysis, and reporting phases are provided throughout this document.

9. Sampling Methods

The Monitoring Program involves the collection of three types of samples: Caulk/sealants; sediment from HDS unit sumps; and water quality samples. Field collection will be conducted by field contractors or municipal staff using a variety of sampling protocols, depending on the media and parameter monitored. These methods are presented below. In addition, the Monitoring Program will utilize several field

sampling SOPs previously developed by the BASMAA Regional Monitoring Coalition identified in Table 9-3 (RMC, BASMAA, 2016).

9.1. Caulk/Sealant Sampling (Task 1)

Procedures for collecting caulk and sealant samples are not well established. Minimal details on caulk or sealant sample collection methodologies are available in peer-reviewed publications. The caulk/sealant sampling procedures described here were adapted from a previous study examining PCBs in building materials conducted in the Bay Area (Klosterhaus et al., 2014). The methods described by Klosterhaus et al. (2014) were developed through consultation with many of the previous authors of caulk literature references therein, in addition to field experience gained during the Bay Area study. It is anticipated that lessons will also be learned during the current study.

9.1.1. Sample Site Selection

Once a structure has been identified as meeting the selection criteria and permission is granted to perform the testing or collection of sealant samples, an on-site survey of the structure will be used to identify sealant types and locations on the structure to be sampled. It is expected that sealants from a number of different locations on each structure may sampled; however, inconspicuous locations on the structure will be targeted.

9.1.2. Initial Equipment Cleaning

The sampling equipment that is pre-cleaned includes:

- Glass sample jars
- Utility knife, extra blades
- Stainless-steel forceps

Prior to sampling, all equipment will be thoroughly cleaned. Glass sample containers will be factory pre-cleaned (Quality Certified™, ESS Vial, Oakland, CA) and delivered to field team at least one week prior to the start of sample collection. Sample containers will be pre-labeled and kept in their original boxes, which will be transported in coolers. Utility knife blades, forceps, stainless steel spoons, and chisels will be pre-cleaned with Alconox, Liquinox, or similar detergent, and then rinsed with deionized water and methanol. The cleaned equipment will then be wrapped in methanol-rinsed aluminum foil and stored in clean Ziploc bags until used in the field.

9.1.3. Field Cleaning Protocol

Between each use the tool used (utility knife blade, spoon or chisel) and forceps will be rinsed with methanol and then deionized water, and inspected to ensure all visible sign of the previous sample have been removed. The clean tools, extra blades, and forceps will be kept in methanol-rinsed aluminum foil and stored in clean Ziploc bags when not in use.

9.1.4. Blind Sampling Procedures

The intention of this sampling is to better determine whether sealants in road and storm drain infrastructure contain PCBs at concentrations of concern, and to understand the relative importance of PCBs in this infrastructure among the other known sources of PCBs that can affect San Francisco Bay. At this phase of the project, we are not seeking to identify specific facilities requiring mitigation (if PCBs are

identified, this could be a future phase). Therefore, in this initial round of sampling, we are not identifying sample locations, but instead implementing a blind sampling protocol, as follows:

- All samples will be collected without retaining any information that would identify structure locations. The information provided to the contractor on sampling locations will not be retained. Structure location information will not be recorded on any data sheets or in any data spreadsheets or other electronic computer files created for the Project. Physical sealant samples collected will be identified only by a sample identification (ID) designation (Section 4). Physical sealant sample labels will contain only the sample ID (see Section 4 and example label in Appendix A). Samples will be identified only by their sample ID on the COC forms.
- As an added precaution and if resources allow, oversampling will occur such that more samples will be collected than will be sent to the laboratory for compositing and analysis. In this case, the Project team would select a subset of samples for PCB analysis based on factors such as application type and/or chlorine content, but blind to the specific location where each sample was collected.
- Up to three individual sealant samples will be composited by the laboratory prior to analysis for PCBs, following instructions from the Consultant PM. This further ensures a blind sampling approach because samples collected at different locations will be analyzed together.

9.1.5. Caulk/Sealant Collection Procedures

At each sample location, the Field-PM, and/or municipal staff, will make a final selection of the most accessible sampling points at the time of sampling. From each point sampled, a one inch strip (aiming for about 10 g of material) of caulk or sealant will be removed from the structure using one of the following solvent-rinsed tools: a utility knife with a stainless-steel blade, stainless steel spoon to scrape off the material, or a stainless steel chisel. The Field-PM or municipal staff at the site will select the appropriate tool based on the conditions of the caulk/sealant at each sample point. Field personnel will wear nitrile gloves during sample collection to reduce potential sample contamination. The sample will then be placed in a labeled, factory-cleaned glass jar. For each caulk sample collected, field personnel will fill out a field data sheet at the time of sample collection, which includes the following information:

- Date and time of sample collection,
- sample identification designation,
- qualitative descriptions of relevant structure or caulk/sealant features, including use profile, color and consistency of material collected, surface coating (paint, oily film, masonry residues etc.)
- crack dimensions, the length and/or width of the caulk bead sampled, spacing of expansion joints in a particular type of application, and
- a description of any unusual occurrences associated with the sampling event (especially those that could affect sample or data quality).

Appendix A contains an example field data sheet. All samples will be kept in a chilled cooler in the field (i.e., at 4 ºC ± 2 ºC), and kept refrigerated pending delivery under COC to the Field PM at KLI. Further, the field data sheets will remain with the samples when they are shipped to KLI, and will then be maintained by the Field PM at KLI.

As needed, the procedure for replacement of the caulk/sealant will be coordinated with the appropriate municipal staff to help ensure that the sampling does not result in damage to the structure.

9.1.6. Sample ID Designation

Every sample must have a unique sample ID to ensure analytical results from each sample can be differentiated from every other sample. This information should follow the sample through the COC, analytical, and interpretation and reporting processes. For the infrastructure caulk/sealant samples, the sample ID must not contain information that can be used to identify where the sample was collected. The following 2-step process will be followed to assign sample IDs to the caulk/sealant samples.

1. Upon collection, the sample will be labeled according to the following naming convention:

   MMDDYYYY-TTTT-##

   Where:

MM	2 digit month of collection
DD	2 digit date of collection
YYYY	4 digit year of collection
TTTT	4 digit time of collection (military time)
##	Sequential 2-digit sample number (i.e., 01, 02, 03…etc.)

   For example, a sample collected on September 20, 2017 at 9 AM could be assigned the following sample ID: 09202017-0900-01.

2. This second step was added to avoid issues that could arise due to duplicate sample IDs, while maintaining the blind sampling approach. While the sample naming system identified above is unlikely to produce duplicate sample IDs, there is a chance that different groups may collect samples simultaneously. This second step will be implemented by the Field PM at KLI upon receipt of caulk/sealant samples from participating municipalities. The Field PM at KLI will review the sample IDs on the COC forms for all samples and compare the sample IDs to all caulk samples for this project already in storage at KLI. If any two samples have the same sample IDs, the Field PM will add a one-digit number to the end of one of the sample IDs, selected at random. This extra number will be added to the sample container label, the field data sheet, and the COC form for that sample.

9.2. HDS Unit Sampling Procedures (Task 2)

9.2.1. Sample Site Selection

Sample site selection will be opportunistic, based on the public HDS units that participating municipalities schedule for cleaning during the project. The project team will coordinate with participating municipalities to schedule sampling during HDS unit cleanouts.

9.2.2. Field Equipment and Cleaning

A list of potential sampling equipment for soil/sediment is presented in Table 5. The equipment list should be reviewed and tailored by field contractors to meet the needs of each individual sampling site. Appropriate sampling equipment is prepared in the laboratory a minimum of four days prior to sampling. Prior to sampling, all equipment will be thoroughly cleaned. Equipment is soaked (fully immersed) for three days in a solution of Alconox, Liquinox, or similar phosphate-free detergent and deionized water. Equipment is then rinsed three times with deionized water. Equipment is next rinsed with a dilute solution

(1-2%) of hydrochloric acid, followed by a rinse with reagent grade methanol, followed by another set of three rinses with deionized water. All equipment is then allowed to dry in a clean place. The cleaned equipment is then wrapped in aluminum foil or stored in clean Ziploc bags until used in the field.

Table 9-1 Field Equipment for HDS Unit Sampling.

Description of Equipment	Material (if applicable)
Sample scoops	Stainless steel or Kynar coated
Sample trowels	Stainless steel or Kynar coated
Compositing bucket	Stainless steel or Kynar coated
Ekman Dredge (as needed)	Stainless steel
Sample containers (with labels)	As coordinated with lab(s)
Methanol, Reagent grade (Teflon squeeze bottle with refill)	
Hydrochloric acid, 1-2%, Reagent grade (Teflon squeeze bottle)	
Liquinox detergent (diluted in DI within Teflon squeeze bottle)	
Deionized / reverse osmosis water	
Plastic scrub brushes	
Container for storage of sampling derived waste, dry	
Container for storage of sampling derived waste, wet	
Wet ice	
Coolers, as required	
Aluminum foil (heavy duty recommended)	
Protective packaging materials	Bubble / foam bags
Splash proof eye protection	
PPE for sampling personnel, including traffic mgmt as required	
Gloves for dry ice handling	Cotton, leather, etc.
Gloves for sample collection, reagent handling	Nitrile
Field datasheets	
COC forms	
Custody tape (as required)	
Shipping materials (as required)	
GPS	

9.2.3. Soil / Sediment Sample Collection

Field sampling personnel will collect sediment samples from HDS unit sumps using methods that minimize contamination, losses, and changes to the chemical form of the analytes of interest. The samples will be collected in the field into pre-cleaned sample containers of a material appropriate to the analysis to be conducted. Pre-cleaned sampling equipment is used for each site, whenever possible and/or when necessary. Appropriate sampling technique and measuring equipment may vary depending on the location, sample type, sampling objective, and weather. Additional safety measures may be necessary in some cases; for example, if traffic control or confined space entry is required to conduct the sampling.

Ideally and where a sufficient volume of soil/sediment allows, samples are collected into a composite container, where they are thoroughly homogenized, and then aliquoted into separate jars for chemical analysis. Sediment samples for metals and organics are submitted to the analytical laboratories in separate jars, which have been pre-cleaned according to laboratory protocol. It is anticipated that soil / solid media will be collected for laboratory analysis using one of two techniques: (1) Remote grab of submerged sediments within HDS unit sumps using Ekman dredge or similar; or (2) direct grab sampling of

sediments after dewatering HDS unit sumps using individual scoops, push core sampling, or similar. Each of these techniques is described briefly below.

- Soil and Sediment Samples, Submerged. Wet soil and sediment samples may be collected from within HDS unit sumps. Sample crews must exercise judgment on whether submerged samples can be collected in a manner that does not substantially change the character of the soil/sediment collected for analysis (e.g., loss of fine materials). It is anticipated that presence of trash within the sumps may interfere with sample collection by preventing complete grab closure and loss of significant portion of the sample. Field crews will have the responsibility to determine the best method for collection of samples within each HDS Unit sump. If sampling personnel determine that sample integrity cannot be maintained throughout collection process, it is preferable to cancel sampling operations rather than collect samples with questionable integrity. This decision making process is more fully described in Section 11, Field Variances.

- Soil and Sediment Samples, Dry. Soils / sediments may be collected from within the HDS unit sump after dewatering. Field crews will have the responsibility to identify areas of sediment accumulation within areas targeted for sampling and analysis, and determine the best method for collection of samples with minimal disturbance to the sampling media.

After collection, all soil/sediment samples for PCBs and mercury analyses will be homogenized and transferred from the sample-dedicated homogenization pail into factory-supplied wide-mouth glass jars using a clean trowel or scoop. The samples will be transferred to coolers containing double-bagged wet ice and chilled to 6°C immediately upon collection.

For each sample collected, field personnel will fill out a field data sheet at the time of sample collection. Appendix A contains an example field data sheet. All samples will be kept in a chilled cooler in the field, and kept refrigerated pending delivery under COC to the field-PM. The Field PM will be responsible for sending the samples in a single batch to CEH for XRF analysis under COC. Following XRF analysis, CEH will deliver the samples under COC to the Consultant-PM. The Consultant-PM will be responsible for working with the project team to group samples for compositing, and sending those samples to the analytical laboratory under COC.

9.2.4. Sample ID Designation

Every sample must have a unique sample ID so that the analytical results from each sample can be differentiated from every other sample. This information should follow the sample through the COC, analytical, and interpretation and reporting processes. Each sediment/soil sample collected from HDS units will be labeled according to the following naming convention:

MMM-UUU-##

where:

MMM	Municipal Abbreviation (i.e., SJC=San Jose; OAK=Oakland; SUN=Sunnyvale).
UUU	HDS Unit Catchment ID; this is the number provided by the municipality for a specific HDS unit.
##	Sequential Sample Number (i.e., 01, 02, 03…etc.)

9.3. Water Quality Sampling and Column Testing Procedures (Task 3)

For this task, monitoring will be conducted during three storm events. The stormwater collected during these events will then be used as the influent for the laboratory column tests of amended BSM mixtures. Four influent samples (i.e., one sample of Bay Area stormwater from each of the three monitored storm events plus one diluted stormwater sample) and 20 effluent samples from the column tests that includes 3 tests for each of the six columns, plus one test with the diluted stormwater in two columns (one test column and one control column) will be collected and analyzed for pollutant concentrations.

9.3.1. Sample Site Selection

Two stormwater collection sites have been selected based on influent PCB concentrations measured during CW4CB (BASMAA, 2017c). Both sites are near tree wells located on Ettie Street in West Oakland. The first site is the influent to tree well #6 (station code = TW6). During CW4CB, influent stormwater concentrations at this location were average to high, ranging from 30 ng/L to 286 ng/L. Stormwater collected from this site will be used as the influent for one of the main column tests and some water will be reserved for the dilution series column tests. The amount of dilution will be determined after results are received from the lab from the first run. The second site is the influent to tree well #2 (station code=TW2). During CW4CB, influent stormwater concentrations at this location were low to average, ranging from 6 ng/L to 39 ng/L. Stormwater collected from this site will be used for the remaining two main column tests..

9.3.2. Field Equipment and Cleaning

Field sampling equipment includes:

1. Borosilicate glass carboys
2. Glass sample jars
3. Peristaltic pump tubing

Prior to sampling, all equipment will be thoroughly cleaned. Glass sample containers and peristaltic pump tubing will be factory pre-cleaned. Prior to first use and after each use, glass carboys (field carboys and effluent collection carboys) will be washed using phosphate-free laboratory detergent and scrubbed with a plastic brush. After washing the carboy will be rinsed with methylene chloride, then de-ionized water, then 2N nitric acid, then again with de-ionized water. Glass carboys will be cleaned after each sample run before they are returned to the Field PM for reuse in the field.

9.3.3. Water Sampling Procedures

During each storm event, stormwater will be collected in six, five-gallon glass carboys. To fill the carboys, the Field PM will create a backwater condition in the gutter before the drain inlet at each site and use a peristaltic pump to pump the water into glass carboys. Field personnel will wear nitrile gloves during sample collection to prevent contamination. Carboys will be stored and transported in coolers with either wet ice or blue ice, and will be delivered to OWP within 24 hours of collection.

9.3.4. Hydraulic Testing

Based on the literature review and availability, the best five biochars will be mixed with the standard BSM to create biochar amended BSMs. Initially, each biochar will be mixed with standard BSM at a rate of 25% biochar by volume (the same as that at the CW4CB Richmond PG&E Substation 1st and Cutting

site). Hydraulic conductivity can be determined using the method stated in the BASMAA soil specification, method ASTM D2434.

1. Follow the directions for permeability testing in ASTM D2434 for the BSM.
2. Sieve enough of the sample biochar to collect at least 15 in^3 on a no. 200 sieve.
3. Mix the sieved biochar with standard BSM at a 1 to 4 ratio.
4. Thoroughly mix the soil.
5. Follow the directions for permeability testing in ASTM D2434.
6. If the soil mix is more than 1 in/hr different from the BSM, repeat steps 1-4 but on step 3, adjust the ratio as estimated to achieve the same permeability as the BSM.
7. Repeat steps 2-6 for each biochar.

9.3.5. Column Testing Procedures

Column Setup: Up to five biochar amended BSMs and one standard BSM will be tested (based on performance and availability of biochars). Six glass columns with a diameter of eight inches and a height of three feet will be mounted to the wall with sufficient height between the bottom of the columns and the floor to allow for effluent sample collection. Each column will be capped at the bottom and fitted with a spigot to facilitate sampling. Soil depth for all columns will be 18" after compaction, which is a standard depth used in bay area bioretention installations (see Figure 9-1 below). To retain soil the bottom of the soil layer will be contained by a layer of filter fabric on top of structural backing. Behind each column, a yardstick will be mounted to the wall so that the depth of water in the column can be monitored.

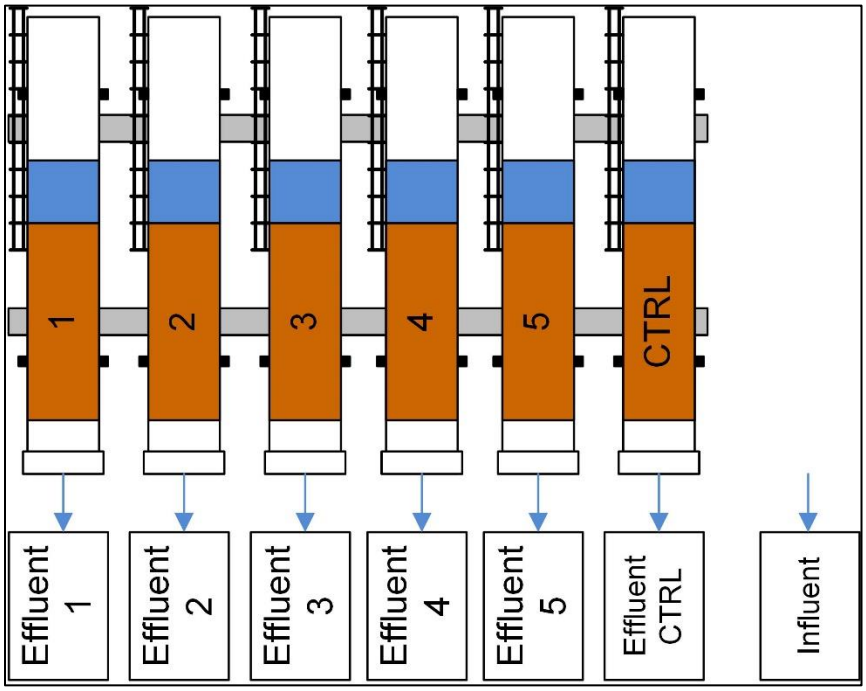

Figure 9-1. Column Test Setup

Dilution Run Column Setup: One of the existing biochar-amended BSM column and the standard BSM will be tested using diluted stormwater.

Testing procedure pre run setup: Before a sampling run begins a clean glass carboy will be placed under each soil column and labeled to match, this carboy will be sized to collect the full effluent volume

of the sample run. A glass beaker will also be assigned and labeled for each column of sufficient volume to accurately measure a single influent dose equivalent to 1 inch of depth in the column. An additional beaker will be prepared and labeled influent.

Media conditioning: Within 24 to 72 hours prior to the first column test run, pre-wet each column with a stormwater matrix collected from the CSUS campus by filling each column from the invert until water ponds above the media. Drain the water after 3 hours.

Sampling run: When the six glass carboys are delivered:

1. Inspect each carboy and fill out the Sample Receiving worksheet.
2. The runs will begin within 72 hours of delivery.
3. Select one carboy at random and fully mix it using a portable lab mixer for five minutes.
4. Turn off and remove the mixer, allow the sample to rest for one minute to allow the largest particles to settle to the bottom.
5. Fill each of the six dosing beakers and the one influent sample jar.
6. Pour each aliquot beaker into its respective column; record the time and height of water in each column.
7. Repeat steps 3-6 for each of the remaining carboys until a total of 18 inches of water is applied to each column. Before pouring an aliquot record the height of water in each column and the time. Pour each successive aliquot from the carboy when all columns have less than three inches of water above the soil surface. The water level should never be above 6 inches in any column at any time (6 inches is a standard ponding depth used in the bay area). Pour all aliquots from a single carboy into the columns at the same time.
8. Collect turbidity samples from the effluent of each column at the beginning, middle, and end of the sampling run. Fill the cuvettes for turbidity measurement directly from the effluent stream of each column and dispose of them after testing.
9. Collect mercury samples from the effluent of each column at the middle of the sample run using pre-labeled sample containers provided by the lab for that purpose.
10. Fill a pre-labeled sample jar from each columns effluent. The jar will be obtained from the laboratory performing the PCB analysis.
11. Pack each jar in ice and complete the lab COCs.
12. Ship the samples to the lab for analysis.

9.3.6.Sample ID Designations

Every sample must have a unique sample identification to ensure analytical results from each sample can be differentiated from every other sample. This information should follow the sample through the COC, analytical, and interpretation and reporting processes. Each influent and effluent water quality sample will be labeled according to the following naming convention:

SSS-TT-MMDDYYYY-##

Where:

SSS	Station code (see Table 9-2 for station codes)
TT	Sample Type (IN=influent; EF=Effluent)
MM	2 digit month of collection
DD	2 digit date of collection
YYYY	4 digit year of collection
##	Sequential 2-digit sample number (i.e., 01, 02, 03…etc.)

For example, a sample collected at the West Oakland Tree Well #2 site on October 20, 2017 and used for the influent sample for run #3 could be assigned the following sample ID: TW2-IN-09202017-03.

Table 9-2 Station Codes for Stormwater Influent Samples and Column Tests.

Station Code	Station Description
TW2	Stormwater sample collected from the West Oakland Tree Well #2
TW6	Stormwater sample collected from the West Oakland Tree Well #6
CO1	Effluent sample collected from column number 1
CO2	Effluent sample collected from column number 2
CO3	Effluent sample collected from column number 3
CO4	Effluent sample collected from column number 4
CO5	Effluent sample collected from column number 5
CO6	Effluent sample collected from column number 6

9.4. Collection of Samples for Archiving

Archive samples will not be collected for this Monitoring Program. The sample size collected will be enough to support additional analyses if QA/QC issues arise. Once quality assurance is certified by the QA Officer, the laboratory will be instructed to dispose of any leftover sample materials.

9.5. Waste Disposal

Proper disposal of all waste is an important component of field activities. At no time will any waste be disposed of improperly. The proper methods of waste disposal are outlined below:

9.5.1. Routine Garbage

Regular garbage (paper towels, paper cups, etc.) is collected by sampling personnel in garbage bags or similar. It can then be disposed of properly at appropriate intervals.

9.5.2. Detergent Washes

Any detergents used or detergent wash water should be collected in the field in a water-tight container and disposed of appropriately.

9.5.3. Chemicals

Methanol, if used, should be disposed of by following all appropriate regulations. It should always be collected when sampling and never be disposed in the field.

9.1. Responsibility and Corrective Actions

If monitoring equipment fails, sampling personnel will report the problem in the comments section of their field notes and will not record data values for the variables in question. Actions will be taken to replace or repair broken equipment prior to the next field use.

9.2. Standard Operating Procedures

SOPs associated with sampling and sample handling expected to be used as part of implementation of The Monitoring Program are identified in Table 9-3. Additional details on sample container information, required preservation, holding times, and sample volumes for all Monitoring Program analytes are listed

in Table 10-1 of Section 10.

Table 9-3. List of BASMAA RMC SOPs Utilized by the Monitoring Program.

RMC SOP #	RMC SOP	Source
FS-2	Water Quality Sampling for Chemical Analysis, Pathogen Indicators, and Toxicity	BASMAA 2016
FS-3	Field Measurements, Manual	BASMAA 2016
FS-4	Field Measurements, Continuous General Water Quality	BASMAA 2016
FS-5	Temperature, Automated, Digital Logger	BASMAA 2016
FS-6	Collection of Bedded Sediment Samples for Chemical Analysis and Toxicity	BASMAA 2016
FS-7	Field Equipment Cleaning Procedures	BASMAA 2016
FS-8	Field Equipment Decontamination Procedures	BASMAA 2016
FS-9	Sample Container, Handling, and Chain of Custody Procedures	BASMAA 2016
FS-10	Completion and Processing of Field Datasheets	BASMAA 2016
FS-11	Site and Sample Naming Convention	BASMAA 2016

In addition, contractor-specific plans and procedures may be required for specific aspects of the Monitoring Program implementation (e.g., health and safety plans, dry ice shipping procedures).

10. Sample Handling and Custody

Sample handling and chain of custody procedures are described in detail in RMC SOP FS-9 (Table 9-3) (BASMAA 2016). The Field-PM or designated municipal staff on site during sample collection will be responsible for overall collection and custody of samples during field sampling. Field crews will keep a field log, which will consist of sampling forms for each sampling event. Sample collection methods described in this document and the study designs (BASMAA 2017a, b) will be followed for each sampling task. Field data sheets will be filled out for each sample collected during the project. Example field data sheets are provided in Appendix A, and described further in Section 9.

The field crews will have custody of samples during field sampling, and COC forms will accompany all samples from field collection until delivery to the analyzing laboratory. COC procedures require that possession of samples be traceable from the time the samples are collected until completion and submittal of analytical results. Each laboratory will follow sample custody procedures as outlined in its QA plans.

Information on sampling containers, preservation techniques, packaging and shipping, and hold times is described below and summarized in Table 10.1.

10.1. Sampling Containers

Collection of all sample types require the use of clean containers. Factory pre-cleaned sample containers of the appropriate type will be provided by the contracted laboratory and delivered to field team at least one week prior to the start of sample collection. Individual laboratories will be responsible for the integrity of containers provided. The number and type of sample containers required for all analytes by media type for each sampling task are provided in Table 10.1.

10.2. Sample Preservation

Field Crews will collect samples in the field in a way that neither contaminates, loses, or changes the chemical form of the analytes of interest. The samples will be collected in the field into pre-cleaned sample containers of a material appropriate to the analysis to be conducted. Pre-cleaned sampling equipment is used for each site, whenever possible and/or when necessary. Appropriate sampling technique and measurement equipment may vary depending on the location, sample type, sampling objective, and weather.

In general, all samples will be packed in sufficient wet ice or frozen ice packs during shipment, so that they will be kept between 2 and 4º C (Table 10.1). When used, wet ice will be double bagged in Zip-top bags to prevent contamination via melt water. Where appropriate, samples may be frozen to prevent degradation. If samples are to be shipped frozen on dry ice, then appropriate handling procedures will be followed, including ensuring use of appropriate packaging materials and appropriate training for shipping personnel.

10.3. Packaging and Shipping

All samples will be handled, prepared, transported, and stored in a manner so as to minimize bulk loss, analyte loss, contamination, or biological degradation. Sample containers will be clearly labeled with an indelible marker. All caps and lids will be checked for tightness prior to shipping. Ice chests will be sealed with packing tape before shipping. Samples will be placed in the ice chest with enough ice or frozen ice packs to maintain between 2 and 4º C. Additional packing material will be added as needed. COC forms will be placed in a zip-top bag and placed inside of the ice chest.

10.4. Commercial Vehicle Transport

If transport of samples to the contracted laboratories is to be by commercial carriers, pickup will be pre-arranged with the carrier and all required shipping forms will be completed prior to sample pickup by the commercial carrier.

10.5. Sample Hold Times

Sample hold times for each analyte by media type are presented in Table 10-1.

Table 10-1 Sample Handling for the Monitoring Program Analytes by media type.

Analyte	Sample Media	Sample Container	Minimum Sample / Container Size[a]	Preservative	Hold Time (at 6º C)
PCBs (40-RMP Congeners)	Caulk or sealant	Pre-cleaned 250-mL glass sample container (e.g., Quality Certified™, ESS Vial, Oakland, CA)	10 g	Cool to 6° C within 24 hours, then freeze to ≤-20° C	1 year at -20º C; Samples must be analyzed within 14 days of collection or thawing.
	Sediment	Pre-cleaned 250-mL I-Chem 200 Series amber glass jar with Teflon lid liner	500 mL (two jars)	Cool to 6° C within 24 hours, then freeze to ≤-20° C	1 year at -20º C; Samples must be analyzed within 14 days of collection or thawing.
	Water	1000-mL I-Chem 200-Series amber glass bottle, with Teflon lid-liner	1000 mL/per individual analyses	Cool to 6º C in the dark.	1 year until extraction, 1 year after extraction
Total Mercury	Sediment	Pre-cleaned 250-mL I-Chem 200 Series amber glass jar with Teflon lid liner	100 g	Cool to 6º C and in the dark	1 year at -20º C; Samples must be analyzed within 14 days of collection or thawing.
	Water	250-mL glass or acid-cleaned Teflon bottle	250 mL	Cool to 6º C in the dark and acidify to 0.5% with pre-tested HCl within 48 hours	6 months at room temperature following acidification
Bulk Density	Sediment	250-mL clear glass jar; pre-cleaned	250 mL	Cool to 6º C	7 days
Grain Size and TOC	Sediment	250-mL clear glass jar; pre-cleaned	250 mL	Cool to 6º C, in the dark up to 28 days[2]	28 days at ≤6 ◦C; 1 year at ≤-20 ◦C
SSC	Water	125-mL amber glass jar or Polyethylene Bottles	125 mL	Cool to 6º C and store in the dark	7 days
Turbidity	Water				
Total Solids	Water	1 L HDPE	1 L	Cool to ≤6 ◦C	7 days
TOC	Water	40-mL glass vial	40 mL	Cool to 6º C and store in the dark. If analysis is to occur more than two hours after sampling, acidify (pH < 2) with HCl or H_2SO_4.	28 days
Particle Size Distribution	Water	1 L HDPE	2 L	Cool to 6º C and store in the dark	7 days

[a]QC samples or other analytes require additional sample bottles.

11. Field Health and Safety Procedures

All field crews will be expected to abide by their employer's (i.e., the field contractor's) health and safety programs. Additionally, prior to the fieldwork, field contractors are required to develop site-specific Health and Safety plans that include the locations of the nearest emergency medical services.

Implementation of the Monitoring Program activities may require confined space entry (CSE) to accomplish sampling goals. Sampling personnel conducting any confined space entry activities will be expected to be certified for CSE and to abide by relevant regulations.

12. Laboratory Analytical Methods

12.1. Caulk/Sealant Samples (Task 1)

12.1.1. XRF Chlorine analysis

XRF technology will be used in a laboratory setting to rank samples for chlorine content before sending the samples to the project laboratory for chemical analysis. Procedures for testing caulk or sealants using X-Ray fluorescence (XRF) and collecting caulk and sealant samples are not well described, and minimal detail on caulk or sealant sample collection is available in peer-reviewed publications. Sealant sampling procedures were adapted from the previous study examining PCBs in building materials (Klosterhaus et al., 2014).

An XRF analyzer will be used at the Center for Environmental Health (CEH) as a screening tool to estimate the concentration of chlorine (Cl) in collected caulk and sealant samples from various structures. Settings for the analyzer will be 'standardized' using procedures developed/ recommended by CEH each time the instrument is turned on and prior to any measurement. European plastic pellet reference materials (EC680 and EC681) will be used as 'check' standards upon first use to verify analyzer performance. A 30 second measurement in 'soil' mode will be used. CEH personnel will inspect the caulk/sealant surfaces and use a stainless steel blade to scrape off any paint, concrete chips, or other visible surface residue. The caulk/sealant surface to be sampled will then be wiped with a laboratory tissue to remove any remaining debris that may potentially interfere with the XRF analysis. At least two XRF readings will be collected from each sample switching the orientation or position of the sample between readings. If Cl is detected, a minimum of four additional readings will be collected on the same material to determine analytical variability. Each individual Cl reading and its detection limit will be recorded on the data sheet. After XRF analysis, all samples will be returned to their original sample container. Results of the XRF analysis will be provided to the project team as a table of ranked Cl screening results for possible selection for chemical (PCBs) analysis.

12.1.2. Selection of Samples for PCB analysis and Compositing

Once samples have been ranked for their chlorine content, primarily samples with the highest Cl will preferentially be selected for chemical analysis. About 75% of samples to be analyzed should be selected from samples with the top quartile Cl content. The remaining 25% should be selected from samples with medium (25 to 75th percentile) Cl, as the previous study using XRF screening showed inconsistent correlation between total Cl and PCB. Although samples with very low Cl seldom had much PCBs, samples with medium Cl on occasion had higher PCBs than samples with high Cl, and within the high Cl group, Cl content was not a good predictor of their ranks of PCB concentration.

In addition to Cl content, other factors about each sample that were recorded on the field data sheets at the time of sample collection, including the color or consistency of the sample, the type and/or age of the structure that was sampled, or the type of caulk or sealant application will be considered in selecting the samples that will be sent to the laboratory for PCBs analysis, as well as how the samples will be grouped for compositing purposes. Those factors are described in more detail in the study design (BASMAA, 2017a).

The Consultant PM will work with the project team to identify up to three samples for inclusion in each composite. A common composite ID will then be assigned to each sample that will be composited together (i.e., all samples the lab should composite together will be identified by the common composite ID). The composite ID will consist of a single letter designation and will be identical for all samples (up to 3 total) that will be composited together. The Consultant PM will add the composite ID to each sample container label, to each sample ID on all COC forms, and to each field data sheet for all samples prior to sending the samples to the laboratory for PCBs analysis.

12.1.3. Sample Preparation

The project laboratory will composite the samples prior to extraction and PCBs analysis according to the groupings identified by the common composite ID. Sample preparation will include removal of any paint, concrete chips, or other surface debris, followed by homogenization of the caulk/sealant material and compositing up to three samples per composite. Each sample will have a composite ID that will be used to identify which samples should be composited together. Samples with the same composite ID will be combined into a single composite sample. For example, all samples with composite ID = "A" will be composited together; all samples with composite ID = "B" will be composited together, etc. Sample preparation and compositing will follow the procedures outlined in the laboratory SOPs (Appendix B). After compositing, each composite sample will be assigned a new sample ID using the following naming convention:

X-MMDDYYYY

Where:

X	the single letter Composite ID that is common to all samples included in a given composite.
MM	2 digit month of composite preparation
DD	2 digit date of composite preparation
YYYY	4 digit year of composite preparation

For example, if three samples with the composite ID= "A" are combined into a single composite sample on December 12, 2017, the new (composite) sample ID would be the following: A-12122017.

12.1.4. PCBs Analysis

All composite caulk/sealant samples will be extracted by Method 3540C, and analyzed for the RMP-40 PCB congeners[3] using a modified EPA Method 8270C (GC/MS-SIM), in order to obtain positive

[3] The 40 individual congeners routinely quantified by the Regional Monitoring Program (RMP) for Water Quality in the San Francisco Estuary include: PCBs 8, 18, 28, 31, 33, 44, 49, 52, 56, 60, 66, 70, 74, 87, 95, 97, 99, 101, l05, 110, 118, 128, 132, 138, 141, 149, l51, 153, 156, 158, 170, 174, 177, 180, 183, 187, 194, 195, 201, and 203

identification and quantitation of PCBs. PCB content of these material covers an extremely wide range, so the subsampling of material should include sufficient material for quantification assuming that the concentration is likely to be around the median of previous results. There may be samples with much higher concentrations, which can be reanalyzed on dilution as needed. Method Reporting Limits (MRLs) for each of the RMP-40 PCB Congeners are 0.5 µg/Kg.

12.2. Sediment Samples Collected from HDS Units (Task 2)

All sediment samples collected from HDS units under Task 2 will be analyzed for TOC, grain size, bulk density, total mercury, and PCBs (RMP 40 Congeners1) by the methods identified in Table 12-1. All sediment samples (with the exception of grain size) will be sieved by the laboratory at 2 mm prior to analysis.

Table 12-1. Laboratory Analytical Methods for Analytes in Sediment

Analyte	Sampling Method	Recommended Analytical Method	Reporting Units
Total Organic Carbon (TOC)	Grab	EPA 415.1, 440.0, 9060, or ASTM D4129M	%
Grain Size	Grab	ASTM D422M/PSEP	%
Bulk Density	Grab	ASTM E1109-86	g/cm3
Mercury	Grab	EPA 7471A, 7473, or 1631	µg/kg
PCBs (RMP 40 Congeners)	Grab	EPA 1668	µg/kg

12.3. Water Samples – Stormwater and Column Tests (Task 3)

All water samples submitted to the laboratory will be analyzed for SSC, TOC, total mercury and PCBs (RMP-40 congeners) according to the methods identified in Table 12-2.

Table 12-2. Laboratory Analytical Methods for Analytes in Water

Analyte	Sampling Method	Recommended Analytical Method	Reporting Units
Suspended Sediment Concentration (SSC)	Grab	ASTM D3977-97 (Method C)	mg/L
Total Organic Carbon (TOC)	Grab	EPA 415.1 or SM 5310B	%
Mercury (Total)	Grab	EPA 1631	µg/L
PCBs (RMP 40 Congeners)	Grab	EPA 1668	ng/L

12.4. Method Failures

The QA Officer will be responsible for overseeing the laboratory implementing any corrective actions that may be needed in the event that methods fail to produce acceptable data. If a method fails to provide acceptable data for any reason, including analyte or matrix interferences, instrument failures, etc., then the involved samples will be analyzed again if possible. The laboratory in question's SOP for handling these types of problems will be followed. When a method fails to provide acceptable data, then the laboratory's

SOP for documenting method failures will be used to document the problem and what was done to rectify it.

Corrective actions for chemical data are taken when an analysis is deemed suspect for some reason. These reasons include exceeding accuracy or precision ranges and/or problems with sorting and identification. The corrective action will vary on a case-by-case basis, but at a minimum involves the following:

- A check of procedures.
- A review of documents and calculations to identify possible errors.
- Correction of errors based on discussions among analysts.
- A complete re-identification of the sample.

The field and laboratory coordinators shall have systems in place to document problems and make corrective actions. All corrective actions will be documented to the FTL and the QA Officer.

12.5. Sample Disposal

After analysis of the Monitoring Program samples has been completed by the laboratory and results have been accepted by QA Officer and the Field-PM, they will be disposed by laboratory staff in compliance with all federal, state, and local regulations. The laboratory has standard procedures for disposing of its waste, including left over sample materials

12.6. Laboratory Sample Processing

Field samples sent to the laboratories will be processed within their recommended hold time using methods agreed upon method between the Lab-PM and Field-PM. Each sample may be assigned unique laboratory sample ID numbers for tracking processing and analyses of samples within the laboratory. This laboratory sample ID (if differing from the field team sample ID) must be included in the data submission, within a lookup table linking the field sample ID to that assigned by the lab.

Samples arriving at the laboratory are to be stored under conditions appropriate for the planned analytical procedure(s), unless they are processed for analysis immediately upon receipt. Samples to be analyzed should only be removed from storage when laboratory staff are ready to proceed.

13. Quality Control

Each step in the field collection and analytical process is a potential source of contamination and must be consistently monitored to ensure that the final measurement is not adversely affected by any processing steps. Various aspects of the quality control procedures required by the Monitoring Program are summarized below.

13.1. Field Quality Control

Field QC results must meet the MQOs and frequency requirements specified in Tables 13-1 – 13-4 below.

13.1.1. Field Blanks

A field blank is collected to assess potential sample contamination levels that occur during field sampling activities. Field blanks are taken to the field, transferred to the appropriate container, preserved (if required by the method), and treated the same as the corresponding sample type during the course of a sampling event. The inclusion of field blanks is dependent on the requirements specified in the relevant MQO tables or in the sampling method or SOP.

Collection of caulk or sealant field blank samples has been deemed unnecessary due to the difficulty in collection and interpretation of representative blank samples and the use of precautions that minimize contamination of the samples. Additionally, PCBs have been reported to be present in percent concentrations when used in sealants; therefore any low level contamination (at ppb or even ppm level) due to sampling equipment and procedures is not expected to affect data quality because it would be many orders of magnitude lower than the concentrations deemed to be a positive PCB signal.

For stormwater samples, field blanks will be generated using lab supplied containers and clean matrices. Sampling containers will be opened as though actual samples were to be collected, and clean lab-supplied matrix (if any) will be transferred to sample containers for analysis.

13.1.2. Field Duplicates

Field samples collected in duplicate provide precision information as it pertains to the sampling process. The duplicate sample must be collected in the same manner and as close in time as possible to the original sample. This effort is to attempt to examine field homogeneity as well as sample handling, within the limits and constraints of the situation. These data are evaluated in the data analysis/assessment process for small-scale spatial variability.

Field duplicates will not be collected for caulk/sealant samples (Task 1), as assessment of within-structure variability of PCB concentrations in sealants is not a primary objective of the Project. Due to budget limitations, PCBs analysis of only one caulk/sealant sample per application will be targeted to maximize the number of Bay Area structures and structure types that may be analyzed in the Project. The selected laboratory will conduct a number of quality assurance analyses (see Section 13), including a limited number of sample duplicates, to evaluate laboratory and method performance as well as variability of PCB content within a sample.

For all sediment and water samples, 5% of field duplicates and/or column influent/effluent duplicates will be collected along with primary samples in order to evaluate small scale spatial or temporal variability in sample collection without specifically targeting any apparent or likely bias (e.g. different sides of a seemingly symmetrical unit, or offset locations in making a composite, or immediately following collection of a primary water sample would be acceptable, whereas collecting one composite near an inlet and another near the outlet, or intentionally collecting times with vastly different flow rates, would not be desirable).

13.1.3. Field Corrective Action

The Field PM is responsible for responding to failures in their sampling and field measurement systems. If monitoring equipment fails, personnel are to record the problem according to their documentation protocols. Failing equipment must be replaced or repaired prior to subsequent sampling events. It is the combined responsibility of all members of the field organization to determine if the performance

requirements of the specific sampling method have been met, and to collect additional samples if necessary. Associated data is to be flagged accordingly. Specific field corrective actions are detailed in Table 13-8.

13.2. Laboratory Quality Control

Laboratories providing analytical support to the Monitoring Program will have the appropriate facilities to store, prepare, and process samples in an ultra-clean environment, and will have appropriate instrumentation and staff to perform analyses and provide data of the required quality within the time period dictated by the Monitoring Program. The laboratories are expected to satisfy the following:

1. Demonstrate capability through pertinent certification and satisfactory performance in inter-laboratory comparison exercises.
2. Provide qualification statements regarding their facility and personnel.
3. Maintain a program of scheduled maintenance of analytical balances, laboratory equipment and instrumentation.
4. Conduct routine checking of analytical balances using a set of standard reference weights (American Society of Testing and Materials Class 3, NIST Class S-1, or equivalents). Analytical balances are serviced at six-month intervals or when test weight values are not within the manufacturer's instrument specifications, whichever occurs first.
5. Conduct routine checking and recording the composition of fresh calibration standards against the previous lot. Acceptable comparisons are within 2% of the precious value.
6. Record all analytical data in bound (where possible) logbooks, with all entries in ink, or electronically.
7. Monitor and document the temperatures of cold storage areas and freezer units on a continuous basis.
8. Verify the efficiency of fume/exhaust hoods.
9. Have a source of reagent water meeting specifications described in Section 8.0 available in sufficient quantity to support analytical operations.
10. Label all containers used in the laboratory with date prepared, contents, initials of the individual who prepared the contents, and other information as appropriate.
11. Date and safely store all chemicals upon receipt. Proper disposal of chemicals when the expiration date has passed.
12. Have QAPP, SOPs, analytical methods manuals, and safety plans readily available to staff.
13. Have raw analytical data readily accessible so that they are available upon request.

In addition, laboratories involved in the Monitoring Program are required to demonstrate capability continuously through the following protocols:

1. Strict adherence to routine QA/QC procedures.
2. Regular participation in annual certification programs.
3. Satisfactory performance at least annually in the analysis of blind Performance Evaluation Samples and/or participation in inter-laboratory comparison exercises.

Laboratory QC samples must satisfy MQOs and frequency requirements. MQOs and frequency requirements are listed in Tables 13-1 – 13-3. Frequency requirements are provided on an analytical batch

level. The Monitoring Program defines an analytical batch as 20 or fewer samples and associated quality control that are processed by the same instrument within a 24-hour period (unless otherwise specified by method). Target Method Reporting Limits are provided in Tables 13.4 – 13.8. Details regarding sample preparation are method- or laboratory SOP-specific, and may consist of extraction, digestion, or other techniques.

13.2.1. Calibration and Working Standards

All calibration standards must be traceable to a certified standard obtained from a recognized organization. If traceable standards are not available, procedures must be implemented to standardize the utilized calibration solutions (*e.g.*, comparison to a CRM – see below). Standardization of calibration solutions must be thoroughly documented, and is only acceptable when pre-certified standard solutions are not available. Working standards are dilutions of stock standards prepared for daily use in the laboratory. Working standards are used to calibrate instruments or prepare matrix spikes, and may be prepared at several different dilutions from a common stock standard. Working standards are diluted with solutions that ensure the stability of the target analyte. Preparation of the working standard must be thoroughly documented such that each working standard is traceable back to its original stock standard. Finally, the concentration of all working standards must be verified by analysis prior to use in the laboratory.

13.2.2. Instrument Calibration

Prior to sample analysis, utilized instruments must be calibrated following the procedures outlined in the relevant analytical method or laboratory SOP. Each method or SOP must specify acceptance criteria that demonstrate instrument stability and an acceptable calibration. If instrument calibration does not meet the specified acceptance criteria, the analytical process is not in control and must be halted. The instrument must be successfully recalibrated before samples may be analyzed.

Calibration curves will be established for each analyte covering the range of expected sample concentrations. Only data that result from quantification within the demonstrated working calibration range may be reported unflagged by the laboratory. Quantification based upon extrapolation is not acceptable; sample extracts above the calibration range should be diluted and rerun if possible. Data reported below the calibration range must be flagged as estimated values that are Detected not Quantified.

13.2.3. Initial Calibration Verification

The initial calibration verification (ICV) is a mid-level standard analyzed immediately following the calibration curve. The source of the standards used to calibrate the instrument and the source of the standard used to perform the ICV must be independent of one another. This is usually achieved by the purchase of standards from separate vendors. Since the standards are obtained from independent sources and both are traceable, analyses of the ICV functions as a check on the accuracy of the standards used to calibrate the instrument. The ICV is not a requirement of all SOPs or methods, particularly if other checks on analytical accuracy are present in the sample batch.

13.2.4. Continuing Calibration Verification

Continuing calibration verification (CCV) standards are mid-level standards analyzed at specified intervals during the course of the analytical run. CCVs are used to monitor sensitivity changes in the instrument during analysis. In order to properly assess these sensitivity changes, the standards used to perform CCVs must be from the same set of working standards used to calibrate the instrument. Use of a

second source standard is not necessary for CCV standards, since other QC samples are designed to assess the accuracy of the calibration standards. Analysis of CCVs using the calibration standards limits this QC sample to assessing only instrument sensitivity changes. The acceptance criteria and required frequency for CCVs are detailed in Tables 13-1 through 13-3. If a CCV falls outside the acceptance limits, the analytical system is not in control, and immediate corrective action must be taken.

Data obtained while the instrument is out of control is not reportable, and all samples analyzed during this period must be reanalyzed. If reanalysis is not an option, the original data must be flagged with the appropriate qualifier and reported. A narrative must be submitted listing the results that were generated while the instrument was out of control, in addition to corrective actions that were applied.

13.2.5. Laboratory Blanks

Laboratory blanks (also called extraction blanks, procedural blanks, or method blanks) are used to assess the background level of a target analyte resulting from sample preparation and analysis. Laboratory blanks are carried through precisely the same procedures as the field samples. For both organic and inorganic analyses, a minimum of at least one laboratory blank must be prepared and analyzed in every analytical batch or per 20 samples, whichever is more frequent. Some methods may require more than one laboratory blank with each analytical run. Acceptance criteria for laboratory blanks are detailed in Tables 13-1 through 13-3. Blanks that are too high require corrective action to bring the concentrations down to acceptable levels. This may involve changing reagents, cleaning equipment, or even modifying the utilized methods or SOPs. Although acceptable laboratory blanks are important for obtaining results for low-level samples, improvements in analytical sensitivity have pushed detection limits down to the point where some amount of analyte will be detected in even the cleanest laboratory blanks. The magnitude of the blanks must be evaluated against the concentrations of the samples being analyzed and against project objectives.

13.2.6. Reference Materials and Demonstration of Laboratory Accuracy

Evaluation of the accuracy of laboratory procedures is achieved through the preparation and analysis of reference materials with each analytical batch. Ideally, the reference materials selected are similar in matrix and concentration range to the samples being prepared and analyzed. The acceptance criteria for reference materials are listed in Tables 13-1 – 13-3. The accuracy of an analytical method can be assessed using CRMs only when certified values are provided for the target analytes. When possible, reference materials that have certified values for the target analytes should be used. This is not always possible, and often times certified reference values are not available for all target analytes. Many reference materials have both certified and non-certified (or reference) values listed on the certificate of analysis. Certified reference values are clearly distinguished from the non-certified reference values on the certificate of analysis.

13.2.7. Reference Materials vs. Certified Reference Materials

The distinction between a reference material and a certified reference material does not involve how the two are prepared, rather with the way that the reference values were established. Certified values are determined through replicate analyses using two independent measurement techniques for verification. The certifying agency may also provide “non-certified or “reference” values for other target analytes. Such values are determined using a single measurement technique that may introduce bias. When available, it is preferable to use reference materials that have certified values for all target analytes. This is not always an option, and therefore it is acceptable to use materials that have reference values for these

analytes. Note: Standard Reference Materials (SRMs) are essentially the same as CRMs. The term "Standard Reference Material" has been trademarked by the National Institute of Standards and Technology (NIST), and is therefore used only for reference materials distributed by NIST.

13.2.8. Laboratory Control Samples

While reference materials are not available for all analytes, a way of assessing the accuracy of an analytical method is still required. LCSs provide an alternate method of assessing accuracy. An LCS is a specimen of known composition prepared using contaminant-free reagent water or an inert solid spiked with the target analyte at the midpoint of the calibration curve or at the level of concern. The LCS must be analyzed using the same preparation, reagents, and analytical methods employed for regular samples. If an LCS needs to be substituted for a reference material, the acceptance criteria are the same as those for the analysis of reference materials..

13.2.9. Prioritizing Certified Reference Materials, Reference Materials, and Laboratory Control Samples

Certified reference materials, reference materials, and laboratory control samples all provide a method to assess the accuracy at the mid-range of the analytical process. However, this does not mean that they can be used interchangeably in all situations. When available, analysis of one certified reference material per analytical batch should be conducted. Certified values are not always available for all target analytes. If no certified reference material exists, reference values may be used. If no reference material exists for the target analyte, an LCS must be prepared and analyzed with the sample batch as a means of assessing accuracy. The hierarchy is as follows: analysis of a CRM is favored over the analysis of a reference material, and analysis of a reference material is preferable to the analysis of an LCS. Substitution of an LCS is not acceptable if a certified reference material or reference material is available, contact the Project Manager and QAO for approval before relying exclusively on an LCS as a measure of accuracy.

13.2.10.Matrix Spikes

A MS is prepared by adding a known concentration of the target analyte to a field sample, which is then subjected to the entire analytical procedure. The MS is analyzed in order to assess the magnitude of matrix interference and bias present. Because these spikes are often analyzed in pairs, the second spike is called the MSD. The MSD provides information regarding the precision of measurement and consistency of the matrix effects. Both the MS and MSD are split from the same original field sample. In order to properly assess the degree of matrix interference and potential bias, the spiking level should be approximately 2-5x the ambient concentration of the spiked sample. To establish spiking levels prior to sample analysis, if possible, laboratories should review any relevant historical data. In many instances, the laboratory will be spiking samples blind and will not meet a spiking level of 2-5x the ambient concentration. In addition to the recoveries, the relative percent difference (RPD) between the MS and MSD is calculated to evaluate how matrix affects precision. The MQO for the RPD between the MS and MSD is the same regardless of the method of calculation. These are detailed in Tables 13-1 – 13-3. Recovery data for matrix spikes provides a basis for determining the prevalence of matrix effects in the samples collected and analyzed. If the percent recovery for any analyte in the MS or MSD is outside of the limits specified in Tables 13-1 – 13-3, the chromatograms (in the case of trace organic analyses) and raw data quantitation reports should be reviewed. Data should be scrutinized for evidence of sensitivity shifts (indicated by the results of the CCVs) or other potential problems with the analytical process. If associated QC samples (reference materials or LCSs) are in control, matrix effects may be the source of

the problem. If the standard used to spike the samples is different from the standard used to calibrate the instrument, it must be checked for accuracy prior to attributing poor recoveries to matrix effects.

13.2.11.Laboratory Duplicates

In order to evaluate the precision of an analytical process, a field sample is selected and prepared in duplicate. Specific requirements pertaining to the analysis of laboratory duplicates vary depending on the type of analysis. The acceptance criteria for laboratory duplicates are specified in Tables 13-1 – 13-3.

13.2.12.Laboratory Duplicates vs. Matrix Spike Duplicates

Although the laboratory duplicate and matrix spike duplicate both provide information regarding precision, they are unique measurements. Laboratory duplicates provide information regarding the precision of laboratory procedures at actual ambient concentrations. The matrix spike duplicate provides information regarding how the matrix of the sample affects both the precision and bias associated with the results. It also determines whether or not the matrix affects the results in a reproducible manner. MS/MSDs are often spiked at levels well above ambient concentrations, so thus are not representative of typical sample precision. Because the two concepts cannot be used interchangeably, it is unacceptable to analyze only an MS/MSD when a laboratory duplicate is required.

13.2.13.Replicate Analyses

The Monitoring Program will adopt the same terminology as SWAMP in defining replicate samples, wherein replicate analyses are distinguished from duplicate analyses based simply on the number of involved analyses. Duplicate analyses refer to two sample preparations, while replicate analyses refer to three or more. Analysis of replicate samples is not explicitly required.

13.2.14.Surrogates

Surrogate compounds accompany organic measurements in order to estimate target analyte losses or matrix effects during sample extraction and analysis. The selected surrogate compounds behave similarly to the target analytes, and therefore any loss of the surrogate compound during preparation and analysis is presumed to coincide with a similar loss of the target analyte. Surrogate compounds must be added to field and QC samples prior to extraction, or according to the utilized method or SOP. Surrogate recovery data are to be carefully monitored. If possible, isotopically labeled analogs of the analytes are to be used as surrogates.

13.2.15.Internal Standards

To optimize gas chromatography mass spectrometry (GC-MS) analysis, internal standards (also referred to as "injection internal standards") may be added to field and QC sample extracts prior to injection. Use of internal standards is particularly important for analysis of complex extracts subject to retention time shifts relative to the analysis of standards. The internal standards can also be used to detect and correct for problems in the GC injection port or other parts of the instrument. The analyst must monitor internal standard retention times and recoveries to determine if instrument maintenance or repair or changes in analytical procedures are indicated. Corrective action is initiated based on the judgment of the analyst. Instrument problems that affect the data or result in reanalysis must be documented properly in logbooks and internal data reports, and used by the laboratory personnel to take appropriate corrective action. Performance criteria for internal standards are established by the method or laboratory SOP.

13.2.16.Dual-Column Confirmation

Due to the high probability of false positives from single-column analyses, dual column confirmation should be applied to all gas chromatography and liquid chromatography methods that do not provide definitive identifications. It should not be restricted to instruments with electron capture detection (ECD).

13.2.17.Dilution of Samples

Final reported results must be corrected for dilution carried out during the process of analysis. In order to evaluate the QC analyses associated with an analytical batch, corresponding batch QC samples must be analyzed at the same dilution factor. For example, the results used to calculate the results of matrix spikes must be derived from results for the native sample, matrix spike, and matrix spike duplicate analyzed at the same dilution. Results derived from samples analyzed at different dilution factors must not be used to calculate QC results.

13.2.18.Laboratory Corrective Action

Failures in laboratory measurement systems include, but are not limited to: instrument malfunction, calibration failure, sample container breakage, contamination, and QC sample failure. If the failure can be corrected, the analyst must document it and its associated corrective actions in the laboratory record and complete the analysis. If the failure is not resolved, it is conveyed to the respective supervisor who should determine if the analytical failure compromised associated results. The nature and disposition of the problem must be documented in the data report that is sent to the Consultant-PM. Suggested ccorrective actions are detailed in Table 13-9.

Table 13-1. Measurement Quality Objectives - PCBs.

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Tuning[2]	Per analytical method	Per analytical method
Calibration	Initial method setup or when the calibration verification fails	• Correlation coefficient (r^2 >0.990) for linear and non-linear curves • If RSD<15%, average RF may be used to quantitate; otherwise use equation of the curve • First- or second-order curves only (not forced through the origin) • Refer to SW-846 methods for SPCC and CCC criteria[2] • Minimum of 5 points per curve (one of them at or below the RL)
Calibration Verification	Per 12 hours	• Expected response or expected concentration ±20% • RF for SPCCs=initial calibration[4]
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analytes
Reference Material	Per 20 samples or per analytical batch	70-130% recovery if certified; otherwise, 50-150% recovery
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent	50-150% or based on historical laboratory control limits (average±3SD)
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	50-150% or based on historical laboratory control limits (average±3SD); RPD<25%
Surrogate	Included in all samples and all QC samples	Based on historical laboratory control limits (50-150% or better)
Internal Standard	Included in all samples and all QC samples (as available)	Per laboratory procedure
Field Quality Control	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate	5% of total Project sample count (sediment and water samples only)	RPD<25% (n/a if concentration of either sample<RL)
Field Blank	Not required for the Monitoring Program	<RL for target analytes

Table 13-2. Measurement Quality Objectives – Inorganic Analytes.

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Calibration Standard	Per analytical method or manufacturer's specifications	Per analytical method or manufacturer's specifications
Continuing Calibration Verification	Per 10 analytical runs	80-120% recovery
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
Reference Material	Per 20 samples or per analytical batch, whichever is more frequent	75-125% recovery
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent	75-125% recovery
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	75-125% recovery ; RPD<25%
Laboratory Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	RPD<25% (n/a if concentration of either sample<RL)
Internal Standard	Accompanying every analytical run when method appropriate	60-125% recovery
Field Quality Control	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate	5% of total Project sample count	RPD<25% (n/a if concentration of either sample<RL), unless otherwise specified by method
Field Blank, Equipment Field, Eqpt Blanks	Not required for the Monitoring Program	Blanks<RL for target analyte

Table 13-3. Measurement Quality Objectives – Conventional Analytes.

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Calibration Standard	Per analytical method or manufacturer's specifications	Per analytical method or manufacturer's specifications
Laboratory Blank	Total organic carbon only: one per 20 samples or per analytical batch, whichever is more frequent (n/a for other parameters)	80-120% recovery
Reference Material	One per analytical batch	RPD<25% (n/a if native concentration of either sample<RL)
Laboratory Duplicate	(TOC only) one per 20 samples or per analytical batch, whichever is more frequent (n/a for other parameters)	80-120% recovery
Field Quality Control	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate	5% of total Project sample count	RPD<25% (n/a if concentration of either sample<RL)
Field Blank, Travel Blank, Field Blanks	Not required for the Monitoring Program analytes	NA

Consistent with SWAMP QAPP and as applicable, percent moisture should be reported with each batch of sediment samples. Sediment data must be reported on a dry weight basis.

Table 13-4. Target MRLs for Sediment Quality Parameters.

Analyte	MRL
Sediment Total Organic Carbon	0.01% OC
Bulk Density	n/a
%Moisture	n/a
%Lipids	n/a
Mercury	30 µg/kg

Table 13-5. Target MRLs for PCBs in Water, Sediment and Caulk

Congener	Water MRL (µg/L)	Sediment MRL (µg/kg)	Caulk/Sealant MRL (µg/kg)
PCB 8	0.002	0.2	0.5
PCB 18	0.002	0.2	0.5
PCB 28	0.002	0.2	0.5
PCB 31	0.002	0.2	0.5
PCB 33	0.002	0.2	0.5
PCB 44	0.002	0.2	0.5
PCB 49	0.002	0.2	0.5
PCB 52	0.002	0.2	0.5
PCB 56	0.002	0.2	0.5
PCB 60	0.002	0.2	0.5
PCB 66	0.002	0.2	0.5
PCB 70	0.002	0.2	0.5
PCB 74	0.002	0.2	0.5
PCB 87	0.002	0.2	0.5
PCB 95	0.002	0.2	0.5
PCB 97	0.002	0.2	0.5
PCB 99	0.002	0.2	0.5
PCB 101	0.002	0.2	0.5
PCB 105	0.002	0.2	0.5
PCB 110	0.002	0.2	0.5
PCB 118	0.002	0.2	0.5
PCB 128	0.002	0.2	0.5
PCB 132	0.002	0.2	0.5
PCB 138	0.002	0.2	0.5
PCB 141	0.002	0.2	0.5
PCB 149	0.002	0.2	0.5
PCB 151	0.002	0.2	0.5
PCB 153	0.002	0.2	0.5
PCB 156	0.002	0.2	0.5
PCB 158	0.002	0.2	0.5
PCB 170	0.002	0.2	0.5
PCB 174	0.002	0.2	0.5
PCB 177	0.002	0.2	0.5
PCB 180	0.002	0.2	0.5
PCB 183	0.002	0.2	0.5
PCB 187	0.002	0.2	0.5
PCB 194	0.002	0.2	0.5
PCB 195	0.002	0.2	0.5
PCB 201	0.002	0.2	0.5
PCB 203	0.002	0.2	0.5

Table 13-6. Size Distribution Categories for Grain Size in Sediment

Wentworth Size Category	Size	MRL
Clay	<0.0039 mm	1%
Silt	0.0039 mm to <0.0625 mm	1%
Sand, very fine	0.0625 mm to <0.125 mm	1%
Sand, fine	0.125 mm to <0.250 mm	1%
Sand, medium	0.250 mm to <0.5 mm	1%
Sand, coarse	0.5 mm to < 1.0 mm	1%
Sand, very coarse	1.0 mm to < 2 mm	1%
Gravel	2 mm and larger	1%

Table 13-7. Target MRLs for TOC, SSC, and Mercury in Water

Analyte	MRL
Total Organic Carbon	0.6 mg/L
Suspended Sediment Concentration	0.5 mg/L
Mercury	0.0002 µg/L

Table 13-8. Corrective Action – Laboratory and Field Quality Control

Laboratory Quality Control	Recommended Corrective Action
Calibration	Recalibrate the instrument. Affected samples and associated quality control must be reanalyzed following successful instrument recalibration.
Calibration Verification	Reanalyze the calibration verification to confirm the result. If the problem continues, halt analysis and investigate the source of the instrument drift. The analyst should determine if the instrument must be recalibrated before the analysis can continue. All of the samples not bracketed by acceptable calibration verification must be reanalyzed.
Laboratory Blank	Reanalyze the blank to confirm the result. Investigate the source of contamination. If the source of the contamination is isolated to the sample preparation, the entire batch of samples, along with the new laboratory blanks and associated QC samples, should be prepared and/or re-extracted and analyzed. If the source of contamination is isolated to the analysis procedures, reanalyze the entire batch of samples. If reanalysis is not possible, the associated sample results must be flagged to indicate the potential presence of the contamination.
Reference Material	Reanalyze the reference material to confirm the result. Compare this to the matrix spike/matrix spike duplicate recovery data. If adverse trends are noted, reprocess all of the samples associated with the batch.
Matrix Spike	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike to confirm the result. Review the recovery obtained for the matrix spike duplicate. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Matrix Spike Duplicate	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike duplicate to confirm the result. Review the recovery obtained for the matrix spike. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Internal Standard	Check the response of the internal standards. If the instrument continues to generate poor results, terminate the analytical run and investigate the cause of the instrument drift.
Surrogate	Analyze as appropriate for the utilized method. Troubleshoot as needed. If no instrument problem is found, samples should be re-extracted and reanalyzed if possible.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	Visually inspect the samples to determine if a high RPD between results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.
Field Blank	Investigate the source of contamination. Potential sources of contamination include sampling equipment, protocols, and handling. The laboratory should report evidence of field contamination as soon as possible so corrective actions can be implemented. Samples collected in the presence of field contamination should be flagged.

14. Inspection/Acceptance for Supplies and Consumables

Each sampling event conducted for the Monitoring Program will require use of appropriate consumables to reduce likelihood of sample contamination. The Field-PM will be responsible for ensuring that all supplies are appropriate prior to their use. Inspection requirements for sampling consumables and supplies are summarized in Table 14-1.

Table 14-1. Inspection / Acceptance Testing Requirements for Consumables and Supplies

Project-related Supplies	Inspection / Testing Specifications	Acceptance Criteria	Frequency	Responsible Person Sampling Containers
Sampling supplies	Visual	Appropriateness; no evident contamination or damage; within expiration date	Each purchase	Field Crew Leader

15. Non Direct Measurements, Existing Data

No data from external sources are planned to be used with this project.

16. Data Management

As previously discussed, the Monitoring Program data management will conform to protocols dictated by the study designs (BASMAA 2017a, b). A summary of specific data management aspects is provided below.

16.1. Field Data Management

All field data will be reviewed for legibility and errors as soon as possible after the conclusion of sampling. All field data that is entered electronically will be hand-checked at a rate of 10% of entries as a check on data entry. Any corrective actions required will be documented in correspondence to the QA Officer.

16.2. Laboratory Data Management

Record keeping of laboratory analytical data for the proposed project will employ standard record-keeping and tracking practices. All laboratory analytical data will be entered into electronic files by the instrumentation being used or, if data is manually recorded, then it will be entered by the analyst in charge of the analyses, per laboratory standard procedures.

Following the completion of internal laboratory quality control checks, analytical results will be forwarded electronically to the Field-PM. The analytical laboratories will provide data in electronic format, encompassing both a narrative and electronic data deliverable (EDD).

17. Assessments and Response Actions

17.1. Readiness Reviews

The Field-PM will review all field equipment, instruments, containers, and paperwork to ensure that everything is ready prior to each sampling event. All sampling personnel will be given a brief review of the goals and objectives of the sampling event and the sampling procedures and equipment that will be used to achieve them. It is important that all field equipment be clean and ready to use when it is needed. Therefore, prior to using all sampling and/or field measurement equipment, each piece of equipment will be checked to make sure that it is in proper working order. Equipment maintenance records will be checked to ensure that all field instruments have been properly maintained and that they are ready for use. Adequate supplies of all preservatives, bottles, labels, waterproof pens, etc. will be checked before each field event to make sure that there are sufficient supplies to successfully support each sampling event, and, as applicable, are within their expiration dates. It is important to make sure that all field activities and measurements are properly recorded in the field. Therefore, prior to starting each field event, necessary paperwork such as logbooks, chain of custody record forms, etc. will be checked to ensure that sufficient amounts are available during the field event. In the event that a problem is discovered during a readiness review it will be noted in the field log book and corrected before the field crew is deployed. The actions taken to correct the problem will also be documented with the problem in the field log book. This information will be communicated by the Field-PM prior to conducting relevant sampling. The Field-PM will track corrective actions taken.

17.2. Post Sampling Event Reviews

The Field-PM will be responsible for post sampling event reviews. Any problems that are noted will be documented along with recommendations for correcting the problem. Post sampling event reviews will be conducted following each sampling event in order to ensure that all information is complete and any deviations from planned methodologies are documented. Post sampling event reviews will include field sampling activities and field measurement documentation in order to help ensure that all information is complete. The reports for each post sampling event will be used to identify areas that may be improved prior to the next sampling event.

17.3. Laboratory Data Reviews

The Field-PM will be responsible for reviewing the laboratory's data for completeness and accuracy. The data will also be checked to make sure that the appropriate methods were used and that all required QC data was provided with the sample analytical results. Any laboratory data that is discovered to be incorrect or missing will immediately be reported to the both the laboratory and Consultant-PM. The laboratory's QA manual details the procedures that will be followed by laboratory personnel to correct any invalid or missing data. The Consultant-PM has the authority to request re-testing if a review of any of the laboratory data is found to be invalid or if it would compromise the quality of the data and resulting conclusions from the proposed project.

18. Instrument/Equipment Testing, Inspection and Maintenance

18.1. Field Equipment

Field measurement equipment will be checked for operation in accordance with manufacturer's specifications. All equipment will be inspected for damage when first employed and again when returned from use. Maintenance logs will be kept and each applicable piece of equipment will have its own log that documents the dates and description of any problems, the action(s) taken to correct problem(s), maintenance procedures, system checks, follow-up maintenance dates, and the person responsible for maintaining the equipment.

18.2. Laboratory Equipment

All laboratories providing analytical support for chemical or biological analyses will have the appropriate facilities to store, prepare, and process samples. Moreover, appropriate instrumentation and staff to provide data of the required quality within the schedule required by the program are also required. Laboratory operations must include the following procedures:

- A program of scheduled maintenance of analytical balances, microscopes, laboratory equipment, and instrumentation.
- Routine checking of analytical balances using a set of standard reference weights (American Society of Testing and Materials (ASTM) Class 3, NIST Class S-1, or equivalents).
- Checking and recording the composition of fresh calibration standards against the previous lot, wherever possible. Acceptable comparisons are < 2% of the previous value.
- Recording all analytical data in bound (where possible) logbooks, with all entries in ink, or electronic format.
- Monitoring and documenting the temperatures of cold storage areas and freezer units once per week.
- Verifying the efficiency of fume hoods.
- Having a source of reagent water meeting ASTM Type I specifications (ASTM, 1984) available in sufficient quantity to support analytical operations. The conductivity of the reagent water will not exceed 18 megaohms at 25°C. Alternately, the resistivity of the reagent water will exceed 10 mmhos/cm.
- Labeling all containers used in the laboratory with date prepared, contents, initials of the individual who prepared the contents, and other information, as appropriate.
- Dating and safely storing all chemicals upon receipt. Proper disposal of chemicals when the expiration date has passed.
- Having QAPP, SOPs, analytical methods manuals, and safety plans readily available to staff.
- Having raw analytical data, such as chromatograms, accessible so that they are available upon request.

Laboratories will maintain appropriate equipment per the requirements of individual laboratory SOPs and will be able to provide information documenting their ability to conduct the analyses with the required level of data quality. Such information might include results from interlaboratory comparison studies, control charts and summary data of internal QA/QC checks, and results from certified reference material analyses.

19. Instrument/Equipment Calibration and Frequency

19.1. Field Measurements

Any equipment used should be visually inspected during mobilization to identify problems that would result in loss of data. As appropriate, equipment-specific SOPs should be consulted for equipment calibration.

19.2. Laboratory Analyses

19.2.1. In-house Analysis – XRF Screening

A portable XRF analyzer will be used as a screening tool to estimate the chlorine concentration in each caulk sample. Since caulk often contains in excess of 1% PCBs and detection limits of portable XRF may be in the ppm range, the portable XRF may be able to detect chlorine within caulk containing PCBs down to about 0.1%. The analysis will be performed on the field samples using a test stand. The analyzer will be calibrated for chlorine using plastic pellet European reference materials (EC680 and EC681) upon first use, and standardized each time the instrument is turned on and prior to any caulk Cl analysis. The standardization procedure will entail a calibration analysis of the materials provided/recommended with the XRF analyzer. Analyses will be conducted in duplicate on each sample and notes kept. The mean will be used for comparison to GC–MS results.

19.2.2. Contract Laboratory Analyses

The procedures for and frequency of calibration will vary depending on the chemical parameters being determined. Equipment is maintained and checked according to the standard procedures specified in each laboratory's instrument operation instruction manual.

Upon initiation of an analytical run, after each major equipment disruption, and whenever on-going calibration checks do not meet recommended DQOs (see Section 13), analytical systems will be calibrated with a full range of analytical standards. Immediately after this procedure, the initial calibration must be verified through the analysis of a standard obtained from a different source than the standards used to calibrate the instrumentation and prepared in an independent manner and ideally having certified concentrations of target analytes of a CRM or certified solution. Frequently, calibration standards are included as part of an analytical run, interspersed with actual samples.

Calibration curves will be established for each analyte and batch analysis from a calibration blank and a minimum of three analytical standards of increasing concentration, covering the range of expected sample concentrations. Only those data resulting from quantification within the demonstrated working calibration range may be reported by the laboratory.

The calibration standards will be prepared from reference materials available from the EPA repository, or from available commercial sources. The source, lot number, identification, and purity of each reference material will be recorded. Neat compounds will be prepared weight/volume using a calibrated analytical balance and Class A volumetric flasks. Reference solutions will be diluted using Class A volumetric glassware. Individual stock standards for each analyte will be prepared. Combination working standards will be prepared by volumetric dilution of the stock standards. The calibration standards will be stored at -20º C. Newly prepared standards will be compared with existing standards prior to their use. All solvents

used will be commercially available, distilled in glass, and judged suitable for analysis of selected chemicals. Stock standards and intermediate standards are prepared on an annual basis and working standards are prepared every three months.

Sampling and analytical logbooks will be kept to record inspections, calibrations, standard identification numbers, the results of calibrations, and corrective action taken. Equipment logs will document instrument usage, maintenance, repair and performance checks. Daily calibration data will be stored with the raw sample data

20. Data Review, Verification, and Validation

Defining data review, verification, and validation procedures helps to ensure that Monitoring Plan data will be reviewed in an objective and consistent manner. Data review is the in-house examination to ensure that the data have been recorded, transmitted, and processed correctly. The Field-PM will be responsible for initial data review for field forms and field measurements; QA Officer will be responsible for doing so for data reported by analytical laboratories. This includes checking that all technical criteria have been met, documenting any problems that are observed and, if possible, ensuring that deficiencies noted in the data are corrected.

In-house examination of the data produced from the proposed Monitoring Program will be conducted to check for typical types of errors. This includes checking to make sure that the data have been recorded, transmitted, and processed correctly. The kinds of checks that will be made will include checking for data entry errors, transcription errors, transformation errors, calculation errors, and errors of data omission.

Data generated by Program activities will be reviewed against MQOs that were developed and documented in Section 13. This will ensure that the data will be of acceptable quality and that it will be SWAMP-comparable with respect to minimum expected MQOs.

QA/QC requirements were developed and documented in Sections 13.1 and 13.2, and the data will be checked against this information. Checks will include evaluation of field and laboratory duplicate results, field and laboratory blank data, matrix spike recovery data, and laboratory control sample data pertinent to each method and analytical data set. This will ensure that the data will be SWAMP-comparable with respect to quality assurance and quality control procedures.

Field data consists of all information obtained during sample collection and field measurements, including that documented in field log books and/or recording equipment, photographs, and chain of custody forms. Checks of field data will be made to ensure that it is complete, consistent, and meets the data management requirements that were developed and documented in Section 13.1.

Lab data consists of all information obtained during sample analysis. Initial review of laboratory data will be performed by the laboratory QA/QC Officer in accordance with the lab's internal data review procedures. However, upon receipt of laboratory data, the Lab-PM will perform independent checks to ensure that it is complete, consistent, and meets the data management requirements that were developed and documented in Section 13.2. This review will include evaluation of field and laboratory QC data and also making sure that the data are reported in compliance with procedures developed and documented in Section 7.

Data verification is the process of evaluating the completeness, correctness, and conformance / compliance of a specific data set against the method, procedural, or contractual specifications. The Lab-PM and Data Manager will conduct data verification, as described in Section 13 on Quality Control, in order to ensure that it is SWAMP-comparable with respect to completeness, correctness, and conformance with minimum requirements.

Data will be separated into three categories for use with making decisions based upon it. These categories are: (1) data that meets all acceptance requirements, (2) data that has been determined to be unacceptable for use, and (3) data that may be conditionally used and that is flagged as per US EPA specifications.

21. Verification and Validation Methods

Defining the methods for data verification and validation helps to ensure that Program data are evaluated objectively and consistently. For the proposed Program many of these methods have been described in Section 20. Additional information is provided below.

All data records for the Monitoring Program will be checked visually and will be recorded as checked by the checker's initials as well as with the dates on which the records were checked. Consultant Team staff will perform an independent re-check of at least 10% of these records as the validation methodology.

All of the laboratory's data will be checked as part of the verification methodology process. Each contract laboratory's Project Analyst will conduct reviews of all laboratory data for verification of their accuracy.

Any data that is discovered to be incorrect or missing during the verification or validation process will immediately be reported to the Consultant-PM. If errors involve laboratory data then this information will also be reported to the laboratory's QA Officer. Each laboratory's QA manual details the procedures that will be followed by laboratory personnel to correct any invalid or missing data. The laboratory's QA Officer will be responsible for reporting and correcting any errors that are found in the data during the verification and validation process.

If there are any data quality problems identified, the QA Officer will try to identify whether the problem is a result of project design issues, sampling issues, analytical methodology issues, or QA/QC issues (from laboratory or non-laboratory sources). If the source of the problems can be traced to one or more of these basic activities then the person or people in charge of the areas where the issues lie will be contacted and efforts will be made to immediately resolve the problem. If the issues are too broad or severe to be easily corrected then the appropriate people involved will be assembled to discuss and try to resolve the issue(s) as a group. The QA Officer has the final authority to resolve any issues that may be identified during the verification and validation process.

22. Reconciliation with User Requirements

The purpose of the Monitoring Program is to comply with Provisions of the MRP and provide data that can be used to identify sources of PCBs to urban runoff, and to evaluate management action effectiveness in removing POCs from urban runoff in the Bay Area. The objectives of the Monitoring Program are to provide the following outcomes:

1. Satisfy MRP Provision C.8.f. requirements for POC monitoring for source identification;

2. Satisfy MRP Provision C.12.e.ii requirements to evaluate PCBs presence in caulks/sealants used in storm drain or roadway infrastructure in public ROWs;
3. Report the range of PCB concentrations observed in 20 composite samples of caulk/sealant collected from structures installed or rehabilitated during the 1970's;
4. Satisfy MRP Provision C.8.f. requirements for POC monitoring for management action effectiveness;
5. Quantify the annual mass of mercury and PCBs captured in HDS Unit sumps during maintenance; and
6. Identify BSM mixtures for future field testing that provide the most effective mercury and PCBs treatment in laboratory column tests.

Information from field data reports (including field activities, post sampling events, and corrective actions), laboratory data reviews (including errors involving data entry, transcriptions, omissions, and calculations and laboratory audit reports), reviews of data versus MQOs, reviews against QA/QC requirements, data verification reports, data validation reports, independent data checking reports, and error handling reports will be used to determine whether or not the Monitoring Program's objectives have been met. Descriptions of the data will be made with no extrapolation to more general cases.

Data from all monitoring measurements will be summarized in tables. Additional data may also be represented graphically when it is deemed helpful for interpretation purposes.

The above evaluations will provide a comprehensive assessment of how well the Program meets its objectives. The final project reports will reconcile results with project MQOs.

23. References

California Regional Water Quality Control Board, San Francisco Bay Region. *Municipal Regional Stormwater NPDES Permit Order R2-2015-0049 NPDES Permit No. CAS612008*. November 19, 2015.

BASMAA. 2016. *BASMAA Regional Monitoring Coalition Creek Status and Toxicity and Pesticide Monitoring Standard Operating Procedures*. Prepared for Bay Area Stormwater Management Agencies Association. Version 3, March 2016.

BASMAA 2017a. The Evaluation of PCBs Presence in Public Roadway and Storm Drain Infrastructure Caulk and Sealants Study Design. Prepared by EOA Inc. and the San Francisco Estuary Institute (SFEI). June 2017.

BASMAA 2017b. POC Monitoring for Management Action Effectiveness Study Design. Prepared by the Office of Water Programs, Sacramento State, CA, EOA Inc., and the San Francisco Estuary Institute (SFEI). July 2017.

BASMAA, 2017c. Clean Watershed for a Clean Bay (CW4CB) Final Report. Prepared for Bay Area Stormwater Management Agencies Association. Prepared by Geosyntec and EOA, Inc., May 2017.

Klosterhaus, S. McKee, L.J. Yee, D., Kass, J.M., and Wong, A. 2014. Polychlorinated Biphenyls in the Exterior Caulk of San Francisco Bay Area Buildings, California, USA. Environment International 66, 38-43.

Surface Water Ambient Monitoring Program Quality Assurance Team, 2013. *SWAMP Quality Assurance Project Plan.* Prepared for the California State Water Quality Control Board. 2013.

24. Appendix A: Field Documentation

Caulk/Sealant Sampling Field Data Sheet	Composite ID:		Contractor:	Pg of Pgs
Sample ID:	Date (mm/dd/yyyy):		Personnel:	Failure Reason
Photos (Y / N)	ArrivalTime:	DepartureTime:		
Photo Log Identifier	**Land-Use at the Sample Location:**		Commercial (pre-1980; post 1980)	Open Space
	Industrial (pre-1980; post-1980)		Residential (pre 1980; post 1980)	Other:

Description of Structure: (Do not include any information on the location of the structure)							**Diagram of Structure (if needed) to identify where caulk/sealants were located in/on structure**
Structure Type:	Storm Drain Catch Basin	Roadway Surface		Sidewalk	Curb/Gutter	Bridge	
	Other:						
Structure Material:	Concrete	Asphalt	Other:				
Condition of Structure:	Good	Fair	Poor	Other:			
Year of Strucutre Construction							
Year of Repair							

Description of Caulk or Sealant Sample Collected:							
Application or Usage	Caulk	caulk between adjoing surfaces of same material (e.g., concrete-concrete); Describe:					
		caulk between adjoining surfaces of different types of material (e.g., concrete-asphalt); Describe:					
		Other:					
	Sealant	Crack Repair (describe):					
		Other:					
Color							
Texture	Hard/brittle	Soft/pliable	Other:				
Condition	Good (intact/whole)		Poor (crumbling/disintegrating)	Other:			
Location	Surface	Between Joints	Submerged	Exposed	At street level	Below street level	Other:
Amount of Caulk/Sealant observed on structure	Crack dimensions:				Spacing of expansion joints		
	Length&width of caulk bead sampled:				Other:		

Samples Taken	
COLLECTION DEVICE:	Equiptment type used:
SITE/SAMPLING DESCRIPTION AND COMMENTS:	

HDS Unit Sampling Field Data Sheet (Sediment Chemistry)			Contractor:	Pg of Pgs
City:	Date (mm/dd/yyyy):	/ /	*Contractor:	
HDS Catchment ID:	ArrivalTime:	DepartureTime:	*SampleTime (1st sample):	Failure Reason
	Personnel:			

Photos (Y / N)	*GPS/DGPS	**Lat (dd.ddddd)**	**Long (ddd.ddddd)**	Address, Location, and Sketches (if needed)
Photo Log Identifier	**Target (if known):**			
	***Actual:**			
	GPS Device:			

Estimate of Volume of Sediment in the HDS unit sump prior to cleanout:	
Estimate of Volume of Sediment REMOVED from the HDS unit sump during the cleanout:	

Env. Conditions		WIND DIRECTION (from):	N W E S	
SITE ODOR:	None,Sulfides,Sewage,Petroleum,Smoke,Other_____			
SKY CODE:	Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy			
PRECIP:	None, Fog, Drizzle, Rain			
PRECIP (last 24 hrs):	Unknown, <1", >1", None			
SOILODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other_____			
SOILCOLOR:	Colorless, Green, Yellow, Brown			
SOILCOMPOSITION:	Silt/Clay, Sand, Gravel, Cobble, Mixed, Debris			
SOILPOSITION	Submerged, Exposed			

Samples Taken (3 digit ID nos. of containers filled) — **Field Dup at Site? YES / NO:** (create separate datasheet for FDs, with unique IDs (i.e., blind samples)

COLLECTION DEVICE: Equiptment type used: Scoop (SS / PC / PE), Core (SS / PC / PE), Grab (Van Veen / Eckman / Petite Ponar), Broom (nylon, natural fiber)

Sample ID (City-Catchment ID-Sample	DepthCollec (cm)	Composite / Grab (C / G)	Grain Size	PCBs	Hg	Bulk Density	TOC	OTHER		

SITE/SAMPLING DESCRIPTION AND COMMENTS:

Stormwater Field Data Sheet (Water Chemistry)							Entered in d-base (initial/date)				Pg of Pgs
***Station Code:**		*Date (mm/dd/yyyy):	/ /						*PurposeFailure:		*Agency:
Personnel:		ArrivalTime:	DepartureTime:								*Protocol:
		*GPS/DGPS	**Lat (dd.ddddd)**		**Long (ddd.ddddd)**		OCCUPATION METHOD: Walk-in Bridge R/V _____ Other				
GPS Device:		**Target:**			-						
Datum: NAD83	Accuracy (ft / m):	***Actual:**			-		Sampling Location (e.g., gutter at SW corner of 10th Street)				
Habitat Observations (CollectionMethod = Habitat_generic)				WADEABILITY: Y / N / Unk	BEAUFORT SCALE (see attachment)						
SITE ODOR:	None,Sulfides,Sewage,Petroleum,Smoke,Other____										
SKY CODE:	Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy			WIND DIRECTION (from):	N W E S		**PHOTOS** (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode):				1: (RB / LB / BB / US / DS / ##)
OTHER PRESENCE:	Vascular,Nonvascular,OilySheen,Foam,Trash,Other_										
DOMINANT SUBSTRATE:	Bedrock, Concrete, Cobble, Boulder, Gravel, Sand, Mud, Unk, Other_____										
WATERCLARITY:	Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)			PRECIPITATION:	None, Fog, Drizzle, Rain, Snow						2: (RB / LB / BB / US / DS / ##)
WATERODOR:	None, Sulfides, Sewage, Petroleum, Mixed, Other___			PRECIPITATION (last 24 hrs):	Unknown, <1", >1", None						
WATERCOLOR:	Colorless, Green, Yellow, Brown										3: (RB / LB / BB / US / DS / ##)
OVERLAND RUNOFF (Last 24 hrs):	none, light, moderate / heavy, unknown										
OBSERVED FLOW:	NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs										

Field Samples (Record Time Sample Collected)

Carboy ID #	Start Sample Time	End Sample Time	Sample Type (Grab=G; Integrated = I)	Collection Depth (m)	Field Dup (Yes/No)	Indiv bottle (by hand, by pole, by bucket); Teflon tubing; Kemmer; Pole & Beaker; Other

COMMENTS:

Stormwater Influent Samples – Office of Water Programs

Sample Receiving							
Date (mm/dd/yy):		Time (24 hr) :			Team Member's Initial:		
Carboy	Temperature	pH	Observations				
1							
2							
3							
4							
5							
6							
7							

Stormwater Column Tests – Office of Water Programs

Sampling Run			
Date (mm/dd/yy):	Time (24 hr) :	Team Member's Initials:	Column ID:

During Test - Timed Measurements

Time	Water Depth	Media Condition	Other Observations

Grab Sample - Beginning of Run

Time	Water Depth	Turbidity (NTU)	Temp	pH	Other Observations

Grab Sample - Middle of Run

Time	Water Depth	Turbidity (NTU)	Temp	pH	Other Observations

Grab Sample - End of Run

Time	Water Depth	Turbidity (NTU)	Temp	pH	Other Observations

Grab Sample - Mercury

Time	Water Depth	Turbidity (NTU)	Temp	pH	Other Observations

25. Appendix B: Laboratory Standard Operating Procedures (SOPs)

APPENDIX C: PCBS CONGENERS CONCENTRATION DATA

PCBs Congener Concentrations Composites A-J (µg/kg dry weight). ND = non-detect (<0.05 µg/kg).

	Composite ID									
Congener	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
PCB 008	88000	44000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 018	300000	310000	ND	ND	ND	ND	ND	ND	6	ND
PCB 020+033	260000	320000	ND	80	ND	ND	ND	ND	6.6	ND
PCB 028	250000	400000	ND	ND	ND	ND	ND	ND	9	ND
PCB 031	240000	390000	26	ND	ND	ND	ND	ND	7.9	ND
PCB 043+049	370000	200000	ND	180	ND	ND	ND	ND	ND	ND
PCB 044	520000	310000	ND	ND	ND	ND	ND	ND	7	ND
PCB 052+069	420000	260000	18	50	ND	ND	ND	ND	ND	ND
PCB 056	250000	240000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 060	280000	160000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 061+074	320000	200000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 066	400000	380000	ND	ND	ND	ND	ND	ND	10	ND
PCB 070	410000	430000	17	ND	ND	ND	ND	ND	9	ND
PCB 086+097+117+125	52000	36000	61	ND	ND	ND	ND	ND	ND	ND
PCB 087+111+115	64000	41000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 089+090+101	120000	ND	32	81	ND	ND	ND	ND	ND	ND
PCB 093+095+098+102	66000	40000	27	ND	ND	ND	ND	ND	ND	ND
PCB 099	47000	27000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 105+127	72000	54000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 106+118	76000	57000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 110	100000	76000	47	ND	ND	ND	ND	ND	ND	ND
PCB 128	8300	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB 132	5200	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB 138	35000	28000	31	ND	ND	ND	ND	ND	ND	ND
PCB 139+149	28000	20000	19	ND	ND	ND	ND	ND	ND	ND
PCB 141	10000	11000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 151	8200	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB 153	36000	28000	19	ND	ND	ND	ND	ND	ND	ND
PCB 156	7100	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB 158+160	5700	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB 170	18000	18000	480	310	ND	ND	ND	ND	ND	ND
PCB 174	14000	14000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 177	7700	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB 180	34000	33000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 182+187	15000	12000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 183	7200	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB 194	9500	11000	ND	ND	ND	ND	ND	ND	ND	ND
PCB 195	3400	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB 196+203	9200	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB 201	800	350	ND	ND	ND	ND	ND	ND	ND	ND

PCBs Congener Concentrations Composites K - T. (µg/kg dry weight). ND = non-detect (<0.05 µg/kg).

	Composite ID									
Congener	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**R**	**S**	**T**
PCB 008	ND	ND	ND	ND	ND	ND	250	ND	ND	ND
PCB 018	ND	ND	ND	ND	ND	ND	2400	ND	29	ND
PCB 020+033	ND	ND	ND	ND	ND	ND	2000	ND	43	ND
PCB 028	65	ND	ND	ND	ND	ND	2700	ND	100	ND
PCB 031	55	ND	ND	ND	ND	ND	2500	ND	67	ND
PCB 043+049	ND	ND	ND	ND	ND	ND	1100	ND	86	ND
PCB 044	ND	ND	ND	ND	ND	ND	1700	ND	130	ND
PCB 052+069	ND	ND	ND	ND	ND	ND	1400	2800	110	2.6
PCB 056	ND	ND	ND	ND	ND	ND	1100	ND	100	ND
PCB 060	ND	ND	ND	ND	ND	ND	700	ND	61	ND
PCB 061+074	ND	ND	ND	ND	ND	ND	980	ND	84	ND
PCB 066	ND	ND	ND	ND	ND	ND	2000	ND	190	ND
PCB 070	ND	ND	ND	ND	ND	ND	2100	ND	240	2.8
PCB 086+097+117+125	ND	ND	ND	ND	ND	ND	200	ND	59	ND
PCB 087+111+115	ND	ND	ND	ND	ND	ND	180	ND	79	ND
PCB 089+090+101	46	ND	ND	ND	ND	ND	400	ND	170	4.1
PCB 093+095+098+102	ND	ND	ND	ND	ND	ND	140	ND	71	ND
PCB 099	ND	ND	ND	ND	ND	ND	110	ND	52	ND
PCB 105+127	ND	ND	ND	ND	ND	ND	190	ND	72	ND
PCB 106+118	ND	ND	ND	ND	ND	ND	200	ND	110	ND
PCB 110	ND	ND	ND	ND	ND	ND	230	ND	160	3.8
PCB 128	ND	ND	ND	ND	ND	ND	24	ND	28	ND
PCB 132	ND	ND	ND	ND	ND	ND	71	ND	16	ND
PCB 138	40	ND	ND	ND	ND	ND	130	ND	110	3.8
PCB 139+149	29	ND	ND	ND	ND	ND	84	ND	72	3.2
PCB 141	ND	ND	ND	ND	ND	ND	30	ND	22	ND
PCB 151	ND	ND	ND	ND	ND	ND	23	ND	14	ND
PCB 153	ND	ND	ND	ND	ND	ND	28	ND	88	3.8
PCB 156	ND	ND	ND	ND	ND	ND	ND	ND	16	ND
PCB 158+160	ND	ND	ND	ND	ND	ND	ND	ND	18	ND
PCB 170	130	ND	ND	ND	ND	ND	760	ND	19	ND
PCB 174	ND	ND	ND	ND	ND	ND	46	ND	10	ND
PCB 177	ND	ND	ND	ND	ND	ND	35	ND	6.5	ND
PCB 180	41	ND	ND	ND	ND	ND	110	ND	20	3.9
PCB 182+187	26	ND	ND	ND	ND	ND	ND	ND	11	ND
PCB 183	ND	ND	ND	ND	ND	ND	21	ND	8.2	ND
PCB 194	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB 195	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB 196+203	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB 201	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Appendix 13

- Annual Reporting for FY 2017-2018, Regional Supplement for Training and Outreach
- Pesticides Subcommittee Annual Report and Effectiveness Assessment - 2017-2018, California Stormwater Quality Association, Final Report, August 2018
- Annual Reporting for FY 2017-2018, New Development and Redevelopment

Annual Reporting for FY 2017-2018

Regional Supplement for Training and Outreach

San Francisco Bay Area Municipal Regional Stormwater Permit

B A S M A A

Bay Area Stormwater Management Agencies Association

September 2018

Alameda Countywide
Clean Water Program

Contra Costa
Clean Water Program

Fairfield-Suisun
Urban Runoff
Management Program

Marin County
Stormwater Pollution
Prevention Program

Napa County
Stormwater Pollution
Prevention Program

San Mateo Countywide
Water Pollution
Prevention Program

Santa Clara Valley
Urban Runoff Pollution
Prevention Program

Sonoma County
Water Agency

Vallejo Sanitation
and Flood
Control District

B A S M A A

To Whom It May Concern:

We certify under penalty of law that this document was prepared under our direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on our inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of our knowledge and belief, true, accurate, and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

James Scanlin, Alameda Countywide Clean Water Program

Courtney Riddle, Contra Costa Clean Water Program

Kevin Cullen, Fairfield-Suisun Urban Runoff Management Program

Matthew Fabry, San Mateo Countywide Water Pollution Prevention Program

Adam Olivieri, Santa Clara Valley Urban Runoff Pollution Prevention Program

Jennifer Harrington, Vallejo Flood & Wastewater District

Bay Area
Stormwater Management
Agencies Association

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INTRODUCTION

This Regional Supplement has been prepared to report on regionally implemented activities complying with portions of the Municipal Regional Stormwater Permit (MRP), issued to 76 municipalities and special districts (Permittees) by the San Francisco Bay Regional Water Quality Control Board (Water Board). The Regional Supplement covers training and outreach activities related to the following MRP provisions:

- Provision C.5.e., Control of Mobile Sources,
- Provision C.7.c.ii.(1), Stormwater Point of Contact, and
- Provision C.9.e.ii.(1), Point of Purchase Outreach.

These regionally implemented activities are conducted under the auspices of the Bay Area Stormwater Management Agencies Association (BASMAA), a 501(c)(3) non-profit organization comprised of the municipal stormwater programs in the San Francisco Bay Area. Most of the 2017-2018 annual reporting requirements of the specific MRP Provisions covered in this Supplement are completely met by BASMAA Regional Project activities, except where otherwise noted herein or by Permittees in their reports. Scopes, budgets, and contracting or in-kind project implementation mechanisms for BASMAA Regional Projects follow BASMAA's operational Policies and Procedures as approved by the BASMAA Board of Directors. MRP Permittees, through their program representatives on the Board of Directors and its committees, collaboratively authorize and participate in BASMAA Regional Projects or Regional Tasks. Depending on the Regional Project or Task, either all BASMAA members or Phase I programs that are subject to the MRP share regional costs.

Training

C.5.e. Control of Mobile Sources

This provision requires:

Each Permittee shall implement a program to reduce the discharge of pollutants from mobile businesses.

(1) The program shall include the following:

(a) Implementation of minimum standards and BMPs for each of the various types of mobile businesses, such as automobile washing, power washing, steam cleaning, and carpet cleaning.

(b) Implementation of an enforcement strategy that specifically addresses the unique characteristics of mobile businesses.

(c) Regularly updating mobile business inventories.

(d) Implementation of an outreach and education strategy to mobile businesses operating within the Permittee's jurisdiction.

(e) Inspection of mobile businesses, as needed.

(2) Permittees may cooperate county-wide and/or region-wide with the implementation of their programs for mobile businesses, including sharing of mobile business inventories, BMP requirements, enforcement action information, and education.

BASMAA's long-standing Surface Cleaner Training and Recognition Program addresses

these aspects of the provision by focusing on the most common type of outdoor cleaning – cleaning of flat surfaces like sidewalks, plazas, parking areas, and buildings. Individual Permittees address the inspection and enforcement aspects of the provision.

Previously, BASMAA, the Regional Water Board, and mobile businesses jointly developed best management practices. The BMPs were packaged and delivered in training materials (e.g., *Pollution from Surface Cleaning* folder), and via workshops and training videos. The folder and the training video have since been translated into Spanish. Cleaners that take the training and a self-quiz are designated by BASMAA as Recognized Surface Cleaners. BASMAA also created and provides marketing materials for use by Recognized Surface Cleaners. Previously, BASMAA converted the delivery mechanism to being online so that mobile businesses would have on-demand access to the materials and the training. BASMAA continues to maintain the Surface Cleaner Training and Recognition program. Cleaners can use the website to get trained and recognized for the first time or renew their training and recognition, as required annually. Recognized cleaners can also download marketing materials from the website. Potential customers, including Permittees can use the site to verify the recognition status of any cleaner, as can municipal inspectors.

In July 2014, the State Water Board adopted a temporary Emergency Regulation for Statewide Urban Water Conservation that directly affected some of the surface cleaning activities and best management practices of the Surface Cleaner Training and Recognition Program. Among other actions, the emergency regulations "prohibited, except where necessary to address an immediate health and safety need:…

2) The use of a hose that dispenses potable water to wash a motor vehicle, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use;

3) The application of potable water to driveways and sidewalks;"

The regulation was to remain in effect for 270 days, unless extended by the State Water Board due to ongoing drought conditions.

Of particular concern was item 3), which prohibited many of the activities conducted by surface cleaners if an immediate health and safety need could not be demonstrated and would require significant changes in the Surface Cleaner Training and Recognition Program. However, both the term and content of the emergency regulations were temporary and the State Water Board might need to change either with minimal notice. Given the uncertain long-term future of the emergency regulations, BASMAA adopted a two-part strategy:

1) track the status of the emergency regulations with a plan to make the necessary changes to the Surface Cleaner Training and Recognition Program if the regulations became permanent, and

2) alert the cleaners that are in the Surface Cleaner Training and Recognition Program to the emergency regulations.

To effect part 2), in August 2014, BASMAA sent a notice to all the Recognized Cleaners alerting them to the emergency regulations. Part 1) progressed along the following

chronology of events:

- May 2015, the State Water Board amended and readopted the emergency regulation extending its effectiveness to February 2016.
- February 2016, the State Water Board extended the emergency regulation through October 2016 (into FY 16-17).
- May 2016, the State Water Board replaced the emergency regulation adopted in February 2016 and extended the regulation through February 2017.
- February 2017, the State Water Board extended the emergency regulation for 270 days until November 25, 2017.
- April 2017, the Governor issued Executive Order B-40-17, which builds on actions taken in Executive Order B-37-16, including the State Water Board maintaining prohibitions on wasteful practices such as hosing off sidewalks. And as directed by the Governor in Executive Order B-37-16, the State Water Board is to separately take action to make wasteful water practices permanent.
- February 2018, the State Water Board attempted to make wasteful water practices permanent but after receiving significant opposition from water agencies before the adoption meeting, postponed adoption to allow more time to address comments.

In discussions with BASMAA, State Water Board staff have indicated that the regulations would regulate water use and not the discharge, and the regulations would regulate the use of potable water. BASMAA continues to track any developments and will work with the State Water Board as they develop and adopt a permanent regulation to try to ensure that necessary outdoor surface cleaning activities can be conducted in accordance with both stormwater regulations and urban water conservation regulations.

Public Information and Outreach

C.7.c.ii.(1) Stormwater Point of Contact

This provision requires:

> *Each Permittee shall maintain and publicize one point of contact for information on stormwater issues, watershed characteristics, and stormwater pollution prevention alternatives. This point of contact can be maintained individually or collectively and Permittees may combine this function with the spill and dumping complaint central contact point required in C.5.*

BASMAA assists with this provision by using the regional website: BayWise.org to list or link to member programs' lists of points of contact and contact information for the stormwater agencies in the Bay Area (https://baywise.org/about/).

Pesticides Toxicity Control

C.9.e.ii.(1) Point of Purchase Outreach

This provision requires Permittees to:

- *Conduct outreach to consumers at the point of purchase;*

- *Provide targeted information on proper pesticide use and disposal, potential adverse impacts on water quality, and less toxic methods of pest prevention and control; and*
- *Participate in and provide resources for the "Our Water, Our World" program or a functionally equivalent pesticide use reduction outreach program.*

The Annual Reporting provision requires:

Outreach conducted at the county or regional level shall be described in Annual Reports prepared at that respective level; reiteration in individual Permittee reports is discouraged. Reports shall include a brief description of outreach conducted…, including level of effort, messages and target audience. (The effectiveness of outreach efforts shall be evaluated only once in the Permit term, as required in Provision C.9.f. [Ed. C.9.g]).

Below is a report of activities and accomplishments of the *Our Water, Our World* program for FY 2017-2018. For a detailed report of activities, see the attached Consultant's Final Report.

- Coordinated program implementation with major chains Home Depot, Orchard Supply Hardware (OSH), and Ace Hardware National.
  - OSH Corporate (San Jose) made a decision to fully 'own' the program.
    1. OSH redesigned the look of their stores to be more modern, with simpler, cleaner, muted graphics.
    2. OSH categorized all pesticides in one of three categories – organic, natural, or synthetic. OSH planned to deemphasize synthetic pesticides, and stop offering their own brand by 2019. OSH wanted to promote the organic and natural pesticides and to do so in a way that fits in with their new look.
    3. OSH developed their own shelf tags with that modern look (see attachments) to distinguish the organic and natural products on their shelves (there is no shelf tag for synthetic pesticides).
    4. To create the cleaner look on the shelf, the OSH tags replace the *Our Water, Our World* shelf tags.

    So, those developments lead to two changes to *Our Water, Our World* display materials in OSH stores:
    1. Shelf tags – removal of all *Our Water, Our World* shelf tags from OSH stores.
    2. Literature rack header sign – replacement of the current header signs with the new header signs on all literature racks in OSH stores. The new sign showed OSH's new tags rather than the OWOW shelf tag (see attachments showing the current and new header signs displayed with the product guide dispensers).

  - Home Depot Corporate (Atlanta) directed support of the program with their stores (see letters attached).

- Maintained an inventory of the following: fact sheets, shelf tags, literature rack display signage, *10 Most Wanted* brochures, *Pest or Pal Activity Guide for Kids*, custom-designed product guide dispensers, and three versions of product guides (OSH, Home Depot, and generic), from which participating agencies could purchase materials.

- Updated less-toxic Product Lists: 2 versions – OSH product-by-pest, and Home Depot product-by-pest

- Coordinated employee trainings and tabling events at *Our Water, Our World* stores.

- Compiled information and provided outreach specific to current issues:
  - Mosquito control and the Zika virus
  - Asian Citrus Psyllid and Huanglongbing
  - Ligurian Leafhopper

- Maintained *Our Water, Our World* website.

- Provided Ask-the-Expert service—in which the Bio-Integral Resource Center (BIRC) provides 24-hour turnaround on answers to pest management questions. BIRC researched and provided answers to about 65 questions in FY 17-18.

- Provided and staffed exhibitor booths and made presentations to attendees (see photos attached).
  - Excel Gardens Dealer Show, Las Vegas (August 2017)
  - L&L Dealer Show, Reno (October 2017)
  - NorCal trade show, San Mateo (February 2018)

- Recruited, trained, and mentored a second class of IPM Advocates (see separate report attached).

- Participated in UCIPM Continuing Education for IPM Advocates.

Although effectiveness information need only be provided in the 2019 annual reports (C.9.g), below are some outputs and outcomes for FY 17-18:

- 124 *Our Water, Our World* Store Trainings[1]
- 1,038 employees trained at *Our Water, Our World* stores[2]
- 113 Tabling events at *Our Water, Our World* stores[3]
- 7,001 customers contacted by Advocates at tabling events at stores[4]
- 65 questions researched and answered by technical expert
- Increases over last year in trainings by 2%, trainees by 6% and customers reached

[1,2,3,4] Funded by permittees at local level.

at tablings by 6%.

- Home Depot reported that Scott's Miracle Gro increased the sales of their less toxic pesticide product line Nature's Care by 5%.
- Home Depot continues to increase their less toxic product offerings by 5-10% over the last year.
- OSH less toxic products increased in units sold by 4% over last year's numbers sold.

Attachments

Point of Purchase Outreach

OSH Shelf Tags – Organic Product

Attachments

Point of Purchase Outreach

OSH Shelf Tags – Natural Product

Attachments

Point of Purchase Outreach

OSH Literature Rack Header

Attachments

Point of Purchase Outreach

Home Depot Letters of Support

Interoffice Memorandum

DATE: January 1, 2018

TO: California Store Managers, D28 ASMs and Department Heads

FROM: Ron Jarvis

CC: Steve Knott, Scott Jacobson

SUBJECT: Our Water Our World training

OUR WATER, OUR WORLD is a coalition of organizations whose purpose is to encourage consumers to use less toxic pest controls in and around their homes. They specialize in retail friendly education. Their goal is not to alienate consumers by telling them what they can't use, but instead their information focuses on less toxic pest management and ties into products currently on our shelves.

An Our Water, Our World (OWOW) representative will be in your store to help train employees and label less-toxic products with shelf-talkers, and may also schedule a tabling event to educate consumers. They will display a sampling of less toxic and Eco Options products off our shelves, and provide free informational literature and a wealth of knowledge and experience. Please enjoy this additional help in your store.

A representative will contact you before the training or demonstration date to arrange details. Please contact Annie Joseph at (707) 373-9611 if you have any questions.

Thank you

Ron

Ron Jarvis
VP, Environmental Sustainability
(770) 384-4835

2455 Paces Ferry Road NW • Atlanta, GA 30339
770-433-8211

Store Support Center

August 8, 2018

Geoff Brosseau
Executive Director
Bay Area Storm Water Management Agencies Association
P.O. Box 2385
Menlo Park, CA 94026

Geoff,

Thank you for the support again this year of the Our Water Our World program in our Home Depot Bay Area stores. The wet weather throughout spring contributed to an increase in rodent populations and weed outbreaks for our customers in Northern California. Annie Joseph and her team of IPM Advocates have been an important resource this selling season, working closely with our associates to raise the awareness of proper rodent trapping, repelling, and exclusion methods and included these methods in their trainings, outreach events, and Home Depot store mentoring visits. They did a great job of making sure our floor displays of traps and less toxic baits were labeled with the less toxic product shelf talkers.

The weed outbreaks this season appeared to increase demand for organic herbicides as the program Advocates saw an increase in customer interest in alternative, non-toxic weed controls including tools, mulches, and eco-friendly herbicides. With our expanded offerings of the new eco-friendly herbicides the Advocates were able to guide many customers looking for less toxic options. The team's engagement, commitment, and IPM expertise continues to make them an essential partner for our Lawn and Garden business in the Bay Area Home Depot stores.

On behalf of The Home Depot, thank you for your partnership and support.

Ron Jarvis

Ron
Vice President Sustainability & SER

Attachments

Point of Purchase Outreach

Photo of Trade Show Booth

Suzanne at OWOW booth at L&L trade show in Reno October 2017

Attachments

Point of Purchase Outreach

Article – OMRI Newsletter

OMRI Materials REVIEW

News and Information for the Organic Community

Fall 2017

IN THIS ISSUE

On the Retail Side

Organic surge benefits from consumer guidance

By Matt Sircely

An organic frontier is growing in the retail world, where consumers who may be new to organics browse the aisles in search of fresh approaches to gardening and yard care. As consumers drive demand for organic home gardening inputs, questions from these newly-inspired customers are also on the rise. Customers often need support to understand organic methodologies and how to effectively use these products.

Fifth Season Gardening has multiple stores in North Carolina. At the Carrboro store, Manager Luis Guerra and his crew serve small farmers, home gardeners, backyard chicken enthusiasts, and indoor organic growers. He says his customers are all looking for something different. One primary driver of new demand, he says, is that more customers are seeking alternatives to glyphosate for weed control. Guerra mentions one alternative, primarily made from essential oils, and adds that horticultural vinegar "has been a popular seller the past two or three years."

Annie Joseph coordinates the "Our Water Our World" program.

"Organic fertilizer is big right now," he says. "There's new stuff coming out all the time. We carry a lot of interesting organic fertilizers." Guerra cites hydrolysate formulations made from fish or non-GMO soy, and another made from hemp protein. "Basically your plants recognize the hemp protein chain faster than even it would with an animal protein from fish or bone." Another company offers an enzymatically-digested fertilizer. "It's the same fertilizer you would use in an organic practice," he says. "They enzymatically digest it and sell it in bottles so that it's available

NOSB continued on page 3

Seaweeds

Uses and definitions for organic production and processing

By Johanna Mirenda

Seaweed is a general term for a broad range of marine plants and macroscopic algae, of which there are over 20,000 species worldwide. Seaweeds are distinct from terrestrial plants, not just because they grow underwater, but also because they lack true roots. Instead of being rooted in soil, seaweeds are free-floating or attached to hard surfaces. Seaweeds are multicellular, making them distinct from microscopic single-celled algae.

Commercially, seaweeds can be wild harvested or intentionally cultivated or farmed. Seaweeds themselves can be certified organic either as crops or as wild crops[1], or they can be used as input materials in an organic system of production and processing. They

Seaweed continued on page 6

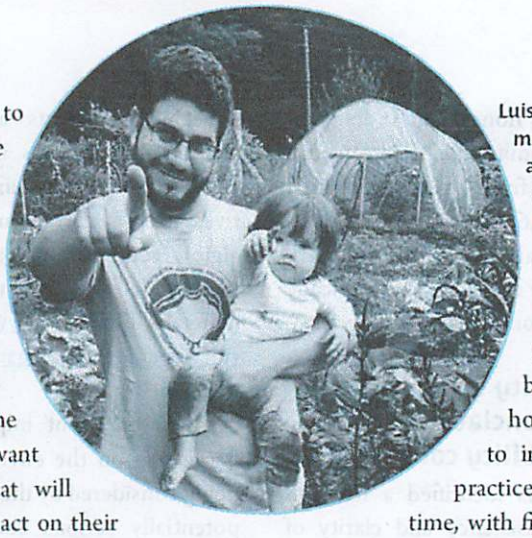
Retail continued from page 1

to the plants a lot quicker than if it had to go through the biology in your soil." He laughs: "I could go on and on."

Roger Baldwin owns Clear Creek Gardener, a nursery, garden and landscape supply store in Hot Springs, Arkansas. He and his wife Molly, a nursery professional, grew organically in Austin, Texas before moving to Hot Springs. They mostly follow organic practices at home. At one point, they emphasized organic garden options at the store, but now they focus on landscaping, says Baldwin.

"The local people that would stop in to buy something, they didn't care about organic," Baldwin laughs. "That's the kind of response I got for trying to go organic." Still, Baldwin works to explain explains to his customers, one at a time, how organic amendments are taken up differently by plants, compared to synthetic fertilizers. "I explain the difference: Conventional is like a Snickers bar, and organic builds up over time. Sometimes, I can talk people into buying organic fertilizer." But he says that the time he spends providing organic support to customers rarely pencils out. "I would love to sit around my nursery all day and talk organics with people, but I would go out of business," he says.

In California, an innovative program called Our Water Our World offers free of charge educational support to consumers and retail staff in hundreds of stores. The program is primarily funded by public agencies, such as wastewater and stormwater agencies, across 20 California counties from Santa Barbara north to Ukiah, and from the Bay Area east to Sacramento and Placer Counties. "We've seen a huge increase in people's comfort in using [organic products] when they understand how they work," says Annie Joseph, who helps to coordinate the nonprofit as a consultant. Joseph explains that it's often necessary to set the "right expectations for the customer so that they understand what to expect when they're using organic or less toxic products, so they're not disappointed."



Luis Guerra says that more customers are seeking alternatives to glyphosate for weed control.

According to Joseph, who once worked for a pesticide distributor, the customers she encounters are commonly concerned about "exposure to pesticides in their home garden. They want to use things that will have the least impact on their families." Our Water Our World always works to stay positive in its outreach, she says. "We talk about products that can help with their pest problems, or practices that they can do to reduce pest problems, and then products that are not a concern as water pollutants."

The program sends integrated pest management (IPM) "Advocates" to train staff at more than 240 partner stores annually. Each store receives a 19-piece literature rack, along with shelf-talkers to appear alongside featured products. Generally, stores are visited once a month during busy seasons. In the spring, the IPM Advocates will set up an informational table for a special event where they answer customer questions and showcase drought-resistant and insectary plants. According to Joseph, guiding consumers to more fully understand IPM strategies can be integral to achieving eventual success. She cites the example of slow-release organic fertilizer. "It greatly reduces pest problems, and for [customers] to see and understand that: Not too much soft, new growth, less sucking insects, and they respond 'Oh, OK'. They can see that piece." Another helpful approach, she says, can be encouraging home gardeners to integrate organic practices one step at a time, with first-hand experiences offering new insights and often boosting confidence.

> **"We've seen a huge increase in people's comfort in using [organic products] when they understand how they work."**
>
> – Annie Joseph

Joseph credits publicly-funded ad campaigns for helping to raise awareness in the region over the years. The organic home gardening sector has "grown exponentially," she says. "Stores have huge selections of organic products."

The Home Depot has worked with Our Water Our World for 14 years, and the partnership extends to dozens of California stores, says Krissa Glasgow, Senior Manager of the Environmental Sustainability team. A few years ago, The Home Depot committed to expanding its range of organic options, and subsequently introduced new brands, including some from smaller suppliers. "It's great to give some of these smaller, niche products a mass platform because of the number of stores that we have," says Glasgow.

With The Home Depot's diversity of Eco Options product categories, Glasgow explains that that third-party certification becomes essential. "It's important to us to have a standard," she says. "OMRI listing, in particular, is the form of third-party certification that we rely on for garden products."

With gratitude, Glasgow praises the work of the IPM Advocates in California. "They are literally in our stores, helping our customers, and training our associates." She also cites another noteworthy in-store outreach program called YardScape in southern Maine. Supporting customers with product guidance can be

Retail continued on page 7

"kelp" is nonspecific in its taxonomic limitations. Beta-carotene derived from algae is permitted at §205.606 as a color, provided that organic forms are not commercially available. It is typically sourced from green algae species.

NOSB activity to address nomenclature and sustainability concerns

The NOSB has identified a need to improve the consistency and clarity of the taxonomic nomenclature used across the nine individual listings of aquatic plant materials and their derivatives on the National List. In the fall of 2016, the NOSB Handling Subcommittee published a discussion document to bring attention to this issue and solicit public comments. At the spring 2017 meeting, the subcommittee presented a recommendation to amend these listings and clarify the taxonomic identity of each listing. However, public comment indicated that additional consideration was needed, so the recommendation was sent back to subcommittee for further deliberation. A revised recommendation may be presented at the next meeting.

Technical reports are available for aquatic plant extracts, marine plants and algae, and several specific seaweed derivatives, such as carrageenan, alginates and alginic acid, and agar-agar. More information is available under individual materials listings at www.ams.usda.gov/rules-regulations/organic/national-list/petitioned.

Concerns about impacts of seaweed harvesting on the environment are also being considered by the NOSB. There are potentially serious conservation issues for some types of algae species in some areas, resulting from overharvesting of wild species and/or destructive harvest methods. The NOSB Crops Subcommittee is considering options for ensuring that harvesting of seaweed for use in input materials does not negatively impact the environment. A recommendation or discussion document may be presented at the next meeting.

1 Certifying agents will consider whether certification as a crop or wild crop is more appropriate. More information on wild crop harvesting is available in the NOP Guidance on Wild Crop Harvesting: https://www.ams.usda.gov/sites/default/files/media/5022.pdf

Retail continued from page 3

critical to their success, she says, noting that the company's customer Garden Club has increasingly featured organic content in its email newsletter. "It's one thing to put products on the shelves, but you want customers to know what to do with them."

Glasgow makes it clear who she believes deserves the most credit for the organic success stories coming out of her company's stores. "It's about our suppliers and the work that they're doing to create quality organic products with organic integrity — going to the expense of getting OMRI Listed to make sure that they have a third-party validating how they're developing their products and the claims they're making about their products."

As the OMRI Seal identifies an ever-increasing number of verified organic inputs on retail shelves, every new product in each new store provides an additional opportunity to educate consumers. Customers are looking for information not only about what the OMRI Seal means, but also about how to use those products in practice. Well-intentioned retail stores often struggle to provide specialized organic customer service, and independent support can make all the difference, says Joseph. When asked about the potential for replication of educational outreach programs similar to Our Water Our World, Joseph mentions that good first steps can include establishing "connections with the public agencies willing to support it in those communities. Because the stores love it. They really do."

Q&A Processing continued from page 4

dust suppression, but their use is limited in organic production. Magnesium chloride must be from a nonsynthetic mined source to be allowed for dust control in organic crop production. Nonsynthetic calcium chloride is restricted at §205.602(c) to use as a foliar spray for calcium deficiencies, and would not be allowed for dust control. Petroleum emulsions and polymer emulsions are commonly used on conventional farms and roadways, but they are prohibited for use as dust suppressants in organic production. Mulch and physical barriers are other possible inputs allowed in organic production, and are generally used in smaller scale applications.

The single allowed synthetic dust suppressant in organic crop production is lignin sulfonate, allowed at §205.601(j)(4). It has its own, separate OMRI category: *Lignin sulfonate, Synthetic* (Allowed with Restrictions). Lignin sulfonate is a derivative of lignin, where the lignin has been sulfonated in a wood pulping process. It is typically used to reduce dust in the manufacture of granular fertilizers, and is widely used to control dust on unpaved roads. The lignin sulfonate salts sodium lignosulfonate, magnesium lignosulfonate, ammonium lignosulfonate and calcium lignosulfonate are specifically allowed as dust suppressants according to NOP regulations. Use of these lignin sulfonated salts for soil fertility purposes is prohibited. An additional OMRI standard is therefore applied to ammonium lignosulfonate. Specifically, ammonium lignosulfonate used according to §205.601(j)(4) may not contribute more than 1% nitrogen if used in a formulated crop fertilizer. Aluminum lignosulfonate is not allowed for use as a source of aluminum salts due to environmental contamination concerns, but it is not expressly prohibited as a dust suppressant. Sodium lignin does not meet the standard of identity for sodium lignosulfonate, and is considered a prohibited synthetic. Certified operations should contact their certifying agent regarding the use of any dust suppressants.

Attachments

Point of Purchase Outreach

Article / Ad – L&L Magazine

Cutting Gardens:

Helping to Protect and Beautify Your Whole Garden

Written by Annie Joseph
Coordinator for the Our Water Our World Program, Advanced CCN Pro, and Master Gardener

With so many garden enthusiasts growing their own food, a time-honored trend is springing up anew, as it did for many of our predecessors. This *'New'* trend is the Cutting Garden. Gardeners are re-discovering the old truth that many of the flowers that we know and love to have adorning our homes and offices are also the same flowers that attract the beneficial insects that protect our vegetable and ornamental gardens. Gardener's new-found interest in Cutting Gardens could be a great opportunity for nurseries and garden centers. Planting up a sample combination pot of herbs and flowers that attract beneficial insects can be a great sales tool. Seeds, starter plants, soils, and organic fertilizers can all be tie-in sales for a well-signed sample garden.

Some garden centers are planting up pots called the "Good Bug Tub". The Good Bug Tub allows many gardeners who are living in limited spaces the opportunity to take home a pot planted up with flowers that are attractive, attract the ladybugs and lacewings, and provide fresh cut herbs and flowers for their kitchen table. Along with the Good Bug Tub you can also sell ladybugs to help with the aphids and other pests that are in their gardens.

The cutting garden can also be woven into the tapestry of an established garden. Zinnia varieties in many sizes and colors can provide a riot of color planted right in the vegetable garden. Other great plants such as alyssum, asters, erigeron can fill this valuable niche. Many beneficial insects are attracted to the flowers for nectar and pollen, and while they are there they lay their eggs and feast on aphids, caterpillars, and other pesky critters.

This trend can continue right into the cool season. Vegetables in the brassica family including cabbage, broccoli, and Brussels sprouts produce tiny flowers that attract the parasitic wasps. Including plants of different heights is also important. Herbs such as thyme, rosemary, and catnip provide shade and protection for the lacewings to lay their eggs. These parasitic wasps are so small that they are attracted to plants with umbels of tiny flowers. In fact, parasitic wasps are in danger of drowning in the nectar of larger blooms.

Spring blooming cutting flowers that thrive amongst the kale and chard include oriental poppies, calendulas, and cosmos. Zinnias, nasturtiums, and rudbeckias that bloom throughout summer and into fall offer pollen and nectar for syrphid flies, ladybeetles, and minute pirate bugs. The fall blooming golden rod, a California Native, produces stalks of tiny yellow flowers that are a favorite of soldier beetles and parasitic wasps. Sunflowers if left on the stalk provide a habitat for overwintering beneficial insects.

So, this is a great opportunity to engage those customers who are interested in organic gardening, and to help them to be successful in both beautifying and increasing the production of their gardens, and in improving your bottom line at the same time.

Attachments

Point of Purchase Outreach

IPM Advocates Training Final Report

OUR WATER — OUR WORLD

IPM ADVOCATES

2017 TRAINING AND MENTORING PROGRAM

Final Report

Annie Joseph
Debi Tidd

UC IPM

BASMAA Bay Area Stormwater Management Agencies Association

dpr

Overview of the Training Program

The Our Water Our World Program currently serves over 240 stores in 19 counties. With the growing demand for new store partnerships and Advocate hours in stores, there was an immediate need for adding new Advocates to the program. In September of 2017, a new Advocate Training and Mentoring Program was offered and five new Advocates were trained and mentored in stores.

This in-class portion of the training ran from September 11th to September 25th. The training included 3 evening classes in Benicia taught by Annie and Debi, and one all-day class at UC IPM in Davis. Following classroom training, Advocates took part in an extensive in-the-field program with Annie Joseph and Debi Tidd providing mentoring in their stores.

Here is a list of our new Advocates and the stores they were trained to cover:

- Patrice Hanlon: Home Depot, Brentwood; Sloat, Concord; Sloat, Martinez
- Darlene Halsted: Sacramento County stores Home Depot, Truxel, Home Depot, Power Inn Road, Home Depot, Carmichael
- Sheri Stoppa: OSH, Pinole, Ace, Oakley, Morgan's, Antioch
- Lisa Ratisz: Home Depot, Hayward; Laurel Ace Hardware, Oakland
- Lori Baumgartner: worked in all OWOW stores in Santa Clara County

Training Program Planning

To recruit Advocates for this training, flyers and emails were sent to a number of contacts and information was posted on line. After reviewing all of the applications, five applicants were selected for the program based on their experience, knowledge and recommendations.

To prepare for the training, instructors modified and developed an interactive training curriculum and certificate exam. An extensive binder was developed to provide instructional readings and copies of handouts and information that would provide reference materials for continued learning. In addition, a series of homework assignments were developed that would give Advocates experience in developing pest management strategies, answering customer and staff questions, and developing their style as a trainer in stores.

Training Program Basics

During the training, Advocates learned about the components of the OWOW program, water quality issues, IPM basics, identification of pests and beneficials and strategies for managing pests, pesticide products and how the active ingredients work, and how to work with staff at retail stores.

Here is a very brief outline of the training topics covered:

Class 1: Our Water Our World Overviews and Introduction to Pesticides/Products
Class 2: Introduction to IPM and Identifying/Managing Pests
Class 3: Working with Retail Stores
Class 4: Troubleshooting, Mentoring and Final Exam

In addition to their in-class training, Advocates were required to complete homework assignments. This included readings of materials in their binder, identifying pest problems and strategies for managing those pests, learning how to give a training to store staff and practice presenting their training during the class, and completing a final take-home exam.

All advocates were given extensive resource materials, including:

- Class Binder with extensive background information, handouts, product lists and guides, fact sheets and OWOW materials, and lists of resources
- Laminated bug guides
- Pests of Garden and Small Farm
- Pests of Landscape Trees and Shrubs
- Master Gardener Handbook
- Landscape Pests Identification Cards
- Weed Pest Identification and Monitoring Cards

New Advocates attending an all-day training with the
UC Statewide IPM Program

Mentoring Basics

This program was designed to get Advocates into the stores as fast as possible so that they could be mentored for a significant amount of time. Annie Joseph and Debi Tidd mentored Advocates in the stores from September 2017 to June 2018. Advocates were asked to participate in re-sets of stores as needed and to add fact sheets and shelf tags on a regular basis. In addition, Advocates were required to work with mentors to provide in-store trainings and outreach events.

Advocate Darlene Halsted labeling end cap at Home Depot

Advocate Patrice Hanlon at an OSH tabling

Continuing Education for Advocates

In addition to their training and mentoring, Advocates were provided with continuing education opportunities to keep updated on products and new pests. This included a class on pests and weeds November 16th provided by UC Statewide IPM, and a class on new product introductions given by Annie Joseph on December 11th. They also receive monthly reminders from Annie Joseph about what topics to be covering in stores, any updated pest information and any new materials available to them.

Training Program Successes

All of the Advocates trained during this program continue to work in their stores, and many will be expanding into new stores in the coming fiscal year. We have been very impressed with the time Advocates have put into their stores, and their commitment to

the program. In addition, we have seen some great reviews for our new Advocates' training abilities on training evaluations we have gotten back from stores. We look forward to continuing to work with the new Advocates, and to be able to provide a quality program to our partner stores.

Advocate Lori Baumgartner training staff at an OSH store

Advocate Sheri Stoppa at an OSH store tabling

Advocate Lisa Ratusz meeting with Central pesticide representative at Home Depot

Advocate Lisa Ratusz at a Home Depot tabling

Attachments

Point of Purchase Outreach

Our Water, Our World Consultant's Final Report

Subjects of Focus for 2017/2018:

- This past year was another boon year for the **spread of mosquito borne diseases**. Annie and the Advocates continued to be well versed in the services offered by the local mosquito and vector control districts and to make sure the OWOW fliers were in the literature racks with the proper contact information for the districts. Those fliers, specific to each county, continued to be put into training folders and displayed at all the tabling events. Less toxic materials for mosquito larval control and practices such as cleaning rain gutters, dumping any standing water, repairing window screens, and reporting unknown sources of mosquito populations were also stressed in trainings and during outreach events. In addition, Annie passed along the updates on Zika virus from the Centers for Disease Control, so Advocates could pursue further information to keep updated. Advocates were reminded throughout the year to keep this pest front and center and to stress prevention rather than pesticide applications.

- One plant disease that was of major concern last year and continued to be this year was **Huanglongbing**, a deadly bacterium that can be spread to citrus trees by an insect called the Asian Citrus Psyllid (ACP). Many employees and customers continued to want to treat for the pest before it arrived at their area with pesticides that are a concern for the waterways, but Annie and the Advocates focused on inspecting, detecting, and then reporting to the CDFA or their local agricultural department. This is proper protocol for invasive pests so the CDFA (California Department of Food and Agriculture) could track the spread of the pest then advise the customer directly. This disease continued to be a focus for trainings and for tabling events. Annie worked closely with Jessica Northrop from the Citrus Pest and Disease Prevention Program (CPDPP) outreach team (they produce and distribute the materials for the CDFA) to bring the educational materials to every training and every tabling to reach as many parties as possible.

- Advocates also refreshed their laminated fliers to post in the stores in prominent places plus bookmarks to display at checkout registers. Annie and Advocates distributed over 3,000 additional bookmarks and fliers to the stores this year. Some fliers were put out in the citrus tree section of the nurseries, some were displayed attached to the literature racks, and some were displayed in the fertilizer sections next to the citrus fertilizers. Photos sent

- The third invasive pest of concern was the dramatic increase of a new pest **the Ligurian leafhopper** that is highly attracted to plants in the mint family. Many drought tolerant and native plants are a host for this pest. Many stores were treating this pest like it was spider mites but of course having little success. The management for the insect is monitoring early and cutting back plants if infestations are high. If needed an application of neem oil can be used where re-infestations are high. Photos of the pest were incorporated into every training and samples of damage were taken in to many stores so they could properly identify it.

- **Weed management alternatives** were high on the radar this year due to a study by an arm of the World Health Organization that indicated a link to glyphosate and cancer. Store buyers, employees and customers were very concerned and keenly interested in

recommending and purchasing alternative herbicides and mechanical controls for weeds. More information on this later in report.

- **Rat and mouse infestations** skyrocketed this year and as did the store choices for less toxic alternatives for eliminating rodents. Annie and the Advocates attached laminated OWOW exclusion sheets in the rodent control aisles of all the stores. Many hours were spent during visits helping customers to stop the revolving door by excluding pests. Many tutorials were done in the aisle helping customers use traps effectively. Photo sent

July

- **7/01** Annie followed up with reminders to Advocates about getting her the number trainings, people trained, and events held, and number of customers reached in FY 2016/2017.
- **7/10, 7/11,7/31** Annie communicated with Krissa Glasgow, Senior Manager for Environmental Innovations at Home Depot about the progress of the OWOW Program in 2017. She asked Krissa for feedback and for support for OWOW for 2018. Annie requested the support letter from Ron Jarvis and data regarding growth of less toxic products.
- **7/20/17** Annie communicated with OSH and found out a new buyer Andrea Kennedy was in place. She alerted Geoff and they made a calendar of dates possible for a meeting.
- **7/21 Annie communicated with Karey Winbiel Rojas at UCIPM regarding ideas for the continuing education class for Advocates scheduled for fall.**
- 7/21 Annie was contacted by Andrea from OSH to set up meeting in early August.
- 7/31 Annie received support letter from Ron Jarvis, she sets up planning meeting with Krissa for 8/24.

August

- **8/1 Krissa contacts Annie and asks if she would do an interview with OMRI magazine on working with Home Depot and OWOW with the focus on trends in organic gardening. Matt from OMRI calls Annie to get her feedback on consumer trends with organic gardening. In the article Krissa compliments OWOW and the work of the Advocates!**
  Article published in fall 2017.
  Article sent

- **Annie communicates with Bill Quarels at BIRC regarding questions on Safer Insect Killing Soap**
- **8/4,8/7** Annie communicates with Andrea at OSH regarding meeting for 8/11.
- 8/4 Annie communicated with Advocates sending reminder regarding new area of spread of Asian Citrus Psyllid.
- **8/7** Annie communicates with rep at Scott's Miracle Gro regarding increases of sales of their products under the Nature's Care line in Home Depots and schedules conference call for 8/11.
- **8/11** Annie and Geoff meet with new OSH buyer Andrea Kennedy and learn about plans for them
  new graphics for garden section. New plans for graphics and their custom shelf talkers are shared. Andrea tells Annie that she*" (OWOW) has definitely made an*

impact on their buying decisions at their corporate headquarters over the years."
They discuss plans for further partnership in the coming year with the launch of Natural and Organic categories. They make plans for another visit, so Annie can see and give input on their product choices and new way of categorizing them at the shelf.

1. They will be phasing out any OSH private label pesticides that are synthetic.
2.They are only labeling with OSH private labels Natural and Organic products.
3. They are only going to carry one national brand of the more toxic products
4. The sections for each pest will lead with the organic or natural products first.
5. They would like to see us partnering in the roll out.

Follow-up e-mails and calls to meeting with Geoff and Andrea on 8/11/18. 8/14, 9/1

8/25 Rescheduled planning meeting with Krissa until September 1st.

- **Central Garden and Pet Trade Show August 28 -31st Las Vegas 2017**
- Annie Joseph and Advocate Suzanne Bontempo manned an OWOW booth and met with over 1500 attendees over the three-day show. They showcased the new less toxic products in their booth and met with OWOW stores from all over Northern California to help them make less toxic selections for the coming year. OWOW was given a free booth space in a very prominent area of the show. Photo sent
- Annie and Suzanne also met with manufacturers and sales representatives to find out what less toxic products are coming to market and which manufacturer's reps cover OWOW stores. There at the show many of the manufacturers of herbicides were showcasing alternative products for weed killers. This was largely due in part to a study on glyphosate by the (IARC) The International Agency for Research and Cancer. They are an arm of the (WHO) World Health Organization. The study raised concerns amongst the manufacturers and customers, so many were in pursuit of alternatives. This was the the launch of a trend away from toxic herbicides that we would see throughout the coming year.
- Annie reminds Advocates to distribute the Summer Newsletter from UCIPM
- Annie communicated with the Advocates re: Zika Virus updates, reminders to post local mosquito and vector control OWOW sheets at stores.
- Communications with Brandy Swisher from Fresno Metropolitan and Flood District regarding OWOW OSH stores in Fresno County
  8/8,2/19,2/20,2/22,2/23,2/25,3/9,3/20,3/21,4/9,4/23,4/25

September:

- 9/1Krissa Glasgow and Annie had conference call and planning meeting for 2017/2018.
- 9/1 Request from Karey at UCIPM that continuing education for IPM Advocates class be moved to November 10. Annie contacted Advocates.
- 9/13 Notification to Advocates that Mosquito Dunks and Mosquito Bits are back on shelves at OSH. Annie made sure Advocates highlighted the change to their stores.
- 9/14 Sent Advocates Western Plant Diagnostic Center newsletter regarding discovery of new tree pathogens found in Washington state.
- 9/21 Annie follows up on Organoid claim of being "bee safe" with Nita, Bill Quarels, and the manufacturer.

- 9/22 Sent Advocates letter from Ron Jarvis to Advocates regrading his thanks and support
- 9/26 CASQA Conference presentation on OWOW Sacramento
- Notified Advocates of increases at OSH and Home Depots also spoke individually to Advocates about new graphics changes coming for OSH.

October:

- **L&L Trade Show October 4,5,6th, 2017; Reno**

  Annie, and Advocate Suzanne Bontempo worked setting up the booth and going to meetings meeting with manufacturers and sales representatives. They were able to see what new less toxic products are coming to market and worked to get samples to use at their outreach events next spring. They met with over 1,600 attendees over the two-day show.
- Annie was one of four speakers showcased at the trade show. Her topic was "**Cutting Gardens"** and she met with a small sized group of nurseries. Debi Tidd created the power point for Annie's presentation that was very well l received by all. The talk focused on adding in flowers into the landscape that can attract beneficial insects but also add an additional benefit of having cut flowers for your home.
- OWOW was given a free booth and a free one-page ad for the show magazine. In addition, Annie wrote an article on "Cutting Gardens" a new trend in gardening to attract beneficial insects but to also have the benefit of cut flowers for the home. Photos and magazine article sent
- Annie and Suzanne met with OWOW retail buyers and the manufacturers to discuss the new products for 2018. They helped guide many stores to look at a weed steamer that retails for around $250.00. They also helped customers look at new herbicides that are less toxic. photos sent
- Annie worked with Debi Tidd after the show to go over new products and their integration into the power point presentations for 2018.
- Annie began to research new products for the Master List and By Pest Lists for the OWOW 2018 Program communicating with Dr. Bill Quarels from BIRC and Dr. Nita Davidson from DPR for feedback on toxicity. She communicated with him on 8/4, 9/6,11/15,12/3,12/7,1/21,1/24,1/29,1/30,1/31,2/1,3/1,3/2,4/9,4/16.
- Annie communicated with Advocates sending updates on new products and articles on pests. She encouraged them to be looking for new less toxic products coming into their stores soon. Advocates contacted Annie and sent photos of products as they saw them appear in the field.
- Communications with Andrea at OSH regarding scheduling meeting to see new products for their stores at a test run at corporate offices 10/24-10/28

November:

- 11/04/17 Annie worked with Advocates to make sure dormant spray endcaps were being built and they distributed a fall and winter check list plus a dormant spray hand out created by Debi Tidd.
- 11/08/17 Annie met Andrea and Francesca at corporate offices at OSH to see the trial layout of products for the coming year. Annie gave her feedback and suggestions for additions and deletions. She is going to see the final layout at a store in January.

- 11/9,11/13 Communications with Andrea regarding recap of meeting, sending new suggested product additions, contacting certain manufacturers regarding labeling.
- IPM Advocates continuing education day hosted by UCIPM Davis 11/16. Annie and 8 Advocates, and Nita Davidson from DPR attended a day long seminar that focused on weeds, arachnophobia, and a pest identification walk in the field.
- 11/9 sent out communication for December meeting at Annie's home.
- 11/21 Communication to Advocates that they would be receiving hard copies to their personal addresses of BIRC'S publications Common Sense Quarterly and The IPM Practitioner compliments of Annie.
- 11/29 Annie sent out laminated copies of the Rat and Mouse Exclusion sheet to all Advocates and requested they post them and take photos of the sheet at their stores and send those photos to her. Photo sent
- 11/29 Annie called Krissa to check in and find out when the annual support letter from Ron would be arriving.

December

- **12/4 Call with Krissa regarding product addition suggestions for 2018.**
- December 7, 2016 Annie worked with Krissa on the plan for the 2017 OWOW campaign in their stores. She also requested the annual introduction support letter from Ron
- **December 11, 2017 IPM Advocates Meeting Annie's Home**
- Annie arranged a product knowledge and procedural meeting with the new and the seasoned IPM Advocates at her home on December. There they discussed new products coming to OSH, the new OSH graphics, Home Depot and independent nursery new products. She also had samples of the new products coming to market and focused on new herbicides and how they work. She also spent a lot of time going over the new graphics for OSH and the importance of us having a high profile with the roll out.
- They also discussed focusing on less toxic options for weed management and the heightened concern with glyphosate.
- The Advocates were also encouraged to continue their focus on the topics of concern Zika virus, the continued spread of the Asian Citrus Psyllid, the new pest the Ligurian leafhopper, rat and mouse exclusion and less toxic weed management.
- **Seven of the Ten Advocates were able to attend.**
- 12/15 Sent out communication on groundbreaking discovery of new pheromone traps for Asian Citrus Psyllid.
- 12/17 Annie completed and sent Krissa product suggestions list
- 12/22 Firmed up store meeting for February 13th.
- 12/26 Sent Krissa list of HD stores in Calif that are OWOW stores.
- Annie continued to work with Debi Tidd on the products lists for Home Depot and OSH visiting the stores to see if the new products had arrived and products that had been deleted.

January

- 1/2 Annie sent communication for regarding OSH Graphics roll out to Advocates.
- 1/12 Annie sent annual letter of support from Ron Jarvis for OWOW training and outreach in the HD stores for 2018.
- 1/16 Annie and Debi meet Andrea at an OSH in Cupertino to view the new graphics

Andrea is with marketing team and Debi and Annie can examine new products and take photos of new graphics. They plan to circle back with Andrea to discuss labeling. Photos sent

- 1/21,1/22 Annie sends out photos of new signage to Advocates
- 1/23 Annie sends Advocates the list of new products that are beginning to appear on Home Depot shelves and for them to make sure to label with OWOW tags.
- Annie sends out note to Advocates to make sure the Sluggo is getting on the shelves and tagged with OWOW shelf talkers in the Home Depot stores.

February

- **2/1 Annie finalized details of store tour with Krissa scheduled for 2/1**
- **2/2 Annie sent photo of possible new Natural shelf label showing up at some Home Depots. She requests Advocates communicate with her if they see it in their stores.**
- 2/5 Annie and Debi go to OSH headquarters to meet with Andrea to discuss new graphics role out and how our product lists can mesh with their new way of listing products. They also discussed ways of supporting their stores to make sure that the shelf talkers go on the correct products.
- 2/9 Annie gathers information on new products in the Home Depot set. She also lets Advocates know about the possible outreach dates for OSH spring 2018 and requested commitment of dates be sent back soon.
- 2/8 Annie and Debi work on Home Depot OWOW Program Summary document and sent to Krissa to review and send out to the field to district managers. Geoff sent out program support for training and events letter from Ron Jarvis to agencies and Advocates to take into Home Depot stores.
- 2/9 Krissa sent communication summary copy document that she sent out to district managers.
- 2/13 Annie and Debi meet with Krissa Glasgow and Mark at Home Depot in Emeryville and spend time touring the store and conducting a brainstorming meeting for continued partnership. Krissa asks" What can we do for Our Water Our World you do so much for us! " photos sent
- 2/14 Annie sent out photo of large end cap of Natural Products at Home Depot in Elk Grove she requested feedback from Advocates to see if their stores are following suit and if they can get end caps set up for their stores also.
- 2/20 Annie communicates with Andrea regarding tabling dates, so she can organize support from Advocates and public agencies.
- 2/21 Krissa sends Annie list of Home Depot's organic controls (products)for Annie to review
- 2/26 Annie requests letter of support from Andrea for our training and outreach events.
- Debi sent out all updated materials for the Advocates to add to their training folders. She also sent power points to Annie for final review which showcased all the current less toxic products the stores were carrying.
- **Nor Cal Landscape and Nursery Spring Trade Show February 15,2018**

Annie set up the day before and met with manufacturers and sales representatives who were setting up booths. There were also landscape industry professionals who were included this year in the show.

Advocates Suzanne Bontempo and Steve Zien attended and helped at the booth the day of the show. It was very well attended, and they contacted over 1,800 attendees. Annie

was able to spend a lot of time with Four Winds Citrus Growers who gave her the most current information on the Asian Citrus Psyllid and Citrus Leaf Miner that she could share with all the Advocates and they could in turn get to the stores.
She also got introduced to a few people from the CDFA by Don Dillon JR. from Four Winds Citrus he told them that OWOW Advocates had been very instrumental in getting the information to the stores and the public who shops at the stores.
They displayed the banner for the Inspect and Detect Citrus Psyllid campaign this year.
The attendance, 2,000 plus attendees, and many landscape professionals flocked to our booth to get information to share with their customers about less toxic pest management.
They also were happy to see all the stores that carry the less toxic products. Photos sent

- Annie consults with Debi Tidd regarding update of pest calendars
- Annie continued to work on the Master Product Lists checking with manufacturers on product availability and pests covered.

March

- Annie consults with Debi regarding final power points, product list and Debi sends out to Advocates.
- 3/1 Annie sent out Western IPM Center newsletter link regarding the great news that a new bedbug website
- 3/2 Annie and Geoff conference call with OSH regarding partnering in outreach.
- 3/6 Annie discusses with Andrea how to redesign our fact sheet rack signage to match OSH'S new theme
- 3/19 Annie sends out idea for displaying new OSH shelf talkers on the literature rack header card.
- 3/20 Annie requests that Geoff our logo be sent to graphics department at OSH for redesign of the header card. She also sends synopsis of OWOW public relations department at OSH. Includes trainings, literature rack, outreach photos.
- 3/20 Work to connect Brandy Swisher from Fresno Flood District and OSH for a special promotion to highlight their new graphics campaign.
- 3/27 Catch up call with Krissa regarding store activities this spring.
- 3/30 Work on aligning OWOW and OSH product lists for OSH headquarters.
- 3/30 Annie is contacted by Mark from Home Depot's Environmental Sustainability Department because he wants to feature OWOW in their sustainability report highlighting the fact sheet racks, shelf talkers, pocket guides, training, mentoring, and outreach.

April

- 4/2,4/8 Annie works with Mark sending him photos of store shots of OWOW in Home Depot.
- 4/2 Annie sends Krissa photo of Natural end cap and inquires if this is a new end cap or a test run. Krissa believes it's a test run for certain areas this year.
- 4/4 Annie, Debi, and Suzanne give presentation to BAPPG on OWOW in Oakland.
- New interested partner agencies, City of Petaluma and Sonoma Water Agency, reach out for partnership with OWOW during the meeting.
- 4/8 Krissa requests information from Annie regarding new labeling instructions for neonicotinoid pesticides. Annie contacts Nita Davidson at DPR and guided to Russell Darling at the EPA who oversees neonicotinoids

- 4/10,4/16 Annie contacts Robert Tillotson Sonoma County Water Agency who wants to sponsor OWOW in Sonoma.
- 4/12 Annie is contacted by Robert Wilson from the City of Petaluma Public Works who wants to sponsor OWOW in OSH and Freidman Home Improvement.
- 4/10 Annie gives feedback on header signage for OSH.
- 4/16 Annie sent out alert for National Mosquito Awareness Week and that the Advocates prominently display our mosquito fact sheets, local mosquito and vector control sheets at all outreach events and trainings.
- 4/9,4/10 Communication with Andrea about tabling events
- 4/16 Annie sends Advocates the distribution map of invasive mosquito populations that can spread Zika virus in California.
- 4/16,4/18, 4/19,4/24,4/25 fact sheet revisions proofing and product review
- 4/17 IPM Summit Annie makes presentation of OWOW and Mosquito IPM success story UC Davis. Advocates Steve Zien, Suzanne Bontempo, Debi Tidd attend.
- 4/23 Annie contacts Krissa to clarify new labeling instructions for neonicotinoids

May

- Annie request Advocates to distribute UCIPM Spring Retail Newsletter
- 5/3,5/4 Annie helps Angela Spain from the City of Chico locate rack supply companies for Home Depot Chico.
- 5/8 Annie requests OSH product list be revised by Debi.
- 5/8 Annie is contacted by L&L Dealer Show to sign up for booth and to speak at October 2018 show.
- 5/8 Annie sent out updates for May/June outreach and trainings to make stores and customers not only aware of mosquitoes but of ticks and Lyme's disease. She also highlights additional opportunities for less toxic products and weed management options.
- 5/15 Annie is contacted by Central Garden and Pet to sign up for August Dealer Show.

June

- **6/11 Krissa sends request to Annie to review her summary of OWOW for Home Depot's annual Sustainability Report.**
- **6/14 Annie connects Geoff to Margo to sign up for Nor Cal Spring Trade Show for 2019.**
- **6/23 Geoff and Annie touch bases about new letters of agreement for 2018 for Advocates.**

- **Final Number of OWOW Store Trainings in Fiscal Year 2017/2018 124**
- **Final number of employees trained at OWOW stores 2017/2018 1,038**
- **Number of Tabling events at stores 113**
- **Number of customers contacted by Advocates at tabling events at stores 7,001**
- **Increases over last year in trainees by 2%, tablings by 6% and customers reached at tablings by 6%.**
- **Home Depot wrote a letter of thanks and support for the OWOW program in early September which Geoff sent to agencies.**
- **Home Depot wrote a different letter about the OWOW program in December, so agencies and Advocates would have ease setting up the stores for 2018 which Geoff sent out to all agencies and Advocates.**

- **Scott's Miracle Grow Nature's Care pesticides increased in sales on average 5% in Home Depot in 2018 due in part to Advocates efforts.**
- **Annie along with the IPM Advocates helped to get Sluggo, the iron phosphate bait, relisted late last year. This year they made sure the product was on the shelf and in a new spot on the shelf at eye or chest level. Partly because of those efforts the IPM Advocates were responsible for an increase in sales of 30% over the last year it was listed!**
- **Home Depot continues to increase their less toxic product offerings by 5-10% over the last year.**
- **OWOW supported all the special events possible per OSH request in 2017/2018.**
- **OSH less toxic products increased in units sold by 4% over last year's numbers sold.**

With the publication of a study from the (IRAC) The International Agency for Research and Cancer) an arm of the WHO (World Health Organization), many
of the stores were requesting more information on less-toxic alternatives for weed management.
Advocates spend time encouraging the trainees to utilize weed prevention techniques such as weed fabric, competitive planting and sheet mulching. We also highly encouraged mechanical means to weed such as hand pulling, using weed steamers, and weed flamers. They spend time gong over the products that each store carried that were alternatives to toxic herbicides.
They witnessed a change in behavior after for the support for weed control alternatives. Many store employees were assisting customers and guiding them to take a more active part in weed management rather than spraying with glyphosate. Many recommendations came for using mechanical means such as weeding tools, steamers and flamers. Recommendations increased for putting more emphasis on weed prevention with picking weeds when they are young before they set seed. Products that were less-toxic for weed management also increased in recommendations.

Behavior changes at special events:

Behavior changes with customers at tabling and outreach events:

An additional focus of concern for customers was finding a replacement for glyphosate, the active ingredient in Roundup, a commonly used herbicide. We noticed behavior changes in customers because of this concern. They were much more willing to not purchase toxic herbicides, to actively be a part of using less-toxic products, and to take a more active role in weed reduction techniques. This included hand pulling, using tools such as hoes, flamers, weed steamers, mulches, weed fabric and to do competitive planting to reduce weed germination. Their main concerns were unnecessary exposures to pets, children and the environment. The shelf space dedicated to less-toxic options for weeds also saw a dramatic increase in 2018.
The other area where we saw behavior change was the customer's willingness to do more rat and mouse exclusion to their homes and more trapping rather than using toxic baits. We attached our Rat and Mouse Exclusion sheet to the rodenticide shelves so customers could have an outline of the steps they need to take to reduce the revolving door of rodent invasion. The stores also ramped up their selections of less-toxic baits,

variety of traps, rat and mouse repellents, and physical barriers.

Store behavior changes:
Many floor displays of electronic rat and mouse traps appeared in our regional larger chain stores such as Home Depot and OSH. These appeared because of the effectiveness and rapid sales of these traps.
OSH expanded their rat and mouse section two-fold, and created a whole new design with their graphics that echoed IPM. This was a major change for a large regional chain. They also modeled new shelf talkers after OWOW shelf talkers that labeled their organic and natural products. Our Advocates made sure that customers and associates were aware of the new graphics that supported our longtime messaging. photos sent

Thanks so much for the opportunity to work with OWOW this past year!
Annie

Alameda Countywide
Clean Water Program

Contra Costa
Clean Water Program

Fairfield-Suisun
Urban Runoff
Management Program

Marin County
Stormwater Pollution
Prevention Program

Napa County
Stormwater Pollution
Prevention Program

San Mateo Countywide
Water Pollution
Prevention Program

Santa Clara Valley
Urban Runoff Pollution
Prevention Program

Sonoma County
Water Agency

Vallejo Sanitation
and Flood
Control District

B A S M A A

Bay Area

Stormwater Management

Agencies Association

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September 28, 2018

Bruce Wolfe, Executive Officer
California Regional Water Quality Control Board, San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

Subject: FY 2017-18 Annual Report: MRP Provision C.9.f - Track and Participate in Relevant Regulatory Processes

Dear Mr. Wolfe:

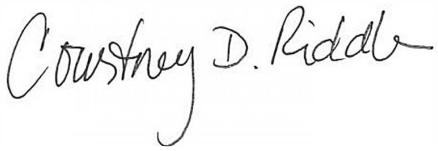
This letter and attachments are submitted on behalf of all 76 municipalities subject to the requirements of the Municipal Regional Stormwater NPDES Permit (MRP).

The essential requirements of provision C.9.f (text attached) are to track U.S. Environmental Protection Agency (USEPA) and California Department of Pesticide Regulation (DPR) actions related to urban-uses of pesticides and actively participate in the shaping of regulatory efforts currently underway. This provision allows for cooperation among Permittees through the California Stormwater Quality Association (CASQA), BASMAA, and/or the Urban Pesticide Pollution Prevention Project (UP3 Project) – an approach the Permittees have engaged in for a number of years. Recognizing this approach is the most likely to result in meaningful changes in the regulatory environment, Permittees elected to continue on this course in FY 2017-18 to achieve compliance with this provision. Oversight of this provision is the purview of the BASMAA Board of Directors.

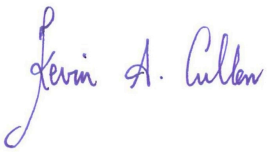
The actual work of tracking and participating in the ongoing regulatory efforts related to pesticides was accomplished through CASQA. CASQA conducted its activities on behalf of members and coordinated funding contributions and activities through its Pesticides Subcommittee, a group of stormwater quality agencies affected by pesticides or pesticides-related toxicity listings, TMDLs, or permit requirements, as well as others knowledgeable about pesticide-related stormwater issues. FY 2017-18 was another productive year for the Subcommittee. The CASQA Pesticides Subcommittee's annual report for FY 2017-18 (attached) provides a comprehensive and detailed accounting of efforts to track and participate in relevant regulatory processes as well as accomplishments related to pesticides and stormwater quality.

We certify under penalty of law that this document was prepared under our direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on our inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of our knowledge and belief, true, accurate, and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Jim Scanlin, Alameda Countywide Clean Water Program



Courtney Riddle, Contra Costa Clean Water Program



Kevin Cullen, Fairfield-Suisun Urban Runoff Management Program

Matthew Fabry, San Mateo Countywide Water Pollution Prevention Program

Adam Olivieri, Santa Clara Valley Urban Runoff Pollution Prevention Program

Jennifer Harrington, Vallejo Flood & Wastewater District

Attachments

MRP Provision C.9.f

Pesticides Subcommittee Annual Report and Effectiveness Assessment 2017-2018; California Stormwater Quality Association; September 2018

MRP Provision C.9.f states:

C.9.f. Track and Participate in Relevant Regulatory Processes

i. **Task Description –** The Permittees shall conduct the following activities, which may be done at a county, regional, or statewide level:

(1) The Permittees shall track U.S. EPA pesticide evaluation and registration activities as they relate to surface water quality and, when necessary, encourage U.S. EPA to coordinate implementation of the Federal Insecticide, Fungicide, and Rodenticide Act and the CWA and to accommodate water quality concerns within its pesticide registration process;

(2) The Permittees shall track DPR pesticide evaluation activities as they relate to surface water quality and, when necessary, encourage DPR to coordinate implementation of the California Food and Agriculture Code with the California Water Code and to accommodate water quality concerns within its pesticide evaluation process;

(3) The Permittees shall assemble and submit information (such as monitoring data) as needed to assist DPR and county agricultural commissioners in ensuring that pesticide applications comply with WQS; and

(4) As appropriate, the Permittees shall submit comment letters on U.S. EPA and DPR re-registration, re-evaluation, and other actions relating to pesticides of concern for water quality.

ii. **Reporting –** In their Annual Reports, the Permittees shall summarize participation efforts, information submitted, and how regulatory actions were affected. Permittees who contribute to a county, regional, or statewide effort shall submit one report at the county or regional level. Duplicate reporting is discouraged.

Pesticides Subcommittee Annual Report and Effectiveness Assessment 2017 - 2018

California Stormwater Quality Association

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Final Report

September 2018

Pesticides Subcommittee Annual Report and Effectiveness Assessment

2017-2018

California Stormwater Quality Association

September 17, 2018

Preface

The California Stormwater Quality Association (CASQA) is comprised of stormwater quality management organizations and individuals, including cities, counties, special districts, industries, and consulting firms throughout California. CASQA's membership provides stormwater quality management services to more than 22 million people in California. This report was funded by CASQA to provide CASQA's members with focused information on its efforts to prevent pesticide pollution in urban waterways. It is a component of CASQA's Source Control Initiative, which seeks to address stormwater and urban runoff pollutants at their sources.

This report was prepared by CASQA Pesticides Subcommittee Co-Chair Dave Tamayo, with substantial assistance from Co-Chair Katie Keefe and Dr. Kelly Moran of TDC Environmental who provided data, documents, guidance, and review.

Disclaimer

Abbreviations Used in this Report

BACWA – Bay Area Clean Water Agencies
CASQA – California Stormwater Quality Association
CCRWQCB – Central Coast Regional Water Quality Control Board
CEQA – California Environmental Quality Act
CVRWQCB – Central Valley Regional Water Quality Control Board
CWA – Clean Water Act
DPR – California Department of Pesticide Regulation
EPA – United States Environmental Protection Agency
ESA – Endangered Species Act
FY – Fiscal Year (July 1 through June 30)
IPM – Integrated Pest Management
MAA – Management Agency Agreement between DPR and the Water Boards
MS4 – Municipal Separate Storm Sewer System
NACWA – National Association of Clean Water Agencies
NPDES – National Pollutant Discharge Elimination System
OPP – U.S. EPA Office of Pesticide Programs
OW – U.S. EPA Office of Water
PAH – Polycyclic aromatic hydrocarbon
PEAIP – Program Effectiveness Assessment and Improvement Plan
PMAC – Pest Management Advisory Committee
PSC – CASQA Pesticides Subcommittee
SFBRWQCB – San Francisco Bay Regional Water Quality Control Board
SPCB – Structural Pest Control Board
STORMS – Strategy to Optimize Resource Management of Storm Water (a program of the State Water Board)
SWAMP – California Water Boards Surface Water Ambient Monitoring Program
SWRCB – State Water Resources Control Board or State Water Board
TMDL – Total Maximum Daily Load (regulatory plan for solving a water pollution problem)
UC IPM – University of California Integrated Pest Management Statewide Program
UP3 – Urban Pesticides Pollution Prevention Partnership
UPCMP – Urban Pesticides Coordinated Monitoring Program
USGS – U. S. Geological Survey
Water Boards – California State Water Resources Control Board together with the California Regional Water Quality Control Boards

Pesticides Subcommittee Annual Report and Effectiveness Assessment

2017-2018

California Stormwater Quality Association

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Executive Summary

This report by the Pesticides Subcommittee (PSC) of the California Stormwater Quality Association (CASQA) describes CASQA's activities related to the goal of preventing pesticide pollution in urban waterways from July 2017 through June 2018.

To address the problems caused by pesticides in California's urban waterways, CASQA collaborates with the California State Water Resources Control Board and the California Regional Water Quality Control Boards (Water Boards) in a coordinated statewide effort, referred to as the Urban Pesticides Pollution Prevention (UP3) Partnership. By working with the Water Boards and other water quality organizations, we address the impacts of pesticides efficiently and proactively through the statutory authority of the California Department of Pesticide Regulation (DPR) and EPA's Office of Pesticide Programs (OPP). More than 15 years of collaboration with UP3 Partners, as well as EPA and DPR staff, has resulted in significant changes in pesticide regulation. CASQA's activities and outcomes are described in Section 2. This year's highlights include continued progress on the State Water Board's Urban Pesticides Amendments project as well the pesticide regulator actions described below.

(Near term/Current problems) – Are actions being taken by State and Federal pesticides regulators and stakeholders that are expected to end recently observed pesticide-caused toxicity or exceedances of pesticide water quality objectives in surface waters receiving urban runoff?

- In direct response to continued communication from CASQA and UP3 regarding **fipronil** water pollution in urban areas DPR formally approved label changes that it negotiated with registrants. The label changes are anticipated to reduce fipronil concentrations in California urban runoff by more than 90 percent. This mitigation precedes at least 22 303(d) listings of urban water bodies in northern and southern California that would be supported by current data. If successful, the mitigation could avoid establishment of fipronil TMDLs for those water bodies.
- In response to requests from CASQA, CASQA members, and UP3 partner requests, DPR routed at least 9 registration applications to its Surface Water Protection Program for review.
- DPR denied a registrant request to allow use of a toxic root control product in storm drains.
- CASQA shared its urban runoff expertise with pesticide regulators by preparing comment letters to EPA for 6 pesticide reviews, providing the Water Boards and other partners with information that triggered additional letters on 4 more pesticide reviews, and participating in numerous meetings and conference calls focused on priority pesticides and long-term regulatory structure improvements. *(See Tables 3, 4 and 5.)*
- CASQA/UP3 reviewed scientific literature in order to update and prioritize the Pesticide Watch List, which it shared with pesticides regulators and with government agency and university scientists to stimulate generation of surface water monitoring and aquatic toxicity data for the highest priority pesticides. *(See Table 2.)*

(Long term/Prevent future problems) – Do pesticides regulators have an effective system in place to exercise their regulatory authorities to prevent pesticide toxicity in urban water bodies?

- The State Water Board continues to work toward adoption of the Urban Pesticide Amendments. These amendments would institutionalize the State's strategy of utilizing pesticide regulations as the primary mechanism for addressing pesticide water quality problems associated with urban runoff.
- DPR continues to demonstrate its commitment to addressing pesticide impacts on receiving waters through timely mitigation and implementation of improved evaluation procedures.
- In concert with the development of the Urban Pesticide Amendments, the State Water Board and DPR continued to work on an update of their Management Agency Agreement, to clarify their respective roles and achieve better coordination on addressing water quality impacts.
- Although many improvements by OPP have been made since the early 2000s, CASQA's previous annual pesticides reports have identified areas where improvement in scientific evaluations supporting OPP's regulatory efforts and better understanding of urban runoff management systems are still necessary to adequately protect urban surface waters from pesticide impairments. Unfortunately, the current regulatory climate at federal agencies generally is not supportive of progress by OPP in addressing these concerns.

In FY 2018-2019, CASQA plans to continue to address near-term pesticide concerns and seek long-term regulatory change. Future near-term and long-term tasks are identified in Section 3, Tables 5 and 6. Key topics include:

- Development and adoption of the Urban Pesticide Amendments by the State Water Board
- Registration review-related activities at EPA for pyrethroids, fipronil, and imidacloprid (the only such opportunity for the next 15 years)
- DPR evaluation and potential additional action regarding pyrethroid and fipronil mitigation measures
- EPA risk mitigation for malathion and carbaryl in urban runoff in tandem with Endangered Species Act evaluations.
- DPR Registration Decisions for new products
- DPR methodology for surface water protection review of registration applications

Section 1. Introduction

1.1 Importance of CASQA's Efforts to Improve Pesticide Regulation

For decades now, the uses of certain pesticides in urban areas – even when applied in compliance with pesticide regulations – have adversely impacted urban water bodies. Currently used pesticides are the primary cause of toxicity in California surface waters.[1] Under the Clean Water Act (CWA), when pesticides impact water bodies, local agencies may be held responsible for costly monitoring and mitigation efforts. To date, some California municipalities[2] have incurred substantial costs to comply with Total Maximum Daily Loads (TMDLs) and additional permit requirements. In the future, more municipalities throughout the state could be subject to similar requirements, as additional TMDL and Basin Plan amendments are adopted (Table 1). Meanwhile local agencies have no authority to restrict or regulate when or how pesticides are used[3] in order to proactively prevent pesticide pollution and avoid these costs.

Table 1. California TMDLs and Basin Plan Amendments Addressing Current-Use Pesticides in Urban Watersheds[4]

Water Board Region	Water Body	Pesticide	Status
Statewide	Statewide Water Quality Control Plan amendment for urban pesticides reduction (all MS4s/ all urban waterways)	All	In preparation
San Francisco Bay (2)	All Bay Area Urban Creeks	All Pesticide-Related Toxicity	Adopted
Central Coast (3)	Santa Maria River Watershed	Pyrethroids, Toxicity	Adopted
Central Coast (3)	Lower Salinas River Watershed	Pyrethroids, Toxicity	Adopted; awaiting US EPA Region 9 review
Los Angeles (4)	Marina del Rey Harbor	Copper (Marine antifouling paint)[5]	Adopted
Los Angeles (4)	Oxnard Drain 3 (Ventura County)	Bifenthrin, Toxicity	EPA-Adopted Technical TMDL
Central Valley (5)	Nine urban creeks in Sacramento, Placer, and Sutter Counties (TMDL) Sacramento River and San Joaquin River Basins (Basin Plan Amendment)	Pyrethroids	Approved by region and State Water Board; awaiting US EPA Region 9 review
Santa Ana (8)	Newport Bay	Copper (Marine antifouling paint)	In preparation
San Diego (9)	Shelter Island Yacht Basin (San Diego Bay)	Copper (Marine antifouling paint)	Adopted

[1] See reports from the California Surface Water Ambient Monitoring Program Sediment Pollution Trends Program including Anderson, B.S., Hunt, J.W., Markewicz, D., Larsen, K., 2011. Toxicity in California Waters, Surface Water Ambient Monitoring Program. California Water Resources Control Board. Sacramento, CA.
[2] For example, Sacramento-area municipalities spent more than $75,000 in the 2008-2013 permit term on pyrethroid pesticide monitoring alone; Riverside-area municipalities spent $617,000 from 2007 to 2013 on pyrethroid pesticide chemical and toxicity monitoring.
[3] Local agencies in California have authority over their own use of pesticides, but are pre-empted by state law from regulating pesticide use by consumers and businesses.
[4] Excludes pesticides that are not currently used in meaningful quantities in California urban areas, such as organochlorine pesticides and diazinon and chlorpyrifos.
[5] Includes pesticide uses that are not in stormwater (i.e., Copper (Marine antifouling paint)).

Under federal and state statutes, EPA and DPR have the authority to regulate pesticides, including substantial authority and responsibility to protect water bodies from adverse effects (including impacts from pesticides in urban runoff). Unfortunately, until the relatively recent past these agencies did not recognize the need, nor did they possess the institutional capacity to exercise their authority to protect urban water quality. As a result, past registration actions have allowed a number of pesticides (such as pyrethroids and fipronil) to be used legally in ways that have resulted in widespread pollution in urban water bodies. This situation is depicted in Figure 1.

To change this situation CASQA is actively engaged with state and federal regulators in an effort to develop an effective pesticide regulatory system, based primarily on existing statutes, that includes timely identification and mitigation of urban water quality impacts, and proactively prevents additional problems through the registration and registration review processes (Figure 2).

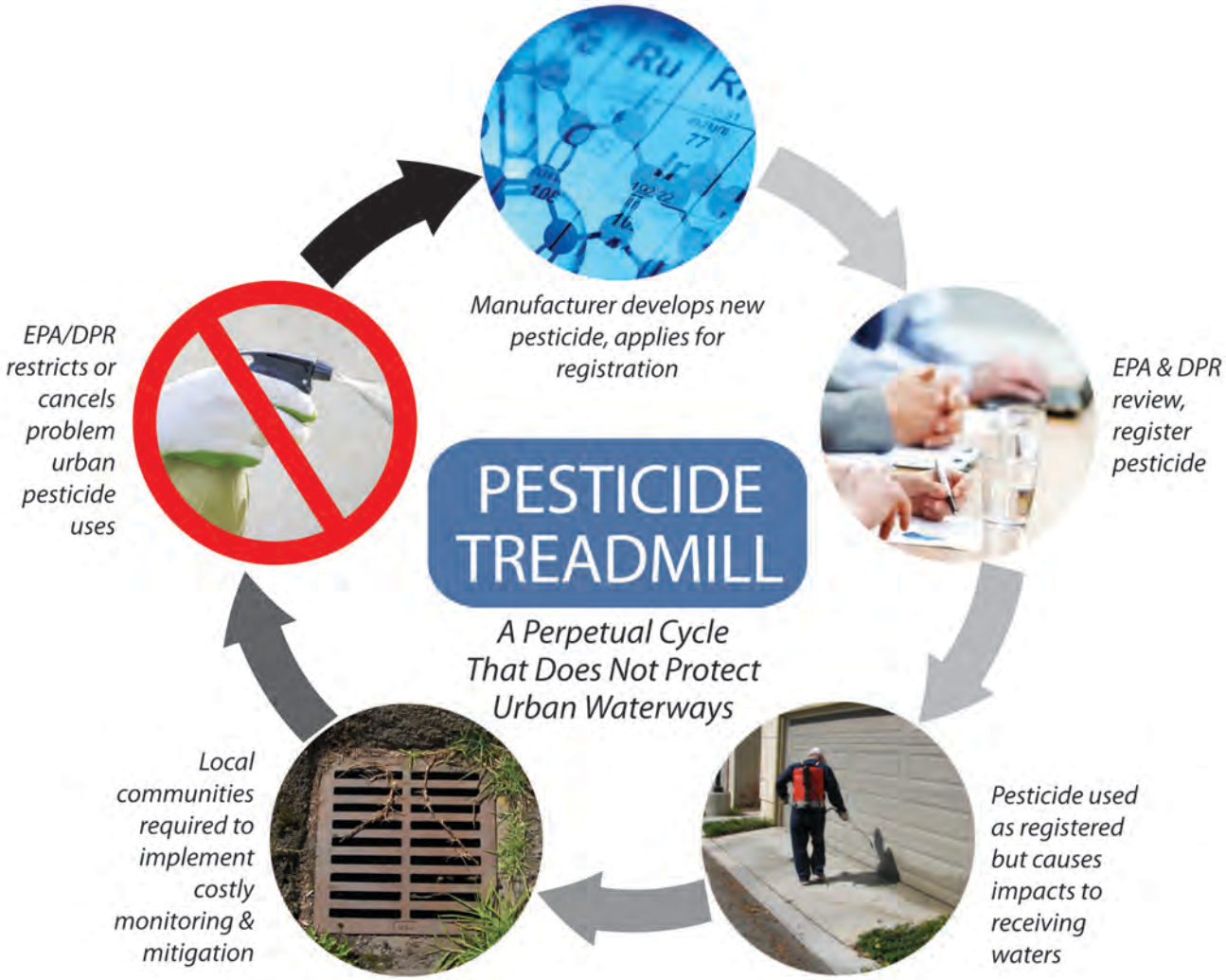


Figure 1. Current Pesticide Regulatory System.[6]

[6] Photos in Figures 1 and 2 of spraying pesticide along a garage was taken by Les Greenberg, UC Riverside

Figure 2. Proactive Use of the Pesticide Regulatory Structure to Restrict Pesticide Uses that have the Potential to Cause Urban Water Quality Problems.

1.2 CASQA's Goals and Application to Program Effectiveness Assessment

The stated goal of CASQA's Vision, Action 1.4, is to "Develop a regulatory system implemented by EPA Office of Pesticide Programs (OPP), and California Department of Pesticides Regulation (DPR) to identify whether urban uses of a pesticide pose a threat to water quality, and then restrict or disallow those uses proactively so that water quality impacts are avoided". To accomplish this goal, primarily through the work of its Pesticides Subcommittee, in engaging in pesticide-related regulatory activities is to protect water quality by eliminating problems stemming from urban pesticide use. In support of Action 1.4, the Vision identifies Proposed Effort Steps 1-4 below.

Step 1. Work with EPA and DPR to develop a registration/reregistration process that clearly evaluates risks and potential water quality impacts of pesticides. The process for registration and registration review must include effective evaluations for the potential of all pesticide active ingredients and formulated products to impact urban waterways. The process must include consideration of all urban use patterns, and data required of manufacturers must support proactive evaluations. Cumulative risk assessments must be conducted, especially for pesticides with similar modes of action.

Step 2. Work with the Water Boards, DPR, EPA's Office of Water (OW) and OPP to develop a consistent definition of what comprises a water quality problem. CASQA will work with EPA's OW and OPP to develop consistent methodologies and approaches to allow evaluation of the potential impacts of pesticides on aquatic life.

Step 3. Develop recommendations for coordinating statewide pesticide monitoring efforts [that consider] monitoring requirements from DPR and the Water Boards and [that are] designed identify emerging pesticide problems in urban waterways before they become widespread and severe, and minimize duplication between the programs.

Step 4. For pesticides that are identified as a problem, identify mechanisms to use pesticide regulations and statutes, rather than total maximum daily loads (TMDLs) and permit requirements, to mitigate the problems. When needed, urban-specific, use-specific mitigation measures will be used to address water quality problems.

The effectiveness of CASQA's efforts toward these goals can be expressed in relation to management questions established as part of Municipal Separate Storm Sewer Systems' (MS4s') Program Effectiveness Assessment. With respect to addressing urban pesticide impacts on water quality, the following two management questions, derived from the proposed efforts for CASQA Vision Action 1.4, are suggested for inclusion in MS4s' program effectiveness assessment:

> Question 1: (Near term/Current problems) – Are actions being taken by State and Federal pesticides regulators and stakeholders that are expected to end recently observed pesticide-caused toxicity or exceedances of pesticide water quality objectives in surface waters receiving urban runoff? **Related to Action 1.4, Step 4.**
>
> Question 2: (Long term/Prevent future problems) – Do pesticides regulators have an effective system in place to exercise their regulatory authorities to prevent pesticide toxicity in urban water bodies? **Related to Action 1.4, Steps 1, 2, and 3.**

This report is organized to answer these management questions, and is intended to serve as an annual compliance submittal for both Phase I and Phase II MS4s. It describes the year's status and progress, provides detail on stakeholder actions (by CASQA and others), and provides a roadmap/timeline showing the context of prior actions as well as anticipated end goal of these activities. This report may also be used as an element of future effectiveness assessment annual reporting.

Section 2. Results of CASQA 2017-2018 Efforts

To prevent urban water quality impacts from registered pesticide uses, CASQA's Vision Action 1.4 address both near-term regulatory concerns (Step 4), and seeks long term changes in the pesticide regulatory structure (Steps 1, 2, and 3).

At any given time, there are dozens of pesticides with current or pending actions from the EPA or DPR. Addressing near term regulatory concerns is important because some pesticides may pose immediate threat to water quality that can lead to compliance liability for MS4s, and because some of the regulatory decisions made by EPA and DPR will last many years. For example, pesticide registration decisions are intended to be revisited on a fifteen-year cycle. To inform its engagement on near-term regulatory concerns, CASQA uses the pesticide "Watch List" created by the PSC and the UP3 Partnership. The Watch List aids CASQA and the UP3 Partnership in their prioritization of near-term efforts (Section 2.1).

Meanwhile, CASQA and the UP3 Partnership are also working on a parallel effort to effect long-term systemic changes in the regulatory process itself. By identifying inadequacies and inefficiencies in the pesticide regulatory process, and persistently working with EPA and DPR to improve the overall system of regulating pesticides, CASQA and the UP3 are gradually achieving results (Section 2.2).

2.1 Near-Term Regulatory Concerns

CASQA seeks to ensure that the Water Boards and EPA's OW work with DPR and the EPA's OPP to manage problem pesticides that are creating near-term water quality impairments. These efforts address CASQA Vision Action 1.4, Step 4 as well as PEAIP Management Question 1 regarding observed pesticide-caused toxicity or exceedances of pesticide water quality objectives in surface waters receiving urban runoff.

Assessment Question 1: (Near term/Current problems) – Are actions being taken by State and Federal pesticides regulators and stakeholders that are expected to end recently observed pesticide-caused toxicity or exceedances of pesticide water quality objectives in surface waters receiving urban runoff?

> **Answer:** As detailed below, at the State level, significant progress has been made by DPR in addressing near-term and current problems with pesticides in surface waters receiving urban runoff. DPR continues to implement improved registration processes and responses to observed water quality problems. DPR also continues to develop, implement and evaluate mitigation measures for observed problems with pyrethroids and fipronil.
>
> At the Federal level, less progress has been made at addressing near term problems. Some progress has been made in mitigating pyrethroid and fipronil problems at the urging of CASQA and DPR. For instance, EPA accepted label changes for fipronil that were negotiated by DPR and the registrants. In addition, EPA risk assessments do recognize some of risks to aquatic environments

posed by various urban use pesticides. However, EPA does not show a clear understanding of key urban uses in its analyses, and it is still unclear if its risk management decisions for pyrethroids, fipronil, and neonicotinoids will provide much protection of urban water bodies.

2.1.1 Updated Pesticide Watch List

A key tool for identifying near-term regulatory concerns is our pesticide "Watch List". CASQA, working through the UP3 Partnership, reviews scientific literature and monitoring studies as they are published. This information is used to prioritize pesticides based on the most up-to-date understanding of urban uses, pesticide characteristics, monitoring, and surface water quality toxicity (for pesticides and their degradates). The PSC uses these insights to update the Watch List each year (Table 2), which serves as a management tool to help us focus our efforts on the most important pesticides from the perspective of MS4 agencies.[7]

Comparing the current Watch List to the version published in the 2016/17 PSC Annual Report, we see that the insecticides fipronil, imidacloprid, malathion, and pyrethroids remain as the Priority 1. In addition, the neonicotinoid insecticides acetamiprid, clothianidin, dinotefuran, and thiamethoxam (degrades into clothianidin) have been re-classified from Priority 4 to Priority 2, based on recent monitoring data. In addition, carbendazim, a registered fungicide (this chemical is also a degradate of the fungicide thiophanate-methyl) has been added to the list of Priority 2 pesticides, based on monitoring data.

[7] The first Watch List was published by the UP3 in 2005.

Table 2. Current Pesticide Watch List (July 2018) [8]

Priority	Basis for Priority Assignment	Pesticides		
1	Monitoring data exceeding benchmarks; linked to toxicity in surface waters; urban 303(d) listings	Pyrethroids (20 chemicals[9]) Fipronil Imidacloprid (neonic) Malathion		
2	Monitoring data approaching benchmarks; modeling predicts benchmark exceedances; very high toxicity and broadcast application on impervious surfaces; urban 303(d) listing for pesticide, degradate, or contaminant that also has non-pesticide sources	Carbaryl Chlorantraniliprole Chlorothalonil (dioxins) Copper pesticides	Creosote (PAHs) Dacthal (dioxins) Indoxacarb Other Neonics[10]	Pentachlorophenol (dioxins) Polyhexamethylenebiguanide Carbendazim (Thiophanate methyl)[11] Zinc pesticides
3	Pesticide contains a Clean Water Act Priority Pollutant; 303(d) listing for pesticide, degradate, or contaminant in watershed that is not exclusively urban	Arsenic pesticides Chlorpyrifos Chromium pesticides	Diazinon Diuron Naphthenates	Simazine Silver pesticides Trifluralin
4	High toxicity (parent or degradate) and urban use pattern associated with water pollution; synergist for higher tier pesticide; on DPR or Central Valley Water Board priority list	Abamectin Chlorinated isocyanurates Dichlobenil Dithiopyr Halohydantoins	Hydramethylnon Mancozeb MGK-264 Oxadiazon Oxyfluorfen Pendimethalin	Phenoxy herbicides[12] Piperonyl butoxide Pyrethrins Spinosad/ Spinetoram Triclopyr Triclosan
New	New pesticides that may threaten water quality depending on the urban use patterns that are approved	Chlorfenapyr Cyantraniliprole	Cyclaniliprole Flupyradifurone	Novaluron
None	Based on review of available data, no approved urban use or no tracking trigger as yet identified.	Greater than 300 existing pesticides		
Unknown	Lack of information. No systematic screening has been completed by UP3 for the complete suite of urban pesticides.	Unknown		

2.1.2 Description of Near-Term Regulatory Processes

Immediate pesticide concerns may arise from regulatory processes undertaken at DPR or EPA's OPP. For example, when EPA receives an application to register a new pesticide, there may be two opportunities for public comment that are noticed in the Federal Register, as depicted in green in Figure 3. EPA's process usually takes less than a year while DPR typically evaluates new pesticides or major new uses

[8] The UP3 Partnership also watches two non-priorities pesticides (Glyphosate and Metaldehyde) due to frequent member questions about them.
[9] Allethrins, Bifenthrin, Cyfluthrin, Cyhalothrin, Cypermethrin, Cyphenothrin, Deltamethrin, Esfenvalerate, Etofenprox, Flumethrin, Imiprothrin, Metofluthrin, Momfluothrin, Permethrin, Prallethrin, Resmethrin, Sumethrin [d-Phenothrin], Tau-Fluvalinate, Tetramethrin, Tralomethrin.
[10] Acetamiprid, Clothianidin, Dinotefuran, Thiamethoxam (degrades into Clothianidin)
[11] Carbendazim is a registered pesticide, and also a degradate of thiophanate-methyl
[12] MCPA and salts, 2,4-D, 2,4-DP, MCPP, dicamba

of active ingredients within 120 days. Now that DPR implements relatively robust surface water quality review procedures for new pesticide registrations, there is reduced need for CASQA to provide input to EPA on new pesticides.

Figure 3. EPA's Registration Process for New Pesticides

Another regulatory process, "Registration Review," depicted in Figure 4, is meant to evaluate currently registered pesticides about every 15 years, to account for new data available since initial registration. In general, it takes EPA 5 to 8 years to complete the entire process. EPA regularly updates its schedule for approximately 50 pesticides that will begin the review process in a given year.[13]

Figure 4. EPA's Registration Review – Process to Review Registered Pesticides at a Minimum of Every 15 Years.

While EPA must consider water quality in all of its pesticide registration decisions, at DPR this step is not yet fully established as standard (most outdoor urban pesticide registration applications are routinely routed by DPR for surface water review, but a few – notably antimicrobial products used in storm drains – do not automatically receive this review). CASQA monitors registration applications, to identify those relevant to urban runoff, based on the pesticide watch list in Table 2 and use pattern/toxicity analysis for pesticides that have not previously been reviewed.

2.1.3 Key Near-Term Regulatory Activities in 2017-18

In 2017-18, CASQA identified three product registration applications containing fipronil (a top priority pesticide). CASQA and/or its UP3 Partners successfully requested these products be routed by DPR for surface water review. Six other product applications were also routed for surface water review at the request of CASQA. DPR staff recommend that CASQA continue monitoring all registration applications while DPR considers changing its standard procedures in response to CASQA's 2015 request that all storm drain pesticides be automatically routed for surface water review.

[13] See https://www.epa.gov/pesticide-reevaluation/registration-review-schedules for schedule information.

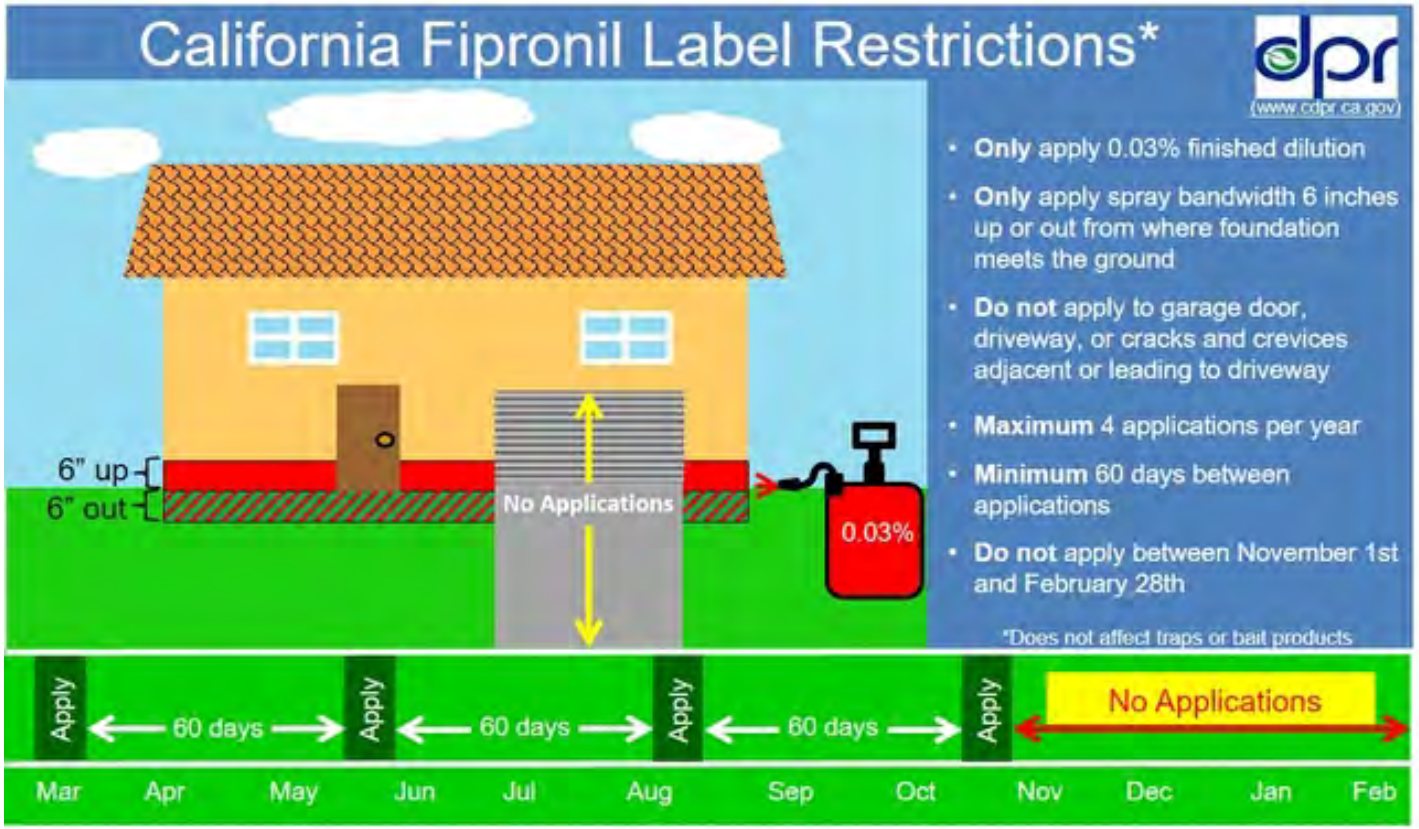
DPR also has an ongoing, but informal review process (called continuous evaluation) that can address pesticides water pollution. If it needs to obtain data from manufacturers, DPR can initiate a formal action, called "Reevaluation." DPR evaluations of pyrethroids and fipronil in urban runoff have occurred in response to CASQA and Water Board requests. These evaluations have involved ongoing communication with CASQA and the UP3 Partnership.

2.1.3.1 Regulatory Progress on Fipronil

DPR's action to mitigate fipronil concentrations in urban water bodies, prior to any water bodies being placed on 303(d) lists, is an important demonstration of DPR's commitment and capacity for protecting water quality. Data compiled by DPR indicated occurrence of fipronil in storm drains and urban water bodies and storm drains in northern and southern California, with 48% of samples containing fipronil above EPA's chronic aquatic benchmark[14,15]. Informal application by CASQA of potential listing criteria to DPR's fipronil dataset indicates that numerous urban water bodies (located in northern and southern California) could be listed, although as of yet, there are no 303(d) listings for fipronil anywhere in the state. Based on the observed occurrence of fipronil, DPR initiated early action. Utilizing the results of numeric modeling and experimental studies of fipronil transport and efficacy, DPR negotiated an agreement with registrants on label changes that limit applications in a manner that provides for effective pest control while leading to anticipated reductions of fipronil concentrations in California urban runoff by more than 90 percent[16]. Following EPA approval of the California-specific label changes, DPR formally approved the changes in November 2017. A summary by DPR of the new label restrictions is provided in Figure 5. In addition, UC IPM has contributed to efforts to educate pest control licensees on the new requirements of the fipronil labels [17]

[14] Fipronil Monitoring and Model Scenarios. February 16, 2016. California Dept. of Pesticide Regulation. Robert Budd, Ph.D. and Yuzhou Luo, Ph.D.
[15] Addendum: Evaluation of Alternative Fipronil Use Scenarios: Modeling Results, Runoff Trials, and Product Efficacy. June 26, 2017. California Dept. of Pesticide Regulation. Robert Budd, Yuzhou Luo, and Nan Singhasemanon.
[16] Ibid.
[17] Fipronil Labels Have New Restrictions, in Pests in the Urban Landscape, July 6, 2018 UC ANR Blogs. http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=27509

Figure 5. DPR Summary of Fipronil Label Restrictions



2.1.3.2 Progress on Near-Term Regulatory Concerns

Table 3 presents a summary of recent UP3 activities to address near-term regulatory concerns and their 2017-2018 results. The positive outcomes in Table 3 reflect the success of CASQA's teamwork in the UP3 Partnership. Some of this work occurs during formal public comment periods. To accomplish this, CASQA monitors the Federal Register and DPR's website for notices of regulatory actions related to new pesticide registrations and registration reviews. Since the watch list is not based on a comprehensive review of all pesticides, CASQA watches for additional pesticides that appear to have any of the following characteristics: proposed urban, outdoor uses with direct pathways for discharge to storm drains, high aquatic toxicity, or containing a priority pollutant. Participating in these regulatory processes can take many years to complete.

This year CASQA concentrated efforts to affect near-term regulatory concerns on Priority 1 pesticides. CASQA has had considerable success in working with DPR and the Water Board. **A major challenge and opportunity in the upcoming fiscal year will be to continue to work to influence EPA OPP to ensure positive outcomes in the registration decisions resulting from its reviews of the pyrethroids, fipronil, and imidacloprid, as well as determining the impact of EPA's omission of urban uses of malathion in registration review.**

Table 3. Latest Results of Efforts Communicating Near-Term Regulatory Concerns (4 pages)[18]

Regulatory Action or Concern	CASQA Efforts			Partner Support	Outcomes and notes
	Letter(s)	Call(s) or emails	Mtg(s)		
DPR					
Fipronil		✓	✓	SWRCB SFBRWQCB CVRWQCB BACWA	DPR and Water Boards are monitoring effectiveness of mitigation measures being implemented via enhanced label language. The mitigation measures implemented by DPR and registrants are anticipated to reduce the concentration of fipronil and degradates in urban runoff by more than 90 percent.
Fipronil foam registration application (Lnouvel)		Email to DPR		SFBRWQCB	Urban runoff information provided by CASQA to SF Bay Water Board Outdoor uses removed from label prior to registration
Other fipronil products (6 products)	✓	✓	✓	SFBRWQCB	DPR has routed all fipronil registration applications – including some that might not have met its usually routing criteria – to its surface water program for review. Due to the prevalence of fipronil water pollution, CASQA is carefully screening all fipronil product registration applications and partnering with the Water Board to ensure they have robust DPR surface water program review.
Pyrethroids			✓	SWRCB SFBRWQCB CVRWQCB	CASQA representatives periodically meet with DPR to discuss DPR's urban runoff monitoring data evaluation that is in progress and possible additional mitigation strategies for urban uses of pyrethroids.
Storm drain antimicrobial registration application (AbTech Smart Sponge)		Email to DPR		Sacramento County	DPR responded that this registration application will be routed to Surface water protection program for review. Registration completed August 2018.

[18] Color coding in this table is meant to reflect the "Watch List" prioritization color coding in Table 2.

Regulatory Action or Concern	CASQA Efforts			Partner Support	Outcomes and notes
	Letter(s)	Call(s) or emails	Mtg(s)		
Fipronil proposed outdoor use expansion (Termidor HP II)		Email to DPR		Sacramento County	DPR responded that this registration application will be routed to Surface water protection program for review Registration decision is pending.
Broflanilide registration application (multiple products)		Email to DPR		SFBRWQCB	Urban runoff information provided by CASQA to SFBRWQCB DPR responded that this registration application will be routed to Surface water protection program for review. Registration decision is pending.
Microparticle copper paint additive registration application		Email to DPR		Sacramento County	DPR responded that this registration application will be routed to Surface water protection program for review. Registration decision is pending.
Fipronil proposed outdoor use expansion (Fendona CS)		Email to DPR		Sacramento County	DPR responded that this registration application will be routed to Surface water protection program for review Registration decision is pending.
Indoxacarb product label modification question		Email to DPR		Sacramento County	Confirmed that outdoor use is not expanded by the revised product label language
Novaluron expanded outdoor use registration application		Email to DPR		Sacramento County	DPR responded that this registration application will be routed to Surface water protection program for review Registration decision is pending.
Fipronil proposed outdoor use expansion (Fuse Foam)		Email to DPR		SFBRWCB	Urban runoff information provided by CASQA to SFBRWQCCB DPR responded that this registration application will be routed to Surface water protection program for review Registration decision is pending.
Deltamethrin window screen registration application	Email to DPR			Sacramento County	DPR responded that this registration application will be routed to Surface water protection program for review Registration decision is pending.
Registrant request to allow use of dichlobenil (Oblitiroot) in storm drains (Oblitiroot)	Prior year letter			CASQA	In response to letter sent in fiscal year 15/16, DPR denied registrant request to allow use of a toxic root control product in storm drains.

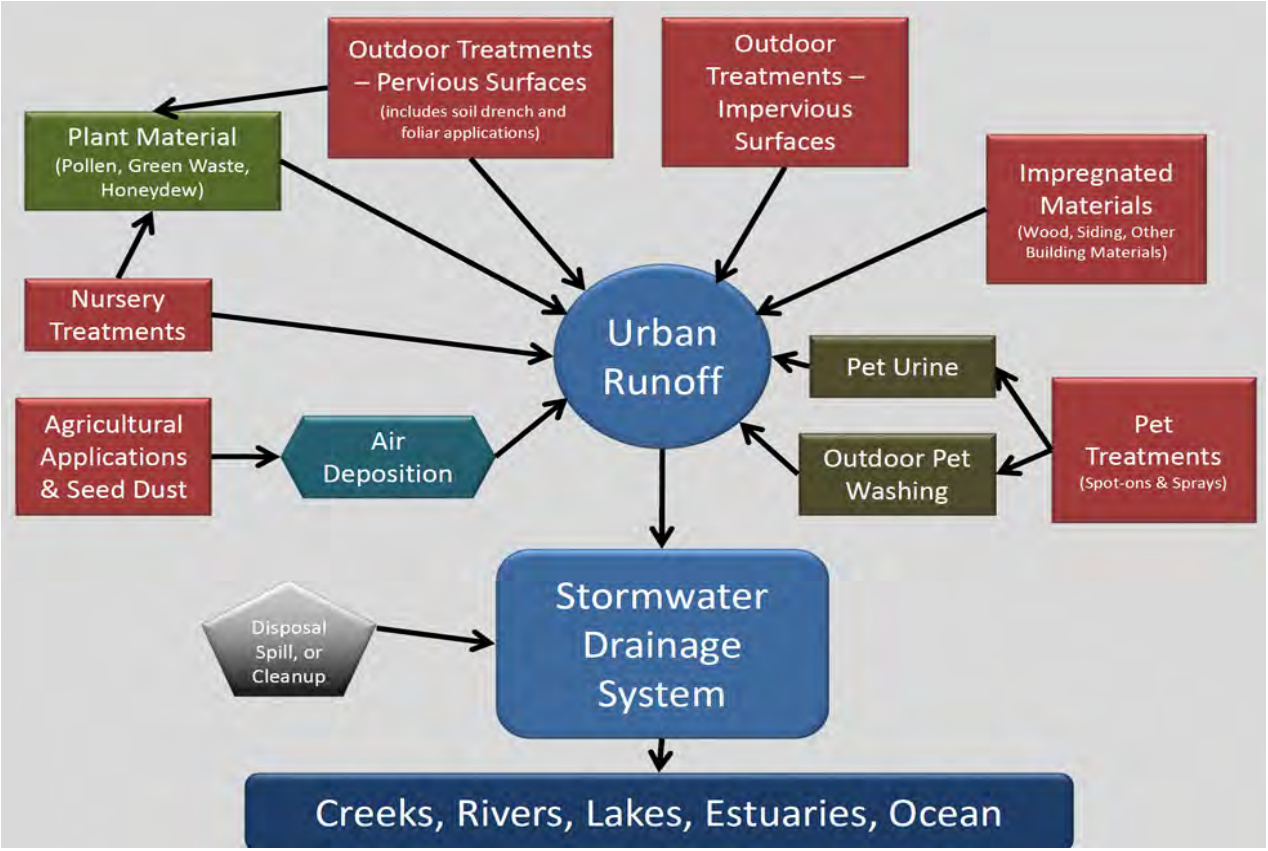
Regulatory Action or Concern	CASQA Efforts			Partner Support	Outcomes and notes
	Letter(s)	Call(s) or emails	Mtg(s)		
EPA					
Pyrethroids Registration Review Risk Assessments	✓			CASQA State Water Board CCRWQCB SFBRWQCB (DPR) BACWA NACWA	Pending
Malathion Registration Review/ESA Consultation		Emails to EPA and Services	✓	CASQA (Sacramento County)	Information informally shared was not addressed in the next step in the consultation. At EPA's recommendation, the information has been updated and was formally submitted in July 2018.
Imidacloprid Registration Review Risk Assessment	✓			CASQA CCRWQCB SFBRWQCB BACWA NACWA	Pending
Boric Acid/Sodium Salts (swimming pool products)	✓			CASQA SFBRWQCB BACWA NACWA	Language requested by CASQA and its UP3 Partners to address pool, spa, and fountain emptying will be required to be placed on all such product labels, as of August 2018
Indoxacarb Registration Review Preliminary Risk Assessments	✓			CASQA SFBRWQCB BACWA Tri-TAC	Pending
Copper Registration Review - Proposed Decision	✓			CASQA SFBRWQCB NSMA	Language requested by CASQA and its UP3 Partners to address pool, spa, and fountain emptying will be required to be placed on all such product labels.
Hypochlorites Registration Review - Proposed Decision	✓			CASQA SFBRWQCB NACWA	Language requested by CASQA and its UP3 Partners to address pool, spa, and fountain emptying will be required to be placed on all such product labels.
Dichlobenil Registration Review Preliminary Risk Assessments	✓			CASQA SFBRWQCB BACWA NACWA	In response to request by CASQA and its UP3 Partners, EPA has proposed to prohibit use in storm drains (August 2018).

Regulatory Action or Concern	CASQA Efforts			Partner Support	Outcomes and notes
	Letter(s)	Call(s) or emails	Mtg(s)		
Pyriproxyfen registration review preliminary risk assessments	✓			SFBRWQCB BACWA NACWA	Urban runoff information provided by CASQA to SFBRWQCB. EPA did not address any of the urban runoff-related scientific gaps identified in the Water Board comments in its proposed decision.
Dinotefuran registration review preliminary risk assessments	✓			SFBRWQCB BACWA NACWA	Urban runoff information provided by CASQA to SFBRWQCB EPA proposed decision is pending
Clothianidin registration review preliminary risk assessments	✓			SFBRWQCB BACWA NACWA	Urban runoff information provided by CASQA to SFBRWQCB EPA proposed decision is pending
Thiamethoxam registration review preliminary risk assessments	✓			SFBRWQCB BACWA NACWA	Urban runoff information provided by CASQA to SFBRWQCB EPA proposed decision is pending

2.1.3.3 Imidacloprid Comments

CASQA's comments on EPA's preliminary risk assessments for the insecticide imidacloprid exemplify some of the deficiencies that we observe in EPA's scientific process for registration review. Although CASQA expressed concurrence with EPA's finding of significant risk to aquatic environments for this pesticide, we also conveyed to EPA our concern that EPA's efforts to address this risk would benefit from a better understanding of the sources of imidacloprid that has been observed in urban runoff, and suggested that "EPA coordinate with CDPR, professional applicators, and imidacloprid registrants to revise allowable imidacloprid urban product use patterns and label language with the goal of providing mitigation to protect water quality." To assist EPA, we provided them with additional information on imidacloprid uses, and the graphic conceptual model shown in Figure 6, of sources and transport pathways to surface water via urban runoff. This model is based on product labels and information in the literature. As seen in the figure, due to its myriad of uses, imidacloprid has many pathways by which it can be washed into urban runoff.

Figure 6. Urban Runoff Imidacloprid Sources Conceptual Model



2.2 Long-Term Change in the Pesticides Regulatory Structure

Since the mid-1990s, CASQA (and its predecessor organization the Storm Water Quality Task Force), have worked toward a future in which the pesticide regulatory structure at the state and federal level proactively restricts pesticide uses that have the potential to cause urban water quality problems. These efforts directly relate to PEAIP Management Question 2.

Assessment Question 2. (Long term/Prevent future problems) – Do pesticides regulators have an effective system in place to exercise their regulatory authorities to prevent pesticide toxicity in urban water bodies?

Answer: Improvements in processes at EPA and especially at DPR have moved us closer to that future. Many of these improvements are linked to the persistent work of CASQA and the UP3 Partnership to educate regulators on how previous process deficiencies did not adequately address urban pesticide problems.

As detailed below, at the State level, significant progress has been made by DPR and the Water Boards in establishing a comprehensive statewide approach to utilizing pesticide regulatory authorities to prevent pesticide toxicity in urban water bodies. Overall, DPR has a system in place that is reasonably effective at addressing pesticide toxicity in urban water bodies, although improvement is needed to better coordinate this with the requirements of the Clean Water Act and NPDES MS4 permits. DPR and the Water Board, along with CASQA and other stakeholders, are working diligently to strengthen this system and to institutionalize it. This is primarily embodied in the State's effort to establish the Urban Pesticide Amendments and update the MAA between DPR and the State Water Board.

At the Federal level, OPP has implemented some improvements in how it evaluates and responds to water quality problems associated with pesticides, but it does not do this reliably and does not have a system in place to ensure that this will happen consistently and adequately. Although more effective regulation of pesticides by EPA is still an important goal for CASQA[19], due to the current regulatory climate at federal agencies, the CASQA does not expect OPP to be very responsive to requests for additional improvements. Specific examples include the current administration's orders for a blanket reduction in regulations, chronic under-staffing at OPP, and lack of accessibility to OPP staff to share scientific information and stormwater expertise.

As a result, CASQA has decided for the time being to limit its efforts to affect long-term systemic change by EPA and other federal agencies. Instead, CASQA has focused more on solidifying advances made at the state level, which will leverage the considerable authority held by the State of California for regulating the use of pesticides.

[19] Long-term regulatory goals at the state and federal level are described in detail in Section 1.2.

2.2.1 Focus on California's Urban Pesticide Amendments

At the urging of CASQA, in 2014 the State Water Board made a strategically important decision to institutionalize its commitment to work closely with DPR and EPA to utilize pesticide regulatory authority as the primary mechanism for preventing and responding to impairments of receiving waters linked to current use pesticides in urban runoff. To accomplish this, it established an urban pesticides reduction project (now entitled the "Urban Pesticides Amendments") as a top priority project for 2016 under the comprehensive stormwater strategy it adopted in December 2015, known as "Strategy to Optimize Resource Management of Storm Water" or STORMS.[20] In 2017-18, although it did not adopt the amendments as anticipated, the State Water Board continued working towards developing the Urban Pesticides Amendments which will be changes to the Inland Surface Waters, the Enclosed Bays, and Estuaries Water Quality Control Plan, and the Water Quality Control Plan for Ocean Waters of California. The amendments are now anticipated to be adopted in 2019. It is important to note that a critical factor in the State Water Board's decision to move in this direction was DPR's demonstrated commitment and significant progress in addressing urban water quality issues caused by pesticides[21].

CASQA representatives have been participating actively in the development of the Urban Pesticide Amendments since their inception, as members of the projects Core Team and various work groups, to ensure that they are consistent with CASQA's vision for pesticide control[22]. The key elements that we anticipate being in the amendments are listed below.

- Element 1: Establishment of a framework for the Water Boards to work with DPR and U.S. EPA to utilize pesticide regulatory authority as the primary means for addressing pesticides in urban runoff.
- Element 2: Monitoring program designed to support effective implementation of Element 1.
- Element 3. Requirements for MS4s to support Elements 1 and 2 by contributing expertise on how pollutants present in urban environments enter and behave in urban runoff and water bodies, and providing data and/or material support for monitoring.
- Element 4: Other actions that can reasonably be implemented by MS4s, such as IPM outreach, in support of pesticides reductions.

[20] STORMS' overall mission is to "lead the evolution of storm water management in California by advancing the perspective that storm water is a valuable resource, supporting policies for collaborative watershed-level storm water management and pollution prevention, removing obstacles to funding, developing resources, and integrating regulatory and non-regulatory interests." (http://www.waterboards.ca.gov/water_issues/programs/stormwater/storms/)

[21] As reported in previous CASQA Pesticide Subcommittee Annual Reports, DPR's accomplishments include improved modeling, active ingredient screening for urban water quality issues, monitoring, and regulatory mitigation of pyrethroids and fipronil.

[22] These goals have been adapted from the CASQA document, "End Goals for Pesticide Regulatory Activities," 2014. Goal 3, above, is directly tied to Goals 2, 4, and 5 of that document.

CASQA supports the State Water Board's stated goal of implementing the Urban Pesticides Amendments *"as an alternative to TMDL development to address pesticide and pesticide-related toxicity impairments in individual water bodies."* Achievement of this goal would provide substantial savings of state and MS4 agency resources as compared to establishment of multiple TMDLs throughout the state.

Elements 1-3 are consistent with CASQA Vision Action 1.4. Water Board staff have indicated their intent that the Urban Pesticides Amendments, as shown in Element 4, should also establish a consistent set of "*minimum pesticides source control measures for MS4 dischargers."*

In response to CASQA concerns, the State Water Board has indicated that "*permittees fully implementing these minimum pesticide control measures should be deemed in compliance during the term of the permit with receiving water limitations."* In addition, CASQA representatives have worked with the Water Boards to ensure that such requirements are reasonable and consistent with similar measures already in place in some regions. At this time, the list of potential minimum measures includes use of integrated pest management (IPM), education of and outreach to residents and professional pesticide applicators, providing urban runoff scientific and management expertise to support pesticide regulatory processes, limitations to dry weather runoff, and pesticide and toxicity monitoring.

CASQA supports the stated goal to "*create a comprehensive, coordinated statewide monitoring framework for pesticides and toxicity in urban runoff and receiving water that improves resource efficiency, usefulness of data, and coordination of data collection to support management decisions.*" A well-designed and managed monitoring framework that is properly representative of urban areas can simultaneously provide more useful information and improve the utilization of resources by eliminating unnecessary MS4 monitoring requirements that do not contribute to effective management of pesticides and pesticide-caused toxicity.

Monitoring. Through the spring of 2018, CASQA participated in a process to set up a statewide monitoring framework. In early 2018 the Water Boards, CASQA, DPR, and the environmental community representatives agreed to pursue a statewide Urban Pesticides Coordinated Monitoring Program (UPCMP). Key joint accomplishments on the establishment of the monitoring program:

1. Agency team formed (Pesticides Plan Amendments Core Team/Monitoring workgroup)
2. Cooperative relationships established among stakeholder partners
3. Monitoring Management Questions & Monitoring Objective identified
   - Core team approved MQs & MOs
   - Draft priority MQs prepared & reviewed by core team
4. Core team consensus on conceptual organizational structure for UPCMP
5. Developed workplan and budget for formation of UPCMP. The workplan includes developing a program Charter, establishing management and technical groups, and preparing funding plan and first year workplan
6. Grant for monitoring startup funding applied for by Water Board with CASQA support
7. Took first steps in establishing a "Formation Management Group" (including Water Boards, DPR, US EPA, MS4s, and environmental community representative) to guide the process of establishing the UPCMP

Technical support. CASQA continues to provide technical support to the Water Boards on numerous crucial and highly detailed items related to the Urban Pesticide Amendments, Staff Report, CEQA Document, monitoring program, model permit language, and the relationship of these to the Management Agency Agreement.

MS4 input. CASQA Pesticides Subcommittee initiated formation of a work group to obtain broad MS4 management-level support and guidance for ongoing participation in the adoption of the Urban Pesticide Amendments.

2.2.2 CASQA Participation in other State efforts

As presented in Tables 4, CASQA has been actively involved with various State agencies and advisory groups that affect pesticide use and pest management in urban areas.

Table 4. Participation in other State Efforts to Support CASQA's Goals

Agency or Conference	Latest Outcomes
DPR's Pest Management Advisory Committee (PMAC)	Participation on the PMAC has resulted in expanded focus by DPR on urban pest management and water quality issues and generated funding for urban integrated pest management programs. DPR conducted a multi-stakeholder initiative entitled Pests, Pesticides, and Integrated Pest Management (PPI) to identify strategic actions to identify overcome barriers and establish widespread adoption of IPM; it includes urban pests as a key focus. A PSC member served on the PPI steering committee as well as the Structural Pest working group.
California Structural Pest Control Board (SPCB)	A PSC member is an appointed member of the SPCB. The SPCB recognizes the potential for excessive pesticide application to impact water quality. The SPCB is in the process of adopting regulations to increase continuing education hours required in the IPM category. The SPCB reconvened its Research Advisory Panel which solicited and recommended funding for proposals for research projects to advance the field of urban IPM. Selected projects will be supported by the SPCB research fund. The PSC member on the SPCB Board presented on recent advances in California in addressing urban pesticide issues at the Beyond Pesticides Organic Neighborhoods Conference in Irvine, CA, in April 2018.
University of California Statewide IPM (UCIPM)	A PSC member continues to serve on UCIPM's Strategic Planning Committee, which met in 2017 to review progress in implementing the program's strategic plan. Consistent with the plan, UCIPM continues to provide resources, develop materials, and implement programs that support urban IPM, such as the ongoing blogs "Pests in the Urban Landscape"[23], and Retail Nursery & Garden Center IPM News[24]

[23] http://ucanr.edu/blogs/UCIPMurbanpests/
[24] http://ipm.ucanr.edu/retail/retail-newsletter.html

Section 3. CASQA's Approach Looking Ahead

At any given time, EPA and DPR may be in the process of evaluating and registering various pesticides for urban use. To improve ongoing pesticide regulatory processes, CASQA and the UP3 Partnership continuously track and engage in EPA and DPR activities, sharing their urban runoff and water-quality specific expertise with pesticides regulators. Typically, these efforts entail peer review of pesticides scientific assessments and risk management proposals, and sharing monitoring data, water quality regulatory background, and urban runoff agency compliance cost information. Sometimes, this involves recommending changes in an individual product's allowable uses or use instructions or requesting that regulators examine urban runoff discharges or fill critical data gaps by obtaining more data from manufacturers. CASQA and the UP3 Partnership are also working on a parallel effort to effect long-term change in the regulatory process, often using specific regulatory actions as educational opportunities on long-term issues.

In the coming year, CASQA plans to undertake activities to both address near-term pesticide concerns and seek long-term regulatory change.[25] Although changes at the federal level are important for fully achieving CASQA's goal of protecting water quality through the effective use of pesticide regulations, until there is a more favorable situation at that level, we will continue to focus our efforts on solidifying progress at the state level. In FY 2018-2019, we will continue engagement on specific actions for priority pesticides at the federal level, while continuing our critical "end game" activities at the state level. This is in response to:

- the immediate need to participate in pyrethroid, fipronil, malathion, and imidacloprid regulatory actions (the only such opportunity for these chemicals the next 15 years);
- the opening of a strategic window of opportunity created by OPP's requirements to revise risk assessment procedures under the ESA;
- new data revealing the extent of urban pesticides water pollution and dozens of current and anticipated 303(d) listings / TMDLs for pyrethroids, fipronil, malathion, and imidacloprid, and
- a chance to leverage our recent success at the state level toward creating a realistic long-term pesticide management framework for MS4s.

CASQA's current priority activities are as follows:

(1) Continue collaboration with DPR to address near-term regulatory concerns, while seeking OPP and OW actions to reduce inconsistencies:

- Ensure DPR action on fipronil water pollution is completed, including professional user education about new restrictions on its outdoor urban use

[25] Activities in 2018 are subject to available funding.

- Ensure DPR enforces mitigation measures for pyrethroids and adopts additional measures as necessary
- Ensure the state continues to conduct surveillance monitoring to evaluate pyrethroids (and fipronil) mitigation effectiveness and to evaluate occurrence of new threats like imidacloprid and other neonicotinoid insecticides
- Continue to encourage EPA to complete scientific groundwork and to identify and implement pyrethroids, fipronil, malathion, and imidacloprid mitigation measures, recognizing that it is likely that necessary mitigation cannot readily be implemented entirely by DPR.
    - Focus on providing EPA with detailed scientific information to support mitigation strategies appropriate in the urban context
    - Seek to engage with the EPA about the risk associated with urban uses of malathion (and the associated 303(d) listings) and the need to include traditional water quality risk assessments in tandem with complying with the ESA

(2) Seek long-term changes in the pesticide regulatory structure:

- Leverage our success at the state level and continue to be a key stakeholder in the STORMS project that is developing statewide Water Quality Control Plan amendments for urban pesticides reduction. Through this process, work with other stakeholders to implement the planned restructuring of California's urban surface water pesticides monitoring to increase its effectiveness and improve coordination.
- Seek procedure changes such that DPR continues to refine its registration procedures to address remaining gaps in water quality protection.

CASQA will continue to coordinate with the Water Boards through the UP3 Partnership to take advantage of efficiencies, increase effectiveness, and ensure that the water quality community has a consistent message. The types of activities that CASQA and the UP3 Partnership engage on an ongoing basis in are summarized in Table 5.

Table 5. Typical Ongoing CASQA Pesticide Committee Activities

Activity		Purpose	Level of Effort
Regulatory Tracking	Track Federal Register notices	Identify regulatory actions that may require review.	Daily review; analyze EPA's scientific work and provide notification to CASQA members and partners as needed.
	Track DPR notices of registration applications and decisions	Identify pesticides meriting surface water review that are not within DPR's automatic routing procedures, identify gaps or potential urban runoff-related problems with current DPR evaluation or registration plans other regulations, procedures & policies.	Weekly review; obtain water quality assessments from DPR through public record requests; analyze from scientific and urban runoff management perspective and provide notification to CASQA members and partners as needed.
	Track activities at the Water Boards	Identify opportunities for improvements in TMDLs, Basin Plan Amendments, and permits.	Often weekly phone calls with Water Board staff; weekly review of noticed proceedings; review scientific information.

Activity		Purpose	Level of Effort
	Review regulatory actions, guidance documents, and work plans	Identify potential urban runoff-related problems with current EPA evaluation or registration plans, other regulations, procedures, and policies.	According to need as identified by tracking activities (average of 6 per month).
Regulatory Communications	Briefing phone calls, informal in-person meetings, teleconference meetings, and emails with EPA and DPR	Information sharing about immediate issues or ongoing efforts; educate EPA and DPR about issues confronting water quality community. Provide early communication on upcoming proceedings that help reduce the need for time-intensive letters.	As needed, but often several times per week. In-person meetings with DPR and EPA Region 9 approximately quarterly and OPP about 1-2 times per year (due to budget limitations, these are always in association with advisory committee meetings and scientific conferences).
	Convene formal meetings, write letters and track responses to letters	Ensure current pesticide evaluation or registration process accurately addresses urban runoff and urban pesticide use and management contexts, and take advantage of opportunities to formally provide information suggest more robust approaches to that could be used in future regulatory process. Request and maintain communication on mitigation actions addressing highest priority pesticides.	Typically provide information and recommendations with regard to a dozen or so pesticides annually that could pose threats to water quality if EPA or DPR does not initiate certain procedures. Letters vary in length, but often are many pages and require many hours to write. As dockets are updated, review responses to comments and identify next opportunities. 4-6 meetings per year with DPR on mitigation actions.
Advisory	Serve on EPA, DPR, and Water Board policy and scientific advisory committees	Provide information and identify data needs and collaboration opportunities toward development of constructive approaches for managing pesticides.	Two to six meetings per committee per year. The PSC is currently represented on DPR's external advisory committee and has sporadic representation on water board panels related to pesticides.

Activity		Purpose	Level of Effort
Educational	Presentations to and informal discussions with EPA, DPR, Water Board, CASQA members, pesticide manufacturers, water quality researchers, and other collaborators.	Educate EPA, DPR, Water Board, and CASQA members about the urban runoff-related shortcomings of existing pesticide regulatory process, educational efforts to support process improvements, and report on achievements. Encourage research and monitoring programs to address urban runoff data needs and priorities. Stimulate academic, government, or private development of analytical and toxicity identification methods to address anticipated urban runoff monitoring needs. Inform development of new pesticides by manufacturers and selection of pesticides by professional users.	As many as a dozen opportunities to present at water quality, pesticides and chemical conferences nationally. Additional 8-10 opportunities per year for state and regional events. Informal interactions weekly. Budget limits participation to just a few formal events because preparation of presentations and coordination with water quality community can take as much as 40 hours per opportunity.
	Developing and delivering public testimony	Educate Water Board members about the problems with existing pesticide regulatory process, encourage change, and report on achievements.	Two to three times per year. Preparation and coordination can take as much as 40 hours per opportunity.

Activity		Purpose	Level of Effort
Monitoring and Science	Track major urban runoff monitoring and pesticide scientific studies; review scientific literature, monitoring data, and government reports; and maintain reference database	Stay abreast of the latest scientific findings in order to identify pesticide priorities for monitoring and mitigation, to improve methods for identifying sources of pesticides in urban runoff, and to support input and discussions with regulators toward improving pesticide regulation, which is science-based.	About 10 important publications per month and a dozen meetings per year.
	Peer review EPA, DPR, and Partner work plans and reports	Provide insights and ensure that work plans and reports are utilizing latest science regarding urban pesticide use, fate and transport, and water quality impacts and study designs focus on the most important information gaps about urban runoff pesticides water pollution.	About 6 peer reviews per year, which can take up to 8 hours each.
	Update Pesticide Watch List based on new scientific and regulatory information	The Pesticide Watch List (Table 2) serves as a management tool to prioritize and track pesticides used outdoors in urban areas.	2-3 updates per year
	Develop urban conceptual models and track urban runoff numeric model development	Identify major sources of pesticides in urban runoff to focus identification of mitigation and prevention opportunities. Encourage better EPA and DPR predictive modeling to improve pesticide registration decisions.	1-2 modeling publications per month. Develop one conceptual model annually (20-40 hours).
	Data analysis of DPR/SWAMP/USGS/MS4 monitoring, pesticide use data, and information from scientific literature	Summarize data to educate CASQA members and water quality community, Water Boards, DPR, and EPA.	Detailed analysis is infrequent because finding, compiling, and analyzing data requires very high level of effort and funding. CASQA undertook a detailed monitoring summary in 2013. Report is available at www.casqa.org.
Reporting	Prepare Monthly Action Plans	Coordinate CASQA's regulatory actions with Partners	3 hours/month
	Prepare PSC Annual Report to describe the year's status and progress, provide detail on stakeholder actions, and the context of prior actions as well as anticipated end goal of these activities.	Provide CASQA's members with focused information on its efforts to prevent pesticide pollution in urban waterways. The document serves annual compliance submittal for both Phase I and Phase II MS4s. It may also be used as an element of PEAIPs and future effectiveness assessment annual reporting.	Preparation and coordination takes about 50 to 60 hours.

Table 6 summarizes upcoming regulatory action items that are likely to proceed and may require CASQA attention in FY 2018-19.

Table 6. Anticipated Opportunities for CASQA and the UP3 Partnership Pesticides Regulatory Engagement in 2018-2019

EPA Pesticide Registration Review (15-year cycle)
Environmental Risk Assessments • Priority 1 pesticides: Fipronil • Priority 2-4 pesticides: Dithiopyr, Hydramethylnon, Phenoxy herbicides (2,4-DP; MCPA), Thiophanate methyl/Carbendazim, Trifluralin, Zinc metal/salts; others (schedule unknown)
Endangered Species Act Biological Evaluation • Carbaryl
Proposed Decisions • Priority 1 pesticides: Pyrethroids and Imidacloprid • Priority 2-4 pesticides: 2,4-D, Abamectin, Dichlobenil, Indoxacarb, Neonics (Clothianidin, Dinotefuran, Thiamethoxam), Zinc Borate; others (schedule unknown) • Other opportunities: Glyphosate (Endangered Species Act pilot), Piperonyl butoxide (PBO) (pyrethroids synergist), Pyrethrins
DPR New Pesticide Registration Decisions
• Momfluorothrin (new pyrethroid, 5 products) • Alpha Cypermethrin (new pyrethroid, 1 product) • Transfluthrin (new pyrethroid, 1 product) • Deltamethrin window screen (new use) • Three new fipronil products (proposed expanded fipronil use) • Copper-microparticle containing paint additive • Broflanilide (proposed new insecticide/pyrethroid alternative) • Novaluron (pyrethroid alternative/expanded use)
Other DPR-related Items
• Fipronil mitigation measure implementation including outreach to professional applicators and effectiveness monitoring • Pyrethroids – possible updates to water quality protection regulations and/or implementation of other mitigation measures • Updates to Methodology for Evaluating Pesticide Registration Applications for Surface Water Protection – development of new and updated modules to continue to improve accuracy of urban evaluations. • Registration Application Surface Water Reviews – continue to follow up on communications requesting review of all storm drain products, outdoor antimicrobials, and swimming pool additives
Water Boards
• STORMS Urban Pesticides Plan Amendments • Pesticides 303(d) listings • Pesticide TMDL implementation requirements for permittees

Annual Reporting for FY 2017-2018

Regional Supplement for New Development and Redevelopment

San Francisco Bay Area Municipal Regional Stormwater Permit

B A S M A A

Bay Area Stormwater Management Agencies Association

September 2018

Alameda Countywide
Clean Water Program

Contra Costa
Clean Water Program

Fairfield-Suisun
Urban Runoff
Management Program

Marin County
Stormwater Pollution
Prevention Program

Napa County
Stormwater Pollution
Prevention Program

San Mateo Countywide
Water Pollution
Prevention Program

Santa Clara Valley
Urban Runoff Pollution
Prevention Program

Sonoma County
Water Agency

Vallejo Sanitation
and Flood
Control District

B A S M A A

To Whom It May Concern:

We certify under penalty of law that this document was prepared under our direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on our inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of our knowledge and belief, true, accurate, and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

James Scanlin, Alameda Countywide Clean Water Program

Courtney Riddle, Contra Costa Clean Water Program

Kevin Cullen, Fairfield-Suisun Urban Runoff Management Program

Matthew Fabry, San Mateo Countywide Water Pollution Prevention Program

Adam Olivieri, Santa Clara Valley Urban Runoff Pollution Prevention Program

Jennifer Harrington, Vallejo Flood & Wastewater District

Bay Area
Stormwater Management
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MRP Regional Supplement for New Development and Redevelopment
Annual Reporting for FY 2017-2018

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BASMAA comments on California Natural Resources Agency *Safeguarding California Plan: 2017 Update – California's Climate Adaptation Strategy* (June 23, 2017)

Response to Comments (excerpt) on California Natural Resources Agency *Safeguarding California Plan: 2017 Update – California's Climate Adaptation Strategy* (January 2018)

INTRODUCTION

This Regional Supplement has been prepared to report on regionally implemented activities complying with portions of the Municipal Regional Stormwater Permit (MRP), issued to 76 municipalities and special districts (Permittees) by the San Francisco Bay Regional Water Quality Control Board (Water Board). The Regional Supplement covers new development and redevelopment activities related to the following MRP provisions:

- C.3.j.i.(2)(g) Green Infrastructure Facility Sizing Analysis, and
- C.3.j.iii. Participate in Processes to Promote Green Infrastructure.

These regionally implemented activities are conducted under the auspices of the Bay Area Stormwater Management Agencies Association (BASMAA), a 501(c)(3) non-profit organization comprised of the municipal stormwater programs in the San Francisco Bay Area. Most of the 2017-18 annual reporting requirements of the specific MRP Provisions covered in this Supplement are completely met by BASMAA Regional Project activities, except where otherwise noted herein or by Permittees in their reports. Scopes, budgets and contracting or in-kind project implementation mechanisms for BASMAA Regional Projects follow BASMAA's Operational Policies and Procedures as approved by the BASMAA Board of Directors. MRP Permittees, through their program representatives on the Board of Directors and its committees, collaboratively authorize and participate in BASMAA Regional Projects or Regional Tasks. Depending on the Regional Project or Task, either all BASMAA members or Phase I programs that are subject to the MRP share regional costs.

Green Infrastructure Planning and Implementation

C.3.j.i.(2)(g) Green Infrastructure Facility Sizing Analysis

MRP Provision C.3.j.i.(2)(g) states that Green Infrastructure Plans should include requirements that stormwater treatment facilities "*be designed to meet the treatment and hydromodification sizing requirements in Provisions C.3.c. and C.3.d.*" The Provision further states that for street projects that are not Regulated Projects:

> *… Permittees may collectively propose a single approach with their Green Infrastructure Plans for how to proceed should project constraints preclude fully meeting the C.3.d. sizing requirements. The single approach can include different options to address specific issues or scenarios. That is, the approach shall identify the specific constraints that would preclude meeting the sizing requirements and the design approach(es) to take in that situation. The approach should also consider whether a broad effort to incorporate Hydromodification controls into green infrastructure, even where not otherwise required, could significantly improve creek health and whether such implementation may be appropriate, plus all other information, as appropriate (e.g., how to account for load reduction for the PCBs or mercury TMDLs).*

MRP Provision C.3.d. contains sizing criteria. These include the option to size facilities to

treat at least 80% of the total runoff over the life of the project, using local rainfall data.

Provision C.3.c.i. states that LID treatment measures are harvesting and use, infiltration, evapotranspiration, and biotreatment (bioretention). Bioretention systems shall be designed to have a surface area no smaller than what is required to accommodate a 5 inches/hour stormwater runoff surface loading rate.

In FY 16-17, the BASMAA Development Committee initiated a project to address provision C.3.j.i.(2)(g). This project used continuous simulation modeling to evaluate relationships of facility size to facility performance to develop an approach for implementing green infrastructure projects when there are constraints on facility size.

The project included the following technical tasks:

- Adapt existing continuous simulation models that simulate bioretention performance.
- Compile and update long-term hourly rainfall records at six Bay Area locations.
- Run continuous simulations and evaluate outputs to address questions.
- Present the outputs in the form of charts and equations.
- Document the work in a brief technical memo.

The project was initiated in March 2017 and by the end of FY 16-17, the BASMAA Development Committee had received and discussed the initial results and analysis of the model simulations across the six selected rain gauges and a range of bioretention sizing factors, and considered and agreed upon some additional analyses to run.

In FY 17-18, the additional analyses were conducted and reviewed, and the project was completed in December 2017. In January 2018, the BASMAA Board of Directors approved the report *Green Infrastructure Facility Sizing for Non-Regulated Street Projects* as a BASMAA final product subject to the following conditions: the report is watermarked "Do Not Use, Cite, or Quote" and the report's distribution is limited to only BASMAA member Programs until companion implementation guidance is completed so the report is not used inappropriately.

The BASMAA Development Committee formed the Green Infrastructure Facility Sizing Work Group in December 2017 to develop regional guidance on how to use the modeling results to size GI measures under specific design scenarios and constraints. The Work Group continued its work through the end of FY 17-18 and is expected to complete development of guidance by the end of 2018.

C.3.j.iii. Participation in Processes to Promote Green Infrastructure

This provision requires:

> *(1) The Permittees shall, individually or collectively, track processes, assemble and submit information, and provide informational materials and presentations as needed to assist relevant regional, State, and federal agencies to plan, design, and fund incorporation of green infrastructure measures into local infrastructure projects, including transportation projects. Issues to be addressed include coordinating the timing of funding from different sources, changes to standard designs and design*

criteria, ranking and prioritizing projects for funding, and implementation of cooperative in-lieu programs.

The BASMAA activities described in this section provide compliance for MRP Permittees with this provision.

Grant – Urban Greening Bay Area

Urban Greening Bay Area is a large-scale, grant-funded effort to re-envision Bay Area urban landscapes to develop stormwater-friendly dense, green urban infrastructure that addresses challenges associated with climate change, infiltrates or captures stormwater and pollutants near their sources, and in turn, promotes improved water quality in San Francisco Bay. *Urban Greening Bay Area* is funded by an EPA Water Quality Improvement Fund grant awarded to the Association of Bay Area Governments (ABAG), a joint powers agency acting on behalf of the San Francisco Estuary Partnership (SFEP), a program of ABAG. The term of the *Urban Greening Bay Area* grant project was July 1, 2015 to June 30, 2018, but the term is being extended to December 31, 2019 and additional funding is being provided to support follow-up implementation.

BASMAA is one of the subrecipients of the grant and took the lead on two of the grant project tasks – a Regional Green Infrastructure Roundtable process and a Design Charrette, both of which were implemented between May 2016 and May 2018.

The Regional Roundtable was a two-year process, with work groups as needed, to identify and develop a list of recommendations for integrating green infrastructure and stormwater management funding and investments with future climate change and transportation investments within the region. The Roundtable included convening meetings with local, regional, and state stakeholders, agencies, elected officials, and staff to produce draft and final task reports that identified and recommended possible legislative fixes, agency agreements, consolidated funding mechanisms, and other means and actions as appropriate. The Roundtable used innovative participatory processes that included key experts, regulators, decision-makers, and other stakeholders to share information, solicit and discuss ideas and solutions, and to identify next steps (i.e., a roadmap), which were summarized in the draft and final task reports.

The Design Charrette task involved coordinating with the cities of Sunnyvale and San Mateo to conduct a Bay Area design charrette to develop cost-effective and innovative "typical" designs for integrating green infrastructure with bicycle and pedestrian improvements at roadway intersections. The overall goal of developing standardized, transferable designs was to make progress in addressing the high cost of design, implementation, operations, and maintenance that inhibits the widespread use of green infrastructure and LID features.

During FY 17-18, BASMAA's key accomplishments on the *Urban Greening Bay Area* project included:

- The Draft Roadmap of Funding Solutions for Sustainable Streets was distributed to Roundtable Participants in September 2017 and discussed at a September 19, 2017 Roundtable meeting.
- Feedback on the Roadmap was incorporated in the Final Roadmap, which was published in April 2018.
- BASMAA and SFEP began forming a Roadmap Committee to guide implementation of the Roadmap.
- The BASMAA Vice-Chair presented on the Roadmap at the May 2018 CASQA Quarterly meeting and submitted an abstract for the 2018 CASQA conference, which was accepted as an alternate presentation.

Work products of the Urban Greening Bay Area grant are posted at: http://www.sfestuary.org/urban-greening-bay-area/#planning. The Planning section includes documents related to the Regional Roundtable and the Implementation section includes documents related to the Design Charrette.

Participation and Comments

In addition to the *Urban Greening Bay Area* grant efforts described above, BASMAA submitted comments to the following agencies regarding the listed documents.

BASMAA comments to State Coastal Conservancy on *Strategic Plan 2018-2022* (October 30, 2017) (attached). Most of BASMAA's comments were incorporated (see attached excerpt of Response to Comments) into the Plan (http://scc.ca.gov/about/plan/).

BASMAA comments to California Natural Resources Agency on *Safeguarding California Plan: 2017 Update – California's Climate Adaptation Strategy* (June 23, 2017) (attached). Most of BASMAA's comments were incorporated (see attached excerpt of Response to Comments) into the *Safeguarding California Plan: 2018 Update*.

ATTACHMENT

C.3.j.iii. Participate in Processes to Promote Green Infrastructure

BASMAA comments on
State Coastal Conservancy Strategic Plan 2018-2022
(October 30, 2017)

Response to Comments (excerpt) on
State Coastal Conservancy Strategic Plan 2018-2022
(November 2017)

Alameda Countywide Clean Water Program

Contra Costa Clean Water Program

Fairfield-Suisun Urban Runoff Management Program

Marin County Stormwater Pollution Prevention Program

Napa County Stormwater Pollution Prevention Program

San Mateo Countywide Water Pollution Prevention Program

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Sonoma County Water Agency

Vallejo Sanitation and Flood Control District

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October 30, 2017

State Coastal Conservancy
spcomments@scc.ca.gov

Subject: Strategic Plan 2018-2022

State Coastal Conservancy:

On behalf of the Bay Area Stormwater Management Agencies Association (BASMAA), thank you for the opportunity to provide comments on Strategic Plan 2018-2022. BASMAA is a 501(c)(3) non-profit organization comprised of the municipal stormwater programs in the San Francisco Bay Area representing 100 agencies, including 85 cities and towns, 8 counties, and 7 special districts. BASMAA focuses on regional challenges and opportunities to improve the quality of stormwater flowing to our local creeks, the Delta, San Francisco Bay, and the Pacific Ocean.

Comments

Regional Context: San Francisco Bay Area

BASMAA recommends the Coastal Conservancy recognize more explicitly efforts occurring in the realm of stormwater management. As a result of state regulations, Bay Area agencies are embarking on significant stormwater planning efforts that will build a foundation for decades of future actions to manage stormwater more sustainably to meet water quality goals and simultaneously provide additional benefits such as increased flood resiliency, enhanced groundwater recharge, increased urban greening, and improved climate change adaptation. We recommend adding another bullet to the list of five-year efforts in the Bay Area that indicates the Coastal Conservancy will support development and implementation of multi-benefit Green Infrastructure and Stormwater Resource Plans to improve watershed health and build climate change resiliency.

Protect and Restore the Coast

Our primary concern with this section of the Strategic Plan is that the Bay Area is not explicitly included in regard to efforts to improve water quality, such as Objective 6G – Implement projects to improve water quality to benefit coastal and ocean resources. If this section is intended to address Coastal Conservancy jurisdictional areas outside of the Bay Area, then BASMAA recommends adding a similar objective to the Bay Area strategic goals. If not, then BASMAA recommends adding support for projects in the Bay Area under Objective 6G.

Climate Ready

Overall, BASMAA recommends the Coastal Conservancy better recognize and support goals and requirements of the State Water Resources Control Board and the San Francisco Bay Regional Water Quality Control Board in regard to stormwater management. As stated already, municipalities are required by state regulations to develop Stormwater Resource Plans and Green Infrastructure Plans showing how grey infrastructure will gradually be "greened" to manage stormwater more sustainably,

meet long-term water quality goals, and build climate change resiliency. These water quality mandates will require significant levels of green infrastructure implementation in the coming decades – efforts that will directly support the Coastal Conservancy's goals. Currently, however, the Strategic Plan is generally silent on many of these stormwater-related issues.

In addition to overall support and recognition of the benefits of supporting green infrastructure implementation for stormwater management and climate resiliency, as a forward-focused document, we recommend that Strategic Plan 2018-2022 recognize and capture the emerging shift from a focus on Complete Streets to Sustainable Streets. Because of the water quality drivers, communities are moving from the current focus on Complete Streets that address active transportation issues to Sustainable Streets that also incorporate green infrastructure for stormwater management – thereby reducing runoff from urbanized areas, mitigating flooding, improving water quality, recharging groundwater, reducing urban heat island impacts, improving aesthetics, reducing greenhouse gas emissions, and mitigating the effects of climate change.

A Sustainable Streets focus would take advantage of the many natural linkages between stormwater quality management, transportation planning, greenhouse gas reductions, and climate change mitigation strategies. It would also build on the ABAG / San Francisco Estuary Partnership *Urban Greening Bay Area* project (http://www.sfestuary.org/our-projects/water-quality-improvement/greenplanning/). *Urban Greening Bay Area* includes a Regional Roundtable series of working meetings where local, regional, state, and federal agencies, elected/appointed officials, and private sector and non-profit partners are developing policy solutions to integrate transportation, climate, and water quality investments. Coastal Conservancy staff have been active participants in the Regional Roundtable process.

The Climate Ready goal should include a statement of support for implementation of Green Infrastructure Plans and Stormwater Resource Plans to achieve multi-benefit climate change resiliency, water quality improvement, groundwater recharge, etc. Additionally, Objective 8C should include a concomitant statement, and Objective 11A should include a statement of the connection with water quality goals prioritized in the Water Boards' Basin Plans and related permitting efforts of the State and Regional Water Boards.

Thank you again for the opportunity to comment. If you have any questions, please contact me at 650-599-1419 or our Executive Director, Geoff Brosseau at 650-365-8620.

Sincerely,

Matt Fabry, Chair
Bay Area Stormwater Management Agencies Association

cc: Sam Schuchat, Executive Director, State Coastal Conservancy
Bruce Wolfe, Executive Officer, San Francisco Bay Regional Water Board
Tom Mumley, Assistant Executive Officer, San Francisco Bay Regional Water Board
Keith Lichten, Watershed Management, San Francisco Bay Regional Water Board
BASMAA Board of Directors

Commentor	Suggested Revisions and Comments	Section or Region	Coastal Conservancy Staff Response
Bay Area Stormwater Management Agencies Association	Regional Context: San Francisco Bay Area BASMAA recommends the Coastal Conservancy recognize more explicitly efforts occurring in the realm of stormwater management. As a result of state regulations, Bay Area agencies are embarking on significant stormwater planning efforts that will build a foundation for decades of future actions to manage stormwater more sustainably to meet water quality goals and simultaneously provide additional benefits such as increased flood resiliency, enhanced groundwater recharge, increased urban greening, and improved climate change adaptation. We recommend adding another bullet to the list of five-year efforts in the Bay Area that indicates the Coastal Conservancy will support development and implementation of multi-benefit Green Infrastructure and Stormwater Resource Plans to improve watershed health and build climate change resiliency.	SF Bay Area	We have added the following statement to the list of Major Efforts in the San Francisco Bay Area: "Support development and implementation of multi-benefit Green Infrastructure and Stormwater Resource Plans to improve watershed health and build climate change resiliency."
Bay Area Stormwater Management Agencies Association	Protect and Restore the Coast Our primary concern with this section of the Strategic Plan is that the Bay Area is not explicitly included in regard to efforts to improve water quality, such as Objective 6G – Implement projects to improve water quality to benefit coastal and ocean resources. If this section is intended to address Coastal Conservancy jurisdictional areas outside of the Bay Area, then BASMAA recommends adding a similar objective to the Bay Area strategic goals. If not, then BASMAA recommends adding support for projects in the Bay Area under Objective 6G.	SF Bay Area	We agree that the Bay Area should be explicitly included in our efforts to improve water quality and have added numerical targets for the Bay Area to objectives 6F (Complete 4 plans to improve water quality to benefit coastal and ocean resources) and 6G (Implement 8 projects to improve water quality to benefit coastal and ocean resources).
Bay Area Stormwater Management Agencies Association	Climate Ready Overall, BASMAA recommends the Coastal Conservancy better recognize and support goals and requirements of the State Water Resources Control Board and the San Francisco Bay Regional Water Quality Control Board in regard to stormwater management. As stated already, municipalities are required by state regulations to develop Stormwater Resource Plans and Green Infrastructure Plans showing how grey infrastructure will gradually be "greened" to manage stormwater more sustainably, meet long-term water quality goals, and build climate change resiliency. These water quality mandates will require significant levels of green infrastructure implementation in the coming decades – efforts that will directly support the Coastal Conservancy's goals. Currently, however, the Strategic Plan is generally silent on many of these stormwater-related issues. In addition to overall support and recognition of the benefits of supporting green infrastructure implementation for stormwater management and climate resiliency, as a forward-focused document, we recommend that Strategic Plan 2018-2022 recognize and capture the emerging shift from a focus on Complete Streets to Sustainable Streets. Because of the water quality drivers, communities are moving from the current focus on Complete Streets that address active transportation issues to Sustainable Streets that also incorporate green infrastructure for stormwater management – thereby reducing runoff from urbanized areas, mitigating flooding, improving water quality, recharging groundwater, reducing urban heat island impacts, improving aesthetics, reducing greenhouse gas emissions, and mitigating the effects of climate change. A Sustainable Streets focus would take advantage of the many natural linkages between stormwater quality management, transportation planning, greenhouse gas reductions, and climate change mitigation strategies. It would also build on the ABAG / San Francisco Estuary Partnership Urban Greening Bay Area project (http://www.sfestuary.org/our-projects/waterquality-improvement/greenplanning/). Urban Greening Bay Area includes a Regional Roundtable series of working meetings where local, regional, state, and federal agencies, elected/appointed officials, and private sector and non-profit partners are developing policy solutions to integrate transportation, climate, and water quality investments. Coastal Conservancy staff have been active participants in the Regional Roundtable process. The Climate Ready goal should include a statement of support for implementation of Green Infrastructure Plans and Stormwater Resource Plans to achieve multi-benefit climate change resiliency, water quality improvement, groundwater recharge, etc. Additionally, Objective 8C should include a concomitant statement, and Objective 11A should include a statement of the connection with water quality goals prioritized in the Water Boards' Basin Plans and related permitting efforts of the State and Regional Water Boards.	Climate Ready	We have added the following statement about multibenefit green infrastructure under our Climate Ready goal: "In urban areas, the Conservancy will continue to support multi-benefit projects that use nature to reduce stormwater runoff, mitigate flooding, improve water quality, recharge groundwater, reduce urban heat island impacts and create neighborhood open space."
Resource Conservation District of Santa Cruz County	The RCD commends the Conservancy for the manner in which it achieves its goals by providing funding and technical assistance to partners. The Conservancy's grant-making process, in particular, is an effective and efficient mechanism through which funds are allocated to priority projects and programs. The RCD urges the Conservancy to resist pressure to further modify its grants program as with what we've seen under Proposition 1. We feel that the program has historically balanced the need for competitiveness with an appreciation of the impact on applicants and the marginal value that the additional requirements tend to have. Also, a successful element of the grants program is that Conservancy staff are available to discuss projects, pre-application, and advise potential applicants on perceived competitiveness and ways in which projects or applications could be made stronger. This approach makes for better projects, and is respectful of the significant investment of resources required effective grants applications. Similarly, while there will always be room for improvement, the application document itself is reasonable for the size of grants usually awarded.	Overarching Goals	The Conservancy will continue to strive to accomplish projects and provide grants in an effective manner and will continue to provide staff resources to aid in project development and implementation. We recognize that applying for and managing grants is time consuming and challenging for nonprofits and public agencies and strive to reduce the barriers to the extent feasible given state laws and policies we have to follow.

ATTACHMENT

C.3.j.iii. Participate in Processes to Promote Green Infrastructure

BASMAA comments on
California Natural Resources Agency
Safeguarding California Plan:
2017 Update – California's Climate Adaptation Strategy
(June 23, 2017)

Response to Comments (excerpt) on
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June 23, 2017

California Natural Resources Agency

Subject: Comments on Draft *Safeguarding California Plan: 2017 Update – California's Climate Adaptation Strategy*

California Natural Resources Agency:

On behalf of the Bay Area Stormwater Management Agencies Association (BASMAA), thank you for the opportunity to provide comments on the Draft *Safeguarding California Plan: 2017 Update* (Update). BASMAA is a 501(c)(3) non-profit organization comprised of the municipal stormwater programs in the San Francisco Bay Area representing 100 agencies, including 85 cities and towns, 8 counties, and 7 special districts. BASMAA focuses on regional challenges and opportunities to improve the quality of stormwater flowing to our local creeks, the Delta, San Francisco Bay, and the Pacific Ocean.

Stormwater agencies throughout California are increasingly mandated by the State and Regional Water Boards to develop and implement stormwater management plans to achieve long-term water quality goals. This will require significant investment in green infrastructure and other approaches to capture, treat, and infiltrate stormwater runoff. We believe this work will play a significant role in supporting climate change resilience and should be appropriately addressed in the Update. As such, we appreciate the inclusion of Recommendation W-8, "Utilize low-impact development and other methods in state and regional storm water permits to restore the natural hydrograph." However, **we have some specific suggestions on how Recommendation W-8 could be improved**.

First of all, stormwater management and efforts to support implementation of green infrastructure solutions are being supported by more state agencies than just the State and Regional Water Boards. For example, the Department of Water Resources administers the Integrated Regional Water Management program and associated bond funds. Similarly, the Strategic Growth Council and State Coastal Conservancy have been on the forefront of efforts to integrate green infrastructure with other state priorities. We **recommend this section be revised to address programs and efforts that are already or will be implemented by all relevant state agencies**, not just the State and Regional Water Boards.

Secondly, we **recommend the Update make a strong connection between the Transportation and Water sectors in regard to stormwater management**. Currently, the Transportation recommendations seem focused on impacts to transportation infrastructure as a result of climate change and not on the role transportation infrastructure plays in both causing and adapting to climate change impacts related to stormwater runoff, flooding, and increased temperature.

Transportation infrastructure makes up a significant amount of the impervious surfaces in urbanized areas, with streets and parking lots often constituting 25-50% of urbanized land areas. As such, transportation infrastructure is a major contributor

to stormwater runoff and associated pollutants, as well as to urban heat islands. This will become a bigger issue with climate change as runoff may increase under more intense storms and heat islands get worse with increasing temperatures.

Transportation systems serve as the primary surface conveyance system for stormwater runoff and therefore represent a key opportunity to capture and manage stormwater before it enters underground drainage systems or receiving water bodies. Incorporating green stormwater infrastructure in roadways – such as through stormwater curb extensions, sidewalk infiltration planters, street trees, and rain gardens that capture, infiltrate, and treat runoff – creates "Green Streets" that improve water quality, reduce urban flooding, recharge groundwater, mitigate urban heat islands, and enhance the bicycle and pedestrian environment.

There is an existing statewide priority to implement "Complete Streets" to better accommodate bicycles, pedestrians, and transit and reduce greenhouse gas emissions by reducing vehicle miles traveled. Combining Green Streets and Complete Streets creates "Sustainable Streets" that are truly multi-benefit and essential to climate change resiliency in urbanized areas. As such, BASMAA **recommends revising Transportation Recommendation T-4 to include a new "Next Step" that specifically supports implementation of Sustainable Streets** as part of the State's Active Transportation Program and other relevant programs, such as the Natural Resources Agency's recent Urban Greening program. **We also recommend a partner recommendation in the Water section under Recommendation W-8**, with appropriate connections between the two to highlight the inter-related nature of these two sectors.

Similarly, **BASMAA recommends that the Plan recognize as an Ongoing Action in both the Water and Transportation sections** the Association of Bay Area Governments (ABAG) / San Francisco Estuary Partnership *Urban Greening Bay Area* project (http://www.sfestuary.org/our-projects/water-quality-improvement/greenplanning/). *Urban Greening Bay Area* includes a Regional Roundtable series of working meetings where local, regional, state, and federal agencies, elected / appointed officials, and private sector and non-profit partners are developing policy solutions to integrate transportation, climate, and water quality investments.

BASMAA also recommends the following changes to the Changing Climate Conditions Metrics section of Appendix B:

- Include metrics regarding increased urban flooding incidences caused by increased stormwater runoff volume and/or intensity
- Include a metric related to disaster funds distributed to local agencies for flood-related impacts due to increased stormwater runoff volume and/or intensity

BASMAA recommends the following changes to the Resilience Outcomes Metrics Appendix:

- Add a metric related to acreage of impervious area managed by downstream green infrastructure or volume of stormwater managed by green infrastructure – over time, municipalities will be managing more and more runoff to achieve water quality goals that should also be tracked in regard to climate resilience
- Incorporate Green Infrastructure Plans, Stormwater Resource Plans, and Watershed Management Plans in metrics related to planning documents addressing climate resiliency issues
- Change metric related to "Complete Streets features" built into transportation infrastructure projects to "Sustainable Streets features," recognizing the importance and need to incorporate green infrastructure in these improvements to provide enhanced climate change resilience.

Thank you again for the opportunity to comment. If you have any questions, please contact me at 650-599-1419 or our Executive Director, Geoff Brosseau at 650-365-8620.

Sincerely,

Matt Fabry, Chair
Bay Area Stormwater Management Agencies Association

cc: Bruce Wolfe, Executive Officer, San Francisco Bay Regional Water Board
Tom Mumley, Assistant Executive Officer, San Francisco Bay Regional Water Board
Keith Lichten, Watershed Management, San Francisco Bay Regional Water Board
Julie Alvis, Deputy Assistant Secretary, California Natural Resources Agency representative to Urban Greening Bay Area, Sustainable Streets Roundtable
BASMAA Board of Directors

Responses to Comments on the **Safeguarding California Plan: May 2017 Draft Report**

Reviewed for the

SAFEGUARDING CALIFORNIA PLAN:
2018 UPDATE
CALIFORNIA'S CLIMATE ADAPTATION STRATEGY

JANUARY 2018

CALIFORNIA natural resources AGENCY

COMMENT SUMMARY: AT A GLANCE

33 LETTERS RECEIVED

Agricultural Council of California
Alliance of Regional Collaboratives for Climate (ARCCA)
Asian Pacific Environmental Network (APEN)
Bay Area Stormwater Management Agencies Association (BASMAA)
CADMUS Group
California Association of Sanitation Agencies (CASA)
California Forestry Association
California Pan-Ethnic Health Network (CPEHN)
Center for Biological Diversity
City and County of San Francisco
Delta Stewardship Council
East Bay Regional Park District
Greenlining Institute
Gregory Nelson
Heal the Ocean
Human Impact Partners
Joint Environmental NGO Letter
Leadership Counsel for Justice and Accountability (LCJA); Center on Race, Poverty, & the Environment (CRPE); Community Alliance for Agroecology (CAA); Central Valley Air Quality Coalition (CVAQC)
Nature Conservancy
Ocean Conservancy
Pacific Forest Trust
Roy Thun
San Diego County Water Authority
San Diego Unified Port District
Santa Ana Watershed Project Authority
Sid Abma
Sierra Business Council
Southern California Gas Company (SoCalGas)
State Coastal Conservancy
Thomas J. Phillips
Union of Concerned Scientists
William Stewart (1)
William Stewart (2)

Split up and reviewed as:

500+ INDIVIDUAL COMMENTS

- **82** Overall Plan
- **28** Emergency Management
- **60** Energy
- **25** Land Use and Community Development
- **82** Public Health
- **37** Transportation
- **34** Agriculture
- **39** Biodiversity and Habitat
- **55** Forests
- **37** Ocean and Coast
- **43** Water

Resulting in:

OVER 500 RESPONSES
from State Agency Staff;

OVER 300 REVISIONS
to the May 2017 draft; and

2 ADDITIONAL CHAPTERS
included in the final Plan.

Transportation Chapter Comments

Source	*Comment Summary*	*Response*	*Edit Location*
Bay Area Stormwater Management Agencies Association	Incorporating green stormwater infrastructure in roadways, such as through stormwater curb extensions, sidewalk infiltration planters, street trees, and rain gardens that capture, infiltrate, and treat runoff, creates "Green Streets" that improve water quality, reduce urban flooding, recharge groundwater, mitigate urban heat islands, and enhance the bicycle and pedestrian environment.	We agree; this change was made.	T-4
Bay Area Stormwater Management Agencies Association	T-4 should include a new "next step" that specifically supports implementation of Sustainable Streets as part of the State's Active Transportation Program and other relevant programs, such as the Natural Resources Agency's recent Urban Greening Program.	A definition of "Sustainable Streets" would be needed to make this change.	N/A
Union of Concerned Scientists	The Update should clarify which state agency will be taking on each Next Step and Ongoing Action including a specific timeline for initiation and completion.	This is not within the scope of the document.	N/A
Union of Concerned Scientists	Recommendation T-1: The Update should recognize efforts from local and regional groups such as BCDC and MTC's sea level rise mapping for the Bay Area as well as commit to a process to share this data.	T-1.2 was added to mention working with local and regional groups, where applicable; this is also addressed in T-2.4.	T-1.2
Union of Concerned Scientists	Recommendation T-1: "Next Steps" should include the California State Transportation Agency or Caltrans to integrate the various existing and nearly complete vulnerability assessments for different transportation assets and systems.	We agree; this change was added.	T-1.2
Union of Concerned Scientists	Recommendation T-4: State transportation agencies should coordinate with the private sector in addition to local, regional, and federal partners to ensure consistency and compatibility of the solutions being implemented. Caltrans should also review the Highway Design Manual for potential updates based on the results of its vulnerability assessments and other relevant information.	Where private sector adaptation plans are addressed at a local level, the State encourages coordination.	T-2; T-5
Union of Concerned Scientists	Recommendation T-5: This section should identify specific solutions to address equity issues for transportation systems and partner with vulnerable populations in transportation decisions. For instance, differences in transportation access between urban and rural areas, or across vulnerable groups (e.g., elderly, low-income, and disabled communities), could influence just how resilient a community is to climate change.	We agree; this change was added.	T-5.3

TRANSPORTATION

Source	*Comment Summary*	*Response*	*Edit Location*
ARCCA	T-4: We strongly support T-4 and the focus on resilience, mobility, and accessibility – not just infrastructure and concrete. Strategies like T-4.6 can help save lives, and we recommend that transit providers work with public health agencies to develop emergency programs such as free rides during extreme heat days and heat waves. Providing real-time bus arrival information, in combination with passive shading, can also help improve the comfort of riders during hot days.	Acknowledged, thank you.	N/A
Port of San Diego	Due to the location of ports along California's coasts and harbors, they are susceptible to rising sea levels and severe storms. While the Plan identifies policies and strategies to "Improve transportation system resiliency" (T-4), we are concerned the 2017 Update does not adequately distinguish and prioritize water-dependent and water-related uses that are important economic engines for California. These uses may require specific structural strategies to become resilient to climate change impacts. We highly encourage the CNRA to include additional policies and strategies in the Plan that differentiate and prioritize water-dependent and water-related uses from non-water dependent/related uses and the transportation infrastructure, specifically water-based systems, upon which they rely.	Noted; T-1 was edited to include sea ports.	T-1.1
Bay Area Stormwater Management Agencies Association	The update should make a strong connection between the Transportation and Water sectors regarding stormwater management. Currently, the Transportation recommendations seem focused on impacts to transportation infrastructure because of climate change and not on the role transportation infrastructure plays on in both causing and adapting to climate change impacts related to stormwater runoff, flooding, and increased temperature. Transportation infrastructure makes up a significant amount of the impervious surfaces in urbanized areas, with streets and parking lots often constituting 25-50% of urbanized land areas. As such, transportation infrastructure is a major contributor to stormwater runoff and associated pollutants, as well as to urban heat islands.	Language was added to T-4.4a to investigate transportation infrastructure that leads to other benefits such as stormwater management and flood prevention.	T-4.4a

Source	Comment Summary	Response	Edit Location
	drinking water augmentation," are already in use in proposed potable reuse projects.		
Bay Area Stormwater Management Agencies Association	W-8 Include other state agencies in support of implementing green infrastructure solutions, such as the Department of Water Resources Integrated Regional Water Management program and associated bond funds. Similarly, the Strategic Growth Council and State Coastal Conservancy have been on the forefront of efforts to integrate green infrastructure with other state priorities. Revise this section to address programs and efforts that are already or will be implemented by all relevant state agencies, not just the State and Regional Water Boards.	A bullet was added to W-8 on Strategic Growth Council and State Coastal Conservancy Programs for natural infrastructure.	W-8 ongoing actions
San Diego County Water Authority	W-3 Include Next Step that promotes holistic water supply diversification through potable reuse and ocean desalination permit streamlining. The Plan Update should identify all viable local supply sources including ocean desalination and potable reuse as diversification strategies. "The State Water Resources Control Board will provide efficient permitting of ocean desalination facilities under the California Ocean Plan (and potable reuse facilities).	The introductory text to W-3 and its first ongoing action are general to include all viable local sources, including desalination and potable reuse. A sentence was added to the W-3 opening paragraph to better emphasize this.	Introduction to W-3
San Diego County Water Authority	W-3 Include Next Steps that elevate, promote and sustain Integrated Regional Water Management. The diversification strategy fails to recognize ongoing actions in IRWM that have been vital in making regions across the state more resilient to changing climate. a) DWR will publish findings of the "Draft 2015 IRWM Strategic Plan" and implement recommendations included within. b) DWR shall integrate the recommendation of the IRWM Strategic Plan and recommendations into the California Water Plan Update 2018 and the California Water Action Plan c) DWR, the State Water Resources Control Board, the legislature, and the Governor should work together to address long-term funding support for IRWM.	Noted; IRWM is mentioned in W-8. For brevity, these changes were not included; please refer to the IRWM program.	N/A
San Diego County Water Authority	W-3 Recognize individual agencies' or regions' unique water supply conditions and differences. The Water Authority urges state agencies to provide a mechanism for a thoughtful and deliberative process inclusive of broad stakeholders and regional experts to develop water use targets that account for differences in local conditions.	W-3 is meant to be general to respect these differences and unique water supply conditions. The introduction to W-3 was revised to better emphasize this point.	Introduction to W-3

Source	Comment Summary	Response	Edit Location
Santa Ana Watershed Project Authority	W-2 and L-3 are closely related. Emphasizing this connection and drawing attention to CA-6 could make for a stronger draft.	The cross-sector icons in the final version of Safeguarding California aim to better emphasize connections between recommendations.	Cross-sector icons
ARCCA	W-4: We recommend a greater consideration of saltwater intrusion in the Delta and its effects on drinking water, Delta residents, and agriculture.	The introductory text to W-4 mentions the threat of saltwater intrusion to drinking water.	N/A
The Nature Conservancy	Hotter and drier conditions may result in increased water demand being met from groundwater supplies, which requires electricity to pump. It may also result in less available hydropower, with the expectation that power plants will fill the energy gap at a time when higher temperatures could reduce their efficiency. The Plan briefly mentions this nexus in the Energy chapter, by highlighting the need for more research in this area, and in the Water chapter, by mentioning the Water-Energy grant programs. A more coordinated discussion of how the sectors and respective departments are, and plan to enhance working together and the anticipated benefits of closer collaboration would be helpful.	Noted; although this issue is mentioned in the Water and Energy chapters, it may be better addressed collaboratively in conversations between state agencies and not within Safeguarding California.	N/A
Santa Ana Watershed Project Authority	W-5 and P-5/P-9 are closely connected. This connection should be emphasized in the text while also calling attention to CA-6.	The cross-sector icons in the final version of Safeguarding California aim to better emphasize connections between recommendations.	Cross-sector icons
Delta Stewardship Council	The Delta Stewardship Council is committed to the development of a Delta governance strategy for climate adaptation projects; providing policy leadership on resilient infrastructure; creating new funding sources for adaptation and resilience; establishing and providing a resilience technical services team; and expanding of the Delta's network of natural infrastructure.	Noted; thank you for your comment. Edits were made to the ongoing actions for W-4 to reflect the work of the Delta Stewardship Council.	W-4 ongoing actions
Bay Area Stormwater Management Agencies Association	Ongoing actions should include the Association of Bay Area Governments (ABAG)/San Francisco Estuary Partnership Urban Greening Bay Area Project. Urban Greening Bay Area includes a Regional Roundtable series of working meetings where local, regional, state, and federal agencies, elected/appointed officials, and private sector and non-profit partners are developing policy solutions to integrate transportation, climate, and water quality investments.	We commend this effort, but this plan is focused on what State Agencies are doing to adapt to climate change.	N/A