SAN MATEO COUNTYWIDE

Water Pollution Prevention Program

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# FY 2025-2026

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# ANNUAL REPORT

## SEPTEMBER 30, 2026

# Credits

This report is being submitted by the participating agencies in the

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County of San Mateo
San Mateo County Flood and Sea Level Rise Resiliency District
City of South San Francisco
Town of Woodside

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*Prepared for:*

**San Mateo Countywide Water Pollution Prevention Program (SMCWPPP)**
**555 County Center, Redwood City, CA 94063**

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

*Prepared by:*

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# LIST OF ACRONYMS

| | |
|---|---|
| **AGOL** | ArcGIS On-line |
| **BAMSC** | Bay Area Municipal Stormwater Collaborative |
| **BASMAA** | Bay Area Stormwater Management Agencies Association |
| **BAWSCA** | Bay Area Water Supply and Conservation Agency |
| **BMPs** | Best Management Practices |
| **BSM** | Biotreatment Soil Mix |
| **BWM** | Biotreatment Wood Mulch |
| **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 |
| **CCAP** | Climate Change Adaptation Plan |
| **CE** | Continuing Education |
| **CII** | Commercial/Industrial/Illicit Discharge |
| **CNRA** | California Natural Resources Agency |
| **CoC** | San Mateo County Continuum of Care Steering Committee |
| **DIY** | Do-It-Yourself |
| **DO** | Dissolved Oxygen |
| **DPR** | Department of Pesticide Regulation |
| **ECWG** | RMP Emerging Contaminant Work Group |
| **EHS** | San Mateo County Environmental Health Services |
| **EO** | Executive Officer |
| **EPA** | Environmental Protection Agency |
| **ERP** | Enforcement Response Plan |
| **FSLRRD** | San Mateo County Flood and Sea Level Rise Resiliency District |
| **FY** | Fiscal Year |
| **GSRD** | Gross Solids Removal Device |
| **GI** | Green Infrastructure |
| **GILE** | Green Infrastructure Leadership Exchange |
| **GIS** | Geographic Information System |

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|---|---|
| **GSI** | Green Stormwater Infrastructure |
| **HHW** | Household Hazardous Waste |
| **HSA** | San Mateo County Human Services Agency |
| **HUD** | United States Department of Housing and Urban Development |
| **IMR** | Integrated Monitoring Report |
| **IPM** | Integrated Pest Management |
| **JPA** | Joint Powers Authority |
| **LID** | Low Impact Development |
| **MOU** | Memorandum of Understanding |
| **MPC** | Monitoring and Pollutants of Concern |
| **MPCP** | Moderate PCBs-Contaminated Property |
| **MRP** | Bay Area Stormwater NPDES Municipal Regional Permit |
| **MS4** | Municipal Separate Storm Sewer System |
| **NDS** | New Development Subcommittee |
| **NPDES** | National Pollutant Discharge Elimination System |
| **O&M** | Operations and Maintenance |
| **OFEE** | Oil-filled Electrical Equipment |
| **OICMP** | Old Industrial Area Pollutant Control Measure Plan |
| **OVTA** | On-land Visual Trash Assessment |
| **OWOW** | Our Water Our World |
| **PCBs** | Polychlorinated Biphenyls |
| **PG&E** | Pacific Gas and Electric |
| **PIP** | Public Information and Participation |
| **PIT** | Point-in-Time |
| **PLDA** | Private Land Drainage Area |
| **PMU** | Priority Margin Unit |
| **POC** | Pollutants of Concern |
| **POTW** | Publicly Owned Treatment Works (sewage treatment plants) |
| **QAPP** | Quality Assurance Project Plan |
| **QSD/QSP** | Qualified Stormwater Pollution Prevention Plan Developer/Practitioner |
| **RAA** | Reasonable Assurance Analysis |
| **RMP** | San Francisco Estuary Regional Monitoring Program |
| **ROW** | Right of Way |

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|---|---|
| **RV** | Recreational Vehicle |
| **SAP** | Sampling and Analysis Plan |
| **SCVURPPP** | Santa Clara Valley Urban Runoff Pollution Prevention Program |
| **SFEP** | San Francisco Estuary Partnership |
| **SFEI** | San Francisco Estuary Institute |
| **SMCOE** | San Mateo County Office of Education |
| **SMCWPPP** | San Mateo Countywide Water Pollution Prevention Program |
| **SOP** | Standard Operating Procedure |
| **SSMP** | San Mateo Countywide Sustainable Streets Master Plan |
| **STLS** | Small Tributaries Load Strategy |
| **SWC** | Stormwater Committee |
| **SWRP** | Stormwater Resource Plan |
| **SWPPP** | Stormwater Pollution Prevention Plan |
| **TAC** | Technical Advisory Committee |
| **TIP** | Trash Inspection Program |
| **TMA** | Trash Management Area |
| **TMDL** | Total Maximum Daily Load |
| **UCMR** | Urban Creeks Monitoring Report |
| **VSQG** | Very Small Quantity Generator |
| **WARP** | Workgroup Advancing Regional Projects |
| **WLA** | Waste Load Allocation |
| **WMA** | Watershed Management Area |
| **WOW** | Watching Our Watersheds |
| **WQIF** | Water Quality Improvement Fund |
| **WQO** | Water Quality Objective |
| **WY** | Water Year |

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# SECTION 1
# INTRODUCTION

## BACKGROUND

This FY 2025/26 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 2025/26. SMCWPPP's activities benefit 22 municipal agencies in San Mateo County: 15 cities, five towns, the County of San Mateo, and the San Mateo County Flood and Sea Level Rise Resiliency District (FSLRRD, also referred to as OneShoreline). Each of these agencies also separately submits an individual Annual Report to the San Francisco Bay Regional Water Quality Control Board (Water Board) focusing on that agency's stormwater management activities during FY 2025/26.

The organizational structure of SMCWPPP is shown in Figure 1-1, at the end of this section. 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 transportation, stormwater runoff, and air 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 San Mateo County municipalities 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 Stormwater Committee

The C/CAG Stormwater Committee provides policy and technical advice and recommendations to the C/CAG Board of Directors and direction to technical subcommittees on all matters relating to stormwater management and compliance with associated regulatory mandates from the State Water Resources Control Board and San Francisco Bay Regional Water Quality Control Board. A significant role of the C/CAG Stormwater Committee regarding the Countywide Program is engaging in State legislation related to stormwater management and water quality regulations.

[1]NPDES Permit No. CAS612008 (Order No. R2-2022-0018) dated May 11, 2022. The MRP has a five-year term: effective July 1, 2022 and expires June 30, 2027, and has been administratively extended through June 30, 2028.

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The Stormwater Committee currently has three Ad-hoc Workgroups, including the longstanding MRP Implementation Workgroup, the Funding and Financing Ad-hoc Workgroup, and the Workgroup Advancing Regional Projects (WARP), which was established at the February 2022 Stormwater Committee with the responsibilities to advance the development of a Regional Collaborative Program to support regional-scale stormwater management via multi-jurisdictional projects and programmatic implementation of distributed green infrastructure.

### *Membership*

The Stormwater Committee is comprised of one director-level (or equivalent) representative (and one optional alternate) from each San Mateo County municipality, with decision-making authority and primary responsibility for implementing stormwater management programs within their jurisdictions, and one non-voting executive management representative (and one optional alternate) from the Water Board staff, all appointed by title or by name 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;
- Approve staff recommendations to submit countywide and regional compliance documents on behalf of C/CAG's member agencies for activities performed via C/CAG through SMCWPPP or the BAMSC Steering Committee;
- Convey relevant program and compliance information and direction to appropriate staff and departments within their agencies;
- Form ad-hoc work groups to address 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 MRP;
    - Permit requirements, especially those related to new and redevelopment, GI, monitoring, and pollutants of concern, including trash, mercury, PCBs, pesticides and emerging contaminants;
    - Training and technical support needs for municipal staffs; and
    - Legislation and statewide policy issues impacting San Mateo County municipalities.

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### *Meetings*

The Stormwater Committee met six times during FY 2025/26 (August, September, November, February, March, April) to assist with planning and organizing SMCWPPP's stormwater management activities including MRP compliance actions. During these meetings Committee members received presentations, updates, and took actions on various stormwater-related issues. Appendix 1 includes a table summarizing attendance at the Stormwater Committee meetings held during FY 2025/26. Stormwater Committee meeting agendas, minutes, and presentations are summarized below and can be found on the Committee's website.

- In August, reviewed and approved recommendation to update the Stormwater Committee Guidelines to add a primary and alternate seat designated for OneShoreline and make editorial edits. Approved Final Draft Regional Firefighting Discharges Report. Approved Final Draft Regional Supplemental for new and Redevelopment. Received presentation on Integrated Safe Routes to School and Green Streets Pilot Program Summary Report.
- In September, reviewed and approved SMCWPPP Fiscal Year 2024-25 Annual Report. Received presentation on Fiscal Year 2025-26 EOA scope of services to the Countywide Stormwater Program. Received presentation on the Final OneWatershed Climate Resilience Framework Report.
- In November, nominated Committee Chair (Robert Ovadia, Town of Atherton) and Vice Chair (Maziar Bozorginia, City of Brisbane) for the Stormwater Committee. Received presentation on current Polychlorinated Biphenyls related activities being led by the Countywide Stormwater Program. Provided input on potential C/CAG federally directed spending requests for Fiscal Year 2027 related stormwater projects and programs.
- In February, reviewed and approved a recommendation to the BAMSC Steering Committee authorizing the submittal of the Final Draft Fiscal Year 2025-26 Annual Report Forms to the Water Board. Received presentation on the operations and monitoring for the Orange Memorial Park Regional Stormwater Capture Project in South San Francisco. Received presentation on implementation of the MRP 3.0 requirements related to emergency firefighting discharges. Received presentation on the MRP 3.0 requirements related to MS4 map updates.
- In March, reviewed and recommended to certify and submit the SMCWPPP Water Years 2020-2025 Integrated Monitoring Report (IMR) to the Water Board. Reviewed and recommended to certify and submit the SMCWPPP Updated PCBs and Mercury TMDL Implementation Plan and Reasonable Assurance Analysis (RAA) report to the Water Board. Reviewed and approved recommendation for Bay Area Municipal Stormwater Collaborative to submit comments on proposed MRP 4.0 low priority provisions to the Water Board. Received presentation of San Bruno Creek OneWatershed Pilot Study.
- In April, received presentation on annual updates from California Stormwater Quality Association. Received information on the status of compliance with the Municipal Regional Stormwater Permit C.10 trash requirements. Received information on the preliminary Fiscal Year 2026-27 Stormwater Program Budget. Received information on the development of the Regional Climate Change Adaptation Report.

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## Program Director and Stormwater Program Specialist

C/CAG's SMCWPPP Program Director oversees the overall Countywide Program, serving as staff to the C/CAG Board and Stormwater Committee and liaison among San Mateo County municipalities, technical consultants, committees, the Bay Area Municipal Stormwater Collaborative (BAMSC), the California Stormwater Quality Association (CASQA), and Water Board staff. The Program Director represents San Mateo County municipalities at regional and statewide meetings and manages technical consultants that support programmatic activities.

### *Participation in Relevant Regional and Statewide Organizations and Activities*

In addition to providing regular staff support, agenda reports, and presentations to the C/CAG Board and the Stormwater Committee, Countywide Program staff participated in the following activities during the FY 2025/26 reporting year:

- BAMSC: The Bay Area Municipal Stormwater Collaborative is an informal collaborative of Phase I and Phase II Municipal Stormwater Programs. The Program Director participated in Steering Committee meetings and subcommittee meetings and workgroups focused on MRP implementation. The Program Director also participated in several BAMSC workgroups formed for the purposes of discussing requirements of the next iteration of the MRP (i.e., MRP 4.0).
- Bay Area One Water Network: The Program Director is a member of the Network planning team and participates in workshop discussions focusing on integrated "one water" urban water systems in the San Francisco Bay Area, including the session held on September 5, 2025.
- CASQA: The Program Director attended and presented at the 2025 annual CASQA conference (see details below). The Program Director has also served on the CASQA Board of Directors since 2024 and continued to serve as Vice Chair of the Board in Fiscal Year 2025-26.
- Green Infrastructure Leadership Exchange: The Program Director continued participating in the Green Infrastructure Leadership Exchange (GILE).
- FY 2025/26 Presentations/Actions/Activities by the Program Director:
    - Presented at the 2025 CASQA Conference, September 15, 2025, in Pasadena on the topic of "Climate Change, Resiliency, and Sustainability", featuring a discussion on the San Mateo County OneWatershed Framework approach in the San Bruno Creek Watershed. The presentation emphasized the process of integrating a community-led planning process with local agency coordination for near- and long-term adaptive capacity.
    - Participated in a panel discussion at the September 5, 2025 Bay Area One Water Network meeting on the topic of green infrastructure and water reuse.
    - Presented to the San Mateo County Fire Chiefs Association alongside EOA, Inc. on September 4, 2025 and April 1, 2026 regarding the need to coordinate on emergency firefighting trainings and standard operating practices identified in the BAMSC Regional Firefighting Discharges Report submitted to the Regional Water Board in September 2025.
    - Met with Federal Congressional leaders, including Senator Padilla's Office on March 11, 2026 and Congressmember Mullin's Office on March 12, 2026, to advocate for federal funding for GSI projects in San Mateo County, focusing on earmark requests for $1.8M in funding for sustainable streets projects in East Palo Alto, Daly City, and South San

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Francisco and $1.5M for advancing SMCWPPP's OneWatershed effort to develop tools and resources to support local agencies with integrated climate resilience and watershed planning.

- Submitted a comment letter on April 24, 2026 on the Regional Water Board's Proposed Tentative Resolution and Draft Advance Restoration Plan for Indicator Bacteria Impairment at San Mateo County Beaches.

### *Grant-funded Project Activities*

The Program Director continued advancing several grant-funded projects in support of SMCWPPP's countywide planning and implementation efforts.

Watching Our Watersheds

In FY 2022/23, the Program Director worked with the participating BAMSC countywide stormwater programs partnering on the Watching Our Watersheds (WOW) Regional Trash Monitoring Program to submit a revised Work Plan to Region 9 US EPA to support the US EPA's funding recommendation to award the project $3,366,000 under the Fiscal Year 2024 San Francisco Bay Water Quality Improvement Fund program, with $3,366,000 in in-kind matching contributions from the countywide program partners. The Program Director submitted the revised Work Plan in March 2023 and received a notice of award from the US EPA on June 28, 2023. In August 2023, C/CAG issued a Request for Proposal and selected a consultant team to implement the WOW project. The consultant team began implementing the project on December 15, 2023.

The consultant team completed the following match and grant funded tasks and deliverables in FY 2025/26:

- Developed and submitted two semi-annual progress reports to EPA on October 10, 2025 and April 30, 2026 to EPA.
- Submitted Annual Federal Financial Report to EPA on September 30, 2025.
- Single-Use Plastic Source Control Ordinance Effectiveness Evaluation Project
  - The final report titled "*Litter Characterization to Inform Single-Use Plastic Food Service Ware Ordinance Implementation*" was submitted to EPA in April 2026.
- Anti-Litter Campaign
  - Media advertising was conducted from September 2025 to December 2025 in catchment areas around five outfalls where trash monitoring is being conducted. These outfalls are located in the Cities of Dublin, Pacheco, Half Moon Bay, San Jose, and Suisun City.
  - The Final Campaign Summary and Evaluation Report was submitted to EPA in April 2026.
- Streamlining On-land Visual Trash Assessment (OVTA) Methods
  - OVTA data collected across the region were statistically evaluated to inform future OVTA programs, including the number of assessments, the spatial density of sites, and seasonality. Data results and analyses were presented to WOW PMT in February 2026.
  - A draft technical report, "*A Statistical Evaluation of On-land Visual Trash Assessment (OVTA) Data to Inform Future Demonstrations of the Low Trash Generation Stormwater*

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*Goal*," was sent to the WOW PMT for review in May 2026. A revised draft report will be sent to the Water Board and EPA sometime in August 2026.

- Trash Monitoring
  - Prepared and facilitated Trash Technical Advisory Group (TAG) meeting (TAG meeting #6) on May 27, 2026. The purpose of the meeting was to present the findings from trash outfall and trash receiving water monitoring documented in the Integrated Monitoring Report (IMR) that was submitted to the Water Board on March 31, 2026 and to the EPA in April 2026. A summary of a pilot study to test an alternative method to conduct trash outfall monitoring using video imaging and artificial intelligence was also presented at the meeting.
  - Outfall trash monitoring: To date, a total of 102 samples have been collected at 11 sites over three years of monitoring. Results from the first two years of monitoring (WY 2024 and WY 2025) were described in the IMR.
  - Receiving water trash monitoring: To date, 36 storm events were sampled at six sites over two years of monitoring. Results from the first year of monitoring (WY 2025) were described in the IMR.

<u>OneWatershed Climate Resilience Framework and Community-Led Plan</u>

In 2023, the Program Director worked with a group of regional partners in San Mateo County to submit a successful grant application under the Integrated Climate Adaptation and Resilience Program administered by the Governor's Office of Planning and Research for an Adaptation Planning Grant Program grant of $649,648 to develop the San Mateo County OneWatershed Climate Resilience Framework and Community-Led Plan, an equitable climate adaptation approach focused on integrated watershed management. C/CAG received the notice of award on June 8, 2023 and the grant agreement was executed in October 2023. Contracts with Geosyntec and Climate Resilient Communities, the two consultants for the OneWatershed Framework Project, were executed in November and December, and the project began in December 2023.

A Technical Advisory Committee and Equity Priority Community Group (EPC Workgroup) were formed to help advise on the primary project deliverables, including development of a Project Work Plan, Community Engagement Plan, a OneWatershed Data Inventory and Dashboard, the OneWatershed Framework Approach and Report, and a series of Community Vulnerability Assessment Workshops and the final preparation of the San Bruno Creek OneWatershed Pilot Study.

The *OneWatershed Framework Report* (April 24, 2025) is intended to support the collaborative efforts of San Mateo County agencies and interested parties, working across jurisdictions, organizations and watershed boundaries to achieve long-term and strategic climate resilience. The Report is designed to employ a community co-creation approach to listen to the lived experiences of community members and weigh this input along with available quantitative climate hazard exposure data and projections. The Report evaluates different climate hazards at a countywide scale and supports watershed-level pilot studies and planning efforts. The hazards evaluated in the Report are Sea Level Rise, Extreme Heat, Extreme Precipitation, Drought, and Wildfire.

Additional Project outputs beyond the OneWatershed Framework Report include a OneWatershed Data Inventory of GIS data related to water infrastructure and resource assets as well as future climate hazard exposure data; a OneWatershed Dashboard integrated with C/CAG's existing Green Infrastructure Tracking and Mapping Tool; and a OneWatershed Pilot Study for the San Bruno Creek Watershed. As part

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of the pilot study, a selected priority resilience infrastructure project will be developed into a concept design to leverage for future funding. The final phase of the community engagement strategy concluded with two workshops in August/September 2025, where the project partners presented the findings from the Community-Led Vulnerability Assessment, modeling the OneWatershed Framework methodology, and community members and partners had a chance to respond to the draft pilot study climate hazard maps and proposed project types that are referenced in the pilot study.

The San Bruno Pilot Study was the final deliverable of the OneWatershed Project and is intended to apply the OneWatershed Framework in a real-world setting. A group of residents and partners identified ten projects during the Community Vulnerability Assessment workshop series. The highest ranking project was a multi-benefit LID or green street project near an elementary school. The project team will continue to search for funding opportunities to advance the concept design. The overall project was completed in January 2026.

<u>San Bruno I-280/I-380 Regional Stormwater Capture Project Member Directed Funding Request (U.S. EPA STAG)</u>

Under the Fiscal Year 2022/23 National Defense Authorization Act with Congresswoman Jackie Speier's leadership, C/CAG secured $2.4 million in a Member Directed Funding Request to fund planning and design for the San Bruno Regional Stormwater Capture Project at I-280/I-380. The project, which was originally envisioned through a concept design as part of C/CAG's Countywide Stormwater Resource Plan, would manage an estimated 226 acre-feet of stormwater annually from 942 acres in the San Bruno Creek Watershed via a storm drain diversion into a large subsurface retention basin underneath the existing Caltrans maintenance yard at the interchange. The project is projected to provide full infiltration of captured stormwater into an actively used underlying groundwater basin (Westside Groundwater Basin) and would also provide some relief on the downstream storm drain system during wet weather. During Fiscal Year 2024/25, the project team obligated the $2.4 million in funding with EPA and amended the consultant contract with the City to complete the environmental phase and design the project. The project team also developed the Hydrology and Hydraulics Study Report, drafted and revised the Preliminary Geotechnical and Materials Report, prepared environmental documents, developed and finalized the draft Initial Site Assessment Report. In Fiscal Year 2025/26 the project team adjusted the design to move the environmental document from an Initial Study/Mitigated Negative Declaration to a Categorical Exemption under CEQA, to help Caltrans expedite review and finalizing the Project Approval and Environmental Document phase. The project team anticipate having 65% designs ready by October 2026.

<u>Sustainable Streets Design Pilot Program Grant (U.S. DOT) Community Project Grant Program</u>

Under the Fiscal Year 2023/24 Federal Appropriations Budget, the Program Director worked with C/CAG to secure $850,000 in federal funding via the U.S. Department of Transportation Community Project Grant Program to fund the proposed Sustainable Streets Design Pilot in San Mateo County. The pilot design project will support planning and design of three priority sustainable streets projects identified and conceptualized in the 2021 Countywide Sustainable Streets Master Plan (i.e., projects focused on underserved and at-risk communities in East Palo Alto, Colma, Daly City). In FY 2025-26, the project sponsor submitted final applications for funding through Caltrans to advance towards procuring consultants for design/planning. Additonally, C/CAG staff submitted for $1.8 million in FY 2027 Federal earmark funding to advance the East Palo Alto and Daly City projects into construction phase and to conduct planning, design and environmental review for the Grand Avenue Sustainable Street Project in South San Francisco. Congressmen Mullin included $500,000 in funding for these projects in the Transportation, Housing and Urban Development appropriations bill for 2027 and passed a continuing resolution to maintain current funding levels during the Senate appropriations process.

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Caltrans Community Cleanup and Employment Pathway Grant

In FY 2025/26, C/CAG executed an agreement with Caltrans for the Clean California Community Cleanup and Employment Pathway Grant Program in an amount not to exceed $501,462 for C/CAG's proposed Green Workforce for Clean and Sustainable Streets in San Mateo County. The project will support litter abatement and community cleanups in up to eleven San Mateo County jurisdictions in the vicinity of El Camino Real and other state highway areas impacted by litter. The project addresses historically underserved communities as designated by the CalEnviroScreen 4.0 dataset and will be conducted in partnership with the San Jose Conservation Corps and Climate Resilient Communities.

PCBs TMDL Special Studies and Imlementation Project

In FY 2024/25, the Program Director worked with the participating BAMSC countywide stormwater programs to develop an application to the EPA San Francisco Bay Program Office for $10.57 million in Fiscal Year 2024 grant funds for the Regional PCBs Total Maximum Daily Load (TMDL) Special Studies and Implementation Project. The application was submitted by the City of San Pablo, which is serving as the fiscal agent on behalf of BAMSC programs, and was awarded in December 2025. Following a competitive solicitation process, the City of San Pablo contracted with a consultant team in June 2025. The PCBs Speical Studies Project includes: Regional PCBs Monitoring Programs (establishment of four fixed monitoring stations, including one in San Mateo County and use of canine detection dogs to investigate source properties); Phase II PCBs Program Development and Monitoring; and Phase I PCBs Monitoring, Mapping, and Control Measure Planning. During FY 2025/26, the constultant team developed Workplans to implement the project tasks. The San Mateo County Workplan focuses on monitoring in old industrial areas to identify source properties where abatement will result in reductions in PCBs loading to MS4s. The San Mateo Workplan also includes improvements to existing GIS data, support to municipalities on outreach to property owners, and support for enhanced O&M actions. Implementation of the San Mateo Workplan began in FY 2025/26 with the collection of approximately 75 sediment samples and one stormwater sample for PCBs analysis. More information is provided in Section 11/12 of this report.

Targeted Approach to Reducing PCBs

On March 3, 2026, C/CAG submitted an application to the EPA San Francisco Bay Program Office for $3.805 million in grant funds for the proposed Targeted Approach to Reducing PCBs (TARP Project) in San Mateo County, which expands on the PCBs TMDL Special Studies Implementation Project. The application also includes $1.27 million in planned local match to be provided primarily by through in-kind consultant services through SMCWPPP over the course of approximately five years. The primary goal of the proposed project is to support enhanced PCBs monitoring and BMP implementation to support the San Mateo County permittees comply with MRP provisions related to the PCBs and mercury Total Maximum Daily Load requirements. In May 2026, EPA announced that the TARP Project was selected for funding. SMCWPPP is currently developing a request for proposals to procure a consultant to assist with project implementation.

## NPDES Technical Advisory Committee and Subcommittees

The Stormwater Committee provides direction to and receives feedback and recommendations from the NPDES 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 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 has not met formally since 2015 and did not meet in FY

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2025/26 but received regular emails from the Program Director and staff with updates on key permit compliance topics and occasional requests for feedback.

SMCWPPP has 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 2025/26 and are discussed further in the remaining sections of this report.

## Flood and Sea Level Rise Resiliency District (OneShoreline)

AB 825 (Mullin) became law on January 1, 2020, officially revamping the San Mateo County Flood Control District to become the San Mateo County Flood and Sea Level Rise Resiliency District (FSLRRD also known as OneShoreline). OneShoreline is intended to address sea level rise, coastal erosion, flooding, and regional stormwater management. As such, assuming OneShoreline can secure long-term, sustainable funding during the startup period, it will likely play a key role in helping to design, build, and maintain regional stormwater facilities that will help achieve water quality goals in the MRP. The initial three-year funding commitment by the County and cities/towns ($4.5 million over three years) was an important step forward for achieving integrated and climate resilient water management in San Mateo County. Since its inception, OneShoreline has secured a number of grants to sustain its operations beyond the initial start-up period for the agency. In FY 2024/25, coinciding with the third and final year of the initial funding commitments from C/CAG's member agencies, OneShoreline solicited a second round of operational funding commitments from the County/Cities/Towns at the same level for the next three years through December 2028 with the hope of developing a viable long-term funding plan by that date.

Consistent with the authorizing legislation, the C/CAG Board appoints the five city/town elected officials to the OneShoreline governing board. The County Board of Supervisors appoints the two County Supervisor seats. The seven governing board members currently representing the different geographic areas in the county as of June 2026 are:

- North: Donna Colson, City of Burlingame
- Central: Adam Rak, City of San Carlos
- South: Kaia Eakin, City of Redwood City
- Coast: Debra Ruddock, City of Half Moon Bay
- At-Large: Marie Chuang, Town of Hillsborough
- Coast Supervisor: Ray Mueller
- At-Large Supervisor: Lisa Gauthier

Len Materman (former San Francisquito Creek Joint Powers Authority Executive Director) was brought on as Chief Executive Officer in May 2020. Information on OneShoreline can be found at its website, www.oneshoreline.org. OneShoreline inherits the MRP permittee responsibilities of the prior Flood Control District, with those duties currently contracted to the County Department of Public Works for implementation and reporting. OneShoreline was included as a new permittee under the MRP with its reissuance in 2022. In addtion to participating in SMCWPPP as a permittee implementing relevant requirements for flood control districts and non-population-based permittees, OneShoreline has been an active partner in several initiatiatives and projects related to SMCWPPP's focus on integrated watershed management and climate reslience planning, including the OneWatershed Framework and San Bruno Creek OneWatershed Pilot Study and supporting green infrastructure crediting related to the Orange Memorial Park Regional Stormwater Capture Project in South San Francisco.

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# ORGANIZATION OF REPORT

The remainder of this FY 2025/26 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
- C.17. Discharges Associated with Unsheltered Homeless Populations
- C.20. Cost Reporting
- C.21. Asset Management

The following sections of this report summarize how SMCWPPP assisted San Mateo County Permittees with implementing the MRP in FY 2025/26 for each of the above provisions. Each section includes three sub-sections: 1) Introduction, 2) Implementation of MRP Actions, and 3) Future Actions. Note that Appendices are numbered to match the Annual Report section. If a Section does not have any associated Appendices the number is skipped.

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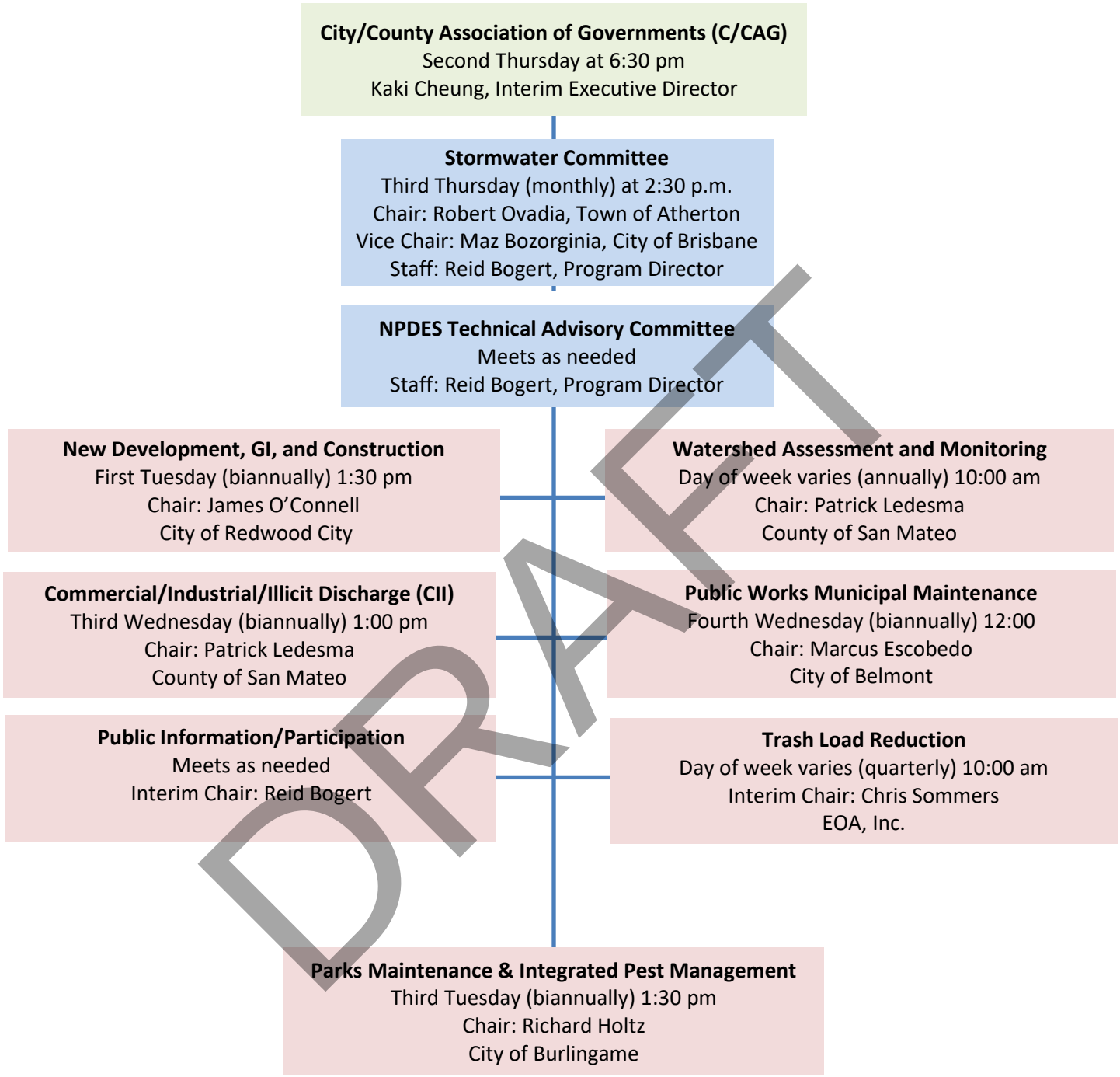


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**Figure 1-1. Organizational Structure and FY 2025/26 Meeting Schedule**

# 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 with and implementation of Municipal Operations tasks are coordinated through the SMCWPPP Public Works Municipal Maintenance Subcommittee.

## IMPLEMENTATION OF MRP PROVISIONS

SMCWPPP performs a number of tasks to assist San Mateo County Permittees with implementation of Provision C.2, with input and assistance provided by the Public Works Municipal Maintenance Subcommittee. FY 2025/26 accomplishments included the following:

- Held two Public Works Municipal Maintenance Subcommittee meetings in person; and
- Updated a pesticide tracking template, in coordination with SMCWPPP's Parks Maintenance and IPM Work Group, to assist San Mateo County Permittees to 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 provide 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.

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City of Belmont staff continued to chair the Subcommittee during FY 2025/26. The Subcommittee met twice during the fiscal year. The Subcommittee met in March and May 2026, with participation by municipal staff, as shown by the attendance list (Appendix 2).

Countywide Program staff also facilitated discussions at the meetings about a variety of pertinent topics, including trash full capture device installation and maintenance, training, cleanup of emergency firefighting discharges, storm drain inlet medallions, responding to discharges of human waste from unsheltered homeless populations, coordination with San Mateo County Mosquito and Vector Control District, BMP documentation and annual reporting.

## Program Materials

Since the first version of the MRP was adopted in 2009, SMCWPPP has developed a variety of materials to assist municipal maintenance agency staff with implementing Provision C.2. These materials are available on the SMCWPPP website (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 San Mateo County Permittees 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. In FY 2022/23, the SWPPP template and corporation yard inspection form template were updated to address MRP 3.0 requirements.

During FY 2010/11, SMCWPPP developed the "Stormwater Pump Station Dry Season DO Monitoring and Inspection Form" to assist San Mateo County Permittees in developing a systematic and efficient way to collect dissolved oxygen (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 FCSLRRD (i.e., OneShoreline).

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 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. that is updated annually. 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 2025/26 with the current two years of pesticide product data from the DPR website.

In FY 2022/23 SMCWPPP drafted a Proposed Workplan to meet MRP C.2.h training requirements. The distribution memo included links to available training materials such as videos, CASQA BMP fact sheets,

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Caltrans BMP fact sheets, BASMAA materials and other reference materials that could be used for in-house training. This memo was updated in FY 2023/24.

## FUTURE ACTIONS

FY 2026/27 activities planned by SMCWPPP to assist San Mateo County Permittees understand and comply with requirements in MRP Provision C.2 include the following:

- Continue holding two Public Works Municipal Maintenance Subcommittee meetings;
- Update tracking templates and guidance materials, as needed;
- Develop training for municipal maintenance staff on containment and cleanup of emergency discharges of firefighting water and foam in the public right of way;
- Develop guidance for training contractors hired by municipalities to participate in the containment and cleanup of emergency discharges of firefighting water and foam in the public right of way; and
- Coordinate with SMCWPPP's New Development Subcommittee to provide guidance on GI maintenance.

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# SECTION 3
# C.3 NEW DEVELOPMENT AND REDEVELOPMENT

## INTRODUCTION

This section describes SMCWPPP's activities to assist municipal agencies in San Mateo County to comply 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). SMCWPPP also obtained input and direction from agency representatives through the NDS. During FY 2025/26, James O'Connell with the City of San Mateo continued to chair the NDS.

This section also describes C/CAG's efforts to: help advance the most cost-effective and maximum benefit stormwater projects in San Mateo County, in support of the Green Infrastructure (GI) Plan and other GI requirements in the MRP; promote GI through the County, region, and State; and participate in regional collaborative efforts.

## IMPLEMENTATION OF MRP PROVISIONS

SMCWPPP's accomplishments during FY 2025/26 include the following tasks to assist San Mateo County municipalities with implementation of Provision C.3:

- Held two meetings of the NDS to assist municipal agencies in San Mateo County to comply with MRP Provisions C.3 (New Development and Redevelopment) and C.6 (Construction Controls). Each meeting was well attended (see Appendix 3 for the FY 2025/26 NDS attendance record). SMCWPPP's facilitation of the NDS meetings and related review of work outside of the meetings allowed SMCWPPP to help advance key elements of San Mateo County Permittee GI Plans, progress towards achieving GI numeric targets, review of proposed project opportunities and concepts, and implementation of C.3 requirements.
- Continued providing support to vendors, municipal staff and design professionals related to biotreatment soil media (BSM) and biotreatment wood mulch (BWM) including referrals to the Program website and regional specifications. Updated the C.3-C.6 Development Review Checklist and continued providing on-call support to Permittees with questions related to implementation of C.3 requirements for regulated private and public projects.
- Participated in the BAMSC Development Subcommittee (DS) and assisted with developing the agendas and arranging guest speakers for the DS meetings.
- Continued promoting the GI Design Guide for use by San Mateo County Permittees and external partners. The GI Design Guide includes broad guidance on the design and implementation of various green stormwater infrastructure treatment measures and typical details and standard specifications for numerous GI design options and settings.

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- Conducted a variety of GI outreach activities, including promoting rain barrel and rain garden rebate programs and bulk order rain barrel distribution program, publishing blog posts and newsletter articles, sharing via social media a series of educational videos on green stormwater infrastructure in different settings, and posting on social media. SMCWPPP outreach staff also led two rain barrel classroom presentations/installations and participated in efforts to engage schools via programs led by the San Mateo County Office of Education, including acting as a community partner in Sustainable and Climate Ready Schools Initiative Partnership in the water focus area. Additionally, SMCWPPP outreach staff tabled at the San Mateo County Office of Education's annual Climate Ready Schools Symposium and participated in the San Mateo County Office of Education's Climate Based Environmental Education Partners quarterly meetings.
- Supported local, regional and statewide implementation of GI through a technical presentation on "Piloting the OneWatershed Framework in San Mateo County" at the California Stormwater Quality Association 2025 Annual Conference in Sacramento on September 15, 2025 and presentations and engagement with numerous other organizations and partners across the county and region. C/CAG's Program Director also continued proactively seeking additional sources of funding to support green stormwater infrastructure implementation and additional planning efforts for a variety of GI project types and scales within the county, through State and federal funding.

Additional details about the above accomplishments are provided below.

## C.3 Implementation and Outreach Products

With the assistance of the NDS, SMCWPPP completed a major update to the SMCWPPP C.3-C.6 Development Review Checklist, which is . The checklist is included in Appendix 3 and posted on the program website:

- Added new sections for un-regulated projects and alternative compliance required by the MRP
- Updated sections on frontage area requirements
- Created new version in a fillable PDF format

## Operation and Maintenance of Stormwater Treatment Systems

SMCWPPP continued to collect data from Permittees on newly installed treatment and hydromodification systems for submittal to the San Mateo County Mosquito and Vector Control District and Regional Water Board per Provision C.3.h.iv(2). The data were submitted to the Mosquito and Vector Control District on September __, 2026. A copy of the communication and the list of treatment and hydromodification systems installed in FY 2025/26 is included in Appendix 3.

## Green Infrastructure Outreach

During FY 2025/26, SMCWPPP continued performing a variety of GI-related outreach, including the following efforts:

- Promoted the Green Infrastructure, Green Infrastructure Story Map, Green Infrastructure Design Guide, Rain Barrels & Rebate Program, and Rain Garden pages on the SMCWPPP website (flowstobay.org).

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- Partnered with the Bay Area Water Supply Conservation Agency (BAWSCA) to promote the countywide rain barrel program in association with a bulk rain barrel distribution program and executed a targeted digital ad campaign for the Rain Barrel Rebate on Meta and Google. SMCWPPP partnered with the City of Daly City and the City of Half Moon Bay to host two bulk-order rain barrel distribution events in November 2025. The supporting Rain Barrel outreach campaign received 77 rebate applications from residents for a total of 231 rain barrel installations. Over 3,596 rain barrels have been installed to date in San Mateo County under the rebate program.

- Partnered with BAWSCA to promote the Rain Garden Rebate as part of the Lawn Be Gone! Rebate, with at least one rain garden rebate issued in Fiscal Year 2024/25 and four submitted in FY 2025/26 for three completed rain garden projects.

- Implemented rain garden-related posts on social media and the FlowsToBay website, and executed a targeted digital ad campaign for the Rain Garden Rebate on Meta focused on driving awareness of rebate availability and eligibility requirements to increase the number of rebate applications submitted to BAWSCA.

- The "How Do Rain Gardens Work?" video that was initially created in FY 2022/23 has continued to be shared with residents via social media, the website, and e-newsletters, and has now received over 10,000 views on YouTube to date.

- Supported and have continued to engage with the County Office of Education (COE) on advancing stormwater-related partnerships for facility improvements through the COE Sustainable and Climate Ready Schools Initiative. SMCWPPP outreach staff tabled at the San Mateo County Office of Education's annual Climate Ready Schools Symposium, the San Mateo County Office of Education's Environmental Youth Leadership Summit, the San Mateo High School Sustainability Expo, and twice at the Mills High School Sustainability Expo (November 2025 and April 2026).

- Delivered seven rain barrel rebate-focused e-newsletters targeted to specific audiences, including a) rain barrel purchaser prospects placed on a waitlist from last FY's (2024/25) Bulk Rain Barrel Program, b) targeted segments of the total subscriber list, and c) all participants of the FY 2025/26 Bulk Rain Barrel Program. These seven e-newsletters achieved an average open rate of 21.4%, an average click rate of 4.1%, and an average clicks-per-unique-opens rate of 19.0%.

- SMCWPPP continued implementing the Green Schoolyards Program by supporting and facilitating two on-campus installations of rainwater harvesting tanks and community workshops, one at the Connect Community Charter School in the City of Redwood City (205-gallon capacity) and one at Gateway Center School in the City of San Mateo (265-gallon capacity), and conducting a presentation at each school about watersheds and rainwater capture. Between the two school sites, 125 students, 13 community members, and 10 school staff attended the rain barrel installations and community workshops.

- Published a blog on the El Zanjon Creek in October 2025 titled "From Flooded Street to Flowing Creek: San Bruno's Latest Green Infrastructure Win".

- Continued to promote the San Mateo County Office of Education's Teacher Fellowship on an as-needed basis, with a focus on Sustainable Watersheds and advancing green stormwater infrastructure curriculum and project implementation at schools.

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- Participated in 19 GI-related public outreach and citizen involvement events. Of the 19 events, there were two community vulnerability assessment workshops, two rain barrel delivery events, one community presentation, two rain barrel classroom presentations, two rain barrel installation workshops, and ten tabling events that included outreach on rain barrels and GI.

## San Mateo Countywide Stormwater Resource Plan

In response to the State's legislative mandate for Stormwater Resource Plans in order to compete for voter-approved bond funds, C/CAG worked with its member agencies to develop the San Mateo County Stormwater Resource Plan in 2017. The plan utilized various metrics to prioritize opportunities for stormwater capture at varying scales. Since that time, San Mateo County Permittees have been working to advance implementation of stormwater management measures at three primary scales:

1) the parcel scale, where only the rain falling on a site is managed (primarily new and redevelopment projects);
2) the street scale, where stormwater runoff from public roadways and sidewalks and adjacent parcel run-on to the streets is managed via green street features; and
3) the regional scale, where runoff from watershed or drainage areas is managed in large, centralized facilities.

In FY 2024/25, C/CAG staff and its member agencies continued advancing the original outputs from the Stormwater Resources Plan by growing partnerships and continuing to seek funding and implementation pathways for multi-scale green stormwater infrastructure, as detailed further below. The Sustainable Streets Master Plan (described below), which was a follow-up countywide planning process leading out of the Stormwater Resource Plan, has resulted in meaningful GI planning and implementation within a street context. For example, C/CAG staff submitted a pending federal grant application under the US EPA Community Change Grant Program in November 2024 for $20 million to fund three priority sustainable streets projects in Daly City, South San Francisco and East Palo Alto, along with a workforce development pilot program and community based urban greening. Additionally, C/CAG staff submitted a successful federal earmark in FY 2023/24 and secured $850,000 in appropriations funds to design three sustainable streets projects in the County (including the projects in Daly City and East Palo Alto, mentioned above) in early FY 2024/25. In FY 2025/26, the three agencies receiving funds through this earmark completed the funding application process working with the Metropolitan Transportation Commission and Caltrans to move these projects towards initial planning and design. Also in FY 2025/26, C/CAG staff submitted two federal earmarks for $1.8 million to support additional design and construction of sustainable streets projects in East Palo Alto, Daly City and South San Francisco, and $1.5 million to develop additional tools and resources under the "OneWatershed" program to support integrated climate resilience and water quality infrastructure throughout San Mateo County. C/CAG staff also continued to evaluate opportunities to advance regional-scale multi-benefit stormwater capture projects, originally identified in the Stormwater Resource Plan.

## Reasonable Assurance Analysis (RAA) for Green Infrastructure and Regional Collaborative Program Development

As required under Provisions C.11 and C.12 (of the prior permit "MRP 2.0"), C/CAG developed a countywide pollutant transport/hydrology model coupled with GI scenario modeling to provide Permittees with quantitative details on how much GI would be needed spatially to meet the MRP 2.0 goal for PCBs load reduction via GI by 2040. The RAA helped Permittees recognize:

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1) The rate of GI implementation via new development and redevelopment is generally outside the control of municipalities, but the extent of projects subject to stormwater requirements is governed by both MRP and local requirements;
2) Meeting GI and stormwater treatment targets on a countywide basis instead of proportionally within each jurisdiction can result in overall cost savings by implementing projects where it makes most sense;
3) Regional-scale projects, while costly, can be very cost-effective in terms of the overall volume managed vs. equivalent levels of small-scale distributed systems, especially with regard to operations and maintenance. These larger scale projects can also provide other significant benefits such as flood risk reduction and water supply augmentation, and are often competitive multi-benefit/multi-jurisdictional projects for state and federal grant programs; and
4) Green street implementation is likely to be the most impactful on local Permittee resources, both for capital expenses and long-term operations and maintenance given that it is most likely to be funded by the limited local allocations of transportation dollars and result in many distributed bioretention facilities requiring ongoing maintenance. This contrasts with parcel-scale projects funded primarily by private developers or regional-scale projects likely to be funded by significant state or federal grants due to the integrated, multi-benefit nature.

As a result, C/CAG and its member agencies began looking at options to meet water quality and treatment requirements while reducing the financial burden of green streets on local agencies when evaluating approaches for meeting long-term water quality goals. Past and ongoing efforts to support GI implementation across scales and for maximum benefit included: the development of the Sustainable Streets Master Plan (completed in winter 2021); the Advancing Regional-scale Stormwater Management in San Mateo County project (completed in winter 2022); the Resilient San Carlos Schoolyards Project (completed spring 2023); updating the San Mateo County GI Tracking and Mapping Tool to address missing or inaccurate data and improve mapping capabilities; seeking additional funding sources for regional-scale multi-benefit stormwater projects (including obligating $2.4 million in federal earmark funding for the design phase of the San Bruno Regional Project); securing $850,000 in federal earmark funding for design of three sustainable streets projects, and submitting follow-up earmark requests in FY 2025/26 for $1.8 million in funding for additional sustainable streets projects and $1.5 million for OneWatershed climate resilience data tools and resources; and, lastly, with $649,648 in state funding from the Governor's Office of Land Use and Climate Innovation's Integrated Climate Adaptation and Resilience Program, completed the San Mateo County OneWatershed Climate Resilience Framework and Community-led Plan in December 2025 to support additional prioritization of new and planned multi-benefit stormwater capture projects from the perspective of addressing shared risk to water infrastructure in the face of climate change.

## Regional-Scale Stormwater Management and Countywide Collaboration

Since the Stormwater Resource Plan, SMCWPPP has helped shepherd several regional projects through initial planning, concept design and engineering (as well as construction in the case of South San Francisco's Orange Memorial Park project). The following summarizes the status of the current regional projects underway in San Mateo County.

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### *South San Francisco (Orange Memorial Park)*

This project, which is the first of its kind in the Bay Area, was completed in June 2022 and provides water quality improvements to help meet the MRP requirements related to mercury, PCBs, and trash, and new requirements in the reissued permit (MRP 3.0) for retrofit of quantified amounts of green infrastructure not already defined as a Regulated Project pursuant to Provision C.3.b. The project includes an instream diversion and pre-treatment structure (trash screen and sediment removal chamber) in the upper end of the Colma Creek flood control channel within Orange Memorial Park. Pretreated water gravity drains to an underground stormwater reservoir where it is stored until either infiltrating or being further treated for direct non-potable reuse (i.e., irrigation for the park and nearby trails, as well as a source of water for street sweeping and urban trees). When storage capacity is exceeded, treated overflow is discharged back into the channel. Originally conceptualized in the Stormwater Resource Plan, the project will divert approximately 16% of the annual drainage from approximately 6,500 acres of land primarily in the City of South San Francisco, Town of Colma, the City of Daly City, and a portion of unincorporated San Mateo County and the City of Pacifica, of which 9% will be treated to remove trash/sediment before being returned to the channel, 6% infiltrated into the Westside groundwater basin (approximately 240 acre-feet/year), and 1% treated and used onsite and in nearby linear parks for irrigation purposes (approximately 45 acre-feet/year). The project is anticipated to capture 100 tons of sediment, 10 grams of PCBs, and 30 grams of mercury, annually. The project was funded through a $15.5M Cooperative Implementation Agreement with Caltrans to help satisfy its pollutant load reduction requirements, focusing on trash load reductions. C/CAG staff has supported conversations with the City of South San Francisco, OneShoreline, and other agencies in the drainage area of this project to identify feasible and desired strategies to cost share the ongoing operations and maintenance needs. OneShoreline and the City of South San Francisco have a current operational funding agreement designated for the Colma Creek channel, which provides operations and maintenance support for the Orange Memorial Park stormwater project through June 2026. The process of establishing an interim operations and maintenance funding agreement was supported by SMCWPPP's Work Group Advancing Regional Projects (WARP). In FY 2025/26, the WARP was convened in April 2026 to discuss the potential options for C.3.j credit allocation among SMCWPPP permittees and an approach to developing a unit-cost for "greened acres" associated with the Orange Memorial Park project. C/CAG staff also continued dialogue with Regional Water Board staff in FY 2025/26 regarding MRP compliance credit for this first-of-its-kind regional project in the Bay Area.

### *Belmont Project (Twin Pines Park)*

The Belmont project was originally conceptualized in the Stormwater Resource Plan as a small-scale regional facility capturing runoff from a small neighborhood. Since then, the Cities of Belmont and San Carlos and the County of San Mateo, through its Flood Resilience Program (now OneShoreline), jointly developed a Watershed Management Plan for Belmont Creek. In this plan, the Twin Pines Park project was increased in scale to be comparable to the other regional projects (~20 acre-feet of storage capacity), with an underground detention/retention gallery conceptualized beneath the Twin Pines Park parking lot. In early 2020 C/CAG, in conjunction with the California Natural Resources Agency, allocated $913,000 of a $2.94M State budget allocation to advance regional stormwater projects in San Mateo County to the Belmont project for preliminary design and environmental review. At the same time, OneShoreline was also successful in applying for Department of Water Resources grant for $1M to restore Belmont Creek within Twin Pines Park as a joint project. In FY 2021/22, the City of Belmont issued a joint Request for Proposals for design and construction services on both projects concurrently, leveraging an additional ~$6M grant from the California Natural Resources Agency (CNRA) received in early 2022. The City has contracted for design and construction services on both the stormwater capture and the creek restoration

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project. The City has secured partial funding for construction of the stormwater capture project through the CNRA grant and local matching funds from the City, the City of San Carlos and the County of San Mateo, and is actively seeking additional grant funds to secure full construction funding. The City plans to have 100% designs in August or September 2025 and is still going through the environmental permitting process.

### *San Bruno Project (I-280/380 Interchange)*

Subsequent to the project concepts developed for the Stormwater Resource Plan, C/CAG worked with its member agencies to develop additional regional project concepts to help reduce the potential green streets burden on cities indicated as needed by the RAA modeling to meet the MRP 2.0 goal for PCBs load reduction via GI by 2040. San Bruno had identified the need for retention within the Crestmoor Canyon watershed to address storm drain system capacity deficiencies. Ultimately, C/CAG and the City collaborated to conceptualize an approximately 20-acre-foot regional underground stormwater capture facility on Caltrans property within the large vacant land area within the I-280/380 interchange. Similar to the Belmont project, C/CAG worked with the Natural Resources Agency to provide $913,000 to San Bruno for preliminary design and environmental review for the project. In addition, the County of San Mateo received a U.S. EPA Water Quality Improvement Fund (WQIF) grant under which $200K was provided to the San Bruno project for preliminary design, for a total of $1.13M between the two funding sources. San Bruno participated in the joint Request for Proposals process with C/CAG, Redwood City, and the County of San Mateo and has contracted with a design consultant and executed a project oversight cooperative agreement with Caltrans. In FY 2022/23 the City completed the pre-design phase with geotechnical, utility surveys, and other preliminary design studies as part of the Caltrans Project Study Report-Project Development Support (PSR-PDS) document. In FY 2022/23, with support from C/CAG, the City also secured a member-directed spending request through Congresswoman Jackie Speier's office for an additional $2.4M (plus 20% matching funds) to advance the project through the PA&ED phase. Caltrans has indicated the PA&ED and PS&E phases of the project will be at no additional project cost to the City for Caltrans oversight. During FY 2024/25, the project team obligated the $2.4 million in funding with EPA and amended the consultant contract with the City to complete the environmental phase and design the project. The project team also developed the Hydrology and Hydraulics Study Report, drafted and revised the Preliminary Geotechnical and Materials Report, prepared environmental documents, and developed and finalized the Initial Site Assessment Report.

### *Redwood City Project (Red Morton Park)*

Like the San Bruno project, C/CAG worked with Redwood City staff to identify a regional project opportunity to help the City reduce its potential green streets burden to meet the MRP goal for PCBs load reduction via GI by 2040, identified through the RAA modeling. A two-phase project was conceptualized for Red Morton Park, with underground storage systems proposed beneath two playing fields, with a combined storage capacity of ~43 acre-feet. As with the San Bruno and Belmont projects, C/CAG worked with the Natural Resources Agency to provide $913,000 to do preliminary design and environmental review. Redwood City also participated in the joint Request for Proposals process and has contracted with a design consultant. Like San Bruno, the County of San Mateo provided an additional $200,000 from its U.S. EPA grant for preliminary design, for a total of $1.13M between the two funding sources. The preliminary design report identified three primary potential project alternatives: one that is sized to treat the 85$^{th}$ percentile design storm (9.5 acre-feet of storage capacity); one that maximizes the size of the storage beneath the first playing field (23.5 acre-feet of storage); and a third that maximizes potential storage, including additional storage beneath the second field (30 acre-feet of storage). Based on further consideration of the preliminary design report, the City has since approved advancing design work for the

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maximized single field alternative. In FY 2022/23 the City advanced towards 60% designs for the single field project alternative for an 85th percentile capture design volume and initiated negotiations with Caltrans on potential funding support through a cooperative implementation agreement. In FY 2024/25, the project team continued work on the 100% design for the project and has proactively evaluated funding opportunities ranging from state and federal grants to potential cooperative implementation funding from Caltrans. The project team has also been involved in discussions with SMCWPPP regarding the potential future credit this project may provide with respect to the MRP, i.e., PCBs and mercury load reductions, but also the potential for supporting future green infrastructure retrofit requirements.

## Regional Project Planning and Collaborative Framework

As mentioned above, C/CAG worked with its state legislative delegation to secure a $3M ($2.94M after deducting the State's administrative costs) grant to advance regional stormwater capture opportunities and a coordinated programmatic approach to regional distributed GI implementation. The bulk of those funds were allocated to initial design and environmental review of the Belmont, San Bruno, and Redwood City regional projects, described above. C/CAG directed the remaining funds ($200,000) from the state budget allocation to a collaborative effort to further advance regional-scale stormwater management opportunities in San Mateo County. With oversight and input on the project deliverables through a Technical Advisory Committee, including representatives from C/CAG's member agencies, OneShoreline, the Bay Area Water Supply Conservation Agency, Silicon Valley Clean Water and the Regional Water Quality Control Board, C/CAG completed a multi-part project culminating in the Regional Collaborative Program Framework White Paper (White Paper) in January 2022.

The core components of the project included: 1) developing drivers and objectives for regional-scale stormwater management and a business case and collaborative framework for San Mateo County Permittees (and other potential project partners) to work together to share costs and benefits of these large-scale regional projects; 2) conducting a countywide analysis of regional capture project opportunities and ranking opportunities based on key performance indicators that map onto the selected multi-benefit drivers and objectives; 3) developing preliminary design concepts and cost estimates for the five highest performing sites from the analysis (note – this portion of the project was funded by a portion of the County's EPA Water Quality Improvement Fund grant); 4) conducting a countywide credit trading feasibility analysis focused on evaluating the market feasibility for Regulated Projects to participate in an off-site alternative compliance/credit trading program; and 5) developing an innovative funding and financing report to support further exploring options in San Mateo County for GI investments countywide, and how funding and financing options might be integrated into a Regional Collaborative Program. The final project deliverables are available on the dedicated Regional Collaborative Program website www.flowstobay.org/regional-collaborative.

The White Paper laid the foundation for further developing a Regional Collaborative Program that provides a cost-effective mechanism to meet local stormwater quality requirements while delivering multiple benefits, including sustainable stormwater management and climate resilience. The Technical Advisory Committee identified a Regional Collaboration Program framework option that includes both a near-term Memorandum of Understanding (MOU)-based approach and a longer-term market-based approach. In FY 2022/23, C/CAG developed the structure and parameters for an Interim MOU-Based Regional Collaborative Program (Interim Program) and outlined them in a draft Interim Program Report. The Interim Program is intended to enable County jurisdictions to participate in cost-sharing or other transactions to fund the implementation and maintenance of regional stormwater management projects to better meet MRP and other watershed management needs. The Interim Program Report describes

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eligible participants, buyers, and sellers; a proposed unit of exchange ("greened acres") and cost basis; exchange boundaries; and methods of exchange based on an MOU approach (drawing from the coordination meetings and outcomes from discussions regarding initial operations and maintenance cost-sharing for the Orange Memorial Park regional project in South San Francisco, as described above). With input from C/CAG's Work Group Advancing Regional Projects (WARP; Ad-hoc of the Stormwater Committee) the final MOU-Based Interim Collaborative Program Summary Report was completed in fall 2023. C/CAG has plans to continue to expand the Regional Collaborative Program design to include additional institutional components to support current and future C.3.j numeric retrofit implementation, including a cost-analysis and template MOU documents to support cost-sharing or "greened acre" credit transactions among SMCWPPP permittees and private regulated project sponsors. In FY 2025/26, C/CAG staff continued to advance planning and discussion with the SMCWPPP permittees regarding the options for cost-sharing and credit allocations for achieving the current C.3.j numeric retrofit targets at a countywide scale with a portion of credits being achieved by the regional stormwater capture project at Orange Memorial Park in South San Francisco. C/CAG staff also continued dialogue with the Regional Water Board and the BAMSC regarding regional strategies for collaborative stormwater management in FY 2025/26 through the BAMSC Long-term Green Stormwater Infrastructure Technical Working Group efforts and other venues.

### *Rainwater Harvesting Rebates/Incentives*

C/CAG has been partnering with BAWSCA to implement a joint rebate/incentive program for rainwater harvesting since late 2014. Under this program, C/CAG has provided a countywide rebate of $50/barrel that is matched by many of the water purveyors in the County. Starting in FY 2020/21, C/CAG expanded its incentives to provide rebates for larger storage systems, offering $100 for systems between 100-199 gallons and $150 for systems of 200 gallons or more, all of which continue to be combined with $50/system rebates from participating water purveyors. In addition, C/CAG added a new stacked $300 rain garden incentive on top of rebates from participating water purveyors for BAWSCA's "Lawn Be Gone!" turf replacement program.

In FY 2021/22, C/CAG piloted two bulk order rebate campaigns, offering a discounted rain barrel on pre-order through a partnership with RainWater Solutions, and in FY 2022/23, C/CAG and RainWater Solutions offered four pre-order deliveries. During the four events, C/CAG helped distribute 825 rain barrels to residents throughout the county. Continuing on the success of the rain barrel distribution campaign, C/CAG and RainWater Solutions launched the third annual Bulk Rain Barrel Program in FY 2023/24 and distributed 297 rain barrels. C/CAG launched the fourth annual Bulk Rain Barrel Program in FY 2024/25, and partnered with RainWater Solutions to plan two distribution events, maintaining the momentum of previous years and the rain barrel bulk program's success in encouraging rain barrel installations and rebate applicants in San Mateo County through lower-cost, high-quality rain barrels that can be pre-purchased and picked up at central locations within the County. The City of Burlingame and the Town of Hillsborough co-hosted the first distribution event on December 7, 2024, and the City of San Carlos hosted the second distribution event on December 14, 2024. Together, C/CAG, the City of Burlingame, the Town of Hillsborough, the City of San Carlos, and RainWater Solutions were able to provide an opportunity to deliver 363 high-quality, lower-cost rain barrels to 209 community members in a convenient manner, while advancing the benefits of stormwater harvesting and stormwater pollution prevention messaging. In FY 2025/26, C/CAG launched the fifth annual Bulk Rain Barrel Program, continued its partnership with RainWater Solutions, and offered two pre-order deliveries. The City of Daly City hosted the first distribution event on November 1, 2025, and the City of Half Moon Bay hosted the second distribution

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event on November 8, 2025. The two events resulted in the distribution of 231 rain barrels to 134 community members. A postcard promoting the rebate was placed in each rain barrel distributed.

As part of the rain garden incentives program beginning in Fiscal Year 2019/20, C/CAG partnered with the Master Gardeners and University of California Extension to implement two consecutive years of a pilot Green Streets Stewardship Program to help raise awareness about GI in the county and to help municipalities ensure their facilities are properly maintained. Since 2020, the Master Gardeners completed nine stewardship events at two locations coinciding with the Safe Routes to School and Green Streets Infrastructure Pilot Projects funded by C/CAG mentioned below (Half Moon Bay Library/Cunha Middle School and Cabrillo Elementary School). The stewardship activities are focused on evaluating and improving sites in the following focus areas: litter/debris, vegetation, and soils. Beginning in FY 2023/24, the Pilot Program was placed on hold until additional funding can be committed to advance community-based GI stewardship in the county. SMCWPPP has also started exploring a proposal for a Pilot Workforce Development Program focusing on addressing GI maintenance needs in the county and supporting skills development for underserved communities. As mentioned above, in FY 2024/25 C/CAG staff submitted an application for a $20 million US EPA grant for advancing green infrastructure and a pilot workforce development program focused on green infrastructure maintenance training in underserved communities.

### *California Resilience Challenge Grant – Resilient San Carlos Schoolyards*

During the 2020 grant cycle, C/CAG received one of 12 California Resilience Challenge grants in the state to develop resilient schoolyard concept plans for multiple sites in the San Carlos School District to show how GI can be integrated to build climate resilience while also improving water quality, increasing shading and greening on campuses, enhancing outdoor learning environments, and making curriculum connections with teachers and students. This builds on existing school-related efforts that C/CAG has been implementing, including partnership with the County Office of Education on its environmental literacy program and providing funding for integrated Safe Routes to School / Green Infrastructure projects further described below in the Street-Scale Stormwater Management section. In winter of 2022, the project team completed the concept plans for the three selected school sites and compiled the plans into a comprehensive Resilient San Carlos Schoolyards Concept Plan Report (available at the project website). The Program Director co-presented the report with the project team and stakeholders at the February 16, 2023, San Carlos School Board meeting and advocated to include the concept plans in the parallel strategic planning and Facility Master Plan update. Since completing the report and concept plans, the School District has adopted its updated Facilities Master Plan, which includes the San Carlos Resilient Schoolyards Report as an appendix. The School District also passed a bond measure to fund implementation of the Facilities Master Plan and the project team and partners continue to seek additional funding to support full integration of the schoolyard resilience components.

### *Green Infrastructure Design Guide and GI Videos*

As reported in prior years and described above, C/CAG created a comprehensive GI Design Guide detailing how GI can be effectively incorporated into both parcel- and street-scale projects, including a library of typical design details. In FY 2023/24, C/CAG updated the GI Design Guide to a new version 2.0 containing updates to reflect changes and requirements in MRP 3.0 and new guidance on mulch, trees and other GI-related information. C/CAG continues to educate and inform member agencies of its availability and supported its access via the flowstobay.org website.

In FY 2021/22, C/CAG developed a series of GI videos that link back to the core focus areas and scales for GI described in the GI Design Guide. The five-part video series includes an overall GI video and three focus

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videos showcasing GI in sustainable streets, schools, residential applications, and effective GI maintenance practices. The videos were finalized and posted on the SMCWPPP website (www.flowstobay.org) and the Flows To Bay YouTube channel (https://www.youtube.com/@flowstobay) in early FY 2023/24.

### *OneWatershed Climate Resilience Framework and San Bruno Creek OneWatershed Pilot Study*

In FY 2022/23 C/CAG staff submitted a successful grant application for approximately $650,000 under the Governor's Office of Land Use and Climate Innovation's Integrated Climate Adaptation and Resilience Program (ICARP) Adaptation Planning Grant Program for the San Mateo County OneWatershed Climate Resilience Framework and San Bruno Creek OneWatershed Pilot Study (OneWatershed Project). In collaboration with partner agencies and organizations, including Climate Resilient Communities (CRC), the San Mateo County Flood and Sea Level Rise Resiliency District (OneShoreline), City of San Bruno, County of San Mateo Sustainability Department, City of South San Francisco's South San Francisco-San Bruno Regional Water Quality Control Plant, and the Bay Area Water Supply & Conservation Agency (BAWSCA), C/CAG developed the OneWatershed Framework Report (completed January 2026), which documents a new method to assess the regional and shared climate change hazard exposure to water infrastructure and resources (sewer, water, and stormwater) in San Mateo County and a framework for working across water sectors and through an inclusive community-led planning process to evaluate climate hazards and identify and prioritize multi-benefit climate resilience projects at a watershed scale.

To demonstrate the approach, the project team developed the San Bruno Creek OneWatershed Pilot Study, which applies the OneWatershed Framework within a priority watershed in San Bruno. As a primary output from this effort, a preliminary project concept was developed for a OneWatershed pilot project at the Belle Aire Elementary School, which was a priority location identified by impacted community members for resilience infrastructure, including multiple types and scales of GI to support flood risk reduction, heat mitigation, improved mobility, ecological benefits and other community co-benefits.

This model for an integrated OneWatershed framework and application to the San Bruno Creek Watershed will be an ongoing strategy pursued by the project partners and potentially involving other municipalities in San Mateo County seeking to increase adaptive capacity with a lens towards equitable and community-centered engagement. The approach of incorporating multi-benefit projects in the OneWatershed resilience infrastructure planning process also intentionally includes leveraging existing planning strategies from C/CAG and its member agencies with the intent to find synergies among parallel climate adaptation strategies being led by a variety of agencies and organizations advancing these efforts in San Mateo County and to better overcome potential barriers to collaboration and shared resources.

## Street-Scale Stormwater Management

### *Countywide Sustainable Streets Master Plan*

In 2018, C/CAG was awarded a nearly $1M Caltrans Climate Adaptation Planning grant to develop the San Mateo Countywide Sustainable Streets Master Plan (SSMP) that prioritizes opportunities to integrate GI with planned transportation projects to help adapt the roadway network to a changing climate while simultaneously improving water quality. The SSMP prioritizes identified transportation needs (pulled from active transportation and Complete Streets plans, Safe Routes to School walk audits, Specific Plans, etc.) for GI integration using numerous technical suitability and co-benefit criteria. As part of the SSMP, C/CAG modeled future climate impacts on precipitation patterns, advancing the county's understanding of how storm intensity and frequency may change under future climate conditions. The SSMP includes 11 project concepts illustrative of different Sustainable Street typologies and geographically distributed throughout

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the county. Included in the appendices is a new Intersection Assessment Tool that allows municipalities to rapidly determine the feasibility of incorporating stormwater curb extensions at an intersection, as well as a complete library of typical design details for Sustainable Street projects. High-resolution drainage delineations were developed for the entire county, further advancing San Mateo Permittees' digital mapping of storm drain catchments down to the catch basin scale. The SSMP also includes model Sustainable Street policy language for Permittees to consider adopting, including model Sustainable Streets language for policy documents, a model Sustainable Streets resolution and policy to go beyond typical Complete Streets policies, a model resolution for GI development standards for new buildings, and model conditions of approval for development projects to require Sustainable Streets implementation as part of private development.

Since its completion, C/CAG has continued sharing resources within the SSMP to its member agencies through workshops and Subcommittee meetings, especially regarding updates to the GI Tracking and Mapping Tool and continued sharing the resources online through the dedicated SSMP webpage www.flowstobay.org/ssmp. In FY23/24, SMCWPPP developed and began implementing a workplan for Phase 2 of the GI Tracking and Mapping Tool, focusing on project database QA/QC, user interface improvements, new metrics and visualization capabilities for water quality and community co-benefits, and creating a new public facing website with content and dashboard enhancements. In FY 2024/25, SMCWPPP updated the GI Tracking and Mapping Tool to include a module for the new OneWatershed Framework development and associated new climate hazard and watershed asset data inventory. Additionally, following a successful C/CAG federal earmark request in FY 2023/24, C/CAG executed Memorandums of Understanding with the Cities of East Palo Alto, Daly City and Town of Colma for a total of $850,000 to design sustainable streets projects in underserved communities, under C/CAG's submittal for the Sustainable Streets Design Pilot Program. Also in FY 2025/26, as noted above, C/CAG staff submitted federal earmark requests in FY 2025/26 for $1.8 million in funding for additional sustainable streets projects design and construction funding for projects in East Palo Alto, Daly City and South San Francisco, and $1.5 million for OneWatershed climate resilience data tools and resources, respectively.

### *Safe Routes to School / Green Infrastructure Pilot Projects*

In 2017, C/CAG awarded just over $2M to 10 pilot projects throughout the County integrating Safe Routes to School and GI. These projects were funded with equal shares of Safe Routes to School and stormwater program funds, with funds from C/CAG covering up to 85% of construction costs. In June 2024, the last of the 10 projects was constructed. C/CAG staff has been compiling information from each of the projects detailing total costs, relative shares of Safe Routes to School and stormwater costs, and impervious area treated. These results are summarized in Table 3-1.

Table 3-1 shows that the average cost (in 2025 dollars) per acre treated is approximately $300,000 when using just the estimated GI project costs (which are often difficult to clearly separate given the integrated nature of things like paving, concrete gutter work, etc.) or roughly $600,000 when using total project costs. The cost-effectiveness also varies among projects, with the projects treating the largest areas generally tending to be more cost-effective, which highlights the importance of incorporating GI into projects where it will have the most benefit in terms of area treated. While these costs reflect variability in terms of the scope of included costs (i.e., some costs reflect only the relative costs of the green infrastructure and associated SRTS components of a larger project, whereas others reflect the overall project costs for the entire project), they are illustrative of likely costs to treat an acre of impervious area

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within the public right of way. A final Pilot Program Summary Report is available on the www.flowstobay.org website.

**Table 3-1. Pilot Integrated Safe Routes to School and Green Streets Infrastructure Project Costs (Costs in 2025 Dollars)**

| Project Sponsor | Year Completed | Drainage Area (acres) | GI Project Cost (2025$) | SRTS Cost (2025$) | Other Cost (2025$) | Total Cost (2025$) | GI Cost/Acre (2025$) | Total Cost/Acre (2025$) |
|---|---|---|---|---|---|---|---|---|
| Brisbane | 2021 | 0.78 | $ 385,104 | $ 572,130 | $ - | $ 957,234 | $ 491,832 | $1,222,521 |
| Colma | 2021 | 1.47 | $ 208,062 | $ 136,553 | $ - | $ 344,615 | $ 141,539 | $ 234,432 |
| County Unincorporated | 2020 | 0.23 | $ 170,895 | $ 179,966 | $ 10,082 | $ 360,943 | $ 736,616 | $1,555,787 |
| Daly City | 2019 | 1.40 | $ 141,042 | $ 72,658 | $ - | $ 213,700 | $ 100,745 | $ 152,643 |
| East Palo Alto | 2024 | 6.22 | $ 1,295,938 | $ 597,090 | $ - | $ 1,893,027 | $ 208,350 | $ 304,345 |
| Half Moon Bay | 2018 | 0.48 | $ 370,336 | $ 246,890 | $ - | $ 617,226 | $ 771,533 | $1,285,887 |
| Menlo Park | 2020 | 1.46 | $ 341,103 | $ 281,736 | $ 51,729 | $ 674,568 | $ 233,632 | $ 462,033 |
| Millbrae | 2020 | 1.95 | $ 409,106 | $ 183,912 | $ 463 | $ 593,481 | $ 209,798 | $ 304,349 |
| Pacifica | 2022 | 1.25 | $ 159,183 | $ 162,266 | $ - | $ 321,449 | $ 127,347 | $ 257,159 |
| Redwood City | 2021 | 2.83 | $ 444,301 | $ 274,893 | $ - | $ 719,193 | $ 156,997 | $ 254,132 |
| | | | | | | **Average (2025$)** | **$ 317,839** | **$ 603,329** |

### *Non-Regulated Green Infrastructure Projects*

C/CAG and its member agencies have been proactively building non-regulated GI projects since C/CAG provided its first pilot project funding to four projects in 2007. During the current permit term, municipalities have continued implementing regulated GI projects such as green streets, voluntary GI projects consistent with the MRP requirement for "no missed opportunities," primarily street-scale projects integrated with transportation improvements, as well as planning projects towards addressing the C.3.j GI numeric targets. C/CAG maintains a GIS Story Map detailing public GI projects (note: the map is currently in process of being updated and does not reflect all completed projects to-date; additionally not all projects shown are non-regulated though the majority are non-regulated retrofit projects). C/CAG also supports its member agencies in tracking GI implementation for purposes of quantifying mercury and PCBs load reductions.

## Tracking and Reporting Progress on Green Infrastructure

During FY 2025/26, SMCWPPP continued to develop and implement methods to track and report implementation of GI in San Mateo County and track associated pollutant load reductions. At the end of each fiscal year, SMCWPPP Permittees provide data on completed GI projects in their jurisdictions, including information needed to calculate mercury and PCBs load reductions associated with these projects. The analysis of mercury and PCB loads reduction is described in Section 11/12 (Mercury/PCBs Controls) of this report and the *Mercury and PCBs Control Measures Report* in Appendix 11/12.

As mentioned above, C/CAG utilized funding through the San Mateo Countywide SSMP project to create an updated web-based San Mateo County GI Tracking Tool (Tool). The Tool is publicly available via the Countywide Program's website. The Tool allows for tracking all scales of GI implementation (regional, street, and parcel), and provides the tracking needed to demonstrate that wasteload allocations for TMDLs are being met. The public interface of the Tool is a dynamic map showing the locations of implemented GI with descriptions of the GI measure, location, characteristics of the area treated, and estimated pollutant load reductions.

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The Tool has been populated with information on GI constructed in the County through FY 2024/25. Enhancements to the Tool in FY 2024/25 and FY 2025/26 include a new OneWatershed Climate Resilience Framework module with additional data layers featuring climate hazards and climate vulnerable communities. The new interface also includes metrics for tracking additional co-benefits of GI related to flood risk reduction, urban heat island mitigation, water conservation, green street amenities, and more.

During FY 2022/23, the Tool development team developed a technical methodology to translate volumes of runoff managed by regional capture projects to MRP compliance metrics, specifically impervious acres managed ("Greened Acres") by GI retrofit projects. A memorandum was prepared that summarizes the proposed methodology for calculating stormwater capture for a regional project that diverts stormwater from a creek channel or storm drain, in a way that is translatable to the sizing criteria in Provision C.3.d and allows Greened Acres to be tracked for regional projects. The memorandum also describes the modeling analysis conducted to estimate stormwater capture for an example regional project in San Mateo County (Orange Memorial Park) and demonstrates the calculation of Greened Acres for this project. C/CAG staff and consultants met with Water Board staff on March 6, 2023, and January 19, 2024, to discuss the proposed methodology. In a letter dated April 29, 2024, Water Board staff accepted the methodology and provided comments on the role of regional projects in achieving GI goals in the region. Discussion with Water Board staff continued during FY 2024/25 as part of the Long Term GSI Technical Working Group. C/CAG staff also met with Water Board staff on January 5, 2026 to discuss the proposed approach to crediting Orange Memorial Park operations and maintenance costs for C.3.j compliance during the current permit term. Water Board staff supported the approach and work has continued on defining the process for exchanging and tracking credits and the cost per acre.

## Regional Collaboration

### *BAMSC Development Subcommittee*

SMCWPPP continued to participate in the Development Subcommittee (DS), which meets approximately quarterly, to share information on topics related to C.3 and GI implementation. Topics discussed during FY 2025/26 included:

- An overview of Bay Area pervious pavement in public roadway projects and lessons learned, as well as a presentation on the Katherine Court permeable interlocking concrete paver project in the City of San José.
- An update on the Contra Costa Countywide Clean Water Program's (CCCWP's) Regional Alternative Compliance (RAC) System and recent efforts to establish a Joint Powers Authority and a Community Facilities District to support its implementation.
- An overview of the CCCWP "Clean Watersheds 4 All" project, including development of an Old Industrial Treatment Measure Plan, a Project Funding and Delivery Roadmap, and use of Community-Based Public Private Partnerships (CBP3s) to support implementation of a regional GSI project. This effort is closely aligned with the Contra Costa County RAC System implementation.
- A presentation on filtration media specifications and an upcoming report on the subject prepared by the Stormwater Media Filtration Committee of the Urban Water Resources Research Council (part of the American Society of Civil Engineers).
- Regular updates on Subcommittee work groups and Regional Water Board items.

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### *Regional C.3 Work Groups*

Through the BAMSC DS, SMCWPPP also participated in regional work groups and projects that assist SMCWPPP and its San Mateo County municipalities in meeting specific requirements of Provision C.3. During FY 2025/26, SMCWPPP staff participated in three work groups related to C.3 – the Long Term GSI Technical Working Group, the Asset Management Work Group, and the Trees in GSI Work Group.

### *Biotreatment Soil Media (BSM) and Biotreatment Wood Mulch (BWM) Specifications*

In FY 2025/26, SMCWPPP continued to support municipal staff, consultants and suppliers who have questions on the review and use of biotreatment soil media (BSM) and biotreatment wood mulch (BWM). The program has a vendor list that is posted on the SMCWPPP website. The vendors must demonstrate an understanding of the 2016 BASMAA specification, submit lab results and a sample of their BSM product, and use consistent terminology on their websites advertising the product. See the BAMSC website for the BSM specification and Flowstobay website for the BWM specification, vendor lists, and more information.

### *San Francisco Estuary Partnership (SFEP) Implementation Committee*

The Program Director participated in the SFEP Implementation Committee on behalf of BAMSC. The Implementation Committee coordinates the implementation of the Estuary Blueprint (2022), helps to set priorities for the Partnership's work, and approves annual work plans and budgets. The Estuary Blueprint is intended to drive regional actions, including multi-benefit nature-based solutions.

### *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 BAMSC activities as well as conducting its own activities to assist Permittees in complying with this provision.

During FY 2025/26, C/CAG participated in the following efforts to promote GI:

- C/CAG's Stormwater Program Director gave a technical presentation on "Piloting the OneWatershed Framework in San Mateo County" at the California Stormwater Quality Association 2025 Annual Conference in Pasadena on September 15, 2025. C/CAG's Stormwater Program Director attended and represented the Bay Area stormwater management perspective at the Bay Area One Water Network meeting held in San Francisco on September 5, 2025. A significant focus for this meeting was evaluating programmatic, institutional, and funding strategies to support a more holistic approach to water and watershed management, including options for leveraging and supporting GI.
- C/CAG's Stormwater Program Director met with Federal Congressional leaders, including Senator Padilla's Office on March 11, 2026 and Congressmember Mullin's Office on March 12, 2026, to advocate for federal funding for GI projects in San Mateo County, focusing on earmark requests for $1.8M in funding for sustainable streets projects in East Palo Alto, Daly City, and South San Francisco and $1.5M for advancing SMCWPPP's OneWatershed effort to develop tools and resources to support local agencies with integrated climate resilience and watershed planning.
- C/CAG's Stormwater Program Director and Senior Program Specialist presented at multiple community workshops and meetings in spring and summer 2025 on the state-grant funded

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OneWatershed Framework and San Bruno Creek Watershed Pilot Study. Workshops were presented in multiple languages and were intended to gather input on climate hazards and multi-benefit green infrastructure solutions to address community adaptive capacity needs. Workshop attendees included community members as well as city council members from the City of San Bruno.

- C/CAG's Stormwater Program Director worked with Green Schoolyards America and the San Mateo County Office of Education to promote the Schoolyard Forest Leadership Institute to San Mateo County school districts. The institute will be piloted for the first time in the Bay Area in fall 2026 and is intended to support school sites and districts in making the necessary institutional transformations that will support deeper integration of nature-based solutions, including GI, in schoolyard greening initiatives.
- Engaged directly with the San Mateo County Office of Education (SMCOE) on advancing stormwater-related partnerships for facility improvements through the SMCOE Sustainable and Climate Ready Schools Initiative. On April 29, 2026, program staff took part in the SMCOE's Climate Ready Schools Symposium, connecting with superintendents, principals, and school administrators to advance stormwater and climate-resilience education in local schools. Additionally, on November 17, 2025, April 15, 2026, and April 20, 2026, Program staff tabled at the Mills High School Sustainability Expo (fall session), the San Mateo High School Sustainability Expo, and the Mills High School Sustainability Expo (spring session), respectively. At these expos, program staff talked with students, teachers, and school administrators about potential stormwater and climate-resilience projects for their schools.

The BAMSC FY 2025/26 Annual Report Regional Supplement for New Development and Redevelopment (Appendix 3) provides additional information on regional participation in processes to promote GI.

# FUTURE ACTIONS

In FY 2026/27, SMCWPPP plans to continue working with the NDS to conduct the following activities to assist San Mateo County municipalities to comply with MRP Provision C.3:

- Continue to exchange information with San Mateo County municipalities on MRP implementation and other timely issues through NDS meetings and/or C.3 workshops.
- Continue to conduct GI outreach and education with the public, municipal staff, and elected officials and further raise awareness about GI, including supporting and highlighting local GI projects and leveraging the GI video series, through the SMCWPPP website and GI Tracking Tool.
- Continue to coordinate with other related SMCWPPP subcommittees as needed (e.g., the Public Information and Participation Subcommittee to engage on GI outreach).
- Continue updating and improving the GI Tracking Tool, including training on use for Permittees as needed and updating the database of completed GI projects.
- Continue to collaborate with BAMSC and Bay Area countywide stormwater programs on MRP 3.0 implementation, particularly GI implementation and guidance, updates to the BSM and BWM specifications and supplier lists, and designs for bioretention with trees through the BAMSC DS Trees in GSI Work Group.
- Collaborate with the BAMSC DS and Water Board staff, participate in regional development-related work groups as appropriate, and engage in discussions related to continued negotiations for MRP 4.0.

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- Continue advancing the Regional Project Planning and Collaborative Program Framework, including advancing the initial phase of the MOU-based program to support implementation of the existing planned regional projects and to support long-term funding for the operations and maintenance of the completed regional project at Orange Memorial Park. New program elements and outputs may include development and legal review of the interim MOU-based Regional Collaborative Program, documents supporting initial pilot cost-sharing (e.g., a model MOU and/or interagency agreement, and O&M certification or other credit tracking and certification documents), and implementation of initial cost-sharing arrangements focused on the regional stormwater capture project at Orange Memorial Park.
- Continue supporting, as needed, the Cities of San Bruno, Belmont, and Redwood City on advancing designs, environmental review and construction for regional projects and seek new partnership and funding opportunities to advance these projects towards implementation.
- Seek additional funding to support OneWatershed Infrastructure implementation, via implementation funds for early pilot projects and additional watershed-scale OneWatershed resilience data tools and resources.
- Continue seeking funding for pilot Resilient San Carlos Schoolyards projects and other schoolyard greening projects in the county, building from prior concept planning and engagement efforts. In parallel, as part of C/CAG's core outreach program, continue implementing pilot rain barrel installations at schools and community organizations, including community-based workshops demonstrating how to install rainwater harvesting systems and providing details on C/CAG's and BAWSCA's rebate programs. Continue supporting the County Office of Education's Sustainable and Climate Ready Schools Initiative through community partnership.
- Seek additional opportunities to partner on and fund a pilot green infrastructure workforce development program in San Mateo County.
- Continue supporting member agencies in pursuing funding for implementing projects identified in the Sustainable Streets Master Plan, focusing on the initial 11 project concepts.
- Continue administering the rainwater harvesting rebates and additional incentives for residential rain garden installations as part of the Lawn Be Gone! rebate program, in partnership with BAWSCA. The rain barrel rebate program will include two planned pilot bulk-order distribution events hosted in partnership with C/CAG member agencies to keep up momentum and encourage participation in the program. Continue to integrate GI outreach efforts to include information focused on the rain garden and Lawn Be Gone! rebate program and lawn/rain garden integration replacement process.
- Plan to present at the annual CASQA conference in October 2026 on the OneWatershed Climate Resilience Framework and Community-Led Plan and two panel presentations focused on working with Community-Based Organizations on multi-benefit stormwater projects and the challenges and opportunities around integrating climate resilience into stormwater programs for compliance benefit.
- Participate in the Bay Area One Water Network as opportunities arise.
- Continue participating on the San Francisco Estuary Partnership Implementation Committee on behalf of the BAMSC and SMCWPPP to support funding for GI.

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# SECTION 4
# C.4 INDUSTRIAL AND COMMERCIAL SITE CONTROLS

## INTRODUCTION

Provision C.4 requires Permittees to implement an industrial and commercial site inspection and control program at all sites which could reasonably be considered to cause or contribute to pollution of stormwater runoff, with follow-up and enforcement consistent with local Enforcement Response Plans (ERPs), to prevent discharges of pollutants and impacts on beneficial uses of receiving waters. The provision identifies specific elements of the program including identifying sites to inspect (C.4.b.ii.(1)), inspection frequency (C.4.b.ii.(2)), inspection content (C.4.d.ii.(1)), data tracking (C.4.b.ii.(3) and C.4.d.ii.(2)) and staff training (C.4.e).

San Mateo County Permittees are responsible for complying with various commercial and industrial business facility inspection requirements under MRP Provision C.4. SMCWPPP's Commercial, Industrial and Illicit Discharge (CII) component assists San Mateo County Permittee staff with understanding these MRP requirements and develops various related tools, templates, reporting forms, and other MRP compliance support materials. The CII component also assists San Mateo County Permittees to comply with other MRP provisions that are discussed in other sections of this report (Sections 5, Illicit Discharge Detection and Elimination and Section 13, Copper Controls).

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

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## IMPLEMENTATION OF MRP PROVISIONS

SMCWPPP performs a variety of tasks to assist San Mateo County Permittees with implementation of MRP Provision C.4, with input and assistance provided by the CII Subcommittee. FY 2025/26 accomplishments included the following:

- Held two CII Subcommittee meetings;
- Held an Industrial, Commercial, and Illicit Discharge Stormwater Inspector Workshop; and
- Updated the business stormwater inspector contact list on the SMCWPPP website.

More information about 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 MRP compliance. The

Subcommittee met two times during FY 2025/26 with good participation by municipal staff, as shown by the attendance list (Appendix 4). Patrick Ledesma, County Environmental Health, chaired the CII Subcommittee for the December 2025 meeting and Dan Sternkopf, SMCWPPP Senior Program Specialist, chaired the Subcommittee for April 2026 meeting.

The meetings provided the opportunity for municipal staff to share their experiences with implementing the MRP provisions related to the CII component, including Provision C.4. During FY 2025/26 meetings, the subcommittee discussed a number of pertinent topics, including MRP requirements, BASMAA surface cleaner certification program, mobile businesses, illicit discharges, annual reporting, outreach materials, industrial facilities that are potential sources of copper, coordinating with PG&E, and MS4 map updates. The subcommittee also discussed other MRP provision requirements that may overlap with inspectors' activities including Provision C.15.b.iii emergency firefighting discharges, and Provision C.17 unsheltered homeless populations.

## Program Materials

SMCWPPP has developed a variety of materials to assist municipal agency staff with implementing Provision C.4. These materials are all available on the SMCWPPP website (flowstobay.org) and continue to be useful tools that assist agency staff to achieve MRP compliance. The materials include a Stormwater Facility Inspection Form Template, a Stormwater Facility Inspection Tracking Excel Template, and outreach materials.

## CII Training Workshop

The Industrial, Commercial, and Illicit Discharge Stormwater Inspector Training Workshop was held on May 28, 2026 in-person at San Mateo Main Library Oak Room and was attended by 39 people. The workshop covered the regulatory requirements of sotrmwater inspections, inspector resources, a city's industrial site inspection case study, a city's illicit discharge investigation case study, and a group exercise reviewing inspection photos. Appendix 4 includes a copy of the workshop agenda, attendance list and evaluation summary. Based on the evaluation forms submitted, attendees generally found the workshop was useful and met their expectations.

# FUTURE ACTIONS

FY 2026/27 activities planned by SMCWPPP to assist San Mateo County Permittees in complying with requirements in MRP Provision C.4 include the following:

- Hold two CII Subcommittee meetings; and
- Assist San Mateo County Permittees with the implementation of commercial and industrial stormwater inspection tasks, including updating the Business Inspection Plans (BIP) template, Enforcement Response Plans (ERP) template, and inspection form and inspection tracking table, as needed.

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# SECTION 5
# C.5 ILLICIT DISCHARGE DETECTION AND ELIMINATION

## INTRODUCTION

Provision C.5 requires Permittees to implement an illicit discharge control program that includes centralized complaint collection and follow-up to target illicit non-stormwater discharge sources. The provision identifies specific elements of the program including follow up and enforcement consistent with local Enforcement Response Plans (C.5.b), a central contact point for complaints and spill reporting (C.5.c.), mobile business discharge control program (C.5.e.), and spill and discharge complaint tracking system (C.5.d).

A primary goal of SMCWPPP's Commercial, Industrial and Illicit Discharge (CII) component is to assist San Mateo County Permittees to effectively prohibit the discharge of illicit, non-stormwater discharges to the municipal storm drain system. San Mateo County Permittees are responsible for controlling non-stormwater discharges prohibited by MRP Provision C.5. SMCWPPP's CII component assists San Mateo County Permittee 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 Permittees to comply with other MRP provisions that are discussed in other sections of this report (see Section 4, Industrial and Commercial Site Controls, and Section 13, Copper Controls).

SMCWPPP's CII component is coordinated through the CII Subcommittee. See Section 4 for further details about the CII Subcommittee.

## IMPLEMENTATION OF MRP PROVISIONS

During FY 2025/26, SMCWPPP performed a number of tasks to assist San Mateo County Permittees 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;
- Updated the Countywide mobile business inventory;
- Updated the Illicit Discharge contact list on the SMCWPPP website; and
- Held an Industrial, Commercial, and Illicit Discharge Stormwater Inspector Training Workshop (see Section 4 for details).

More information on these accomplishments is provided below.

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## 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 (flowstobay.org) and continue to be useful tools that assist agency staff to achieve MRP compliance. The materials include an Illicit Discharge Investigation Field Form template, an Illicit Discharge Tracking Excel Template, and outreach materials.

In FY 2024/25, Countywide Program staff worked with the CII Subcommittee to develop guidance for the MRP Provision C.5.f requirement that Permittees submit a Plan and Schedule with their September 2026 annual reports to identify information missing from current MS4 maps and compile additional storm sewer system information. The guidance included an annotated outline and presentation at the January 2025 Subcommittee meeting.

Countywide Program staff also continued to make other outreach materials available on the SMCWPPP website (flowstobay.org).

## Mobile Business Source Control

Available on the members only section of the SMCWPPP website is the countywide inventory of mobile businesses operating in San Mateo County. The mobile businesses identified in the inventory fall into the following categories: carpet cleaners, auto washers, steam cleaners, power washers, graffiti removal, mobile fuelers and pet care providers. The county inventory of mobile businesses is updated annually.

There are currently 170 mobile businesses on the inventory. There are approximately 33 mobile car cleaners, 35 carpet cleaners, 14 pet groomers, 9 fuelers, 30 power washers, and other miscellaneous mobile cleaner businesses (e.g., trash bin washers, steam cleaning, etc.). The inventory will be provided to the Regional Water Board upon request to meet reporting requirements in C.5.e.iii.(1)(e) on behalf of SMCWPPP permittees.

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 members only section of the SMCWPPP website. The table is updated annually with additional enforcement action information. A letter is mailed to mobile businesses that received enforcement actions in different jurisdictions. The letter includes the Mobile Business BMP flyer in English, Spanish and Chinese.

In addition, BAMSC has a long-standing Surface Cleaner Training and Recognition program (developed by BASMAA[1]) that focuses on improving the use of BMPs for businesses that clean surfaces (i.e., sidewalks, plazas, parking areas, and building exteriors). In FY 2025/26 SMCWPPP participated in the BAMSC regional Work Group to review the materials (e.g., quiz, videos, BMPs, and webpage) and provide recommended updates. San Mateo County Permittees have continued to refer cleaners to BAMSC's website for surface cleaning training materials.

In March 2026, SMCWPPP mailed a letter and copies of the appropriate SMCWPPP mobile business BMP fact sheet to all the mobile businesses on the countywide inventory. The SMCWPPP Mobile Business BMP fact sheet was provided in English, Spanish, and Chinese. The SMCWPPP Mobile Fueling BMP fact sheet was provided in English.

[1] BASMAA was dissolved as a 501(c)(3) non-profit organization in FY 2021/22 but this program is continuing via the Bay Area Municipal Stormwater Collaborative (BAMSC).

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The SMCWPPP PIP Subcommittee consultant includes mobile business BMP topics in their social media posts and ad materials, e-newsletter, blog article and links to the mobile business fact sheets in general social posts. The social media posts were tailored to pet grooming, steam cleaning, and carpet cleaning businesses, informed owners and customers about best practices. Four example social media posts are below. There was also a section in the Flows to Bay winter community newsletter (distributed to 4,452 community members) that was dedicated to best practices that mobile business owners, cleaners, and customers can utilize to prevent stormwater pollution. A new blog was publised on the SMCWPPP website on March 24, 2026 on *Mobile Business Best Practices: How Power Washing and Exterior Cleaning Services Can Do Great Work and Protect Our Waterways*. This blog was written for power washers, auto detailers, pet groomers, and carpet cleaners, and the property owners who hire them.

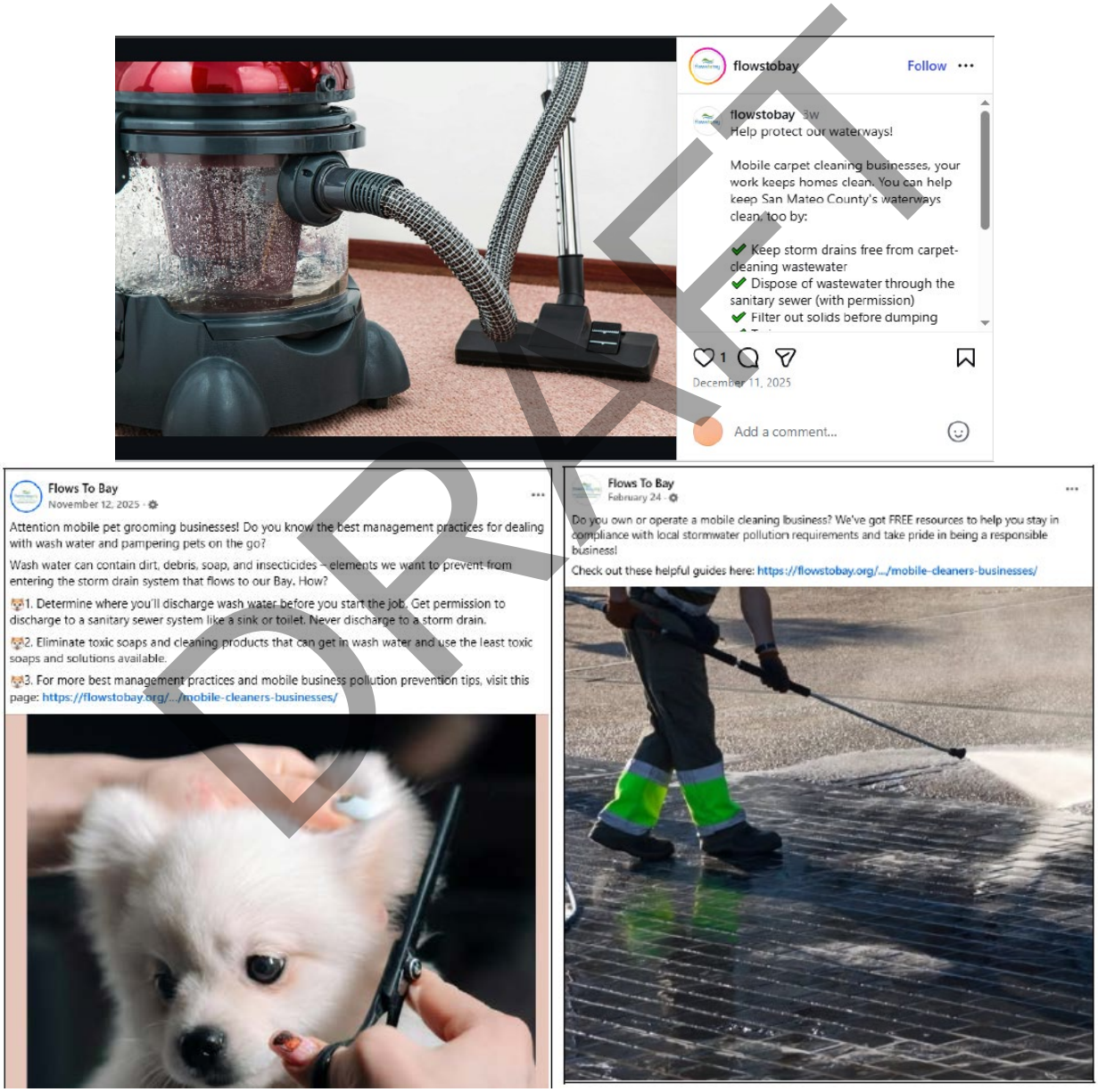


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**Figure 5-1 Example Social Media Posts for Mobile Cleaner BMPs.**

# FUTURE ACTIONS

During FY 2026/27, SMCWPPP will assist San Mateo County Permittees comply with the requirements in MRP Provision C.5 by:

- Holding two CII Subcommittee meetings;
- Assisting with the implementation of illicit discharge detection and elimination tasks, including updating existing or developing new outreach materials as needed, and updating the Enforcement Response Plans (ERP) template, Illicit Discharge Investigation Field Form, and Illicit Discharge Tracking Template as needed; and
- Assisting Permittees in complying with the requirements for controlling mobile sources in MRP Provision C.5.e, including providing updated information on mobile business BMPs as needed, sharing enforcement information, annually updating the countywide mobile business inventory, and conducting outreach activities.

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# SECTION 6
# C.6 CONSTRUCTION SITE CONTROL

## INTRODUCTION

This component of SMCWPPP assists San Mateo County municipalities in complying with MRP Provision C.6 (Construction Site Control) which requires Permittees to implement a construction site inspection and control program at all construction sites, with follow-up and enforcement consistent with local Enforcement Response Plans (ERPs), to prevent construction site discharges of pollutants and impacts on beneficial uses of receiving waters. Assistance continued to be provided through the New Development Subcommittee (NDS, see Section 3 for more details). Countywide Program staff also obtained input and direction from municipal 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 2025/26 include the following tasks to assist San Mateo County municipalities with implementation of MRP Provision C.6:

- Provided updates to the NDS at meetings and through emails on the reissued State Construction Stormwater General Permit (Order 2022-0057-DWQ, effective September 1, 2023), and Qualified Stormwater Pollution Prevention Plan Developer (QSD) or Practitioner (QSP) training opportunities (see Section 3 for more details about the NDS).

### Construction Site Stormwater Inspection (C.6) Form

With assistance from the NDS and staff from the City of San Mateo, SMCWPPP updated the Construction Site Stormwater Inspection Form and distributed the form to permittees for their use.

The form is included in Appendix 6 and posted on the SMCWPPP website.

## FUTURE ACTIONS

FY 2026/27 activities planned by SMCWPPP to assist San Mateo County Permittees comply with requirements in MRP Provision C.6 include the following:

- Continue to share information about construction site controls among San Mateo County municipalities through NDS meetings;
- Continue to provide training materials to construction site inspectors; and
- Continue to coordinate with partner organizations to provide information on construction-related stormwater issues.

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# 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. Per Provision C.8, a complete documentation of all water quality monitoring data collected from October 1, 2025 through September 30, 2026 (i.e., Water Year 2026 or WY 2026) will be presented in SMCWPPP's Urban Creeks Monitoring Report, which will be submitted to the Regional Water Board by March 31, 2027.

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# 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 residents' participation and involvement in SMCWPPP activities.

Public information and participation is essential for controlling and reducing the source of pollution since many preventable pollutants are associated with everyday residential activities. 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 2025/26

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 did not meet in FY 2025/26; however, outreach updates were sent to the Subcommittee on a bi-annual basis and posted to SMCWPPP's members-only website. Links to the reports are included in Appendix 7A.

SMCWPPP's PIP accomplishments during FY 2025/26 include the following:

- Partnered with the Bay Area Water Supply Conservation Agency (BAWSCA) to promote the countywide Rain Barrel Rebate in association with the Bulk Rain Barrel Pilot Outreach Program. SMCWPPP executed a targeted digital ad campaign for the Rain Barrel Rebate on Google Ads and Meta that earned over 575,000 impressions and 6,000 clicks. SMCWPPP also secured 40 airings of a rain barrel radio PSA with a nonprofit coastside community radio station to promote the Half Moon Bay distribution event and the Rain Barrel Rebate. Together, this campaign directly resulted in the Event landing page earning 15,800 views from 5,700 active users during the campaign - an approximately 1,500% increase from the preceding period. The supporting Rain Barrel outreach campaign received 77 rebate applications from residents for a total of 119 rain barrel installations. Over 3,484 rain barrels have been installed to date in San Mateo County under the rebate program.
- Partnered with BAWSCA to promote the Rain Garden Rebate as part of the Lawn Be Gone! Rebate. The program received four rebate applications from residents in FY 2025/26.
- Implemented rain garden-related posts on social media and the Flows To Bay website driving awareness of rebate availability and eligibility requirements and directing residents to the "Rain

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Gardens & Rebate Program" webpage, which earned 1,166 pageviews and 108 downloads of program materials this fiscal year.

- Continued to share the "How Do Rain Gardens Work?" video that was initially created in FY 2022/23 with residents via social media, the website, and e-newsletters. It has now received over 10.1K views on YouTube to date.
- Supported and continued to engage with the San Mateo County Office of Education (SMCOE) on advancing stormwater-related partnerships for facility improvements through the SMCOE Sustainable and Climate Ready Schools Initiative, including attending the SMCOE's event in Redwood City on November 15, 2025, and participating in the SMCOE Climate Schools Symposium on April 29, 2026.
- Promoted Coastal Cleanup Day, helping to gain 4,067 volunteers at over 30 countywide locations, resulting in 25,147 pounds of litter reported being collected and raising awareness of the event and the consequences of littering behaviors.
- Promoted the efforts of San Mateo County Environmental Health Services (EHS), including a campaign to reduce littering of cigarette butts, the Household Hazardous Waste (HHW) Collection Program, the Used Motor Oil/Filter Recycling Program, Fishing Smart in SF Bay, Safe Medicine Disposal, the School Share Table Program, Healthy Nail Salon, and ReFuel Your Fun.
- Promoted Caltrans' "Tarp Your Load" educational material regarding uncovered loads (in English and Spanish).
- Maintained an Instagram following of over 1,100 followers with 103 posts, reached 1,803 unique users each month on average, and enjoyed 429 interactions in posts with stormwater pollution prevention messaging, ad campaigns, and relevant partner shares.
- Maintained over 25,600 followers on Facebook, earning a total reach of approximately 123,713 and 1,599 interactions through stormwater pollution prevention messaging, event promotion, ad campaigns, and relevant partner shares.
- Maintained over 4,458 email subscribers and tracked an estimated average open rate of 21.4%, an estimated average 4.1% click rate, and an estimated average 19.0% clicks per unique opens rate.
- Delivered seven e-newsletters total. Six of these were promotions for the 2025 Bulk Rain Barrel Distribution Program. Of these six emails, three were targeted to a large subset of subscribers based activity signals which marked them as more likely to engage with the Program. These emails reached approximately 3,426 of Flows to Bay's voluntary email subscribers with the list removing users if they successfully interacted with the previously sent emails to avoid redundant sendouts. The other three of these six promotional emails were sent to a much smaller audience of individuals who opted into the waitlist for the Bulk Rain Barrel Program in prior years. The final newsletter sent was an event survey meant to collect feedback on the Bulk Rain Barrel Distribution event. This seventh newsletter was sent to 130 individuals who participated in the 2025 distribution event.
- Received 33,692 annual visitors to the SMCWPPP website, which focuses on stormwater pollution prevention messaging, and provided resources to residents, businesses, teachers, and city departments and municipalities. SMCWPPP recorded a large number of foreign automated clicks to the website late 2025 and early 2026. All website data in this report has been filtered to account for these botted clicks.
- Participated in 20 public outreach and citizen involvement events with an estimated total of 5,970 engaged participants or attendees. These in-person events provided educational content and solutions to interested residents, businesses, and youth, and also offered participants the opportunity to have their questions answered.

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- Participated in two countywide stormwater-focused campus events, pairing classroom presentations about stormwater pollution prevention and rainwater harvesting with hands-on installation workshops where SMCWPPP supported and facilitated the on-campus installation of two rainwater harvesting systems (one 205-gallon and one 265-gallon), reaching 148 total attendees.

# IMPLEMENTATION OF MRP PROVISION C.7

## C.7.a. Outreach Campaigns

### *Bulk Rain Barrel Pilot Outreach Program*

The Bulk Rain Barrel Outreach Program in San Mateo County consisted of a combination of digital engagement, two city partnerships, and two in-person events. The goal of this outreach program is twofold. The first is to address barriers for San Mateo County residents wanting to install rain barrels on their properties. These barriers, identified through multiple survey data, include the high cost of rain barrels and the lack of convenience for finding rain barrels in the County. The second aspect of this program is to promote the San Mateo County Rain Barrel Rebate Program and increase participation in the rebate program.

Continuing on the success of the rain barrel distribution campaign from FY 2024/25, SMCWPPP launched the fifth annual Bulk Rain Barrel Program. SMCWPPP partnered with Rain Water Solutions in FY 2025/26 to plan two distribution events, maintaining the momentum of previous years and the program's success in encouraging rain barrel installations and rebate applicants in San Mateo County through lower-cost, high-quality rain barrels that can be pre-purchased and picked up at central locations within the County. The City of Daly City hosted the first distribution event on November 1, 2025, and the City of Half Moon Bay hosted the second distribution event on November 8th, 2025, increasing access to the program for coastside residents.

Together, SMCWPPP, the City of Daly City, the City of Half Moon Bay, and Rain Water Solutions were able to provide an opportunity to deliver 231 high-quality, lower-cost rain barrels to 134 community members in a convenient manner, while advancing the benefits of stormwater harvesting and stormwater pollution-prevention messaging. A postcard (Figure 7-1) was placed in each rain barrel for distribution during the events. The postcard included information about the Rain Barrel Rebate, the relevant rain barrel resources on the SMCWPPP website, and encouraged recipients to participate in the rain barrel story map.

Combining the bulk discount rate with the rebate incentive gave residents in BAWSCA-participating member agency service areas the opportunity to receive a rain barrel at zero net cost (Figure 7-2).

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**Figure 7-1. Postcard distributed during the rain barrel pickup events.**

**Figure 7-2. SMCWPPP and city staff helping local residents pick up their rain barrels at distribution events in Daly City (left) and Half Moon Bay (right).**

### *Campaign Results & Evaluation*

The FY 2025/26 program distributed 231 rain barrels across two events, including the program's first coastside distribution event in Half Moon Bay, which significantly expanded access to the program for coastal communities.

Results of the Bulk Rain Barrel Outreach Program as of June 30, 2026:

- 575,451 impressions earned through paid Meta ads, Google ads, and social media-boosting promotions.
- 6,110 clicks earned through paid Meta ads, Google ads, and social media-boosting promotions.
- 15,802 views from 5,718 active users received for the campaign landing page during the flight of digital ad campaigns promoting the event. This represents an approximately 1,500% increase in views to this landing page compared to the period preceding the campaign.
- 3,629 total opens and 381 total clicks earned from newsletters promoting the distribution event, including both Flows To Bay's general newsletter subscriber list and a highly engaged group of individuals who opted into waitlist notifications the previous year.
- 34 downloads of the FY 2025/26 rain barrel paper application with rebate information on the relevant SMCWPPP webpage.
- 231 barrels sold and distributed to 134 San Mateo County (SMC) residents, which will capture nearly 11,550 gallons of water each time the barrels are entirely filled.
- 77 Rain Barrel Rebate applications from SMC residents this FY received by BAWSCA.
- 36 or more of the BAWSCA rebates administered in San Mateo County this FY came from purchasers at the two events.

**Follow-Up Survey.** To take a deeper dive into the program's success, and to improve program efforts, SMCWPPP designed and distributed a survey via e-newsletter in June 2026 to 130 program participants, which received a 20% response rate. The full survey report is attached in Appendix 7B. Key survey takeaways included:

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- 88% of respondents were "very satisfied" or "somewhat satisfied" with the rain barrel program. Three individuals reported being "somewhat unsatisfied" or "very unsatisfied".
- 88% of respondents stated that they successfully set up their rain barrel and had no trouble doing so, and 96% were able to complete their installation. This implies that Flows To Bay's instructions regarding rain barrel set-up were intuitive, accessible, and easily understood.
- 92% of respondents indicated they would be "very likely" or "somewhat likely" to recommend the program to someone they know.

**Landing Page.** The digital components of this program included a webpage on the SMCWPPP public education website, flowstobay.org. Visit the "San Mateo Countywide Half-Price Rain Barrel Sale" landing page on the website. This page provides details of both the rebate program and the Bulk Rain Barrel Outreach Program, including a form to quickly understand how much of the rebate residents are eligible for, a step-by-step video on rain barrel installation, details on ordering and picking up the rain barrel, and a list of rain barrel installers for additional assistance. Residents that were interested in participating in the program were sent to an e-commerce site set up by Rain Water Solutions to purchase a barrel online securely. View the Half Moon Bay sale page on the Rain Water Solutions website.

To promote the program and rebate, SMCWPPP sent out six e-newsletters, published posts in English, Spanish, and traditional Chinese on its Instagram and Facebook platforms with 26K+ total followers, distributed a communications toolkit (Download the SMC Rain Barrel Sale Promotional Toolkit) to partnering agencies with a request to help spread the word on their own communications channels and launched paid digital advertising on Google and Meta in English, Spanish, and traditional Chinese (Figure 7-3; Figure 7-4; Figure 7-5). The results of these marketing efforts are described in Table 7-1. See section C.7.d. Watershed Stewardship Collaborative Efforts for more information and results.

**Table 7-1. Bulk Rain Barrel Pilot Outreach Program - Multimedia Promotional Campaign Results**

| Platform | Impressions | Clicks/Engagement |
|---|---|---|
| Campaign Landing Page | 15,802 | 375 |
| Meta Ads | 202,426 | 1,914 |
| Google Ads | 333,026 | 3,264 |
| Boosted Meta Posts | 23,665 | 736 |
| E-Newsletter | 3,629 | 381 |

SMCWPPP also developed a rain barrel radio public service announcement (PSA) in English and Spanish and pitched it to Bay Area radio stations, including KCBS, KXSF, Pacifica Network stations, and KHMB/KHMV-LP. The PSA was secured and aired in English with KHMB/KHMV-LP, a 501(c)(3) non-profit coastside community station serving the San Mateo County Mid-Coast, with additional online listenership across the Peninsula and other Bay Area communities. Program staff worked with the station to finalize a script tailored to its coastside audience, focusing on the November 8th distribution event in Half Moon Bay and the Rain Barrel Rebate. The station ultimately elected to air the English version based on its listenership. **The PSA aired eight times per day across five days (40 total airings) to promote the event**, and the program received an additional organic on-air mention from the host of the station's Friday morning call-in show. See section C.7.d. Watershed Stewardship Collaborative Efforts to view the PSA script.

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SMCWPPP updated the Rain Barrel Rebate flyer with clarified rebate information and reprinted it for distribution to PIP members and for use in outreach (Figure 7-6). To support promotional efforts, an event-specific flyer was developed for each municipality, Daly City (Figure 7-7) and Half Moon Bay, to distribute at community events leading up to the rain barrel event. SMCWPPP promoted the rain barrel program and rebate to students and community members at the two school rain barrel installation workshops in May 2026 — sharing the updated flyers, the waitlist for next year's bulk sale, and additional rain barrel resources to support participation in the broader program. See C.7.e. School-Age Children Outreach for more information about these events and promotional activities. Educational information and the Rain Barrel Rebate flyer were shared with the public at all three IPM tabling events at program stores and placed on the community corkboard at Lyngso Garden Materials, Inc. (Figure 7-8). See Section 9 Point of Purchase Outreach for more information about these events.

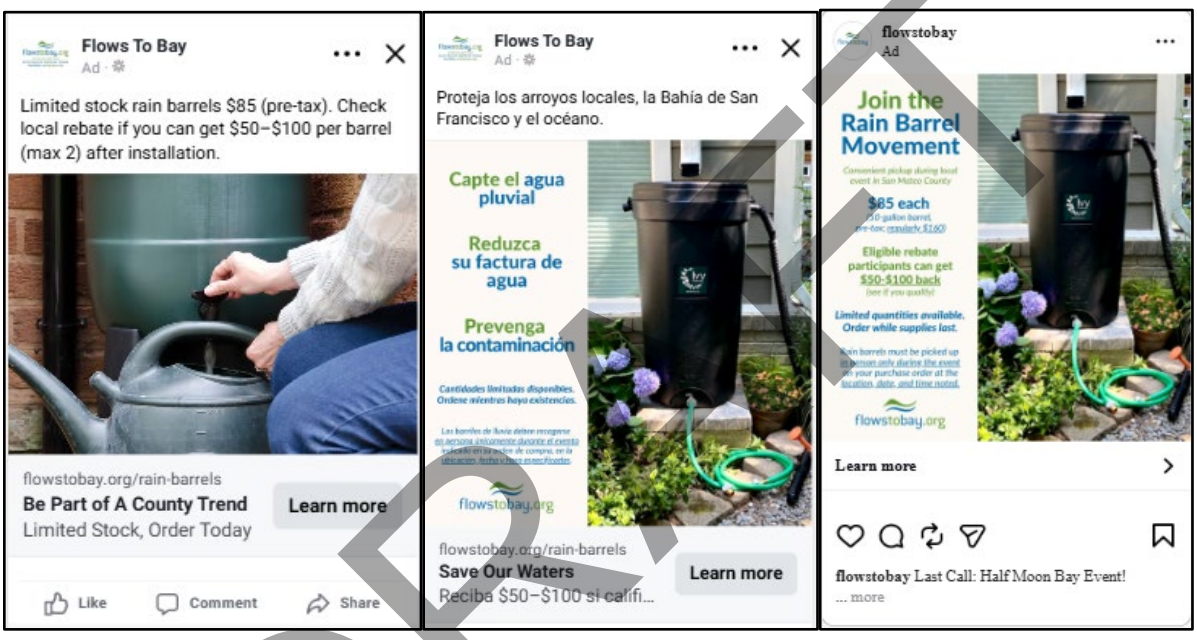


**Figure 7-3. Examples of the rain barrel program ads for the Meta Ads campaigns.**

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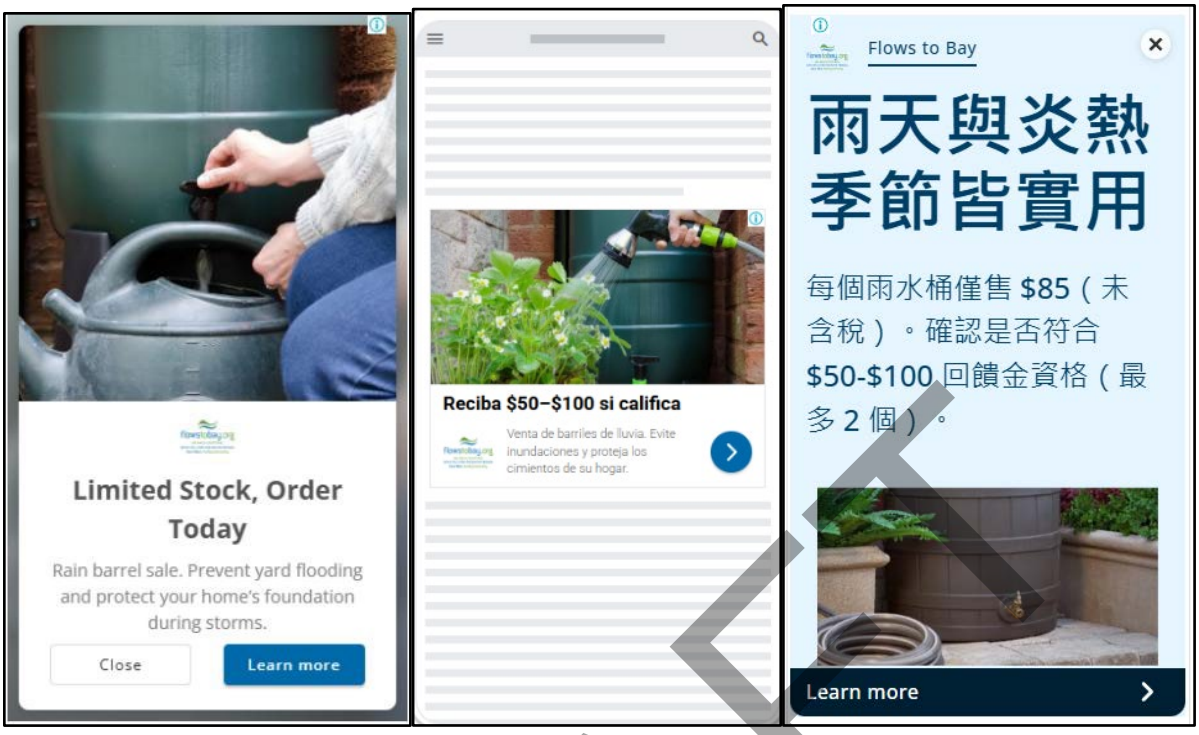


**Figure 7-4. Examples of the rain barrel program ads for the Google Ads campaigns.**

**Figure 7-5. An image from the FY 2024/25 Rain Barrel Distribution event as featured in the Community Newsletter promoting the FY 2025/26 Rain Barrel Distribution Program.**

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**Figure 7-6. Updated Rain Barrel Rebate flyer.**

**Figure 7-7. Event-specific flyer developed for Daly City's rain barrel pickup event.**

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**Figure 7-8. Photograph of the flyers about the benefits of and relevant rebates for rain gardens and rain barrels placed on Lyngso Garden Materials, Inc.'s community corkboard.**

### *Rain Garden Outreach Program*

In FY 2025/26, SMCWPPP continued outreach efforts to promote the Rain Garden Rebate as part of the BAWSCA Lawn Be Gone! (LBG) lawn conversion rebate program. Viewers can read about the Rain Garden Rebate on the main website. The rebate provides a flat rate of $300 to residents in the participating BAWSCA member agency jurisdictions when approved rain gardens are installed with a qualifying lawn replacement project. SMCWPPP efforts throughout the fiscal year included:

- Continued to promote an educational animated video on rain gardens and their benefits (that was created in FY 2022/23) on the website and social media (Figure 7-9). Watch the "How Do Rain Gardens Work?" YouTube video.
- Continued to maintain the online video resources section on the rain garden webpage (Figure 7-10). View the "Rain Gardens & Rebate Program" webpage on the Flows to Bay website for resources.
- Posted rain garden-related posts on social media directed to the "Rain Gardens & Rebate Program" webpage (Figure 7-11). Visit the "Rain Gardens & Rebate Program" webpage on the Flows to Bay website.
- Updated the Rain Garden Rebate flyer with clearer rebate information and a new design, and reprinted it for distribution to PIP members and for use in outreach (Figure 7-12).
- Published information about the Rain Garden Rebate in the blog, "From Flooded Street to Flowing Creek: San Bruno's Latest Green Infrastructure Win" (Figure 7-16). Read the blog about green infrastructure in San Bruno on the Flows to Bay website.

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- Shared rain garden educational materials with the public at events throughout the year, including Cultura Fest in South San Francisco (August 23), the San Mateo County Office of Education's tabling event in Redwood City (November 15), Mills High School's Sustainability Event in Millbrae (November 17), both school rain barrel installation workshops (Connect Community Charter on May 6 and Gateway Center School on May 12), and all three IPM tabling events at OWOW stores in Millbrae, Pacifica, and San Carlos, where materials were also placed on the community corkboard at Lyngso Garden Materials, Inc.
- Partnered with PIP members who are also BAWSCA Rain Barrel Rebate-participating agencies to help promote the rain garden rebate.

Residents were directed to the rain garden webpage on the website to get more information on rain gardens and their benefits. Interactive "before" and "after" photos are included to demonstrate how the rebate can be implemented in residents' yards, along with information about the Lawn Be Gone! (LBG) Rebate and the rain garden addition, along with additional resources. View the "Rain Gardens & Rebate Program" webpage on the Flows to Bay website.

### *Campaign Results & Evaluation*

The results of the campaign conducted in FY 2025/26 included:

- Four Rain Garden Rebate applications were submitted in FY 2025/26.
    - Of the four applicants, one rebate application was approved, one is pending approval, and one is still in review. Together, these three completed rain garden projects represent a 50% increase from FY 2024/25.
- 1,166 pageviews on the Rain Garden Rebate webpage.
- 108 total downloads of materials on the program webpage, including the "Rebate Program Terms and Conditions" and "Rain Garden Rebate: Pre- and Post-Conversion Site Inspection Checklist".
- 1,418 impressions from campaign promotional materials.
    - 660 impressions to relevant blog posts
    - 654 impressions from related social media posts
    - 104 impressions on the educational animated video

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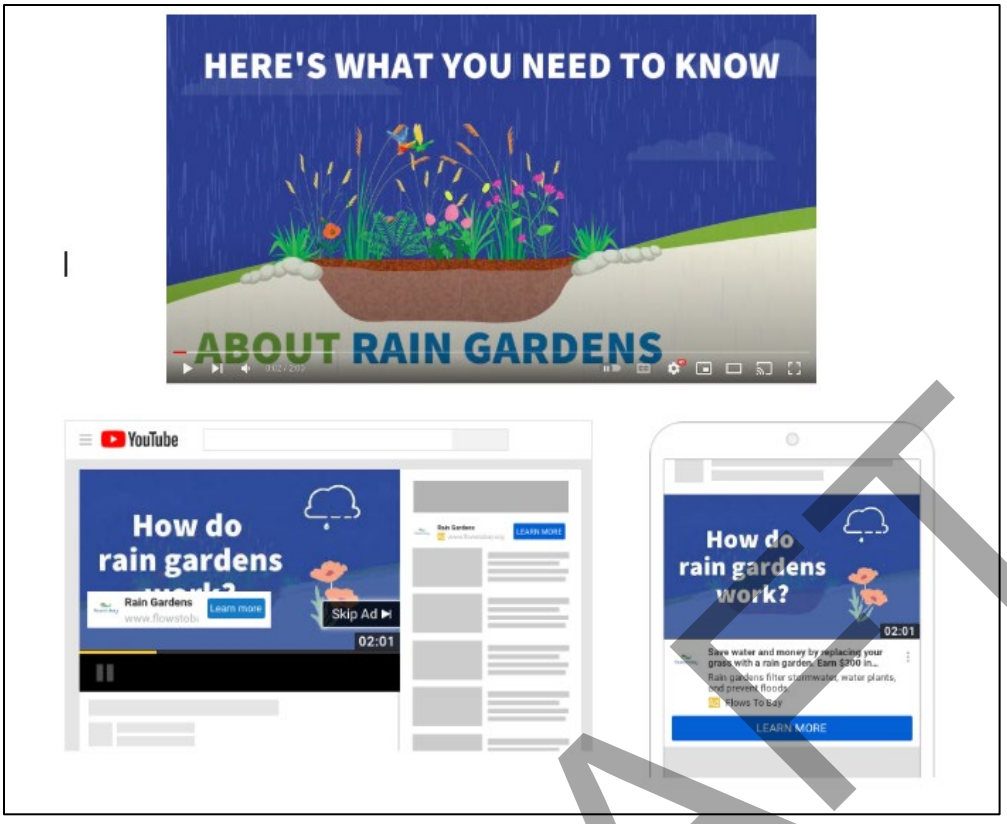


**Figure 7-9. Examples of promotion of the rain garden educational video.**

**Figure 7-10. Online website resources, including sample design plans, past webinars, and guides.**

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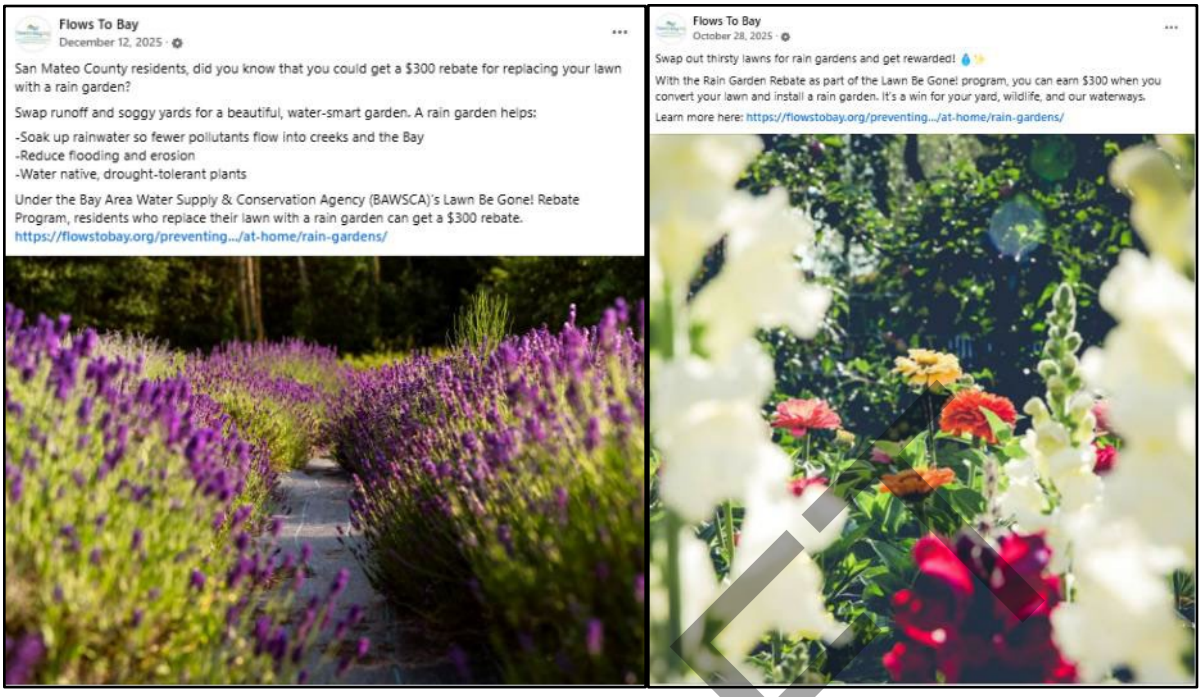


**Figure 7-11. Examples of social media posts promoting rain gardens and the Rain Garden Rebate.**

**Figure 7-12. Updated Rain Garden Rebate flyer.**

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### *Green Streets Stewards Pilot Program Continuation*

The goal of Green Streets Stewards (GSS) Program was to pilot a foundational program to support current and ongoing green stormwater infrastructure (GSI) facility maintenance needs across different jurisdictions while also engaging and educating residents, students, and community groups on the function and value of GSI. The pilot, which began in FY 2020/21 in partnership with the UC Master Gardeners of San Francisco and San Mateo County, aimed to educate residents and community groups on the function and value of GSI, and to promote sustainable stormwater management by empowering residents and community groups to perform basic maintenance on their local GSI in cooperation with the local municipal government agencies. The pilot program operated through FY 2022/23 with two events held at Integrated Safe Routes to School and Green Streets Pilot Program bioretention projects located in the City of Half Moon Bay and the City of Pacifica. In total, the program supported 11 events over three active program fiscal years. Due to program resource constraints under MRP 3.0, the pilot program was put on hold starting in FY 2023/24.

## C.7.b. Stormwater Pollution Prevention Education

For C.7.b. Stormwater Pollution Prevention Education, SMCWPPP continued to use social media, the SCMWPPP website, and the electronic newsletter to promote stormwater pollution prevention messages.

### *Social Media*

SMCWPPP continued to maintain the social media platforms of Facebook and Instagram. These platforms were used as a tool for two-way communication and have continued to be an effective method to engage with residents. With an established Facebook presence consisting of over 25,600 followers and an Instagram following of over 1,100, SMCWPPP focused its efforts on maintaining engagement and followership on both platforms.

Facebook and Instagram were used to publicize stormwater issues, watershed characteristics, and stormwater pollution prevention alternatives. The platforms were also used to inform the public of environmental outreach events, promote a shift towards incorporating sustainable behaviors into daily lifestyles, and provide environmental and marine news relevant to San Mateo County pollution prevention. The accounts were monitored on a weekly basis throughout the fiscal year. As part of the overall effort to enhance social presence and engagement with followers, SMCWPPP invited conversation and responded to residents' questions, often directing them to resources on the website.

In FY 2025/26, SMCWPPP also strengthened the accessibility of its social media content so that pollution prevention messaging reaches as many community members as possible. Staff conducted an ADA compliance review and implemented improvements across social media posts, including adding alternative text to images and adjusting graphics to meet accessibility standards.

The following is a breakdown of tasks and evaluation metrics associated with social media activity for FY 2025/26:

- Continued utilizing Facebook as a two-way communication tool to share and exchange information on pollution prevention messages between SMCWPPP residents, businesses, nonprofits, and community stakeholders within San Mateo County. Specific program messages included watershed protection and water pollution prevention, the benefits of GSI, including green streets, rain gardens, rain barrels and rainwater harvesting, schoolyard greening, and the El Zanjon Creek restoration in San Bruno, litter and trash reduction, cleanup volunteering, integrated pest management, pet waste, wash water pollution prevention for residents and

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mobile businesses, household hazardous waste and safe disposal, and fish consumption risk reduction content.

- Utilized Facebook and Instagram to promote Flows To Bay events, such as the Bulk Rain Barrel Program, IPM tabling events at partner hardware stores, and the two school rain barrel installation workshops.
- Continued to utilize Facebook (Figure 7-13) and Instagram (Figure 7-14) as the SMCWPPP website's advertising platforms to further promote messages.

**Facebook metrics:**

- Maintained roughly 25,600 followers. *This is a 1% decrease from the previous FY.*
- Earned 1,207 total page visits (number of times people viewed the page). *This is a **43% increase** from the previous FY.*
- Reached approximately 123,713 users (number of people who had content from the page enter their screens). *This is a 33% decrease from the previous FY.*
- Posts earned 1,599 content interactions (likes, comments, and shares). *This is a **211% increase** from the previous FY.*
- Published a total of 105 Facebook posts.

**Instagram metrics:**

- Maintained 1,183 followers. *This is a **3% increase** from the previous FY.*
- Earned 416 total page visits (number of people who viewed the page). *This is a **64% increase** from the previous FY.*
- Earned 429 content interactions (likes, comments, and shares). *This is a **108% increase** from the previous FY.*
- Received 21 saves on posts. *This is a **62% increase** from the previous FY.*
- Received 424 website clicks from posts. *This is a **38% increase** from the previous FY.*
- Published a total of 97 Instagram account posts.
- Published a total of six Instagram story posts.

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**Figure 7-13. Examples of FY 2025/26 Facebook Posts.**

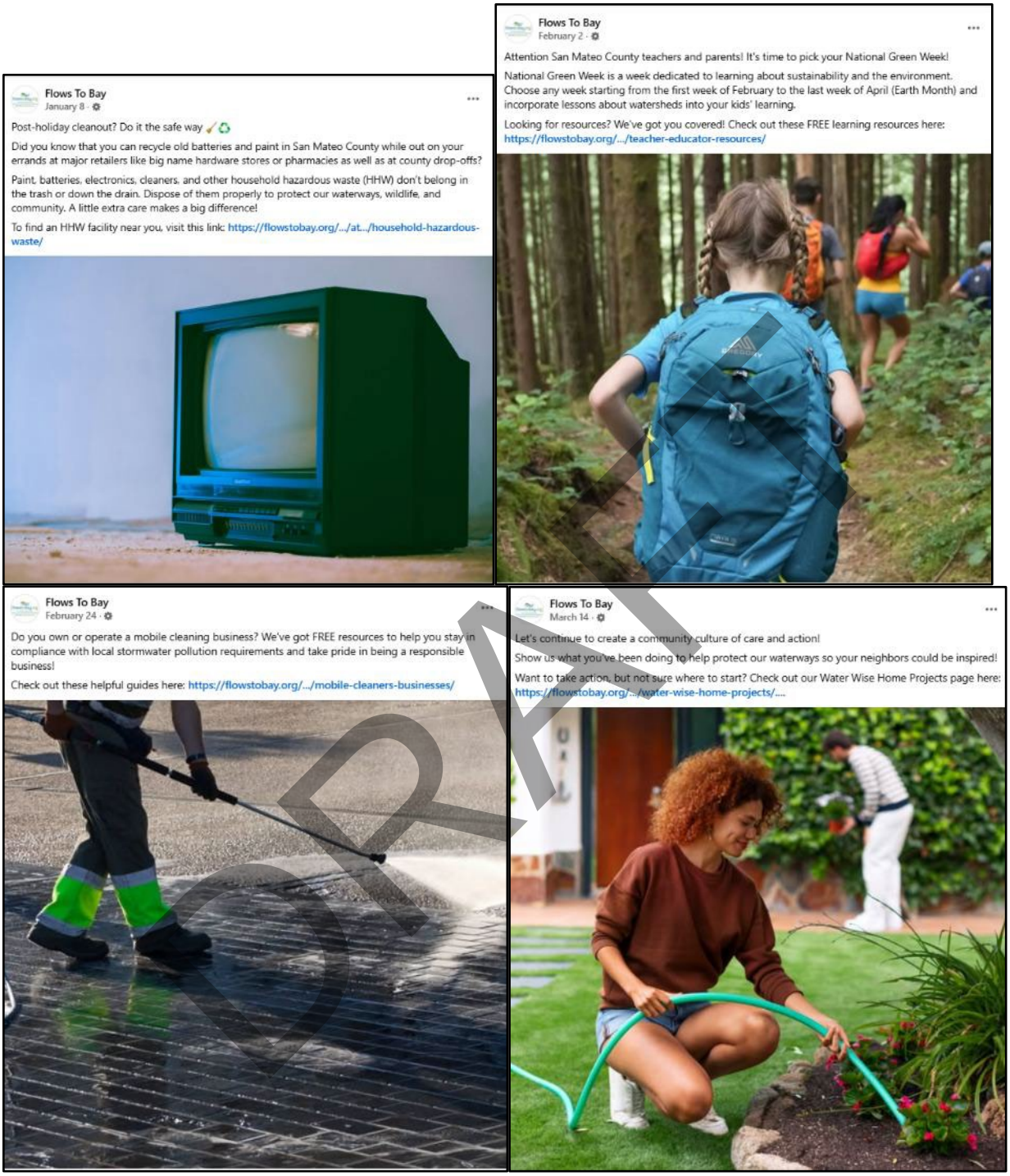


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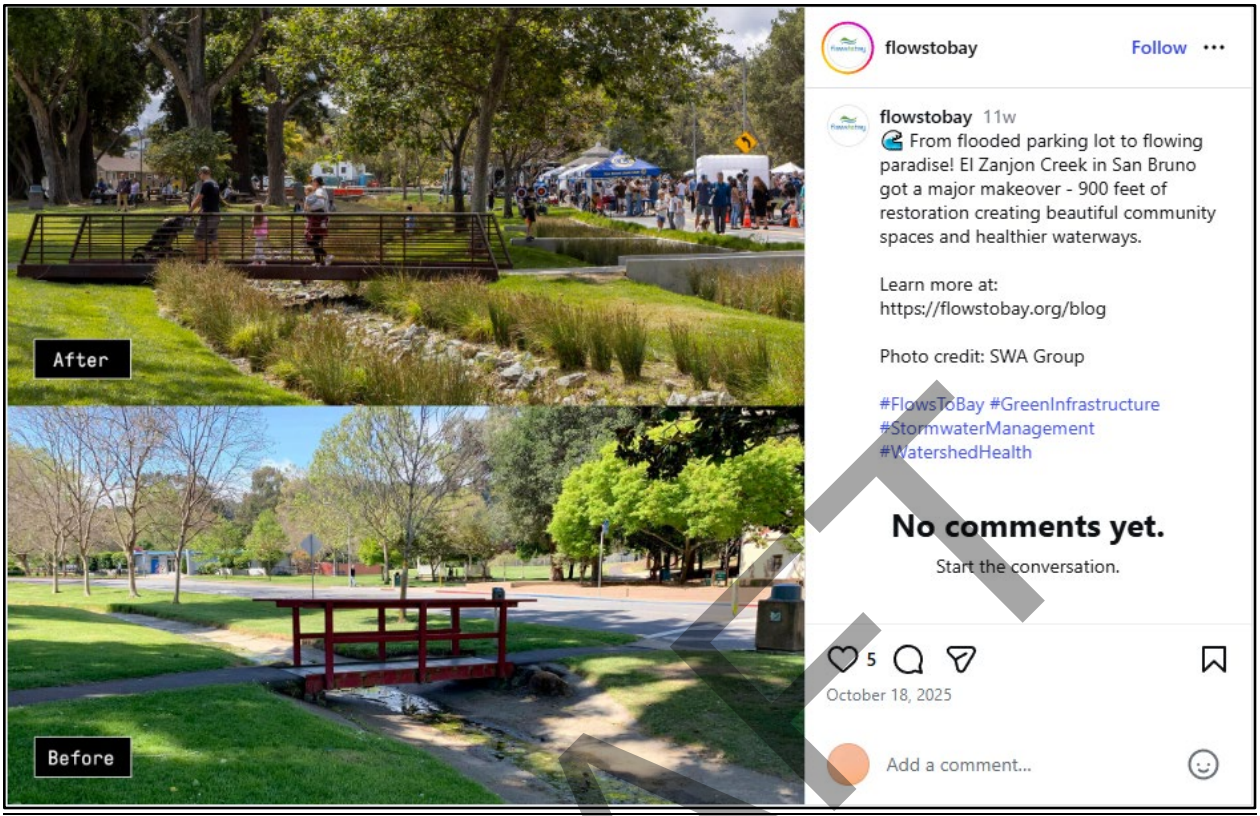
**Figure 7-13. Examples of FY 2025/26 Facebook Posts (continued).**



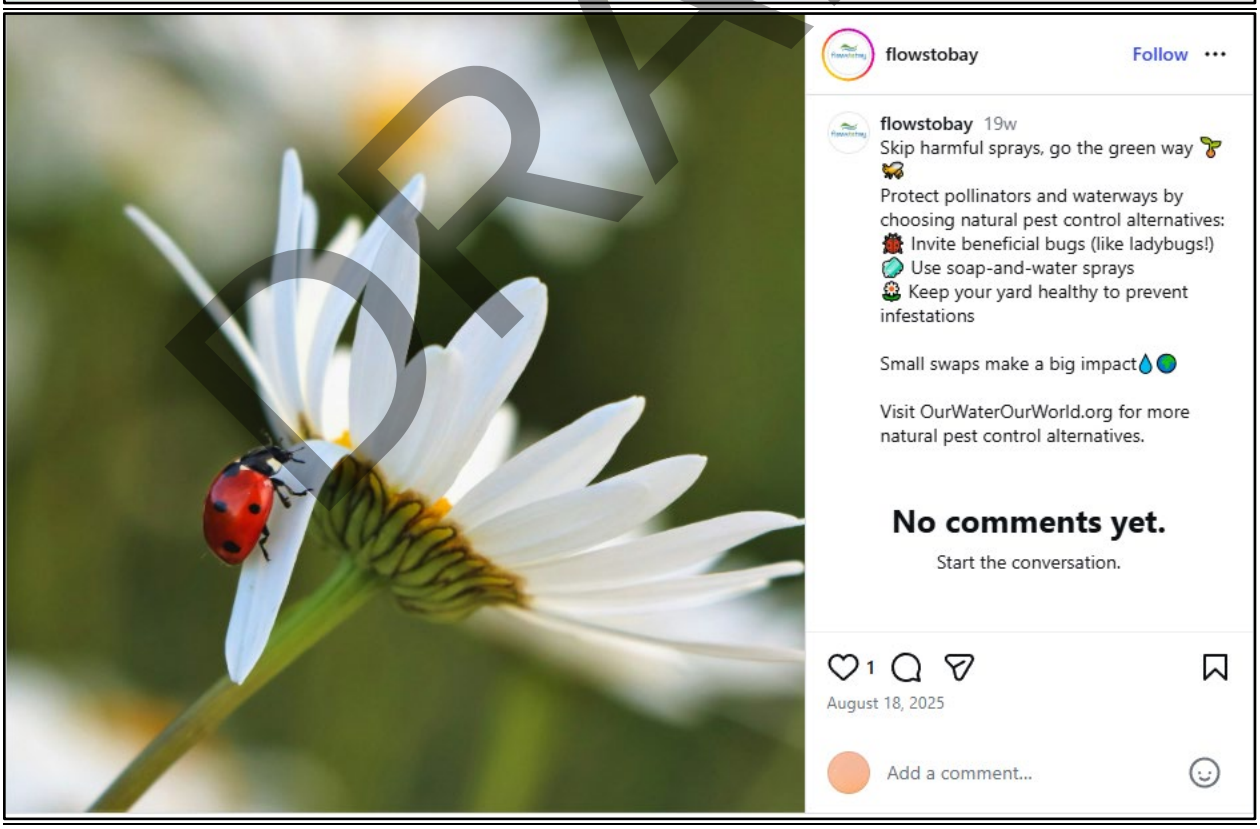




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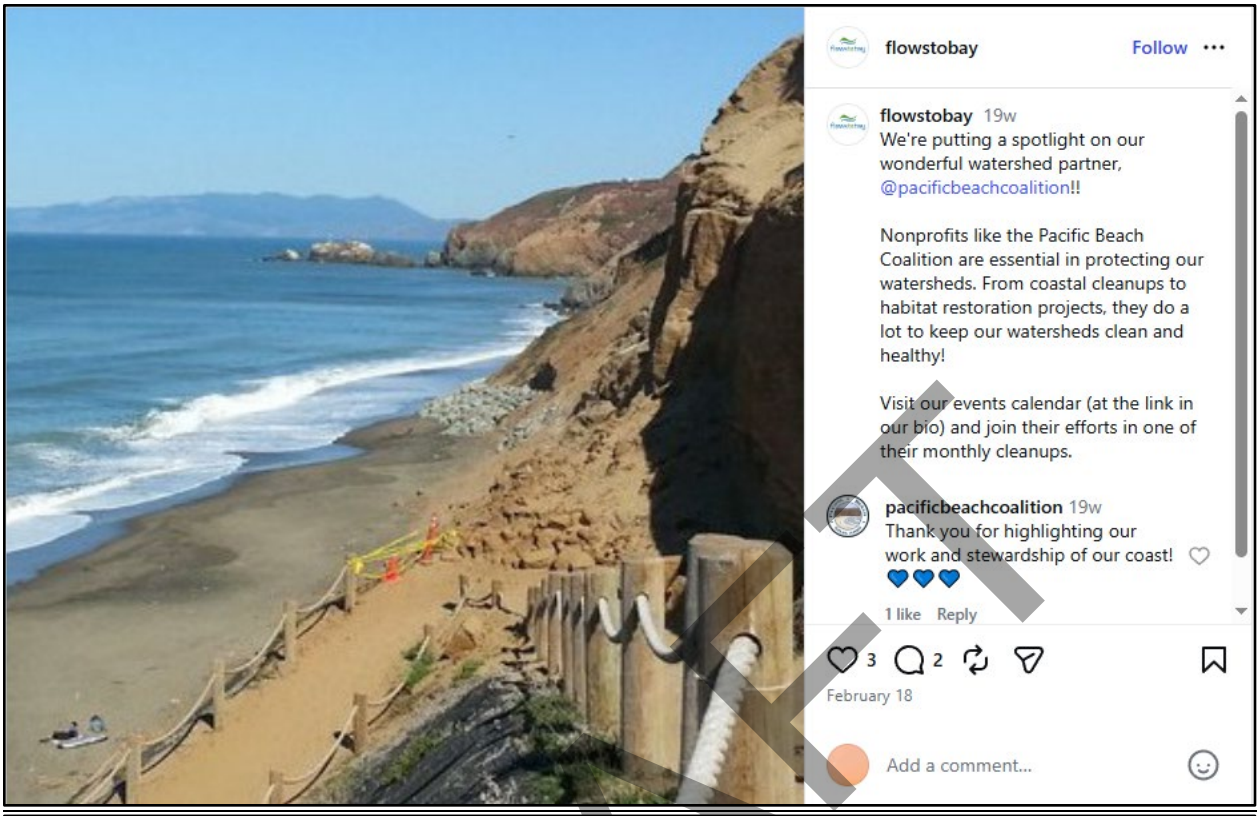
**Figure 7-14. Examples of FY 2025/26 Instagram Posts.**



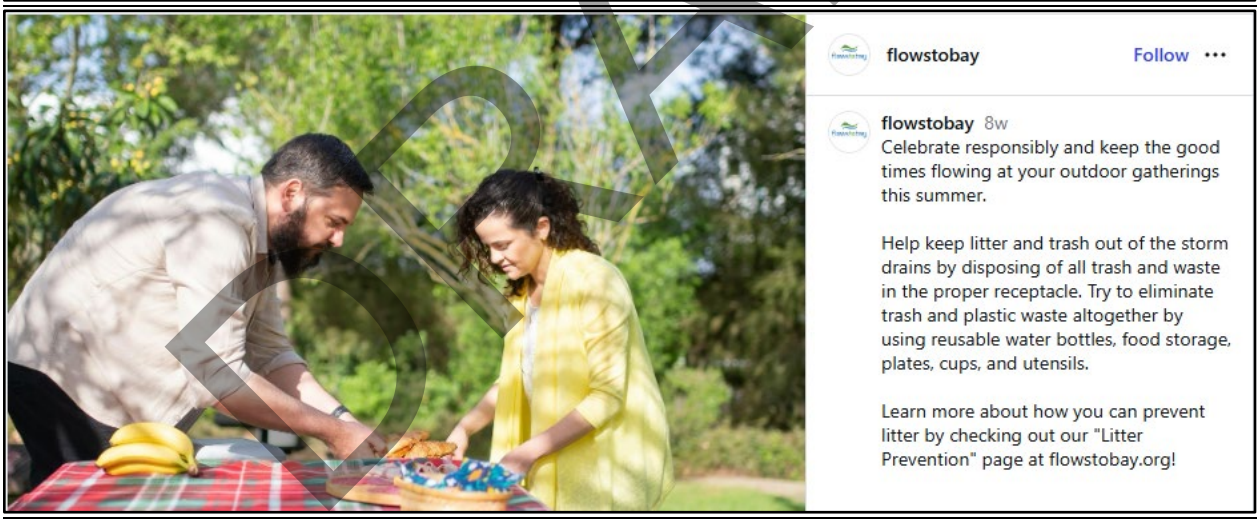




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**Figure 7-14. Examples of FY 2025/26 Instagram Posts (continued).**

### *Newsletter*

The SMCWPPP newsletter is used to publicize stormwater issues, watershed information, upcoming events, and stormwater pollution prevention options to residents. A total of seven e-newsletters were sent during FY 2025/26, six of which promoted the fifth annual Bulk Rain Barrel Program. Table 7-2 details the data for each e-newsletter distributed.

Six e-newsletters were sent to promote the Bulk Rain Barrel Program: three to individuals who signed up for the prior fiscal year's waitlist and three to the community subscriber list. The final e-newsletter of the year was sent to individuals who purchased and picked up a rain barrel, reminding them about their rebate and asking them to complete a survey about their experience.

The six e-newsletters promoting the Bulk Rain Barrel Program, along with the final post-purchase survey e-newsletter, accounted for a combined total of 10,757 send-outs across the fiscal year. These seven e-newsletters had an average open rate of 21.4%, an average click rate of 4.1%, and an average clicks per unique opens* rate of 19.0%. Both the open rate and click-through rate exceeded the Campaign Monitor benchmarks for Government email newsletters of 19.4% and 2.8%, respectively. Read more about Campaign Monitor's benchmarks on their website.

*Clicks per unique opens refers to those who clicked/opened.

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**Table 7-2. SMCWPPP E-Newsletter Metrics for FY 2025/26**

| Subject Line | Content | Send Date | Total Recipients | Open Rate | Click Rate | Clicks Per Unique Opens. |
|---|---|---|---|---|---|---|
| Rain Barrel Bulk Program FY 25/26 Waitlist/Earlybird E-blast | • Announcement of the Rain Barrel Bulk Program opening sales to individuals on the waitlist from the previous fiscal year. | 9/16/2025 | 167 | 38.4% | 28.7% | 74.6% |
| Rain Barrel Bulk Program '25 KICKOFF E-blast — Community Newsletter | • Announcement of the Rain Barrel Bulk Program opening sales to the general public. | 9/21/2025 | 3,426 | 16.2% | 3.6% | 16.2% |
| Rain Barrel Sale Program '25 Reminder/Second NSL — Community Newsletter | • Reminder about the Bulk Rain Barrel Program to the community subscriber list. | 10/13/2025 | 3,369 | 21.6% | 2.8% | 12.7% |
| Rain Barrel Sale Program '25 Reminder/Second NSL — Waitlist 2025 | • Reminder about the Bulk Rain Barrel Program to individuals on the waitlist. | 10/13/2025 | 166 | 29.9% | 9.8% | 32.7% |
| Rain Barrel Sale Program '25 Third/Final NSL — Community Newsletter | • Final reminder about the Bulk Rain Barrel Program to the community subscriber list. | 10/18/2025 | 3,333 | 19.7% | 2.6% | 13.1% |
| Rain Barrel Sale Program '25 Third/Final NSL — Waitlist 2025 | • Final reminder about the Bulk Rain Barrel Program to individuals on the waitlist. | 10/18/2025 | 166 | 29.9% | 12.8% | 42.9% |
| Rain Barrel Survey FY 25/26 + Relevant Items | • Short survey for the Rain Barrel Bulk Program<br>• Reminder about the Rain Barrel Rebate and application process<br>• Rain Barrel Resources, Story Map, and Water-Wise Project Form | 6/25/2026 | 130 | 45.4% | 26.2% | 57.6% |

*Note: General average open rate is 35.63% and average click rate on articles is 2.62%. Source: Mailchimp's email marketing benchmarks (July 2026).*

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### *SMCWPPP Website*

This fiscal year, SMCWPPP linked or referenced content on the main website through various communication mediums, such as Facebook, Instagram, e-newsletters, blogs, and workshops for resources. SMCWPPP additionally regularly updates the online community events calendar with new entries. View all events published on the Flows to Bay online community events calendar. See Appendix 7C for blog and analytics data.

During FY 2025/26, the following updates were made to the SMCWPPP website:

- **Published a blog, "Mobile Business Best Practices: How Power Washing and Exterior Cleaning Services Can Do Great Work and Protect Our Waterways,"** directing mobile cleaners and the residents who hire them to best management practices and relevant resources for preventing stormwater pollution. Read the blog about mobile business best practices on the Flows to Bay website (Figure 7-15).
- **Published a blog, "From Flooded Street to Flowing Creek: San Bruno's Latest Green Infrastructure Win,"** featuring the recently completed El Zanjon Creek Restoration project in San Bruno as an example of how strategic green infrastructure investments can deliver community benefits and stormwater solutions. Read the blog about El Zanjon Creek on the Flows to Bay website (Figure 7-16).
- **Updated the Major Creeks of San Mateo County webpage** to showcase the El Zanjon Creek Restoration project. Read the new El Zanjon Creek section on the Flows to Bay website (Figure 7-17).
- **Updated the "Rain Barrels & Rebate Program" page, the Rain Barrel Paper Rebate Application hosted on this page, the "Rain Gardens & Rebate Program" page, and several other pages related to rain barrels and rain gardens.** The goal of these updates was to ensure residents were informed and empowered to participate in the San Mateo County rain barrel and rain garden rebate programs. View the updated application on the "Rain Barrel & Rebate Program" page on the Flows to Bay website. Visit the updated "Rain Gardens & Rebate Program" page on the Flows to Bay website.
- **Added two new fire-related Best Management Practices fact sheets to the "Commercial Businesses" page**: Best Management Practices for Business Facilities Prone to Fires and Best Management Practices for Contractors Involved in Containment and Cleanup After Fires. View the factsheets on the "Commercial Businesses" page of the Flows to Bay website. These materials provide guidance on preventing firefighting pollutants from entering the storm drain system and local waterways. See C.15 Provision C.15.b.iii to learn more about these factsheets.
- **Uploaded the updated Greening Schoolyards in San Mateo County informational PDF to the "School Site Improvements" page**, summarizing the Greening Schoolyards program and all past school campus installation projects completed prior to FY 2025/26 in order to support outreach to new school partners and communities (Figure 7-23). Review the Greening Schoolyards PDF on the "School Site Improvements" page of the Flows to Bay website**.** See C.7.e. School-Age Children Outreach for more information about the program.
- **Created registration landing pages for the rain barrel installation workshops at Connect Community Charter School on May 6 and Gateway Center School on May 12** to support event sign-ups and promotion. View the Connect Community Charter School landing page on the Flows

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to Bay website. View the Gateway Center School landing page on the Flows to Bay website. See C.7.e. School-Age Children Outreach for more information about the school projects completed in FY 2025/26.

- **Added the OneWatershed Framework Report to the "OneWatershed Framework and San Bruno Creek OneWatershed Pilot Study" page**. The Report is intended to support the collaborative efforts of San Mateo County agencies and interested parties, working across jurisdictions, organizations, and watershed boundaries to achieve long-term and strategic climate resilience. View the Report on the OneWatershed Framework page on the Flows to Bay website.
- **Maintained and improved the website on an ongoing basis**, updating links and resolving technical issues as they arose.
- **Initiated a website accessibility audit with a certified accessibility consultant** to evaluate the Flows To Bay website against the Web Content Accessibility Guidelines (WCAG 2.2), the standard for ADA-compliant web content.
- **Through the online community events calendar, SMCWPPP countywide promoted community events throughout the fiscal year**, including San Mateo County Health's HHW drop-off events in La Honda (July 12) and Palo Alto (August 16), the rain barrel distribution events in Daly City (November 1) and Half Moon Bay (November 8), the Pacific Beach Coalition Earth Day and EcoFest 2026 (April 18), City of Belmont Earth Day 2026 (April 18), the City of San Mateo's Earth Day Cleanup at Ryder Park (April 25), and the rain barrel hands-on installation workshops at Connect Community Charter School (May 6) and Gateway Center School (May 12). Learn more about the events featured on the online calendar on the Flows to bay website.

During FY 2025/26, the SMCWPPP website had the following results (Table 7-3):

- 88,533 sessions *(49% decrease from FY 2024/25).*
- 65,846 new users *(54% decrease from FY 2024/25).*
- 124,277 page views *(44% decrease from FY 2024/25).*
- 2.64 sessions per user *(118% increase from FY 2024/25).*
- 1.40 pages viewed per session *(9% increase from FY 2024/25).*
- 00:00:53 average session duration *(33% increase from FY 2024/25).*
- 62.38% bounce rate *(17% decrease from FY 2024/25).*
- 6,572 file downloads *(24% decrease from FY 2024/25).*
- 1,903 outbound link clicks *(19% decrease from FY 2024/25).*

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**Table 7-3. Google Analytics metrics for FY 2025/26.**

| Event Type | Event Count | Total Users | Events per User |
|---|---|---|---|
| Page View | 124,277 | 33,628 | 3.71 |
| Session Start | 88,533 | 33,620 | 2.64 |
| User Engagement | 68,103 | 15,295 | 4.53 |
| First Visit | 65,846 | 33,105 | 1.99 |
| File Download | 6,572 | 2,379 | 2.76 |
| Click | 1,903 | 1,254 | 1.52 |

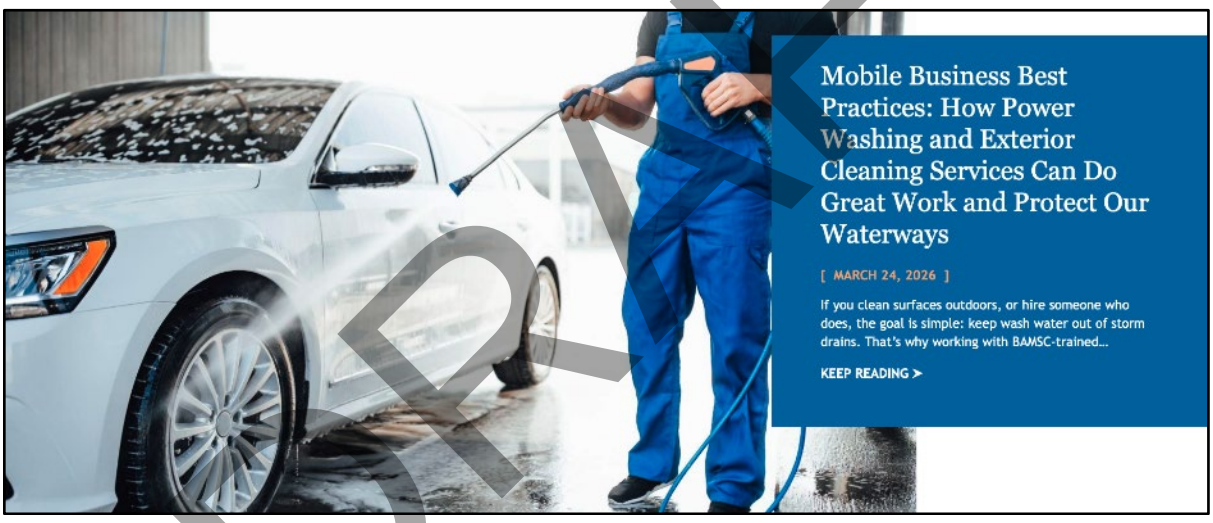


**Figure 7-15. Mobile business blog featuring best management practices for pollution prevention.**

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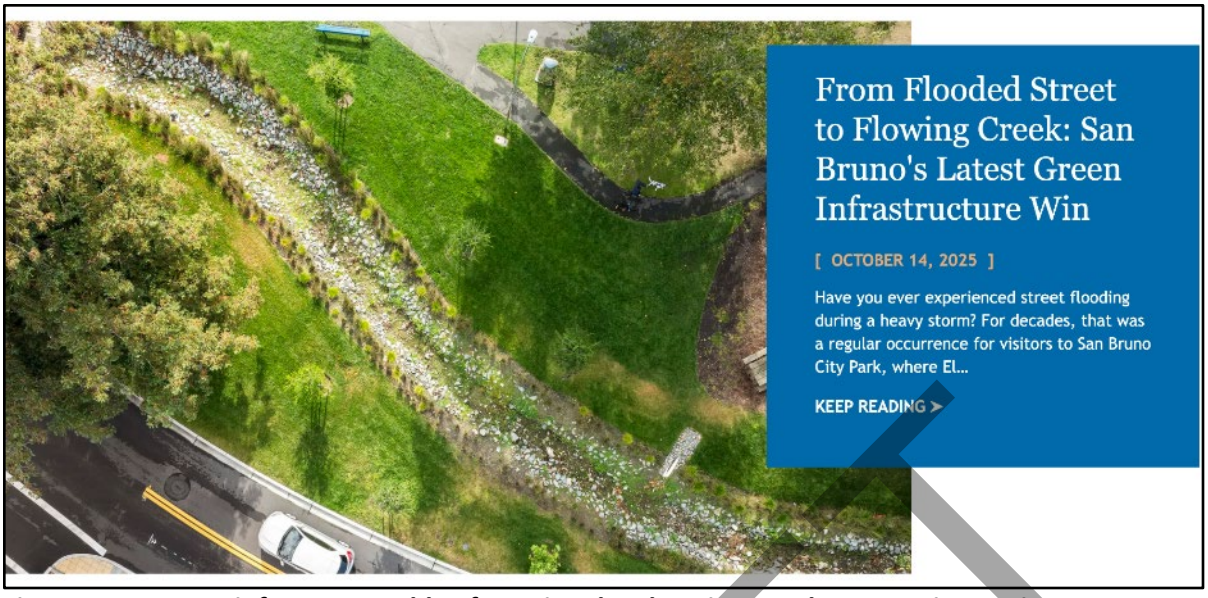
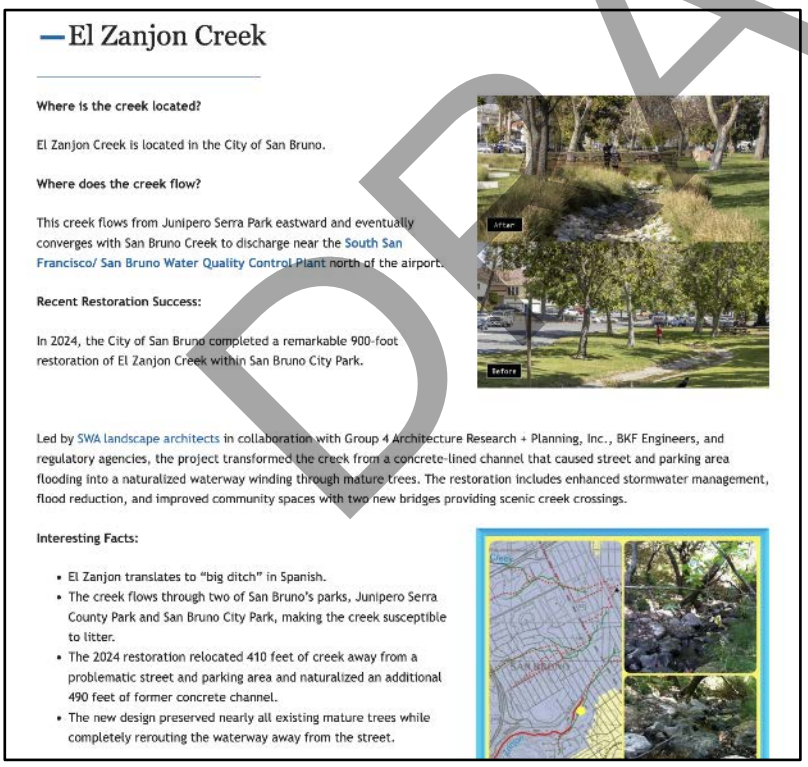



**Figure 7-16. Green infrastructure blog featuring the El Zanjon Creek Restoration project.**



## El Zanjon Creek

**Where is the creek located?**

El Zanjon Creek is located in the City of San Bruno.

**Where does the creek flow?**

This creek flows from Junipero Serra Park eastward and eventually converges with San Bruno Creek to discharge near the South San Francisco/ San Bruno Water Quality Control Plant north of the airport.

**Recent Restoration Success:**

In 2024, the City of San Bruno completed a remarkable 900-foot restoration of El Zanjon Creek within San Bruno City Park.



Led by SWA landscape architects in collaboration with Group 4 Architecture Research + Planning, Inc., BKF Engineers, and regulatory agencies, the project transformed the creek from a concrete-lined channel that caused street and parking area flooding into a naturalized waterway winding through mature trees. The restoration includes enhanced stormwater management, flood reduction, and improved community spaces with two new bridges providing scenic creek crossings.

**Interesting Facts:**

- El Zanjon translates to "big ditch" in Spanish.
- The creek flows through two of San Bruno's parks, Junipero Serra County Park and San Bruno City Park, making the creek susceptible to litter.
- The 2024 restoration relocated 410 feet of creek away from a problematic street and parking area and naturalized an additional 490 feet of former concrete channel.
- The new design preserved nearly all existing mature trees while completely rerouting the waterway away from the street.

**Figure 7-17. El Zanjon Creek section on the Major Creeks of San Mateo County webpage.**

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## C.7.c. Public Outreach and Citizen Involvement Events

### *Overview*

SMCWPPP directly participated in 20 public outreach and citizen involvement events in FY 2025/26 to reach a wide array of residents in different parts of the County (Figure 7-18 and Table 7-4). SMCWPPP hosted, co-hosted, and/or paid for the promotion and advertising of each event, and used online channels, such as Facebook, Instagram, the SMCWPPP website, and if applicable, paid digital advertising, and e-newsletters to promote events and gather participants countywide. In total, events had a reach of 176,844 with 5,970 event attendance.

### *Event Goals*

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

### *Outreach Materials*

The following SMCWPPP items are given out by request, provided to Permittees, organizations, and residents in San Mateo County (not including the less-toxic pest control items listed in Provision 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
- Pet waste tip card (English, Mandarin, and Spanish)
- Microplastics tip card (English, Mandarin, and Spanish)
- Litter tip card (English, Mandarin, and Spanish)
- "Tarp Your Load" flyer (English front, Spanish back)
- Green Stormwater Infrastructure fact sheet
- Rain Barrel Rebate and Rain Garden Rebate flyers (updated with new QR codes and design enhancements)
- Dog waste bag canister
- Branded metal straw with rubber tip and cleaner
- Recycled water bottle pens
- Branded book bags (new this FY 2025/26)

In the fall of 2025, SMCWPPP ordered a new type of branded bag. Amongst bag types, a book tote was selected to be flexible for both general public outreach and school-aged outreach. This new outreach material was ordered in three different shades of blue for community members to select their favorite.

- 75 Cool Blue book totes
- 75 Navy book totes
- 75 Royal Blue book totes

Additionally, during fall of 2025, SMCWPPP printed 400 copies of a postcard with information about the Rain Barrel Rebate, the relevant rain barrel resources on the SMCWPPP website, and the rain barrel Story Map to encourage participation in the Bulk Rain Barrel Program (Figure 7-1). A rain barrel postcard was placed in each rain barrel for distribution during the rain barrel pickup events. To support promotional

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efforts, an event-specific flyer was developed for each municipality, Daly City and Half Moon Bay, to distribute at community events leading up to the rain barrel event. Both municipalities received a digital copy of its flyer and SMCWPPP supported Half Moon Bay by printing and distributing 50 copies upon request.

The following materials were also printed to support distribution within the County to bolster stormwater education and outreach efforts, including for Permittees' annual material orders:

- 1000 Rain Barrel Rebate flyers (English)
- 1000 Rain Garden Rebate flyers (English)
- 1000 Pet waste tip card (English)
- 500 Pet waste tip card (Spanish)
- 250 Pet waste tip card (Chinese)
- 1000 Microplastics tip card (English)
- 500 Microplastics tip card (Spanish)
- 250 Microplastics tip card (Chinese)
- 1000 Litter tip card (English)
- 500 Litter tip card (Spanish)
- 250 Litter tip card (Chinese)

In FY 2025/26, SMCWPPP continued to share a green infrastructure poster, depicting a map with pin drops for places in the county where residents could find various stormwater systems in local neighborhoods, derived from the Green Infrastructure Story Map on the SMCWPPP website – at relevant community events, including to students and community members who attended the school rain barrel installation workshops at Connect Community Charter School (May 6) and Gateway Center School (May 12). The poster is included in the outreach event images below. View the Story Map on the Green Infrastructure page on the website.

### *Event Locations*

SMCWPPP hosted, co-hosted, and/or paid for the promotion and advertising of the public outreach and citizen involvement events identified in the table below. SMCWPPP promoted these events countywide through social media, the SMCWPPP website, e-newsletters, paid advertising, other engagement, and cross-promotion, so that community members throughout San Mateo County were encouraged to participate. The list below reflects the partnering jurisdictions where the events were held.

- San Mateo County (countywide)
- City of South San Francisco
- City of San Bruno
- City of Daly City
- City of Half Moon Bay
- City of Redwood City
- City of Millbrae
- City of San Mateo
- City of Pacifica
- City of Burlingame
- City of San Carlos

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**Table 7-4. A table cataloguing FY 2025/26 Public Outreach and Citizen Involvement Events**

Notes regarding how SMCWPPP's Role is defined in Table 7-4:

- Lead: SMCWPPP organized and hosted the event or activity.
- Co-lead: SMCWPPP attended, tabled, or delivered programming at an event hosted by a partner organization.
- Promotion: SMCWPPP promoted the event through its countywide communication channels.

| Dates | Event Location | Event Name | Type of Event | Estimated Event Attendance | Category | SMCWPPP's Role |
|---|---|---|---|---|---|---|
| September 20, 2025 | On-site/In-person — various locations, San Mateo County | Coastal Cleanup Day | Volunteer Effort | 4,067 volunteers | Resident Involvement | Promotion |
| August 23, 2025 | On-site/In-person — South San Francisco | Cultura Fest | Festival/Tabling | 1,000+ attendees | Public Outreach | Co-lead + Promotion |
| October 22, 2025 | On-site/In-person — Belle Aire Elementary School, San Bruno | OneWatershed Community Vulnerability Assessment Workshop (English) | Workshop | 27 attendees (total between English and Spanish workshops) | Resident Involvement + Public Outreach | Co-lead |
| November 3, 2025 | On-site/In-person — Belle Aire Elementary School, San Bruno | OneWatershed Community Vulnerability Assessment Workshop (Spanish) | Workshop | 27 attendees (total between English and Spanish workshops) | Resident Involvement + Public Outreach | Co-lead |
| November 1, 2025 | On-site/In-person — Daly City | Rain Barrel Distribution Event, City of Daly City | Distribution | 76 rain barrel buyers | Resident Involvement + Public Outreach | Lead + Promotion |
| November 8, 2025 | On-site/In-person — Half Moon Bay | Rain Barrel Distribution Event, City of Half Moon Bay | Distribution | 58 rain barrel buyers | Resident Involvement + Public Outreach | Lead + Promotion |
| November 15, 2025 | On-site/In-person — SMCOE, Redwood City | Tabling Event, San Mateo County Office of Education | Tabling | 50 (students + adults) | Public Outreach | Co-lead |

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| Dates | Event Location | Event Name | Type of Event | Estimated Event Attendance | Category | SMCWPPP's Role |
|---|---|---|---|---|---|---|
| November 17, 2025 | On-site/In-person — Mills High School, Millbrae | Tabling Event, Mills High School Sustainability Event | Tabling | 50 (students + organizations) | Public Outreach | Co-lead |
| April 15, 2026 | On-site/In-person — San Mateo High School, San Mateo | Tabling Event, San Mateo High School Sustainability Expo | Tabling | 50 (high school students) | Public Outreach | Co-lead |
| April 18, 2026 | On-site/In-person — San Bruno | San Bruno Resilience Fair | Fair/Tabling | 250 attendees | Public Outreach | Co-lead |
| April 20, 2026 | On-site/In-person — Mills High School, Millbrae | Tabling Event, Mills High School Sustainability Event | Tabling | 30 (high school students) | Public Outreach | Co-lead |
| April 29, 2026 | On-site/In-person — SMCOE, Redwood City | SMCOE Climate Schools Symposium | Symposium | 68 attendees | Resident Involvement + Public Outreach | Co-lead |
| May 6, 2026 | On-site/In-person — Connect Community Charter School, Redwood City | Rain Barrel Classroom Presentation | Presentation | 127 (120 students, 7 school staff) | Resident Involvement + Public Outreach | Lead + Promotion |
| May 6, 2026 | On-site/In-person — Connect Community Charter School, Redwood City | Rain Barrel Installation Workshop | Workshop/Installation | 128 (120 students, 1 community member, 7 school staff) | Resident Involvement + Public Outreach | Lead + Promotion |
| May 12, 2026 | On-site/In-person — Gateway Center School, San Mateo | Rain Barrel Classroom Presentation | Presentation | 20 (5 students, 12 community members, 3 school staff) | Resident Involvement + Public Outreach | Lead + Promotion |
| May 12, 2026 | On-site/In-person — Gateway Center School, San Mateo | Rain Barrel Installation Workshop | Workshop/Installation | 20 (5 students, 12 community members, 3 school staff) | Resident Involvement + Public Outreach | Lead + Promotion |
| June 6, 2026 | On-site/In-person — Outdoor Supply Hardware, Millbrae | Tabling Event, Outdoor Supply Hardware | Tabling | 15 customers | Public Outreach | Lead + Promotion |

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| Dates | Event Location | Event Name | Type of Event | Estimated Event Attendance | Category | SMCWPPP's Role |
|---|---|---|---|---|---|---|
| June 8, 2026 | On-site/In-person — American Red Cross San Mateo County Chapter, Burlingame | Stormwater Pollution Prevention Presentation to the American Red Cross San Mateo County Chapter | Presentation | 40 attendees | Public Outreach | Co-lead |
| June 13, 2026 | On-site/In-person — Hassett Ace Hardware, Pacifica | Tabling Event, Hassett Ace Hardware | Tabling | 18 customers | Public Outreach | Lead + Promotion |
| June 20, 2026 | On-site/In-person — Lyngso Garden Materials, Inc., San Carlos | Tabling Event, Lyngso Garden Materials, Inc. | Tabling | 23 customers | Public Outreach | Lead + Promotion |

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*(a)* *(b)*

*(c)* *(d)*

**Figure 7-18. Photos from various events attended by SMCWPPP throughout the fiscal year. a) SMCWPPP's local IPM expert tabling at a partner hardware store. b) Rain barrel installation workshop at Gateway Center School on May 12, 2026. c) Cultura Fest in South San Francisco on August 23, 2025. d) C/CAG staff and city partners at the rain barrel pick up event in Half Moon Bay on November 8, 2025.**

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## C.7.d. Watershed Stewardship Collaborative Efforts

### *Rain Barrel & Rain Garden Rebate Programs*

During FY 2025/26, SMCWPPP continued its partnership with the Bay Area Water Supply and Conservation Agency (BAWSCA) to promote the countywide Rain Barrel and Rain Garden Rebate Programs and inspire San Mateo County residents to join the rainwater harvesting movement and help promote other water conservation events. The programs subsidize the cost of purchasing a rain barrel by providing rebates up to $200 and provide a flat $300 rebate for approved rain garden installations as part of the Lawn Be Gone! Rebate.

Throughout the fiscal year, SMCWPPP promoted the rebates through updated and reprinted Rain Barrel and Rain Garden Rebate flyers distributed to PIP members and at in-person events, e-newsletter messaging, social media posts, and in-person conversations at the school rain barrel installation workshops and IPM tabling events.

From September 26 to October 26, SMCWPPP also ran digital advertisements in English, Spanish, and Traditional Chinese on Meta and Google, promoting its fifth annual Bulk Rain Barrel Rebate Program. These ads drove awareness of both the bulk sale and the year-round BAWSCA rebate available to residents. They were run in English, Spanish, and Chinese in order to increase equitable access to these programs. Examples of these ads are shown in Figure 7-19a and Figure 7-19b.

SMCWPPP also extended rebate promotion to radio, securing a rain barrel public service announcement (PSA) placement from October 22 to October 26 with KHMB/KHMV-LP, a nonprofit coastside community radio station primarily serving the San Mateo County Mid-Coast along with other communities across the Peninsula and Bay Area. The PSA script highlighted the year-round Rain Barrel Rebate alongside the November 8 distribution event in Half Moon Bay, and aired eight times per day across five days (40 total airings). The final PSA script has been included below:

> *Collect the rain – don't let it drain away!*
>
> *Homeowners can collect and save rainwater this winter with half-price rain barrels from Flows To Bay.org. Purchase up to two high-quality 50-gallon rain barrels for $85 each while supplies last. The barrels usually cost $160 each! Learn about the benefits of owning a rain barrel and how to receive $50–$100 back per barrel for up to two barrels through the local rebate program. Pick up your order on November 8th in Half Moon Bay. Supplies are limited – reserve yours now at Flows To Bay.org. Collect it, conserve it, and help prevent neighborhood flooding. Clean water – healthy community. Visit Flows To Bay.org*

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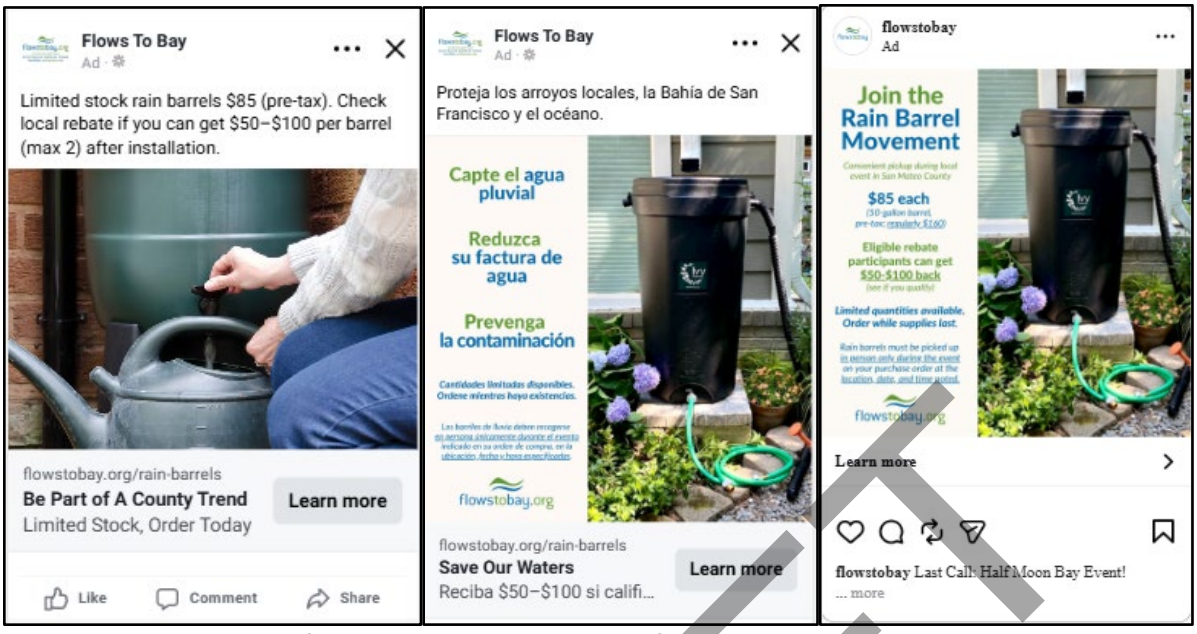


**Figure 7-19a. Examples of the rain barrel program ads for the Meta Ads campaigns which also promoted the Rain Barrel Rebate.**

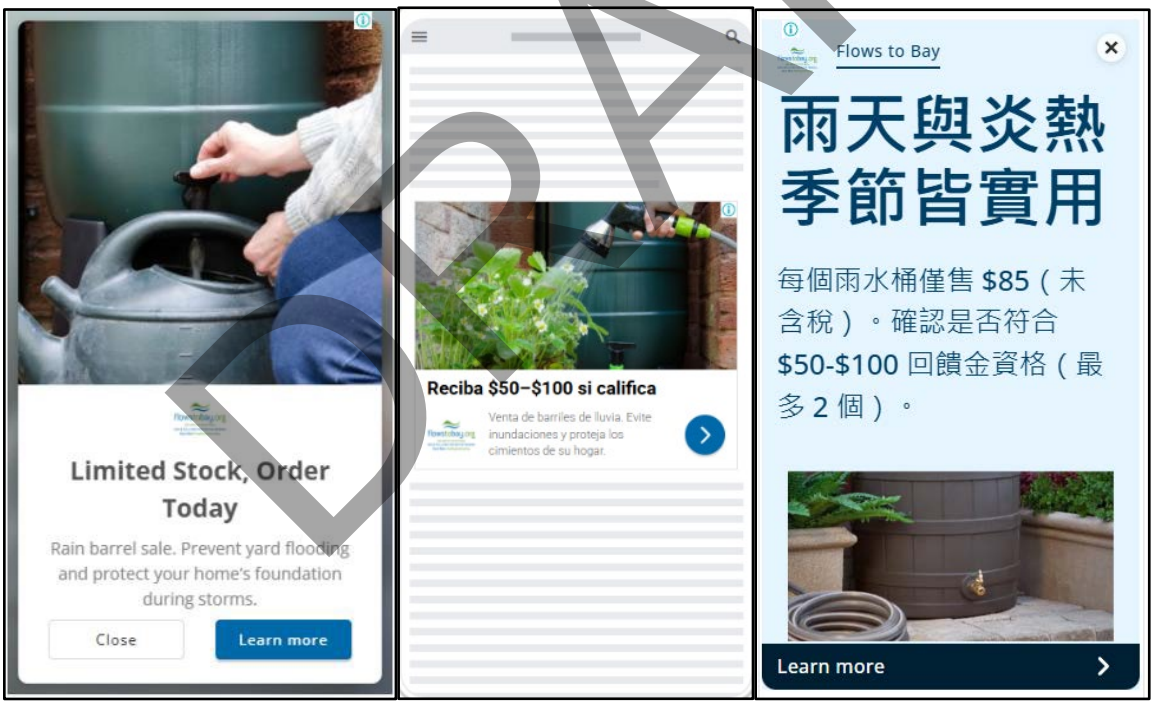


**Figure 7-19b. Examples of the rain barrel program ads for the Google Ads campaigns, which also promoted the Rain Barrel Rebate.**

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Results:

- Ads earned 575,451 impressions and 6,110 clicks.
- Radio PSA aired 40 times over five days.
- During the campaign period, the Rain Barrel Rebate landing page received 1,522 visits from 389 unique users. *This represents a **257% increase in traffic** from the period preceding the campaign.*

In FY 2025/26, BAWSCA reported a total of 77 rebate applications and 119 rain barrel installations for its service area. To date, over 3,484 rain barrels have been installed in San Mateo County under the rebate program. See Section C.7.a for additional details.

## C.7.e. School-Age Children Outreach

### *Schoolyard Rain Barrel Installation (Greening) Projects*

To engage school communities and advance the Schoolyard Greening Initiative that was developed over four years ago, SMCWPPP has continued to explore tactical green infrastructure (GI) on school campuses with an educational component. GI is a term that is broadly used to describe a more effective and resilient approach to managing stormwater runoff and pollutants associated with runoff through engineered bioretention systems. It involves capturing, storing, and treating rainwater where it falls, using special soils and plants that filter, absorb, and evapotranspire water, mimicking a more natural water cycle. Since the program's inception, there have been 15 successful Schoolyard Rain Barrel Installation (Greening) Projects. The Greening Schoolyards in San Mateo County informational PDF, available for download on the "School Site Improvements" webpage, includes all completed projects prior to FY 2025/26 (Figure 7-23).

In FY 2025/26, C/CAG continued the momentum of the Schoolyard Greening Initiative to continue the aims of the project and educate school administrations, teachers, students, and parents about the benefits of GI on school campuses, by sponsoring two rain barrel installation workshops in May 2026: one at Connect Community Charter School in Redwood City (May 6) and one at Gateway Center School in San Mateo (May 12). More information and photos from these events can be found below (Table 7-5; Figure 7-20a and Figure 7-20b).

C/CAG supplied the rainwater harvesting systems, hardware, learning materials, and snacks, and coordinated each installation in partnership with its contracted rainwater-harvesting specialist, DIG Cooperative. During the workshops, DIG Cooperative discussed rainwater capture, stormwater pollution prevention, green infrastructure, and climate resilience, and led students and community members through the hands-on installation of each system. Attendees took home Rain Barrel and Rain Garden Rebate flyers, topic tip cards, bookmarks, reusable bags, and metal straws, and left with an understanding of how BAWSCA's Rain Barrel Rebate works and how they can apply what they learned to install rain barrels at home. Following each event, staff invited participants to join the waitlist for next year's Bulk Rain Barrel Program (see Section C.7.a for more information about the Bulk Rain Barrel Program).

At Connect Community Charter School on May 6, SMCWPPP worked closely with DIG Cooperative and Principal Hayley Dupuy to host a workshop that reached 128 attendees (120 2nd–8th grade students, 1 community member, and 7 school staff). The team, students, and community installed a 205-gallon rainwater harvesting tank to supply the school's vegetable and pollinator gardens. Classes rotated through the installation by grade level, which enabled program staff and the rainwater-harvesting specialist to tailor the educational components to each grade and provide a more intimate and engaging learning experience.

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At Gateway Center School on May 12, SMCWPPP worked closely with DIG Cooperative and Sarah Notch and Julie Hilborn of the San Mateo County Office of Education (SMCOE) to host a workshop that reached 20 attendees (5 10th–12th grade students, 12 community members, and 3 school staff). The team, students, and community installed a 265-gallon rainwater harvesting tank to irrigate the campus garden. Staff took additional measures to support Gateway's high-need student population, reserving time for the students to engage in the hands-on installation before members of the broader community joined the event. SMCWPPP received positive feedback from SMCOE regarding how supportive and engaging this experience was for the Gateway students.

The goals of installation projects such as this are to:

- Conduct hands-on community-based events that engage schools, their students, and surrounding communities while educating and demonstrating how residents may install similar projects on their property.
- Provide climate resilience benefits of GSI to school campuses, which may include flood mitigation, reducing urban heat island effects, and increasing natural habitat for pollinators and birds.
- Create an outdoor educational resource that may be used in classroom curricula to discuss the water cycle, environment, watersheds, and effects of climate change.

San Mateo County community members were invited to participate in these events. SMCWPPP promoted the installation workshops on Flows To Bay's social media accounts (Instagram and Facebook) through organic posts, a paid social media ad campaign on Meta ads, and events on the Facebook account (Figure 7-21a), as well as on the SMCWPPP website's online Community Events Calendar. SMCWPPP also prepared promotional flyers (Figure 7-21b) and digital toolkits for its school partners, local PIP members, and BAWSCA to share with their networks — including Spanish-language translations for the May 6 event at the request of the school principal (Figure 7-21c). These promotions achieved the following results:

- **The Connect Community Charter School Installation Facebook Event** received 53 responses. 53 residents responded that they were "interested" in the event and 0 residents responded that they were "going" to the event.
- **The Gateway Center School Installation Facebook Event** received 56 responses. 54 residents responded that they were "interested" in the event and 2 residents responded that they were "going" to the event.
- **The Facebook and Instagram posts promoting these events** collectively earned 557 views, 8 interactions, 1 share, and 2 saves.
- **The paid Meta digital ads promoting these events** earned 53,255 impressions and 667 link clicks. These ads advertised these schoolyard greening events to 18,633 local residents.

During the events, SMCWPPP displayed an 18 x 24" green infrastructure poster (Figure 7-22) that highlights green infrastructure sites in San Mateo County with the students, staff, and community members in attendance to increase community awareness of the benefits of green infrastructure and direct traffic to the website's "Green Infrastructure" page. Visit the "Green Infrastructure" page on the Flows to Bay website.

In FY 2026/27, SMCWPPP plans to feature both workshops in a new section on the website's "School Site Improvements" page and continue to share them across its channels, including social media. View the projects on the "School Site Improvements" page on the Flows to Bay website.

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**Table 7-5. A table showing the reach of the FY 2025/26 Schoolyard Greening Program.**

| School | Grades Level | Approximate Number of Students Reached | Details |
|---|---|---|---|
| Connect Community Charter School | Grades 2–8 | 120 | • Classroom presentation delivered to the entire school |
| Connect Community Charter School | Grades 2–8 | 120 | • Hands-on installation of one 205-gallon rainwater harvesting system supplying the vegetable and pollinator gardens |
| Gateway Center School (SMCOE) | Grades 10–12 | 5 | • Classroom presentation delivered to the entire school |
| Gateway Center School (SMCOE) | Grades 10–12 | 5 | • Hands-on installation of one 265-gallon rainwater harvesting system irrigating the campus garden |

**Figure 7-20a. Photos from SMCWPPP's hands-on rain barrel installation workshops at Connect Community Charter School in Redwood City.**

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**Figure 7-20b. Photos from SMCWPPP's hands-on rain barrel installation workshops at Gateway Center School in San Mateo.**

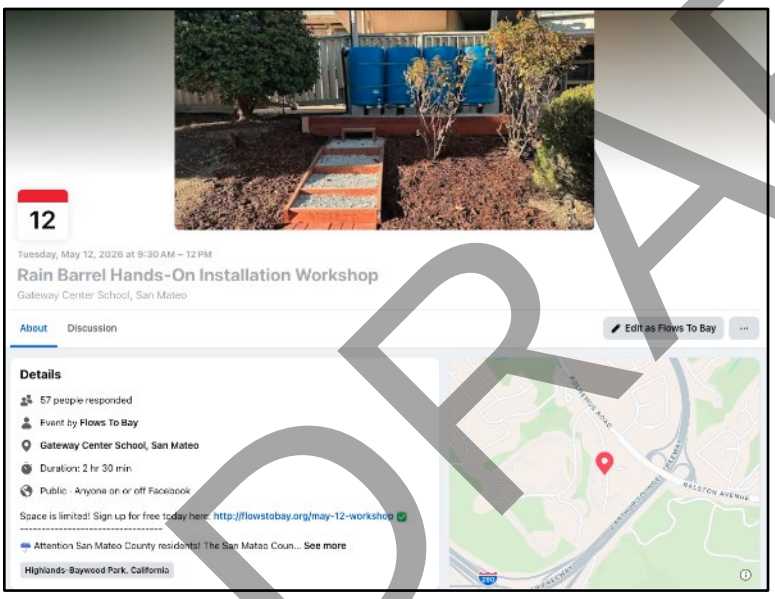


**Figure 7-21a. Facebook Event for the May 12 Gateway Workshop.**

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**Figure 7-21b. Promotional flyer for the May 12 Gateway Workshop.**

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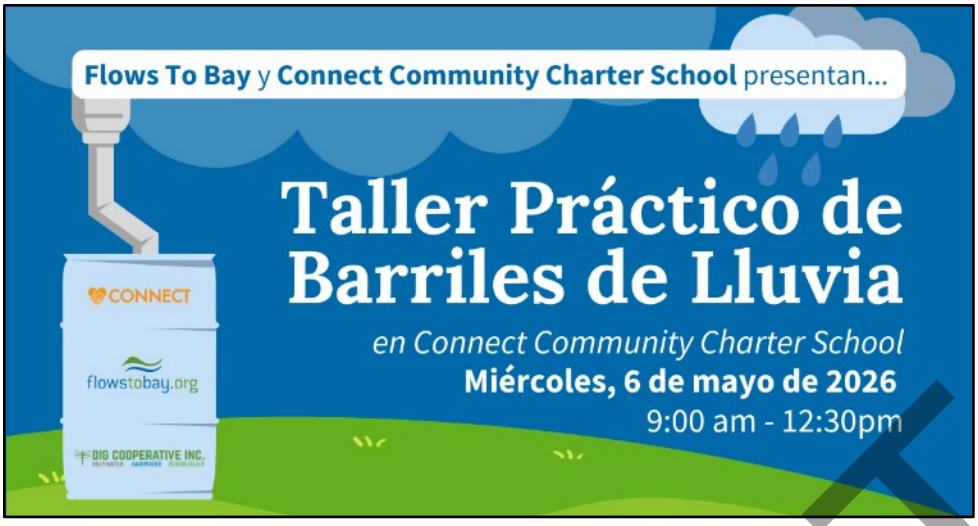


**Figure 7-21c. Facebook graphic for the May 6 Connect Community Charter Workshop, translated into Spanish.**

**Figure 7-22. Green infrastructure poster displayed at the school rain barrel installation workshops.**

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**Figure 7-23. Pages 1-2 of the Greening Schoolyards in San Mateo County informational PDF.**

### *Stormwater Pollution In-Class Presentations*

Flows To Bay receives multiple inquiries for assistance with materials or presentations on stormwater pollution prevention each year. In FY 2025/26, SMCWPPP conducted educational presentations covering stormwater pollution prevention and climate resilience at both partner schools (Connect Community Charter and Gateway) in conjunction with the hands-on installation workshops. During the presentations, green infrastructure and rainwater harvesting were introduced as part of the solution.

At Connect Community Charter School, contracted rainwater-harvesting specialist, DIG Cooperative, delivered a presentation in the auditorium to the entire school (120 2nd–8th grade students), and the educational content was then tailored to each grade level as classes rotated through the installation.

At Gateway Center School, the contracted rainwater-harvesting specialist, DIG Cooperative, delivered two separate presentations: one for the 10th–12th grade students and another for the broader community members in attendance, to ensure these high-need students had a meaningful, dedicated learning experience. The presentations and activities allowed SMCWPPP to share its message about watershed protection, pollution prevention, and GSI with these students and the communities around them.

### *County Office of Education Sustainable and Climate Ready Schools Initiative*

In FY 2021/22, SMCWPPP was a supporting partner with the San Mateo County Office of Education to implement a comprehensive, standards-aligned learning unit that focused on the environmental, social, and economic impacts of stormwater pollution and watershed management. Flows To Bay served in the role as community-based partner, assisting with stormwater content and being available as a resource for teachers, and conducting in-class presentations as requested.

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SMCWPPP continues to support the Resilient San Carlos Schoolyard project as deemed necessary and appropriate to ensure progress towards project implementation. This includes updating the SMCWPPP website to house the program information, assistance with program collateral (as feasible/useful), outreach, and providing promotion. C/CAG staff will also coordinate with the County Office of Education on the Teacher Fellowship program and support community grant projects as needed.

In FY 2025/26, SMCWPPP staff continued to engage directly with the SMCOE on advancing stormwater-related partnerships for facility improvements through the SMCOE Sustainable and Climate Ready Schools Initiative. Staff tabled at the SMCOE's event in Redwood City on November 15, 2025, sharing information about schoolyard greening and stormwater pollution prevention with local students and community members. On April 29, 2026, program staff took part in the SMCOE's Climate Schools Symposium, connecting with superintendents, principals, and school administrators to advance stormwater and climate-resilience education in local schools.

## C.7.f. Outreach to Municipal Officials

SMCWPPP assisted Permittees with outreach to municipal officials with the following activities:

- Program Director presented to the C/CAG Board of Directors, comprised of 21 municipal elected officials, covering updates on the Countywide Stormwater Program at its December 11, 2025 meeting

## C.7.g. Tracking and Reporting

Table 7-6 provides brief descriptions of the current year's outreach campaigns by type of outreach program implemented, per provision C.7.g.iii reporting requirements. This information is also provided in individual San Mateo County Permittee Annual Reports.

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**Table 7-6. Provision C.7.g.iii Summary of Outreach Activities**

| Type of Outreach Program Implemented | Brief Description of Current Year Campaigns | FY 2022/23 (# of outreach campaigns/events) | FY 2023/24 (# of outreach campaigns/events) | FY 2024/25 (# of outreach campaigns/events) | FY 2025/26 (# of outreach campaigns/events) |
|---|---|---|---|---|---|
| C.7.a. Outreach Campaigns | SMCWPPP conducted several stormwater pollution prevention outreach campaigns covering water pollution prevention, water conservation, rainwater harvesting, pesticides, and trash and litter reduction, including:<br>▪ Multiple weekly messages on social channels, Facebook and Instagram, aimed at residential and business audiences;<br>▪ Seven e-newsletters aimed at residents, six promoting the annual Bulk Rain Barrel Program and one distributing a follow-up survey to program participants;<br>▪ Two blogs aimed at residents, businesses, and school communities: one covering mobile business best practices and one covering the El Zanjon Creek restoration in San Bruno;<br>▪ A radio public service announcement promoting the rain barrel distribution event and Rain Barrel Rebate, aired 40 times on a nonprofit coastside community station;<br>▪ An educational video on How Rain Gardens Work promoted on social media and the website;<br>▪ Classroom presentations and hands-on rain barrel installation workshops at two partner schools aimed at school communities;<br>▪ Rain barrel distribution events in two cities aimed at residents of San Mateo County; and<br>▪ The update and maintenance of the Flows To Bay website including information, education, guides, and best practices aimed at residents, businesses, and city departments. | ▪ 200+ social posts<br>▪ 10 newsletters<br>▪ 12 blog articles<br>▪ 2 live webinars<br>▪ 1 mail campaign<br>▪ 1 video<br>▪ 3 classroom presentations<br>▪ 2 school rain barrel installation<br>▪ 2 workshops<br>▪ 4 Rain barrel distribution events<br>▪ 1 website | ▪ 200+ social posts<br>▪ 7 newsletters<br>▪ 3 blog articles<br>▪ 1 live webinar and workshop<br>▪ 1 video promoted<br>▪ 1 classroom presentation<br>▪ 1 school rain barrel installation<br>▪ 1 Rain barrel distribution event<br>▪ 1 website | ▪ 200+ social posts<br>▪ 7 newsletters<br>▪ 1 blog article<br>▪ 1 live webinar and workshop<br>▪ 1 video promoted<br>▪ 1 classroom presentation<br>▪ 1 school rain barrel installation<br>▪ 2 Rain barrel distribution events<br>▪ 1 website | ▪ 200+ social posts<br>▪ 7 newsletters<br>▪ 2 blog articles<br>▪ 1 video promoted<br>▪ 1 radio PSA<br>▪ 2 classroom presentations<br>▪ 2 school rain barrel installations<br>▪ 2 Rain barrel distribution events<br>▪ 1 website |

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| Type of Outreach Program Implemented | Brief Description of Current Year Campaigns | FY 2022/23 (# of outreach campaigns/events) | FY 2023/24 (# of outreach campaigns/events) | FY 2024/25 (# of outreach campaigns/events) | FY 2025/26 (# of outreach campaigns/events) |
|---|---|---|---|---|---|
| C.7.c. Public Outreach and Citizen Involvement Events | SMCWPPP conducted or participated in several resident-involved events including:<br>▪ A Coastal Cleanup Day volunteer event promoted countywide;<br>▪ Community vulnerability assessment workshops, held in English and Spanish, aimed at residents;<br>▪ Rain barrel distribution events held in two cities aimed at residents;<br>▪ Classroom presentations and on-site, hands-on rain barrel installations aimed at school communities;<br>▪ On-site Integrated Pest Management tabling events aimed at gardeners, shoppers, and store employees;<br>▪ Tabling at a community festival, school and countywide sustainability events, and a community resilience fair; and<br>▪ A presentation to the American Red Cross San Mateo County Chapter aimed at community volunteers. | 17 events including:<br>▪ 1 Volunteer event<br>▪ 4 Rain Barrel distributions<br>▪ 2 On-site installation workshops<br>▪ 5 tabling events<br>▪ 2 hardware store trainings<br>▪ 1 Round-Table discussion<br>▪ 3 webinars | 8 events including:<br>▪ 1 Volunteer event<br>▪ 1 Rain Barrel distribution<br>▪ 1 On-site installation workshop<br>▪ 4 tabling events<br>▪ 1 webinar and workshop aimed at residents | 13 events including:<br>▪ 1 Volunteer event<br>▪ 2 Rain Barrel distributions<br>▪ 1 On-site installation workshop and presentation<br>▪ 4 tabling events<br>▪ 1 webinar and workshop aimed at residents<br>▪ 1 workshop aimed at teachers<br>▪ 1 workshop on flooding prevention<br>▪ 1 educational family event | 20 events including:<br>▪ 1 Volunteer event<br>▪ 2 community vulnerability assessment workshops<br>▪ 2 Rain Barrel distributions<br>▪ 2 On-site installation workshops<br>▪ 2 classroom presentations<br>▪ 10 tabling events<br>▪ 1 community presentation |
| C.7.d. Watershed Stewardship Collaboration | Together with the Bay Area Water Supply and Conservation Agency (BAWSCA), SMCWPPP supported and participated in:<br>▪ A Rain Barrel Rebate program promoted to residents via e-newsletters, social media, a radio PSA, and paid digital advertising on Meta and Google in English, Spanish, and Traditional Chinese; and<br>▪ A Rain Garden Rebate program, offered as part of the Lawn Be Gone! Rebate, promoted to residents through a blog, social media posts, and updated program materials. | ▪ 4 Rain Barrel Campaigns with Rebate promotion<br>▪ 2 Rain Garden Webinars with Rebate Promotion | ▪ 1 Rain Barrel Campaign with Rebate promotion<br>▪ 1 Rain Garden Rebate program (including one newsletter, blog, and several social media posts) | ▪ 2 Rain Barrel Campaigns with Rebate promotion<br>▪ 1 Rain Garden Rebate program (including several newsletters, 1 blog, and several | ▪ 1 Rain Barrel Campaign with Rebate promotion (including paid digital ads in three languages, a radio PSA, and six e-newsletters) |

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| Type of Outreach Program Implemented | Brief Description of Current Year Campaigns | FY 2022/23 (# of outreach campaigns/events) | FY 2023/24 (# of outreach campaigns/events) | FY 2024/25 (# of outreach campaigns/events) | FY 2025/26 (# of outreach campaigns/events) |
|---|---|---|---|---|---|
| | The rebate program encourages rebates for stormwater harvesting, water conservation, and lawn replacement by San Mateo County residents. | | | social media posts) | ▪ 1 Rain Garden Rebate program (including 1 blog and several social media posts) |
| C.7.e. School-Age Children Outreach | SMCWPPP conducted stormwater pollution prevention outreach to K-12 school children including:<br>▪ Conducting classroom presentations at one elementary/middle school and one high school;<br>▪ Leading two hands-on rain barrel installation workshops with community participation at partner schools;<br>▪ Providing support for the San Mateo County Office of Education's Sustainable and Climate Ready Schools Initiative and the Resilient San Carlos Schoolyard project; and<br>▪ Providing downloadable stormwater pollution educational materials, toolkits, and resources for each educational level from K-12 to teachers via the SMCWPPP website. | ▪ 2 High School presentations<br>▪ 1 Middle School presentation<br>▪ 2 Installations and Workshops<br>▪ K-12 Teaching Materials | ▪ 1 Middle School presentation<br>▪ 1 Installation and Workshop<br>▪ 3 school-focused events attended<br>▪ K-12 Teaching Materials | ▪ 1 Elementary School presentation<br>▪ 1 Installation and Workshop<br>▪ 2 school-focused events attended<br>▪ K-12 Teaching Materials | ▪ 1 Elementary/Middle School presentation<br>▪ 1 High School presentation<br>▪ 2 Installations and Workshops<br>▪ 5 school-focused events attended<br>▪ K-12 Teaching Materials |
| C.7.f. Outreach to Municipal Officials | ▪ Program Director presented to the C/CAG Board of Directors, comprised of 21 municipal elected officials, covering updates on the Countywide Stormwater Program at its December 11, 2025 meeting | ▪ N/A | ▪ N/A | ▪ N/A | ▪ 1 presentation |

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# FUTURE ACTIONS

FY 2026/27 activities planned by SMCWPPP to assist San Mateo County Permittees in complying with requirements in Provision C.7 of the reissued municipal stormwater permit (MRP 3.0) include the following:

- Grow the reach, engagement, and following of SMCWPPP's Facebook and Instagram accounts, exploring stories and reels and posts and advertisements that continue to expand awareness of stormwater prevention and issues;
- Promote and host county clean-up events and encourage volunteer efforts through the website and social media;
- Support individual jurisdiction's stormwater collection and pollution prevention projects to highlight the benefits and support for green infrastructure;
- Support SMCWPPP to provide individual jurisdictions with materials, fact sheets, and talking points for stormwater projects and fee initiatives;
- Implement litter and illegal dumping messaging to bring awareness to the issue and encourage litter prevention and participation in litter cleanup behavior;
- Conduct two bulk rain barrel program distribution events to distribute low-cost, high-quality rain barrels to residents while also promoting the Rain Barrel Rebate;
- Conduct a follow-up survey to validate use, behavior, attitudes, and values of installers and users;
- Support greening project planning and implementation at a priority school, in partnership with a rain harvest consultant and youth ambassadors to support GSI efforts, school-age education, and outreach;
- Continue supporting or facilitating in-person, hands-on community rain barrel installation events that promote stormwater pollution prevention and best practices;
- Host and facilitate in-person tabling events at hardware stores across the county to educate employees, gardeners, and gardening businesses and support IPM messaging;
- Maintain and update SMCWPPP's website as a reliable source of stormwater pollution prevention content with the most updated initiatives, education, and policies for residents, businesses, and cities;
- Audit and update the SMCWPPP's website to assess the need for new content, functions, or features;
- Audit and remediate the SMCWPPP's website to bring it into ADA WCAG 2.2 compliance.
- Continue outreach and promotion of stormwater messaging through the e-newsletter, one of the top-performing platforms;
- Grow e-newsletter subscribership numbers through cross-promotion on the website, social media platforms, giveaways, contests, and paid advertising media;
- Support and promote the Rain Barrel Rebate and Rain Garden Rebate programs to rain barrel owners and enthusiasts in partnership with BAWSCA and C/CAG, and through paid advertising;

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- Share eco-friendly and stormwater pollution prevention practices, rebates, and educational workshops with residents, especially in DAC communities;
- Provide ongoing online support of the Resilient San Carlos Schoolyards project and in-person support of the County Office of Education's Sustainable and Climate Ready Schools Initiative and the Youth Climate Ambassador Program; and
- Support the Public Information and Participation (PIP) Subcommittee with individual material and messaging needs using Community-Based Social Marketing as a model to increase environmental stewardship and distribute materials annually to members to support their stewardship efforts.

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# SECTION 9
# C.9 PESTICIDE TOXICITY CONTROLS

## INTRODUCTION

The primary objective of MRP Provision C.9 Pesticide 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 by each San Mateo County Permittee. 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 Provision C.9 is coordinated through SMCWPPP's Parks Maintenance and Integrated Pest Management (IPM) Work Group, except for Provision C.9.e, the public outreach portion of Provision C.9, which is supported by SMCWPPP's Public Information and Participation (PIP) component.

## IMPLEMENTATION OF MRP PROVISIONS

During FY 2025/26, SMCWPPP performed several 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 one meeting of the Parks Maintenance and IPM Work Group in November 2025.
- Conducted the Annual Landscape IPM Workshop in March 2026.
- Continued to coordinate with San Mateo County Agriculture / Weights and Measures.
- Updated the pesticide tracking template with the current two years of pesticide product data from the Department of Pesticide Regulation (DPR) website.
- Participated in relevant BAMSC and CASQA activities.
- Continued to maintain the Our Water Our World (OWOW) retail partnerships with 12 top-tier stores that sell pesticides/fertilizers within San Mateo County (e.g., The Home Depot, Hassett Ace Hardware, and Outdoor Supply Hardware). Tasks included ordering materials, organizing outreach collateral, checking in with store managers, and providing outreach to residents. Hassett Ace Hardware in Redwood City was involved in Q1/2 and temporarily closed before Q3 through the remainder of the fiscal year. In Q4, Brisbane Hardware permanently closed, and Hassett Ace Hardware in Pacifica joined. The new location received a tabling event and employee training to kick off the partnership and presence as a resource to the community.

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- The IPM educator conducted in-person outreach at popular hardware stores with three tabling events during the fiscal year and a store training with five employees when Hassett Ace Hardware - Pacifica joined the program.
- Sent a letter via mail to 40 active-licensed pest control operators in San Mateo County in English and Spanish.

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. Richard Holtz from the City of Burlingame chaired the work group. The Parks Maintenance and IPM Work Group met one time in FY 2025/26 on November 20, 2025. The meeting included a presentation from San Mateo County Agriculture / Weights and Measures staff on new pesticide safety information leaflets, inspections, and pesticide use reporting. The DPR approved this presentation for one hour of Laws and Regulations Continuing Education (CE) units. The attendance list is included in Appendix 9.

## Annual Landscape Integrated Pest Management Workshop

The annual SMCWPPP Landscape IPM Workshop was held on March 10, 2026 at the Foster City Library and Community Center. The workshop was attended by 52 municipal staff and contractors and covered the following topics:

- Regulatory Update – Pesticides Toxicity Control Requirements in the Municipal Stormwater Regional Permit
- Alternatives to Neonicotinoids
- Building Healthier, Pest-Resilient Soils with Compost
- Rodent Control in Municipal Landscapes and Green Infrastructure Features
- Regulatory Update and Common Violations

The presenters were from SMCWPPP, UC Cooperative Extension, Romeo Packing, San Mateo Resource Conservation District, and San Mateo County Agriculture/Weights and Measures. Evaluation forms completed by the workshop's attendees indicated that overall, the workshop was beneficial and 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 (flowstobay.org).

## Coordination with San Mateo County Department of Agriculture

San Mateo County Agriculture / Weights and Measures staff attended the FY 2025/26 meeting of the Parks Maintenance and IPM Work Group and the Landscape IPM Workshop and presented information on regulations. In addition, SMCWPPP worked closely with San Mateo County Agriculture/Weights and Measures staff to provide DPR Continuing Education Hours for participants at the meeting and the Landscape IPM Workshop.

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## 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 pesticide tracking template utilizes a lookup list of pesticides and active ingredients compiled from data tables available on the DPR website. The template was updated during FY 2025/26 with the current two years of pesticide product data from the DPR website.

## Participation in CASQA

MRP Provision C.9.f requires Permittees to track and participate in regulatory processes relevant to pesticide toxicity control. During FY 2025/26, SMCWPPP accomplished this task by working with CASQA. For additional information, see the *CASQA 2026 Pesticide Annual Report and Effectiveness Assessment* included in Appendix 22. In addition, SMCWPPP staff stayed current with pesticide controls and regulatory efforts by participating in selected CASQA meetings.

SMCWPPP also provided funds toward implementing the Regional OWOW Program, which is now being managed by CASQA. SMCWPPP staff participated in the CASQA OWOW Committee and provided input, as needed. Additional details are included in the *CASQA 2026 OWOW Annual Report included in* Appendix 22.

## Our Water Our World (OWOW) Point of Purchase Outreach

SMCWPPP conducted point-of-purchase outreach to home improvement store consumers at frequently visited stores (e.g., The Home Depot, Hassett Ace Hardware, and Outdoor Supply Hardware), providing tips to residents (customers and store associates) about the proper use and disposal of pesticides and other lawn and garden chemicals. Through a partnership with a sub-consultant, Kat Meler (an IPM Advocate in association with OWOW), SMCWPPP was also able to provide the public with a credible and reliable source of information at tabling events. Kat educated consumers and store employees about proper pesticide use and less-toxic alternatives to conventional pesticides. Photos from tabling events are included in Appendix 9. Tabling events were promoted via Facebook events on the Flows To Bay account and the events calendar on the SMCWPPP website. View the Events Calendar on the SMCWPPP website to see the list of events. One store partner, Lyngso Garden Materials, Inc. (Lyngso), also promoted the tabling event at their location by creating an event on Eventbrite and including it on their website. Visit the Lyngso website to view the event created on Eventbrite. Visit the "Upcoming Classes & Events" page on Lyngso's website to see the event listing. Appendix 9 shows examples of items included in SMCWPPP's promotional campaigns to promote the events and actions Lyngso conducted to promote its event.

SMCWPPP's in-store tabling events consisted of educating consumers about (1) stormwater runoff, (2) the role residents play in reducing pesticide use, (3) the less-toxic pesticides sold in the store, and (4) proper usage of pesticides and current pest problems/less-toxic solutions to these problems. At these events, consumers were directly engaged with and informed about solutions for every issue – from beneficial insects to ants, rats, and aphids to peach leaf curl. Swag items were also distributed. Comments from customers who interacted with the IPM advocate included, "Thanks for being out here", "Thank you very much for the helpful information", and "Keep it up. What you're doing is important." Table 9-1 below summarizes the three tabling events held during FY 2025/26, which included engagement with 56 customers.

Surveys were voluntarily completed by customers during tabling events following engagement. Respondents rated each question on a scale of 1 (not familiar/not likely) to 5 (very familiar/very likely). Across tabling events held throughout FY 2025/26, the average responses were:

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- "How familiar were you with the use of less toxic pest management products or methods before today?" 2.2 / 5
- "How likely is the information you learned today going to influence your use of less toxic pest management products or methods?" 4.8 / 5
- "How likely are you to recommend or discuss stormwater pollution prevention methods with family, friends, or neighbors?" 4.4 / 5

**Table 9-1. FY 2025/26 San Mateo County IPM In-store Tabling Events.**

| Store | Date of Tabling Event | Number of People Engaged With | Number of Surveys Taken |
|---|---|---|---|
| Outdoor Supply Hardware, Millbrae | 6/6/26 | 15 customers | 2 |
| Hassett Ace Hardware, Pacifica | 6/13/26 | 18 customers | 3 |
| Lyngso Garden Materials, Inc., San Carlos | 6/20/26 | 23 customers | 0 |

Program materials were provided directly to the public via point-of-purchase displays during tabling events at a time when residents are most receptive to hearing our message. Additionally, shelf talkers were placed next to products that are recommended by OWOW as being less toxic, and topic-specific factsheets from OWOW were re-stocked throughout the fiscal year during store visits. All of these efforts helped to promote the regional OWOW program. Table 9-2 lists the 13 stores that participated in the OWOW point-of-purchase program at some point during FY 25/26, although we maintained having 12* stores involved in the program. In FY 2025/26, an updated English version and a new Spanish version of the OWOW factsheets for "Moles, Voles, and Gophers" and "Snails and Slugs" were made available, ordered, and distributed at program stores. Appendix 9 shows photographs from store visits.

**Table 9-2. San Mateo County Participating OWOW Hardware Stores during FY 2025/26**

| Store Name | Address | City |
|---|---|---|
| Brisbane Hardware | 1 Visitacion Ave. | Brisbane |
| Hassett Ace Hardware | 1029 Alameda de las Pulgas | Belmont |
| Hassett Ace Hardware | 111 Main St. | Half Moon Bay |
| Hassett Ace Hardware | 560 San Pedro Ave | Pacifica |
| Hassett Ace Hardware | 282 Woodside Plaza | Redwood City |
| Hassett Ace Hardware | 545 1st Avenue | San Mateo |
| Lyngso Garden Materials, Inc | 345 Shoreway Rd. | San Carlos |
| Outdoor Supply Hardware | 900 El Camino Real | Millbrae |
| Outdoor Supply Hardware | 2110 Middlefield Rd | Redwood City |
| The Home Depot | 2 Colma Blvd. | Colma |
| The Home Depot | 303 Lake Merced Blvd. | Daly City |

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| Store Name | Address | City |
|---|---|---|
| The Home Depot | 1781 E Bayshore Rd. | East Palo Alto |
| The Home Depot | 2001 Chess Dr. | San Mateo |

*During FY 2025/26, Flows To Bay received shifts in its partner list with the:

- Temporary closure of Hassett Ace Redwood City before the start of Q3
- Permanent closure of Brisbane Hardware at the end of May 2026
- Addition of Hassett Ace Pacifica in June 2026

Hassett Ace Hardware in Redwood City temporarily closed at the end of December 2025 due to store damage from a crash and fire. As such, during the Q3/4 period, the location did not receive relevant outreach and was not an active partner. The location will re-join the program at the beginning of FY 2026/27 following its reopening in early July 2026.

Brisbane Hardware permanently closed at the end of May 2026. The IPM advocate visited the location before closure to collect relevant programmatic materials and personally thank the location for its many years of partnership.

In June 2026, using materials from Brisbane Hardware, including a literature rack, a new partnership was forged with Hassett Ace Hardware in Pacifica. The IPM Advocate conducted training with store associates, placed shelf talkers under relevant products, and placed fact sheets in the literature rack to set up the store for partnership.

SMCWPPP began FY 2025/26 with 12 stores involved in the program, and it will begin FY 2026/27 with 12 stores, with Hassett Ace Hardware - Redwood City rejoining.

## Pest Control Contracting Outreach

In FY 2025/26, SMCWPPP continued outreach that directly targets residents 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 Facebook and Instagram. Examples of Facebook posts are shown in Figure 9-1 and Instagram posts in Figure 9-2. Table 9-3 has a breakdown of posts related to pest control promoted during FY 2025/26.

**Table 9-3. FY 2025/26 Pest Control Related Posts**

| Platform | Posts | Engagements (likes, comments, shares, and link clicks) | Reach |
|---|---|---|---|
| Facebook | 5 | 4 | 392 |
| Instagram | 5 | 5 | 270 |

In addition to social media posts, SMCWPPP stocked OWOW fact sheets detailing IPM approaches to various pest-related problems, as well as resources for hiring pest control companies and disposing of pesticides responsibly, in literature racks at the 13 program hardware stores listed in Table 9-2 (with 12

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stores maintained). In FY 2025/26, an updated English version (Appendix 9A-10) and a new Spanish version (Appendix 9A-11) of the OWOW "Hiring a Pest Control Company" factsheet were made available, ordered, and then utilized at program stores. Our sub-consultant Kat Meler (an IPM educator in association with OWOW) also discussed this topic and factsheets during store visits and three tabling events with customers and store associates. Posts were published on SMCWPPP's Instagram and Facebook to promote this message.

## Outreach to Pest Control Contractors

To help fulfill the MRP Provision C.9.e.ii(3) requirement for outreach to pest control operators, SMCWPPP incorporated direct outreach via mail to 40 County pest control operators. The aim of this outreach was to inform pest control operators of the hazards of pesticides and to encourage the reduction of their usage. The letter was prepared and distributed in both English (Appendix 9A-12) and Spanish (Appendix 9A-13). Prior to outreach, the SMCWPPP team reviewed the Department of Consumer Affairs (DCA) License Database and updated our contacts of San Mateo County pest control operators from the Department of Pesticide Regulation and the Structural Pest Control Board accordingly. The recipients of the FY 2025/26 letter can be viewed in Appendix 9 (Table 9A-1). A page is dedicated to pest control professionals on the SMCWPPP website. The page can be viewed in Figure 9-3 or by visiting the "Pest Control Professionals" page on the SMCWPPP website.

**Figure 9-1. Examples of Facebook posts promoting pesticide pollution prevention**

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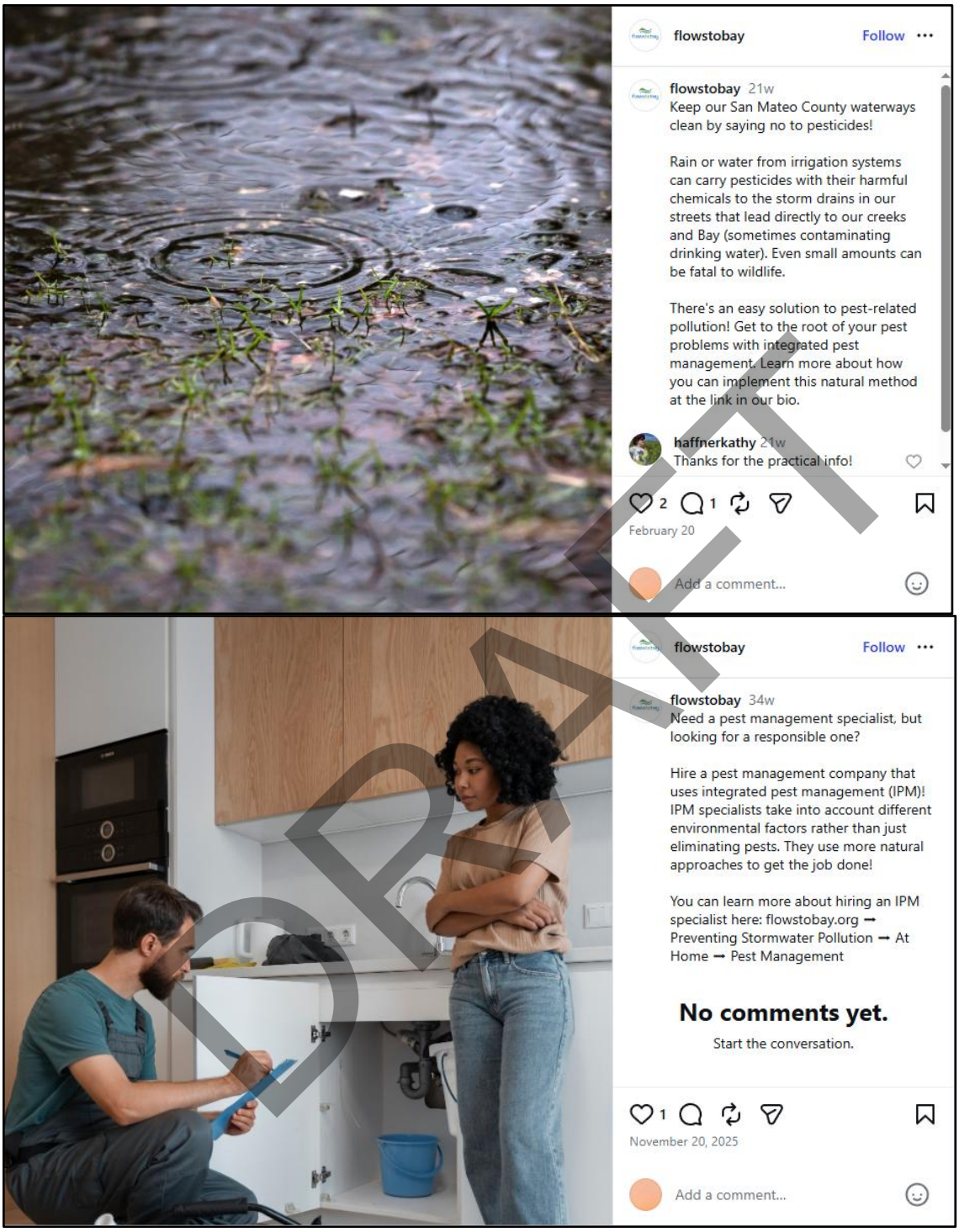


**Figure 9-2. Examples of Instagram posts promoting pesticide pollution prevention**

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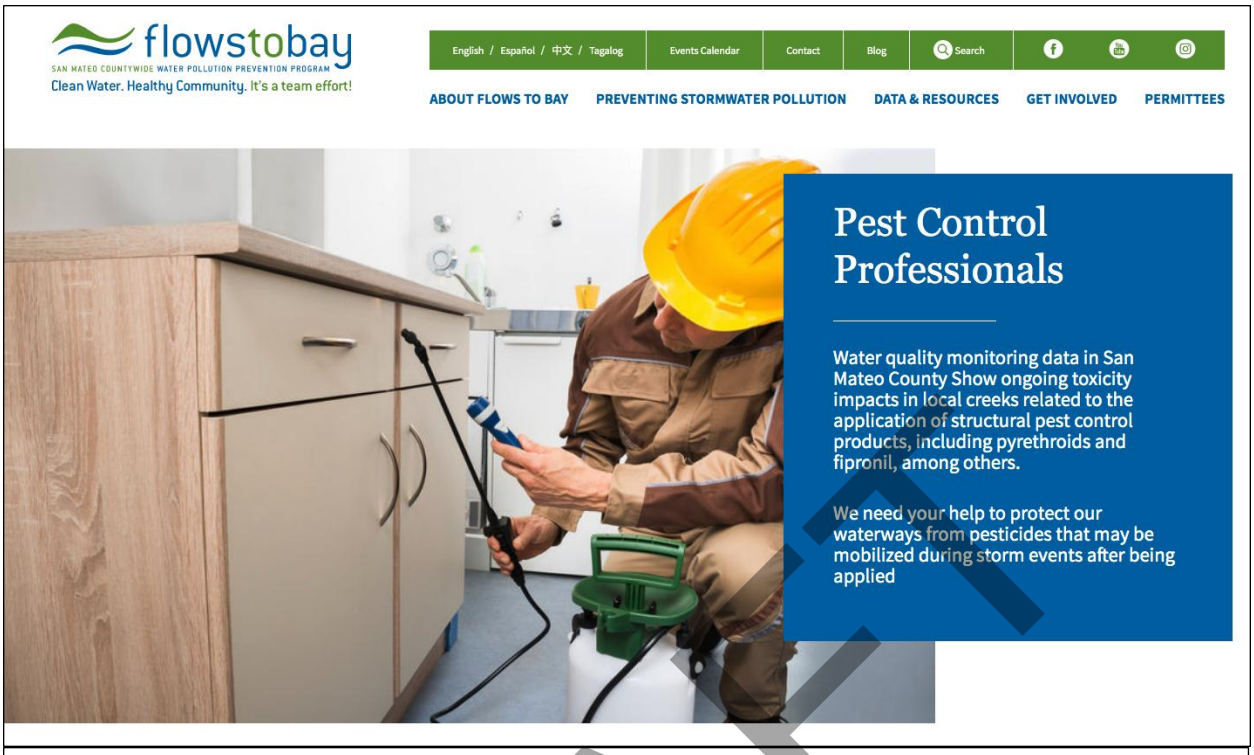


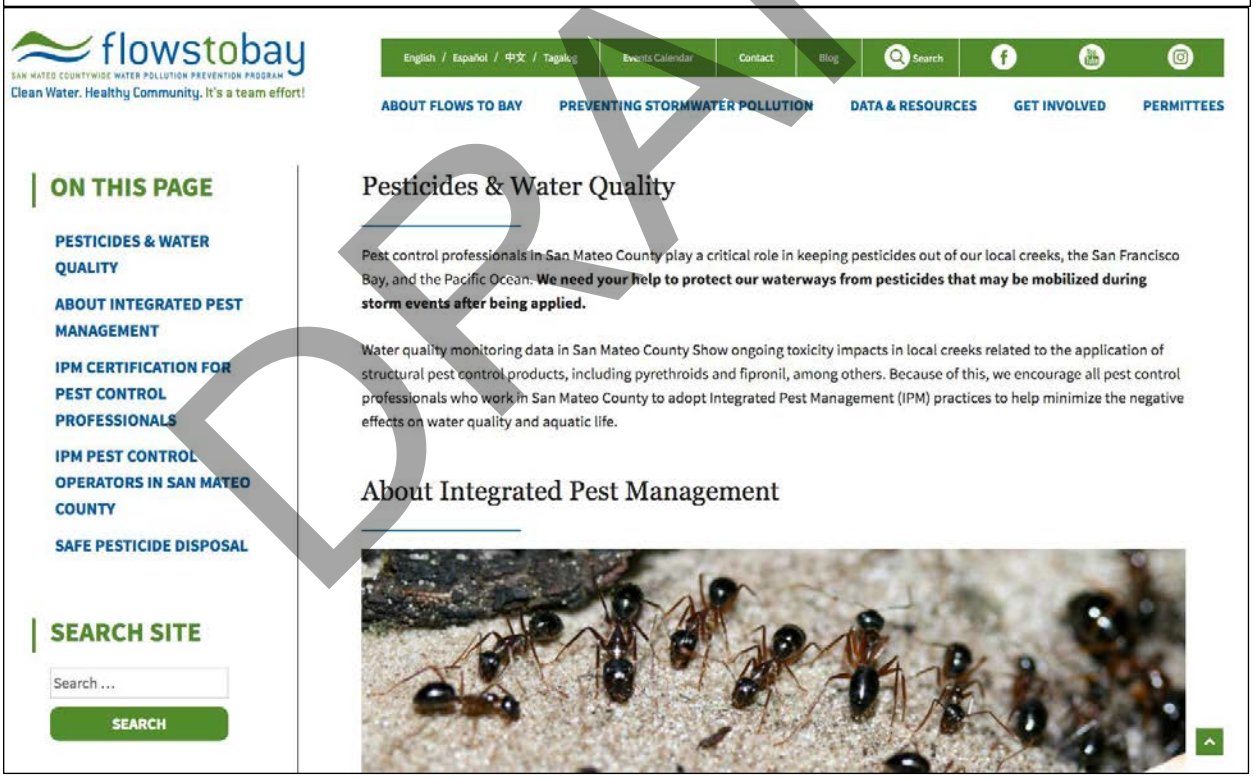


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**Figure 9-3. Screenshots of "Pest Control Professionals" web page on the SMCWPPP website**

# FUTURE ACTIONS

FY 2026/27 activities planned by SMCWPPP to assist San Mateo County Permittees understand and comply with requirements in MRP Provision C.9 include the following:

- Continue to assist member agencies in implementing their IPM programs and policies, with input and assistance provided by the Parks Maintenance and IPM Work Group;
- Continue holding Parks Maintenance and IPM Work Group meetings once per year;
- Conduct annual landscape and/or structural IPM training workshop (if selected as priority topic among potential trainings);
- Continue to coordinate with County Agriculture / Weights & Measures;
- Conduct and launch promotional campaigns to promote in-person tabling events;
- Continue using signage and materials developed by OWOW for the point-of-purchase program;
- Perform outreach messaging to residents on best practices for hiring pest control contractors certified in IPM via factsheets, SMCWPPP's website (flowstobay.org), social media posts, and the SMCWPPP e-newsletter; and
- Continue to send mail and email communications to pest control professionals that encourage IPM certification and education.

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# SECTION 10
# C.10 TRASH LOAD REDUCTION

## INTRODUCTION

MRP Provision C.10 Trash Load Reduction tasks are implemented by each San Mateo County Permittee with support from SMCWPPP, the Countywide Program. 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 included in Provision C.10, which requires Permittees (as applicable) to:

- Reduce trash from 2009 levels and demonstrate achievement of the 100% trash load reduction benchmark by June 30, 2025;
- Implement trash prevention and control actions, including full trash capture systems or other trash management actions, or combinations of actions, with trash discharge control equivalent to or better than full trash capture systems, to reduce trash generation to a low trash generation rate or better;
- Ensure that private lands that are moderate, high, or very high trash generating, and that drain to storm drain inlets that Permittees do not own or operate (private), but that are plumbed to Permittees' storm drain systems are equipped with full trash capture systems or are managed with trash discharge control actions equivalent to or better than full trash capture systems;
- Maintain and provide documentation of the design, operation, and maintenance of full trash capture systems, including the mapped location and drainage area served;
- Assess trash reductions associated with control measures other than full capture systems using a visual assessment protocol; and
- Maintain a Long-Term Trash Load Reduction Plan designed to achieve 100% trash reduction.

During FY 2025/26, SMCWPPP completed the tasks described below in support of member agency trash management activities conducted in compliance with the above requirements.

## IMPLEMENTATION OF MRP PROVISIONS

SMCWPPP performs a variety of tasks to assist San Mateo County Permittees with implementation of MRP Provision C.10 requirements listed above, with input and assistance provided by the SMCWPPP Trash Subcommittee. FY 2025/26 accomplishments included the following:

- Coordinated and facilitated two meetings of SMCWPPP's Trash Subcommittee;
- Assisted San Mateo County Permittees in delineating full trash capture treatment areas and managing full trash capture information in GIS (currently more than 14,875 acres are treated by full capture systems in San Mateo County);

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- Continued to implement SMCWPPP's Trash Assessment Strategy, including conducting 259 On-land Visual Trash Assessments (OVTAs) at 100 sites in FY 2025/26 and maintained the Countywide Program's Trash Load Reduction Dashboard to allow San Mateo County Permittees to calculate trash load reductions and store OVTA data;
- Continued to provide guidance to San Mateo County Permittees on complying with MRP operation and maintenance requirements and implementing standard operating procedures for maintaining full trash capture systems;
- Assisted with updating San Mateo County Permittee Trash Generation Maps using ArcGIS On-line (AGOL) and updating publicly available pdf maps posted on the SMCWPPP website;
- Provided additional guidance to San Mateo County Permittees on how to implement a Private Land Drainage Area (PLDA) Trash Inspection Program (TIP), and discussed procedures for conducting PLDA trash inspections, including how to use the SMCWPPP standardized PLDA inspection data collection form;
- Identified options for addressing trash associated with jurisdictional land areas adjacent to Caltrans right-of-way (ROW) for each Permittee;
- Assisted with managing Permittee PLDA data collection tools, and tracking and reporting Permittee PLDA inspection results in the SMCWPPP Trash Load Reduction Dashboard;
- Shared information on regional, State, and Federal litter-related topics including foodware reuse and reduction programs, legislation, illegal dumping, and guidance documents;
- Coordinated with the SMCWPPP Public Information and Participation (PIP) Subcommittee on public outreach efforts targeting litter reduction;
- Coordinated with San Mateo County Permittee, Caltrans, and the Regional Water Board staff on the potential installation of large trash full-capture systems through cooperative implementation agreements;
- Assisted San Mateo County Permittees that have not achieved the 100% trash load reduction benchmark by providing guidance and model Updated Trash Load Reduction Plans and Notices of Non-compliance; and
- Assisted San Mateo County Permittees in developing information necessary for reporting trash load reductions with their FY 2025/26 Annual Reports.

More information on each of these accomplishments is provided below.

## Trash Subcommittee

SMCWPPP's Trash Subcommittee assists San Mateo County Permittees 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 2025/26, Countywide Program staff facilitated two Trash Subcommittee meetings, which were chaired by Chris Sommers (EOA, Inc.). The Trash Subcommittee continued to have excellent participation by municipal staff and other stakeholders, as shown in the FY 2025/26 attendance list (Appendix 10).

During the Trash Subcommittee meetings in FY 2025/26, Subcommittee members discussed and provided input on the following topics/projects:

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- C.10 requirements in the MRP;
- SMCWPPP Long-Term Trash Reduction Guidance Work Plan tasks;
- 100% trash load reduction benchmark reporting after June 30, 2025;
- Arc GIS On-line (AGOL) trash generation maps;
- PLDA Trash Inspection Program implementation;
- Watching Our Watershed (WOW) tasks, a regional grant project funded by the USEPA San Francisco Bay Water Quality Improvement Fund;
- Litter-related items of interest;
- Receiving water trash monitoring;
- Other opportunities for collaboration with Caltrans;
- SMCWPPP Trash Assessment Strategy, including OVTAs conducted in Trash Management Areas (TMAs); and
- MRP 4.0 reissuance.

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

SMCWPPP developed an initial *Trash Assessment Strategy* (Assessment Strategy) in FY 2013/14 on behalf of San Mateo County Permittees. The Strategy was submitted to the Regional Water Board on February 3, 2014, as part of San Mateo County Permittee Long-Term Trash Load Reduction Plans and was intended to serve as the trash tracking method required by the Permit. SMCWPPP began to implement the Strategy in FY 2013/14 and continued its implementation at a full-scale during FY 2025/26 on behalf of (and in collaboration with) all San Mateo County Permittees.

The Assessment Strategy is intended to provide information on the magnitude and extent of trash reductions associated with stormwater discharges in San Mateo County. The Strategy is consistent with C.10 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%, 80%, 90% and 100%) been achieved by San Mateo County Permittees?*

The primary environmental and programmatic indicators that SMCWPPP and San Mateo County Permittees currently track to answer this core management question are:

1. **Full Capture Systems** – The extent of areas effectively treated by full trash capture devices and the operation and maintenance of these devices;
2. **Other Trash Controls** – Reductions in the levels of trash observed on-land and available to enter MS4s;

In selecting the indicators above, San Mateo County Permittees recognized that multiple indicators can provide the information necessary to definitively determine that progress has been made to reduce trash discharged from MS4s. SMCWPPP's methods used to collect or track information on the indicators listed above are briefly described below, along with summaries of associated activities conducted by SMCWPPP in FY 2025/26. Additional information and the results of data collected to support the reporting of these

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two indicators are found in Section 10, Provision C.10.b.iii(a) and (b), of individual San Mateo County Permittee FY 2025/26 Annual Reports.

**1. Full Capture Systems (Including Operation and Maintenance)**

Devices and facilities meeting the full trash capture design criteria described in the MRP and certified by the State Water Resources Control Board (State Water Board) are effective trash controls if adequately maintained to ensure their capture efficiency. Consistent with the Long-Term Plan Framework and the State Water Board's Trash Amendments, 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" and has achieved the ultimate trash reduction benchmark outlined in the MRP (i.e., 100% reduction). Additional trash reductions, therefore, are not needed in areas draining to (and treated by) full capture systems to demonstrate compliance with the MRP benchmarks.

From FY 2013/14 through FY 2025/26, SMCWPPP and San Mateo County Permittees have expended considerable time and resources identifying and mapping areas draining to full capture devices, using a combination of fieldwork and desktop Geographic Information System (GIS) analysis. Drainage areas for newly installed full capture devices are delineated and mapped as part of an annual update of individual San Mateo County Permittee 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. More than 14,875 acres of land area is currently treated by full capture systems in San Mateo County. Trash reductions associated with these areas are calculated based on the baseline trash generation levels established on San Mateo County Permittee baseline trash generation maps and are reported in individual Permittee Annual Reports (see Section C.10).

In accordance with MRP Provision C.10.a.ii.(a) and the State Water Board's Trash Full Capture Certification process, stormwater treatment facilities (e.g., bioretention systems) implemented in accordance with MRP Provision C.3 are deemed a full capture system if the facility, including its maintenance, prevents the discharge of trash to the downstream MS4 and receiving waters and discharge points from the facility, including overflows, are appropriately screened or otherwise configured to meet the full trash capture screening specification for storm flows up to the full trash capture one year, one hour storm hydraulic specification. Based on this definition, San Mateo County Permittees have applied a very conservative assumption to determine which bioretention facilities constructed in San Mateo County are meeting the criteria included in the MRP and the State Water Board Certification Factsheets for "multi-benefit" stormwater treatment systems should be considered full trash capture systems. Currently, only bioretention facilities constructed after July 1, 2010, designed to treat at least 3% of the drainage management area (DMA), and have at least a 6-inch ponding depth have been identified by San Mateo County Permittees as meeting the definition of a full trash capture system. A technical memorandum describing the analysis conducted by the Santa Clara Valley Urban Pollution Prevention Program (SCVURPPP) that supports the application of these criteria and considering these multi-benefit systems as full trash capture systems regionwide was provided in Appendix 10-1 of SCVURPPP's FY 2021/22 Annual Report. In April 2023, Countywide Program staff assisted with developing suggested responses to Water Board staff comments and next steps to the BAMSC Trash Subcommittee regarding the use of bioretention facilities as full trash capture. A follow-up meeting was also held to discuss multi-benefit treatment systems as full trash capture in April 2023. MRP Permittees provided a written response to the Water Board staff comments in May 2024, and the issue was briefly discussed in Bay Area Municipal Stormwater Collaborative (BAMSC) meetings during summer 2024. In January 2025, Water Board staff distributed a letter to MRP Program Managers that provides additional comments on the SCVURPPP memorandum and guidance regarding how bioretention systems can be acceptable as full trash

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capture equivalent systems. In May 2025, Water Board staff agreed to presume that these systems are full trash capture systems until final criteria can be developed that establish the conditions under which these multi-benefit systems can be considered full trash capture. Given the uncertainties in the criteria that will eventually be developed, the San Mateo County Permittees decided to not count these multi-benefit systems as full trash capture systems in FYs 2024/25 or 2025/26. Countywide Program staff will continue to participate in discussions regarding the use of bioretention facilities as full trash capture.

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 2025/26, SMCWPPP continued to provide guidance to San Mateo County Permittees on O&M requirements and standard operating procedures developed for San Mateo County Permittees as part of the Model Verification Program. San Mateo County Permittees 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 San Mateo County Permittee Annual Reports provide information regarding O&M of full capture devices and any associated issues with the devices (see Section 10, Provision C.10.b.i and ii).

**2. Other Trash Control Measures (via On-land Visual Trash 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 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. The four OVTA scoring categories correspond with the four trash generation rate categories (i.e., low-A; moderate-B; high-C; and very high - D) and the associated weighting factors (i.e., 0, 1, 4, 12) included in the MRP.

Consistent with the MRP, OVTAs are conducted at randomly selected street/sidewalk sites representing at least 10% of the applicable street miles in each trash management area (TMA) where trash reductions are being reported by San Mateo County Permittees. 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 on average at a site will allow improvements in trash levels to be detected with an acceptable level of confidence. Currently, SMCWPPP annually conducts two to three assessments at each site during each FY and then averages the two FYs of data to calculate trash load reductions in a given FY. For example, in reporting reductions for FY 2025/26, results from assessments conducted in both FY 2024/25 and FY 2025/26 were averaged and used to represent the "current" levels of trash within the applicable land areas.

During FY 2025/26, Countywide Program staff conducted 259 OVTAs at 100 assessment sites (averaging 1,000 feet in length). OVTA sites were assessed at least two times during FY 2025/26, and most sites were assessed three times. Table 10-1 summarizes the number of OVTAs conducted each fiscal year from FY 2017/18 through FY 2025/26. Due to the continued installation of full capture devices by SMCWPPP Permittees, the number of OVTAs completed over the last few FYs has decreased. OVTA data are stored in the SMCWPPP Trash Load Reduction Dashboard, which is available to San Mateo County Permittees.

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**Table 10-1. Number of OVTAs Completed in San Mateo County by Fiscal Year**

| FY 18/19 | FY 19/20 | FY 20/21 | FY 21/22 | FY 22/23 | FY 23/24 | FY 24/25 | FY 25/26 |
|---|---|---|---|---|---|---|---|
| 704 | 562 | 788 | 677 | 601 | 653 | 531 | 259 |

## Model Private Land Drainage Area Trash Control Program

As described in MRP 3.0 Provision C.10.a.ii.(b), private properties that 1) generate moderate, high, or very high levels of trash, 2) are plumbed to the San Mateo County Permittee's MS4, and 3) are not already addressed by a full capture device are required to be equipped with a full capture device or be managed by trash control measures equivalent to or better than a full capture device by July 1, 2025.

To address trash contributions from these properties, which are referred to as Private Land Drainage Areas (PLDAs), SMCWPPP finalized a memorandum in FY 2022/23 describing the recommended approach for implementing a Trash Inspection Program (TIP) for PLDAs. Guidance on developing a San Mateo County Permittee TIP Plan, and inventory of PLDAs greater than 10,000 $ft^2$, were included as attachments to the memorandum. Through the TIP, inspections are performed on PLDAs and if the level of trash observed on the property via OVTAs is greater than low trash generation, property owners and/or managers are required to implement additional trash control measures and achieve low trash generation. Trash control measures may include FTC systems or other types of trash control actions. The goal of the TIP is to address trash from all PLDAs in the City by July 1, 2025.

During FY 2023/24, SMCWPPP identified remaining PLDAs that are less than 10,000 $ft^2$ for inclusion in the TIPs; developed additional tools for tracking, managing, and reporting PLDA inspection results; and created a fact sheet and inspection letter for San Mateo County Permittees to use in educating property owners and managers about trash reduction requirements. Some San Mateo County Permittees began implementing a TIP on PLDAs during FY 2023/24. As part of launching San Mateo County Permittee PLDA TIPs, SMCWPPP provided field training on how to perform PLDA trash inspections on January 30, 2024. A total of 41 municipal staff and consultants attended the field training. The use of a standardized PLDA inspection data collection form was presented at the training. The presentation is posted on the SMCWPPP website (opens in a new tab). During FY 2024/25, a few San Mateo Permittees requested that SMCWPPP provide additional guidance on how to implement a Private Land Drainage Area (PLDA) Trash Inspection Program (TIP). Like the FY 2023/24 field training, procedures for conducting PLDA trash inspections, including how to use the SMCWPPP standardized PLDA inspection data collection form were discussed. Guidance was provided during individual Zoom meetings.

During FY 2024/25, SMCWPPP identified remaining PLDAs with jurisdictional land areas adjacent to Caltrans right-of-way (ROW). As described in San Mateo County Permittee FY 2024/25 Annual Reports, all San Mateo County Permittees with identified PLDAs began implementing and completed inspecting and documenting low trash generation levels and appropriate trash control measure implementation, including jurisdictional land areas adjacent to Caltrans ROW. As part of compiling San Mateo County Permittee PLDA inspection data, SMCWPPP assisted with managing Permittee PLDA data collection tools, and tracking and reporting Permittee PLDA inspection results in the SMCWPPP Trash Load Reduction Dashboard. During FY 2025/26, SMCWPPP continued to provide guidance to San Mateo County Permittees on PLDA TIP implementation, assisted with managing Permittee PLDA data collection tools and PLDA inventories, and continued tracking and reporting Permittee PLDA inspection results in the SMCWPPP Trash Load Reduction Dashboard.

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## Revised Trash Generation Maps

MRP 3.0 Provisions C.10.a.ii and g.ii requested that MRP Permittees submit revised trash generation map(s) with their FY 2023/24 Annual Reports. The Bay Area Municipal Stormwater Collaborative (BAMSC) Trash Subcommittee discussed options for map formats and decided to use ArcGIS Online (AGOL) Map Viewer as the tool to share maps with the Regional Water Board staff. This format allows for consistent resolution when zoomed in and out, ease of layer updates, and ease of viewability for all viewers. To view the maps, an AGOL license is required. In FY 2023/24, Countywide Program staff assisted in developing regional guidance approved by Water Board staff to develop the Revised Trash Generation Maps for each San Mateo County Permittee. A link which allows Regional Water Board staff to view the map(s) was provided in San Mateo County Permittee FY 2023/24 Annual Reports. Since the initial submittal in FY 2023/24, Countywide Program staff have assisted San Mateo County Permittees with updating Trash Generation Maps and reposting on AGOL. A link which allows Regional Water Board staff to view the updated map(s) is provided in San Mateo County Permittee FY 2025/26 Annual Reports – Section C.10.

## Coordination with San Mateo Countywide Recycling Committee

To increase coordination among solid waste and recycling programs and San Mateo County Permittee MS4 trash reduction activities, Countywide Program staff began attending Countywide Recycling Committee meetings in FY 2012/13. SMCWPPP continued to coordinate with the Recycling Committee in FY 2025/26, specifically targeting outreach and coordination with municipally solid waste/recyclables haulers in San Mateo County to reduce trash impacts associated with inadequate waste container management. Countywide Program staff also coordinated with the Recycling Committee on collection activities, PCBs and demolition regulations, litter reduction and zero waste building design and operation, source reduction policies, and zero waste programs.

# FUTURE ACTIONS

FY 2026/27 activities that are planned by SMCWPPP to assist San Mateo County Permittees comply with MRP Provision C.10 requirements include the following:

- Continue to facilitate SMCWPPP Trash Subcommittee meetings;
- Conduct a series of tasks designed to assist San Mateo County Permittees with maintaining 100% trash load reduction benchmark required by MRP 3.0;
- Identify trash generating areas that may be diverging away from the low trash generation level and may require further trash control measure evaluation by San Mateo County Permittees;
- Evaluate, identify, and account for applicable Green Infrastructure (GI) that achieve the full capture system design criteria for Multi-benefit Systems, as outlined in the Regional Water Board guidance developed in FY 2024/25;
- Continue to implement the SMCWPPP trash assessment strategy designed to demonstrate progress towards and the attainment of the 100% trash load reduction benchmark;
- Continue to assist San Mateo County Permittees that have yet to demonstrate achievement of the 100% trash load reduction benchmark with trash control measure planning;
- Continue to maintain SMCWPPP Trash Load Reduction Dashboard;

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- Continue to support long-term plan implementation and control actions for trash management, including guidance on updating/revising Long-term Plans consistent with MRP 3.0 requirements;
- Continue to calculate and report on trash load reductions for each San Mateo County Permittee;
- Continue to update/revise trash generation and full capture system maps and GIS data layers in preparation for the FY 2026/27 Annual Report submittal;
- Continue PLDA training of San Mateo County Permittees, as needed, and manage data generated by Permittees on PLDAs;
- Continue providing guidance on PLDA Trash Inspection Program implementation and assisting with PLDA data management and reporting;
- Continue sharing of information on regional, State, and Federal litter-related topics including foodware reuse and reduction programs, legislation, illegal dumping, and guidance documents;
- Continue coordination and information sharing with the SMCWPPP PIP Subcommittee on countywide litter reduction efforts;
- Continue coordination with Caltrans for trash capture device design review, purchase, installation, and maintenance agreements; and
- Continue coordination with the New Development Subcommittee (and State and Regional Water Board staff) on the trash load reduction benefits of GI facilities.

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# SECTION 11/12
# C.11/12 MERCURY/PCBs CONTROLS

## INTRODUCTION

Provisions C.11 and C.12 of the MRP require Permittees to implement control programs to reduce the stormwater impacts of mercury and PCBs on San Francisco Bay (Bay). The Water Board has previously determined that stormwater discharges of these legacy pollutants have contributed to exceedances of water quality objectives (WQOs) and that associated beneficial uses of the Bay are not achieved. The Water Board has therefore adopted water quality attainment strategies called Total Maximum Daily Loads (TMDLs) that assign pollutant load reductions (through waste load allocations) to Bay Area municipal stormwater dischargers. Provisions C.11 and C.12 implement the urban runoff requirements of the mercury and PCBs TMDLs.

The control programs and other actions that Provisions C.11 and C.12 require Permittees to implement during the permit term include the following:

- Assess Mercury and PCBs Load Reductions from Stormwater (C.11/12.a);
- Program for Source Property Identification and Abatement (C.11/12.b);
- Program for Control Measure Implementation in Old Industrial Areas (C.11/12.c);
- Mercury Collection and Recycling Implemented throughout the Region (C.11.d);
- Program for Controlling PCBs from Bridges and Overpasses (C.12.d);
- Program for Controlling PCBs from Electrical Utilities (C.12.e);
- Plan and Implement Green Stormwater Infrastructure to reduce Mercury and PCBs Loads (C.11.e/C.12.f);
- Manage PCBs-Containing Materials and Wastes During Building Demolition Activities (C.12.g);
- Prepare Implementation Plan and Schedule to Achieve TMDL Wasteload Allocations (C.11.f/C.12.h);
- Fate and Transport Study of Mercury and PCBs: Urban Runoff Impact on San Francisco Bay Margins (C.11.g/C.12.i); and
- Risk Reduction Program for Mercury and PCBs (C.11.h/C.12.j).

During FY 2025/26, Provisions C.11 and C.12 requirements were addressed primarily at three levels: directly by San Mateo County Permittees; at the countywide level via SMCWPPP; and/or at the regional level via BAMSC. MRP mercury and PCBs requirements are similar due to similarities in the control programs for these sediment-associated and legacy pollutants. Therefore, descriptions of the activities conducted in compliance with the Provisions C.11 and C.12 requirements are grouped into this single section of the SMCWPPP Annual Report.

The remainder of this section is organized by the sub-provisions in C.11 and C.12. The subsections below briefly describe the requirements in each sub-provision and summarize the compliance activities

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conducted during FY 2025/26 at the Permittee, Countywide Program (SMCWPPP), and/or regional (BAMSC) levels to address these requirements.

# IMPLEMENTATION OF MRP PROVISIONS

## C.11/12.a Assess Mercury and PCBs Load Reductions from Stormwater

### *Permit Requirements*

Provisions C.11/12.a require Permittees to implement an assessment methodology and data collection program to quantify mercury and PCBs loads reduced through implementation of all controls described in Provisions C.11/12. At the end of the previous permit term, SMCWPPP submitted a TMDL Control Measure Implementation and Reasonable Assurance Analysis (RAA) report to the Water Board that describes the calculation methodologies, data requirements, and model parameters used to quantify mercury and PCBs loads reduced for each type of control measure identified in Provisions C.11/12 (SMCWPPP 2020[1]). Permittees will continue to use these methods to quantify the mercury and PCBs load reductions achieved through all controls implemented during the permit term as described in Provisions C.11/12.b through C.11.e and C.12.g. To comply with the detailed requirements in the permit for reporting on the mercury and PCBs control programs, San Mateo County Permittees have developed a *Mercury and PCBs Control Measures Report* that will be updated each year of the permit term. Version 4.0 of this report is included in Appendix 11/12a. The report provides or will provide the following:

- Each Year of the Permit:
    - Documentation to confirm that all control measures effectuated during the previous permit term for which load reduction credit was recognized continue to be implemented at an intensity sufficient to maintain the credited load reduction; and
    - Documentation to demonstrate the status of control measure implementation during the current permit term, updated each year of the permit.
- In the FY 2025/26 Annual Report:
    - Mercury and PCBs load reductions achieved through implementation of controls since the beginning of the permit term, and estimates of the load reductions from controls taking place through the end of the permit term, including all supporting data to substantiate the load reduction estimates; and
    - Refinements to the measurement and estimation methodologies to assess mercury and PCBs load reductions from control measures in the subsequent permit for Water Board Executive Officer (EO) approval.

### *Progress During FY 2025/26*

During FY 2025/26, all control measures effectuated during the previous permit term for which load reduction credit was recognized continued to be implemented at an intensity sufficient to maintain the

[1] San Mateo County Water Pollution Prevention Program (SMCWPPP), 2020. Pollutant Control Measures Implementation Plan and Reasonable Assurance Analysis for San Mateo County, California. September 30, 2020.

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credited load reduction. Documentation of these controls is provided in the *Mercury and PCBs Control Measures Report* (Appendix 11/12a).

Documentation of mercury and PCBs control measure implementation and associated loads reduced during MRP 3.0 to date and estimated for the fifth year of the permit term are reported in Appendix 11/12a.

During FY 2025/26, the Program worked with BAMSC partners to update the *Source Control Load Reduction Accounting (SCLRA) for Reasonable Assurance Analysis* (RAA) report that was developed during MRP 2.0 and approved by the Water Board EO for use during MRP 3.0. The updated report is provided in Appendix 11/12b, and includes refinements to the measurement and estimation methodologies to assess mercury and PCBs load reductions from control measures. The updated report is submitted with this Annual Report for Water Board EO approval for use during MRP 4.0.

## C.11/12.b Program for Source Property Identification and Abatement

### *Permit Requirements*

Provisions C.11/12.b require San Mateo County Permittees to investigate, using both conventional sampling and laboratory analysis techniques, at least 1,411 acres of land areas during the MRP 3.0 permit term that likely contribute mercury and/or PCBs[2] to MS4s. These investigations are focusing on land areas where industrial activities occurred prior to 1980 and continue today (i.e., old industrial land use areas that have not been redeveloped). For properties or land areas found to be contributing substantial amounts of mercury or PCBs or where high mercury or PCBs concentrations are found (generally areas with sediment concentrations greater than 0.5 mg/kg), Permittees will take actions to abate the mercury and PCBs sources into their MS4s or refer the properties to the Water Board for follow-up measures. For each source property referred to the Water Board, Permittees will implement interim enhanced Operation and Maintenance (O&M) measures in the street or storm drain infrastructure adjacent to the referred source property or implement stormwater treatment downstream of the property. Provisions C.11/12.b reporting requirements include the following:

- In each Annual Report through 2026, Permittees are required to:
    - Report progress on the acreage of land areas investigated, including progress toward investigation of the 1,411 acres of old industrial land uses in San Mateo County. The reporting shall indicate what action was taken for the parcels investigated (e.g., abatement, referral, enforcement). Permittees are required to submit all supporting data and information including referral reports.
    - Report on ongoing enhanced O&M activities associated with all past contaminated property referrals.
- In the 2026 Annual Report:

[2] PCBs, with regards to source property identification and abatement, refers to the total sum of the Regional Monitoring Program (RMP) 40 PCBs congeners. The RMP 40 PCB congeners include: PCB-8, PCB-18, PCB-28, PCB-31, PCB-33, PCB-44, PCB-49, PCB-52, PCB-56, PCB-60, PCB-66, PCB-70, PCB-74, PCB-87, PCB-95, PCB-97, PCB-99, PCB-101, PCB-105, PCB-110, PCB-118, PCB-128, PCB-132, PCB-138, PCB-141, PCB-149, PCB-151, PCB-153, PCB-156, PCB-158, PCB-170, PCB-174, PCB-177, PCB-180, PCB-183, PCB-187, PCB-194, PCB-195, PCB-201, PCB-203.

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- Report on total acreage of land area investigated, area and description of properties referred, description of enhanced O&M measures, and the estimated total mercury and PCBs mass load reduced (consistent with the approved accounting procedures) resulting from implementing this control measure.

### *Progress During FY 2025/26*

During FY 2025/26, the Countywide Program (on behalf of San Mateo County Permittees) continued to investigate old industrial land areas in San Mateo County using a tiered investigation process, similar to the process used during previous permit terms. The process generally starts with desktop review of catchments with old industrial properties to identify potential locations where stormwater screening samples may be collected. Stormwater screening samples are collected at or near a catchment outfall to screen relatively large areas (i.e., catchment or sub-catchment). This screening is intended to identify Watershed Management Areas (WMAs) where PCBs are elevated and additional actions are warranted. Stormwater is considered elevated if PCBs concentrations are in the top 15% of stormwater sample concentrations collected in the public right-of-way (ROW) regionwide (~35 ng/L) or if the stormwater particle ratio (PCBs concentration divided by suspended sediment concentration ) is 0.2 mg/kg or higher. BAMSC identified these thresholds based on analysis of over 400 stormwater samples collected from outfalls or other storm drain infrastructure across the five MRP counties over the past 20+ years (SMCWPPP 2022[3]). Catchments with elevated stormwater are targeted for further investigation via public ROW sediment sampling to pinpoint potential source areas and potential source properties that are likely contributing to elevated concentrations in the catchment. In catchments where stormwater sampling at or near the outfall is not feasible, the field investigations begin with sediment sampling in the public ROW. Additional desktop analysis is conducted to identify potential locations in the public ROW that drain one or more old industrial properties. Properties that drain to public ROW locations with low levels of mercury or PCBs (i.e., < 0.3 mg/kg for mercury or < 0.2 mg/kg for PCBs) in the public ROW are deemed unlikely sources and removed from further investigation.

Areas with elevated public ROW sediment concentrations of mercury or PCBs (i.e., ≥ 0.3 mg/kg for mercury or ≥ 0.2 mg/kg for PCBs) are targeted for further investigation. Further investigation is aimed at identifying specific properties that are likely contributing PCBs or mercury to the MS4 (i.e., source properties), and may include additional public ROW sediment sampling or on-site property sampling. Although source properties may, in some cases, be identified based on public ROW sediment samples alone, on-site property samples may be needed to confirm a given property is a source of PCBs or mercury to the MS4.

The purpose of on-site investigations is to increase the likelihood of identifying properties contributing elevated PCBs (≥ 0.2 mg/kg) or mercury (≥ 0.3 mg/kg) to Permittee MS4s. If on-site sampling is deemed necessary, Program staff coordinate with municipal staff to conduct property inspections and collect sediment samples on the property as an extension of existing municipal stormwater inspection programs. City staff initiate this process by sending letters to property owners to inform them about the upcoming inspections and sampling, followed by an inspection and collection of on-site sediment samples conducted by Program and City staff. Next steps for each property are determined once the on-site sample results are available. Properties with low concentrations (i.e., < 0.3 mg/kg for mercury or < 0.2 mg/kg for PCBs) are deemed unlikely sources and removed from further investigation. Properties with moderate concentrations (i.e., ≥ 0.3 mg/kg and less than 1 mg/kg for mercury or ≥ 0.2 mg/kg and less than 1 mg/kg for PCBs) are confirmed Moderate Pollutant-Contributing Properties (MPCPs), and are addressed through

[3] San Mateo County Water Pollution Prevention Program (SMCWPPP), 2022. Urban Creeks Monitoring Report Part C: Monitoring in San Mateo County for Pollutants of Concern – Water Year 2021. March 31, 2022.

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the MPCP program that was developed as part of SMCWPPP's Old Industrial Area Control Measure Plan (SMCWPPP 2024) [4], and described in the section on *Program for Control Measure Implementation in Old Industrial Areas (C.11/12.c)* of this report. Properties with high concentrations (i.e., ≥ 1 mg/kg for mercury or PCBs) are confirmed Source Properties and are addressed through referral to the Water Board for further investigation and abatement. SMCWPPP's source investigation process, MPCP program, and the source property referral and abatement process are described in more detail in Appendix 11/12a.

In addition to the investigations conducted via monitoring, the Program also conducts desktop reviews of existing information and data from third parties across to identify both past and present PCBs cleanup sites or other locations with high PCBs measured in soils on these properties. These evaluations make use of available data from historical maps and records referring to business activities or land uses (i.e. Sanborn maps; business lists such as White Pages; and newspaper or media excerpts); credible data on third-party Environmental Site Assessments and related pollutant investigation and/or remediation or abatement efforts (e.g. data from the US EPA, CA DTSC (EnviroStor), and State Water Resources Control Board (Geotracker)); and contemporary information provided by Permittees on new and redevelopments and the installation of new LID/GI stormwater treatment measures. Properties with sufficient data identifying them as a source of PCBs (or mercury) are categorized as highly likely source properties, which may be referred to the Water Board for further investigation and abatement, or may be submitted to the Water Board as a "self-abated" property that was a PCBs source in the past but has been fully remediated.

The source property investigation related efforts conducted by SMCWPPP on behalf of San Mateo County Permittees during FY 2025/26 included the following actions:

- Desktop Evaluation and Field Reconnaissance of Catchments with Old Industrial parcels to Identify Potential Sediment and/or Stormwater Runoff Sample Stations. During FY 2025/26, the Countywide Program conducted desktop review of parcel and MS4 infrastructure in GIS, satellite and aerial photos, Google Earth, and/or Google's street view to identify likely stormwater flow pathways within catchments of interest (i.e., those with old industrial parcels where no monitoring has yet occurred, or where previous monitoring found elevated PCBs in public ROWs areas but the source(s) have yet to be identified) and to continue to identify potential sites within the MS4 where screening level sediment and/or stormwater runoff samples could be collected. This desktop review was followed by field reconnaissance of some of these areas to better understand flow pathways through catchments and from parcels into the MS4, to confirm locations of storm drain structures where samples (MS4 sediment or stormwater) could be collected, and to develop sampling plans. During FY 2025/26, Countywide Program staff conducted desktop review and field reconnaissance in 108 catchments with old industrial land uses in 17 cities throughout the County, as well as in unincorporated County territory. These efforts included review of more than **1,500 acres** of old industrial land use parcels and identified potential sample locations for the MS4 sediment and stormwater runoff samples that were collected during FY 2025/26 as described below, and for samples that will be collected during the next fiscal year.
- Stormwater Sampling. One stormwater runoff sample was collected in April 2026 to screen for elevated mercury or PCBs in the City of San Mateo. The sample was collected mid-channel in Marina Lagoon, just downstream of the outfalls of WMAs 89 and 1009, together draining over 270 acres. The catchment areas feeding into this sample point include 72 acres of Old Industrial

[4] SMCWPPP 2024. Final Revised Pollutant Control Measure Plan to Reduce PCBs And Mercury in Urban Runoff from Old Industrial Areas in San Mateo County, California, Plan and Schedule for Control Measure Implementation during MRP 3.0. Final Revised July, 2024.

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parcels, much of which had not been previously investigated. Final results from the April 2026 sampling were pending at the time this report was completed.

- Public ROW MS4 Sediment Sampling. MS4 sediment samples were collected in July 2025, April 2026, and June 2026. These samples were collected in locations that drain one or more old industrial parcels, including catch basins, manholes, and street dirt. In total, these sampling efforts screened nearly **450 acres** of old industrial parcels, as detailed below. The laboratory results for the July 2025 samples were predominantly low in PCBs (i.e. < 0.2 mg/kg), though five samples had elevated mercury concentrations (≥ 0.3 mg/kg). Additionally, one ROW sample had moderately elevated PCBs (≥ 0.2 mg/kg and < 1 mg/kg) and two had highly elevated PCBs (≥ 1 mg/kg), together associated with approximately 7 acres of old industrial parcels. Locations with elevated PCBs or mercury will require further investigation in the future to identify the source(s) of these pollutants. Results for the April and June 2026 samples are not yet available from the laboratory. Once analytical data is available, the Program will review the results and determine the next steps for these areas, which may include on-site sampling at suspect properties and/or implementation of other actions to address any sources of PCBs or mercury identified in the catchments. Additional details on FY 2025/26 sediment sampling are provided below.

    - Brisbane: Ten sediment samples were collected during July 2025 from two WMAs (17 and 1004), as well as other areas where the WMA boundaries (i.e. catchment boundaries) have not yet been delineated, in the City of Brisbane. Three of the samples were composites, aggregating a total of seven sediment grabs to better represent two potential source properties and a railroad tract. The FY 2025/26 samples targeted public ROW locations that drain **165 acres** of old industrial parcels. Seven samples had low PCBs (< 0.2 mg/kg) and low mercury (<0.3 mg/kg), two samples had elevated PCBs but low mercury, and one sample had low PCBs but elevated mercury. The location where the elevated PCBs concentration was observed was along a public trail. The trail appears to be a source of moderately to highly elevated PCBs in this area and will be addressed through the MPCP program. The area of elevated mercury will require further investigation to identify the source(s).

    - Burlingame: Eleven sediment samples were collected during June 2026 from five WMAs (85, 141, 164, 1006, 1006A), as well as other areas where the WMA boundaries (i.e. catchment boundaries) have not yet been delineated, in the City of Burlingame. Seven of the samples were composites, aggregating a total of 22 sediment grabs to better represent large potential source properties, mixed catch basins and street sediment, and areas of the ROW near railroads and street crossings. The FY 2025/26 samples targeted public ROW locations that drain more than **47 acres** of old industrial parcels. Analytical results from the June 2026 sampling were pending at the time this report was completed.

    - Colma: Three sediment samples were collected during June 2026 from WMA 329, as well as other areas where the WMA boundaries (i.e. catchment boundaries) have not yet been delineated, in the City of Colma. Three of the samples were composites, aggregating a total of 10 sediment grabs to better represent multiple driveways/entrances at large potential source properties and mixed catch basins and street sediment. The FY 2025/26 samples targeted public ROW locations that drain approximately **9 acres** of old industrial parcels. Analytical results from the June 2026 sampling were pending at the time this report was completed.

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- Daly City: Four sediment samples were collected during June 2026 from three WMAs (307, 1004A, and *Colma Creek Upper*) in the City of Daly City. One sample was a composite, aggregating two sediment grabs to better represent multiple potential source properties. The FY 2025/26 samples targeted public ROW locations that drain approximately **14 acres** of old industrial parcels. Analytical results from the June 2026 sampling were pending at the time this report was completed.
- East Palo Alto: One sediment sample was collected during June 2026 from WMA 70B in the City of East Palo Alto. The FY 2025/26 sample targeted a public ROW location that drains **17 acres** of old industrial parcels. Analytical results from the June 2026 sampling were pending at the time this report was completed.
- Menlo Park: Four sediment samples were collected during April (two samples) and June 2026 (two samples) from three WMAs (238, 239, and 1012) in the City of Menlo Park. One sample was a composite, aggregating two sediment grabs at either side of a railroad tract. The FY 2025/26 samples targeted public ROW locations that drain over **23 acres** of old industrial parcels. Analytical results from both sets of sampling were pending at the time this report was completed.
- Millbrae: Ten sediment samples were collected during July 2025 (8 samples) and June 2026 (2 samples) from three WMAs (395, 401, 1005), as well as other areas where the WMA boundaries (i.e. catchment boundaries) have not yet been delineated, in the City of Millbrae. Two samples were composites, aggregating a total of four sediment grabs to better represent multiple stormwater and sediment transport pathways at large potential source properties. The FY 2025/26 samples targeted public ROW locations that drain **47 acres** of old industrial parcels. The July 2025 samples all had low PCBs (< 0.2 mg/kg), though three samples had elevated mercury (> 0.3 mg/kg). Analytical results for the June 2026 sampling were pending at the time this report was completed.
- Redwood City: Twenty-three sediment samples were collected during July 2025 and April and June 2026 from eight WMAs (261, 325, 334, 335, 336, 379, 407, 1000A), as well as other areas where the WMA boundaries (i.e. catchment boundaries) have not yet been delineated, in the City of Redwood City. Four of the samples were composites, aggregating a total of eight sediment grabs to better represent a railroad tract and multiple entrances or stormwater pathways of large or complex potential source properties. The FY 2025/26 samples targeted public ROW locations that drain **110 acres** of old industrial parcels. The July 2025 sampling results (13 samples) identified three parcels (approximately 9 acres) associated with highly elevated PCBs (>1.0 mg/kg) in the ROW. These parcels are now prioritized for on-site investigations to verify whether they are Source Properties. Analytical results from the April and June 2026 sampling events (10 samples) were pending at the time this report was completed.
- South San Francisco: Nineteen sediment samples were collected during April 2026 (14 samples) and June 2026 (five samples) from 12 WMAs (1001, 1001C, 1001D, 1001E, 1002, 291, 292, 295, 297, 306, 316, 317), as well as other areas where the WMA boundaries (i.e. catchment boundaries) have not yet been delineated, in the City of South San Francisco. Seven of the samples were composites, aggregating a total of 23 sediment grabs to better represent large or complex potential source properties; mixed catch basin and surface sediments; and large areas of the MS4 right-of-way. The FY 2025/26 samples targeted

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public ROW locations that drain over **170 acres** of old industrial parcels. Analytical results for the FY 2025/26 sampling events were pending at the time this report was completed.

On-site Inspections and Sampling. During July 2025, Program and City staff conducted on-site inspections in the City of Brisbane and collected samples from **nine private properties**, including two composite samples aggregating a total of four sediment grabs. These properties include approximately **23 acres** of old industrial parcels. The July 2025 on-site samples identified one parcel (of approximately 1.4 acres) that had highly elevated PCBs (>1.0 mg/kg) concentrations. It is anticipated that this property will be referred as a source property to the Water Board in FY 2026/27.

- Reporting. The chemical analysis results for samples that were collected in July 2025 were reported in the SMCWPPP Integrated Monitoring Report (IMR) that was submitted to the Water Board in March 2026. Analytical results for samples collected in April and June 2026 will be reported in the SMCWPPP WY 2026 Urban Creeks Monitoring Report (UCMR) that will be submitted to the Regional Water Board in March 2027. The combined outcomes of all source investigations conducted during MRP 3.0 to date in San Mateo County are presented in the *Mercury and PCBs Control Measure Report* (Appendix 11/12a).
- Continued Planning for Source Investigations during FY 2026/27. The Program is currently reviewing the analytical data received so far for samples collected in FY 2025/26. Once the results are available, the Program will review those data and other information collected during FY 2025/26 to determine next steps for the catchments and properties that were investigated during FY 2025/26. The Program plans to continue screening-level stormwater and sediment sampling in the public ROW and targeted on-site sampling, as described in the SMCWPPP Old Industrial Area Control Measure Plan (SMCWPPP 2024). The pace of these investigations has increased because of the availability of funding from US EPA through the San Francisco Bay Program grant funds. At the beginning FY 2025/26, the Program developed a Work Plan with review and input from Permittees, outlining the plan for how the US EPA grant funds will be used to continue to increase the pace of on-site investigations across San Mateo County and complete the remaining public ROW investigations. Source investigations continue to be planned and conducted using a combination of Program and grant funds.
- Desktop Screening and Review of Third-Party Data. Desktop evaluations conducted during FY 2025/26 identified about 260 acres of PCBs cleanup sites that may require further action, or that have already been fully abated. The Program is currently reviewing these data and will meet with applicable Permittees on next steps for these properties. Next steps may include submitting source property referrals to the Water Board for further investigation/remediation or to document that the properties were high PCBs sources in the past but have been fully remediated since the start of the PCBs TMDL. These efforts will continue during the next fiscal year.

All required documentation to demonstrate implementation of the Source Investigation and Abatement control program in San Mateo County during the current Permit term, and reporting on the associated mercury and PCBs loads reduced, is provided in the *Mercury and PCBs Control Measures Report* (Appendix 11/12a).

***Source Property Referrals and Ongoing Enhanced O&M***

In FY 2025/26, SCMWPPP Permittees did not submit any new mercury or PCBs source property referrals to the Water Board. Permittees continued to conduct the agreed-upon enhanced O&M activities for the source property referrals submitted in previous fiscal years as summarized in Appendix 11/12a. Permittees have identified eight PCBs Source Properties, of which one is also a mercury Source Property and two are

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mercury MPCPs. Permittees are currently developing plans for next steps, which may include referral to the Water Board for abatement. Details of all referrals that may be submitted during MRP 3.0 are provided in Appendix 11/12a.

## C.11/12.c Program for Control Measure Implementation in Old Industrial Areas

### *Permit Requirements*

San Mateo County MRP Permittees are required, during the permit term, to implement or cause to be implemented control measures to address 445 acres of old industrial land use areas at 70% control measure efficiency, or through accounting for the mass reduction of 19 g/yr of mercury and 81 g/yr of PCBs. Reporting requirements include the following:

- Submit plans and schedules for implementing controls in old industrial areas by March 31, 2023.
- In each Annual Report starting in 2023, submit an account of the controls implemented consistent with the plan submitted in March 2023, and any modifications thereto. Reporting shall include maps of the areas treated; the acreage of catchments addressed; and a description of all control measures, installed treatment devices, and routing facilities for each treated catchment.
- In the FY 2025/26 Annual Report, Permittees are required to report on all control measures and stormwater diversion measures implemented during the permit term and provide the total acreage treated and an estimate of the total mercury and PCBs mass loads reduced resulting from this implementation.

### *Progress During FY 2025/26*

**Old Industrial Area Control Measures Plan**

During FY 2025/26, Permittees continued to implement their Old Industrial Control Measure Plan (OICMP) that was submitted to the Water Board by the Program on behalf of all SMCWPPP Permittees in July 2024[5] and approved by the Water Board in October 2024. In order to develop and implement the OICMP, the Program first developed a complete dataset of all old industrial (OI) parcels draining to an MS4 within San Mateo County (i.e. the OI Parcel Dataset). The Program then conducted a thorough analysis of existing data to identify and document both the treatment status and the PCBs monitoring status for each old industrial parcel at the start of MRP 3.0. The treatment status for each parcel is identified as one of the following:

- Redeveloped/GI Treatment – indicates the property has undergone low impact development (LID) and/or is treated by GI facilities;
- Source Property – indicates the property has been confirmed as a PCBs source property and is undergoing (or will undergo) abatement via referral to the Water Board or self-abatement;
- Moderate Property – indicates the property has been confirmed as an MPCP and is addressed (or will be addressed) via the MPCP program controls; or,
- No Treatment.

[5] SMCWPPP 2024. Final Revised Pollutant Control Measure Plan to Reduce PCBs And Mercury in Urban Runoff from Old Industrial Areas in San Mateo County, California, Plan and Schedule for Control Measure Implementation during MRP 3.0. Final Revised July, 2024.

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The monitoring status for each parcel is identified as one of the following:

- Low - indicates the parcel has been sampled on-site or in the adjacent public ROW and PCBs concentrations were low (< 0.2 mg/kg). These parcels are considered unlikely to be sources of elevated PCBs to the MS4 and are not typically investigated further.
- Moderate - indicates the parcel has been sampled on-site or in the adjacent public ROW and PCBs concentrations were moderate (≥ 0.2 mg/kg to < 1 mg/kg); if the moderate sample was collected on-site, the parcel "Treatment Status" is updated to MPCP; if the moderate sample was collected in the public ROW, the parcel is targeted for on-site sampling;
- High - indicates the parcel has been sampled on-site or in the adjacent public ROW and PCBs concentrations were high (≥ 1.0 mg/kg); if the high sample was collected on-site, the parcel "Treatment Status" is updated to Source Property; if the high sample was collected in the public ROW, the parcel is targeted for on-site sampling; or
- No Monitoring – indicates the parcel is not associated with any sampling data and requires investigation.

SMCWPPP uses the treatment and monitoring status of OI parcels to determine where and what type of investigations (if any) are required and/or if other actions are needed to address elevated PCBs (i.e., source property referral, MPCP program, or other types of controls). -The treatment and monitoring status have been continuously updated during MRP 3.0 as new investigations are conducted and/or new treatment measures are applied to OI parcels. This information is used to track the progress of investigations and controls in OI areas as documented in Appendix 11/12a.

The Final Revised OICMP describes the new and enhanced controls that Permittees have been and will continue to implement in old industrial land use areas in San Mateo County to achieve the mercury and PCBs load reductions required by MRP C.11/12.c. The control programs described in the OICMP that Permittees continued to implement during FY 2025/26 include the following:

1. Targeted Control Measure Programs. These control programs are directed by Permittees and include ongoing, enhanced, and new actions that target OI land areas located in stormwater catchments containing known or suspected PCBs or mercury source areas, or evidence of moderately to highly elevated PCBs or mercury based on monitoring data. Targeted control measures include:

    - Controls for properties with moderately elevated PCBs or mercury;
    - Controls for properties with highly elevated PCBs or mercury; and
    - Controls for public ROW areas in catchments with moderately to highly elevated PCBs or mercury (e.g., enhanced O&M).

2. Other (non-targeted) Control Measure Programs. These control programs include actions that are implemented by Permittees, other agencies, or by private parties associated with OI land areas, but do not specifically target areas with known moderately to highly elevated PCBs or mercury in the catchment. Other control measures include:

    - Green Stormwater infrastructure (GI), including parcel-based LID, public sustainable streets and regional stormwater capture projects;
    - Other Stormwater Treatment Measures, including High-Flow Capacity systems and inlet-based devices.

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The *Mercury and PCBs Control Measure Report* (Appendix 11/12a) documents the control measures that have been implemented in San Mateo County consistent with the OICMP during the permit term to date, and provides maps of the areas treated, the acreage of catchments addressed, and a description of all control measures within each treated catchment. Additional information on control measure planning and implementation in old industrial areas during FY 2025/26 is presented below.

**Targeted Controls in Old Industrial and Moderate PCBs Areas.**

During FY 2025/26 the Program worked with SMCWPPP Permittees to continue implementing the program that was described in the OICMP to identify and address Moderate Pollutant-Contributing Properties and plan and implement other controls that specifically target old industrial and moderate PCBs or mercury areas. The MPCP program is described in detail in the OICMP (SMCWPPP 2024)[3]. A primary component of this program includes enhanced efforts to identify moderate and high PCBs properties by conducting on-site sampling of suspect properties. Properties with moderate PCBs on-site will then be addressed through the MPCP abatement program, which requires Permittees to work directly with the property owner(s) to implement controls on the property and/or in the public ROW adjacent to the property to prevent the release of PCBs from the property and/or remove PCBs-contaminated sediment from the public ROW. Properties with high PCBs on-site will be addressed through the existing source property referral program.

During FY 2025/26, the Program continued working with Permittees on the next steps for confirmed MPCPs, including the 18-acre MPCP property in the City of San Carlos that was identified in FY 2024/25. Next steps include outreach to the property owners to implement BMPs and O&M in the public ROW. The Program is also developing recommendations for O&M that the San Carlos can conduct in WMAs with identified MPCP or Source properties to address PCBs (and mercury) in the public ROW. In addition to ongoing planning for the 18-acre MPCP, the Program confirmed two new MPCPs that were identified during FY 2025/26. One, an approximately 2-acre property located in the City of South San Francisco was identified through desktop analysis and stormwater sampling conducted during MRP 2.0; public ROW samples collected in FY 2024/25; and on-site investigations on the parcel itself during FY 2025/26. Although ROW stormwater and sediment samples had highly elevated mercury and PCBs in the catchment, the on-site investigation determined that this property is a Moderate Pollutant Contributing Property rather than a full Source Property. As a result, the Program is continuing investigations in the area while also meeting with City staff to plan next steps. An additional 0.7-acre MPCP property has been identified at a former rail line in the City of Brisbane, with planning for MS4 O&M and property outreach currently ongoing between Brisbane and the Program. All of these properties are undergoing additional investigations and planning efforts between the Program and City staff, with initiation of BMPs and MS4 O&M anticipated during this permit term.

As source investigations continue, the Program anticipates more MPCPs will be confirmed. The current and anticipated PCBs load reductions that have been achieved or are anticipated by the end of the permit term due to MPCP abatement are provided in Appendix 11/12a.

***Enhanced O&M in Old Industrial / Moderate PCBs Areas***

MS4 storm drain line flush-and-capture cleanouts were planned during FY 2025/26 and are anticipated in future fiscal years in areas of the MS4 where the Program has identified elevated PCBs or mercury based on monitoring data. A total of 15,300 linear feet of such segments of the MS4 have been identified in the cities of San Carlos, South San Francisco, and Redwood City, with cleanouts to be conducted by the Cities or contractors beginning in FY 2026/27. This includes approximately 7,182 linear feet of storm drain lines in the City of San Carlos that are to be flushed and cleaned by the

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owners/operators of specific Source Properties as an EPA-mandated condition of their ongoing PCBs abatement activities. The Program anticipates that additional locations where O&M activities can be implemented to reduce PCBs loads will be identified during FY 2026/27 and in future years. Total MRP 3.0 mercury and PCBs load removals expected to result from these line cleanouts are included in Appendix 11/12a.

During FY 2025/26, targeted removal of stream sediment (channel de-silting) and PCBs evaluations of removed sediment were conducted in Belmont Creek culverts underneath Highway 101 in the City of San Carlos. While these efforts are not specifically targeted at old industrial areas, they do address portions of the channels/streams that drain old industrial areas. The most recent cleanout removed approximately 830 cubic yards of sediment drained from a catchment including 30 acres of old industrial areas. Evaluations of the average annual mass of sediment removed and estimated PCBs load reductions are provided in Appendix 11/12a.

**GI and Other Treatment Controls in Old Industrial / Moderate PCBs Areas**

GI facilities that treat old industrial land use areas have been implemented across San Mateo County as a result of stormwater requirements issued to new and redevelopment projects. Although Permittees have little control over the pace and extent to which private redevelopment in old industrial areas occurs, as redevelopment projects are permitted, they continue to ensure that stormwater treatment controls and other LID measures are incorporated into permitted projects on both public and private lands.

During FY 2025/26, San Mateo County Permittees continued to plan and implement public GI projects, including via implementation of their GI plans. Permittees also continued to track the installation of private and public GI facilities to ensure proper maintenance and operation and to assist with demonstrating pollutant load reductions. Section 3 of this Annual Report provides additional information about sustainable street and regional stormwater capture GI projects in San Mateo County.

San Mateo County Permittees also continued to plan and install other stormwater treatment systems (e.g., large high-flow capacity systems and small inlet-based devices) in public ROW locations that drain old industrial land use and other land use areas. During development of the OICMP, Countywide Program staff prioritized potential locations for future device installation in old industrial land use areas that also have moderate, high, or very-high trash generation.

The GI and other stormwater treatment controls implemented in old industrial and moderate PCBs areas in FY 2025/26, during the MRP 3.0 permit term to date, and anticipated through the end of MRP 3.0, and the associated PCBs and mercury loads reduced, are documented in the *Mercury and PCBs Control Measures Report* (Appendix 11/12a). The information provided in Appendix 11/12a includes supporting data and information needed for these load reduction calculations, including descriptions of the projects, maps of the areas treated, and the acreages treated within each catchment by land use category. It should be noted that information available for the current reporting year and projections through the end of the permit term is considered preliminary, as the data on all projects completed in FY 2025/26 and on planned projects may not be available until after this report is finalized. Permittees will continue to gather this information as it becomes available and submit it in subsequent Annual Reports

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## C.11.d Mercury Collection and Recycling Implemented throughout the Region

### *Permit Requirements*

Permittees are required to promote, facilitate, and/or participate in collection and recycling of mercury containing consumer products, devices, and equipment to increase effectiveness and public participation. Permittees must report on the following in each of the FY 2022/23 through FY 2025/26 Annual Reports:

- Efforts to promote recycling of mercury-containing products;
- Efforts to increase effectiveness of those recycling efforts; and
- The mass of mercury-containing material collected throughout the county along with an estimate of the mass of mercury contained in recycled material using the methodology contained in load reduction accounting system described and cited in the MRP Fact Sheet.

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.

### *Progress During FY 2025/26*

San Mateo County municipalities and the public continue to participate in the 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 San Mateo County municipal agencies promote the availability of the HHW Program and VSQG Program on their agency websites.

In FY 2025/26, the County programs collected a total of 20,749 linear feet of fluorescent lamps and 2,158 compact fluorescent lamps. In addition, these programs also collected the following mercury-containing devices and equipment during FY 2025/26:

- 13 Thermostats;
- 16 Mercury Thermometers; and
- 16 pounds of mercury-contaminated debris.

The programs also collected 5.9 Kg of elemental Mercury. The estimated mass of mercury collected via these activities during MRP 3.0 to date and anticipated through the end of the permit term is reported in the *Mercury and PCBs Control Measure Report* (Appendix 11/12a).

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## C.12.d Program for Controlling PCBs from Bridges and Overpasses

### *Permit Requirements*

Permittees are required to implement a Caltrans specification to manage, as part of bridge and overpass roadway replacement or major repair, potential PCBs-containing materials in bridge roadway expansion joints. Six months after availability of the Caltrans specification, Permittees must begin to implement or cause to be implemented the Caltrans specification during applicable replacement activities that are under the direction of the Permittee. Permittees are required to report the following:

- In the Annual Report immediately following availability of the specification, provide a description of the Caltrans specification for managing PCBs-containing materials in bridge or roadway expansion joints during roadway replacement or repair;
- In the FY 2022/23 Annual Report, submit an inventory of bridges in the program area that includes bridge ownership and the bridge roadway replacement schedule;
- In the FY 2023/24 through FY 2025/26 Annual Reports, submit documentation confirming the use of the Caltrans specification (once it is available) during all instances of bridge roadway replacement or repair in their jurisdiction during that reporting year and provide an estimate of the volume of material managed and total PCBs mass load reduced resulting from implementation of the specification.
- In the FY 2025/26 Annual Report, report an estimate of the total PCBs mass load reduced, consistent with approved accounting procedures, resulting from implementing this control measure.

### *Progress During FY 2025/26*

The Caltrans specification was not yet available as of the end of FY 2025/26. At the end of the previous fiscal year, the Program began working with other regional partners through BAMSC to develop draft guidance materials that Permittees can use to determine when it will be necessary to implement controls during bridge replacement or demolition activities to prevent the release of PCBs to the MS4. These draft guidance materials are based on the Caltrans *Standard Operating Procedure (SOP) for Inspecting, Removing and Reporting Materials Containing Polychlorinated Biphenyls (PCBs) Prior to Demolition or Renovation of Structures,* which was released in 2024.[6] Although not a specification that Permittees can provide with bid documents for bridge repair/demolition contracts, the Caltrans SOP and the BAMSC guidance was being developed to assist MRP Permittees identify bridges slated for demolition that will require removal and special handling of PCBs-containing materials prior to demolition. The purpose is so Permittees know when they need to request a project-specific specification from Caltrans for use during demolition of any bridges that are found to have PCBs-containing materials that require controls during removal/disposal. Early in FY 2025/26, an initial draft of the guidance document was sent out to all MRP Permittees across the region for their review and comment. The MRP Permittees had many questions and uncertainty about the draft guidance document and how to implement the inspection and removal activities that were described, including questions about the logistics and timing of sampling efforts, who would be responsible for implementing these actions (e.g., municipalities, Caltrans, or other entities), lack of municipal authority over bridge replacement activities, and lack of municipal staff qualifications and expertise to conduct bridge inspections and caulk sampling operations. A number of Permittees reached

[6] Caltrans, 2024. Standard Operating Procedure (SOP) for Inspecting, Removing and Reporting Materials Containing Polychlorinated Biphenyls (PCBs) Prior to Demolition or Renovation of Structures. CTSW-OT-23-407.05.1. June 2023, revised January 2024.

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out to Caltrans to inquire about their use of their own Caltrans 2024 SOP, and the information received suggested the Caltrans contacts were not aware of or implementing their own SOP. Given all of these issues (e.g., Permittees concerns, lack of information from Caltrans on their efforts to implement their Caltrans 2024 SOP, Caltrans authority over bridge replacements) and because MRP 3.0 does not require Permittees to pre-emptively identify their bridges that contain PCBs in caulk through inspection and sampling, BAMSC decided to postpone finalization of the guidance document. The BAMSC and MRP Permittees anticipate that MRP 4.0 will provide more clarity on these issues.

## C.12.e Program for Controlling PCBs from Electrical Utilities

### *Permit Requirements*

Permittees are required to develop and implement a program to manage PCBs in oil-filled electrical equipment (OFEE) for municipally owned electrical utilities in the MRP program area and collaborate with the Water Board to determine PCBs loadings in OFEE from non-municipally owned electrical utilities. Reporting requirements include the following:

- In every Annual Report beginning in 2023:
    - A summary of the actions undertaken during that reporting year that remove municipally owned PCBs-containing OFEE along with the loads avoided and the details of the calculations and assumptions used to estimate the load reduced.
- In the FY 2022/23 Annual Report:
    - Estimated PCBs loads avoided (along with supporting documentation) resulting from the removal of municipally-owned PCBs-containing OFEE through maintenance programs and system upgrades for the period 2002 to the beginning of this permit term (2023).
    - A description of the improved spill response and reporting practices implemented by municipally owned electrical utilities.
- In the FY 2023/24 Annual Report, submit a summary of plans to maintain and upgrade OFEE for municipally owned electrical utilities.
- In the FY 2025/26 Annual Report, submit the estimated PCBs loads reduced during the permit term associated with municipally owned OFEE removal resulting from maintenance programs and system upgrades.
- Within 12-months of the Water Board transmitting to the Permittees information from the non-municipally owned electrical utilities, Permittees shall submit a report discussing the following, to the extent possible given any data limitations: (a) locations of the PCBs-containing OFEE still in service, (b) previous locations of PCBs-containing OFEE, and (c) opportunities to improve non-municipally owned electrical utilities' standard operating procedures for spill response, reporting, cleanup, and sampling and analysis

### *Progress During FY 2025/26*

### *Municipally Owned Electrical Utilities*

San Mateo County does not have any municipally owned electrical utilities. Thus, most of the above MRP requirements do not apply to San Mateo County Permittees.

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### *Non-Municipally Owned Electrical Utilities*

As of the end of FY 2025/26, the Water Board had not transmitted information from the non-municipally owned electrical utilities to the Permittees. Based on updates obtained from Water Board staff during recent BAMSC Monitoring and Pollutants of Concern (MPC) Subcommittee meetings, Water Board staff are planning to meet with representatives from Pacific Gas and Electric (PG&E), the primary non-municipally owned electrical utility that operates in the MRP area, and plan to continue to engage PG&E on this topic during the next fiscal year.

## C.11.e/C.12.f Plan and Implement Green Infrastructure (GI) to Reduce Mercury and PCBs Loads

### *Permit Requirements*

Permittees are required to implement GI projects consistent with the requirements in Provision C.3.j during the permit term. Reporting on this sub-provision will be required in the FY 2025/26 Annual Report, and will include the following information for all GI projects (i.e. parcel-based, street ROW, and regional projects) implemented during the permit term:

- A summary description of the projects including GI type, location, and area;
- The total acreage treated; and
- Estimates of the total mercury and PCBs mass load reduced resulting from this implementation.

### *Progress During FY 2025/26*

During FY 2025/26, San Mateo County Permittees have continued to implement public GI projects across San Mateo County including via implementation of their GI plans. Permittees have also continued to track the installation of private and public GI facilities to ensure proper maintenance and operation and to assist with demonstrating pollutant load reductions. Section 3 of this Annual Report provides additional information about sustainable street and regional stormwater capture GI projects in San Mateo County.

As noted earlier, updated information on all GI projects implemented during the permit term to date, including parcel-based projects, sustainable streets, and regional stormwater capture projects, as well as projections for the completion of planned projects during the final year of the permit (FY 2026/27), is provided in the *Mercury and PCBs Control Measures Report* (Appendix 11/12a). The information provided in Appendix 11/12a includes supporting data and information needed to calculate the mercury and PCBs loads reduced, including descriptions of the projects, maps of the areas treated, and the acreages treated within each catchment by land use category. It should be noted that information available for the current reporting year is considered preliminary, as the data on all projects completed in FY 2025/26 may not be available until after this report is finalized in September 2026. Permittees will continue to gather this information as it becomes available and include it in subsequent Annual Reports.

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## C.12.g Manage PCBs-Containing Materials and Wastes During Building Demolition Activities

### *Permit Requirements*

Permittees are required to continue to implement the protocols developed during the previous permit term for managing PCB-containing materials and wastes during building demolition so that PCBs do not enter MS4s. In addition, new requirements that became effective during FY 2023/24 include the following:

- Beginning July 1, 2023, for Applicable Structures containing building materials with PCBs ≥ 50 ppm, Permittee requirements include:
    - Require demolition contractors to provide notification to the Permittee, the Water Board, and US EPA at least one week before any demolition is to occur;
    - Enhance Permittee's construction site control programs to minimize migration of PCBs into the MS4 during demolition activities; and
    - For permits approved after July 1, 2023, verify that PCBs in demolished buildings are properly managed to minimize transport to the MS4 by obtaining official documentation that the building materials with PCBs ≥ 50 ppm were disposed appropriately according to state and federal regulations.
- Beginning with the 2023/24 rainy season, Permittees are required to inspect demolition sites with Applicable Structures containing building materials with PCBs ≥ 50 ppm pursuant to Provision C.6 to ensure that effective construction pollutant controls are used to prevent discharge into the MS4.

Reporting requirements include the following:

- Permittees seeking exemption from Provision C.12.g. requirements based on lack of Applicable Structures must submit documentation, such as historic maps or other historic records, that clearly demonstrates that the only structures that existed pre-1980 were single-family residential and/or wood-frame structures; and
- In their FY 2022/23 Annual Report, Permittees shall discuss enhancements to their construction site control program to minimize migration of PCBs from demolition activities into the MS4.
- Beginning with their FY 2022/23 Annual Report, the Permittees are required to provide each of the following items:
    1. The number of Applicable Structures that applied for a demolition permit during the reporting year;
    2. A running list of the Applicable Structures that applied for a demolition permit since July 1, 2019, the number of samples each structure collected, and the concentration of PCBs in each sample;
    3. For each Applicable Structure, with PCBs concentrations ≥ 50 mg/kg, include the following: the project address, the demolition date, and a brief description of the PCBs-containing materials; and
    4. For each structure that was constructed or remodeled between the years 1950 and 1980 and requires emergency demolition to protect public health and/or safety, provide the following: address, date building was constructed, and date of demolition.

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- Beginning with their FY 2023/24 Annual Report, Permittees are required to provide the following: whether the site was inspected during demolition, and for those cases where notification and advance approval from the U.S. EPA is not required and were approved for demolition after June 30, 2023, the hazardous waste manifest prepared for transportation of the material to a disposal facility;
- In their FY 2025/26 Annual Report, Permittees are required to submit an evaluation of the effectiveness of the protocol for controlling PCBs during building demolition as well as supporting data. This should be conducted and reported at the regional level on behalf of all Permittees and shall be considered the Report of Waste Discharge for Provision C.12.g. for the next permit reissuance; and
- In their FY 2025/26 Annual Report, Permittees may submit for use in the subsequent permit term an updated assessment methodology and data collection program to quantify PCBs loads reduced through implementation of the protocol for controlling PCBs-containing materials and wastes during demolition of Applicable Structures.

### *Progress During FY 2025/26*

During FY 2025/26, Permittees continued to implement the protocols developed during the previous permit term for managing PCB-containing materials and wastes during building demolition so that PCBs do not enter MS4s. Permittees also continued to implement the required enhancements to their protocols to address new requirements in MRP 3.0 Provision C.12.g for construction site control programs that began on July 1, 2023. These new protocols were described in each Permittee's FY 2023/24 Annual Report.

In addition, the Program developed a technical memorandum that addresses other FY 2025/26 reporting requirements in Provision C.12.g. (*Program for Management of PCBs during Building Demolition – Data Summary through FY 2025/26 for San Mateo County MRP Permittees*). The technical memorandum is included as an attachment to Appendix 11/12a. This memorandum documents the following items for San Mateo County Permittees:

- The number of demolition permits issued for Applicable Structures during FY 2025/26, which is the seventh year of the program (data from FY 2019/20 through FY 2024/25, the first through sixth years of the program, are also included);
- A running list of the Applicable Structures for which a demolition permit was applied (since July 1, 2019, the date the PCBs control program began implementation) that had material(s) with total PCBs concentration ≥ 50 ppm, with the address and demolition date for each structure; and
- For FY 2025/26 samples with total PCBs concentration ≥ 50 ppm, the PCBs concentration in each sample and a brief description of PCBs-containing materials that were sampled.
- Also during FY 2025/26, the Program, in collaboration with their BAMSC partners, conducted a regional effectiveness evaluation of the protocols for controlling PCBs during building demolition. The *Regional Effectiveness Evaluation of the Protocols for Managing PCBs-containing Materials During Building Demolition* report (BAMSC 2026) is provided in Appendix 11/12c.

Permittees also participated in a BAMSC regional workgroup during FY 2025/26 comprised of municipal staff and countywide stormwater program representatives to facilitate improved information sharing on implementation of this program amongst Permittees. The workgroup met three times during FY 2025/26. Discussions included experiences in implementing the protocols as well as challenges and successes experienced to date. The workgroup also discussed the need for minor updates to the protocols and the need for additional guidance on the implementation of the protocols.

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## C.11.f/C.12.h Prepare Implementation Plan and Schedule to Achieve TMDL Wasteload Allocations

### *Permit Requirements*

MRP 3.0 requires that Permittees evaluate the effectiveness of all mercury and PCBs control measures in the 2020 Mercury and PCBs Control Measure Plan and Reasonable Assurance Analysis (RAA) that was submitted during the previous permit term and update the RAA as necessary. Updates can focus on those control measures for which new information is available and for control measures not evaluated in previous efforts. Permittees are also required to prepare detailed implementation plans for all control measures to be implemented and inform permit requirements during the subsequent permit term. These long-term plans must:

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

Additionally, Permittees must identify all specific control measures to be implemented, the intensity of control measure implementation, and the estimated load reduction benefit from control measures implemented during the subsequent permit term. This implementation plan must include:

- Identification of all control measures implemented during the current permit term and any additional control measures to be implemented in the subsequent permit term;
- A description of the intensity or extent of control measure implementation (e.g., acres treated, acres investigated for source areas, types of roadway projects for which protocols applied);
- Identification of accountability metrics to track during the subsequent permit corresponding to the proposed implementation intensity; and
- Estimates for load reductions to be achieved through implementation of control measures during subsequent permit term at the proposed intensity.

Permittees must submit the updated plan and schedule no later than March 31, 2026.

### *Progress During FY 2025/26*

During FY 2025/26, the Program, with input and approval of San Mateo County Permittees, developed a work plan to update the Control Measure Implementation Plan and RAA (RAA Plan) that was submitted during the previous permit term. The updates focus on the addition of new controls and provide the estimated mercury and PCBs load reductions achieved during MRP 3.0 and anticipated load reductions during MRP 4.0. San Mateo County Permittees have continued to track all control measures implemented to date to reduce mercury and PCBs stormwater loads in the County. Permittees used these data to update the RAA Plan for all new controls (e.g., GI and source controls) and submitted the final *PCBs and Mercury TMDL Implementation Plan and Reasonable Assurance Analysis for San Mateo County 2026 Update* to the Water Board on March 31, 2026 (SMCWPPP 2026).

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## C.11.g./C.12.i Fate and Transport Study of Mercury and PCBs: Urban Runoff Impact on San Francisco Bay Margins

### *Permit Requirements*

MRP 3.0 requires Permittees to conduct or cause to be conducted studies concerning the fate, transport, and biological uptake of mercury and PCBs discharged from urban runoff to San Francisco Bay margin areas. The studies should focus on near-shore areas contaminated with mercury and PCBs from historical activity and the expected trajectory of recovery as sources from local watersheds are reduced. Reporting requirements include the following:

- In the FY 2022/23 Annual Report:
  - Submit a workplan describing the specific manner in which these information needs will be accomplished and describing the studies to be performed with a preliminary schedule, and
  - Report on status of the studies.
- In the March 31, 2026, Integrated Monitoring Report:
  - Findings and results of the studies completed, planned, or in progress as well as implications of studies on potential control measures to be investigated, piloted, or implemented in future permit cycles.

### *Progress During FY 2025/26*

Permittees are addressing Provisions C.11.g and C.12.i through a multi-year project by the San Francisco Bay (Bay) Regional Monitoring Program (RMP) to identify, model, and investigate embayments along the Bay shoreline designated "Priority Margin Units" (PMUs). BAMSC developed a Work Plan for the fate and transport study of mercury and PCBs during MRP 3.0, which was submitted with the Program's FY 2022/23 Annual Report. During FY 2025/26, Program staff continued to participate in the RMP PCBs Workgroup to help oversee this work and guide it towards developing information that will inform implementing controls for mercury and PCBs in stormwater runoff and reducing the Bay's impairment by these pollutants. During FY 2026/27 and through the remainder of the MRP 3.0 permit term, Countywide Program staff will continue to participate in the RMP PCBs Work Group to help oversee the project. Permittees reported on the findings and results of the projects in the IMR that was submitted to the Water Board on March 31, 2026.

## C.11.h./C.12.j Implement a Risk Reduction Program

### *Permit Requirements*

MRP 3.0 requires Permittees to conduct an ongoing risk reduction program to address public health impacts of mercury and PCBs in San Francisco Bay/Delta fish. The fish risk reduction program must take actions to reduce actual and potential health risks to those people and communities most likely to consume San Francisco Bay-caught fish, such as subsistence anglers and their families. The risk reduction framework developed in the previous permit term, which funded community-based organizations to develop and deliver appropriate communications to appropriately targeted individuals and communities, is an appropriate approach. Permittees should work with local health departments, the Bay Area Clean Water Agencies, and the Western States Petroleum Association to

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leverage resources for this program and to appropriately target at-risk populations. At a minimum, the Risk Reduction Program must have the potential to reach 3,000 individuals annually who are likely consumers of San Francisco Bay-caught fish. Reporting requirements include:

- In each Annual Report, Permittees shall report on the status of the risk reduction program, 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.
- In the FY 2025/26 Annual Report, Permittees shall report the findings of the effectiveness evaluation of their risk reduction program.

### *Progress During FY 2025/26*

SMCWPPP is assisting San Mateo County Permittees comply with the risk reduction program requirements by coordinating with and reporting on the Fish Smart program (https://www.smchealth.org/fishsmart) conducted by San Mateo County Environmental Health Services (EHS). Fish Smart builds upon the San Francisco Bay Fish Project (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 (See Figure 11-1 for example guidance).

During FY 2025/26, EHS continued to conduct a variety of activities that target at-risk populations (e.g., subsistence fisherman) via the Fish Smart program. The accomplishments of the Fish Smart program during FY 2025/26 are summarized below.

- Maintained 16 Fish Smart guideline signs at locations around San Mateo County.
- Delivered a total of 130 multilingual (English, Spanish, Chinese, Tagalog, Vietnamese) flyers to 34 retail partners to display/distribute to the public.
- Tabled at 10 in-person events to promote the Fish Smart Program.
- Sent out annual Fish Smart updates newsletter email.
- Presented Fish Smart youth education opportunities to teachers and administrators in San Mateo County at San Mateo County Office of Education event.
- Ran monthly social media awareness posts with a monthly average traffic of 15 views over three platforms (Facebook, Instagram, and X).

The summary illustrates the Fish Smart program's success during this past fiscal year in providing outreach about potential health impacts of consuming certain types of fish caught in San Francisco Bay. It is likely these efforts have led to reduced health risks in those people and communities most likely to consume San Francisco Bay-caught fish, such as subsistence fishers and their families.

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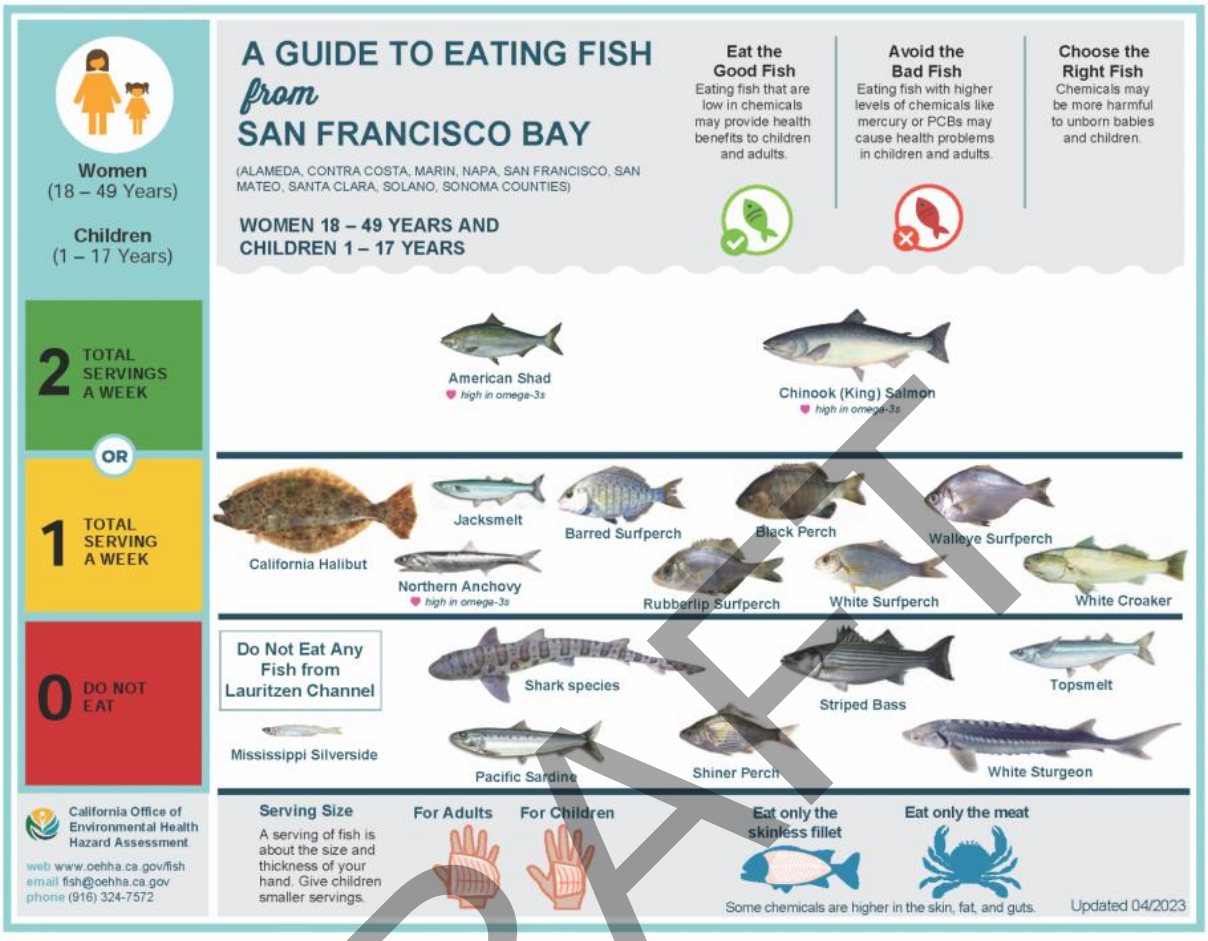


**Figure 11-1. San Francisco Bay fish consumption guidance promoted by the Fish Smart program**

### *Evaluation of Effectiveness*

The following measures indicate the success of the Program's outreach about the potential health impacts of eating San Francisco Bay-caught fish:

- Fish Smart Program event tabling continues to reach a wide audience, with an average reach of 150 people per event. Tabling has reached an estimated 1,500 people during FY 2025/26 and over 4,000 people during the permit term to date. Tabling at events provides a meaningful in-person interaction and is likely to make a strong impression on the residents reached.
- The annual newsletter reaches 325 people in the Fish Smart mailing list. Recipients of the annual newsletter are more likely to be engaged in the fishing and/or environmental education fields and directly utilize the Fish Smart information or help to pass it along to other interested and potentially at-risk populations.
- Targeted presentations and presentation collateral also leverage high-quality, in-person interactions and key community members. Fish Smart youth education opportunities have been presented to San Mateo County teachers, administrators, and youth organizations since FY 2022/23.

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- Social media engagement represents a moderate but low barrier-to-entry avenue of ongoing engagement, supplementing the Fish Smart website (with thousands to tens of thousands of annual visits); educational videos (hundreds of hours of interactions to date); and periodic online advertisements (millions of impressions to date).
- Signage and flyers target key at-risk populations by focusing on fishing areas and retailers and enhancing information access for non-English speakers. Both signs and flyers are provided in English, Spanish, Vietnamese, Tagalog, and Chinese, with the number of local partner locations for flyer distribution continuing to grow year-over-year.

Overall, SMCWPPP's Fish Smart outreach efforts have been effective in reaching growing numbers of residents year-over-year; in targeting key community members to help spread the message; and in reaching at-risk populations at their points of contact with Bay-caught fish and in their own preferred languages. SMCWPPP will continue to implement these and similar actions and will continue to develop new community partnerships and explore additional methods to reach at-risk populations.

## FUTURE ACTIONS

During FY 2026/27, Countywide Program staff will continue to assist San Mateo County Permittees comply with all mercury and PCBs control program requirements, as described above.

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# 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 2025/26, Permittees and the Countywide Program continued to conduct activities related to complying with Provision C.13. Local copper control actions are documented in each Permittee's individual Annual Report. This section summarizes related 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. A SMCWPPP factsheet entitled *Requirements for Architectural Copper: Protect water quality during installation, cleaning, treating, and washing!* targets suppliers and installers of copper materials and is available on the SMCWPPP website (flowstobay.org).

### 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 *Best Management Practices for Pools, Hot Tubs, and Fountain Water Discharges* includes information on avoiding the use of copper-based algaecides. The fact sheet is available on the SMCWPPP website (flowstobay.org). Section 15 discusses related public outreach by SMCWPPP to promote pool, spa, and fountain discharge BMPs through social media posts. In FY2025/26 the requirements of this provision were presented at the May

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28, 2026 SMCWPPP Industrial, Commercial, and Illicit Discharge Stormwater Inspector Training Workshop described in Section 4.

### 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 San Mateo County municipal 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. These documents address industrial sources of copper and are available on SMCWPPP's members only website. In FY2025/26 the requirements of this provision were presented at the May 28, 2026 SMCWPPP Industrial, Commercial, and Illicit Discharge Stormwater Inspector Training Workshop described in Section 4.

## FUTURE ACTIONS

FY 2026/27 activities planned by SMCWPPP to assist San Mateo County Permittees comply with MRP Provision C.13 requirements 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, construction site stormwater inspector training workshops and materials, and at presentations to CALBIG or other partner organizations;
- Continue to provide outreach material and guidance via SMCWPPP's CII and PIP Subcommittees regarding pool, spa, and fountain discharge BMPs; and
- Provide guidance to San Mateo County Permittees via SMCWPPP's CII Subcommittee and/or SMCWPPP stormwater business inspector training workshops and materials 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.

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# SECTION 15

# C.15 EXEMPTED AND CONDITIONALLY EXEMPTED DISCHARGES

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## 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 implement this provision. SMCWPPP helps municipal staff understand the MRP's requirements and makes various MRP compliance support materials available for their use. 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.

During FY 2025/26, SMCWPPP's PIP component conducted selected activities to help San Mateo County Permittees comply with public outreach requirements in Provision C.15.b.iv Individual Residential Car Washing, C.15.b.v Swimming Pool, Hot Tub, Spa, and Fountain Water Discharges, and 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.iii Emergency Discharges of Firefighting Water and Foam

Permittees are required to collectively convene a regionwide Firefighting Discharges Work Group to identify and evaluate opportunities to reduce the impacts of discharges to the MS4 associated with emergency firefighting activities. During FY 2022/23, SMCWPPP surveyed the CII Subcommittee for stormwater program and fire department representatives that would like to participate in the BAMSC Firefighting Discharges Work Group.

Countywide Program staff and representatives from SMCWPPP member stormwater programs and fire departments actively participated in BAMSC Work Group meetings during FY 2022/23 through FY 2025/26. The BAMSC Work Group developed a Project Profile with tasks and schedule for a regional collaborative project to develop a Regional Firefighting Emergency Discharges Report.

SMCWPPP provided in-kind support to the BAMSC project of regional benefit to jointly develop a Regional Firefighting Discharges Report and hold Regional Work Group meetings. SMCWPPP assisted to organize, facilitate and participate in the Work Group meetings. The Work Group consists of representatives from regulatory agencies (EPA and Regional Water Board), stormwater programs and Fire Departments,

including representatives from San Mateo County stormwater programs and fire departments. SMCWPPP also assisted to organize and participate in Task Force meetings. The Task Force is a smaller, working group that reviews deliverables and identifies topics and questions to facilitate information sharing in the larger Regional Work Group.

The BAMSC Project Team, including SMCWPPP Program staff, developed the *Regional Firefighting Emergency Discharges Work Group Report* (Regional Report) that was submitted in the SMCWPPP FY 2024/25 Annual Report in September 2025. SMCWPPP Program staff organized and participated in the May 4, 2026 BAMSC Regional Work Group meeting where participants shared information on the implementation of recommendations in the Regional Report.

SMCWPPP Program staff provided information on the Work Group activities to the CII Subcommittee. At the CII Subcommittee meetings the group continued to discuss the requirement to evaluate the adequacy of large industrial facilities' BMPs/SOPs for the prevention, containment, and cleanup of emergency firefighting discharges into storm drains and receiving waters. The Subcommittee continued to discuss how to identify the "large industrial sites such as IGP sites, gas plants, gas concentration facilities, and chemical plants" identified in the MRP.

There is a requirement in C.15.b.iii to develop outreach materials. The two outreach materials *Fire Restoration Contractors BMPs* Fact Sheet and *Sites Prone to Fires BMPs* Fact Sheet were developed by the CII Subcommittee in FY 2024/25. Both fact sheets are available on the SMCWPPP webpage for Commercial Businesses.

In September 2025, SMCWPPP distributed the Fire Restoration Contractors BMPs Fact Sheet to a list of contractors that would typically respond to illicit discharges in San Mateo County. The list was compiled from DTSC hazardous waste transporters in San Mateo County and names of contractors provided by SMCWPPP Permittees.

In February 2026, SMCWPPP staff presented the Regional Report recommendations to the SMCWPPP Stormwater Committee (SWC). Because six of the eleven Fire Departments in San Mateo County serve multiple jurisdictions, the SWC requested Program staff assistance to make initial contact with the Fire Departments to facilitate a common message and identify appropriate contacts/communication pathways. On April 1, 2026, Program staff presented the Regional Report recommendations at the San Mateo County Fire Chiefs Association meeting. Program staff also handed out a short survey at the meeting to collect information on the Fire Departments foam usage and contact information. Following up on this meeting and survey, Program staff developed a longer survey released in late April and collected responses both electronically and via telephone interviews for Permittee use and mutual understanding. As part of this effort, Program staff developed a preferred liaisons contact list to facilitate further programmatic coordination.

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

During FY 2025/26, SMCWPPP continued previous years' outreach efforts through social media posts to encourage residents to use professional car wash companies rather than washing their cars at home (Figures 15-1a and 15-1b). The practice of using commercial car washes helps keep soaps, automotive pollutants, and environmental toxins from washing into San Mateo County storm drains. Through social media posts, residents were directed to learn more about why they should choose car wash companies and best practices to use at home if they need to wash at home. The SMCWPPP "Automotive Care" webpage shown in Figure 15-2 received 374 pageviews in FY 2025/26 (up about 65% from FY 2024/25)*. Visit the "Automotive Care" page on the SMCWPPP website.

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**Due to high volumes of artificial traffic, both the FY 2025/26 and FY 2024/25 numbers have been adjusted to include only US-based traffic.*

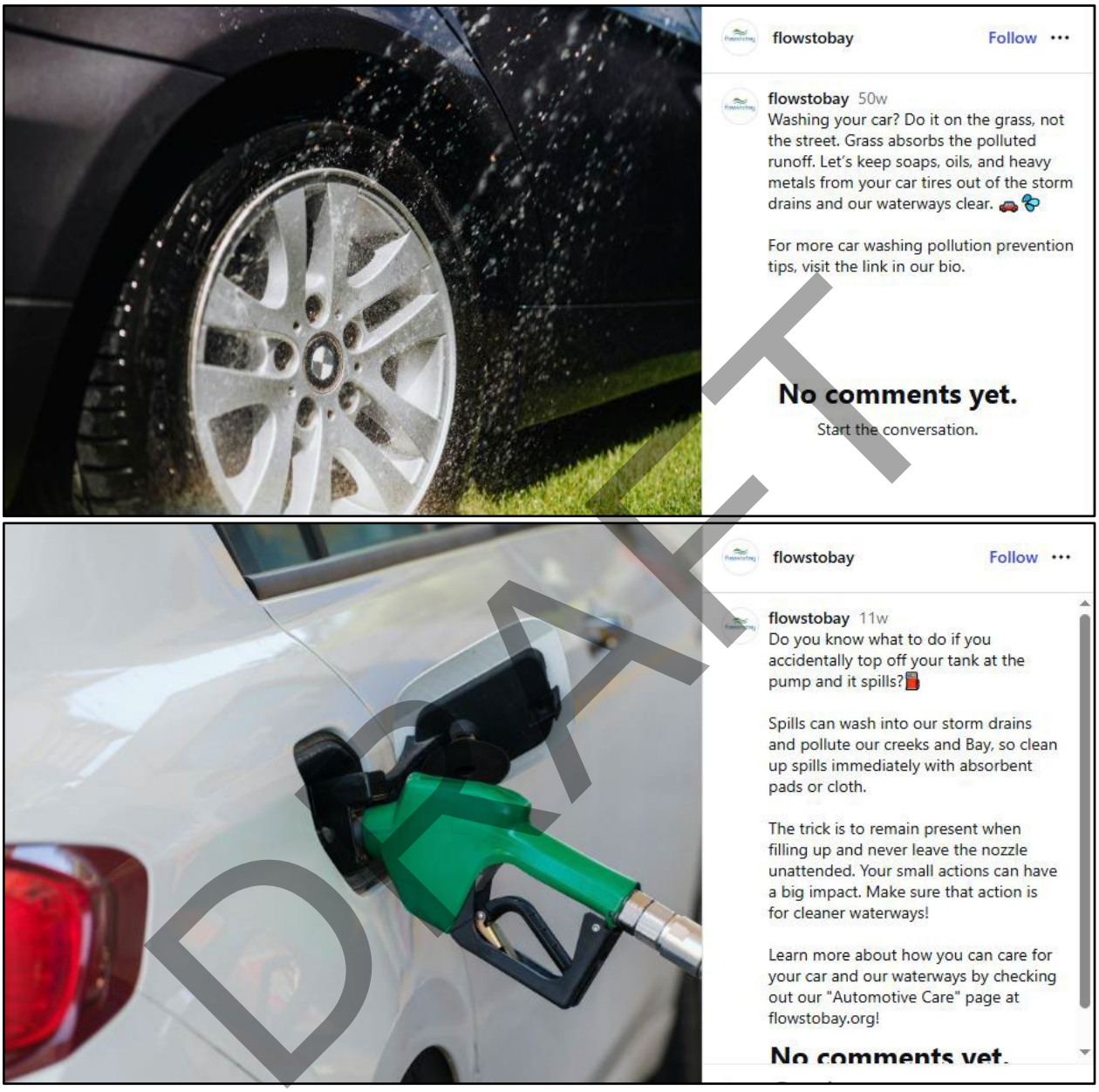


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**Figure 15-1a. Examples of Instagram posts about car washing.**

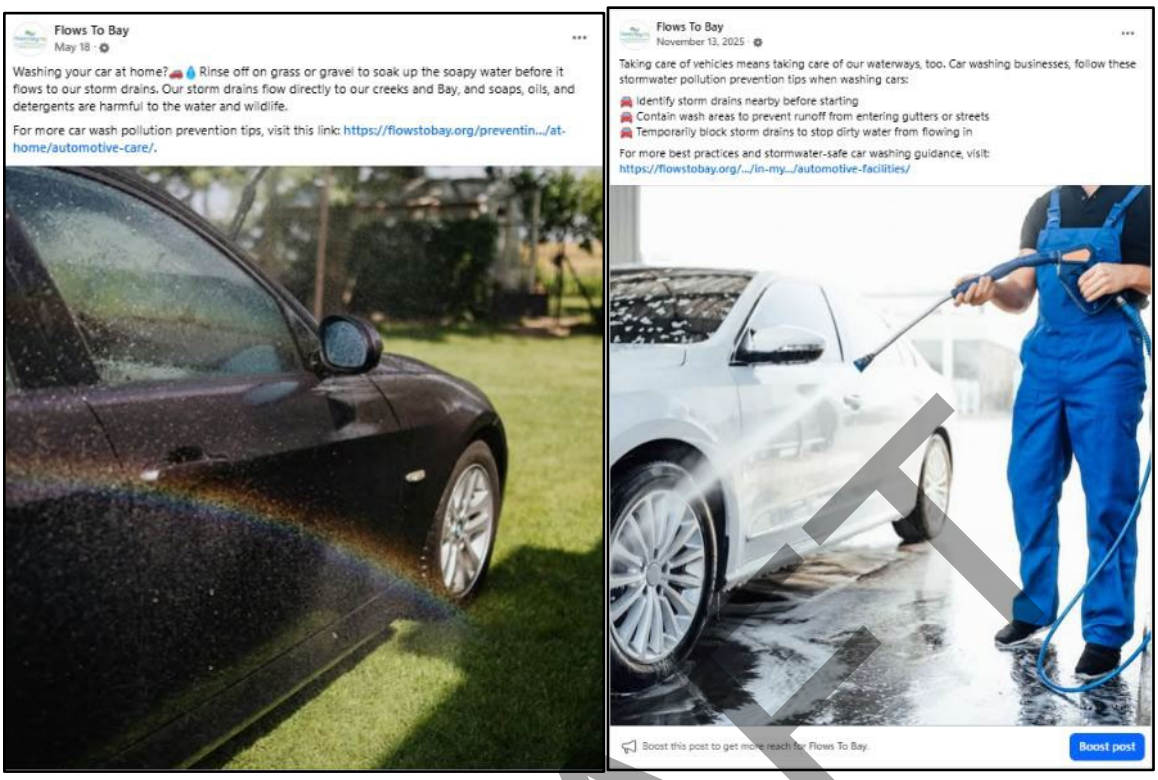


**Figure 15-1b. Examples of Facebook posts about car washing.**

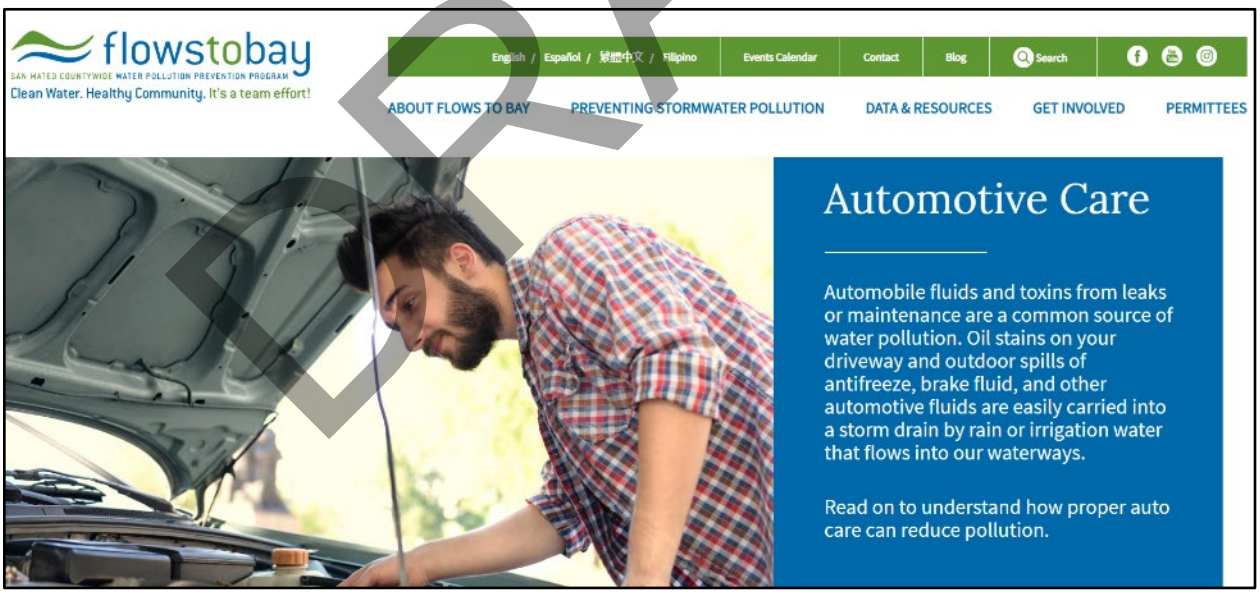


**Figure 15-2. "Automotive Care" webpage.**

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## Provision C.15.b.v Swimming Pool, Hot Tub, Spa, and Fountain Water Discharges

During FY 2025/26, SMCWPPP continued public outreach and educational efforts to encourage the implementation of appropriate BMPs for swimming pool, hot tub, spa, and fountain water discharges in commercial, municipal, and residential facilities. Best practices were promoted through social media posts on Facebook and Instagram, which reminded residents never to drain pool water to storm drains and directed them to the swimming pool, hot tub, and fountain resources on the SMCWPPP website (Figure 15-3). The BMP fact sheets that specifically target swimming pool, hot tub, spa, and fountain water discharges, developed in a prior fiscal year, remained available for member agencies and residents to read and download on the SMCWPPP website. Visit the "Swimming Pools, Hot Tubs & Fountains" webpage on the website.

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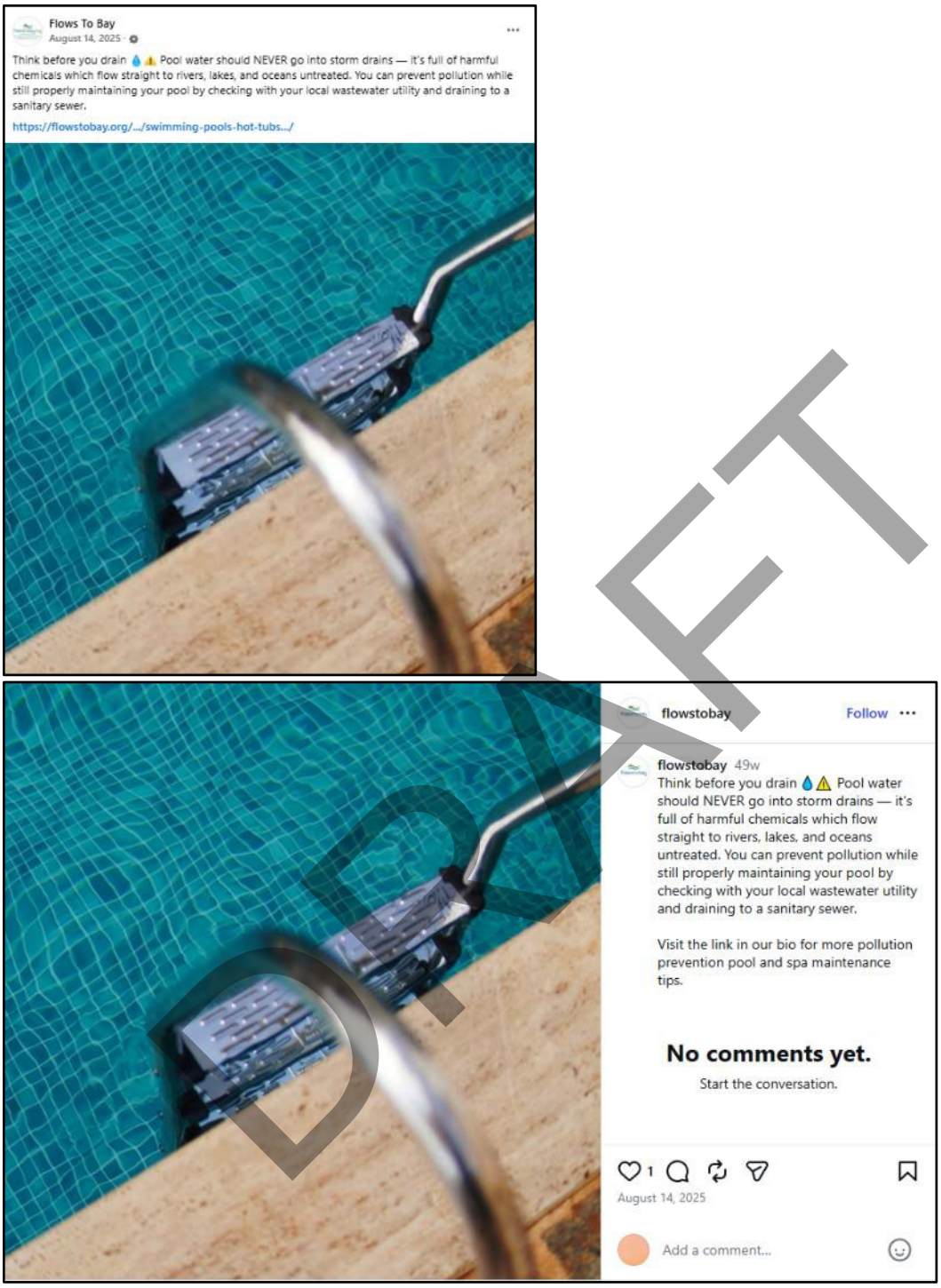


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**Figure 15-3. Examples of Facebook and Instagram posts about swimming pool, hot tub, spa, and fountain water discharge.**

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

In FY 2025/26, 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:

- Conducted outreach to San Mateo County residents to support and promote eco-friendly alternatives to toxic pesticides (Figures 15-4 and 15-5; Tables 15-1 and 15-2). The promotion took place on social media. Additional messaging was provided through SMCWPPP's point-of-purchase program, where OWOW materials were distributed to educate residents about eco-friendly pesticide alternatives at three tabling events and 12 local hardware stores.
- Continued to promote water conservation through social media — including posts for World Water Day and on water-saving planting and green infrastructure — and maintained the Water Wise Home Projects webpage on the SMCWPPP website, which features lawn replacement, mulching, and rain garden project guidance and invites residents to share their own water-wise projects (Figure 15-6). View the "Water Wise Home Projects" webpage on the website.
- Promoted planting of drought-tolerant, native vegetation through our online media channels, including social media (Figures 15-7 and 15-8; Tables 15-3 and 15-4). Messaging focused on the environmental benefits of planting native plants, including their tolerance to drought (Figure 15-9).
- SMCWPPP also published five organic social media posts promoting the Rain Barrel and Rain Garden Rebates, which support rainwater capture and help reduce landscape irrigation demand. See Section C.7.d Watershed Stewardship Collaborative Efforts for details on the paid digital advertising campaign that promoted the Bulk Rain Barrel Program and the Rain Barrel Rebate.

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

| Post Focus | Reach | Engagements (likes, comments, and shares) | Clicks |
|---|---|---|---|
| Integrated Pest Management (1 post) | 149 | 5 | 0 |
| Hiring a Pest Control Operator (2 posts) | 173 | 0 | 1 |
| Links Between Pesticides & Water Quality (2 posts) | 187 | 5 | 0 |

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**Table 15-2. Summary of Instagram Posts on Pesticide Pollution Prevention Topics**

| Post Focus | Reach | Engagements (likes, comments, shares, and saves) |
|---|---|---|
| Integrated Pest Management (1 post) | 42 | 1 |
| Hiring a Pest Control Operator (2 posts) | 87 | 1 |
| Links Between Pesticides & Water Quality (2 posts) | 82 | 3 |

**Figure 15-4. Facebook posts on pesticide pollution prevention topics.**

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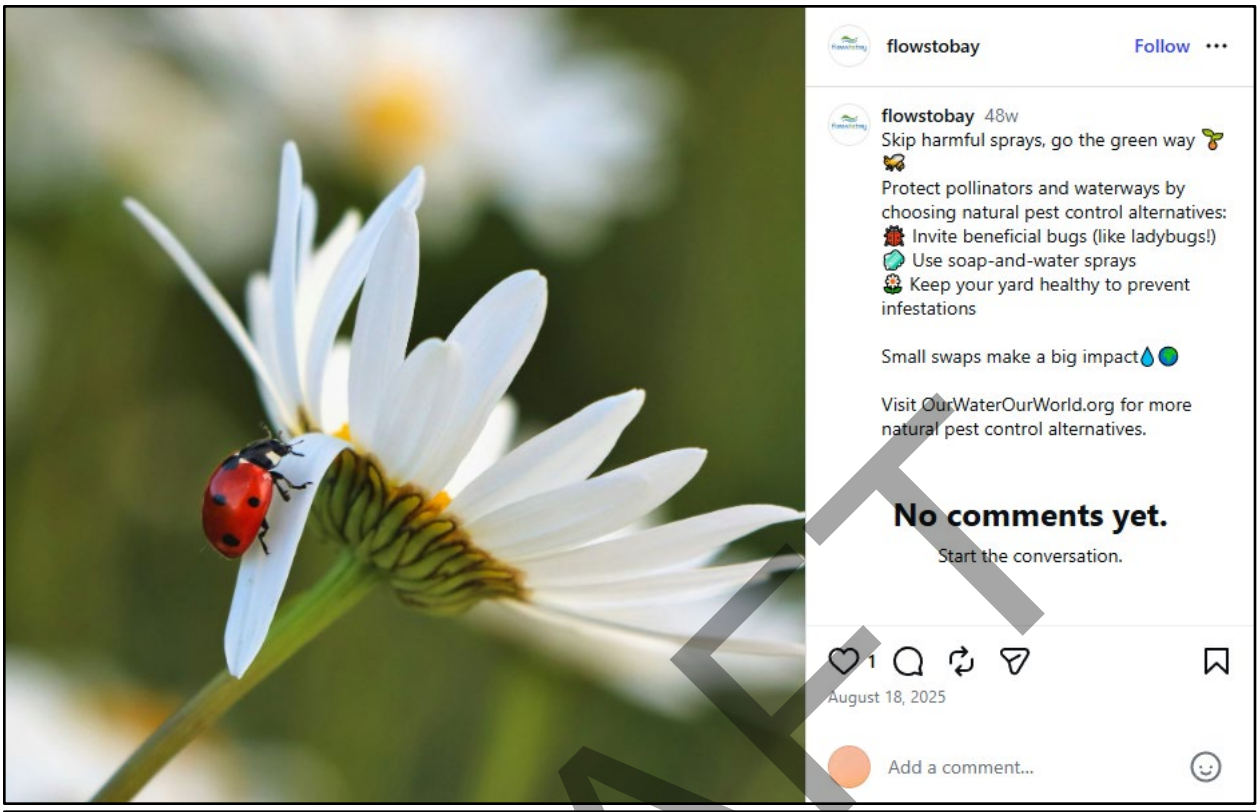


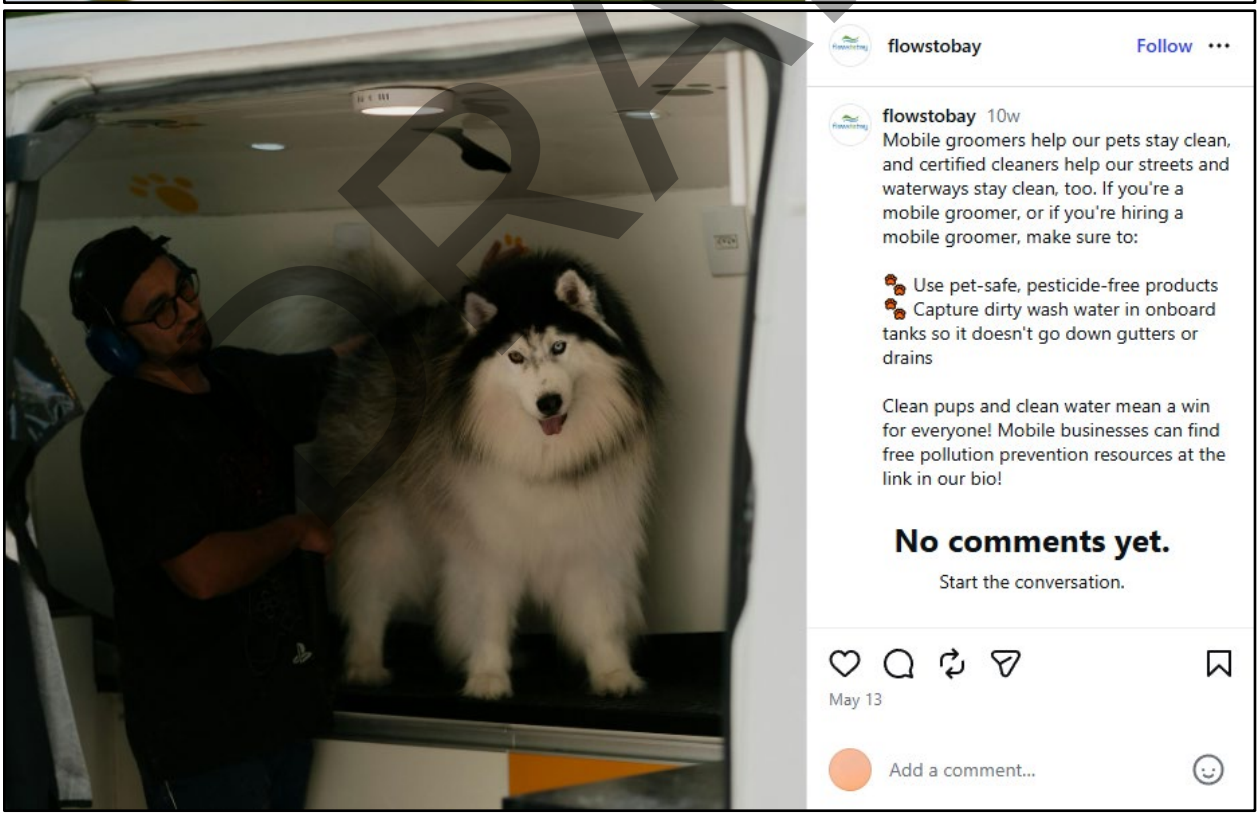


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**Figure 15-5. Instagram posts on pesticide pollution prevention topics.**

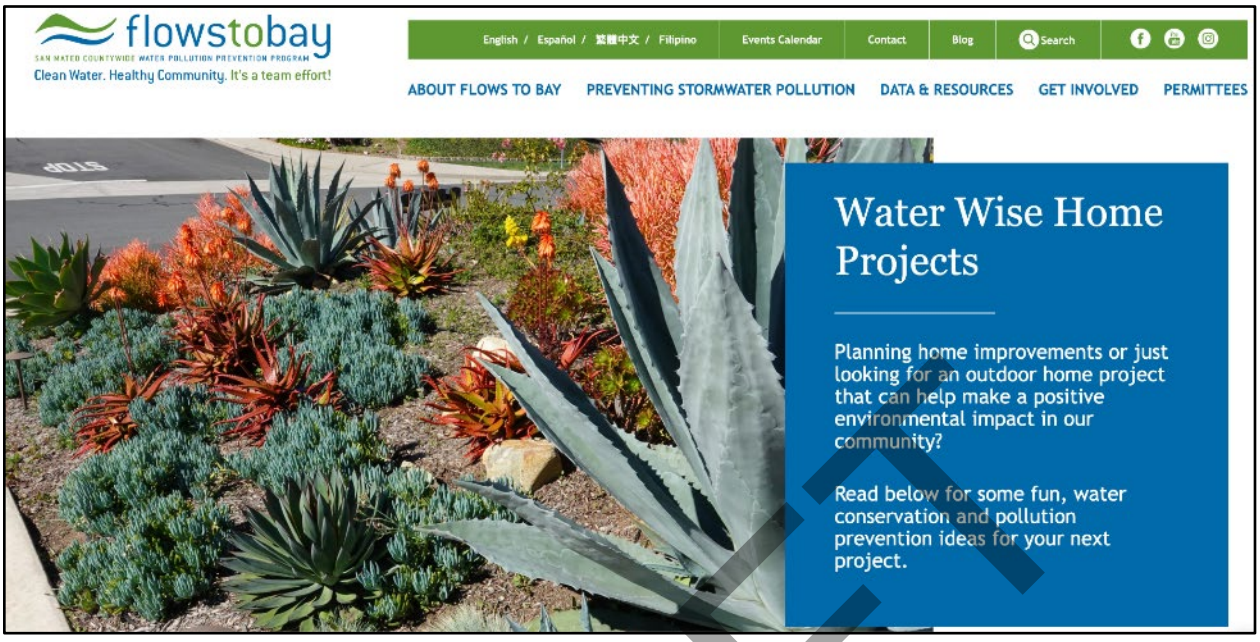


**Figure 15-6. Photo of the "Water Wise Home Projects" webpage.**

**Table 15-3. Summary of Facebook Posts Promoting Landscape Management and the Use of Drought-Tolerant, Native Vegetation**

| Post Focus | Reach | Engagements (likes, comments, and shares) | Clicks |
|---|---|---|---|
| Drought-Tolerant, Native Vegetation (5 posts) | 507 | 16 | 0 |

**Table 15-4. Summary of Instagram Posts Promoting Landscape Management and the Use of Drought-Tolerant, Native Vegetation**

| Post Focus | Reach | Engagements (likes, comments, shares, and saves) |
|---|---|---|
| Drought-Tolerant, Native Vegetation (5 posts) | 239 | 6 |

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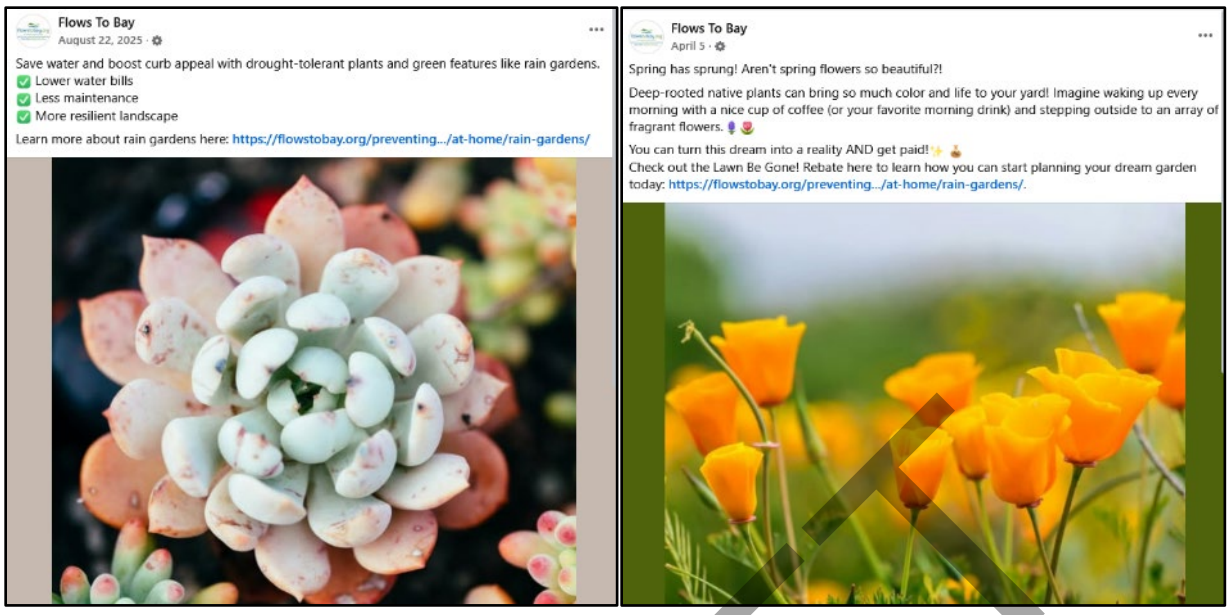


**Figure 15-7. Facebook posts promoting landscape management and the use of drought-tolerant, native vegetation.**

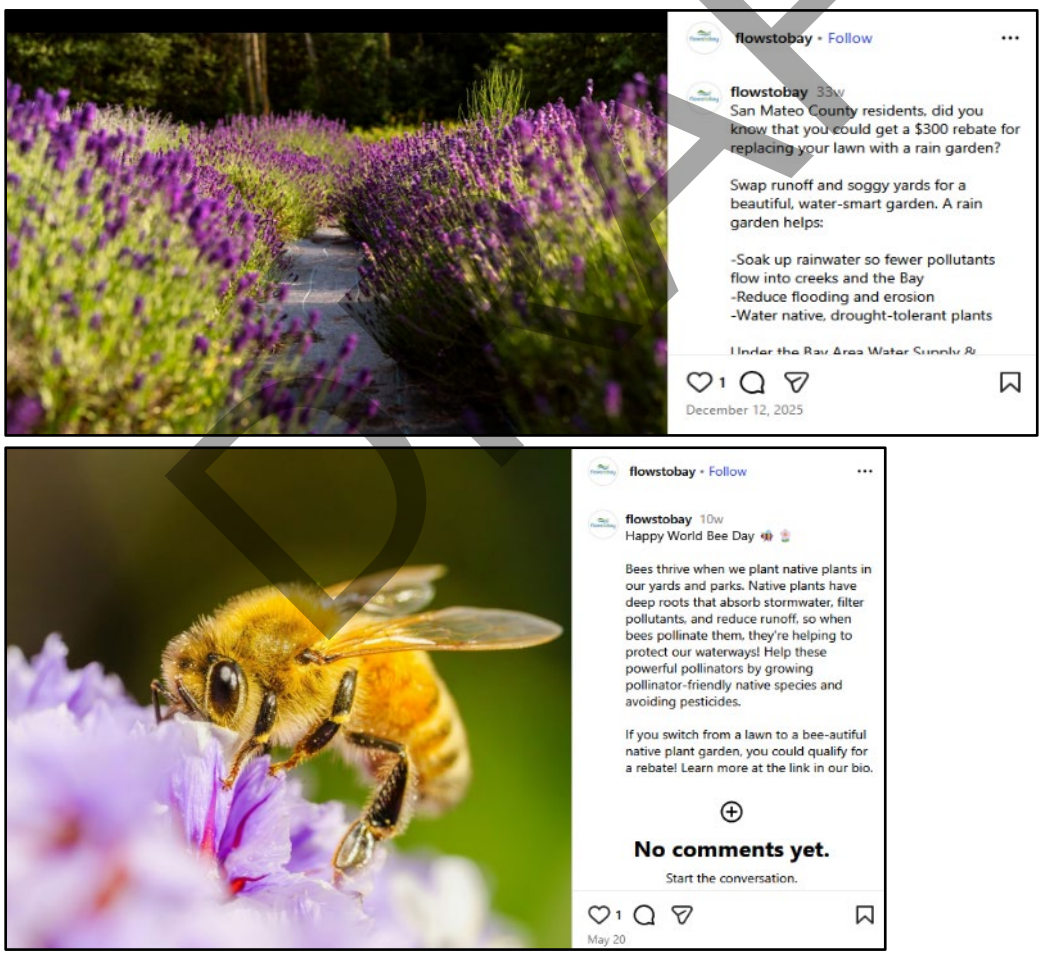


**Figure 15-8. Instagram posts promoting landscape management and the use of drought-tolerant, native vegetation.**

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# The Benefits of California Native Plants

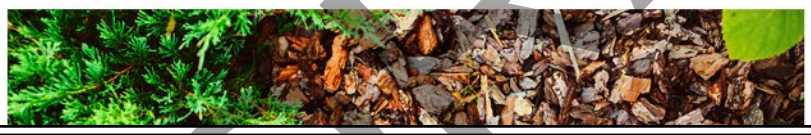
With winter on the horizon and the rainy season among us, now is the time to consider how colder and wetter conditions impact water conservation efforts in our yard and garden. California is still in a drought, so make the most of the gift of rain this season and incorporate native plants into your landscape to maximize the benefits of rain while minimizing rainwater runoff pollution!

San Mateo County receives an average of 24 inches of rain per year, with the rainy season lasting from October to May. During this period, the excess rainwater that does not soak into the ground travels on streets and pavements (also known as impermeable surfaces) and will pick up pollutants along the way into storm drains, which drain into local creeks, the San Francisco Bay, and the Pacific Ocean. Because native plants are best suited for the semi-Mediterranean climate, their deep roots absorb rainwater and prevent runoff from ever reaching these impermeable surfaces.

## Lawn Replacement

Your lawn is one of the most water-intensive plant features in your yard. And, as you know, it requires year-round maintenance. Consider replacing your grass with drought tolerant landscaping. You'll have all the green you want - without the hassle. You may be eligible to receive a rebate for your lawn replacement. Click here to learn more.

## Mulching



## Rain Gardens

Rain gardens are a relatively low-cost, effective, and aesthetically pleasing way to reduce the amount of stormwater that runs off your property then washes pollutants into storm drains, local streams, the San Francisco Bay, and the Pacific Ocean. While protecting water quality, rain gardens also provide attractive landscaping and habitat for birds, butterflies, and other animals, especially when planted with native plants. Click here to learn more and check out our community calendar for upcoming rain garden workshops.

## Share Your Project With Us!

If you have one of the water-wise outdoor projects described on this page, let us know. Share your story and pictures with us by filling out the form below. We'd love to feature your project and share it with San Mateo County residents.

Name *

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**Figure 15-9. Screenshots of content on SMCWPPP's website that featured native plants.**

# FUTURE ACTIONS

In FY 2026/27, SMCWPPP will continue to assist member agencies to comply with requirements in the MRP Provision C.15 related to conditionally exempt non-stormwater discharges, including conducting selected types of related outreach. This will include:

- Educational posts featuring automotive care, pools and spas, and IPM topics on social media;
- Public tabling events focused on IPM and native planting;
- Website content such as blogs highlighting best practices for businesses and mobile businesses;
- Rain barrel and rain garden water rebate and water conservation promotion through partners and programs;
- Participation in the Regional BAMSC Firefighting Discharges Work Group;
- Developing training for municipal maintenance staff on containment and cleanup of emergency discharges of firefighting water and foam in the public right of way (see Section 2);
- Developing guidance for training contractors hired by municipalities to participate in the containment and cleanup of emergency discharges of firefighting water and foam in the public right of way (see Section 2); and
- Continue to work with local Fire Department representatives on behalf of member agencies to assist with implementation of the BAMSC *Regional Firefighting Emergency Discharges Work Group Report* recommendations

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# SECTION 17
# C.17 DISCHARGES ASSOCIATED WITH UNSHELTERED HOMELESS POPULATIONS

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## INTRODUCTION

Provision C.17, Discharges Associated with Unsheltered Homeless Populations, is a new provision introduced with MRP 3.0. The objective of Provision C.17 is to identify and ensure the implementation of appropriate control measures to address non-stormwater discharges into MS4s associated with unsheltered homeless populations, including discharges from areas where unsheltered people congregate. This section describes SMCWPPP's countywide activities conducted to help San Mateo County Permittees implement this provision. SMCWPPP helps municipal staff understand the MRP's requirements, makes various MRP compliance support materials available for their use and participates, on behalf of its members, in regional groups (e.g., BAMSC Work Group). A SMCWPPP C.17 Work Group was formed in FY 2022/23 to facilitate and coordinate providing this assistance to the Permittees.

## IMPLEMENTATION OF MRP PROVISIONS

### Provision C.17.a.ii(1) Unsheltered Homeless Population Map

Permittees were required to submit a map with their FY 2022/23 and FY 2024/25 Annual Reports that identified the approximate location(s) of unsheltered homeless populations, storm drain inlets and existing streams, rivers, flood control channels, and other surface water bodies within the Permittee's jurisdiction. The MRP allows the use of biennial point-in-time (PIT) census surveys results to develop the maps. SMCWPPP worked with San Mateo County Human Services Agency (HSA) staff to obtain data from the PIT Count and Survey. SMCWPPP developed a map for each Permittee using the data provided by San Mateo County HSA. Due to privacy and safety concerns raised, the location data were mapped at the census tract level for the publicly available report. The more specific, but still approximate, location data provide by the HSA was made available to Permittees.

### Provision C.17.a.ii(2) Regional Best Management Practices Report

To encourage ongoing regional, countywide, and municipal coordination efforts, the MRP required Permittees to collectively develop a best management practice report that identifies effective practices to address non-storm water discharges associated with homelessness into MS4s that impact water quality. The BAMSC formed a Work Group to develop the *Regional BMP Report for Addressing Non-stormwater Discharges Associated with Unsheltered Homeless Populations* (Regional BMP Report).

SMCWPPP staff provided in-kind contributions towards the development of the Regional BMP Report and actively participated in the Work Group.

The Regional BMP Report was submitted in the SMCWPPP FY 2022/23 Annual Report. The Regional BMP Report described the BMPs that may be, or are currently being, implemented by Permittees to address discharges associated with homelessness impacting water quality. Each BMP is presented as a Fact Sheet in the BMP Report. The Fact Sheets describe the BMP, goals, limitations, and challenges, and provide local implementation examples.

## Coordination with County Human Services Agency

SMCWPPP recognizes that identifying BMPs and strategies to manage the water quality impacts associated with unsheltered populations does not inherently address the complex issues contributing to and impacting the chronic homelessness in the County. The San Mateo County Board of Supervisors is committed to preventing homelessness and ensuring anyone who is experiencing homelessness is supported with safe shelter and a pathway to housing. The HSA is the County Department tasked with implementing this vision on behalf of the Board of Supervisors and the San Mateo County Continuum of Care Steering Committee (CoC), a diverse, cross-sectoral body that guides and shapes the countywide response to homelessness. HSA works in close collaboration with other County departments and community partners in these efforts (San Mateo County CoC Strategic Plan on Homelessness, July 2022).

The County's CoC Strategic Plan on Homelessness (July 2022) identifies the programs, initiatives and strategies in place and system improvements for the next three years. The programs and services described include outreach and engagement, shelter/interim housing, housing solutions, prevention assistance, and targeted programs for special populations. The Plan identifies the strategies to accomplish the goals and track progress towards these goals, including reaching functional zero homelessness. SMCWPPP will continue to engage with these organizations whose primary mission is to end homelessness to ensure stormwater agency efforts are supportive and not disruptive of the existing efforts.

## Work Group

A SMCWPPP C.17 Work Group was formed in FY 2022/23 to facilitate and coordinate providing this assistance to the Permittees. In FY 2025/26 the Work Group met once on April 22, 2026. At the meeting SMCWPPP Program staff reviewed the FY 2024/25 Annual Report BMP effectiveness evaluations, shared information, and discussed the Regional Water Board general comments on the Annual Reports.

# FUTURE ACTIONS

In FY 2026/27, SMCWPPP will assist member agencies to comply with requirements in MRP Provision C.17 related to discharges from unsheltered homeless populations, as needed.

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# SECTION 20
# C.20 COST REPORTING

## INTRODUCTION

Provision C.20 Cost Reporting is a new provision introduced with MRP 3.0. Provision C.20.a requires each Permittee to annually prepare and submit a fiscal analysis of the capital and operation and maintenance costs incurred to comply with MRP requirements. Provision C.20.b.i requires Permittees to develop a cost reporting framework and methodology to perform the fiscal analysis. Permittees are encouraged to collaboratively develop the framework and methodology. The framework is required to consider identification of costs incurred solely to comply with MRP requirements as compared to costs shared with other programs or regulatory requirements, provide meaningful data to assess costs of different program areas, and allow for comparisons and to identify trends over time. Provision C.20.c requires Permittees to submit the cost reporting framework and methodology to the Water Board by June 30, 2023, and to submit their fiscal analyses annually according to the accepted cost reporting framework and methodology starting with the 2025 Annual Report.

SMCWPPP collaborated with other MRP countywide programs through the Bay Area Municipal Stormwater Collaborative (BAMSC) to develop and make updates to the Bay Area Cost Reporting Framework and Guidance Manual to address Provision C.20 requirements and coordinated with the State Water Board on the statewide cost reporting policy. This section provides information on this collaborative effort, support of San Mateo County Permittees, and next steps.

## IMPLEMENTATION OF MRP PROVISIONS

### Provision C.20.b.i Cost Reporting Implementation

In FY 2022/23, SMCWPPP provided in-kind support to a BAMSC project of regional benefit to jointly develop a cost reporting framework and methodology, along with other BAMSC MRP countywide stormwater programs. The Project Team consisted of consulting firms already under contract to the participating countywide programs (EOA and Larry Walker and Associates). Permittees submitted the final Bay Area Cost Reporting Framework (Framework) and Guidance Manual to the Water Board on June 26, 2023, and Water Board staff provided comments on August 11, 2023. In March 2024, the Program completed revisions to the Framework based on Water Board comments and submitted the revised final Framework and Guidance Manual. On June 26, 2024, the Water Board provided conditional approval for the revised final Framework and Guidance Manual. The condition of approval was that any future modifications, either for better alignment with Permittee accounting practices or for consistency with the State Water Board's Municipal Stormwater Cost Policy, must be approved by the Water Board's Executive Officer. The FY 2024/25 cost analysis for each San Mateo County Permittee was submitted with their individual FY 2024/25 Annual Report in September 2025.

During FY 2025/26, the Program focused on assisting San Mateo County Permittees with use of the approved Framework and Guidance Manual to track and report costs of implementing MRP requirements

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and to complete their first submittal that was due in September 2025, including providing a presentation on cost reporting as part of annual report training. In January 2026, the Program hosted a work group meeting of Permittees to discuss lessons learned from the initial submittal process. Program staff prepared and provided a FY 2025/26 Framework with updated Program numbers in the spring and continued to provide informal assistance.

In addition, the Program continued to track the State Water Board and CASQA efforts on implementation of the Statewide Municipal Stormwater Cost Policy adopted in January 2025. The Program provided in-kind support during FY 2025/26 for a BAMSC Regional Project to update the Bay Area Cost Reporting Framework to allow submittal of cost information to the State's Municipal Cost Data Portal for FY 2026/27, per the requirements of the adopted Municipal Stormwater Cost Policy. As part of this effort, the Program actively participated in the BAMSC Cost Reporting Work Group meetings held on May 28, 2026 and June 15, 2026. BAMSC completed an internal draft update to the Framework and Guidance incorporating translation and summary tabs and making improvements resulting from initial year lessons learned. Finalization will occur after the release of State requirements and guidance, which have been delayed and are anticipated now to be released in FY 2026/27.

## FUTURE ACTIONS

FY 2026/27 activities planned by SMCWPPP to assist San Mateo County Permittees to comply with MRP requirements in Provision C.20 include the following:

- Provide support during FY 2026/27 for finalization of the BAMSC Regional Project to update the Bay Area Cost Reporting Framework to allow submittal of cost information to the State's Municipal Cost Data Portal for FY 2026/27.
- Support San Mateo County Permittees with their fiscal analyses due with the Annual Reports by answering Permittee questions and conducting brief demonstrations of the Framework including any updates in appropriate forums.

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# SECTION 21
# C.21 ASSET MANAGEMENT

## INTRODUCTION

Provision C.21 Asset Management is a new provision introduced with MRP 3.0. The objective of Provision C.21 is for each Permittee to develop and implement an Asset Management Plan to ensure the satisfactory condition of all hard assets constructed during this and previous Permit terms. Hard assets are defined in the Permit as structural controls that serve a water quality function (e.g., bioretention cells, pervious pavement systems, and full trash capture devices). Provision C.21.b.i requires Permittees to develop an Asset Management Plan that includes asset category descriptions, an inventory of assets, an Asset Management O&M Plan for prioritizing and scheduling O&M activities, and recommendations for a reporting strategy. Provision C.21.c requires Permittees to submit their Asset Management Plans with the 2025 Annual Reports and then to report on implementation efforts annually starting with the 2026 Annual Reports. In addition, Provision C.21.c requires Permittees to jointly complete a Climate Change Adaptation Report to identify potential climate change-related threats to assets and appropriate adaptation strategies by September 2026.

In FY 2025/26, SMCWPPP continued the countywide Asset Management Work Group to assist SMCWPPP Permittees and collaborated with other MRP countywide programs through a newly formed BAMSC Work Group focused on development of the Climate Change Adaptation Report (CCAR). This section provides information on the countywide and collaborative efforts, including the products developed and next steps.

## IMPLEMENTATION OF MRP PROVISIONS

### Provision C.21.b.i Asset Management Plan Development

During FY 2024/25 and early 2025/26, SMCWPPP Permittees developed local Asset Management Plans with guidance from the Countywide Program. In September 2025, SMCWPPP Permittees submitted Asset Management Plans with their Annual Reports as required by Provision C.21.c.[1]

### Provision C.21.b.ii Asset Management Plan Implementation

In FY 2025/26, Permittees began implementation of their Asset Management Plans. SMCWPPP provided assistance by continuing its Asset Management Work Group, formed in FY 2023/24, to help guide SMCWPPP Permittees in the development and implementation of Asset Management Plans. The Work Group met twice during FY 2025/26 and participants included representatives from SMCWPPP, One Shoreline, San Mateo County, and the Cities of Atherton, Daly City, East Palo Alto, Foster City, Half Moon Bay, Hillsborough, Menlo Park, Redwood City, and San Bruno. SMCWPPP Asset Management Work Group meeting agendas included a roadmap overview for asset management implementation; a discussion on

[1] Two Permittees requested extensions of the submittal date.

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conducting condition assessments including approaches, assessment parameters, and data collection; and a discussion on how to report inventory information for LID, Non-LID, and Trash assets.

SMCWPPP also held a virtual training on asset management and conducting condition assessments that was recorded and made available to SMCWPPP Permittees via the Flows to Bay Presentations webpage. In addition to and in conjunction with the training, SMCWPPP developed a draft *Asset Condition Assessment Guidance* memo that focused on guidance related to landscape-based GI assets, which make up the majority of the SMCWPPP Permittees' GI asset inventories. The memo provides an overview of asset management and MRP requirements, and then describes the concept of condition assessments as it relates to GI, assessment parameters, scoring approaches, steps for conducting assessments, data to collect, and post-assessment considerations. Additionally, the memo includes appendices showing photo-based scoring guidance as well as an example assessment data collection form.

### Provision C.21.b.v Climate Change Adaptation Report Development

In FY 2025/26, SMCWPPP provided in-kind support to a BAMSC regional project for completion of a CCAR that will identify potential climate change-related threats to Permittees' stormwater quality-related hard assets and appropriate adaptation strategies. The CCAR is due to the Water Board in September 2026. The CCAR includes a discussion of the Permittees' Asset Management Plans and the linkage to climate impacts; an assessment of Bay Area climate threats, including impacts on specific assets; assessment of the geospatial vulnerability of assets; potential climate adaptation strategies; and recommended next steps.

A regional CCAR Work Group was formed for Permittees to collaborate on the report, review the CCAR outline, receive initial feedback from Water Board staff, and review report drafts. The CCAR Work Group held four meetings in January, February, March, and May of 2026. Work Group members included representatives from SMCWPPP and the other MRP countywide stormwater programs. First and second drafts of the CCAR were circulated to SMCWPPP and the other Countywide stormwater programs and their permittees in May and June 2026 for review and comment. The final CCAR was provided to the SMCWPPP Stormwater Committee and BAMSC Steering Committee for approval in August 2026. The final Climate Change Adaptation Report is provided in Appendix 21.

## FUTURE ACTIONS

FY 2026/27 activities planned by SMCWPPP to assist San Mateo County Permittees in complying with MRP requirements in Provision C.21 include the following:

- The SMCWPPP Asset Management Work Group will continue to meet to provide assistance to Permittees with implementation of and reporting on local asset management programs. Assistance will include completion of a guidance memo on conducting condition assessments of assets and how to implement other asset management program elements like analyzing risk.
- SMCWPPP will continue to participate in the BAMSC Asset Management Work Group, which will continue discussing approaches for assessing condition of assets (GI and trash) and reporting strategies as needed.

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# Appendix 1

- Stormwater Committee – Attendance List for FY 2025/26

**SMCWPPP Stormwater Committee Attendance FY 2025/26**

| Agency | Representative | 8/21/25 | 9/18/25 | 11/20/25 | 2/19/26 | 3/19/26 | 4/16/26 |
|---|---|---|---|---|---|---|---|
| Atherton | Robert Ovadia (Vice Chair, Chair) – Public Works Director | X | X | X | X | X | X |
| Belmont | Edric Kwan Public Works Director<br>Brian Nguyen – Assistant Civil Engineer (Alternate) | X | X | X | | | X |
| Brisbane | Randy Breault (Chair, Retired) – Public Works Director/City Engineer<br>Maziar Bozorginia (Vice Chair) – Public Works Director | X | | X | | X | |
| Burlingame | Syed Murtuza – Public Works Director<br>Noah Craney – Environmental Compliance Manager (Alternate) | X | X | X | X | X | X |
| Colma | Brad Donohue – Public Works Director | | X | | X | X | X |
| Daly City | Richard Chiu – Public Works Director | X | | X | X | X | X |
| East Palo Alto | Anwar Mirza – City Engineer<br>Fatima Khan – Environmental Services Aid (Alternate) | X | X | X | X | X | X |
| Foster City | Andrew Brozyna – Public Works Director<br>Laura Galli – Manager of Engineering (Alternate) | X | X | | | | |
| Half Moon Bay | Maziar Bozorginia – Public Works Director<br>Todd Seely – Interim Public Works Director | X | X | X | | | |
| Hillsborough | Paul Willis – Public Works Director | X | X | X | X | X | X |
| Menlo Park | Azalea Mitch – Public Works Director | X | X | | | X | |
| Millbrae | Ahmad Haya – City Engineer (Alternate) | X | X | X | X | X | X |
| OneShoreline | Summer Bundy – Projects Director | | X | X | X | | |
| Pacifica | Roland Yip – Deputy Director of Public Works/City Engineer<br>Melissa Tigboa - Public Works Director (Alternate) | X | X | X | X | X | |
| Portola Valley | Javad Mirsaidi – Interim Town Engineer | | | | | | |
| Redwood City | Tanisha Werner – Director of Transportation and Engineering<br>Paige Saber – Senior Civil Engineer (Alternate) | | X | X | X | X | X |
| San Bruno | Matt Lee – Public Works Director | | | X | | X | X |
| San Carlos | Steven Machida - Public Works Director | X | X | X | X | X | X |
| San Mateo | Matt Fabry - Public Works Director | X | X | X | X | X | X |
| South San Francisco | Eunejune Kim - Public Works Director | X | X | X | | | X |
| Woodside | Yaz Emrani - Public Works Director<br>Louis Sun – Public Works Director | X | | | X | | |
| San Mateo County | Ann Stillman - Public Works Director | X | X | X | X | X | X |
| Regional Water Quality Control Board | Watershed Supervisor | O | O | O | O | O | O |

Notes:
X - primary or designated alternate representative; O - "other" agency representative/non-voting (see meeting minutes for "other" attendees)

# Appendix 2

- Municipal Maintenance Subcommittee – Attendance List for FY 2025/26

**Municipal Maintenance Subcommittee Meeting Attendance - FY 2025/26**

| NAME | MUNICIPALITY | 3/25/2026 | 5/27/26 |
|---|---|---|---|
| Brandon Tyler | Belmont | ✓ | ✓ |
| Ryan Moran | Belmont | | ✓ |
| Dolan Shoblo | Brisbane | ✓ | ✓ |
| Noah Craney | Burlingame | ✓ | ✓ |
| Louis Gotelli | Colma | ✓ | |
| Alan Chui | Daly City | ✓ | |
| Javier Barajas | Daly City | ✓ | |
| Jose Padilla | Daly City | ✓ | |
| Diana Tran | East Palo Alto | ✓ | ✓ |
| Zach Tschiersdilkey | Foster City | | ✓ |
| Sangita Duff | Hillsborough | ✓ | |
| Rick Pina | Hillsborough | ✓ | |
| John Roias | Millbrae | ✓ | |
| Mario Zertuche | Millbrae | ✓ | |
| Hugo Torres | Menlo Park | ✓ | |
| Nelson Gutierrez | Menlo Park | | ✓ |
| Shayan Serajeddini | Menlo Park | ✓ | ✓ |
| Rey Soriano | Pacifica | | ✓ |
| Claudio Ramirez | Pacifica | | ✓ |
| Linda Chang | Redwood City | ✓ | |
| Gino Quinn | San Bruno | ✓ | |
| Angelica Ali | San Bruno | ✓ | |
| Gustavo Lopez | San Mateo | ✓ | ✓ |
| Ben Zarrabi | San Mateo | ✓ | |
| Troy Warner | San Mateo | ✓ | ✓ |
| Ryan Thorndike | San Mateo County Mosquito & Vector Control District | ✓ | ✓ |
| Reid Bogert | C/CAG | | ✓ |
| Dan Sternkopf | C/CAG | | ✓ |
| Kristin Kerr | EOA, Inc. | ✓ | ✓ |

# Appendix 3

- New Development Subcommittee – Attendance List for FY 2025/26
- Communication to San Mateo County Mosquito and Vector Control District Re: Transmittal of FY 2025/26 List of Newly Installed Treatment Measures in San Mateo County
- FY 2025/26 Regional Supplement for New Development and Redevelopment, Bay Area Municipal Stormwater Collaborative, September 2026

NDS
FY 2025-26

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
Clean Water. Healthy Community www.flowstobay.org

| Representing | Name | Nov. 18, 2025 | May 12, 2026 |
|---|---|---|---|
| Atherton | William Burse / Tim Au/Gabriela Ruiz | - | -/-/X |
| Belmont | Elizabeth Wada/Brian Nguyen/Ryan Chen | X/- | -/X/X |
| | Jose Ortiz/Josh Sun/Pravnesh Jit | | X/X/X |
| Brisbane | Jake Whitney/Julia Ayres/Dolan Shoblo | -/X/X | X/-/X |
| Burlingame | Noah Craney/Victor Voong | X/- | X/- |
| Colma | Muneer Ahmed (CSG), Catherine Chan (CSG) | - | X/X |
| County of San Mateo | Camille Leung/Zac McDonough/Avery Lai | X/X | -/-/X |
| | Julie Casagrande/Wency Ng/Chanda Singh | -/-/- | X/X/X |
| | Sarah Deicke/Chris Chan/Johnson Young | -/X | X/X/X |
| | Sultan Henson/Melia Green/Alex Zhang | X/X | X/X/X |
| | Edward Nacpil/Sheilah Neff/Monica Raman | -/-/- | X/X/X |
| C/CAG – SMCWPPP | Reid Bogert/Dan Sternkopf | X/X | X/- |
| Daly City | Sibely Calles/Venus Young/Sam Fielding | X/-/X | -/X/X |
| East Palo Alto | Diana Tran/Fatima Khan/Colleen Hunt | -/-/X | -/-/X |
| EOA-SMCWPPP | Jill Bicknell/Lisa Sabin | X/- | X/- |
| | Peter Schultze-Allen/ Bonnie de Berry | X/- | X/X |
| Foster City | Kareem Arabi/Claire McWilliams | X/- | X/X |
| | Jerrick Carandang/Amy Zhou/Ryan Marquez | -/-/- | X/X/X |
| Half Moon Bay | Nick Zigler, Liz Diaz-Gunning, Mark Lander (BV) | -/-/- | -/X/X |
| | Matt Nichols | X | - |
| Hillsborough | Natalie Gribben/Doug Belcik/Irfan Aziz | -/X/- | -/X/- |
| Menlo Park | Rambod Hakhamaneshi/Jason Santos | - | -/X |
| | Ed Rangeen/Kaila Jones/Shayan Serajeddini | -/-/- | -/-/X |
| Millbrae | Armando Mora/Ahmad Haya | -/X | -/X |
| | Roscoe Mata/Craig Centis/Brandon Huang | - | -/-/X |
| | Nicole Tandel/Amer Zreika | - | X/X |
| Pacifica | Roland Yip/James Lin | - | X/X |
| | Justin Yee/Rey Soriano | - | X/X |
| Portola Valley | Thomas Geisler | - | - |
| Redwood City | Alex Chan/Justin Lee | X | X/- |
| | Patti Schrotenboer/Christian Craig | -/- | X/X |
| San Bruno | Jeff Benbow/Talha Amor/Eliseo Amaya | X/X/- | -/-/X |
| | Ibraheem Mosa/ Dalia Manois/ Angelica Ali | -/-/X | X/-/X |
| San Carlos | Evan Cai/Nidhi Thanki/Jana Cadiz | -/-/- | X/-/X |
| | Grace Lee/ Hanieh Houshmandi/Jessica Lee | -/-/- | X/X/X |
| | Ken Der/ Michael Runchey/Ryan Martino | -/-/- | X/X/X |
| | Tracy Scramaglia/Wesley Mercado | -/-/- | X/X/X |
| San Mateo (City) | Gustavo Lopez/Selena Lau/ James O'Connell | X/X/X | X/-/X |
| | John Thompson/Ella Phillips/Troy Warner | X/X/X | X/-/X |
| | Ryan Brunmeier/Ben Zarrabi/Selena Marson | X/X/- | X/X/X |
| | Dominic Boneno/Jason Hallare/Charlie Evans | -/X/- | X/-/X |
| SM County RCD | Jarrad Fisher/Joe Issel | -/- | -/- |
| South S.F. | Andrew Wemmer/Robin Lee/Gianna LaRoca | -/-/- | X/-/X |
| | Daniel Garza/ Kim Hopkins/Natasha Gutierrez | -/-/- | X/-/X |
| Woodside | Sindhi Mekala/Muneer Ahmed (CSG) | -/- | -/X |

# Annual Reporting for FY 2025-2026

# Regional Supplement for New Development and Redevelopment

# San Francisco Bay Area Municipal Regional Stormwater Permit

## Bay Area Municipal Stormwater Collaborative

FINAL DRAFT

September 2026

**MRP Regional Supplement for New Development and Redevelopment Annual Reporting for FY 2025-2026**

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**MRP Regional Supplement for New Development and Redevelopment Annual Reporting for FY 2025-2026**

## 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 79 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 3.0 provision:

- C.3.j.iv Participate in Processes to Promote Green Infrastructure.

These regionally implemented activities were conducted under the auspices of the Bay Area Municipal Stormwater Collaborative (BAMSC), an informal coalition of the municipal stormwater programs in the San Francisco Bay Area. Most of the 2025-26 annual reporting requirements of Provision C.3.j.iv covered in this Supplement were completely met by BAMSC member activities, except where otherwise noted herein or by Permittees in their reports. Through their program representatives on the BAMSC Steering Committee and its Subcommittees, MRP Permittees collaboratively participated in these BAMSC informal regional activities.

## GREEN INFRASTRUCTURE PLANNING AND IMPLEMENTATION

### C.3.j.iv 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.*

This section describes activities and accomplishments during FY 2025-26 to promote green infrastructure (GI or GSI). The BAMSC activities described in this section provide compliance for MRP Permittees with this provision.

### Activities and Accomplishments during FY 2025-26

#### *MRP 3.0 C.3/GSI Work Groups*

The following development-related BAMSC regional work groups began to meet or continued to meet in FY 2025-26: the Long Term GSI Technical Working Group, the Asset Management Work Group, and the Trees in GSI Work Group.

*BAMSC Long Term GSI Technical Working Group*

Provision C.3.j.ii (4) of the MRP allows Permittees, Water Board (WB) staff, and impartial science experts to collectively form a technical working group to discuss long-term GSI goals and recommend long-term percentage reductions in Permittees' impervious surfaces, at individual, countywide, and regional scales. Working cooperatively through BAMSC, Permittees formed the Long-Term GSI Technical Working Group (TWG) in FY 2023-24. The TWG met four times in FY 2024-25 and three times in FY 2025-26. The TWG includes WB and EPA staff.

MRP Provision C.3.j.v (7) requires Permittees to collectively produce a report summarizing TWG efforts and recommendations and submit it to the WB by September 2025. The BAMSC "TWG Summary and Recommendations Report", which fulfills this requirement, was completed in August 2025 and submitted with each Countywide Program's FY 2024-25 Annual Report. The TWG Summary and Recommendations Report includes summaries of all TWG meetings and Permittee recommendations for a proposed GSI Implementation Framework that includes crediting of a broader range of project types, projects with multiple benefits, and projects in various phases of implementation. During FY 2025-26, the TWG discussed and refined the proposed Framework and completed its work. Discussions related to GSI implementation are continuing in the new BAMSC MRP 4 C.3 Workgroup, led in conjunction with WB staff.

*BAMSC Asset Management Work Group*

The purpose of the Work Group is to provide a forum to discuss and get regional agreement on approaches to condition assessment and O&M needs of stormwater quality assets. In FY 2023-24, two Work Group meetings were held, both focused on condition assessment of LID/GSI assets. In FY 2024-25, one meeting was held on July 23, 2024, to discuss assessing the condition of trash control assets. Following the July 2024 meeting, the effort to assist Permittees with development of Asset Management Plans shifted to the Countywide Programs, and no additional BAMSC Work Group meetings have been held.

*BAMSC Trees in GSI Work Group*

The Trees in GSI Work Group of the BAMSC Development Subcommittee met once in FY 2025-26 with attendees including municipal staff, WB staff, and representatives of UC Extension, Davey Resource Group, and NGOs. The Work Group met on December 17, 2025, and discussed Bay Area municipal plans, such as urban forest plans, that contain examples of policies related to the integration of trees in GSI. In FY 2026-27, the Work Group will continue to meet, with an emphasis on design and construction challenges related to integrating trees into bioretention systems.

## MRP Regional Supplement for New Development and Redevelopment Annual Reporting for FY 2025-2026

### *BAMSC Development Subcommittee*

The BAMSC Development Subcommittee continued to meet approximately quarterly during FY 2025-26 and promoted the implementation of GSI by providing a forum to discuss the following topics:

- Pervious Pavement - Peter Schultze-Allen (EOA) provided an overview of Bay Area pervious pavement in public roadway projects and lessons learned, and staff from the City of San José provided a presentation on the Katherine Court permeable interlocking concrete paver project.
- "Clean Watersheds 4 All" - Rinta Perkins (CCCWP) provided an overview of the "Clean Watersheds 4 All" project, including its goals and tasks. Task 1, which developed an Old Industrial Treatment Measure Plan, and Task 2, which created a Project Funding and Delivery Roadmap, have both been completed. Task 3a, focused on Project Design and Implementation, remains in progress and will use Community-Based Public Private Partnerships (CBP3s) to support implementation of a regional GSI project. Task 3b, which involved identifying an Alternative Project for Design, is also ongoing. Task 4 focuses on establishing a Community Facilities District (CFD) to provide sustainable long-term operations and maintenance (O&M) funding for these facilities. This effort is closely aligned with the Contra Costa County Regional Alternative Compliance (RAC) System implementation.
- Contra Costa County RAC System – Rinta Perkins (CCCWP) delivered two presentations on the RAC System, focusing on recent efforts to establish a Joint Powers Authority (JPA) and Community Facilities District (CFD) to support System implementation. The RAC System is a collaborative framework that enables participating municipalities and developers to achieve permit compliance through a regional, market-based approach. The System allows participants to purchase "compliance units" generated by off-site GSI projects. To support administration and long-term sustainability, a JPA and a CFD will be established to provide ongoing funding for O&M. The JPA will function as a separate legal entity responsible for managing compliance transactions and coordinating among member agencies. At the same time, the CFD will fund the long-term O&M of GSI projects. The RAC System was recognized with the 2025 CASQA Award for the Outstanding Stormwater Funding Initiative.
- Filtration Media - The Subcommittee received a presentation from Contech's Regional Regulatory Manager, Craig Fairbaugh, on filtration media specifications and an upcoming report on the subject prepared by the Stormwater Media Filtration Committee of the Urban Water Resources Research Council (part of the Environmental Water Resources Institute of the American Society of Civil Engineers).

***Other Participation and Comments***

- Peter Schultze-Allen (EOA/SCVURPPP) presented on "Moving the Needle: Green Street Implementation in the San Francisco Bay Area" on October 29, 2025, at the 2025 State of the Estuary conference in Oakland.
- Peter Schultze-Allen (EOA/SCVURPPP) presented on "Designing Resilient Streets through Green Infrastructure" at a webinar hosted by the Active Transportation Resource Center (ATRC) on November 18, 2025. The ATRC is a project coordinated by Caltrans and the California Department of Public Health.
- Reid Bogert (SMCWPPP) presented a technical presentation on "Piloting the OneWatershed Framework in San Mateo County" at the California Stormwater Quality Association 2025 Annual Conference in Sacramento on September 15, 2025
- Reid Bogert (SMCWPPP) and Chris Sommers (SCVURPPP) attended and represented the Bay Area stormwater management perspective at the Bay Area One Water Network meeting held in San Francisco on September 5, 2025. A significant focus for this meeting was evaluating programmatic, institutional, and funding strategies to support a more holistic approach to water and watershed management, including options for leveraging and supporting GSI.
- Reid Bogert (SMCWPPP) met with Federal Congressional leaders, including Senator Padilla's Office on March 11, 2026 and Congressmember Mullin's Office on March 12, 2026, to advocate for federal funding for GSI projects in San Mateo County, focusing on earmark requests for $1.8M in funding for sustainable streets projects in East Palo Alto, Daly City, and South San Francisco and $1.5M for advancing SMCWPPP's OneWatershed effort to develop tools and resources to support local agencies with integrated climate resilience and watershed planning.
- Reid Bogert and Dan Sternkopf (SMCWPPP) presented at multiple community workshops and meetings in spring and summer 2025 on the state-grant funded OneWatershed Framework and San Bruno Creek Watershed Pilot Study. Workshops were presented in multiple languages and were intended to gather input on climate hazards and multi-benefit green infrastructure solutions to address community adaptive capacity needs. Workshop attendees included community members as well as city council members from the City of San Bruno.
- Reid Bogert (SMCWPPP) presented on GSI and resilient schoolyards partnership opportunities at the San Mateo County Office of Education's 10th Annual Environmental Solutionary Teacher Fellowship community partners event. The presentation was focused on how school site and district staff can effectively integrate GSI with schoolyard greening and climate resilience initiatives through partnerships with the countywide stormwater program.
- Reid Bogert (SMCWPPP)worked with Green Schoolyards America and the San Mateo County Office of Education to promote the Schoolyard Forest Leadership Institute to San Mateo County school districts. The institute will be piloted for the

first time in the Bay Area in fall 2026 and is intended to support school sites and districts in making the necessary institutional transformations that will support deeper integration of nature-based solutions, including GSI, in schoolyard greening initiatives.

- Rinta Perkins (CCCWP) provided three presentations to Contra Costa County Public Managers Association (PMA), City/County Engineering Advisory of Contra Costa (CCEAC), and Contra Costa Planning Directors, focusing on the RAC System JPA and the related CFD. In addition, the CCCWP conducted two technical sessions for stakeholder groups on August 12 and September 29, 2025. These outreach efforts are part of an ongoing engagement process to inform and coordinate with local agencies. The formation of the RAC JPA is anticipated to be completed by July 2026.

- Rinta Perkins (CCCWP) delivered ten presentations on the RAC JPA and CFD to the governing bodies of Antioch, Concord, Contra Costa County, Hercules, Moraga, Oakley, Orinda, Pinole, Pleasant Hill, and Richmond during October 2025 through June 2026. In addition to providing agencies with flexibility and efficiency in fulfilling stormwater permit obligations by joining the JPA, the RAC System provides other benefits, such as reduced costs, targeted legacy pollutant areas through regional projects, streamlined administrative tasks, and alignment with regional water quality goals.

- On November 8, 2025, at the State Water Resources Control Board's Urban Stormwater Capture and Use Workshop, Rinta Perkins (CCCWP) and Lisa Austin (Geosyntec Consultants) delivered a presentation on the Contra Costa County RAC System as part of the broader session on stormwater credit systems. The presentation outlined the RAC System's legal basis, the collaborative development process, and the approach to establishing sustainable funding for O&M. It also identified key recommendations to support wider adoption and implementation, including incorporating statewide permit language to enable alternative compliance, developing model joint powers agreement documents, securing dedicated grant funding, and providing ongoing technical assistance.

- Funded by the US EPA Water Quality Improvement Fund (WQIF) program, the CCCWP *Clean Watershed for All (CW4A)* project is advancing countywide implementation (i.e., funding and delivery) of GSI and other water quality improvement projects, with a particular emphasis on benefiting underserved communities. During this permit year, the Project completed identifying and prioritizing stormwater capture opportunities and developed corresponding concept-level designs to support future implementation. As part of its exploration of delivery approaches, the Project also evaluated alternative public-private partnerships (P3) strategies to help secure sustainable financing and expand implementation capacity for these critical watershed improvements.

**Future Activities**

The MRP 4.0 C.3 Work Group is kicking off in July 2026 and will be meeting during FY 2026-27 to develop and discuss the GSI Implementation Framework and goals and Provision C.3 requirements in the next permit.

BAMSC representatives will also continue to engage in various coordination efforts related to funding and implementation support for GSI. For example, the current CASQA Vice Chair, Reid Bogert, and Board Directors Chris Sommers and Rob Carson are working with leadership at CASQA to evaluate and advance potential funding strategies and funding-related legislation to support stormwater management programs at the state scale. Additionally, BAMSC representatives will continue efforts to promote green and complete streets with regional entities such as the Metropolitan Transportation Commission, the Bay Area Air District, Save the Bay, CalBike, Caltrans, Bay Area Regional Collaborative, Active Transportation Resource Center, San Franscisco Estuary Program, San Francisco Estuary Institute, ReScape, Association of Bay Area Governments, Bay Conservation and Development Commission, and other Bay Area and California organizations.

# Appendix 4

- CII Subcommittee – Attendance List for FY 2025/26
- Commercial, Industrial, and Illicit Discharge Stormwater Inspector Workshop – May 28, 2026
    - Workshop Agenda
    - Workshop Attendance
    - Workshop Evaluation Summary

**SMCWPPP Commercial/Industrial/Illicit Discharge (CII) Subcommittee Attendance – FY 2025/26**

| Name | Agency | 12/02/2025 | 04/07/2026 |
|---|---|---|---|
| Gabriela Ruiz | Atherton | ✓ | ✓ |
| Bozhena Palatnik | Belmont | ✓ | |
| Parvnesh Jit | Belmont | | ✓ |
| Dolan Shoblo | Brisbane | ✓ | ✓ |
| Noah Craney | Burlingame | ✓ | ✓ |
| Laura Suarez | Burlingame (Veolia) | ✓ | ✓ |
| Muneer Ahm | Colma | | ✓ |
| Sibely Calles | Daly City | ✓ | |
| Kaila DeFries | Daly City | ✓ | |
| Gabriela Ruiz | Atherton | | ✓ |
| Dolan Shoblo | Brisbane | | ✓ |
| Laura Suarez | Burlingame (Veolia) | | ✓ |
| Noah Craney | Burlingame | | ✓ |
| Muneer Ahm | Colma | | ✓ |
| Adrianne Groves | East Palo Alto (Stone Creek Environmental Consulting) | ✓ | |
| Kareem Arabi | Foster City | ✓ | |
| Jerrick Carandang | Foster City | ✓ | |
| Nick Zigler | Half Moon Bay (Black & Veatch) | ✓ | ✓ |
| Kaila Jones | Menlo Park | ✓ | ✓ |
| Shayan Serajeddini | Menlo Park | | ✓ |
| Cliff Ly | Millbrae | ✓ | ✓ |
| Rey Soriano | Pacifica | | ✓ |
| Linda Chang | Redwood City | ✓ | |
| Vicki Sherman | Redwood City | ✓ | ✓ |
| Angelica Ali | San Bruno | ✓ | ✓ |
| Dominic Garcia | San Bruno | ✓ | |
| Gino Quinn | San Bruno | ✓ | ✓ |
| Ben Zarrabi | San Mateo | ✓ | ✓ |
| Ella Phillips | San Mateo | ✓ | |
| Gustavo Lopez | San Mateo | ✓ | ✓ |
| Troy Warner | San Mateo | ✓ | ✓ |
| Evan Cai | San Carlos | ✓ | |
| Jessica Lee | San Carlos | | ✓ |
| Patrick Ledesma | County of San Mateo | ✓ | ✓ |
| Sarah Deicke | County of San Mateo | ✓ | ✓ |
| Sultan Henson | County of San Mateo | ✓ | |
| Natasha Gutierrez | South San Francisco | ✓ | ✓ |
| Daniel Garcia | South San Francisco | ✓ | |
| Dr. Devin Flannery | South San Francisco Fire | ✓ | |
| Doug Belcik | Town of Hillsborough | ✓ | |
| Irfan Aziz | Town of Hillsborough | ✓ | |
| Brandon Perez | Silicon Valley Clean Water (SVCW) | | |

| Name | Agency | 12/02/2025 | 04/07/2026 |
|---|---|---|---|
| Ben Padua | Silicon Valley Clean Water (SVCW) | ✓ | |
| Richard Tam | Silicon Valley Clean Water (SVCW) | ✓ | |
| Catherine Chan | Colma, Portola Valley, Woodside (CSG) | | ✓ |
| Dan Sternkopf | C/CAG | ✓ | ✓ |
| Reid Bogert | C/CAG | ✓ | |
| Claudia Mayo | EOA, Inc. | ✓ | ✓ |
| Kristin Kerr | EOA, Inc. | ✓ | ✓ |

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

# Business and Illicit Discharge Stormwater Inspector Training Workshop

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

**Thursday, May 28, 2026**

Oak Room, City of San Mateo Main Library
55 West 3rd Avenue, San Mateo

## AGENDA

| | | |
|---|---|---|
| 9:45 AM | Registration | |
| **10:00 AM** | **Welcome** | Dan Sternkopf, *C/CAG* |
| 10:10 AM | Municipal Regional Stormwater Permit (MRP) – Part 1 (C.4) | Kristin Kerr, *EOA, Inc.* |
| 10:20 AM | Municipal Case Study – Industrial Facility | Gustavo Lopez, *City of San Mateo* |
| 10:35 AM | MRP – Part 2 (C.5) | Kristin Kerr, *EOA, Inc.* |
| 10:45 AM | Municipal Case Study – Illicit Discharge | Claudia Mayo, *EOA, Inc.* |
| 10:55 AM | MRP – Part 3 (Other Provisions) | Kristin Kerr, *EOA, Inc.* |
| 11:10 AM | Enforcement Response Panel Discussion | Benjamin Zarrabi, City of San Mateo, Daniel Garza, South San Francisco, Nick Zigler, B&V HMB |
| 11:40 AM | Break/Lunch | |
| 12:10 PM | Group Exercise | Everyone |
| 1:20 PM | Inspector Resources and Wrap Up | Kristin Kerr, *EOA, Inc.* |
| **1:30 PM** | **Adjourn** | |

*Attendance at this workshop is acceptable for 3 Contact Hours toward maintaining CWEA certifications.*

**SMCWPPP Commercial/Industrial/Illicit Discharge (CII) Subcommittee Attendance – FY 2025/26**

| Name | Agency | 12/02/2025 | 04/07/2026 |
|---|---|---|---|
| Gabriela Ruiz | Atherton | ✓ | ✓ |
| Bozhena Palatnik | Belmont | ✓ | |
| Parvnesh Jit | Belmont | | ✓ |
| Dolan Shoblo | Brisbane | ✓ | ✓ |
| Noah Craney | Burlingame | ✓ | ✓ |
| Laura Suarez | Burlingame (Veolia) | ✓ | ✓ |
| Muneer Ahm | Colma | | ✓ |
| Sibely Calles | Daly City | ✓ | |
| Kaila DeFries | Daly City | ✓ | |
| Gabriela Ruiz | Atherton | | ✓ |
| Dolan Shoblo | Brisbane | | ✓ |
| Laura Suarez | Burlingame (Veolia) | | ✓ |
| Noah Craney | Burlingame | | ✓ |
| Muneer Ahm | Colma | | ✓ |
| Adrianne Groves | East Palo Alto (Stone Creek Environmental Consulting) | ✓ | |
| Kareem Arabi | Foster City | ✓ | |
| Jerrick Carandang | Foster City | ✓ | |
| Nick Zigler | Half Moon Bay (Black & Veatch) | ✓ | ✓ |
| Kaila Jones | Menlo Park | ✓ | ✓ |
| Shayan Serajeddini | Menlo Park | | ✓ |
| Cliff Ly | Millbrae | ✓ | ✓ |
| Rey Soriano | Pacifica | | ✓ |
| Linda Chang | Redwood City | ✓ | |
| Vicki Sherman | Redwood City | ✓ | ✓ |
| Angelica Ali | San Bruno | ✓ | ✓ |
| Dominic Garcia | San Bruno | ✓ | |
| Gino Quinn | San Bruno | ✓ | ✓ |
| Ben Zarrabi | San Mateo | ✓ | ✓ |
| Ella Phillips | San Mateo | ✓ | |
| Gustavo Lopez | San Mateo | ✓ | ✓ |
| Troy Warner | San Mateo | ✓ | ✓ |
| Evan Cai | San Carlos | ✓ | |
| Jessica Lee | San Carlos | | ✓ |
| Patrick Ledesma | County of San Mateo | ✓ | ✓ |
| Sarah Deicke | County of San Mateo | ✓ | ✓ |
| Sultan Henson | County of San Mateo | ✓ | |
| Natasha Gutierrez | South San Francisco | ✓ | ✓ |
| Daniel Garcia | South San Francisco | ✓ | |
| Dr. Devin Flannery | South San Francisco Fire | ✓ | |
| Doug Belcik | Town of Hillsborough | ✓ | |
| Irfan Aziz | Town of Hillsborough | ✓ | |
| Brandon Perez | Silicon Valley Clean Water (SVCW) | | |

| Name | Agency | 12/02/2025 | 04/07/2026 |
|---|---|---|---|
| Ben Padua | Silicon Valley Clean Water (SVCW) | ✓ | |
| Richard Tam | Silicon Valley Clean Water (SVCW) | ✓ | |
| Catherine Chan | Colma, Portola Valley, Woodside (CSG) | | ✓ |
| Dan Sternkopf | C/CAG | ✓ | ✓ |
| Reid Bogert | C/CAG | ✓ | |
| Claudia Mayo | EOA, Inc. | ✓ | ✓ |
| Kristin Kerr | EOA, Inc. | ✓ | ✓ |

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
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# Commercial, Industrial and Illicit Discharge Inspector Training Workshop

## Evaluation Summary

Number of Attendees: **37**
Number of Evaluations: **31**

San Mateo, CA — Thursday, May 28, 2026

1. **Municipal Regional Permit: C.4, C.5 and Other Provisions –** Kristin Kerr, EOA, Inc.
   Very Useful **29** Somewhat Useful **2** Not useful **0**

   **Comments:**
   - Tons of new information (2)
   - Well put together
   - Good perspectives on enforcement methods
   - Great PowerPoint, loved the group exercises and great speakers

2. **Municipal Case Study – Industrial Facility–** Gustavo Lopez, City of San Mateo
   Very Useful **28** Somewhat Useful **3** Not useful **0**

   **Comments:**
   - Best presentation (2)
   - Appreciated the enforcement breakdown and Notice of Violation template
   - Good example
   - Case studies are very helpful
   - Good investigation and good response
   - City of San Mateo has a very streamlined process for inspections that would be efficient for other agencies to follow

3. **Municipal Case Study – Illicit Discharge –** Claudia Mayo, EOA, Inc.
   Very Useful **28** Somewhat Useful **3** Not useful **0**

   **Comments:**
   - Good case study visuals
   - Great example case (2)
   - Useful information to determine source pollutants
   - Good to see specific issues and how that city resolved it using GIS
   - Thank you for the pond example! Very relevant to my workload now!

4. **Enforcement Response Panel Discussion**
   Very Useful **27** Somewhat Useful **4** Not useful **0**

**Comments:**
- Good variety of jurisdiction
- Enforcement information provided helpful background, but some not applicable to our agency
- I would’ve liked to see the questions and ask questions from the audience

- Beneficial discussion
- The open discussion was helpful, this could have definitely gone longer
- Different opinions
- Really liked it
- Any information is always helpful
- Nice to talk about
- Interesting to see how different agencies approach inspections differently
- Best agenda item

5. **Group Exercise**
   Very Useful **31** Somewhat Useful **0** Not useful **0**

   **Comments:**
   - Good to work with other agencies
   - The best agenda item
   - I liked the option to talk to neighbors and get their insight
   - Menti meter was cool, definitely want to use it now in my own presentations
   - Great open discussion
   - Great concept
   - Learned from others
   - Always good to bounce ideas back and forth
   - This was great
   - Great way to get outside perspectives on common issues
   - Nice format

6. **Did this training meet your expectations?** Yes **31** No **0**
   - Exceeded mine
   - The staggered agenda was so nice - made things easier to consume and didn't lose my concentration
   - This was my first stormwater training and I found it helpful to discuss these topics in the open forum

7. **What parts of the training were most useful to you?**
   - Just the right of amount of topics covered
   - Getting a full review and update
   - Group discussion/panel discussion
   - The panel was an interesting addition
   - Panel was nice to just hear what other folks are doing and how they handle things
   - Panel was good and group exercise was also helpful
   - Panel and group exercise
   - Municipal case studies (2)
   - I like case studies and questions, good challenging scenarios
   - Scenarios/responses from various agencies (4)
   - Case study and group exercises were helpful as well as survey questions
   - Case studies, discussion interesting
   - Case studies, open Q&A, overview of permit requirements
   - Group exercise (3)

- Real examples
- The group exercises – real life examples with photos were helpful
- Group exercise, very educational
- Group exercise, C4/C5 Program information and resources
- Different experience by inspectors
- Resources, case studies, contacts (2)
- All (3)
- All, interesting to see how other cities handle situations
- All the resources, contacts, BMP ideas, fact sheets, lunch

8. **What would have made this training more useful?**
    - This was fine
    - Hearing from more cities/diversify presence
    - Nore time on some detailed requirements could be interesting
    - The Menti Meter was operating slowly for my phone
    - Great job, more case studies (2)
    - Outside training
    - Maybe longer classes, including C6
    - Good as is/ but forms to take away would help
    - Summarize most common violations for each type of inspection
    - More time to talk
    - The group exercises, real life examples w/ photos were helpful
    - Maybe resources before the very end
    - Maybe a bit of insight into how EOA handles enforcement/inspections for cities whose inspections are through EOA
    - Maybe for very new stormwater inspectors how to conduct an inspection (2)
    - More unique, but plausible in any city discharge examples

9. **What topics would you recommend for a future training?**
    - Nothing
    - Not sure but it was very informative
    - None, everything was great
    - Basics for new people
    - Continue group meeting
    - I'm new so more background
    - More hands-on work /examples
    - Panel session again
    - Who really enforces
    - C.3 inspections for GI (2)
    - More case studies, some common and some unique (2)
    - Please have more training in-person like this. They are extremely helpful to inspectors and staff.
    - Could SMCWPP coordinate a QISP or other stormwater training for an individual from each jurisdiction?
    - More detail on firefighting water/foam discharges, information on unhoused encampment guidance, industry BMP reviews, and review secondary containment BMP enforcement

- I'd be more interested in enforcement that results in fines, or in C4 inspections where the property owner wouldn't fix the issue
- Case studies of good sites too so we can relate what we are inspecting per the MRP
- Be more in depth for the provision regarding unsheltered homeless population
- More participation from other municipalities
- Additional case studies, more group exercises
- BMPs for various industrial facilities
- Agricultural stormwater inspections
- Additional shared waste areas
- Sprinkler flush for required maintenance
- Fertilization of landscaping at commercial properties and fertilizers going into storm drains
- For illicit discharges, determining if reported actual discharges in waterways are actually a natural process that just looks like illicit discharge
- Specific industry (common) comment topics/problems

10. **General Comments?**
    - Great training! (3)
    - Great job
    - Well done!
    - Workshop flow excellent!
    - Good training (3)
    - Thanks for lunch
    - Thank you (2)
    - Thank you for all you do!
    - These workshops are very helpful, good refresher
    - Appreciate you hosting this training and allowing me to attend. Also appreciate learning of the different agencies involved
    - Please send the example Notice of Violation and other letters shared by Gustavo! We would like to use them to develop our own materials.
    - Great job. I'd love to do/view more trainings since I do stormwater inspections more rarely. Consider presenting at a CUPA conference on additional storm water elements or practices.

# Appendix 6

- Construction Site Inspection (C.6) Form

flowstobay
SAN MATEO COUNTYWIDE WATER POLLUTION PREVENTION PROGRAM
Clean Water. Healthy Community. It's a team effort!

# CONSTRUCTION SITE INSPECTION REPORT

Inspection Date: _____ Inspector: _____ Current Weather: _____

Inspection Type: ☐ Initial ☐ Routine ☐ Follow-up ☐ Other ☐ Final C.6 Inspection

Permit Type: ☐ Building Permit ☐ Grading Permit ☐ Site Development ☐ CIP Project Permit #: _____

Project Name: _____ Project Address: _____

Contact Name: _____ Phone: _____ Email: _____

Project Type: ☐ Residential ☐ Landscaping ☐ Institutional ☐ Commercial/Industrial ☐ Utility ☐ Grading ☐ Demolition ☐ Street Improvement ☐ Other:

☐ *Project disturbance ≥ 1 acre ☐ *High Priority Site (significant threat to water quality) ☐ *Hillside Project *If checked, inspect monthly during wet season.
☐ Project under statewide Construction General Permit ☐ NOI Required ☐ SWPPP on site SWPPP Dated:

| Sediment Control Measures | Status* |
|---|---|
| ☐ Stabilized Construction Entrance | --- |
| ☐ Street Sweeping | --- |
| ☐ Dust Control | --- |
| ☐ Straw Wattles / Fiber Rolls | --- |
| ☐ Compost Socks / Compost Berms | --- |
| ☐ Silt Fences | --- |
| ☐ Sedimentation Basin | --- |
| ☐ Check Dams | --- |
| ☐ Inlet Filters (Gravel Bags) | --- |
| ☐ Earth Dikes / Drainage Swales | --- |

☒=Present; *NM=Needs Maintenance; A=Adequate

| Erosion Control Measures | |
|---|---|
| ☐ Jute Netting / Fiber Blankets | --- |
| ☐ Mulch | --- |
| ☐ Hydroseed / Soil Binder / Compost Blanket | --- |
| ☐ Mark Areas to be Preserved | --- |
| ☐ Slope Interruption (Straw Wattles/Fiber rolls) | --- |
| ☐ Slope Interruption (Compost Socks/Berms) | --- |
| ☐ Riparian Area Barrier | --- |
| **Run-on and Runoff Control** | |
| ☐ Earth Dikes / Drainage Swales | --- |
| ☐ Sampling is conducted, if required | --- |
| ☐ Active Treatment System (if any) | --- |

| Good Site Management | |
|---|---|
| ☐ Soil Stockpiles (Tarps, Roofed) | --- |
| ☐ Waste Systems Management(Tarped/Contained) | --- |
| ☐ Construction / Demolition Material Sorting | --- |
| ☐ Hazardous Materials (paint, solvents...) | --- |
| ☐ Petroleum Products (oil, fuel...) | --- |
| ☐ Spill Prevention / Cleanup Materials | --- |
| ☐ Vehicle Servicing | --- |
| **Non-Stormwater Management** | |
| ☐ Concrete / Stucco washout area | --- |
| ☐ Architectural copper rinsewater | --- |
| ☐ Other: | --- |

**Inspection Comments:** ☐ Is there an actual illicit discharge or evidence of illicit discharge to storm drain/discharge point? _____

**Corrective Actions/Enforcement:** ☐ None ☐ Written Warning ☐ Notice of Violation ☐ Citation ☐ Stop Work Corrections required by: _____

Comments: _____

**Abatement/Resolution:** ☐ Problem Fixed ☐ Need More Time (rationale in comments) ☐ Escalate Enforcement Date Resolved by Inspector: _____

☐ Rain with runoff after problem was identified and before resolution? ☐ Items corrected during inspection (see comments)

Comments: _____

**Signature/Acknowledgment:**

Inspected By: _____ Phone: _____ Date: _____

Received By: _____ Signature: _____ Title: _____

☐ No responsible party present ☐ Left report copy at site **Failure to fix violation(s) within 10 business days (or by the stated deadline) may result in penalties.**

NOTES AND DEFINITIONS OF TERMS USED IN THE

CONSTRUCTION SITE INSPECTION REPORT

**NOTES:**

**PENALTIES** - Agency staff are required to verify correction of any stormwater violations within 10 business days or before the next rainfall with runoff. If a violation is not corrected within this time frame, enforcement will escalate per the Enforcement Response Plan. This may result in the jurisdiction taking one or all the following actions: 1) Issuance of a Stop Work Notice (such that inspections on all permits will be stopped until all violation(s) have been corrected); 2) Application of fines/re-inspection fees of $_____ per day; 3) and/or Referral of the violation(s) to the Regional Water Quality Control Board. Erosion control measures, or other best management practices, in addition to those shown on the plans may be required by agency staff to ensure effective stormwater management.

**Stormwater Inspection Requirement** - Agency staff are required to inspect the following categories of sites at least once per month during the rainy season: sites that disturb 1 acre of land or more, Hillside Projects and High Priority Sites (see definitions below).

**Construction General Permit Compliance** - Projects that disturb 1 acre or more of land are required to obtain coverage under the statewide Construction General Permit (see www.swrcb.ca.gov/water_issues/programs/stormwater/constpermits.shtml for information and to download the permit). To obtain coverage under the Construction General Permit, file a Notice of Intent using the SMARTS database, at https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.xhtml.

**Requirement to Verify Construction General Permit Coverage** - Agency staff must verify that projects disturbing one acre or more of land have obtained coverage under the statewide Construction General Permit.

**Where to Find Information on Construction BMPs** - Detailed information on construction best management practices (BMPs) is available at the California Stormwater Quality Association's online Construction BMP Portal, at www.casqa.org/resources/bmp-handbooks. A subscription fee is required to access the portal. For information on access to the portal, inspectors should contact their agency's representative to the Countywide Program's New Development Subcommittee.

**DEFINITIONS:**

**Active Treatment System** - Active Treatment Systems (ATS) reduce turbidity of construction site runoff by collecting runoff in a tank and introducing chemicals through direct dosing or an electrical current to enhance flocculation, coagulation, and settling of the suspended sediment. The increased flocculation aids in sedimentation and ability to remove fine suspended sediments, thus reducing stormwater runoff turbidity and improving water quality.

**High Priority Site** - A site that has a steep slope or is adjacent to a creek or other water body, or a site that the agency or the Regional Water Quality Control Board (Water Board) has determined to have significant threat to water quality based on site-specific evaluation of the following additional factors: soil erosion potential or soil type, project size and type, sensitivity of receiving water bodies, proximity to receiving water bodies, non-stormwater discharge, or any other relevant factors as determined by the local agency or Water Board.

**Illicit Discharge** - Any discharge to a municipal storm drain system that is prohibited under local, state, or federal law, including all non-stormwater discharges not composed entirely of stormwater and discharges prohibited under the Municipal Regional Stormwater Permit (MRP).

**Hillside Project** - As defined in the MRP, those projects on sites disturbing 5,000 square feet or more of land area and with slopes greater than or equal to 15% (or based on the Permittee's map of hillside development areas or criteria.)

# Appendix 7

- 7a. Public Information and Participation Subcommittee Bi-Annual Reports
- 7b. Rain Barrel Outreach Program Survey Report
    - Program Awareness
    - Repeat Participation and Rain Barrel Ownership
    - Resident Satisfaction with Program
    - Motivators for Rain Barrel Purchase
    - Rebate Application Process
    - Additional Feedback Provided
- 7c. SMCWPPP Blog and Analytics

# Appendix 7:

**Appendix 7a: PIP Subcommittee Bi-Annual Reports**

- **Read the Q1/2 PIP Update** on Google Drive
- **Read the Q3/4 PIP Update** on Google Drive

**Appendix 7b: Rain Barrel Outreach Program Survey Report**

The survey was sent to 130 program participants and received 26 responses.

## Program Awareness

As indicated in Figure 7B-1, the majority of respondents heard about the Flows To Bay Rain Barrel Program via one of three ways: a city or county agency (50%), having participated in the program in a prior year (23%), or a local organization (15%).

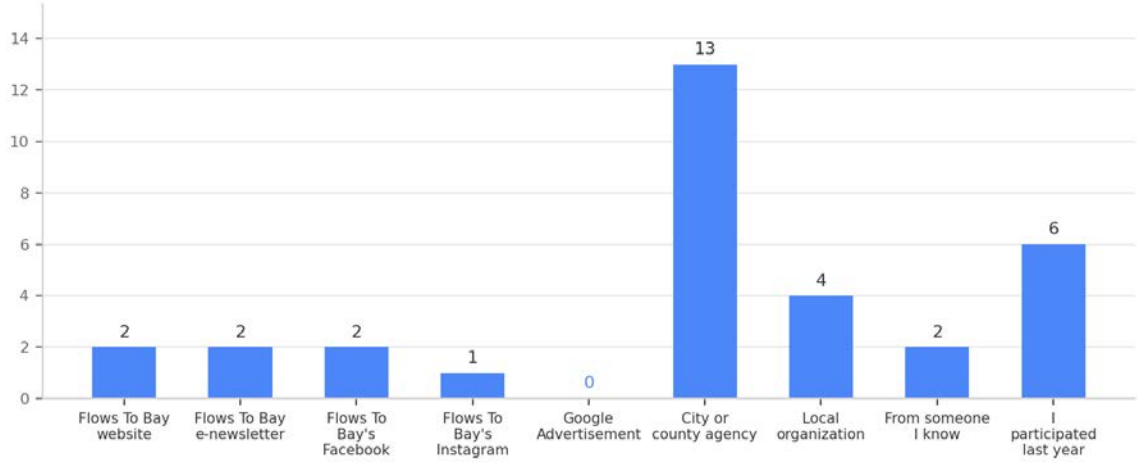



**Figure 7B-1. How did you hear about the Flows To Bay Rain Barrel Program?**

## Repeat Participation and Rain Barrel Ownership

73% of respondents reported that they had participated in the rain barrel program in a prior year. When asked how many rain barrels they now have, most of these repeat participants reported owning two or more (16 of 19 respondents), including six who now own four or more barrels (Figure 7B-2). This suggests that the program is retaining participants who continue to expand their rainwater harvesting capacity over multiple program years.

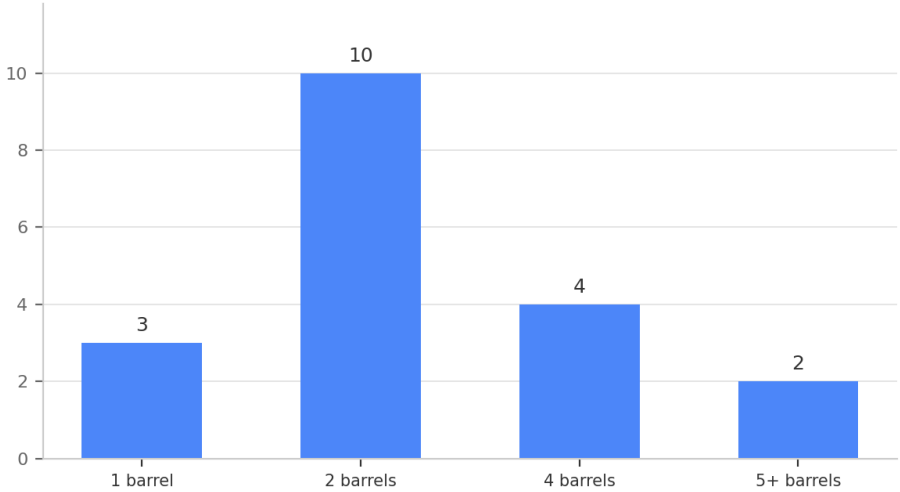


**Figure 7B-2. How many rain barrels do you now have? (Asked of respondents who participated in a prior year.)**

## Resident Satisfaction with Program

Respondents were very satisfied with this rain barrel program, with 88% indicating that they were "very satisfied" or "somewhat satisfied" and 12% of respondents indicating they were "somewhat unsatisfied" or "very unsatisfied" with the program.

For the three residents that responded with "somewhat unsatisfied" or "very unsatisfied," the following answers were provided:

- "The mash at the top is low quality and falls apart as soon as there is some debris coming from the gutter."
- "I never received my rebate."
- "The 30-day deadline to prove installation is too short. I purchased these for a project undergoing permit processing, so I didn't get around to installing until around 60 days. And by then it was too late to submit my proof."

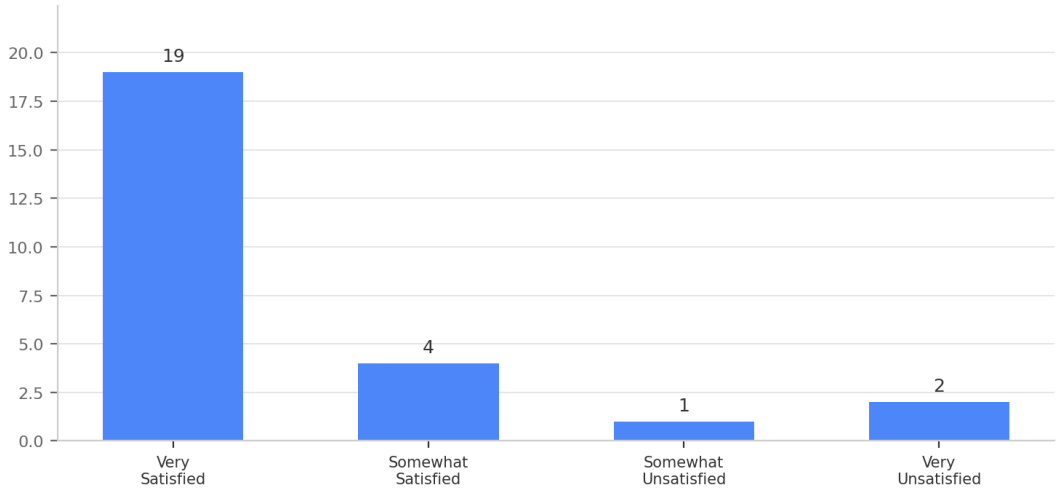



**Figure 7B-3. How satisfied were you with this rain barrel program?**

## Motivators for Rain Barrel Purchase

Indicated in Figure 7B-4, the strongest motivator for residents is water conservation, with 88% of respondents indicating "to conserve water" as one of the reasons they purchased a rain barrel. Additionally, 73% of respondents noted that they purchased a rain barrel since "rain water is good for my garden." Saving money ranked third in terms of motivators (58% of respondents), followed by reducing stormwater pollution (35%).

For the three residents that responded with "other," the following answers were provided:

- "In an emergency, the water can be purified for basic needs."
- "Required by my HMB Measure D certificate"

- "Helps keep water away from my foundation as overflow can be redirected further away"

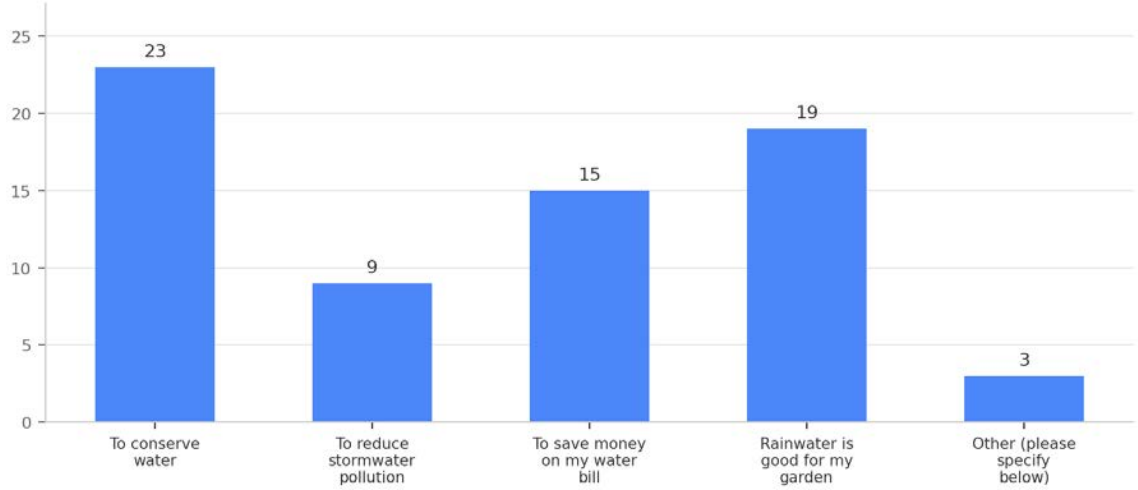



**Figure 7B-4. Why did you decide to purchase a rain barrel? (Select all that apply.)**

## Rebate Application Process

65% of respondents have already applied for a BAWSCA rain barrel rebate for their purchased barrels, 94% of which have already received their rebate and 6% of which are still awaiting their rebate. 15% of respondents plan to apply soon, and 19% will not be applying.

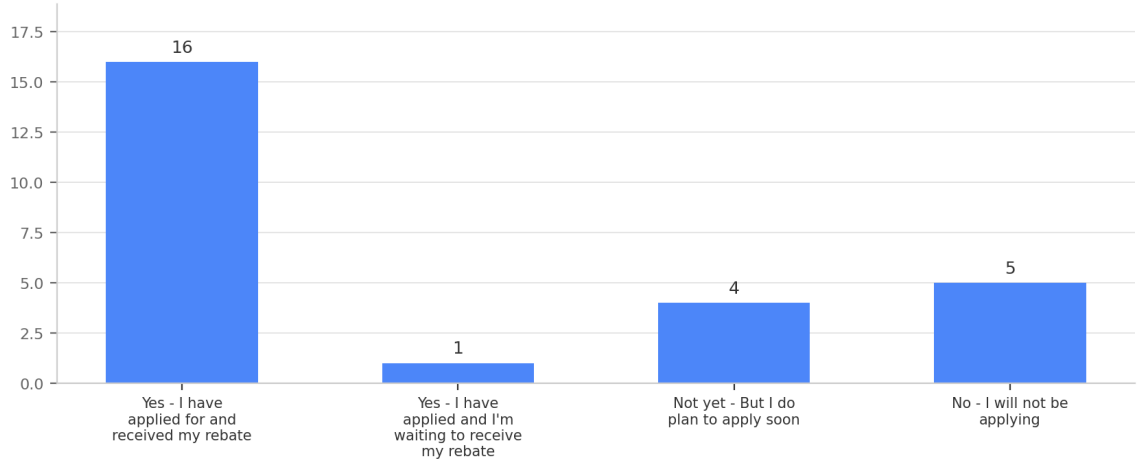



**Figure 7B-5. Have you applied for a BAWSCA rain barrel rebate for your purchased barrel(s)?**

Concerns with the BAWSCA rain barrel rebate application process are as follows:

- 1 resident reported submitting their rebate application many months ago, following all rules and instructions, and never receiving their rebate. They requested assistance resolving the issue.
- 2 residents reported issues with the application process that have since been resolved.

Barriers to applying for a rebate were provided as follows:

- 1 resident reported that the 30-day deadline to prove installation was too short for their situation, as their barrels were purchased for a project undergoing city permit processing and were not installed until around 60 days after purchase.
- 1 resident reported that they were not aware of the rebate and believed the only rebates available were from their local water district.
- 1 resident reported that they did not know anything about the rebate.
- 1 resident reported that their rain barrel is installed on a bench and may not meet the rebate requirements.
- 1 resident reported that they did not believe they were eligible, or had applied and forgotten about the result.

## Additional Feedback Provided

**Positive Feedback**

- **Program Appreciation:** 3 respondents expressed general appreciation for the program.
  - Ex: "I love my rain barrel and my city for programs like this. Thank you."
  - Ex: "Great program, keep it up, expand the program if possible, improve the rain barrel design if practical to do so."
  - Ex: "Thank you for offering this - I hope that it continues."
- **Rain Barrel Effectiveness:** 2 respondents described how well their rain barrels are working.
  - Ex: "love the rain barrels - I water my garden/yard for at least 2 months into the dry season."
  - Ex: "With the winter rains gone my rain barrel stays close to topped off with the local coastal fogs."
- **Pickup and Installation:** 1 respondent commented positively on the pickup and installation experience.
  - Ex: "The barrel pick up was effortless and the installation was easy. The rebate was worth it."
- **Instructional Resources:** 1 respondent highlighted the value of the program's instructional videos.
  - Ex: "The videos with detailed instructions were very helpful. Without them, I probably would have been too overwhelmed to purchase."

**Constructive Feedback**

- **Rebate Processing:** 2 respondents reported issues with receiving their rebate.
  - Ex: "It's a great program...when it works. But I haven't received my rebate after applying a very long time ago, so while I'm glad I have a rain barrel, and I'm using it for watering my garden, it cost me way more than I could afford because I never got my rebate."

    - Ex: "Didn't get the tax portion back on the rebate even though within the specified amount."
- **Rebate Scope:** 1 respondent requested that the rebate program cover more barrels per household.
    - Ex: "I would like to see the rebate program expanded to allow for more barrel purchases – either full or partial refund."
- **Product Design:** 2 respondents suggested improvements to the rain barrels themselves, including bottom connectors for linked barrels and offering wine-barrel conversion kits.
    - Ex: "...for ganging them, they have connectors at the top of the barrels but not at the bottom. This means the first barrel must fill up completely before the second barrel gets any water."
    - Ex: "I would appreciate you offering kits to convert wine barrels to rain barrels. They are better looking and wineries give them away at the end of their service life for a nominal cost."

**Appendix 7c: SMCWPPP Blog and Analytics**

| Blog Title | Page Views | Unique Users | Time on Page | Bounce Rate |
|---|---|---|---|---|
| From Flooded Street to Flowing Creek: San Bruno's Latest Green Infrastructure Win | 300 | 96 | 00:01:30 | 38.75% |
| Mobile Business Best Practices: How Power Washing and Exterior Cleaning Services Can Do Great Work and Protect Our Waterways | 39 | 16 | 00:00:36 | 44.44% |

# Appendix 9

- Paks Maintenance & IPM Work Group - Attendance List FY 2025/26
- Landscape Integrated Pest Management (IPM) Workshop, March 10, 2026
    - Workshop Agenda
    - Workshop Attendance
    - Workshop Evaluation Summary
- Pest Control Point of Purchase Outreach

San Mateo Countywide Water Pollution Prevention Program
Parks Maintenance IPM Work Group Attendance List - FY 2025/26

| REPRESENTATIVE | PERMITTEE | EMAIL | 11/20/2025 |
|---|---|---|---|
| Dolan Shoblo | Brisbane | dolanshoblo@brisbaneca.org | x |
| Richard Holtz | Burlingame | rholtz@burlingame.org | x |
| Ione Yuen | County of San Mateo | iyuen@smcgov.org | x |
| Michael Wong | County of San Mateo | mjwong@smcgov.org | x |
| Sultan Henson | County of San Mateo | shenson@smcgov.org | x |
| Thais Spiropoulos | County of San Mateo | tspiropoulos@smcgov.com | x |
| Zachary McDonough | County of San Mateo | zmcdonough@smcgov.org | x |
| Fernando Barron | Daly City | fbarron@dalycity.org | x |
| Jeff Templin | Daly City | jtemplin@dalycity.org | x |
| Nicholas Crescenzi | Daly City | ncrescenzi@dalycity.org | x |
| Sibely Calles | Daly City | scalles@dalycity.org | x |
| Amir Mahmoudi | East Palo Alto | amahmoudi@cityofepa.org | x |
| Anwar Mirza | East Palo Alto | amirza@cityofepa.org | x |
| Colleen Hunt | East Palo Alto | colleen@consultingstonecreek.co | x |
| Dan Gagliani | East Palo Alto | dgagliani@cityofepa.org | x |
| Fatima Khan | East Palo Alto | fkhan@cityofepa.org | x |
| Lenin Melgar | East Palo Alto | lmelgar@cityofepa.org | x |
| Gregory Shimizu | Foster City | gshimizu@fostercity.org | x |
| Ryan Barron | Foster City | rbarron@fostercity.org | x |
| Lucas Wilder | Redwood City | lwilder@redwoodcity.org | x |
| Ben Zarrabi | San Mateo (City) | bzarrabi@cityofsanmateo.org | x |
| Ella Phillips | San Mateo (City) | ephillips@cityofsanmateo.org | x |
| Gustavo Lopez | San Mateo (City) | glopez@cityofsanmateo.org | x |
| Reid Bogert | SMCWPPP | rbogert@smcgov.org | |
| Brian Brunelli | South San Francisco | brian.brunelli@ssfca.gov | x |
| Donald Louie | South San Francisco | donald.louie@ssfca.gov | x |
| Zachary Kust | South San Francisco | zachary.kust@ssfca.gov | x |
| Vishakha Atre | EOA/SMCWPPP | vatre@eoainc.com | x |

# 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**
**Tuesday, March 10, 2026**
**11:00 a.m. – 3:00 p.m.**

---

| | |
|---|---|
| **Registration and Lunch** | 11:00 am – 11:30 am |
| **Welcoming Remarks**<br>Dan Sternkopf, CCAG/*SMCWPPP* | 11:25 am – 11:30 am |
| **Pesticides Toxicity Control Requirements in the Municipal Stormwater Regional Permit**<br>Vishakha Atre*, EOA* | 11:30 am – 11:45 am |
| **Alternatives to Neonicotinoids**<br>Chris Romeo*, Romeo Packing* | 11:45 am – 12:30 pm |
| **Building Healthier, Pest-Resilient Soils with Compost**<br>Doug Millar, *San Mateo Resource Conservation District*<br>Jack Steinmann, *County of San Mateo Sustainability Department* | 12:30 pm – 1:00 pm |
| **Break** | 1:00 pm – 1:15 pm |
| **Rodent Control in Municipal Landscapes and Green Infrastructure Features (e.g., Bioretention Areas)**<br>Dr. Carolyn Whitesell**,** *UC Cooperative Extension* | 1:15 pm – 2:00 pm |
| **Regulatory Update, Common Violations**<br>Avneet Kakkar, *San Mateo County Agriculture/Weights and Measures* | 2:00 pm – 3:00 pm |
| **Adjourn** | 3:00 pm |

---

**SMCWPPP Landscape IPM Workshop**
**March 10, 2026**
**List of Attendees**

| | First Name | Last Name | Agency |
|---|---|---|---|
| 1 | Alain | Urruty | Belmont |
| 2 | Jeffrey | Coffey | Belmont |
| 3 | Matt | Ward | Belmont |
| 4 | Michael | Stevens-Nappi | Belmont |
| 5 | Sean | Brosnan | Belmont |
| 6 | Brian | Trinh | Brisbane |
| 7 | Randy | Thomas | Brisbane |
| 8 | Zach | Meagher | Brisbane |
| 9 | Antonio | Marquez | Burlingame |
| 10 | Carlie | Burow | Burlingame |
| 11 | Chris | Mejia | Burlingame |
| 12 | Cornelius | Brosnan | Burlingame |
| 13 | Mike | Terrell | Burlingame |
| 14 | Pedro | Barron | Burlingame |
| 15 | Richard | Holtz | Burlingame |
| 16 | Dan | Sternkopf | C/CAG |
| 17 | Carlos | Rojas | Daly City |
| 18 | Fernando | Barron | Daly City |
| 19 | Jeff | Templin | Daly City |
| 20 | Javier | Paredes | Daly City |
| 21 | Amir | Mahmoudi | East Palo Alto |
| 22 | Carlos | Valerio | Foster City |
| 23 | Eriverto | Plancarte | Foster City |
| 24 | Fakatoulava | Kioa | Foster City |
| 25 | Frank | Fanara | Foster City |
| 26 | Garrett | Gotthardt | Foster City |
| 27 | Gregory | Shimizu | Foster City |
| 28 | James | Echeverria | Foster City |
| 29 | Jorge | Mijangos | Foster City |
| 30 | Luis | Neri | Foster City |
| 31 | Manuel | Garcia | Foster City |
| 32 | Naz | Schroeder | Foster City |
| 33 | Raul | Salazar | Foster City |
| 34 | Ryan | Barron | Foster City |
| 35 | Salvador | Acevedo | Foster City |

**SMCWPPP Landscape IPM Workshop**
**March 10, 2026**
**List of Attendees**

| | First Name | Last Name | Agency |
|---|---|---|---|
| 36 | Wilber | Ventura | Foster City |
| 37 | Daniel | Weber | Foster City |
| 38 | Justin | Bixby | Portola Valley |
| 39 | Daniel | Martinez | Redwood City |
| 40 | Gabriel | Jimenez | Redwood City |
| 41 | Gelacio | Ramirez | Redwood City |
| 42 | Glenn | Fukudome | Redwood City |
| 43 | Leonardo | Moreno | Redwood City |
| 44 | Matthew | Davidson | Redwood City |
| 45 | Michael | Bauer | Redwood City |
| 46 | Victor | Contreras | Redwood City |
| 47 | Carlos | Munguia | Redwood City |
| 48 | Chris | Romeo | Romeo Landscaping |
| 49 | Aldo | Zuniga | San Mateo County |
| 50 | Avneet | Kakkar | San Mateo County |
| 51 | Donald | Louie | South San Francisco |
| 52 | Peter | Shea | South San Francisco |

**Summary of Workshop Evaluations**

# 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

**Tuesday, March 10, 2026**
**11:00 a.m. – 3:00 p.m.**

**Evaluations: 35**
**Attendance: 52**

**What Did You Think of the Following Presentations?**

1. **Regulatory Update - Pesticides Toxicity Control Requirements in the Municipal Stormwater Regional Perm**it - *Vishakha Atre, EOA*

   Very helpful **25** Somewhat helpful **10** Not helpful **0** Did not attend **0**

2. **Alternatives to Neonicotinoids** – *Chris Romeo, Romeo Packing*

   Very helpful **29** Somewhat helpful **5** Not helpful **1** Did not attend **0**

3. **Building Healthier, Pest-Resilient Soils with Compost -** *Doug Millar, San Mateo Resource Conservation District*

   Very helpful **31** Somewhat helpful **4** Not helpful **0** Did not attend **0**

4. **Rodent Control in Municipal Landscapes and Green Infrastructure Features**- *Dr. Carolyn Whitesell, UC Cooperative Extension*

   Very helpful **32** Somewhat helpful **3** Not helpful **0** Did not attend **0**

5. **Regulatory Update, Common Violations - *Avneet Kakkar,*** *San Mateo County Agriculture/Weights and Measures*

   Very helpful **30** Somewhat helpful **5** Not helpful **0** Did not attend **0**

**Did this workshop meet your expectations?** Yes **35** No **0**

**Suggestions for future workshop topics:**

- Bee pollinators.
- More interaction, asking questions during the presentations.
- Healthy School Act.
- IPM maintenance techniques for turf/sports fields.

- Replacements for restricted or future restricted pesticides and timelines. Known resistant weeds – how to kill the challenging ones.
- Weed ID, glyphosate resistance.

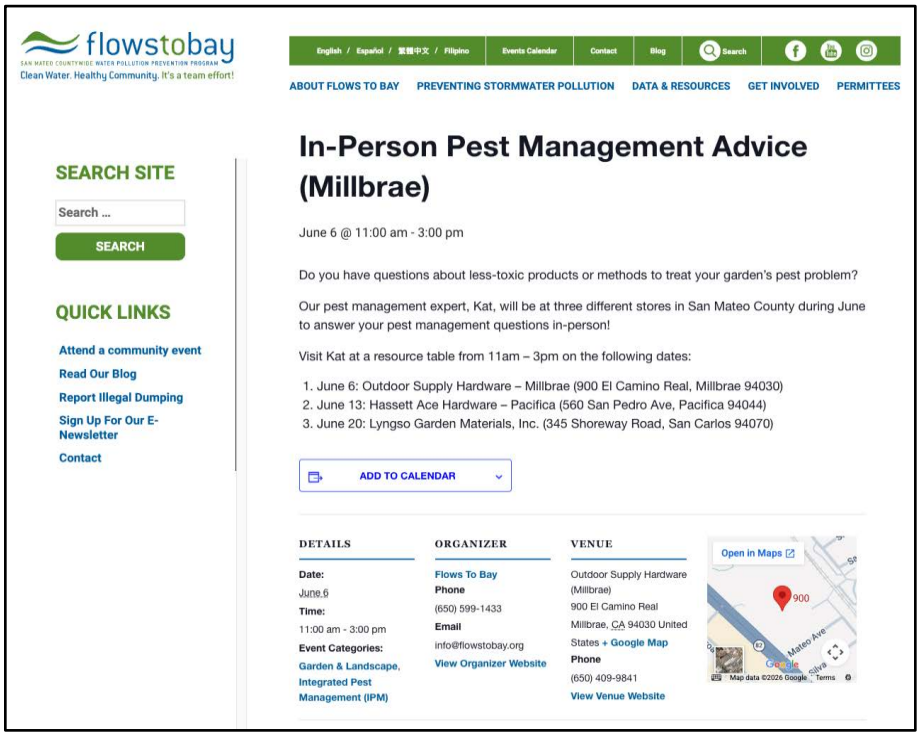
**General Comments**:

- Very informative, thank you!
- Always helpful to see common violations – quiz of what's missing!
- Keep up the good work.
- It was great to have this workshop in person again.
- Excellent! Good information!
- Thank you!
- Great venue!
- Very good work.
- Thank you! Lunch was delicious!
- Thank you for having this in person, great food!

# Appendix 9:

**Appendix 9A: Point of Purchase Outreach**

Figure 9A-1. Photos from C.9. public outreach tabling events.



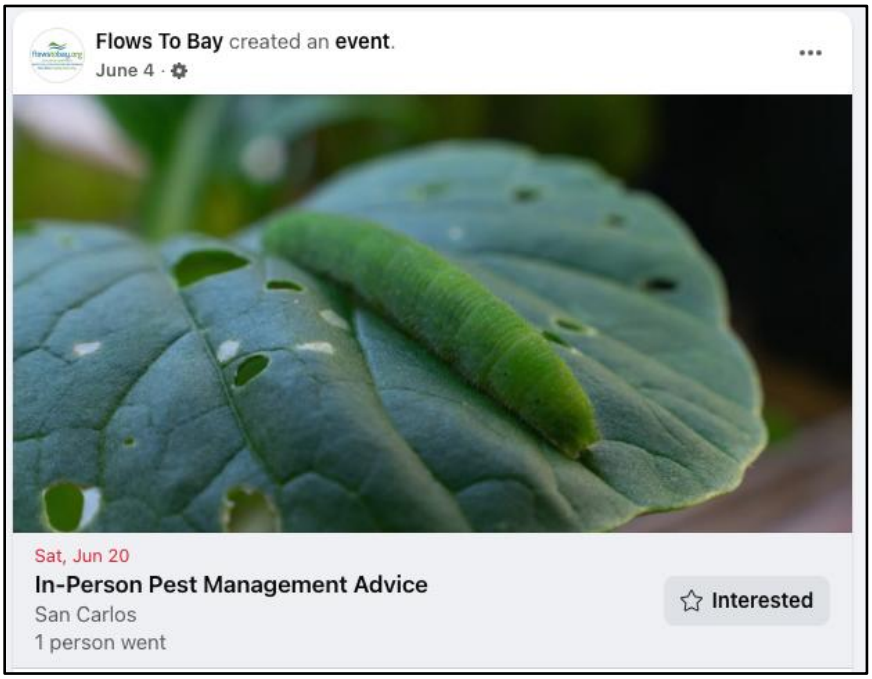




Figure 9A-2. Examples of items in SMCWPPP's campaigns to promote the C.9. public outreach tabling events.

LYNGSØ

Products | Services | Resources | Sustainability | FAQ / Updates | Contact Us | Product search ...

CLINIC

Our Water Our World

This event has ended

| STARTS | ENDS | LOCATION MAP |
|---|---|---|
| 06/20/2026 | 06/20/2026 | LYNGSØ Garden Materials, Inc. |
| 10:00 am | 1:00 pm | 345 Shoreway Road |
| | | San Carlos, CA 94070 |

Keep your children, pets, and garden healthy. Got garden question? Get answers!

Stop by Lyngso on Saturday, June 20th to meet the **Our Water Our World**'s represenative. Our Water Our World outreach table will be open from 10am -1pm for all your gardening and pest questions!
OWOW (**http://ourwaterourworld.org/**) & UCIPM (**https://ipm.ucanr.edu/PMG/menu.homegarden.html**) materials will be available for getting a head start on pest management. We look forward to seeing you!
Our Water Our World is an award-winning partnership between city- and county-based water pollution prevention agencies and garden centers and hardware stores that sell pest control products. OWOW focuses on less-toxic, eco-friendly products and techniques because many common pesticides are harmful to sensitive species and ecosystems when they reach local creeks, bays, and the ocean.

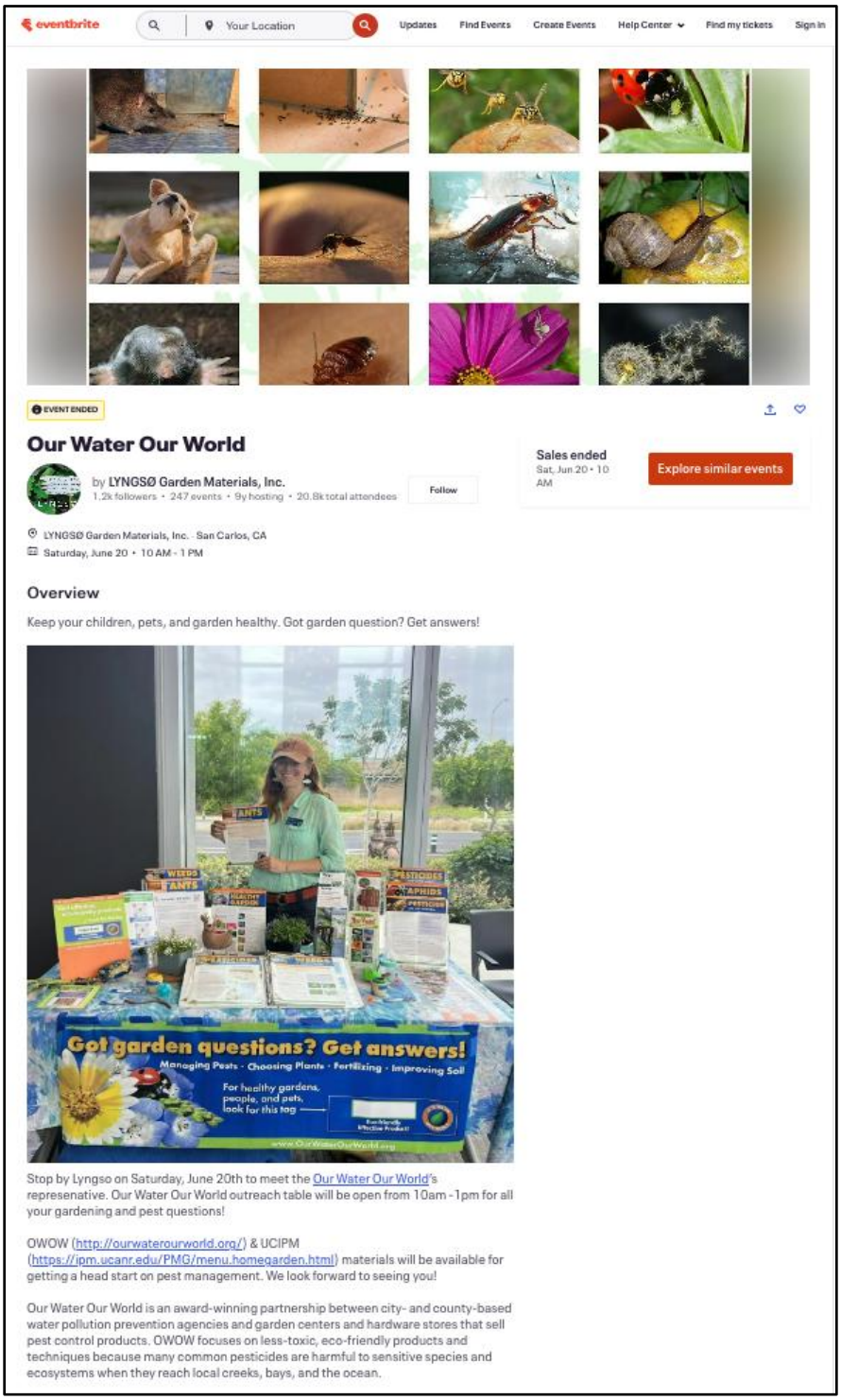



Figure 9A-3. Promotional actions conducted by Lyngso to promote the tabling event at its location.

Figure 9A-4. Photos from FY 2025/26 in-person store visits for POP outreach.

Figure 9A-5. Photo of store associates at Hassett Ace Hardware in Pacifica after their training on June 10.

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

**June 8, 2026**

Pest Control Professionals:

**Help Protect San Mateo County Waterways from Pesticides in Stormwater Runoff**

Pest control professionals in San Mateo County play a critical 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 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 can be mobilized during storm events after being applied.**

Water quality monitoring data in San Mateo County Show ongoing toxicity impacts in local creeks related to the application of structural pest control products, especially those including pyrethroids and fipronil, among others. Because of this, we encourage all pest control professionals who work in San Mateo County to adopt Integrated Pest Management (IPM) practices to help minimize the negative effects on water quality and aquatic life.

**Next Steps You Can Take:**

- Become a certified IPM pest control operator through EcoWise, GreenPro, or Green Shield certification process.
- If your business is already certified, please consider having individual employees certified as well.
- If your business is IPM certified, **please confirm** that you are listed on our "IPM Pest Control Operators" section at **flowstobay.org/pestpro.**

**Contact Us**
If you need more information or have any questions, please contact Reid Bogert at **(650) 863-2126** or email **rbogert@smcgov.org**. Find more information about IPM practices and IPM certification at **flowstobay.org/pestpro**.

Sincerely,

Reid Bogert
Stormwater Program Director
City/County Association of Governments, San Mateo County

Figure 9A-6. Letter mailed to pest control operators in English.

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

**8 de Junio de 2026**

Profesionales en Control de Plagas:

**Ayuden a Proteger los Cuerpos de Agua del Condado de San Mateo de los Pesticidas en el Escurrimiento de Aguas Pluviales**

Los profesionales en control de plagas en el condado de San Mateo desempeñan un papel crítico en mantener los pesticidas fuera de nuestros arroyos locales, la Bahía de San Francisco y el Océano Pacífico. La Asociación de Ciudades/Condado del Condado de San Mateo administra el Programa de Prevención de la Contaminación del Agua del Condado de San Mateo, que ayuda a los gobiernos locales a reducir la contaminación en el escurrimiento de aguas pluviales.

**Necesitamos su ayuda para proteger nuestros cuerpos de agua de los pesticidas que pueden ser movilizados durante eventos de tormenta después de su aplicación.**

Los datos de monitoreo de calidad del agua en el condado de San Mateo muestran impactos continuos de toxicidad en arroyos locales relacionados con la aplicación de productos de control de plagas estructurales, especialmente aquellos que incluyen piretroides y fipronil, entre otros. Por esta razón, alentamos a todos los profesionales en control de plagas que trabajan en el condado de San Mateo a adoptar prácticas de Manejo Integrado de Plagas (IPM) para ayudar a minimizar los efectos negativos en la calidad del agua y la vida acuática.

**Próximos Pasos que Puede Tomar:**

- Conviértase en un operador de control de plagas certificado en MIP a través del proceso de certificación de EcoWise, GreenPro o Green Shield.
- Si su empresa ya está certificada, considere también certificar a los empleados individualmente.
- Si su empresa está certificada en MIP, confirme que está incluida en nuestra sección de "Operadores de Control de Plagas en MIP" en flowstobay.org/pestpro.

**Contáctenos** Si necesita más información o tiene alguna pregunta, comuníquese con Reid Bogert al **(650) 863-2126** o por correo electrónico a **rbogert@smcgov.org**. Encuentre más información sobre las prácticas de MIP y la certificación en IPM en **flowstobay.org/pestpro**.

Atentamente,

Reid Bogert
Stormwater Program Director
City/County Association of Governments, San Mateo County

Figure 9A-7. Letter mailed to pest control operators in Spanish.

Table 9A-1. Department of Pesticide Regulation Active Pesticide Operator licenses and recipients of the FY 2025/26 pest control operator letter in English and Spanish.

| Business Name | Business Address |
|---|---|
| BENNETT MARINE UTILITY, LLC | 1027 CALIFORNIA DR, BURLINGAME, CA 94010 |
| BRIGHTVIEW LANDSCAPE SERVICES, INC | 1564 ROLLINS RD, BURLINGAME, CA 94010 |
| BRIGHTVIEW LANDSCAPE SERVICES, INC | 855 MAHLER RD, BURLINGAME, CA 94010 |
| BRUSH HOG TREE CARE INC | 799 MAIN ST STE P, HALF MOON BAY 94019 |
| BURNETT LANDSCAPE DEVELOPMENT, INC. | 3645 HAVEN AVE, MENLO PARK, CA 94025 |
| CAGWIN & DORWARD | 1204 LINDA MAR BLVD, PACIFICA, CA 94044 |
| CLARK PEST CONTROL OF STOCKTON, INC | 485 O'NEILL AVE, BELMONT, CA 94002 |
| COURSECO, INC. | 6650 GOLF COURSE DR, BURLINGAME, CA 94010 |
| CURTIS EDWARD DENNISON LANDSCAPE INC. | 1635 MISSION RD, SOUTH SAN FRANCISCO, CA 94080 |
| DOLEZAL, LEON F. | 1590 CORDILLERAS RD, REDWOOD CITY, CA 94062 |
| EWING IRRIGATION PRODUCTS, INC. | 926 BRANSTEN RD, SAN CARLOS, CA 94070 |
| FOX LANDSCAPE & IRRIGATION, INC. | 201 HAZEL AVE, REDWOOD CITY, CA 94061 |
| GACHINA LANDSCAPE MANAGEMENT INC. | 404 TALBERT ST, DALY CITY 94014 |
| GACHINA LANDSCAPE MANAGEMENT INC. | 1130 O'BRIEN DR, MENLO PARK, CA 94025 |
| GARRATT-CALLAHAN COMPANY | 50 INGOLD RD, BURLINGAME, CA 94010 |
| GARRATT-CALLAHAN CO. | 50 INGOLD RD, BURLINGAME, CA 94010 |
| GO NATIVE, INC | 331 10TH ST, MONTARA, CA 94037 |
| GOTHIC LANDSCAPE MAINTENANCE DIVISION | 160 DEMETER ST EAST PALO ALTO, CA 94303 |
| HORIZON DISTRIBUTORS INC | 4060 CAMPBELL AVE MENLO PARK, CA 94025 |
| J COZZOLINO LANDSCAPE SERVICES | 11853 SAN MATEO RD HALF MOON BAY, CA 94019 |
| KEN FUSON PEST MANAGEMENT SERVICE | 111 ELM ST, MENLO PARK, CA 94025 |
| LANDCARE USA LLC | 1914 SPRING ST, REDWOOD CITY, CA 94063 |
| LMV LANDSCAPING, INC | 616 ADAMS ST, REDWOOD CITY, CA 94061 |
| LORAL LANDSCAPING | 704 SOUTH AMPHLETT BLVD, SAN MATEO, CA 94402 |
| MAYNE TREE EXPERT CO., INC. | 535 BRAGATO RD STE A, SAN CARLOS, CA 94070 |
| NED PATCHETT CONSULTING, INC | 971 TERMINAL WAY, SAN CARLOS, CA 94070 |
| ORKIN PEST CONTROL | 819 COWAN RD SUITE E, BURLINGAME, CA 94010 |
| POST AND TRELLIS INC | 2645 FAIR OAKS AVE, REDWOOD CITY, CA 94063 |
| ROMEO PACKING CO. | 106 PRINCETON AVE, HALF MOON BAY, CA 94019 |

| Business Name | Business Address |
|---|---|
| SAVATREE, LLC | 1993 E BAYSHORE RD, REDWOOD CITY 94063 |
| SCAPES, INC. LANDSCAPE COMPANY | 12344 SAN MATEO RD, HALF MOON BAY, CA 94019 |
| SEGALE AND CERINI, INC. | 2551 HILLSIDE BLVD, COLMA, CA 94014 |
| SITEONE LANDSCAPE SUPPLY, LLC | 815 AMERICAN ST, SAN CARLOS, CA 94070 |
| STOCHL LANDSCAPE SERVICES INC | 110 GLENN WAY #15, SAN CARLOS, CA 94070 |
| TERRA FERMA FINE GARDENING, INC. | 139 MITCHELL AVE #220, SOUTH SAN FRANCISCO, CA 94080 |
| THE DAVEY TREE EXPERT COMPANY | 2496 BAY RD, REDWOOD CITY, CA 94063 |
| THE DAVEY TREE EXPERT COMPANY | 1400 MISSION RD, COLMA, CA 94010 |
| THE F A BARTLETT TREE EXPERT | 1 ARASTRADERO RD, PORTOLA VALLEY, CA 94028 |
| URBAN TREE MANAGEMENT, LLC | 597 QUARRY RD, SAN CARLOS, CA 94070 |

# Appendix 10

- Trash Subcommittee - Attendance List FY 2025/26

## Trash Subcommittee Meeting Attendance – FY 2025/26

| Name | Agency | Phone | E-Mail | 10/21/25 | 03/05/26 |
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| Zaheed Danish | City of Foster City | | zdanish@fostercity.org | | |
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| Brian Henry | City of Menlo Park | (650) 330-6799 | bphenry@menlopark.org | | |
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| Craig Centis | City of Millbrae | | ccentis@ci.millbrae.ca.us | | |
| Ahmad Haya | City of Millbrae | | ahaya@ci.millbrae.ca.us | | X |
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| Gustavo Lopez | City of San Mateo | (650) 522-7342 | glopez@cityofsanmateo.org | X | X |

## Trash Subcommittee Meeting Attendance – FY 2025/26

| Name | Agency | Phone | E-Mail | 10/21/25 | 03/05/26 |
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| Andrew Wemmer | City of So. San Francisco | (650) 829-3883 | andrew.wemmer@ssf.net | X | X |
| Gianna LaRocca | City of So. San Francisco | | gianna.larocca@ssf.net | | |
| Kim Hopkins | City of So. San Francisco | | kimberly.hopkins@ssf.net | | |
| Lawerence Henriquez | City of So. San Francisco | (650) 829-6652 | lawrence.henriquez@ssf.net | | X |
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| Sultan Henson | County of San Mateo | (910) 206-2457 | shenson@smcgov.org | X | X |
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| John Fusco | EOA, Inc. | (510) 832-2852 X130 | jrfusco@eoainc.com | X | X |
| Renee Crawford | EOA, Inc. | (510) 832-2852 | rcrawford@eoainc.com | X | X |
| Alexandra Rinear | Recology | | ARinear@recology.com | | X |
| Robin Lee | Schaaf & Wheeler | | rlee@swsv.com | X | X |
| Teresa Montgomery | SSF Scavenger Company | | teresa@ssfscavenger.com | X | |
| **No. Attending** | | | | **30** | **38** |

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- 11/12a. Mercury and PCBs Control Measures Report (Version 4.0), September 2026
- 11/12b. Source Control Load Reduction Accounting (SCLRA) for Reasonable Assurance Analysis (RAA) Report, September 2026
- 11/12c. Regional Effectiveness Evaluation of the Protocols for Managing PCBs-containing Materials During Building Demolition report, September 2026

# SOURCE CONTROL LOAD REDUCTION ACCOUNTING

## FOR REASONABLE ASSURANCE ANALYSIS

*Prepared for*

**Bay Area Municipal Stormwater Collaborative**

*Prepared by*

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3214 College Avenue
Berkeley, CA 94704

August 2026

*Version 1*

B A M S C
Bay Area Municipal Stormwater Collaborative

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ACCWP | Alameda Countywide Clean Water Program |
| BAMSC | Bay Area Municipal Stormwater Collaborative |
| BASMAA | Bay Area Stormwater Management Agencies Association |
| CCCWP | Contra Costa Clean Water Program |
| GSI | Green Stormwater Infrastructure |
| GIS | Geographic Information System |
| IMR | Integrated Monitoring Report |
| mg/ac/yr | milligram per acre per year |
| mg/kg | milligram per kilogram |
| MPC | Monitoring and Pollutants of Concern Subcommittee |
| MRP | Municipal Regional Permit |
| MS4 | Municipal Separate Storm Sewer System |
| NPDES | National Pollutant Discharge Elimination System |
| O&M | Operation and Maintenance |
| OFEE | Oil-Filled Electrical Equipment |
| PCBs | Polychlorinated Biphenyls |
| PG&E | Pacific Gas and Electric Company |
| POC | Pollutants of Concern |
| POTW | Publicly Owned Treatment Works |
| RAA | Reasonable Assurance Analysis |
| ROW | Right-of-Way |
| SCVURPPP | Santa Clara Valley Urban Runoff Pollution Prevention Program |
| SFEI | San Francisco Estuary Institute |
| SFBRWQCB | San Francisco Bay Regional Water Quality Control Board |
| SMCWPPP | San Mateo Countywide Water Pollution Prevention Program |
| SSA | Solano Stormwater Alliance |
| TMDL | Total Maximum Daily Load |
| WY | Water Year |

# 1. INTRODUCTION

## 1.1 Background

In 2016, Municipal Regional Permit (MRP; SFBRWQCB, 2015[1]) Provisions C.11.b and C.12.b required the Permittees to develop and implement an assessment methodology and data collection program to quantify mercury and polychlorinated biphenyls (PCBs) loads reduced through implementation of pollution prevention, source control, and treatment control measures. The Bay Area Stormwater Management Agencies Association (BASMAA) prepared the report *Interim Accounting Methodology for TMDL Loads Reduced* (BASMAA, 2017a), which was approved by the San Francisco Bay Regional Water Quality Control Board (Water Board) for use during the MRP permit term from January 1, 2016, through June 30, 2022 (known as "MRP 2.0"). The Permittees used this assessment methodology to demonstrate progress towards achieving the load reductions required in MRP 2.0. In 2021 and 2022, BASMAA revised the Interim Accounting Methodology to address the requirements of MRP 2.0 Provisions C.11.b.iii.(3) and C.12.b.iii.(3), which required the Permittees to submit, for Executive Officer approval, refinements to the Interim Accounting Methodology to assess mercury and PCBs load reductions in the next permit term (i.e., MRP 3.0). The *Source Control Load Reduction Accounting for Reasonable Assurance Analysis* report was approved by the Water Board in January 2022.

MRP 2.0 Provisions C.11.d and C.12.d required the Permittees to prepare plans and schedules for mercury and PCBs control measure implementation and a reasonable assurance analysis (RAA) demonstrating that those control measures will be sufficient to attain the mercury total maximum daily load (TMDL) wasteload allocations by 2028 and the PCBs TMDL wasteload allocations by 2030. MRP 3.0 Provisions C.11.f and C.12.h require the Permittees to revise the TMDL Control Measure Plan and RAA reports submitted in 2020. The *Source Control Load Reduction Accounting for Reasonable Assurance Analysis* report was used by the Permittees for source control load reduction accounting in the 2020 and 2026 RAAs and for load reduction accounting during MRP 3.0, which is due to the Water Board in the September 2026 Annual Report.

This report refines the *Source Control Load Reduction Accounting for Reasonable Assurance Analysis* report for the purposes of source control load reduction accounting during the next permit term (i.e., MRP 4.0) in compliance with MRP Provisions C.11.a.iii.(3) and C.12.a.iii.3. The Bay Area Municipal Stormwater Collaborative (BAMSC)[2] developed this report on behalf of all MRP Permittees.

This document does not describe the methods used to predict the loads reduced through the implementation of green stormwater infrastructure (GSI) in the RAAs. The RAA methodologies

[1] Reissued November 19, 2015 with effective date January 1, 2016, to 77 Phase I municipal stormwater Permittees in five Bay Area counties which are among over 90 local agencies comprising the Bay Area Stormwater Management Agencies Association (BASMAA).

[2] The Bay Area Municipal Stormwater Collaborative was organized by the Bay Area Stormwater Management Agency Association (BASMAA) Board of Directors to continue the information sharing and permittee advocacy functions of BASMAA in an informal manner after BASMAA's dissolution.

for GSI are described in the countywide RAA reports that were submitted to the Water Board in September 2020 (ACCWP, 2020; CCCWP, 2020; FSURMP, 2020; SMCWPPP, 2020; and SCVRURPPP, 2020) and the revised RAA reports that were submitted in March 2026 (ACCWP, 2026a; CCCWP, 2026; SSA, 2026; SMCWPPP, 2026; and SCVURPPP, 2026).

## 1.2 Report Overview

The load reduction accounting methodologies are presented in Sections 2 through 7 of this document for the following mercury and PCBs source control measure programs:

- Source Property Identification and Abatement
- Control Measures in Old Industrial Areas, including
  - Moderate Property Controls
  - Operations and Maintenance Control Measures
  - Parcel-Based Redevelopment
  - Treatment control measures
- Management of PCBs in Stormwater Infrastructure
- Management of PCBs in Electrical Utilities
- Management of PCBs-Containing Materials and Wastes During Building Demolition
- Mercury Load Avoidance and Reduction.

The appendices present:

- A summary of how the land use-based PCBs and mercury yields were developed
- A statistical summary of the observed urban sediment concentrations for PCBs and mercury
- A summary of the investigation status of old industrial land areas for each county
- Large, non-inlet-based full trash capture device efficiency factor data analysis
- Enhanced inlet cleaning efficiency factor data analysis for storm drain inlets with and without inlet-based full trash capture devices
- Enhanced street sweeping efficiency factors
- An estimate of load reductions for the Management of PCBs in Stormwater Infrastructure Program

## 1.3 Source Control Load Reduction Accounting Basis

The source control load reduction accounting methodology outlined in this report is based on relative yields of mercury and PCBs from different land use categories. This methodology was first outlined in the 2014 Integrated Monitoring Reports (IMRs) (ACCWP, 2014; CCCWP, 2014; SCVURPPP, 2014; SMCWPPP, 2014) and was described in the MRP 2.0 Fact Sheet. The

method involves using default factors for PCBs and mercury load reduction credits resulting from foreseeable control measures. The *Source Control Load Reduction Accounting for Reasonable Assurance Analysis* (BASMAA, 2022) report updated and refined the accounting system to account for new information; justified the assumptions, analytical methods, sampling schemes, and parameters used to quantify the load reduction for each type of control measure; and indicated what information will be collected and submitted to confirm the calculated load reduction for each unit of activity for each control measure.

As described in the MRP 2.0 Fact Sheet, a land use-based yield is an estimate of the mass of a contaminant contributed by an area of a particular land use per unit time. Essentially, different land uses yield different amounts of pollutants because they differ in the degree of contamination resulting from varying intensities of historic or ongoing pollutant use. The land use categories used to calculate land use-based yields were identified from studies conducted to identify potential sources and source areas of concern (POC), as described below.

The Regional Watershed Spreadsheet Model (RWSM) was developed as part of the Regional Monitoring Program's Small Tributaries Loading Strategy as a regional-scale planning tool primarily for the purpose of estimating long-term average annual pollutant loads from the small tributaries surrounding San Francisco Bay, and secondarily to provide supporting information for prioritizing watersheds or areas within watersheds for management actions (Wu et al., 2016). The RWSM is structured around three stand-alone empirical models: the hydrology model, the sediment model, and the pollutant models. The hydrology model uses runoff coefficients based on land use-soil-slope combinations to estimate annual runoff from a watershed. The sediment model uses a function of geology, slope, and land use to simulate suspended-sediment transport in the landscape while accounting for watershed storage factors. The pollutant model is essentially a "concentration map" that can be driven by either the hydrology model (for pollutant concentrations in water) or the sediment model (for pollutant concentrations on fine sediment particles as particle ratios[3] for specific land use or source areas. Starting in 2010, a multi-year effort was undertaken to systematically develop and calibrate the RWSM. Calibration was completed[4] and the model was released in 2018.

The Regional Monitoring Program is developing a Watershed Dynamic Model (WDM) to estimate regional- and sub-regional-scale loads for the Bay Area. To date, the WDM has been used to simulate hydrology and suspended sediment transport over a 26-year period (Water Years 1994-2023) and is currently being extended to model PCBs and mercury loads. The WDM will incorporate land use-based yields (i.e., potency factors) for PCBs and mercury, but these values are not yet available.

Mercury and PCBs source property yields were derived as the product of a representative mercury or PCBs concentration in shallow surface soils at known source properties and a

[3] Particle ratios = pollutant concentration in water (ng/L) / suspended sediment concentration (mg/L), equivalent to mg/kg.
[4] The calibration for PCBs is "reasonable" but there remains a lower confidence in the calibration for mercury (SFEI, 2017).

representative soil/sediment yield for Old Industrial land use areas. The derivation of the estimated yields for the mercury and PCBs source properties is described in Appendix A.

PCBs were more heavily used in older industrial areas, so older industrial land use areas yield a much higher mass of PCBs per unit area than newer urban land use areas. The estimated average yields of PCBs and mercury from the RWSM are summarized for six land-use yield categories in Table 1-1.[5] These yields are assigned based on land use but may also be assigned by the Permittees based on monitoring data and/or inspection results (e.g., to assign the Source Property yield to a parcel mapped as Old Industrial). These yield values have been developed using the best available data and the best available technical approach at this time. The Permittees may re-evaluate these yields in the future as more information becomes available (i.e., to incorporate the WDM potency factors).

**Table 1-1: Land Use-Based Yields for PCBs and Mercury**

| Land Use Category | Assumed Average PCBs Yield (mg/ac/yr) | Assumed Average Mercury Yield[1] (mg/ac/yr) |
|---|---|---|
| Source Property | 3,677 | 652 |
| Old Industrial | 259 | 53 |
| Old Commercial / Old Transportation | 49 | 57 |
| Old Residential | 2.8 | 57 |
| New Urban | 0.4 | 4 |
| Agriculture/Open Space | 0.4 | 81 |

mg/ac/yr – milligrams per acre per year
Source: RWSM Toolbox v1.0 Pollutant Model, Pollutant Spreadsheet Model Calculations – Region. Spreadsheet dated 6/9/2017.
1. The model calibration for PCBs is "reasonable," but there remains a lower confidence in the calibration for mercury (Wu et al., 2017).

Appendix B presents concentration statistics for PCBs and mercury observed in street and storm drain sediment collected by the BAMSC agencies or the Regional Monitoring Program from 1999 through 2025. The data are summarized by the predominant land use[6] within the vicinity of where the sediment was collected.

[5] Land use category definitions (see Appendix A for details): Old Industrial was industrial land use before 1968, Old Commercial/Old Transportation were commercial or transportation land uses as of 1974, Old Residential was residential land use as of 1974, New Urban are all urban land uses developed after 1974, Agricultural/Open Space land uses include all agricultural or open space land use classifications.
[6] Arterials and highways are included in the Old Transportation land use category, while smaller roadways are included with the adjacent land use category.

# 2. PROGRAM FOR SOURCE AREA IDENTIFICATION AND ABATEMENT

## 2.1 Program Description

The Source Area Identification and Abatement Program involves investigations of properties (i.e., parcels) located in historically industrial land use or other land use areas where PCBs (or mercury) were used, released, and/or disposed of, and/or where sediment concentrations are significantly elevated above urban background levels[7] and are being transported to the municipal separate storm sewer system (MS4). Once a source property is identified, the source of PCBs (or mercury) on the property may be abated or caused to be abated directly by the Permittee, or the Permittee may choose to refer the source property to the Water Board for investigation and abatement.

## 2.2 Loads Reduced Accounting Methodology

The amount of PCBs or mercury loads (i.e., annual mass or milligrams per year (mg/yr)) reduced will be assessed for source properties using the following accounting method:

$$\boldsymbol{Load\ Reduced = SP_A \bullet (SP_Y - OCOT_Y)}$$

Where:

| | | |
|---|---|---|
| $SP_A$ | = | Source property area (acres (ac)) |
| $SP_Y$ | = | Source property mercury or PCBs yield (mg/ac/yr) |
| $OCOT_Y$ | = | Old Commercial/Old Transportation land use mercury or PCBs yield (mg/ac/yr) |

Thus, the PCBs load reduced in mg/yr will be calculated as the area of the source property in acres multiplied by 3,628 mg/ac/yr (i.e., 3,677 – 49 mg/ac/yr). The mercury load reduced in mg/yr will be calculated as the area of the source property in acres multiplied by 603 mg/ac/yr (i.e., 652 – 49 mg/ac/yr).

Fifty percent of this load reduction will be credited to the Permittee for properties that are referred to the Water Board for abatement at the time of referral. This credit is contingent on implementation of enhanced operation and maintenance (O&M) measures or stormwater treatment in the vicinity of the referred source property to remove historically deposited contaminated sediment from storm drain structures and to prevent further contaminated sediment from being discharged to the storm drain system. Enhanced O&M measures will continue until the source property has been abated or for 10 years, whichever occurs first. The remaining fifty percent load reduction for referred properties will be credited to the Permittee upon completion of the abatement process or at ten years, whichever occurs first. The Water Board will notify the Permittee when the abatement process is complete.

[7] See Appendix B for a statistical summary of urban sediment concentrations.

If a source property has been abated without referral to the Water Board, either through voluntary actions by the property owner or the use of municipal enforcement powers, then all of the load reduction calculated using the methodology above will be credited to the Permittee at the time that the abatement is complete. The Permittee shall provide documentation to the Water Board demonstrating that abatement has effectively eliminated the transport of PCBs or mercury to the MS4 or directly to the Bay for all transport mechanisms applicable to the site (e.g., stormwater runoff, wind, vehicle tracking). The documentation shall include information on the type and extent of abatement that has occurred (e.g., whether sources of PCBs to the MS4 have been eliminated through soil removal, capping, paving, walls, plugging/removal of internal storm drains, etc.). Documentation may be from a cleanup regulatory agency such as the US Environmental Protection Agency (USEPA) or the California Department of Toxic Substances Control (DTSC). For sites with ongoing industrial activities, water or sediment monitoring data demonstrating the effective elimination of PCB transport offsite into the MS4 or to the Bay should be provided.

For source properties that include a combination of industrial area and area that is not likely to be a source of PCBs (e.g., unimpacted open space area), the source property yield will only be applied to the portion of the property that is industrial area.

# 3. PROGRAM FOR CONTROL MEASURES IN OLD INDUSTRIAL AREAS

## 3.1 Program Description

This program includes a variety of control measures that may be implemented to reduce loads of PCBs and mercury within old industrial areas, known or suspected source areas, or areas with evidence of moderate to high PCBs or mercury soil concentrations pursuant to MRP Provisions C.11.c and C.12.c. These control measures, which may be implemented on parcels or within the right-of-way (ROW), include:

- Moderate property controls
- Operations and maintenance
- Implementation of GSI through new development and redevelopment activities
- Retrofit of treatment controls (including GSI and non-GSI treatment) into existing developed areas on private and public parcels and within the public ROW
- Full trash capture systems
- Diversion to publicly owned treatment works (POTW)

Appendix C provides a summary of old industrial land use area in each county.

## 3.2 Loads Reduced Accounting Methodology

The following load reduction accounting methodologies will be used to calculate the PCBs and mercury loads reduced by control measures implemented in old industrial or moderately contaminated areas.

### 3.2.1 Moderate Property Controls

Properties with elevated levels of PCBs or mercury that are not source properties (i.e., old industrial properties or properties with evidence of moderate PCBs soil concentrations, generally soil/sediment concentrations greater than 0.2 mg/kg and less than 1 mg/kg for PCBs or greater than 0.3 mg/kg and less than 1.0 mg/kg for mercury) will be abated through voluntary actions by the property owner or the use of municipal enforcement powers. To prevent the release of on-site PCBs and mercury into the MS4, the local Permittee will require property owners to develop and implement a site-specific Pollution Control Plan for their property. The Pollution Control Plan should prevent the transport of PCBs or mercury to the MS4 or directly to receiving waters.

The amount of PCBs loads reduced will be calculated for moderate property controls using the following accounting method:

$$\boldsymbol{Load\ Reduced = P_A \bullet (OI_Y - NU_Y)}$$

Where:

$P_A$ = Property area (acres (ac))

| | | |
|---|---|---|
| $OI_Y$ | = | Old Industrial land use mercury or PCBs yield (mg/ac/yr) |
| $NU_Y$ | = | New Urban land use mercury or PCBs yield (mg/ac/yr) |

Thus, the PCBs load reduced in mg/yr will be calculated as the area of the controlled property in acres multiplied by 258.6 mg/ac/yr (i.e., 259 – 0.4 mg/ac/yr). The mercury load reduced in mg/yr will be calculated as the area of the controlled property in acres multiplied by 49 mg/ac/yr (i.e., 53 – 4 mg/ac/yr).

### 3.2.2 Operations and Maintenance Activities

Routine MS4 O&M activities include street sweeping, drain inlet cleaning, and pump station maintenance. In addition, culverts and channels are also routinely desilted. Enhancements to routine operations and new targeted actions, such as storm drain line and street flush and capture, may improve the Permittees' ability to reduce PCBs and mercury in stormwater.

Storm drain line flush and capture is a maintenance process used to remove accumulated sediment, debris, and pollutants from storm sewer pipes to prevent clogging and flooding. The process typically involves blocking the downstream end of a pipe, using high-pressure water to scour the pipe's interior, and then capturing the wash water (along with associated sediment and debris) for proper disposal. These actions use specialized equipment such as hydro-jetters and Vactor trucks. Street flush and capture similarly uses high-pressure water to scour sediment from streets surfaces and specialized equipment to capture the wash water and associated sediment. Sediment that is removed during these activities must be captured and properly disposed of to achieve pollutant load reductions.

***Inlet Cleaning (With and Without Inlet-Based Full Trash Capture Devices) and Street Sweeping***

Load reductions for inlet cleaning and street sweeping will be calculated as follows:

$$\boldsymbol{Annual\ Load\ Reduced = P_A \bullet P_Y \bullet EE_f}$$

Where:

| | | |
|---|---|---|
| $P_A$ | = | Catchment area for O&M measure (acres) |
| $P_Y$ | = | Area-weighted mercury or PCBs yield (mg/acre-year) for the O&M catchment area based on land use yield |
| $EE_f$ | = | Enhancement Efficiency factor for O&M control measure (See Appendix D for inlet cleaning with and without inlet-based full trash capture devices and Appendix E for street sweeping). |

***Pump Station Cleanout, Storm Drain Line Flush and Capture, Street Flush and Capture, and Culvert/Channel Desilting***

Load reductions for pump station cleanout, storm drain line flush and capture, street flush and capture, and culvert/channel desilting will be calculated as follows:

**Load Reduced = [M • Conc] / RF**

Where:

| | | |
|---|---|---|
| Load Reduced | = | Estimate of mercury or PCBs load reduction from the O&M activity (mg/yr) |
| M | = | Mass of sediment removed (kg). For storm drain line flush and capture, the mass of sediment per length of storm drain can be estimated as 1.4 kg/ft of pipe flushed (see Appendix F) in the absence of project-specific measurements. |
| Conc | = | Average concentration of mercury or PCBs in sediments collected by the O&M control measure for the tributary land use (mg/kg); see Table 3-1 for land use-based sediment concentrations to calculate area-weighted concentrations or alternatively use project-specific measurements. |
| RF | = | Recurrence frequency of the action in years. |

**Table 3-1: Land Use-Based Average Sediment Concentrations for PCBs and Mercury**

| Land Use Category | Average PCBs Concentration (mg/kg) | Average Mercury Concentration (mg/kg) |
|---|---|---|
| Source Property | 23.3 | 4.13 |
| Old Industrial | 0.42 | 0.33 |
| Old Commercial / Old Transportation | 0.30 | 0.23 |
| Old Residential | 0.071 | 0.46 |
| New Urban | 0.042 | 0.51 |
| Agriculture/Open Space | 0.050 | 0.29 |

mg/kg – milligrams per kilogram

### 3.2.3 Parcel-Based Redevelopment

When contaminated areas are redeveloped, the pollutant yield of the area will be reduced through a variety of mechanisms (e.g., removal, capping, or paving contaminated sediment, and GSI treatment of post-development runoff). The amount of PCBs and mercury load reduction can be estimated by multiplying the project area by the difference in land use-based yield. Permittees may also use monitoring data to quantify the load reduction resulting from a redevelopment project.

The Permittees will quantify and report the amount of PCBs and mercury loads reduced for parcel-based redevelopment projects using the following accounting method (unless project specific monitoring data are available):

$$\boldsymbol{Annual\ Load\ Reduced = P_A \bullet (P_Y - NU_Y)}$$

Where:

$P_A$ = New development/redevelopment project area (ac)

$P_Y$ = Existing PCBs or mercury yield (mg/ac/yr) (i.e., yield for the land-use prior to new development/redevelopment)

$NU_Y$ = New Urban PCBs or mercury yield (mg/ac/yr)

### 3.2.4 Stormwater Retrofit Projects

The Permittees will quantify and report the amounts of PCBs and mercury loads reduced through the implementation of stormwater retrofit projects (i.e., projects that provide treatment for existing developed areas without redevelopment of the drainage catchment). Retrofit projects may be implemented as a regional project, a ROW project, or parcel-based project. Treatment types include GSI, non-GSI treatment (e.g., high-flow rate media filters), large (non-inlet based) full trash capture devices (i.e., hydrodynamic separators (HDS) units, gross solids removal devices (GSRDs), and baffle boxes), and diversion to POTW. Retrofit projects will use the following accounting method:

$$\boldsymbol{Annual\ Load\ Reduced = P_A \bullet P_Y \bullet E_f}$$

Where:

$P_A$ = Tributary area treated (acres)

$P_Y$ = Area-weighted PCBs or mercury yield (mg/acre/year)

$E_f$ = Efficiency factor, assumed as follows:

- GSI and non-GSI (i.e., high rate media filter) treatment control measures sized in accordance with MRP Provision C.3.d, are assumed to be 85%[8].
- Treatment control measures that do not meet the MRP Provision C.3.d sizing standard will conduct a project specific analysis to determine the effectiveness factor.
- Large full trash capture devices are assumed to be 20%[9].
- Diversion to POTW is assumed to be 91%[10].

[8] The efficiency factor for all treatment control measures sized in accordance with MRP Provision C.3.d is assumed to be 85% based on the LID monitoring conducted by the BAMSC stormwater programs in MRP 3 (ACCWP, 2026b). High rate media filters are shown to have equivalent TSS removal performance in WRF, 2020.

[9] See Appendix G for large full trash capture device unit efficiency factor data analysis.

[10] SFBRWQCB, 2021.

# 4. PROGRAM FOR CONTROLLING PCBS FROM BRIDGES AND OVERPASSES

## 4.1 Program Description

For this control measure, Permittees will track development of a Caltrans specification for managing PCBs-containing caulks and sealants on bridges or roadway overpasses during bridge replacement or joint maintenance. The Caltrans standard specifications for removal, handling, and disposal of caulk or sealant materials during infrastructure replacement or joint maintenance projects will be used to prevent the release of PCBs to the MS4. The Caltrans specification will be applied to all applicable public bridges or roadway overpass structures when the bridge infrastructure is replaced or undergoes joint maintenance.

## 4.2 Loads Reduced Accounting Methodology

A detailed load reduction accounting methodology is provided in Appendix H and summarized here.

Total PCBs load contained in bridges built and/or reconstructed prior to 1981 within the jurisdictions subject to the MRP was estimated using the following equation:

$$\text{Total Load}_{\text{PCBs, Bridges}} = \text{Density}_{\text{sealant}} * \text{Concentration}_{\text{PCBs}} * \sum \text{Volume}_{\text{sealant, bridges}}$$

Where:

$\text{Density}_{\text{sealant}}$ = average sealant density [kg/m$^3$]

$\text{Concentration}_{\text{PCBs}}$ = concentration of PCBs based on BASMAA monitoring data [mg/kg]

$\sum\text{Volume}_{\text{sealant, bridges}}$ = Volume of sealant in all applicable bridges [m$^3$]

The volume of joint sealant was calculated using an assumed cross-section of sealant, multiplied by the assumed length of applied sealant:

$$\text{Volume}_{\text{sealant, bridges}} = \text{Cross-Section}_{\text{sealant}} * \text{Length}_{\text{sealant}}$$

Where:

$\text{Cross-Section}_{\text{sealant}}$ = Cross-section of applied sealant (square inch)

$\text{Length}_{\text{sealant}}$ = Length of applied sealant (feet)

A summary of the data inputs is provided in Table 4-1. The derivation of the values presented in Table 4-1 is described in Appendix H.

**Table 4-1: Bridge Load Calculation Data Inputs**

| Input | Result | Units | Source |
|---|---|---|---|
| Density of Sealant | 1,100 | kg/m$^3$ | Takhar, 2013 |
| Cross-Section of Sealant | 1 | square inch | Caltrans, 2007 |
| PCBs Concentration | 184 | mg/kg | See Appendix H |

The estimated total PCBs load contained in bridges built and/or reconstructed prior to 1981 within the jurisdictions subject to the MRP is provided in Table 4-2.

**Table 4-2: Total Calculated Loads for Bridges within the MRP Area, Built and/or Reconstructed Prior to 1981**

| County | Total Sealant PCBs Mass - Joints Only (kg) | Total Sealant PCBs Mass - Joints and Longitudinal Seal (kg) | Number of Bridges[1] |
|---|---|---|---|
| Alameda | 3.8 | 11.2 | 340 |
| Contra Costa | 1.7 | 7.3 | 277 |
| San Mateo | 2.5 | 7.2 | 254 |
| Santa Clara | 3.7 | 10.1 | 473 |
| Solano | 0.9 | 3.2 | 133 |
| **Total** | **12.6** | **39.0** | **1,477** |

1. U.S. Department of Transportation Federal Highway Administration, 2019. National Bridge Inventory. Visited 24 March 2020.

To estimate the load reduction associated with long-term bridge or expansion joint replacement, it is assumed that an ongoing PCBs release rate from bridge joints is mitigated through bridge joint maintenance and whole bridge replacement projects. The load reduction estimation assumes that PCBs in caulk are leaching from bridge joints and longitudinal seals over their lifetime. When that PCBs-containing caulk is replaced or removed through maintenance or replacement projects, the source of PCBs release is removed, and the associated annual released load is also removed. PCBs leaching from the material could occur through incremental wear or through larger damage (e.g., pieces of caulk torn out) over the caulk's lifetime.

Lacking a literature-based release rate of sealant over time, two potential average annual release rates (i.e., average over the life of the seal) were assumed to calculate an estimated load reduction from removing the joint seal – 0.5% and 1.0%. Appendix H details how these values were selected. These average annual release rates were applied to the estimated mass of the 1,477 bridges that met the identified age criteria (Table 4-3). These releases would be eliminated by removing the joint seal via joint replacement or bridge replacement.

**Table 4-3: Long-Term Load Reduction (i.e., Replacement of PCBs-Containing Joints in All Older Bridges)**

| County | Total Sealant PCBs Load Reduced - Joints Only (g/year) | Total Sealant PCBs Load Reduced - Joints Only (g/year) | Total Sealant PCBs Load Reduced - Joints and Longitudinal Seal (g/year) | Total Sealant PCBs Load Reduced - Joints and Longitudinal Seal (g/year) |
|---|---|---|---|---|
| | 0.5% annual loss rate over life | 1% annual loss rate over life | 0.5% annual loss rate over life | 1% annual loss rate over life |
| Alameda | 19 | 38 | 56 | 112 |
| Contra Costa | 8 | 17 | 37 | 73 |
| San Mateo | 12 | 25 | 36 | 72 |
| Santa Clara | 19 | 37 | 50 | 101 |
| Solano | 5 | 9 | 16 | 32 |
| **Total** | 63 | 126 | 195 | 390 |

This load reduction would occur no later than 2080, assuming all older joints are removed/replaced within 100 years of installation.

# 5. PROGRAM FOR MANAGING PCBS FROM ELECTRICAL UTILITIES

## 5.1 Program Description

PCBs are present in some electrical equipment still in service in the Bay Area, and through ongoing efforts, the equipment and/or PCBs are gradually being replaced. Electrical utilities in the Bay Area continuously remove PCBs-containing electrical equipment (i.e., oil-filled electrical equipment, or OFEE) from active service due to ongoing maintenance programs. Removal and proper disposal of PCBs-containing OFEE stops any active PCBs releases and prevents future PCBs releases from occurring. Therefore, each piece of PCBs containing OFEE that is removed from service and disposed of properly represents an additional mass of PCBs that is prevented from release to the MS4. The Electrical Utilities Management Program includes improved procedures for documenting removal and disposal of PCBs-containing OFEE as part of ongoing equipment maintenance practices.

For this control measure, Permittee-owned electrical utilities will document the removal of PCBs containing OFEE from the start of the TMDL and, in the future, until all PCBs containing OFEE have been removed from active service, and provide data to support calculations of the associated stormwater load reductions resulting from these efforts. Additionally, it is anticipated that non-municipally owned regional electrical utilities that are not currently subject to PCBs load reduction requirements (i.e., Pacific Gas and Electric, PG&E) have been and will continue to remove PCBs-containing OFEE and document these efforts, past and present, consistent with methods used by applicable MRP permittees. Over the past several years, Water Board staff have been meeting with PG&E representatives to discuss these efforts. Although PG&E has not provided documentation of its efforts, it has informed Water Board staff that all PG&E-owned PCBs containing OFEE in the Bay Area will be removed by approximately 2040.

## 5.2 Loads Reduced Accounting Methodology

The baseline TMDL-normalized load of PCBs from electrical equipment to the San Francisco Bay via stormwater runoff in 2005 is 1.1 kg/yr (McKee et. al., 2006, BASMAA 2020). This is the best estimate available to represent the stormwater load of PCBs to the Bay from PCBs-containing OFEE at the start of the PCBs TMDL, and it represents the maximum PCBs load reduction that can be realized by removing all PCBs-containing OFEE across the Bay Area. Municipally owned electrical utilities serve less than 3% of the Bay Area population, while PG&E serves more than 97% of the Bay Area population (BASMAA 2020). Consequently, the rate of PCBs-containing OFEE removals (and associated PCBs loads reduced) is driven primarily by PG&E efforts.

The load of PCBs reduced through implementation of the Electrical Utilities Management Program will be assessed using the following assumptions and accounting:

- The baseline stormwater load of PCBs from OFEE at the start of the TMDL in approximately 2005 is 1.1 kg/yr (1,100 g/yr). This value is the TMDL-normalized annual load of PCBs from OFEE to the San Francisco Bay, based on data reported in McKee et al. (2006).

- The rate of PCBs-containing OFEE removals (and associated PCBs loads reduced/avoided) is driven primarily by PG&E efforts because PG&E provides electrical utility services to over 97% of the Bay Area population.
- PCBs-containing OFEE removals occur at approximately the same rate for both municipally owned and non-municipally owned electrical utilities across the Bay Area.
- PCBs containing OFEE removals have been and will continue to occur at an approximately linear rate between 2005 and 2040, providing 31.4 kg of additional PCBs load reduction each year (i.e., 1,100 kg/yr PCBs ÷ 35 years = 31.4 kg PCBs reduced annually).
- All PCBs-containing OFEE will be removed from service by 2040 at which time the full 1,100 g/yr of PCBs loads reduced will be realized.

All Permittees will receive a share of the total 1,100 g/yr PCBs load reductions achieved by 2040 as a result of program implementation based on the accepted countywide apportionment method (e.g., population), as shown in Table 5-1.

**Table 5-1: Estimated PCBs Loads Reduced due to the Electrical Utilities Management Program Since the Start of the PCBs TMDL in Approximately 2005, apportioned by County.**

| County | Proportion of the MRP Population | Total PCBs Loads Reduced by 2040 (g/yr) |
|---|---|---|
| Alameda County | 31% | 344.67 |
| Contra Costa County | 18.7% | 205.33 |
| San Mateo County | 13% | 135.67 |
| Santa Clara County | 31% | 344.67 |
| Solano County | 6.3% | 69.67 |

# 6. PROGRAM FOR MANAGING PCBS-CONTAINING MATERIALS AND WASTE DURING BUILDING DEMOLITION

## 6.1 Program Description

The MRP Permittees have developed and implemented a process, beginning in July 2019, for managing materials with PCBs concentrations of 50 ppm or greater in applicable structures at the time such structures undergo demolition. Applicable structures include commercial, public, institutional, and industrial buildings constructed or remodeled between 1950 and 1980 that are undergoing full-building demolition. Single-family residential and wood-frame structures are exempt.

## 6.2 Loads Reduced Accounting Methodology

The load of PCBs reduced through the implementation of the PCBs in the Building Materials Management Program will be assessed using the following accounting method:

$$\boldsymbol{Load\ of\ PCBs\ Reduced} = \left[\sum_{i=1}^{n}(N_i \bullet M_i \bullet SW_i)\right] \bullet E_f$$

Where:

| | | |
|---|---|---|
| $N_i$ | = | Number of applicable buildings demolished each year (units/yr) |
| $M_i$ | = | Average mass of PCBs per applicable building (mg/unit) |
| $SW_i$ | = | Average fraction of PCBs that enters the MS4 due to demolition without controls (%) |
| $E_f$ | = | Average fraction of PCBs prevented by controls from entering MS4 (%) |

Reasonable values were used by the Water Board to assign the load reduction for this control measure in MRP 2.0. Permittees received a total of 2,000 g/yr (2 kg/yr) PCBs load reduction value in 2019 when protocols for managing PCBs-containing materials during demolition, as required in MRP 2.0 Provision C.12.f., were developed and implemented. Table 6-1 lists the four terms and the assumed values used to derive the 2 kg/yr credit. These values may be updated based on future data, as described below.

**Table 6-1: Terms Used to Estimate the Loading of PCBs in Building Materials for MRP 2.0**

| Term | Estimated Value | Units |
|---|---|---|
| 1. Number of applicable buildings[1] demolished per year | 50 | buildings/year |
| 2. Average mass of PCBs per applicable building | 5 | kg |
| 3. Average fraction of PCBs that enters MS4s due to demolition without controls[2] | 0.01 | dimensionless fraction |
| 4. Average fraction of PCBs prevented by controls[2] from entering MS4 | 0.8 | dimensionless fraction |

[1]Applicable buildings: constructed from 1950 through 1980 with PCBs concentration in caulks/sealants greater than 50 ppm, excluding single family residential and wood frame buildings.

[2]The term "controls" refers to the proposed new demolition management program, not existing construction controls.

The 2 kg/yr PCBs load reduction stipulated during MRP 2.0 will be retained. The portion of the load reduction assigned to each county, based on population ratios used for the TMDL, is provided in Table 6-2.

**Table 6-2: Load Reduction Allocated by County during MRP 2.0**

| County | Load Reduced in MRP 2.0 (g/yr) |
|---|---|
| Alameda | 626.67 |
| Contra Costa | 373.33 |
| San Mateo | 246.67 |
| Santa Clara | 626.67 |
| Solano | 126.67 |

# 7. PROGRAM FOR MERCURY LOAD AVOIDANCE AND REDUCTION

## 7.1 Program Description

Mercury load avoidance and reduction includes several source control measures listed in the California Mercury Reduction Act, adopted by the State of California in 2001. These source controls include material bans, reductions of the amount of mercury allowable for use in products, and mercury device recycling. The following source control bans are included:

- Sale of cars that have light switches containing mercury
- Sale or distribution of fever thermometers containing mercury without a prescription
- Sale of mercury thermostats
- Manufacturing, sale, or distribution of mercury-added novelty items

In addition, fluorescent lamp manufacturers continue to reduce the amount of mercury in lamps sold in the U.S. They have significantly reduced mercury levels in fluorescent linear tube lamps and streetlamps. The use of mercury-containing bulbs has also decreased due to their replacement with LED lamps.

Mercury Device Recycling Programs resulting in Mercury load reduction generally include three types of programs that promote and facilitate the collection and recycling of mercury–containing devices and products:

1. Permittee-managed household hazardous waste (HHW) drop-off facilities and curbside or door-to-door pickup
2. Private business take-back and recycling programs (e.g., Home Depot)
3. Private waste management services for small and large businesses

## 7.2 Loads Avoided/Reduced Accounting Methodology

The load avoidance/reduction methodology for this control measure is:

$$\textbf{Hg Mass Avoided} = \textbf{Hg Mass}_{L/S/T} \bullet \textbf{Num}_{L/S/T} \bullet \textbf{T}$$

Where:

| | | |
|---|---|---|
| $\text{Hg Mass}_{LST}$ | = | Average mass of total mercury in each lamp (L), switch (S), and thermostat (T) recycled in the year of interest (Assume: 35mg per kilogram of linear fluorescent lamp or CFL; 2.9g per switch; and 4g per thermostat). |
| $\text{Num}_{LST}$ | = | Number or weight of lamps (L), switches (S), and thermostats (T) discarded into the environment improperly in the year of interest. |
| T | = | % of total mercury in lamps (L), switches (S), and thermostats (T) that, when improperly discarded, are transported to the Bay via urban stormwater (Assume 4.8%). |

Table 7-1 provides conversion factors and references for the assumed values used in these calculations.

**Table 7-1: Mercury Recycling Conversion Factors and References**

| Item | Conversion and Citation |
|---|---|
| Fluorescent Lamps | The average mercury content for a four-foot linear fluorescent lamp is 8.3 milligrams (mg). This is equal to 2.075 mg (2.075 X 10 -6 kilograms (kg)) per linear foot.<br><br>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. |
| Compact Fluorescent Lamps (CFLs) | 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 (4.5 X 10 -6 kg). New CFLs are also assumed to have 4.5 mg on average.<br><br>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. |
| High Intensity Discharge (HID) Lamps | The average content of a HID bulb is 0.5 milligrams of mercury ($0.5 \times 10^{-6}$ kg).<br><br>Source NEMA Opposition to Ban on Mercury Containing Headlamps, 2004 http://www.nema.org/Policy/Environmental-Stewardship/Lamps/Documents/HID%20Headlamps%2010%2004.pdf |
| Thermostats | 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 (0.004 kg) of mercury.<br><br>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.<br><br>Each thermostat recycled is assumed to contain approximately 4.0 g (0.004 kg) of mercury. The average weight of one thermostat is 12 ounces. There are 1.3333 thermostats in a pound of thermostats (1 pound/0.75 pounds = 1.33 thermostats. It is estimated that 0.005333 kg of mercury is recycled for every pound of thermostat recycled (1.333*0.004= 0.005333).<br><br>Source: Average weight of a thermostat obtained from retail websites (www.amazon.com). |
| Switches | The Recycling Corporation reports that one mercury switch contains 2.87 g (0.00287 kg) of mercury.<br><br>Source: TRC 2010. Thermostat Recycling Corporation's Annual Report for California. Prepared by the Thermostat Recycling Corporation. Prepared for the State of California's Office of Pollution Prevention and Green Technology, Department of Toxic Substances Control. March 31, 2010. |

# 8. PROGRAM UPDATES AND REFINEMENTS

The accounting methodology outlined in this report may be updated and refined to account for significant new information as it becomes available. If needed, the proposed updates will be submitted as an addendum to this report for Executive Office approval during the MRP 4.0 permit term.

# 9. REFERENCES

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# APPENDIX A
Land Use-Based Yield Analysis

# APPENDIX A. LAND USE-BASED YIELD ANALYSIS

## A.1 Methodology

The methodology presented in this appendix was developed to assist the MRP Permittees in identifying which watershed characteristics correlate with areas that have high, moderate, and low rates of pollutant-of-concern (POC) loading (i.e., mercury and PCBs) to receiving waters via stormwater runoff. The methodology was developed using the collective local understanding of the types of land areas, facilities, and activities that generate POCs, with a focus on PCBs. The ultimate goal of the analysis was to provide first-order estimates of POC loading rates from high, moderate, and low likelihood source areas and to assist Permittees in identifying areas for implementing POC load reduction measures that would have the greatest load reduction benefit.

### A.1.1 Source Area Mapping

Documented uses and sources of PCBs and mercury in the urban environment and the results of PCBs source identification and abatement studies described in the 2014 Integrated Monitoring Report (IMR) Part B (BASMAA, 2014) have been used to identify PCBs source areas. Findings demonstrate that PCBs (and to a lesser extent mercury) sources are generally associated with watershed areas where equipment containing POCs was transported or used and facilities that recycle POCs or POC-containing devices and equipment. These sources include current and historic metal, automotive, and hazardous waste recycling and transfer stations; electrical properties and power plants; and rail lines. These sources are typically located in areas that were industrialized between the late 1920's and the late 1970's, the timeframe when PCBs and mercury production were the greatest in the U.S.

To assist Permittees in identifying potential POC sources and source areas, a number of preliminary GIS data layers were developed using existing and historical information on land use and facility types that were located in the Bay Area during the early to mid-20th century. GIS data layers included a revised "Old Industrial" land use layer that attempted to depict industrial areas that were present in the year 1968; an "Old Urban" land use layer that depicts urban areas developed by 1974, other than those depicted as Old Industrial; points depicting current facilities that have the potential to have or have had PCBs on-site; and historical and current rail lines where PCBs may have been transported.

#### *A.1.1.1 Old Industrial Land Areas*

Three sets of data layers were acquired and served as the primary sources of information used to create the Old Industrial data layer: 1) the 2005 version of the Association of Bay Area Governments (ABAG) land use data layers for the five Bay Area counties, which depicts current industrial land use areas; 2) 1968 aerial photographs for the Bay Area at 30,000 scale acquired from the United States Geological Survey's (USGS) Earth Explorer website; and 3) the most currently available County Assessor parcel data layers for Bay Area counties. Through the development of the Old Industrial layer, two data layers were created. The first depicts industrial land areas in 1968 that are not currently characterized as industrial by ABAG. This data layer was created by panning through 1968 aerial photography and identifying industrial land areas outside of the areas characterized as industrial land use in roughly 2005 by ABAG. The purpose of this layer was to identify potential industrial facilities that were present in 1968 but possibly

redeveloped or incorrectly identified within the ABAG land use data. The second data layer that was created depicts areas characterized by ABAG in 2005 as industrial land uses that were clearly not industrial in the 1968 aerial photographs. Most of these areas were developed into industrial land uses after 1968 and are most commonly agricultural in the aerial photographs. All parcels that were identified as at least partially industrial in 1968 were visually checked in the data layer to provide greater confidence in their accuracy. Minor edits were then made based on this quality assurance check. If there was uncertainty as to whether a parcel in the 1968 photographs was industrial, then the parcel was classified based on the ABAG land use data. As a final check, the 1968 aerial photographs were also compared to current aerial photographs, and each parcel that had been redeveloped was attributed with the current land use, even if that land use remained industrial.

#### *A.1.1.2 Old and New Urban Land Areas*

Old Urban and New Urban land use data layers that depict areas urbanized prior to and after 1974, respectively, were developed using an urban extents data layer from 1974, the closest year to 1968 when the data were available. All areas that were within the urban extent in 1974 were defined as Old Urban; those areas that fell outside of this definition were classified as New Urban. Old Urban areas have been further divided into residential and park areas versus commercial areas in the current land use classification schema.

#### *A.1.1.3 Identification of Potential POC Associated Facilities*

Point data were collected for a number of facility types that may be associated with either PCBs or mercury. These facility types include those associated with electrical generation, known mercury emitters, metal manufacturing, drum recycling, metal recycling, shipping, automotive recycling, general recycling, and those known to have or historically have had PCBs in use. This information was primarily gathered by the San Francisco Estuary Institute (SFEI) as part of the Urban Stormwater Best Management Practices (BMPs) Proposition 13 Grant project and contains data from a variety of sources, including the California Air Resources Board, EnviroStor, Superfund, Department of Toxic Substances Control, and the State Water Resource Control Board.

Certain facility types for which point data were developed were mapped in greater detail to develop polygons to allow area calculations to be performed. Of particular interest for PCBs were the several hundred electrical substations in the Bay Area. Areas for these facilities were delineated using current and 1968 aerial photographs to attribute whether each facility was built prior to or after 1968. Additionally, military, port, and railroad land use areas were developed using ABAG 2005 land use data and the latest assessor’s parcel data. Military parcels were further edited to only include developed areas.

Land use and facility data layers created as part of this effort were then combined to create one contiguous data layer. This data layer was attributed with additional information such as city, county, and watershed.

## A.2 Regional Watershed Spreadsheet Analysis

### A.2.1 Background

The Regional Watershed Spreadsheet Model (RWSM) was developed as part of the Regional Monitoring Program's (RMP) Small Tributaries Loading Strategy as a regional-scale planning tool primarily for the purpose of estimating long-term average annual loads from the small tributaries surrounding San Francisco Bay, and secondarily to provide supporting information for prioritizing watersheds or areas within watersheds for management actions (Wu et al., 2016).

The RWSM is structured with three stand-alone empirical models: the hydrology model, the sediment model, and the pollutant model (Wu et al., 2016). The hydrology model uses runoff coefficients based on geospatially identified land use-soil-slope combinations, along with rainfall based on PRISM average precipitation[1] to estimate annual runoff from a defined watershed area. The sediment model uses a function of geology, slope, and land-use to simulate suspended sediment transport in the landscape of a defined watershed while adjusting for watershed storage factors. The pollutant model is a spreadsheet model that combines land use-based pollutant concentrations (i.e., pollutant concentrations in water or pollutant concentrations on fine sediment particles as particle ratios[2] corresponding with specific land use types or source areas) with land use-based hydrology model output or sediment model output. Land use-based loading results are compiled to obtain pollutant loading across a defined watershed.

Starting in 2010, a multi-year effort was undertaken to systematically develop and calibrate the RWSM for San Francisco Bay watersheds using RMP data. Calibration was completed[3] and the model was released in 2018 (SFEI, 2018). For further details about each component of the model, see the RWSM User Manual (SFEI, 2018).

### A.2.2 RWSM Results

The estimated average PCBs and mercury yields from the RWSM Toolbox v1.0 Pollutant Model, "Pollutant Spreadsheet Model Calculations – Region" for the modeled land use yield categories are provided in Table A-1 below. The "Region" spreadsheet results were developed using RMP data from well-sampled watersheds to calibrate pollutant concentration coefficients and applying the resulting coefficients to the region to get average pollutant yield results (Gilbreath, 2019).

[1] 800-m grid, from PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu.
[2] Particle ratios = pollutant concentration in water (ng/L) / suspended sediment concentration (mg/L), equivalent to mg/kg.
[3] The calibration for PCBs is "reasonable" but there remains a lower confidence in the calibration for mercury (Wu et al., 2017).

**Table A-1: RWSM Land Use-Based Yields for PCBs and Mercury**

| Land Use Category | Average PCBs Yield (mg/ac/yr) | Average Mercury Yield[1] (mg/ac/yr) |
|---|---|---|
| Old Industrial and Source Areas | 259 | 53 |
| Old Commercial and Old Transportation | 49 | 57 |
| Old Residential | 2.8 | 57 |
| New Urban | 0.4 | 4 |
| Agriculture/Open Space | 0.4 | 81 |

mg/ac/yr – milligrams per acre per year
Note: RWSM Toolbox v1.0 Pollutant Model, Pollutant Spreadsheet Model Calculations - Region. Spreadsheet dated 6/9/2017.
1. The model calibration for PCBs is "reasonable," but there remains a lower confidence in the calibration for mercury (Wu et al., 2017).

Table A-2 below presents the RWSM Toolbox v1.0 Pollutant Model, "Pollutant Spreadsheet Model Calculations – Region" results for PCBs and mercury average concentrations in runoff for the five RWSM modeled land use categories (SFEI, 2018).

**Table A-2: Regional Watershed Spreadsheet Model PCBs and Mercury Concentrations in Runoff**

| Land Use Category | Total PCBs (ng/L) | Total Mercury[1] (ng/L) |
|---|---|---|
| Old Industrial and Source Areas | 204 | 40 |
| Old Commercial and Old Transportation | 40 | 63 |
| Old Residential | 4 | 63 |
| New Urban | 0.2 | 3 |
| Agriculture/Open Space | 0.2 | 80 |

1. The model calibration for PCBs is "reasonable," but there remains a lower confidence in the calibration for mercury (Wu et al., 2017).

## A.3 Source Area/Property PCBs Yield

The derivation of the estimated PCBs source property yield is described below. The PCBs source property yield was derived as the product of a representative PCBs concentration in surface soils at known source properties and a representative soil/sediment yield for old industrial areas.

Table A-3 and Table A-4 present descriptive statistics for measured concentrations of PCBs from source properties located in Alameda, Contra Costa, Santa Clara, and San Mateo Counties. This dataset includes 1,180 PCBs surface soil samples from 52 source property locations. All samples included in the analysis were collected on-site at the source properties, either from storm drain infrastructure, or from surface soils in the 0 to 0.5-foot depth interval, based on the assumption that the top six inches of soil would have the most potential to mobilize off-site via wind or rainfall erosion, with a few exceptions. Data collected from the 0 to 1.0-foot depth interval were included for the General Electric site in Oakland, 2201 Bay Road in Redwood City, and G-C Lubricants in San Carlos, as data for these sites were only reported for this wider range and not broken down into more refined depth categories. The range of PCBs concentration (mg/kg) in surface soils for individual Bay Area source properties is provided in Table A-3 and the summary statistics for all sites combined are provided in Table A-4.

**Table A-3: Site-specific PCBs concentration in surface soil collected on-site from source properties located in Alameda, Contra Costa, Santa Clara, and San Mateo Counties.**

| Site Location | Minimum (mg/kg) | Average (mg/kg) | Maximum (mg/kg) | Count | Reference |
|---|---|---|---|---|---|
| 1411 Industrial Rd, San Carlos | 1.7 | 236 | 418 | 5 | EKI Environment and Water, 2018. Letter from EKI to Mark Johnson, RWQCB, October 8, 2018. Subject: PCB Storm Drain Sediment Sampling Results 1411 Industrial Road, San Carlos, CA (EKI B80090.00); CW4CB Final Report/database (http://basmaa.org/Clean-Watersheds-for-a-Clean-Bay-Project) |
| 270 Industrial Road and 495 Bragato Rd. (Delta Star Inc./Tiegel Manufacturing Co.), San Carlos | 3.4 | 28.4 | 122 | 14 | GHD, 2016. Incremental Sampling Investigation Report. August 4. |
| 280 Valley Drive, Brisbane | 5.1 | 5.1 | 5.1 | 1 | SMCWPPP POC Monitoring |
| 505 Bayshore, Redwood City | 0.006 | 42.2 | 548 | 71 | Langan, 2024. Amended Site Cleanup Plan, 505 E Bayshore Road, Redwood City, CA.<br>West, 2024. Revised Remedial Action Plan, Site-Bank and Off-Site, 505 E Bayshore Road, Redwood City, CA. Prepared for Alan Steel & Supply Co.<br>West, 2025. Remedial Action Implementation Report, Site-Bank and Off-Site Sediment, 505 E. Bayshore Road, Redwood City, CA. |
| 2201 Bay Road (Tyco Engineered Products), Redwood City | 0.08 | 86.7 | 1,910 | 62 | Earth Tech Inc, 2006. Summary Report of Soil and Groundwater Investigations, Tyco Engineered Products and Services/Tyco Thermal Controls, 2201 Bay Road, Redwood City, CA.<br>Geomatrix, 2008. Site Investigation Report, Tyco Thermal Control, Inc, 2201 Bay Road, Redwood City, CA.<br>AMEC Environmental & Infrastructure Inc, 2012. Supplemental Investigation Report, 2201 Bay Road, Redwood City, CA.<br>SCS Engineers, 2013. Remedial Action Completion Report Phase II, Tyco Thermal Controls, 2201 Bay Road, Redwood City, CA.<br>SCS Engineers, 2011. Revised Decommissioning and Demolition Plan, Tyco Thermal Controls, 2201 Bay Road, Redwood City, CA.<br>AMEC Foster Wheeler, 2015. Storm Drain Investigation Completion Report, Pentair Thermal Management, Redwood City, CA. |

| Site Location | Minimum (mg/kg) | Average (mg/kg) | Maximum (mg/kg) | Count | Reference |
|---|---|---|---|---|---|
| 166 Harbor Way (Caltrans Maintenance Facility), South San Francisco | 0.028 | 46.2 | 310 | 51 | Geocon, 2023. Soil Investigation Report, 166 Harbor Way. June 2023. |
| 2100 Bay Road (Cooley Landing), East Palo Alto | 0.033 | 0.38 | 1.6 | 13 | Ninyo & Moore. 2010. Remedial Action Plan Cooley Landing 2100 Bay Road, East Palo Alto, CA |
| 2575 Sand Hill Road SLAC (National Accelerator Laboratory, Menlo Park | 0.037 | 5.9 | 36 | 60 | SLAC. 2013. Final Remedial Investigation Report, West SLAC/ Campus Area/ IR-8 Drainage Channel Operable Unit<br>SLAC. 2015. Feasibility Study for the Research Yard - SSRL / IR-6 Drainage Channel Operable Unit |
| 977 Branston Rd, San Carlos (G-C Lubricants, former California Oil Recyclers, CORI, site) | 0.06 | 207 | 1,470 | 13 | California Oil Recyclers, Inc, San Carlos – California. EPA ID #CAD980695761. PCB Remediation Plan, 3/25/2004 |
| Redwood City Rail Spur between Bay Road and Charter Street | 0.57 | 954 | 3,520 | 10 | Interim Site Stabilization Work Plan, WEST Environmental, 6/7/2013 |
| 2081 Bay Road, East Palo Alto (Romic Environmental Technologies) | ND | 0.75 | 18.8 | 33 | Revised Comprehensive Site-wide Sampling and Analysis Program Report, Former Romic Environmental Technologies. Iris Environmental, 6/12/2013 |
| 300 Constitution Drive, Menlo Park (Tyco Electronics, formerly Raychem, Menlo Park) | 0.08 | 86.7 | 1,910 | 31 | Results of Soil Sampling Railroad Right-of-Way, Near Willow Road Menlo Park. GRA Associates, Sept. 2004. |
| 335 Brokaw Road, Santa Clara | 3.93 | 3.93 | 3.93 | 1 | SCVURPPP POC Monitoring |
| 280 Martin Ave., Santa Clara | 3.56 | 3.56 | 3.56 | 1 | SCVURPPP POC Monitoring |
| 1255 Yard Court, San Jose | 0.03 | 0.84 | 1.65 | 2 | SCVURPPP POC Monitoring |
| 1645 Old Bayshore Highway, San Jose | 17.7 | 17.7 | 17.7 | 1 | SCVURPPP POC Monitoring |
| 1800 South Monterey Road (Sims Metal), San Jose | 1.79 | 2.70 | 3.61 | 2 | SCVURPPP POC Monitoring |
| Union Pacific Railroad at Schallenberger Road, San Jose | 0.19 | 0.97 | 2.80 | 4 | SCVURPPP POC Monitoring |

| Site Location | Minimum (mg/kg) | Average (mg/kg) | Maximum (mg/kg) | Count | Reference |
|---|---|---|---|---|---|
| Union Pacific Railroad Leo Avenue, San Jose | 0.02 | 12.9 | 127 | 45 | CW4CB Final Report/database (http://basmaa.org/Clean-Watersheds-for-a-Clean-Bay-Project)<br><br>GHD, 2017. Remedial Investigation Report. Union Pacific Railroad Property, Leo Avenue ROW, San Jose, CA. September. |
| 1788 Rogers Ave (Alco Iron and Metal), San Jose | 0.42 | 0.68 | 0.93 | 2 | SCVURPPP POC Monitoring |
| 1693 Monterey Road (Glencore Recycling), San Jose | 4.19 | 4.58 | 4.96 | 2 | SCVURPPP POC Monitoring |
| Kings Row, San Jose | 1.09 | 1.09 | 1.09 | 1 | SCVURPPP POC Monitoring |
| 1200 Piper Dr (Former North American Transformer), Milpitas | 0.01 | 1.53 | 12.9 | 25 | Terrasearch, Inc. 2005. Phase II Environmental Site Assessment at Proposed Residential Development · Former North American Transformer Site 1200 Piper Drive<br><br>Terrasearch, Inc. 2005. Remedial Action Plan at Proposed Residential Development · Former North American Transformer Site 1200 Piper Drive. |
| 1775 Monterey Road (Pollack Properties), San Jose | 7.33 | 7.33 | 7.33 | 1 | SCVURPPP POC Monitoring |
| 700 Los Esteros Road, San Jose (SJ-SC Regional Wastewater Facility, San Jose) | ND | 4.89 | 98 | 94 | TSCA PCB Cleanup Completion Report, 09-30-2019 |
| 1420-1600 Monterey Road, San Jose (Sun Garden) | ND | 0.47 | 2.0 | 5 | Site Assessment Report, Sun Garden Center, Western Developer Tract (Phase I). Cornerstone Earth Group, June 24, 2014 |
| 3600 Alameda Ave., Oakland | 0.009 | 1.10 | 10.1 | 12 | Apex, 2025. Summary of Tables of Historical Data for 3600 Alameda Avenue, 3600 Alameda Redevelopment, 3600 Alameda Avenue, Oakland, California, Apex Companies, LLC, 7 October 2025. |
| 7825 San Leandro St., Oakland | 0.14 | 2.81 | 14 | 9 | ACCWP POCs Monitoring |
| 818 West Gertrude Ave, Richmond (Fass Metals) | 2.62 | 4.56 | 7.4 | 3 | CCCWP POCs Monitoring |
| 901 Sanford Ave, Richmond (H&H Recycling) | 1.58 | 2.87 | 4.16 | 2 | CCCWP POCs Monitoring |
| 1530 Wood Street, Oakland (One Stop) | 1.03 | 1.03 | 1.03 | 1 | ACCWP POCs Monitoring |
| 600 South 4th Street, Richmond, (Sims Metals, Inc) | 0.15 | 0.70 | 1.72 | 4 | CCCWP POCs Monitoring |

| Site Location | Minimum (mg/kg) | Average (mg/kg) | Maximum (mg/kg) | Count | Reference |
|---|---|---|---|---|---|
| 1268 48th Ave, Oakland (Yenlin Air Conditioning) | 1.23 | 1.23 | 1.23 | 1 | ACCWP POCs Monitoring |
| 3430 Wood Street, Oakland (Granite Expo) | 93.4 | 93.4 | 93.4 | 1 | ibid |
| 1797 12th St, Oakland (Cole Brothers Auto Wrecker) | 1.67 | 5.22 | 8.78 | 2 | ibid |
| 3015 Adeline St, Oakland (California Electric) | 6.08 | 6.08 | 6.08 | 1 | ibid |
| 1266 14th St, Oakland (Amtech Lighting) | 5.70 | 5.70 | 5.70 | 1 | ibid |
| 3425 Ettie St, Oakland (Allied Painter) | 1.75 | 1.75 | 1.75 | 1 | ibid |
| 2838 Hannah St, Oakland (Former Giampolini) | 17.7 | 17.7 | 17.7 | 1 | ibid |
| 3428-3434 Helen Street, Oakland (ACM) | 10.6 | 10.6 | 10.6 | 1 | ibid |
| 1639 18th St, Oakland (Martinez Bros Trucking) | 1.95 | 1.95 | 1.95 | 1 | ibid |
| 2601-2812 Peralta St, Oakland (Custom Alloy Scrap Sales) | 1.78 | 7.09 | 14.7 | 4 | ibid |
| 280 West MacArthur Blvd, Oakland (Kaiser Oakland) | 0.01 | 1.67 | 27.2 | 101 | Forensic Analytical Environmental Health Consultants, 2017. PCB Soil and Sediment Waste Characterization and Disposal Plan, Kaiser Permanente Medical Center Oakland Legacy Tower Demolition Project, 280 West MacArthur Boulevard, Oakland, CA. Revised April 21, 2017. |
| 710 73rd Avenue, Oakland (Former Aero Plating) | 0.01 | 101 | 790 | 8 | Fugro Consultants, Inc. 2016. Limited Soil Sampling Investigation, 710 73rd Avenue, Oakland, CA. January. |
| 700 73rd Avenue, Oakland (Union Pacific Railroad) | 0.92 | 88.2 | 1,100 | 14 | CDM Smith, 2014. Report of Findings for Data Gaps Investigation Phase B - On-site Investigations, Union Pacific Railroad Company Property, 700 73rd Avenue, Oakland, CA. November 14. |
| 5441 International Boulevard, Oakland (General Electric) | 0.03 | 248 | 11,000 | 134 | Geosyntec Consultants, 2009. Feasibility Study Report for the GE Site at 5441 International Boulevard, Oakland, CA. June. |
| 4560 Horton Street, Emeryville (Former Southern Pacific Railroad) | 0.03 | 0.4 | 1.91 | 6 | EKI, 2016. Corrective Action Work Plan – Shallow Soil Excavation, Former SPRR Parcel South of 53rd Street, Emeryville, CA. June 29. |

| Site Location | Minimum (mg/kg) | Average (mg/kg) | Maximum (mg/kg) | Count | Reference |
|---|---|---|---|---|---|
| One Cyclotron Rd, Berkeley (Lawrence Berkeley National Laboratory) | 0.002 | 3.23 | 135 | 227 | Lawrence Berkeley National Laboratory, 2016. Quarterly and Semiannual Progress Reports for the LBNL Hazardous Waste Facility Permit. Environmental Restoration Program. August 1993 through February 2016. |
| CC-SPL-600-P | 1.29 | 1.29 | 1.29 | 1 | Contra Costa County 2015 POC Sampling |
| San Diego St, Richmond (San Diego St) | 0.03 | 0.12 | 1.2 | 14 | Arcadis, 2016. San Diego Street Transformer Oil Release Cleanup and Closure Report, West End of San Diego Street, Richmond, CA, February. |
| 1014 Chesley Ave, Richmond (World Oil) | 0.01 | 0.79 | 6.5 | 70 | APEX, 2018. PCB Characterization Report, World Oil Corporation Property, 1014 Chesley Avenue, Richmond, California. July 13. |
| 1215 Willow Pass Road, Pittsburg (Molino) | 0.02 | 1.19 | 5.6 | 10 | Ground Zero Analysis, 2016. Phase II Investigation at 1215 Willow Pass Road, Pittsburg, November 11. |
| **Average for All Properties** | | **32.5** | | | |

**Table A-4: Summary of PCBs concentrations in surface soil collected on-site from source properties located in Alameda, Contra Costa, Santa Clara, and San Mateo Counties.**

| Statistic | PCBs (mg/kg) |
|---|---|
| Maximum | 11,000 |
| 90th Percentile | 34 |
| 75th Percentile | 5.2 |
| **Average** | **47.8** |
| Median | 0.83 |
| 25th Percentile | 0.10 |
| 10th Percentile | 0.02 |
| Minimum | ND |
| *N* | 1,180 |

The Bay Area-wide average of PCBs in surface soil from known source properties, based on individual property averages, is 32.5 mg/kg (Table A-3) and the average based on individual sample concentrations is 47.8 mg/kg (Table A-4). An average concentration is the appropriate metric for the yield estimate, as it is representative of the total expected loading, which is affected by very high concentrations.

A sediment yield for Old Industrial land uses within the Santa Clara Basin watersheds was estimated based on a Loading Simulation Program – C++ (LPSC) watershed model developed for the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) as part of their reasonable assurance analysis (SCVURPPP 2020). The sediment yield estimated from the LPSC watershed model represents baseline hydrology and water quality, specifically sediment and solids. The median, LPSC-modeled sediment yield from Old Industrial land uses in the Santa

Clara Basin is 39 grams/m$^2$/year or 157.8 kg/acre/year. Using the average PCBs concentrations estimated with the two different approaches - 32.5 mg/kg (average of the site average) and 47.8 mg/kg (average of all data) from surface soils on Bay Area source properties presented above and the median Old Industrial sediment yield of 157.8 kg/acre, the estimated PCBs yield from source properties is 5,129 mg/acre/year and 7,559 mg/acre/year, respectively.

## A.4 Source Area/Property Mercury Yield

The derivation of the estimated yield of the mercury source property is described below. The mercury source property yield was derived as the product of a representative mercury concentration in surface soils at known source properties and a representative soil/sediment yield for old industrial areas.

Table A-5 and Table A-6 present descriptive statistics for measured concentrations of mercury from source properties located in Alameda, Contra Costa, Santa Clara, and San Mateo Counties. This dataset includes 19 mercury surface soil samples collected on-site at 13 source property locations. All soil samples included in the analysis were collected from the 0 to 0.5-foot depth interval, based on the assumption that the top 6 inches of soil would have the greatest potential to be mobilized off-site by wind or rainfall erosion. The range of mercury concentration (mg/kg) in surface soils for individual Bay Area source properties is provided in Table A-5, and the summary statistics for all sites combined are provided in Table A-6.

**Table A-5: Site-specific mercury concentration in surface soil collected on-site from source properties located in Alameda, Contra Costa, Santa Clara, and San Mateo Counties.**

| Site Location | Minimum (mg/kg) | Average (mg/kg) | Maximum (mg/kg) | Count | Reference |
|---|---|---|---|---|---|
| 543 S 8th St, Richmond | 1.11 | 1.11 | 1.11 | 1 | CCCWP on-site sampling 2025 |
| 901 Sanford Ave, Richmond | 0.098 | 1.17 | 1.95 | 3 | CCCWP on-site sampling 2025 |
| 215 Leo Avenue, San Jose | 6.9 | 6.9 | 6.9 | 1 | CW4CB Final Report/database (http://basmaa.org/Clean-Watersheds-for-a-Clean-Bay-Project) |
| 220 Leo Avenue, San Jose | 4.1 | 4.5 | 4.9 | 2 | CW4CB Final Report/database (http://basmaa.org/Clean-Watersheds-for-a-Clean-Bay-Project) |
| 245 Leo Avenue, San Jose | 15 | 15 | 15 | 1 | CW4CB Final Report/database (http://basmaa.org/Clean-Watersheds-for-a-Clean-Bay-Project) |
| 275 Leo Avenue, San Jose | 1.8 | 1.8 | 1.8 | 1 | CW4CB Final Report/database (http://basmaa.org/Clean-Watersheds-for-a-Clean-Bay-Project) |
| Alco Iron and Metal, San Jose | 1.9 | 3.8 | 5.6 | 2 | SCVURPPP POC Monitoring |
| Leo Ave Railroad | 3.3 | 4.95 | 6.6 | 2 | CW4CB Final Report/database (http://basmaa.org/Clean-Watersheds-for-a-Clean-Bay-Project) |
| Pollack Properties | 1.88 | 1.88 | 1.88 | 1 | SCVURPPP POC Monitoring |
| Schnitzer Recycling Yard, Berryessa Road, San Jose | 1.37 | 1.37 | 1.37 | 1 | SCVURPPP POC Monitoring |

| Site Location | Minimum (mg/kg) | Average (mg/kg) | Maximum (mg/kg) | Count | Reference |
|---|---|---|---|---|---|
| Silicon Valley Power, Lafayette Street, Santa Clara | 4.9 | 4.9 | 4.9 | 1 | SCVURPPP POC Monitoring |
| Sims Metal, San Jose | 1.5 | 5 | 8.5 | 2 | SCVURPPP POC Monitoring |
| Z-Con Specialty, San Jose | 1.32 | 1.32 | 1.32 | 1 | SCVURPPP POC Monitoring |
| **Average for All Properties** | | **4.13** | | | |

**Table A-6: Summary of mercury concentration in surface soil collected on-site from source properties located in Alameda, Contra Costa, Santa Clara, and San Mateo Counties.**

| Statistic | Mercury (mg/kg) |
|---|---|
| Maximum | 15 |
| 90th Percentile | 7.22 |
| 75th Percentile | 5.25 |
| **Average** | **3.90** |
| Median | 1.95 |
| 25th Percentile | 1.48 |
| 10th Percentile | 1.28 |
| Minimum | 0.098 |
| *N* | 19 |

Based on the data reviewed, the Bay Area-wide average of mercury in surface soil from known source properties, based on individual property averages, is 4.13 mg/kg (Table A-5) and the average based on individual sample concentrations is 3.90 mg/kg (Table A-6). An average concentration is the appropriate metric for the yield estimate, as it is representative of the total expected loading, which is affected by very high concentrations.

Using the same median sediment yield for Old Industrial land uses used for PCBs (39 grams/$m^2$/year or 157.8 kg/acre/year) and the average mercury concentrations of 4.13 mg/kg and 3.90 mg/kg presented above, the estimated mercury yield from source properties is 652 mg/acre/year and 615 mg/acre/year, respectively.

## A.5 Limitations and Uncertainty

Land use is used as a surrogate for actual PCBs and mercury source areas. Although many sources have been identified, the locations and sizes of additional sources are difficult to determine at this level of analysis. While categorized the same for modeling and analysis purposes, similar land use in different locations may have very different sources and thus distinctly different concentrations of PCBs and mercury in runoff.

It is difficult to quantitatively assess the implications of these limitations on the projected magnitude of loads, especially as analysis shifts from regional to more refined spatial scales. The

projected loads should be considered a first-order approximation and reflective of the central tendency of the data for the Bay Area as a whole.

## A.6 References


Gilbreath, Alicia, 2019. Personal communication via email, 2/26/2019.

McKee, L.J., Gilbreath, A.N., Wu, J., Kunze, M.S., Hunt, J.A., 2014. Estimating Regional Pollutant Loads for San Francisco Bay Area Tributaries using the Regional Watershed Spreadsheet Model (RWSM): Years 3 and 4 Progress Report. A technical report prepared for the Regional Monitoring Program for Water Quality in San Francisco Bay (RMP), Sources, Pathways and Loadings Workgroup (SPLWG), Small Tributaries Loading Strategy (STLS). Contribution No. 737. San Francisco Estuary Institute, Richmond, California.

San Francisco Estuary Institute (SFEI), 2018. Regional Watershed Spreadsheet Model (RWSM) Toolbox v1.0 User Manual and Pollutant Model. Available here: https://www.sfei.org/projects/regional-watershed-spreadsheet-model#sthash.kOKnKvF2.dpbs.

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# APPENDIX B
Urban Sediment Concentration Statistics

# APPENDIX B. URBAN SEDIMENT CONCENTRATION STATISTICS

## B.1 Descriptive Statistics

Table B-1 and Table B-2 and Figure B-1and Figure B-2 present descriptive statistics for the PCBs and mercury street and storm drain sediment dataset that BAMSC has compiled to date. This dataset includes 2,170 PCBs samples and 1,977 mercury samples taken within the street right-of-way and storm drain conveyance system from 1999 through June, 2026. The predominant land use in the vicinity of the sediment collection site is summarized in the data.

**Table B-1: PCBs concentrations in sediment (mg/kg) collected from streets and stormwater conveyance systems in Alameda, Contra Costa, Santa Clara, San Mateo, and Solano Counties from 1999 through 2026.**

| Statistic | Old Industrial | Old Urban - Commercial/ Transportation | Old Urban - Residential/ Parks | New Urban | Ag/Open | All |
|---|---|---|---|---|---|---|
| Maximum | 50.57 | 16.81 | 0.48 | 0.27 | 0.34 | 51 |
| 90th percentile | 0.70 | 0.19 | 0.19 | 0.07 | 0.15 | 0.62 |
| 75th percentile | 0.164 | 0.071 | 0.084 | 0.040 | 0.042 | 0.144 |
| **Mean** | **0.42** | **0.30** | **0.07** | **0.04** | **0.05** | **0.38** |
| Median | 0.04 | 0.04 | 0.03 | 0.04 | 0.03 | 0.04 |
| GeoMean | 0.06 | 0.04 | 0.02 | 0.02 | 0.02 | 0.06 |
| 25th percentile | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 |
| 10th percentile | 0.009 | 0.009 | 0.003 | 0.007 | 0.003 | 0.008 |
| Minimum | ND | ND | ND | ND | ND | ND |
| *n* | 1,911 | 74 | 70 | 58 | 57 | 2,170 |

**Table B-2: Mercury concentrations in sediment (mg/kg) collected from streets and stormwater conveyance systems in Alameda, Contra Costa, Santa Clara, San Mateo, and Solano Counties from 1999 through 2026.**

| Statistic | Old Industrial | Old Urban - Commercial/ Transportation | Old Urban - Residential/ Parks | New Urban | Ag/Open | All |
|---|---|---|---|---|---|---|
| Maximum | 20.60 | 1.72 | 4.52 | 12.54 | 4.26 | 20.60 |
| 90th percentile | 0.64 | 0.58 | 0.69 | 0.54 | 0.47 | 0.64 |
| 75th percentile | 0.27 | 0.24 | 0.37 | 0.29 | 0.20 | 0.27 |
| **Mean** | **0.33** | **0.23** | **0.46** | **0.52** | **0.29** | **0.34** |
| Median | 0.140 | 0.110 | 0.171 | 0.167 | 0.109 | 0.140 |
| GeoMean | 0.36 | 0.14 | 0.18 | 0.20 | 0.12 | 0.32 |
| 25th percentile | 0.078 | 0.078 | 0.080 | 0.113 | 0.051 | 0.078 |
| 10th percentile | 0.050 | 0.060 | 0.040 | 0.074 | 0.030 | 0.050 |
| Minimum | 0.0045 | 0.0150 | 0.0147 | 0.0480 | 0.0200 | 0.0045 |
| *n* | 1,743 | 63 | 66 | 55 | 50 | 1,977 |

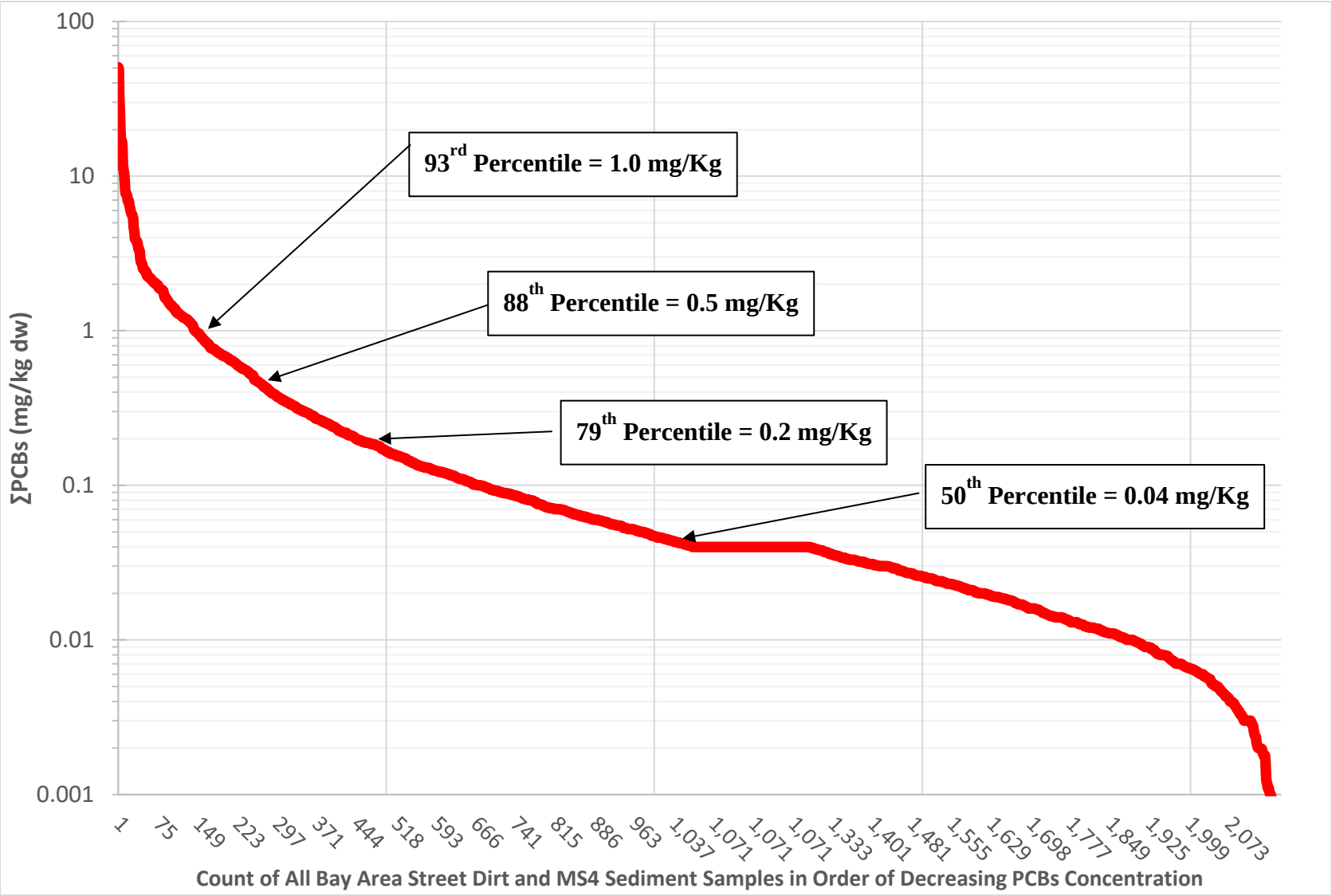


**Figure B.1 Total PCBs concentrations in sediment collected from streets and stormwater conveyance systems in Alameda, Contra Costa, Santa Clara, San Mateo, and Solano Counties from 1999 through 2026. Includes data associated with all land-use categories (i.e., old industrial, old urban-commercial/transportation, old urban-residential/parks, new urban, and agriculture/open-space).**

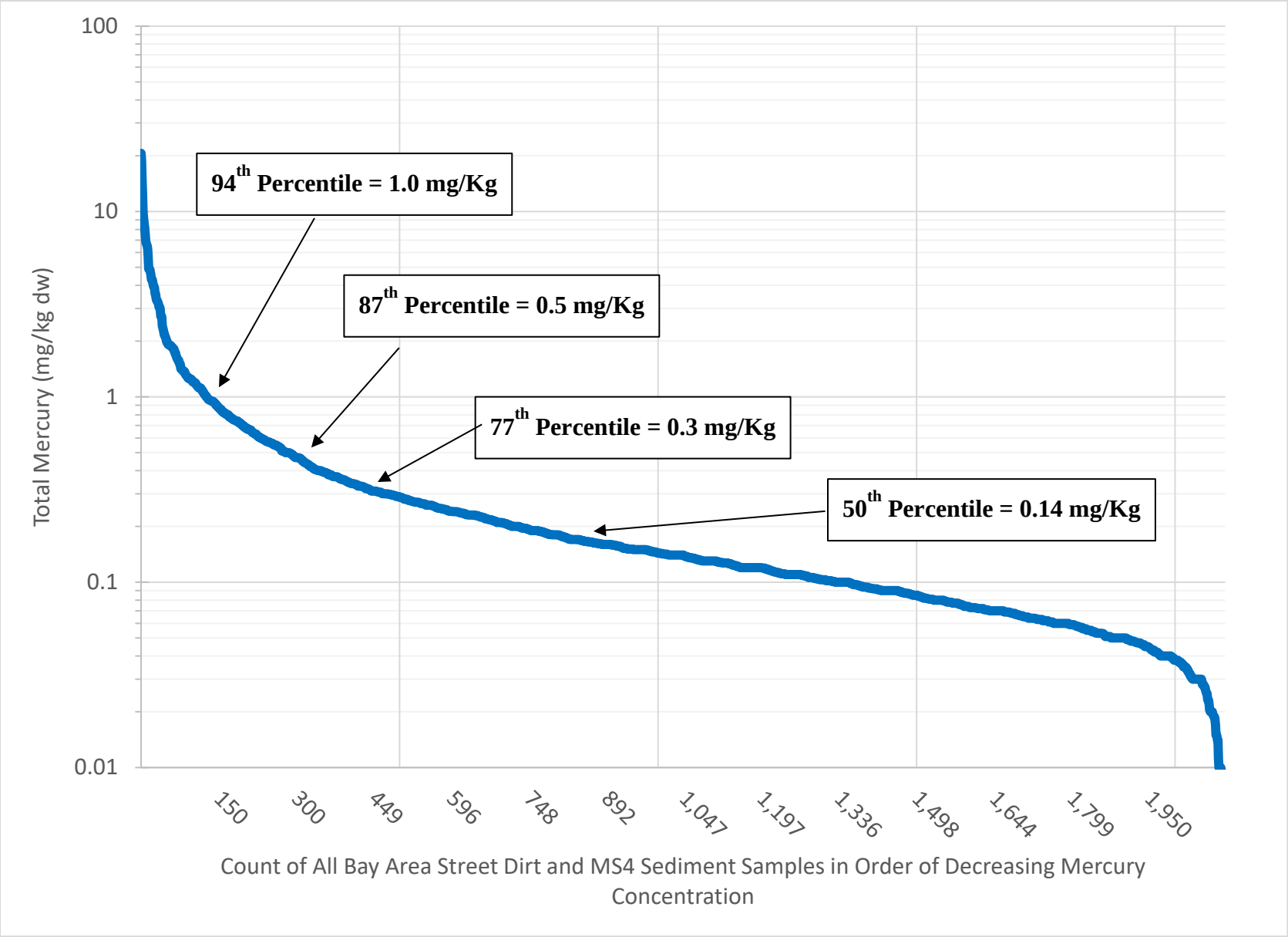


**Figure B.2 Total mercury concentrations in sediment collected from streets and stormwater conveyance systems located in Alameda, Contra Costa, Santa Clara, San Mateo, and Solano Counties from 1999 through 2026. Includes data associated with all land-use categories (i.e., old industrial, old urban-commercial/transportation, old urban-residential/parks, new urban, and agriculture/open-space).**

# APPENDIX C
Old Industrial Land Use Summary

# APPENDIX C. OLD INDUSTRIAL LAND USE SUMMARY

## C.1 Description of the Analysis

Table C-1 and Table C-2 summarize the extent and investigation status of Old industrial land use areas across the five-county region. Table C-1 presents the total baseline old industrial acreage and tracks progress to date, including areas that have been redeveloped, addressed through source property investigations or abatement, or otherwise determined to have low potential for PCBs based on monitoring data collected in the ROW or on-site. The remaining acreage represents parcels that have not yet been fully characterized and therefore remain the focus of ongoing and future source identification efforts. These data were updated for investigations conducted through June 2026.

Table C-2 further characterizes the remaining old industrial parcels by investigation status. Only a small portion of the remaining acreage has been confirmed through site-specific data as having moderate or high PCBs concentrations. A subset of parcels is currently under investigation based on elevated PCBs concentrations observed in right-of-way sampling, while the majority of the remaining acreage has not yet been evaluated with site-specific data.

**Table C-1: Old industrial areas in Alameda, Contra Costa, Santa Clara, San Mateo, and Solano Counties.**

| Category Description | ACCWP (acres) | CCCWP (acres) | SCVURPPP (acres) | SMCWPPP (acres) | SSA (acres) |
|---|---|---|---|---|---|
| Total Baseline Old Industrial | 12,035[a] | 12,394[a] | 9,590[b] | 6,372[c] | 1,407 |
| ROW | 1,491 | 802 | 2,116 | 1,202 | 67 |
| Old Industrial Parcels | 10,544 | 11,592 | 7,474 | 5,170 | 1,340 |
| Redeveloped Parcel Area | 1,180 | 904 | 2,582 | 877 | 593 |
| Referred or Abated PCBs Source Properties | 90 | 84 | 151 | 10 | 0 |
| Confirmed Low Parcel Area | 2,774 | 3,795 | 3,778 | 2,557 | 397 |
| **Remaining Old Industrial Parcel Area** | **6,499** | **6,808** | **963** | **1,726** | **350** |

[a]Excludes Port of Oakland, Caltrans-owned areas, and properties that discharge directly to San Franciso Bay (i.e., not the MS4).

[b]Excludes the federally-owned Moffett Federal Airfield, which is subject to the State Water Resources Control Board Industrial General Permit NPDES Permit. CAS000001 (Order No. 2014-0057-DWQ).

[c]Excludes the San Francisco International Airport (SFO), which is subject to NPDES Permit CA0038318 (Order R2-2025-0002) issued to the City and County of San Francisco .

**Table C-2: Breakdown of remaining old industrial parcel area via investigations conducted through June 2026 in Alameda, Contra Costa, Santa Clara, San Mateo, and Solano Counties.**

| Category Description | ACCWP (acres) | CCCWP (acres) | SCVURPPP (acres) | SMCWPPP (acres) | SSA (acres) |
|---|---|---|---|---|---|
| Confirmed moderate based on-site data | 17 | 45 | 28 | 21 | 0 |
| Confirmed high (Source Properties) based on on-site data | 139 | 171 | 43 | 124 | 0 |
| Under investigation moderate, based on moderate PCBs in ROW | 161 | 38 | 63 | 97 | 0 |
| Under investigation high, based on high PCBs in ROW | 69 | - | 57 | 502 | 0 |
| Remaining area to be investigated | 6,114 | 6,554 | 771 | 982 | 350 |

# APPENDIX D

Enhanced Inlet Cleaning Efficiency Factor Data Analysis for Storm Drain Inlets with and without Inlet-based Full Trash Capture Devices

# APPENDIX D. ENHANCED INLET CLEANING EFFICIENCY FACTOR DATA ANALYSIS FOR STORM DRAIN INLETS WITH AND WITHOUT INLET-BASED FULL TRASH CAPTURE DEVICES

## D.1 Purpose and Approach

The purpose of this appendix is to document findings of analyses conducted to determine the enhanced efficiency factors ($EE_f$) for sediment removal associated with enhanced storm drain inlet maintenance, including increasing the frequency of storm drain inlet cleaning, and the use of small (inlet-based, catch basin insert) full trash-capture (FTC) devices that are expected to capture larger amounts of trash, sediment and vegetation. First, the pollutant removal efficiency was calculated for the baseline control measure, which was assumed to be the annual cleanout of storm drain inlets without FTC devices. The efficiency factors were then developed for the following enhancements: (1) increased frequency of cleanouts at inlets without FTC devices; and (2) twice yearly cleanouts at inlets with FTC devices.

Based on a review of available literature, there are limited data available on the reductions of pollutants (including sediment) associated with different storm drain inlet maintenance frequencies. No studies were found that assessed the reduction of either PCBs or mercury due to enhanced inlet cleaning frequencies. Two studies in particular, Woodward Clyde (1994) and Caltrans (2003), however evaluated the increase in the removal of material (i.e., sediment, vegetation, and trash) from inlets under different cleaning frequencies. Results from both studies indicated that the annual volume of material removed from inlets increased with cleaning frequency.

The Caltrans (2003) *Drain Inlet Cleaning Efficacy Study* was designed to measure the potential increases in material volume/mass and water quality benefits due to increased inlet cleaning frequencies on freeways. The study was conducted from 1996 through 2000. The volume and mass of material removed annually, biannually, and three times per year cleaning frequencies at 55 to 90 inlets, depending on the year, were measured.

The Woodward Clyde (1994) *Storm Inlet Pilot Study* was conducted in Alameda County in 1993. This study was also designed to measure the potential increases in material volume and mass due to increased inlet cleaning frequencies. A total of 15 inlets draining residential, industrial, or commercial land uses were monitored. The volume and mass of material removed under annual, biannual, quarterly, and monthly cleaning frequencies were measured.

None of the inlets in the two studies identified above were equipped with FTC devices. To evaluate pollutant reductions associated with cleanouts of storm drain inlets equipped with small FTC devices, a recent study (SCVURPPP, 2016) documented cleanout volumes of materials removed from inlets equipped with FTC devices. The SCVURPPP (2016) *Storm Drain Trash Monitoring and Characterization* study focused on litter/trash, but also removed and measured other debris (defined as sediment and vegetation) from 119 inlets equipped with small FTC devices. These devices typically require cleaning frequencies of at least twice per year. Each of the 119 inlets was initially cleaned at the start of the project. The volume of trash and debris that accumulated within the inlets was removed and measured during two subsequent monitoring

events. The accumulation period between each monitoring event ranged from four to five months. The data were used to estimate the annual average volumes of trash and debris captured in each inlet. The annual volume of debris removed was converted to a mass using the average density of debris removed from inlets during the Woodward Clyde (1994) study, which was 38 pounds per cubic foot.

The percent increase of annual mass of debris removed from storm drain inlets during cleanouts, as measured in each of the three studies described above, is presented in Figure D-1. Caltrans removals for inlet cleaning without FTC devices appear to be much greater than removal efficiencies measured during the Woodward Clyde study and therefore may not be realistic for the purposes of developing conservative efficiency factors for load reduction accounting. The Woodward Clyde study results were used to represent the enhanced efficiency due to increased cleanout frequency of storm drain inlets without FTC devices. The results of the SCVURPPP (2016) study indicate that the use of inlet-based FTC devices, combined with an increased cleaning frequency of twice annually, appears to substantially increase the annual mass of debris that is captured and removed from these storm drain inlets during cleanouts.

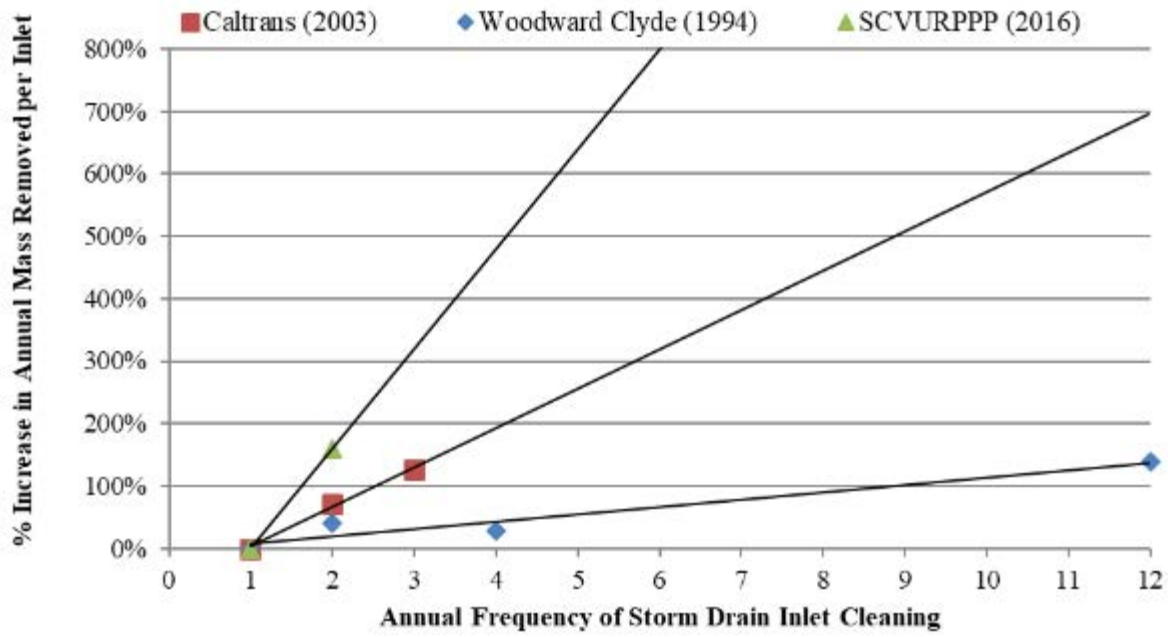


**Figure D.1: Reported results of increases in annual mass of debris (e.g., sediment and vegetation) removed as a result of increased cleaning frequency for storm drain inlet with and without small full trash-capture (FTC) devices.**

Based on the above findings, Table D-1 presents a conservative estimate of the enhanced efficiency factors for more frequent cleaning of storm drain inlets without FTC devices, and the enhanced efficiency factors for cleaning storm drain inlets equipped with inlet-based FTC

devices at least twice per year. For the purposes of load reduction accounting, the method assumes the following:

- Based on an analysis of 36 Alameda County and San Mateo Permittee storm drain inlet cleaning datasets from 1996 through 2009, on average, municipalities clean their inlets once per year (annually);
- Based on the same dataset, an average of 100 kg of material (sediment, vegetation, and litter) is removed from each inlet annually (see descriptive statistics below);

| Statistic | Mass (Kg) of Material Removed Annually per Inlet |
|---|---|
| Maximum | 4,049 |
| 90th Percentile | 476 |
| 75th Percentile | 284 |
| Mean | 268 |
| **Geometric Mean** | **100** |
| Median | 91 |
| 25th Percentile | 41 |
| 10th Percentile | 21 |
| Minimum | 5 |
| # of Municipalities in Dataset | 36 |

- Each inlet (on average) receives drainage from a catchment of 1 acre (BASMAA, 2014), equating to a unit material removal rate of 100 kg per acre per year;
- The mass fraction of material removed during cleanouts that is associated with PCBs and mercury yields (i.e., sediment <63um) is approximately 15% on average (McKee et al., 2006);
- The annual suspended sediment load to each inlet is roughly 134 kg per year on average based on the modeled value for Old Urban land use (Paradigm Environmental, 2020, see attachment to Appendix A); and
- Based on the assumptions above, roughly 15 kg of sediment associated with PCBs and mercury is removed from each inlet cleaned on an annual frequency, equating to about an 11% reduction of PCBs and mercury via annual cleaning (i.e., 15 kg / 134 kg). This is the control measure effectiveness of annual cleaning of storm drain inlet without FTC devices.

Assuming the baseline control measure effectiveness for annual cleaning of 11%, data from the studies cited above were used to calculate the enhanced efficiency factors for storm drain inlet cleaning at increasing frequencies for inlets without FTC devices, and twice-yearly cleaning of inlets that have been equipped with small FTC devices, as shown in Table D-1.

**Table D-1: Enhanced efficiency factors (EEf) for increased storm drain inlet cleaning frequencies for storm drain inlets both with and without small full trash-capture (FTC) devices.**

| | Enhanced Cleaning Frequency for Inlets without FTC devices – Annually | Enhanced Cleaning Frequency for Inlets without FTC devices – Biannually | Enhanced Cleaning Frequency for Inlets without FTC devices – Quarterly | Enhanced Cleaning Frequency for Inlets without FTC devices – Monthly | Enhanced Cleaning Frequency for Inlets with FTC Devices – Biannually |
|---|---|---|---|---|---|
| **Original Cleaning Frequency – No Cleaning or New Inlet** | 0.11 | 0.16 | 0.16 | 0.27 | 0.29 |
| **Original Cleaning Frequency – Annually** | | 0.05 | 0.05 | 0.16 | 0.18 |

## D.2 References


BASMAA (2014). San Francisco Bay Area Stormwater Trash Generation Rates - Final Technical Report. Bay Area Stormwater Management Agencies Association. Prepared by EOA, Inc. Oakland. June.

Caltrans (2003). Drain Inlet Cleaning Efficacy Study. California Department of Transportation. CTSW-RT-03-057.36.1. June.

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Paradigm Environmental (2020). Technical Memorandum: Modeled Yield Estimates from SCVURPPP (all ABAG HRUs). January 7, 2020.

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# APPENDIX E
Enhanced Street Sweeping Efficiency Factors

# APPENDIX E. ENHANCED STREET SWEEPING EFFICIENCY FACTORS

## E.1 Description of the Analysis

The Clean Watersheds for Clean Bay (CW4CB)[4] Task 4 pilot projects evaluated enhancements of municipal operation and maintenance activities that remove sediments and associated pollutants, including PCBs and mercury. This objective coincided with Municipal Regional Stormwater NPDES Permit (MRP, Order R2-2009-0074) Provision C.12.d, which required MRP Permittees to evaluate at the pilot scale in five drainages, ways to enhance existing sediment removal and management practices such as municipal street sweeping, curb clearing parking restrictions, inlet cleaning, catch basin cleaning, stream and stormwater conveyance system maintenance, and pump station cleaning via increased effort and/or retrofits. MRP Provision C.12.d also required Permittees to evaluate existing information on high-efficiency street sweepers, with the goal of evaluating the cost-effectiveness of high-efficiency street sweeping relative to reducing pollutant loads.

Appendix B-1 of the CW4CB Final Report summarizes the results of the Task 4 enhanced street sweeping pilot project that occurred in four pilot study areas (two sites in Richmond and one each in San Jose and Sunnyvale). This study entailed collecting monitoring data in each pilot study area representative of the baseline sweeping condition. The monitoring data were then used to calibrate the Windows Source Loading and Management Model (WinSLAMM) to evaluate sediment, PCBs, and mercury in the pilot study areas. Once WinSLAMM calibrated using the pilot study data, it was used to model street sweeping performance in the pilot study areas during the baseline condition for sediment, PCBs, and mercury. WINSLAMM was also used to model the effectiveness of various street sweeping scenarios for the pilot study areas for removing sediment, PCBs, and mercury. The modeled scenarios included (1) different sweeper types, (2) sweeping frequencies, and (3) street roughness values. The modeled scenarios assumed parking controls were in effect.

The results of the scenario analysis are presented in Table E-1 and Table E-2 below for PCBs and mercury, respectively.

[4] For more information, see: http://basmaa.org/Clean-Watersheds-for-a-Clean-Bay-Project.

**Table E-1: Change in PCBs Mass Removal Efficiency (%) from Initial Street Sweeping Scenario to Final Scenario.**

| **Scenario** | | | | **Final** | **Final** | **Final** | **Final** | **Final** | **Final** | **Final** | **Final** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Sweeper Type** | | | Vacuum | Vacuum | Vacuum | Vacuum | Vacuum | Vacuum | Vacuum | Vacuum |
| | | **Street Roughness** | | Rough | Intermediate | Rough | Intermediate | Rough | Intermediate | Intermediate | Rough |
| | | | **Frequency** | Once per 4 weeks | Once per 4 weeks | Once per 2 weeks | Once per 2 weeks | Once per week | Once per week | Twice per week | Twice per week |
| **Initial** | None | None | None | 9.9% | 14% | 15% | 18% | 19% | 21% | 21% | 22% |
| **Initial** | Vacuum | Intermediate | Once per week | -11% | -7% | -6% | -3% | -2% | 0% | 0% | 1% |
| **Initial** | Vacuum | Intermediate | Once per 2 weeks | -8% | -4% | -3% | 0% | 1% | 3% | 3% | 3% |
| **Initial** | Vacuum | Intermediate | Once per 4 weeks | -4% | 0% | 1% | 4% | 5% | 7% | 7% | 8% |
| **Initial** | Vacuum | Intermediate | Twice per week | -11% | -7% | -6% | -3% | -2% | 0% | 0% | 1% |
| **Initial** | Vacuum | Rough | Once per week | -9% | -5% | -4% | -1% | 0% | 2% | 2% | 2% |
| **Initial** | Vacuum | Rough | Once per 2 weeks | -5% | -1% | 0% | 3% | 4% | 6% | 6% | 6% |
| **Initial** | Vacuum | Rough | Once per 4 weeks | 0% | 4% | 5% | 8% | 9% | 11% | 11% | 12% |
| **Initial** | Vacuum | Rough | Twice per week | -12% | -8% | -6% | -3% | -2% | -1% | -1% | 0% |

Notes:
Change in efficiency resulting from change in sweeping scenario represented by negative values (reduction in efficiency) and positive values (increase in efficiency).

**Table E-2: Change in Mercury Mass Removal Efficiency (%) from Initial Street Sweeping Scenario to Final Scenario.**

| **Scenario** | | | | **Final** | **Final** | **Final** | **Final** | **Final** | **Final** | **Final** | **Final** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Sweeper Type** | | | Vacuum | Vacuum | Vacuum | Vacuum | Vacuum | Vacuum | Vacuum | Vacuum |
| | | **Street Roughness** | | Rough | Intermediate | Rough | Intermediate | Rough | Intermediate | Intermediate | Rough |
| | | | **Frequency** | Once per 4 weeks | Once per 4 weeks | Once per 2 weeks | Once per 2 weeks | Once per week | Once per week | Twice per week | Twice per week |
| **Initial** | None | None | None | 9.1% | 10% | 10% | 10% | 10% | 11% | 11% | 11% |
| **Initial** | Vacuum | Intermediate | Once per week | -1% | 0% | 0% | 0% | 1% | 2% | 2% | 2% |
| **Initial** | Vacuum | Intermediate | Once per 2 weeks | 0% | 0% | 0% | 0% | 1% | 2% | 2% | 2% |
| **Initial** | Vacuum | Intermediate | Once per 4 weeks | 0% | 0% | 1% | 1% | 1% | 2% | 2% | 2% |
| **Initial** | Vacuum | Intermediate | Twice per week | -1% | 0% | 0% | 0% | 1% | 2% | 2% | 2% |
| **Initial** | Vacuum | Rough | Once per week | -2% | -2% | -2% | -2% | -1% | 0% | 0% | 0% |
| **Initial** | Vacuum | Rough | Once per 2 weeks | -2% | -2% | -2% | -2% | -1% | 0% | 0% | 0% |
| **Initial** | Vacuum | Rough | Once per 4 weeks | -1% | -1% | -1% | -1% | 0% | 1% | 1% | 1% |
| **Initial** | Vacuum | Rough | Twice per week | -2% | -2% | -2% | -2% | -1% | 0% | 0% | 0% |

Notes:
Change in efficiency resulting from change in sweeping scenario represented by negative values (reduction in efficiency) and positive values (increase in efficiency).

# APPENDIX F

Mercury and PCBs Load Reduction from Storm Drain Cleanouts

# APPENDIX F. MERCURY AND PCBS LOAD REDUCTION FROM STORM DRAIN LINE CLEANOUTS

## F.1 Background

Municipal Regional Stormwater Permit (MRP) Provisions C.11.c and C.12.c require the Permittees to, within the permit term, implement or cause to be implemented control measures to achieve mercury and polychlorinated biphenyls (PCBs) load reductions. The Alameda County Permittees within San Francisco Bay Regional Water Quality Control Board Region 2 must implement control measures on 664 acres of old industrial land use area that have not been redeveloped or treated with GSI or other treatment controls or alternatively reduce loads of mercury by 28 grams per year (g/yr) and PCBs by 121 g/yr, by June 30, 2027.

One of the mercury and PCBs treatment control measures that will be implemented by the Alameda County Permittees during this permit term to control urban runoff from areas containing known or suspected sources or areas with evidence of moderate to high mercury or PCBs soil concentrations is enhanced operation and maintenance (O&M) practices, and, specifically, storm drain line cleaning. This memorandum estimates mercury and PCBs loads reduced (and equivalent old industrial acres treated) resulting from the City of Oakland storm drain line cleanout activities.

## F.2 Methodology

Load reductions have been estimated in accordance with the approved *Source Control Load Reduction Accounting for Reasonable Assurance Analysis* report (BASMAA, 2022).

Geosyntec used the following method for estimating mercury and PCBs load reduction for storm drain line cleanout:

$$Load\ Reduced = L \cdot\ M \cdot Conc$$

Where:

| | | |
|---|---|---|
| Load Reduced | = | Estimated mercury or PCBs load reduction from storm drain line cleanouts (g/yr) |
| L | = | Average annual length of the storm drain line cleanout (ft/yr) |
| M | = | Unit mass of sediments removed per foot of storm drain line cleanout (kilograms (kg)/ft) |
| Conc | = | Mean concentration of mercury or PCBs in sediments within old industrial land use areas (milligrams (mg)/kg) |

The following subsections summarize the inputs and assumptions used to estimate the individual components of the load reduction calculation: *L*, *M*, and *Conc*.

### F.2.1 Storm Drain Line Cleanout Length, *L*

The City of Oakland (City) provided Geosyntec with a list of storm drain cleanouts across the City that occurred from 2021 to 2023. The address, pipe cleanout length, and cleanout date were

provided for each cleanout event. Using the address, Geosyntec selected the cleanouts conducted within the Emeryville Crescent and San Leandro Bay watersheds and within 200 ft of old industrial land use areas. The total annual cleanout lengths for 2021, 2022, and 2023 and the three-year average were calculated (Table F-1). The three-year average of 5,520 ft was assumed to be representative of the average annual length of the storm drain line cleanout for estimated load reductions.

**Table F-1: City of Oakland Storm Drain Cleanout Events and Pipe Length Summary**

| Year | Number of Storm Drain Line Cleanouts | Length of Storm Drain Line Cleanouts (ft) |
|---|---|---|
| 2021 | 34 | 4,780 |
| 2022 | 27 | 4,010 |
| 2023 | 31 | 7,780 |
| Total | 92 | 16,570 |
| **Average Annual** | **31** | **5,520** |

### F.2.2 Unit Mass of Sediment Removed, *M*

Two sources of input for the unit mass of sediments removed by storm drain cleanout were considered:

1. The Leo Avenue Pilot Project from the Clean Watersheds for a Clean Bay grant project conducted by the Bay Area Stormwater Management Agencies Association (BASMAA, 2017). The calculated mass of solids per linear foot of the storm drain line was 3.8 kg/ft. Due to Leo Avenue's unique location and configuration, the sediment accumulation rate was likely higher than the typical accumulation rate of a larger storm drain system.

2. Geosyntec estimated the corresponding unit mass of one inch of sediment accumulation in an average pipe is 1.37 kg per linear foot. The calculation was performed by first determining the length-weighted average pipe diameter, 29.7 inches, of all storm drain pipes within the priority watersheds and old industrial areas. With the one-inch sediment accumulation assumption, the unit volume of the sediment accumulated was calculated to be 0.050 cubic feet per foot length of the pipe. Using the dry bulk density of the sediment from the Leo Avenue pilot project, 0.965 g/cm$^3$, the unit mass of sediment in a linear foot of storm drain pipe was estimated to be 1.37 kg/ft. Following the same approach, the unit mass of sediment corresponding to a two-inch accumulation was calculated to be 3.82 kg/ft.

Table F-2 below summarizes the three unit mass values of the sediment removed from one foot of storm drain pipe.

**Table F-2: Summary of Unit Mass of Sediment Removed Per Foot of Storm Drain Pipe**

| Assumption / Source | Unit Mass of Sediment Removed (kg/ft) |
|---|---|
| Leo Avenue Pilot Project | 3.80 |
| One-inch Accumulation Assumption | 1.37 |
| Two-inch Accumulation Assumption | 3.82 |

### F.2.3 Mercury and PCBs Concentration, *Conc*

The mercury and PCBs mean sediment concentrations associated with old industrial land uses were calculated using the available sediment sampling data collected from within the combined old industrial areas of Alameda County and Contra Costa County from 2001 to 2022. A total of 187 and 241 data points were used for the analyses of mercury and PCBs, respectively. Sediment sampling results located within fifty meters of known source properties were removed to prevent overestimation of mercury and PCBs concentrations.

The data were first transformed by taking the natural logarithm of each data point, assuming that environmental data is lognormally distributed. The total number of data points are summarized in Table F-3 below. The log-transformed mercury and PCBs datasets were next assessed for normality using the Shapiro-Wilk test. The test results are shown in Table F-3. A p-value below 0.05 indicates that the sample did not come from a normally distributed population. The p-values of the mercury and PCBs data distributions were 0.172 and 0.080, respectively, thus indicating that both datasets follow the lognormal distribution (Figure F-1):

**Table F-3: Data Count and Shapiro-Wilk Test Results**

| Pollutant of Concern | Data Count | W | p | Conclusion |
|---|---|---|---|---|
| Mercury | 187 | 0.99 | 0.172 | Lognormal distribution |
| PCBs | 241 | 0.99 | 0.080 | Lognormal distribution |

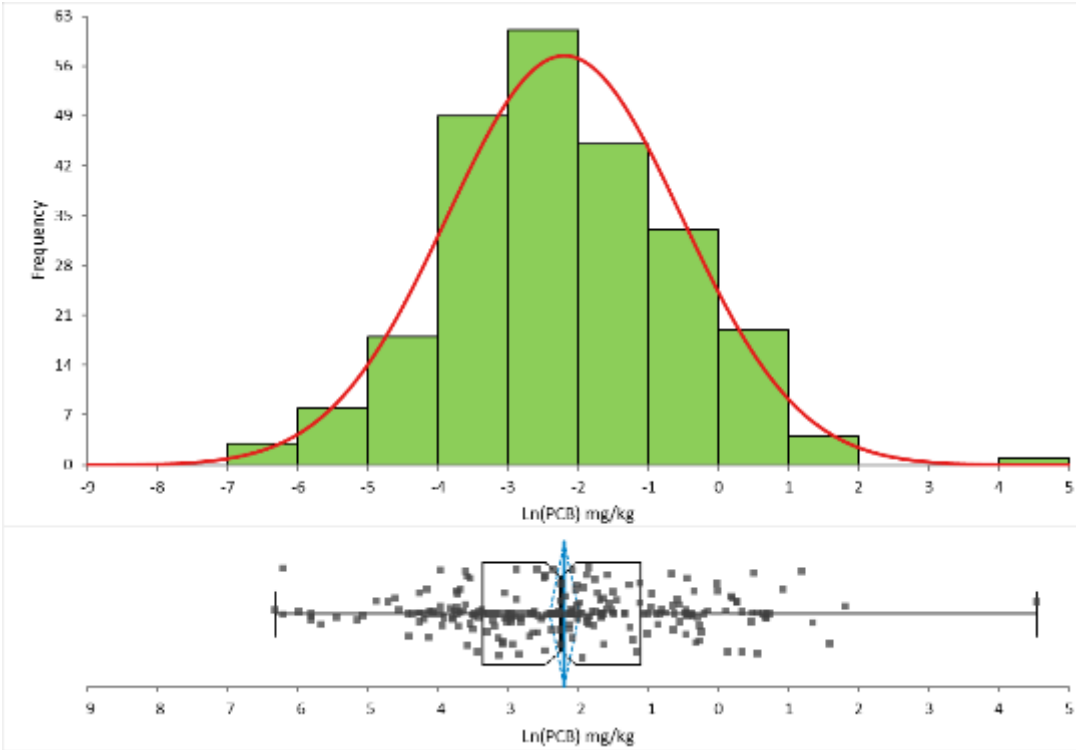


**Figure F.1: Distribution of sampling results for PCBs. For the box scatter plot, the median is shown as the bold line (with a 95% confidence interval shown as a notch on the box), the mean as the blue line (with 95% confidence interval shown as a dashed diamond), the 1st and 3rd quartiles as the edges of the box, and minimum/maximum as end caps.**

The mean concentrations of the natural log-transformed distributions were then calculated using the natural logs of the mean and the standard deviation as shown in the equation below:

$$Mean = \exp(\mu_{ln} + 0.5\sigma_{ln}^2)$$

Where:

exp = e to the power of

$\mu_{ln}$ = the mean of the natural log-transformed distribution

$\sigma_{ln}$= the standard deviation of the natural log-transformed distribution

The back-transformed mean sediment concentrations associated with old industrial land uses for mercury and PCBs are 0.331 and 0.450 mg/kg, respectively (Table F-4).

**Table F-4: Arithmetic Mean Mercury and PCB Concentrations (mg/kg)**

| Pollutant of Concern | μ | σ | Arithmetic Mean Concentration (mg/kg) |
|---|---|---|---|
| Mercury | -1.492 | 0.879 | 0.331 |
| PCBs | -2.20 | 1.672 | 0.450 |

## F.3 Results

Using the equation and inputs defined in Section 2, the load reduction results for storm drain line cleanouts are shown in Table F-5 below. Details on the calculation inputs are provided in Table F-6 below. The PCBs load reductions were estimated to range from 3.4 g/yr to 9.5 g/yr. The mercury load reductions were estimated to range from 2.5 g/yr to 7.0 g/yr.

As defined in the MRP, implementing treatment controls on 664 acres of old industrial land use is equivalent to reducing mercury by 28 g/yr and PCBs by 121 g/yr. The potential PCBs load reduction achieved by storm drain line cleanout in the City of Oakland priority watersheds of 3.4 to 9.5 g/yr is equivalent to treating 19 to 52 acres of old industrial area.

**Table F-5: Storm Drain Line Cleanout Load Reduction Summary**

| Parameter | PCBs Low | PCBs High | Mercury Low | Mercury High |
|---|---|---|---|---|
| L (ft) | 5520 | 5520 | 5520 | 5520 |
| M (kg/ft) | 1.37 | 3.82 | 1.37 | 3.82 |
| Conc (mg/kg) | 0.45 | 0.45 | 0.33 | 0.33 |
| **Annual Load Reduction (g/yr)** | **3.4** | **9.5** | **2.5** | **7.0** |
| **Equivalent Area Treated (ac)** | **19** | **52** | **59** | **166** |

**Table F-6: Details of the City of Oakland Storm Drain Line Cleaning in Old Industrial Areas in the Priority Emeryville Crescent and San Leandro Bay Watersheds**

| Parameter Description | Unit Mass Estimate Based on Leo Avenue Assumption[1] | Unit Mass Estimate Based on Two Inch Assumption[1] | Unit Mass Estimate Based on One Inch Assumption[1] | Units |
|---|---|---|---|---|
| Total length of storm drain line cleanouts within old industrial areas in the priority watersheds from 2021 to 2023 | 16,570 | 16,570 | 16,570 | ft |
| Length of average annual storm drain line cleaned within old industrial areas in the priority watersheds | 5,520 | 5,520 | 5,520 | ft/yr |
| Volume of sediment removed per linear foot of storm drain line | - | 0.140 | 0.050 | $ft^3/ft$ |
| Measured sediment bulk density (dry weight) from the Leo Avenue Watershed Pilot Project (CW4CB 2017) | 0.965 | 0.965 | 0.965 | $g/cm^3$ |
| Calculated mass of solids removed per linear foot of storm drain line | 3.80 | 3.82 | 1.37 | kg/ft |
| Calculated mean mercury concentration in sediment associated with old industrial land uses | 0.331 | 0.331 | 0.331 | mg/kg |
| Calculated mean PCBs concentration in sediment associated with old industrial land uses | 0.450 | 0.450 | 0.450 | mg/kg |

| Parameter Description | Unit Mass Estimate Based on Leo Avenue Assumption[1] | Unit Mass Estimate Based on Two Inch Assumption[1] | Unit Mass Estimate Based on One Inch Assumption[1] | Units |
|---|---|---|---|---|
| Calculated annual mercury load reduced from storm drain cleanout within old industrial areas in the priority watersheds | 6.9 | 7.0 | 2.5 | g/yr |
| Calculated annual PCBs load reduced from storm drain cleanout within old industrial areas in the priority watersheds | 9.4 | 9.5 | 3.4 | g/yr |
| Acres of old industrial area treated per PCBs g/yr reduced, from the MRP (664 acres:121 g PCBs/yr) | 5.5 | 5.5 | 5.5 | acres |
| Equivalent acres of old industrial area treated for annual PCBs load reduced | 52 | 52 | 19 | acres |

Notes:
[1]See Table F-2 for summary of unit mass of sediment removed per foot of storm drain pipe

## F.4 References

Bay Area Stormwater Management Agencies Association (BASMAA), 2017. Storm Drain System Cleaning and Video Inspection Pilot Project – Leo Avenue Watershed, San Jose, CA, April 2017

BASMAA, 2022. Source Control Load Reduction Accounting for Reasonable Assurance Analysis. Prepared for BASMAA by Geosyntec Consultants and EOA, Inc. January 2022.

# APPENDIX G

Large Full Trash Capture Device Efficiency Factor Data Analysis

# APPENDIX G. LARGE FULL TRASH CAPTURE DEVICE EFFICIENCY FACTOR DATA ANALYSIS

## G.1 Purpose and Approach

The purpose of this appendix is to document findings of studies and analyses conducted to determine the effectiveness for removing total suspended solids (TSS), PCBs, and mercury by large (non-inlet-based) trash capture devices, including hydrodynamic separator (HDS) units, gross solids removal devices (GSRDs), and baffle boxes. Other types of non-inlet-based trash capture devices, such as trash netting devices and trash booms, are assumed to remove negligible amounts of sediment, PCBs, and mercury, so are not included in this appendix. Inlet-based devices, including inlet baskets and connector pipe screens, are discussed in Appendix G. For the purposes of load reduction accounting, the method assumes that HDS units, GSRDs, and baffle boxes reduce PCBs and mercury concentrations in direct proportion to TSS reduction.

## G.2 HDS Units

**Percent Removal of TSS**. Percent removal of TSS in HDS units was calculated from the BASMAA Clean Watersheds for a Clean Bay (CW4CB) Task 5 Leo Avenue pilot project data (BASMAA 2017a). For this project, a prefabricated Contech HDS unit called the Continuous Deflective Separator (CDS) was retrofitted into the existing storm drain system in the Leo Avenue Watershed in San Jose.

Influent and effluent water quality was sampled at four events as summarized in Table G-1 below. The CDS unit removed an average of 30% of TSS coming into the unit.

**Table G-1: Percent Removal of TSS at Leo Ave CDS Unit**

| Event | Date | Sample Location | TSS (mg/L) | % Removal |
|---|---|---|---|---|
| 1 | 28-Feb-14 | Inflow | 110 | NA |
| 1 | 28-Feb-14 | Outflow | 91 | 17% |
| 2 | 29-Mar-14 | Inflow | 230 | NA |
| 2 | 29-Mar-14 | Outflow | 190 | 17% |
| 3 | 31-Oct-14 | Inflow | 62 | NA |
| 3 | 31-Oct-14 | Outflow | 7.5 | 88% |
| 4 | 02-Dec-14 | Inflow | 82 | NA |
| 4 | 02-Dec-14 | Outflow | 84.5 | -3% |
| | | | **Average** | **30%** |

The International Stormwater BMP Database (http://bmpdatabase.org/) was evaluated for potentially useful studies. Twenty studies of manufactured devices were identified as useful for analysis. These studies had a total of 334 paired inflow/outflow data points for TSS. Percent removal was calculated for each paired data point and then averaged for the BMP. The results for these studies along with descriptions of land use type and watershed size and imperviousness are presented in Table G-2 below. Average percent removal ranged from -85% (i.e., an increase in

TSS concentration in outflow compared to inflow) to 73% and averaged 19% across all studies (including the City of San Jose's Leo Avenue unit).

The dataset was also analyzed by removing BMPs that were treating just roads or highways, parking lots, or college campuses. In this scenario, ten studies remained that had mixed, other, or unknown land use type. The average percent removal of TSS from the BMPs evaluated in this group of studies was slightly higher at 22%.

**Table G-2: Percent Removal of TSS for Studies in BMP Database**

| Site and BMP | Device Model | Land Use Type | Watershed % impervious | Watershed Area (ac) | Average TSS % Removal[1] |
|---|---|---|---|---|---|
| OP Soccer Complex: PMSU56_40_40 | Contech CDS, Model PMSU56_40_10 | Parking lots adjacent to soccer fields. | 90 | 3.98 | -85% |
| NW Birch Place CDS unit: Continuous Deflective Separation unit | CDS Unit | Low Density Residential: 47.4%<br>Office Commercial: 42.2%<br>Multi-Family Residential: 10.3% | -- | 45.0 | -14% |
| Broadway Outfall: CDS Unit | CDS | | | 132 | -6% |
| University of New Hampshire F3: Continuous Deflective Separation | CDS | College Campus: 100% | 100 | 0.32 | -5% |
| Lake O Sediment Demo: CDS Unit | PSW56_53 | | -- | -- | -3% |
| I-210 / Orcas Ave: Orcas | CDS | Roads/Highway: 100% | 100 | 1.11 | -3% |
| USGS_WI_HSD_DD: Hydrodynamic Settling Device | Downstream Defender®, manufactured by Hydro International. | | 84 | 1.90 | -1% |
| I-210 / Filmore Street: Filmore CDS | CDS | Roads/Highway: 100% | 100 | 2.50 | 2% |
| University of New Hampshire F2: Environment 21 V2B1 | Environment 21 V2B1 | College Campus: 100% | 100 | 0.32 | 5% |
| University of New Hampshire F1: Vortechnics | Vortechnics | College Campus: 100% | 100 | 0.32 | 13% |
| USGS_WI_HSD: HSD | Hydrodynamic Settling Device, Contech | The HSD treats a 0.25-acre deck section of the westbound I–794 freeway | 100 | 0.25 | 26% |
| Harrisburg Public Works Yard: PAYardTerreKleene | Terre Kleen | -- | 90 | 3.21 | 28% |

| Site and BMP | Device Model | Land Use Type | Watershed % impervious | Watershed Area (ac) | Average TSS % Removal[1] |
|---|---|---|---|---|---|
| SC_StructBMP3: BMP3 | Vortechnics | BMP3 is located along the westbound lane of S.C. Highway 802 | -- | -- | 29% |
| Indian River Lagoon CDS Unit: CDS Unit | CDS | Open Space: 38%<br>Light Industrial: 32%<br>Office Commercial: 19% | 11 | 61.5 | 30% |
| Leo Avenue: HDS Unit[2] | Contech CDS | -- | -- | -- | 30% |
| SC_StructBMP1&2: BMP2 | CDS Technologies | BMP2 is located along the southbound lane of U.S. Highway 21 | 100 | 1.11 | 39% |
| University of New Hampshire E1: Aqua Swirl | Aqua Swirl | College Campus: 100% | 100 | 0.99 | 40% |
| Timothy Edwards Middle School: Vortechs No 5000 | Vortechs | -- | 80 | 1.95 | 45% |
| VC: VC | Vortcapture | Residential area with lots of organic matter/leaf litter loading | -- | -- | 53% |
| Marine Village Watershed: VortechsTM Stormwater Treatment System | Vortechs | Office Commercial: 50%<br>Medium Density Residential: 45%<br>Unknown: 5% | 95 | 9.34 | 72% |
| NJ Manasquan Bank: NJManasquanCDS | High Efficiency Continuous Deflective Separator (CDS), Model 20_25 | -- | 79 | 0.89 | 73% |

Notes: -- indicates information was not provided.
1. Based on analysis of paired inflow/outflow results.
2. Leo Ave CW4CB study. Not a BMPDB Study.

The manufacturer's removal efficiency claims and the tested removal efficiencies of six of the BMPs evaluated in the studies were summarized as reported in the Massachusetts Stormwater Technology Evaluation Project (MASTEP) clearinghouse database (Table G-3).

**Table G-3: Percent Removal of TSS for Six Manufactured Devices from MASTEP**

| Product (BMP) | Manufacturer | Manufacturer's Removal Efficiency claim | Tested Removal Efficiency |
|---|---|---|---|
| Aqua-Swirl | Aqua Shield | 85% | 84-87% |
| CDS | Contech | 70% | 65-95% |
| Vortechs | Contech | 35-85% | 35-64% |
| Downstream Defender | Hydro International | 90% | 70% |
| V2B1 | Environment 21 | 80% | 65% |
| Terre Kleen | Terre Hill | 78% | 17-50% |
| | | **Average[1]** | **56%** |

Notes: 1. Average based on low end of reported efficiency range.

Based on the above findings, 20% is a conservative estimate of the average percent removal of TSS by HDS units.

**Percent Removal of PCBs and Mercury.** To further evaluate the pollutant removal performance of HDS units, BASMAA (2019) conducted a combined monitoring and modeling study in 2017 and 2018 based on the removal of solids captured within HDS unit sumps. The Project collected samples of the solids captured and removed from eight different HDS unit sumps during cleanouts. The solid samples were analyzed for PCBs and mercury concentrations. Maintenance records and construction plans for these HDS units were reviewed to develop estimates of the average volume of solids removed per cleanout and the typical number of cleanouts per year. This information was combined with the measured pollutant concentrations to calculate the annual mass of PCBs and mercury captured in the sumps and removed during cleanouts. Next, the annual pollutant loads discharged from each HDS unit catchment were estimated using two different load calculation methods. Method #1 used the land use-based pollutant yields described in the BASMAA Interim Accounting Methodology (BASMAA 2017b) to estimate catchment loads. Method #2 used the Regional Watershed Spreadsheet Model (RWSM, Wu et al. 2017) to estimate runoff volumes and stormwater concentrations and calculate catchment-specific loads. Finally, HDS unit performance was evaluated for both catchment load estimates by calculating the average annual percent removal of PCBs and mercury due to the annual mass removal of solids from the HDS unit sumps. Results are presented in Table G-4.

For catchment loads calculated using Method #1 (land use-based yields), the median percent PCBs removal across all eight units ranged from 5% to 10%, while the mean ranged from 17% to 28%. For catchment loads calculated using Method #2 (RWSM runoff volume x concentration), the median percent PCBs removal ranged from 15% to 32%, while the mean ranged from 23% to 36%. Variability in removal rates was high between individual units, ranging from almost no removal to 100% removal of the estimated loads. For mercury, across all eight units, the median percent removal for catchment loads calculated using Method #1 (land use-based yields) ranged from 3% to 4%, while the mean ranged from 5% to 8%. For all units under Method #1, the removal rates were lower for mercury than for PCBs. For catchment loads calculated using

Method #2 (RWSM runoff volume x concentration) the median removal ranged from 13% to 19%, while the mean ranged from 28% to 35%. Similar to PCBs, removal rates for mercury in individual HDS units were highly variable (Table G-4).

**Table G-4: HDS Unit Performance - Annual Percent Removal Calculated for Two Catchment Load Estimates**

| HDS Unit ID | PCBs Removal Method #1 Low | PCBs Removal Method #1 High | PCBs Removal Method #2 Low | PCBs Removal Method #2 High | Mercury Removal Method #1 Low | Mercury Removal Method #1 High | Mercury Removal Method #2 Low | Mercury Removal Method #2 High |
|---|---|---|---|---|---|---|---|---|
| 1 | 80% | 100% | 100% | 100% | 26% | 40% | 100% | 100% |
| 2 | 8% | 18% | 10% | 22% | 4% | 6% | 65% | 98% |
| 3 | 4% | 9% | 21% | 45% | 2% | 3% | 8% | 12% |
| 4 | 38% | 83% | 27% | 59% | 5% | 7% | 17% | 26% |
| 5 | 0.06% | 0.13% | 0.21% | 0.46% | 0.1% | 0.2% | 1.1% | 1.6% |
| 6 | 5% | 11% | 20% | 43% | 0.01% | 0.02% | 0.1% | 0.2% |
| 7 | 0.6% | 1.4% | 0.5% | 1.1% | 0.06% | 0.09% | 2% | 3% |
| 8 | 1.4% | 3.1% | 7% | 16% | 3% | 4% | 27% | 41% |
| **Median** | **5%** | **10%** | **15%** | **32%** | **3%** | **4%** | **13%** | **19%** |
| **Mean** | **17%** | **28%** | **23%** | **36%** | **5%** | **8%** | **28%** | **35%** |

The BASMAA study results were highly variable and limited by the small sample size. However, pollutant load reductions achieved by HDS units, on average, approach or even exceed 20%, the value identified as a conservative estimate of TSS removal by HDS units in the analysis presented previously. These results support the continued use of a 20% efficiency factor for calculating the annual average PCBs and mercury loads reduced by HDS units.

## G.3 Gross Solids Removal Devices

Caltrans conducted the Gross Solids Removal Devices (GSRDs) Pilot Program to develop and evaluate the performance of non-proprietary, full trash capture devices that could be retrofitted into existing highway drainage systems or incorporated into new highway projects (Sobelman et al.). The GSRD Pilot Program consisted of multiple phases with each phase representing one pilot study. The pilot studies consisted of one or more devices that were developed from concept through design and installation, with two years of pilot testing of overall performance. Five phases were constructed and monitored covering eleven designs. Four general types of GSRDs were developed and studied: linear, inclined screen, baffle box, and v-screen. Of the many configurations tested, the most promising devices, based on considerations of particle capture, clogging, passing design flow, drainage, stage capacity and maintenance requirements, were the Linear Radial (louvered modular well casing), the Inclined Screen (parabolic wedgewire screen) and the Inclined Screen (sloped flat wedge-wire screen). The linear radial and inclined screen devices have been certified by the Los Angeles Regional Water Quality Control Board as being full capture devices. Standard designs were developed for these screen systems that provided the best solids removal performance in the pilot tests.

The results of the first phase of the pilot program, which tested the linear radial and inclined screen devices, are summarized in Table G-5 below.

**Table G-5: GSRD Unit Performance Observed by Caltrans (2003)**

| Device Type | Gross Solids Capture Efficiency by Wet Weight (%) 2000 – 2001 | Gross Solids Capture Efficiency by Wet Weight (%) 2001 – 2002 |
|---|---|---|
| Linear Radial 1 (I-10) | 100[1] | 100 |
| Linear Radial 2 (I-210) | 97 | 87 |
| Linear Radial 2 (I-5) | 94 | 100 |
| Inclined Screen 1 (SR-170) | 100 | 100 |
| Inclined Screen 2 (I-210) | 83[2] | 100 |
| Inclined Screen 2 (US-101) | 86[2] | 73[2] |
| **Average** | **93%** | **93%** |

Notes:

[1] Material collected in the bypass bag was presumed to be windblown.

[2] GSRD overflowed. Gross solids escaped the overflow structure and were unaccounted for. As a result, the calculated capture efficiencies are overstated.

Source: Caltrans, 2003.

Based on the above findings and assuming that the mass fraction of material associated with PCBs and mercury yields (i.e., sediment <63 µm) is approximately 15% on average of the captured debris (McKee et al., 2006), then the percent removal of PCBs and mercury by GSRDs is approximately 14% (93% gross solids removal x 15% of captured debris that is associated with PCBs and mercury).

## G.4 Baffle Boxes

Baffle boxes are subsurface rectangular vaults that are placed inline in the stormwater system to reduce pollutant loadings by capturing sediments, gross solids, and associated pollutants. Treatment mechanisms typically include filtration, hydrodynamic separation, and adsorption. Several different types of baffle boxes are available commercially and have footprints that vary in size from approximately 10 square feet to over 200 square feet. These subsurface vaults are commonly subdivided into a series of chambers by vertical baffles that interrupt the stormwater flow and promote capture of suspended particles by sedimentation.

The treatment effectiveness of the Nutrient Separating Baffle Box ® (NSBB) by Suntree Technologies has been recently evaluated by the manufacturer to assess the suspended sediment removal efficiency under controlled conditions (Suntree Technologies, 2018). The NSBB contains an additional basket screen that is located above the top of the chamber baffles. The screen captures floating and suspended solids and holds them out of the water column during nonflow periods (Suntree Technologies, 2018). The performance evaluation was conducted on the NSBB model 3-6-72, which has an effective sedimentation area (i.e., footprint) of 18 square feet (6 feet by 3 feet). Additional details of this and other models can be found on the Suntree Technologies, Inc. website. Influent suspended sediment concentrations were measured at 200

mg/L with a median particle size of 100 µm; influent flow rates ranged from 0.35 to 1.75 cfs. Resulting annualized TSS removal efficiency ranged from approximately 51 to 68 percent, with a weighted annualized TSS removal efficiency of 62.9%. The annualized TSS removal efficiency for different flow rates is shown in Table G-6 below.

**Table G-6: Nutrient Separating Baffle Box (Model 3-6-72) TSS Removal Efficiency**

| Mean Flow Rate Tested (cfs) | Measured Removal Efficiency | Annual Weighting Factor | Weighted Removal Efficiency |
|---|---|---|---|
| 0.35 | 67.9% | 0.25 | 16.98% |
| 0.70 | 65.8% | 0.3 | 19.74% |
| 1.05 | 63.1% | 0.2 | 12.62% |
| 1.40 | 56.4% | 0.15 | 8.46% |
| 1.75 | 50.6% | 0.1 | 5.06% |
| **Weighted Annualized TSS Removal Efficiency** | | | **62.9%** |

Source: Suntree Technologies, Inc., 2018

A similar baffle box, the Debris Separating Baffle Box, is sold by Bio Clean. It is assumed that the unit processes in the two proprietary baffle box devices are similar, thus the expected removal efficiencies would be the same.

Based on the above study and assuming that the mass fraction of material associated with PCBs and mercury yields (i.e., sediment <63 µm) is approximately 63% of the captured sediment, then the percent removal of PCBs and mercury by baffle boxes is approximately 40% (63% TSS removal with a median particle size of 100 µm x 63% of material that is associated with PCBs and mercury). Given the limited data available on the effectiveness of baffle boxes in reducing PCBs and mercury, however, and the similarity of the baffle box to the mechanistic removal processes used in HDS systems, a conservative estimate is being used for PCB and mercury reduction for baffle boxes. The pollutant removal efficiency that will be used for baffle boxes is 20%, the same as HDS systems.

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# APPENDIX H

Load Reduction Credit for Controlling PCBs from Bridges and Overpasses

# APPENDIX H. LOAD REDUCTION CREDIT FOR CONTROLLING PCBS FROM BRIDGES AND OVERPASSES PROGRAM

## H.1 Background

The BASMAA study *Evaluation of PCBs in Caulk and Sealants in Public Roadway and Storm Drain Infrastructure* (BASMAA, 2018) sampled caulk and sealant materials from public roadway and storm drain infrastructure around the Bay Area. The overall approach to the sampling program was to work cooperatively with multiple Bay Area municipal agencies to identify public right-of-way 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; 11 of these were collected from concrete bridges or overpasses. 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. Ten of these composites were associated with concrete roadways, sidewalks, or bridges.

## H.2 Total Estimated PCBs Load in Older Bridges

The U.S. Department of Transportation Federal Highway Administration National Bridge Inventory (USDOT, 2019) was used to estimate the total potential PCBs load contained in older bridges located within the jurisdictions subject to the MRP.

### H.2.1 Equations Used to Estimate PCBs Load

The equation used to estimate the total PCBs load contained in bridges built and/or reconstructed prior to 1981 within the jurisdictions subject to the MRP is as follows:

$$\text{Total Load}_{\text{PCBs, Bridges}} = \text{Density}_{\text{sealant}} * \text{Concentration}_{\text{PCBs}} * \sum \text{Volume}_{\text{sealant, bridges}}$$

Where:

$\text{Density}_{\text{sealant}}$ = average sealant density [kg/m$^3$]

$\text{Concentration}_{\text{PCBs}}$ = empirically derived concentration of PCBs [mg/kg]

$\sum\text{Volume}_{\text{sealant, bridges}}$ = Volume of sealant in all applicable bridges [m$^3$]

The volume of joint sealant was calculated using an assumed cross-section of sealant, multiplied by the assumed length of applied sealant:

$$\text{Volume}_{\text{sealant, bridges}} = \text{Cross-Section}_{\text{sealant}} * \text{Length}_{\text{sealant}}$$

Where:

$\text{Cross-Section}_{\text{sealant}}$ = Cross-section of applied sealant

$\text{Length}_{\text{sealant}}$ = Length of applied sealant

### H.2.2 Data Used to Estimate Load

Data used to estimate load were obtained from BASMAA, 2018; a study of Bay Bridge sealant summarized by Hardeep Takhar of the California Department of Transportation (Caltrans) in 2013; and bridge dimensional information available from the National Bridge Inventory (USDOT, 2019). A summary of the data inputs is provided in Table H-1 below.

**Table H-1: Bridge Load Calculation Data Inputs**

| Input | Result | Units | Source |
|---|---|---|---|
| Density of Sealant | 1,100 | $kg/m^3$ | Takhar, 2013 |
| Cross-Section of Sealant | 1 | square inch | Caltrans, 2007 |
| PCBs Concentration | 184 | mg/kg | See Section 2.2.1 |

The derivation of the representative concentration of PCBs in sealant applied to bridges is described below.

#### *H.2.2.1 PCBs Concentration*

In order to compute a reasonable estimate of the expected PCBs concentration in caulking material in bridges in the MRP area, a data set consisting of 20 composite samples from BASMAA (2018) and four grab samples from the demolition of the Bay Bridge (Takhar, 2013) was analyzed.

Of the 20 BASMAA composite samples, 10 were identified as representative of caulking used on bridges based on the location from which the samples were taken (i.e., five of the composite samples were taken from bridges and five were from concrete roadway surfaces, sidewalks, and curbs and gutters). The remaining composite samples were judged to be non-representative, as they were taken from storm drain structures, asphalt roadways, metal pipes, and electrical utility poles and boxes. Table H-2 below summarizes the BASMAA study results for the concrete roadway, sidewalk, and bridge composite samples (BASMAA, 2018). Table H-3 summarizes the Bay Bridge caulk measurements (Takhar, 2013).

**Table H-2: Sample Descriptions and PCBs Concentrations for Roadway and Bridge Composite Samples from the BASMAA Regional Infrastructure Caulk and Sealant Sampling Program (BASMAA, 2018)**

| 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 |
|---|---|---|---|---|---|---|---|
| A | 4,967 | Concrete Bridge | Caulk between expansion joints | Black Pliable Foam | 2 | 10 | 1960-70's |
| A | 4,967 | Concrete Bridge | Caulk between expansion joints | Black Pliable Foam | 2 | 13 | <1960 |
| B | 4,150 | Concrete Bridge | Caulk between expansion joints | Black Pliable | 3 | 9 | 1960-70's |
| | | | | | | 30 | 1960-70's |
| | | | | | | 31 | <1960 |

| 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 |
|---|---|---|---|---|---|---|---|
| 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 |
| 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 expansion joints | Black Hard/Brittle | 3 | 2 | <1960 |
| | | | | | | 7 | <1960 |
| | | | | | | 46 | <1980 |
| G | ND | Concrete Sidewalk | Caulk between joints | Brown Fibrous | 2 | 16 | 1960-70's |
| | | | | | | 17 | 1960-70's |
| H | ND | Concrete Sidewalk /Curb/Gutter | Caulk between joints | White/Gray Hard/Brittle or Pliable | 3 | 1 | <1980 |
| | | | | | | 8 | 1960-70's |
| | | | | | | 18 | 1960-70's |
| I | 0.06 | Concrete Sidewalk /Curb/Gutter | Crack Sealant | White Hard/Brittle or White Pliable | 2 | 23 | <1980 |
| | | | | | | 24 | <1980 |
| S | 2.5 | Concrete Bridge | Prefabricated joint filler | Black Pliable | 1 | 12 | <1960 |

A photo log of the samples taken from concrete bridges is provided in Attachment 1.

**Table H-3: Concentrations of PCBs in Caulks Measured from the Bay Bridge**

| Description | Result (mg/kg) |
|---|---|
| PCBs Concentration (Bay Bridge Upper Roadway Sample) | 1.01 |
| PCBs Concentration (Bay Bridge Upper Roadway Sample) | 1.65 |
| PCBs Concentration (Bay Bridge Upper Roadway Sample) | 0.705 |
| PCBs Concentration (Bay Bridge Roadway Barrier Wall) | 3.71 |
| Bay Bridge Average Concentration | 1.77 |

Source: Takhar, 2013

The complete dataset (i.e., results summarized in Table H-2 and Table H-3 and other non-representative samples) contains 10 non-detect (all in the BASMAA (2018) dataset) and 14

detected values. After removing the 10 data points considered unrepresentative of bridges, the representative dataset contains 4 non-detect and 10 detected values (i.e., Table H-2 and Table H-3 summarized values). For the purposes of this analysis, both the complete and the presumed representative subset of the PCBs-in-caulk datasets were analyzed independently.

The non-detect values were imputed using a regression-on-order statistics method prior to estimating summary statistics using a maximum likelihood estimation approach as described in the sections below.

#### *H.2.2.2 Handling Censored (Non-Detect) Results*

Since estimation of common descriptive statistics of censored datasets can be heavily biased with simply substituted values, a robust regression-on-order statistics (ROS) method, as described by Helsel and Cohn (1988), was utilized to provide probabilistic estimates of non-detects (NDs). When applying the ROS method, ND values are imputed based on their plotting positions relative to the probability distribution estimated from the detected data. Imputed values are always less than their detection limits, but if the dataset includes multiple detection limits, some imputed values may be larger than some of the detected values. For the PCBs-in-caulk dataset, method detection limits (MDLs) for individual samples were not reported, but an overall MDL of 0.05 µg/kg was included in the BASMAA report and NDs are only reported for samples when every individual congener was not detected.

***Maximum Likelihood Estimation***

The lognormal probability distribution is often used to represent positively skewed contaminant concentrations (Singh et al., 1997). As such, the PCBs-in-caulking dataset has been assumed to arise from a population that is lognormally distributed, which implies that the standard deviation is proportional to the mean and the data are bound by zero. A random variable, $x$, is said to be lognormally distributed if the distribution of $y = \ln(x)$ is normally distributed with a mean, $\mu_y$, and variance, $\sigma_y^2$. The mathematical equation for lognormal distribution is:

$$\boldsymbol{f_x(x) = \frac{1}{\sqrt{2\pi}\sigma x}\exp\left[-\frac{1}{2}\left(\frac{lnx-\mu}{\sigma}\right)^2\right]\ x > 0} \qquad \textbf{Equation 1}$$

Where:

- $\mu$ is mean of the untransformed random variable $x$,
- $\sigma^2$ is the variance of the untransformed random variable $x$, and
- $x$ is the variable of interest.

The lognormal distribution parameters of $x$ are related to the normal parameters of $y$ with the following equations:

$$\boldsymbol{\mu_x = \exp\left(\mu_y + 0.5\sigma_y^2\right)} \qquad \textbf{Equation 2}$$

$$\boldsymbol{{\sigma_x}^2 = \mu\sqrt{\exp(\sigma_y^2) - 1}} \qquad \textbf{Equation 3}$$

When a dataset is a random sample from a lognormal distribution, the Maximum Likelihood Estimate (MLE) of the parameter, $\mu_y$, is simply the sample mean of the log-transformed data (Singh et al., 1997). Similarly, the MLE of the parameter, $\sigma_y^2$, is the sample variance of the log-

transformed data. However, for small sample datasets with a few extreme values, such as the PCB-in-caulk dataset, severe transformation bias can occur when estimating the arithmetic mean, $\mu_x$, and arithmetic standard deviation, $\sigma_x$. Because of this, an alternative method for computing the expected value is needed as described below.

Advancing the assumption that the sample data arise from a lognormal distribution, a probability weighted mean can be computed as:

$$\hat{\mu}_x = \frac{\sum_{i=1}^{n}(x_i * w_i)}{\sum_{i=1}^{n} w_i} \qquad \textbf{Equation 4}$$

Where:

- $\hat{\mu}_x$ is probability-weighted mean of the untransformed random variable $x$;
- $x_i$ is the $i$th sample value; and
- $w_i$ is weight of the $i$th sample value, which is assumed equal to the probability of occurrence, $p(x_i)$, and can be computed by fitting the data to a lognormal probability density function (PDF).

The lognormal PDF can be constructed by computing the theoretical percentiles and plotting against the probability of a standard lognormal PDF. Any percentile, $P_k$, of x can be computed using the parameters of y as follows:

$$P_k = \exp(\mu_y + z_k \sigma_y) \qquad \textbf{Equation 5}$$

Where:

- $z_k$ is the kth percentiles of the standard normal distribution.

***Results and Conclusions***

As stated above, the available data was evaluated in two separate dataset configurations:

1. All data including the potentially unrepresentative values (*N = 24)*
2. Roadway and bridge-only data excluding the potentially unrepresentative values (*N = 14).*

In both configurations, lognormal distributions were fit to datasets where the non-detect values had been imputed with ROS. Figure H-1 below shows lognormal probability plots along with a best-fit line demonstrating the lognormality of the data.

Table H-4 provides summary statistics after applying ROS to the datasets. As shown, the data mean and data median are significantly different, which again supports the lognormal distribution assumption. The arithmetic mean values computed from Equation 2, however, are unrealistic considering the values are larger than any of the sample values – this is a result of transformation bias. The probability weighted mean values are believed to be the most accurate representation of the central tendency of PCBs in caulk for bridges in the MRP area based on the two datasets because this adjusts for the likely probability of occurrence of the extreme values observed in the data while preserving all sample data in the calculation.

Figure H-2 and Figure H-3 show the PDFs of the best-fit lognormal distributions. Each observed or imputed value drawn along the PDF is used to indicate the probabilities of occurrence, which were used to determine the weights for the probability weighted mean values.

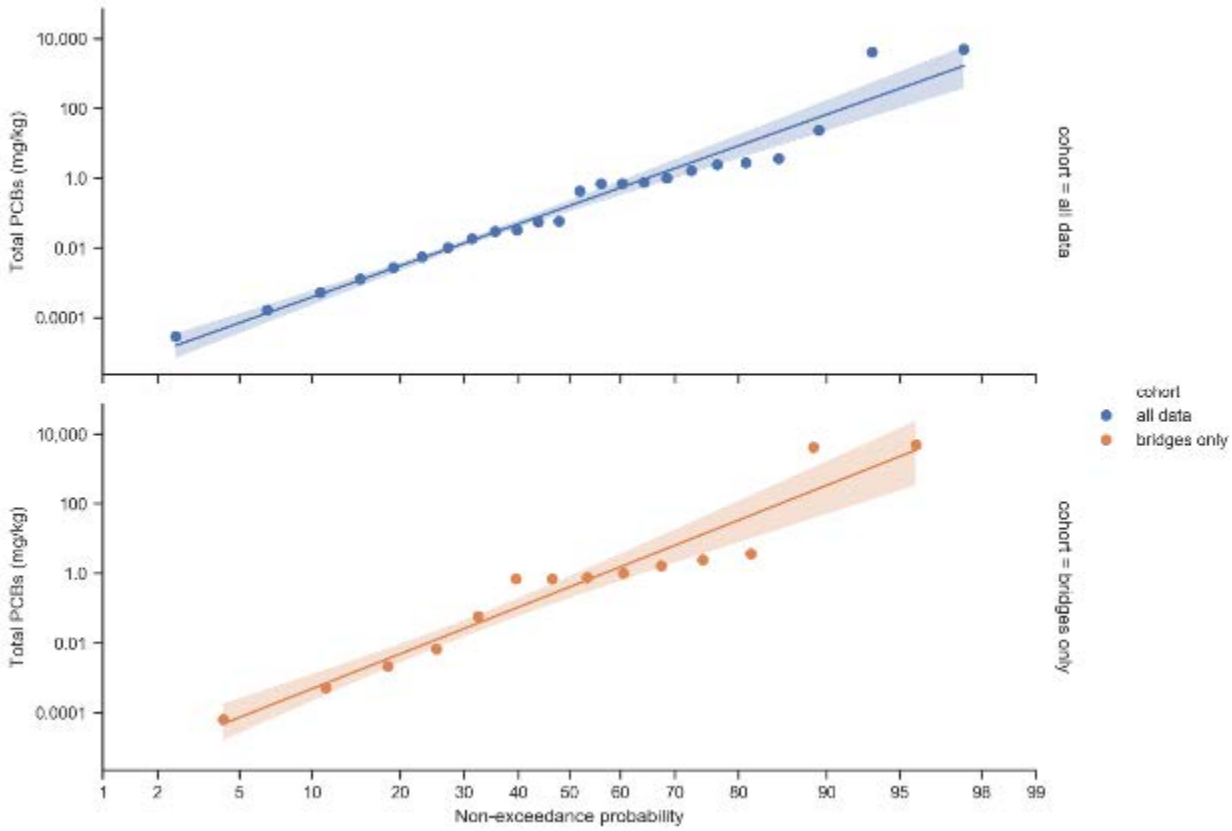


**Figure H.1: Lognormal probability plots. The shaded bands indicate the 95% confidence interval around the best-fit lines.**

**Table H-4: Summary Statistics**

| Statistic | All Data | Roadway/Bridge Only |
|---|---|---|
| Sample Count (Total; NDs) | 24; 10 | 14; 4 |
| Data Mean, mg/kg | 381 | 652 |
| Data Standard Deviation, mg/kg | 1292 | 1663 |
| Data Median, mg/kg | 0.25 | 0.74 |
| Lognormal Mean (μy) | -1.82 | -0.891 |
| Lognormal Standard Deviation(σy) | 4.57 | 5.02 |
| Arithmetic Mean (μx), mg/kg | 8,927 | 334,514 |
| Probability Weighted Mean ($\hat{\mu}_x$), mg/kg | 49.5 | 184 |

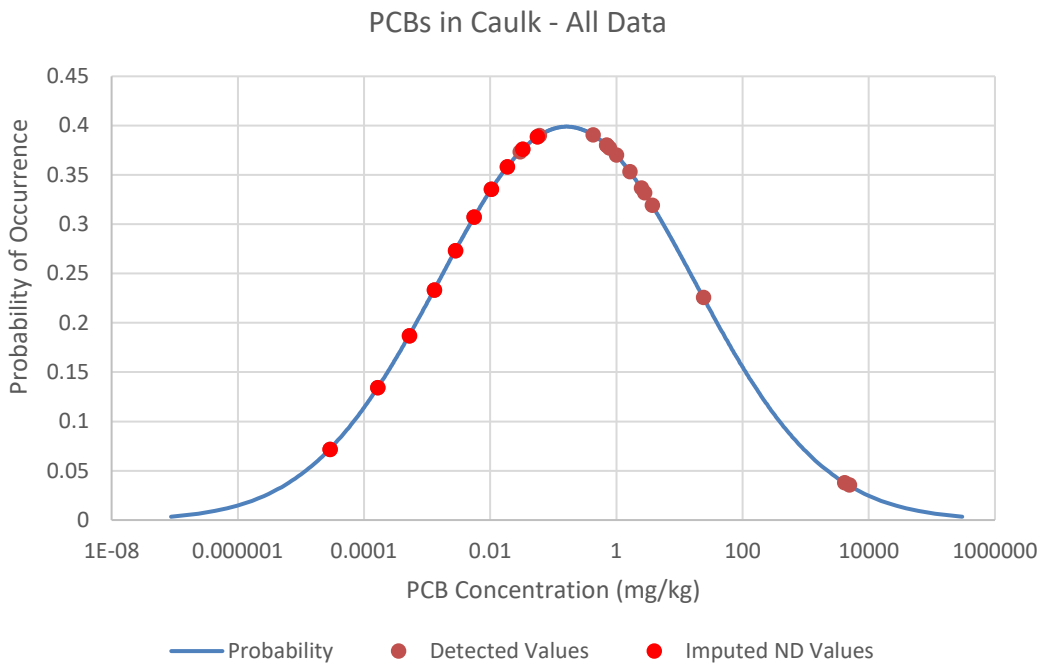


**Figure H.2: Lognormal distribution plot for all available Total PCBs data, showing the weights of the detected and imputed values**

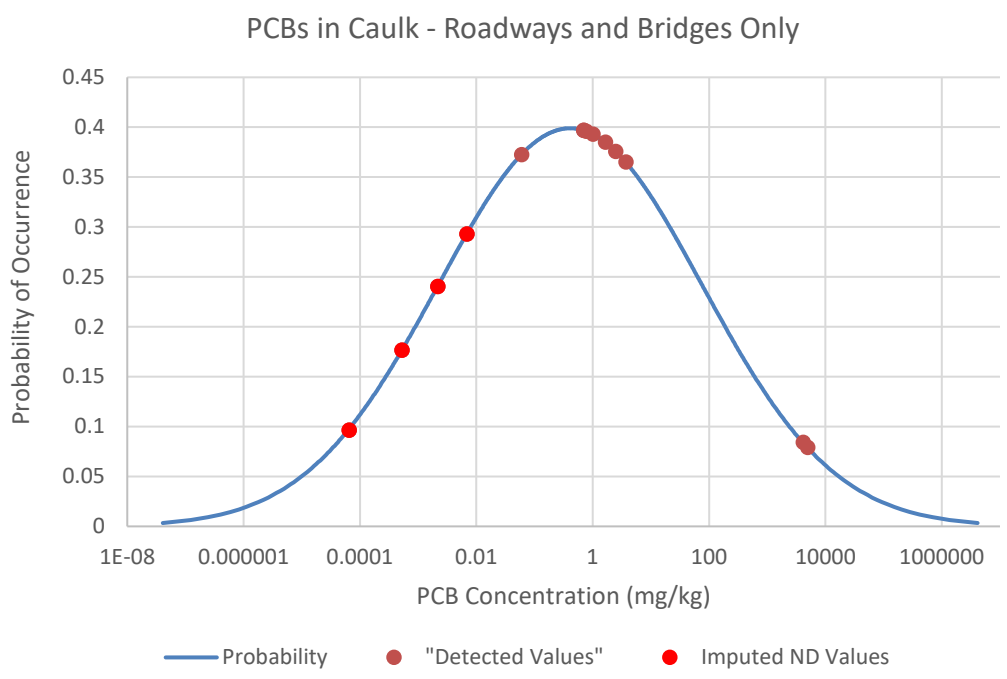


**Figure H.3: Lognormal distribution plot for Total PCBs data from roadways and bridges only, showing the weights of the detected and imputed values**

#### *H.2.2.3 Length of Applied Sealant*

While it is evident from the BASMAA (2018) study photos that sealant may be applied to many concrete connections within any given bridge, this estimate focuses on the locations most exposed to weather and traffic and therefore most likely to leach into the environment. The sealant application locations of focus in this study include the bridge expansion joints (e.g., at connections between bridge spans), and the longitudinal seam between the bridge deck and the sidewalk and/or bridge side rail.

The federal bridge database used for this analysis contains information about dimensions of bridges located within the MRP jurisdictions. The length of sealant used to calculate total potential PCBs mass was estimated using database values as follows:

$$\text{Length}_{\text{sealant, joints}} = (N_{span} + 1) * \text{Width}_{deck}$$

Where:

$N_{span}$ = The number of bridge spans

$\text{Width}_{deck}$ = Bridge deck width

Assuming there are seams along either side of the bridge at the sidewalk or wall, the longitudinal seam was calculated as:

$$\text{Length}_{\text{sealant, longitudinal seam}} = 2 * \text{Length}_{bridge}$$

### H.2.3 Total Estimated PCBs Load in Bridges

A summary of the total calculated loads for bridges within the MRP coverage boundary, built and/or reconstructed prior to 1981, and specific bridge types[5], per the Nation Bridge Inventory, is provided in Table H-5.

**Table H-5: Total Calculated Loads for Bridges within the MRP Area, Built and/or Reconstructed Prior to 1981**

| County | Total Sealant PCBs Mass - Joints Only (kg) | Total Sealant PCBs Mass - Joints and Longitudinal Seal (kg) | Number of Bridges |
|---|---|---|---|
| Alameda | 3.8 | 11.2 | 340 |
| Contra Costa | 1.7 | 7.3 | 277 |
| San Mateo | 2.5 | 7.2 | 254 |
| Santa Clara | 3.7 | 10.1 | 473 |
| Solano | 0.9 | 3.2 | 133 |
| **Total** | **12.6** | **39.0** | **1,477** |

[5] 0 – Other; 01 – Slab; 02 – Stringer/Multi-beam or Girder; 03 – Girder and Floorbeam System; 04 – Tee Beam; 05 – Box Beam or Girders – Multiple; or 06 – Box Beam or Girders – Single or Spread.

The average mass of PCBs in MRP bridges with the characteristics described, based on the calculation, is approximately 8.5 grams, accounting for joint sealant only, and 26 grams, accounting for both joint and longitudinal sealant.

## H.3 Long Term Load Reduction Estimate

### H.3.1 Methodology

To estimate the load reduction associated with long-term bridge or expansion joint replacement, it is assumed that an ongoing PCBs release rate from bridge joints is mitigated through bridge joint maintenance and whole bridge replacement projects. The load reduction estimation is based on the assumption that PCBs in caulk are leaching from bridge joints and longitudinal seals over their lifetime. When that PCBs-containing caulk is replaced or removed through maintenance or replacement projects, the source of PCBs release is removed, and the associated annual released load is also removed. PCBs leaching from the material could occur through incremental wear or through larger damage (e.g., pieces of caulk torn out) over the lifetime of the caulk.

While volumetric or mass-based losses of joint seals over time were not found in literature, publications that describe joint maintenance and failure were reviewed to justify the assumption of leaching over time. Compression and strip seal type joints, which could potentially be expected to consist of PCBs-containing material, have an expected lifetime of 8 to 16 years, according to a survey conducted for an NCHRP study on bridge joints (NCHRP, 2016). Despite this recommended lifetime, an extrapolated rate of joint replacement in the Bay Area demonstrates that joints are being replaced at a much lower frequency. According to three Permittee preventative maintenance plans available on Caltrans' Highway Bridge Program funding website (Caltrans, 2019), approximately 3% of bridges meeting the characteristics described above are scheduled for joint replacement over the next five-year funding period. An additional 1.5% of bridges are scheduled for replacement over the same five-year period (presumptively replacing the joints). At this rate, replacing the joints via joint maintenance or bridge replacement projects in all 1,477 bridges would take over 110 years.

The concept that older, likely PCBs-containing joints persist in the older MRP bridges is borne out through the findings of the BASMAA (2018) study, which found very high PCBs concentrations in composite samples from a random selection of representative bridge infrastructure. This outcome is also consistent with a finding from a 2003 NCHRP report (NCHRP, 2003), which found through interviews with transportation agencies that "agencies indicated that they tend not to respond to joint problems unless there is a safety hazard or when the deck is being rehabilitated or replaced. Other than reactive efforts, joint repair and rehabilitation, in most agencies, is associated with deck rehabilitation." Additionally, while guidance documents typically define joint replacement needs in terms of visual degradation of the joint, along with other factors, the NCHRP study stated that agencies often defined failure of a deck joint as leakage, physical damage, or traffic hazard. These conditions could be taken to interpret that agencies are only replacing severely damaged or degraded joints (NCHRP, 2003).

Older joints could be considered more likely to leach into the environment, as the sealant material accumulates damage over time. Typical types of joint seal damage described by the Wyoming Department of Transportation, Aeronautics Division Airport Pavement Management Program (2020) include: (1) stripping of joint sealant, (2) extrusion of joint sealant, (3) weed

growth, (4) hardening of the filler (oxidation), (5) loss of bond to the slab edges, and (6) lack or absence of sealant in the joint. These damage types are also consistent with those described in NCHRP (2016). Most of these damage types either directly refer to stripping of the sealant from the joint or create a condition in which the sealant is more likely to be released from the joint when subjected to traffic loads (i.e., conditions such as extrusion, hardening/becoming more brittle, loss of bond). Examples of damaged joint seals from this source are provided in Attachment 2.

### H.3.2 Load Reduction Calculation

Lacking a literature-based release rate of sealant over time, two potential annual release rates are provided for the load reduction calculation. Based on the assumption that the joint seal may become degraded over time, it is possible that the sealant releases little during the initial operation period and more as the joint sealant ages. Another possible release pathway is through leaching into surrounding concrete and subsequent degradation of the concrete. Two potential average annual release rates (i.e., average over the life of the seal) were assumed to calculate an estimated load reduction from removing the joint seal – 1% and 0.5%. These average annual release rates were applied to the estimated mass for the 1,477 bridges meeting the identified age criteria (Table H-6). These releases would be eliminated through removal of the joint seal through joint replacement or bridge replacement.

**Table H-6: Long-Term Load Reduction (i.e., Replacement of PCBs-Containing Joints in All Older Bridges)**

| County | Total Sealant PCBs Load Reduced - Joints Only (g/year) | Total Sealant PCBs Load Reduced - Joints Only (g/year) | Total Sealant PCBs Load Reduced - Joints and Longitudinal Seal (g/year) | Total Sealant PCBs Load Reduced - Joints and Longitudinal Seal (g/year) |
|---|---|---|---|---|
| | 1% annual loss rate over life | 0.5% annual loss rate over life | 1% annual loss rate over life | 0.5% annual loss rate over life |
| Alameda | 38 | 19 | 112 | 56 |
| Contra Costa | 17 | 8 | 73 | 37 |
| San Mateo | 25 | 12 | 72 | 36 |
| Santa Clara | 37 | 19 | 101 | 50 |
| Solano | 9 | 5 | 32 | 16 |
| **Total** | 126 | 63 | 390 | 195 |

This is the assumed load reduction by 2080, based on the assumption that all older joints will be removed/replaced within 100 years of installation (this is consistent with recent Caltrans replacement frequency calculated above).

## H.4 References

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## Attachment 1: BASMAA Bridge Sample Photos

Composite A

Composite B

Composite S

Composite C

Composite D

## Attachment 2: Images of Joint Seal Damage

Joint sealant damage is any condition that enables soil or rocks to accumulate in the joints or allows significant infiltration of water. Accumulation of incompressible materials prevents the slabs from expanding and may result in buckling, shattering, or spalling. A pliable joint filler bonded to the edges of the slabs protects the joints from accumulation of materials and also prevents water from seeping down and softening the foundation supporting the slab. Typical types of joint seal damage are: (1) stripping of joint sealant, (2) extrusion of joint sealant, (3) weed growth, (4) hardening of the filler (oxidation), (5) loss of bond to the slab edges, and (6) lack of absence of sealant in the joint..

Source: Wyoming Department of Transportation, Aeronautics Division Airport Pavement Management Program (https://www.appliedpavement.com/hosting/wyoming/pavement-inspection/pci-review/distresses-pcc/joint-sealant-damage.html)

| Severity | Distress Example | Description |
|---|---|---|
| Low | | Joint sealer is in generally good condition throughout the sample. Joint seal damage is at low severity if a few of the joints have sealer which has debonded from but is still in contact with the joint edge. This condition exists if a knife blade can be inserted between sealer and joint face without resistance. |
| Medium | | Sealant needs replacement within two years. Joint seal damage is at medium severity if a few of the joints have any of the following conditions: (a) joint sealer is in place, but water access is possible through visible openings no more than 1/8 in (3 mm) wide. If a knife blade cannot be inserted easily between sealer and joint face, this condition does not exist; (b) pumping debris are evident at the joint; (c) joint sealer is oxidized and "lifeless" but pliable (like a rope), and generally fills the joint openings; or (d) vegetation in the joint is obvious, but does not obscure the joint opening. |

| Severity | Distress Example | Description |
|---|---|---|
| High | | Joint sealer is in generally poor condition over the entire surveyed sample. Sealant needs immediate replacement. Joint seal damage is at high severity if 10% or more of the joint sealer exceeds limiting criteria listed above, or if 10% or more of sealer is missing. |

Bay Area Municipal Stormwater Collaborative

# Regional Effectiveness Evaluation of the Protocols for Managing PCBs-Containing Materials During Building Demolition

## Project Report

*Submitted in Compliance with NPDES Permit No. CAS612008 – Provision C.12.g.iii.(5)*

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August 5, 2026

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| BAAQMD | Bay Area Air Quality Management District |
| BAMSC | Bay Area Municipal Stormwater Collaborative |
| BASMAA | Bay Area Stormwater Management Agencies Association |
| Bay | San Francisco Bay |
| CCCWP | Contra Costa Clean Water Program |
| CEQA | California Environmental Quality Act |
| CWA | Clean Water Act |
| EO | Executive Officer |
| ft | Feet |
| $ft^2$ | Square Feet |
| FY | Fiscal Year |
| kg/yr | Kilograms per Year |
| HVAC | Heating, Ventilation, and Air Conditioning |
| mg | Milligram |
| MPC | Monitoring and Pollutants of Concern Committee |
| MRP | Municipal Regional Permit |
| MRP 2 | Municipal Regional Permit 2 (Order No. R2-2015-0049) |
| MRP 3 | Municipal Regional Permit 3 (Order No. R2-2022-0018) |
| MS4 | Municipal Separate Storm Sewer System |
| NPDES | National Pollutant Discharge Elimination System |
| PCBs | Polychlorinated Biphenyls |
| ppm | parts per million |
| QA/QC | Quality Assurance/Quality Control |
| SFEI | San Francisco Estuary Institute |
| TAG | Technical Advisory Group |
| TMDL | Total Maximum Daily Load |
| TSI | Thermal System Insulation |
| USEPA | U.S. Environmental Protection Agency |
| Water Board | San Francisco Bay Regional Water Quality Control Board |

# 1. INTRODUCTION

This report presents a regional effectiveness evaluation of the protocols for controlling polychlorinated biphenyls (PCBs) during building demolition (Building Demolition Protocols or Protocols) implemented by applicable municipalities in the San Francisco Bay Area, California. This report was prepared by EOA, Inc. and Geosyntec Consultants, Inc. on behalf of the Bay Area Municipal Stormwater Collaborative (BAMSC) member agencies in compliance with Provision C.12.g.iii.(5) of the Municipal Regional Stormwater National Pollutant Discharge Elimination System (NPDES) Permit (Permit No. CAS612008), also known as the Municipal Regional Permit (MRP) (SFBRWQCB 2022).

## 1.1. Background

Fish tissue monitoring in San Francisco Bay (Bay) has revealed the bioaccumulation of PCBs, mercury, and other pollutants in Bay sportfish. The levels found are thought to pose a health risk to people consuming these fish, and as a result, an interim advisory has been issued on the consumption of sportfish 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 and mercury. In response, the San Francisco Bay Regional Water Quality Control Board (Water Board) developed a Total Maximum Daily Load (TMDL) water quality restoration program targeting PCBs in the Bay. The general goals of the TMDL are to identify sources of PCBs to the Bay and implement actions to control the sources of PCBs to achieve water quality standards and restore beneficial uses (SFBRWQCB 2008). The PCBs TMDL identifies the regionwide urban stormwater runoff wasteload allocation as 2 kg/yr, with 1.6 kg/yr allocated to MRP Permittees, to be achieved by March 2030. The urban stormwater runoff requirements of the PCBs TMDL are being implemented through MRP Provision C.12.

PCBs in the past were often incorporated into building materials, such as caulk, and were most commonly used in buildings constructed between 1950 and 1980. When these buildings are demolished, PCBs-laden building materials can be released to the environment unless actions are taken to reduce or prevent these releases and the subsequent conveyance of the materials by urban stormwater runoff to the Bay. The program developed to manage PCBs during building demolition described in this report is the first of its kind, developed to reduce the release of PCBs from building materials during demolition.

## 1.2. Regulatory Requirements

### 1.2.1. MRP 2 Provision C.12.f

During the previous permit term (MRP 2, Order No. R2-2015-0049), the MRP required Permittees (i.e., those public agencies subject to MRP requirements) to develop and implement, or cause to be developed and implemented, an effective protocol for managing materials with PCBs concentrations of 50 parts per million (ppm) or greater in applicable structures at the time such structures undergo demolition, so that PCBs do not enter municipal separate storm sewer systems (MS4s). Applicable structures include, at a minimum, commercial, public, institutional, and industrial structures constructed or remodeled between 1950 and 1980 with building materials with PCBs concentrations of 50 ppm or greater. Single-family residential and wood frame structures are exempt. A Permittee is exempt from this requirement if the only buildings that existed pre-1980 within its jurisdiction were single-family residential and/or wood-frame buildings, as approved by the Water Board Executive Officer (EO).

Permittees were required to develop a Building Demolition Protocol by June 30, 2019, that includes each of the following components, at a minimum:

- The necessary authority to ensure that PCBs do not enter the MS4 from PCBs-containing materials in applicable structures at the time such structures undergo demolition
- A method for identifying applicable structures prior to their demolition.
- Method(s) for ensuring PCBs are not discharged to the MS4 from demolition of applicable structures.

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

- Implement or cause to be implemented a PCBs management protocol for ensuring PCBs are not discharged to the MS4 from demolition of applicable structures 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 structures.

### 1.2.2. MRP 3 Provision C.12.g

During the current permit term (MRP 3, Order No. R2-2022-0018), Permittees are required to continue to implement the Building Demolition Protocols developed during the previous permit term for managing PCBs-containing materials and wastes during building demolition so that PCBs do not enter the MS4. In addition, Permittees were required to implement the following enhancements to their PCBs in building materials control programs:

- Beginning July 1, 2023, for applicable structures containing building materials with PCBs 50 ppm or greater:
    - Demolition contractors must provide notification to the Permittee, Water Board, and United States Environmental Protection Agency (USEPA) at least one week (i.e., five working days) before any demolition is to occur.
    - Permittees must enhance their construction site control programs to minimize migration of PCBs into the MS4 during demolition activities.
- For permits approved after July 1, 2023, Permittees must verify that PCBs in demolished buildings are properly managed to minimize transport to the MS4 by obtaining documentation that the building materials with PCBs 50 ppm or greater were disposed appropriately according to state and federal regulations.
- Beginning in the 2023 rainy season, Permittees must inspect demolition sites with applicable structures containing building materials with PCBs 50 ppm or greater, pursuant to Provision C.6, to ensure that effective construction pollutant controls are used to prevent discharge into the MS4.

MRP 3 reporting requirements include the following:

- Permittees seeking exemption from Provision C.12.g requirements based on lack of applicable structures must submit documentation, such as historic maps or other historic records, that clearly demonstrates that the only structures that existed pre-1980 were single-family residential and/or wood-frame structures.

- In their 2023 Annual Report, Permittees shall discuss enhancements to their construction site control program to minimize migration of PCBs from demolition activities into the MS4.

- Beginning with their 2023 Annual Report, the Permittees shall provide each of the following items:

    1. The number of applicable structures that applied for a demolition permit during the reporting year

    2. A running list of the applicable structures that applied for a demolition permit since July 1, 2019, the number of samples each structure collected, and the concentration of PCBs in each sample.

    3. For each applicable structure, with PCBs concentrations of 50 ppm or greater, include the project address, the demolition date, and a brief description of the PCBs-containing materials.

    4. For each structure that was constructed or remodeled between the years 1950 and 1980 and requires emergency demolition to protect public health and/or safety, provide the address, date the building was constructed, and date of demolition.

- Beginning with their 2024 Annual Report, Permittees shall provide whether the site was inspected during demolition, and for those cases where notification and advance approval from the USEPA is not required and were approved for demolition after June 30, 2023, the hazardous waste manifest prepared for transportation of the material to a disposal facility.

- In their 2026 Annual Report, Permittees shall submit an evaluation of the effectiveness of the protocol for controlling PCBs during building demolition as well as supporting data. This should be conducted and reported at the regional level on behalf of all Permittees and shall be considered the Report of Waste Discharge for Provision C.12.g for the next permit reissuance.

- In their 2026 Annual Report, Permittees may submit for use in the subsequent permit term an updated assessment methodology and data collection program to quantify PCBs loads reduced through implementation of the protocol for controlling PCBs-containing materials and wastes during demolition of applicable structures.

## 1.3. Project Purpose

The purpose of this project was to conduct a regional evaluation of the effectiveness of the Permittees' Building Demolition Protocols for controlling PCBs during building demolition in compliance with MRP Provision C.12.g.iii.(5). This report provides the results of the

effectiveness evaluation, as well as supporting data, and serves as the Report of Waste Discharge for Provision C.12.g for the next permit reissuance.

## 1.4. Organization of the Report

The subsequent sections of this report are organized as follows:

- **Section 2.0 – Building Demolition Protocols.** This section provides an overview of the Building Demolition Protocols that were developed during MRP 2, updated during MRP 3, and have been implemented since July 1, 2019. This section also describes the regional data collection process.
- **Section 3.0 – Effectiveness Evaluation Methods**. This section describes the quantitative and qualitative methods that were used to evaluate the effectiveness of the Building Demolition Protocols for controlling PCBs from building materials during demolitions.
- **Section 4.0 – Results and Discussion**. This section presents the quantitative and qualitative results of the effectiveness evaluation of the Building Demolition Protocols, discusses strengths and limitations**,** and provides recommendations for continued implementation.
- **Section 5.0 – Conclusions.** This section summarizes the overall outcomes of the effectiveness evaluation and provides recommendations for continued implementation of the Protocols.

# 2. BUILDING DEMOLITION PROTOCOLS

This section provides an overview of the Building Demolition Protocols that were developed during MRP 2, updated during MRP 3, and have been implemented by MRP Permittees since July 1, 2019. This section also describes the regional data collection process.

## 2.1. Development of the Protocols

On behalf of MRP Permittees, the Bay Area Stormwater Management Agencies Association (BASMAA)[1] conducted a multi-year regional project during MRP 2 to assist Permittees in developing protocols for managing materials with PCBs concentrations of 50 ppm or greater during building demolition. The BASMAA project developed guidance, tools, and training materials, and conducted outreach.

At the outset of the project, a BASMAA Steering Committee was convened to provide project oversight and guidance. The Steering Committee included BASMAA Directors, countywide stormwater program staff, and Permittee staff from various relevant municipal departments. The Steering Committee met periodically throughout the project. In addition, a project technical advisory group (TAG) was formed from industry, regulatory, and Permittee representatives to provide review and input on selected project work products. Other efforts to engage key stakeholders included an industry stakeholder roundtable meeting and two larger stakeholder group meetings that included industry, regulatory, and municipal representatives.

Key BASMAA project deliverables provided to each Permittee to use as appropriate given local procedures and needs included:

- A protocol for assessment of prioritized PCBs-containing building materials prior to demolition, including a list of the five priority building materials (caulk, thermal insulation, fiberglass insulation, adhesive mastics, and rubber window gaskets) required for testing; PCBs sampling procedures; and sample collection frequency.

- Model language for municipal adoption (e.g., ordinance) of the new program to manage PCBs materials during building demolition and model supporting staff report and resolution.

- California Environmental Quality Act (CEQA) strategy and model notice of exemption.

- Supplemental demolition permit model application materials, including the PCBs in Priority Building Materials Screening Assessment Applicant Package (Screening Form, process flow charts, and applicant instructions).

- An analysis to assist municipalities that pursue cost recovery.

- A coordination/communication strategy for the project.

[1] BASMAA as a non-profit organization dissolved in 2021. The Bay Area Municipal Stormwater Collaborative (BAMSC) was formed soon after as an informal collaboration of the municipal stormwater programs in the San Francisco Bay Area.

- A technical memorandum summarizing any new information & decisions needed by BASMAA at the outset, including an annotated table of regulatory drivers and relevant requirements.

- Tools, Protocol, Outreach & Training: PCBs Materials Management during Building Demolition Project.

- Industry stakeholder outreach materials and a fact sheet for municipal staff.

- A spreadsheet tool used to develop the prioritized list of potential PCBs-containing building materials that the demolition program will focus on.

- A conceptual approach for an assessment methodology and data collection program to quantify PCBs loads reduced through managing PCBs-containing materials during building demolition (Appendix A).

The BASMAA project also conducted the following outreach and training tasks:

- Prepared training materials for municipal staff on adoption and implementation of the new protocols.

- Developed outreach materials and a standard presentation to inform industry stakeholders, including developers, planning firms, urban planning non-governmental organizations, demolition firms, property owners, property managers, and realtors, about the new Building Demolition Protocols.

- Using the above training materials, conducted training workshops (in-person and a webinar) for key municipal and countywide stormwater program staff.

- Conducted a webinar for industry stakeholders.

- Developed a list of Bay Area opportunities, including contact information and dates, for municipal and/or stormwater program staff to conduct additional outreach to industry stakeholders using the above industry outreach materials.

At the start of MRP 3, BAMSC conducted a follow-up regional project on behalf of all MRP Permittees to provide additional guidance and resources to assist Permittees with implementing the new MRP 3 C.12.g requirements. The regional project conducted the following tasks:

- Formed a regional Management of PCBs during Demolition Work Group to oversee the regional project that included countywide stormwater program and Permittee staff.

- Updated the existing BASMAA Model Applicant Package to accommodate the new MRP 3 tracking and reporting requirements (PCBs in Priority Building Materials: Model Screening Assessment Applicant Package, August 2018 (Revised November 2019 and May 2023)) (Appendix B).

- Developed a set of recommended construction inspection and control program enhancement options for use by Permittees, building on the existing C.6 inspection program (Construction Site Control Program Enhancement Options for Demolition Sites

Subject to the PCBs Management Program, Technical Memorandum to Bay Area Municipal Stormwater Collaborative Steering Committee, May 1, 2023) (Appendix C).

The key resources described above are provided in Appendices A, B, and C.

## 2.2. Implementation of the Building Demolition Protocols

MRP Permittees adopted Building Demolition Protocols (e.g., via local policy or ordinance) and trained local staff to implement the Protocols starting July 1, 2019, except for the Town of Clayton, which was exempted by the Water Board EO during MRP 2 due to lack of applicable structures. The City of Monte Sereno was later granted an exemption from implementing the Protocol on January 23, 2024 following their submittal of acceptable evidence that the only structures that existed pre-1980 within its jurisdiction were single-family residential and/or wood-frame structures (SFBRWQCB 2024).

Using the BASMAA/BAMSC Applicant Package and Screening Form, guidance, resources, and training, Permittees developed their own version of the Protocol tailored to the needs of their individual municipality. However, the overall process for all Permittees is similar and includes the following steps:

1. The municipality informs demolition permit applicants (applicants) that their projects are subject to the MRP Provision C.12.g requirements that require applicants to conduct a PCBs screening assessment. The PCBs screening assessment determines whether the building proposed for demolition is likely to have PCBs-containing building materials (i.e., *applicable structures*); and for applicable structures, determines whether PCBs are present in priority building materials at a concentration equal to or greater than 50 ppm.

2. Applicants must complete and submit the municipality's Applicant Package and Screening Form (Screening Form) modeled after the *PCBs in Priority Building Materials: Model Screening Assessment Applicant Package* (BASMAA 2023) or equivalent to the municipality. The Screening Form summarizes and certifies the information required by the municipality to issue a demolition permit. The Screening Form is divided into four parts:

    - **Part 1 – Owner and project information**. This part provides contact information for the building owner and project consultant, the project location, and the type of construction.

    - **Part 2 – Is the building subject to the screening requirement based on type, use, and age of the building?** This part includes questions to identify whether the project involves an *applicable structure*. Applicable structures are buildings that are proposed for complete demolition, were constructed or remodeled between 1950 and 1980, and are not wood-framed or single-family residential structures. Applicable structures are more likely to have PCBs-containing building materials. If the demolition does not involve applicable structures, the form may be certified (Part 4) and submitted to the municipality without completing Part 3.

    - **Part 3 – Report concentrations of PCBs in priority building materials.** Part 3 documents the results of the PCBs concentrations measured in *priority building materials*. Priority building materials include caulk, thermal insulation, fiberglass

insulation, adhesive mastics, and rubber window gaskets. For applicable structures, applicants must test priority building materials for PCBs. If PCBs in these materials are present at a concentration equal to or greater than 50 ppm, the Screening Form must document PCBs concentrations and the quantity of these materials removed prior to demolition, and any supporting documents (i.e., the consultant's report documenting the evaluation results and the QA/QC checklist) must be submitted to the municipality along with the completed Screening Form. BASMAA developed a "Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition (BASMAA 2019; Attachment C in Appendix B), which is provided with the Applicant Package and details how to conduct representative sampling and analysis of the priority building materials.

- **Part 4 – Certification.** The certification must be signed by the property owner or the owner's agent or legal representatives and the consultant who completed the application form. Completing and signing the certification indicates that: (1) the information provided by the applicant on the Screening Form is true, accurate, and complete; (2) the applicant understands the responsibility for knowing and complying with all relevant laws and regulations related to reporting, abating and handling and disposing of PCBs materials and wastes; (3) for sites with PCBs greater than or equal to 50 ppm, the applicant will notify the Water Board, USEPA, and the municipality at least five working days in advance of the start of demolition; and (4) beginning with MRP 3, the applicant will submit the hazardous waste manifest for the disposal of PCBs materials to the municipality within five working days of it becoming available.

3. The municipality reviews the Screening Form to make sure it is filled out correctly and is complete and works with the applicant to correct any deficiencies. The municipality then issues the demolition permit or equivalent, according to its procedures.

4. Starting with the 2023 rainy season, Permittees began inspecting demolition sites of applicable structures containing building materials with PCBs concentrations of 50 ppm or greater upon notification from the applicants that demolition was occurring pursuant to Provision C.6 to ensure that effective construction pollutant controls are used to prevent discharge into the MS4.

If building materials have been screened and determined to contain asbestos, lead, or other hazardous substances and will be abated under an associated waste program, that material need not be sampled for PCBs under this program as those materials will already be subject to appropriate abatement and disposal procedures.

## 2.3. Regional Data Collection Process

During MRP 2, Permittees worked together through the BASMAA Monitoring and Pollutants of Concern Committee (MPC) to develop a framework to comply with data collection and reporting requirements under Provision C.12.f. The overall data collection process is summarized here and described in detail in EOA 2020 (Appendix A). In addition, the regional data collection process has been updated more recently to also address reporting requirements under MRP 3, as described in this section.

The overall framework for the regional data collection process involves collection of data from individual permit applicants at the municipal level, followed by compilation of data for applicable structures at the countywide level for annual reporting, and data compilation at the regional level for the data evaluation presented in this report. The process is described below.

### 2.3.1. Applicant Data Collection

Each project proponent that requests a demolition permit from a given municipality must fill out the Applicant Package and Screening Form to summarize and certify the information required by the municipality to issue the demolition permit.

### 2.3.2. Municipal Data Collection and Reporting

The municipalities are responsible for collecting the completed Screening Forms and supporting documents prior to issuing the demolition permit. The municipality submits the completed Screening Forms for applicable structures and any supporting documents to its countywide stormwater program electronically at least annually. Screening Forms for non-applicable structures are not submitted to the countywide stormwater program but are maintained by the municipality. For active demolition sites each year, Permittees submit the following information with their Annual Reports:

- A list of structures with PCBs concentrations ≥ 50 ppm, including the project addresses and demolition dates, and a description of the PCBs-containing materials.

- For projects approved after June 30, 2023, whether the site was inspected during demolition, and the hazardous waste manifest prepared for transportation of material to a disposal facility for those cases where notification and advance approval from USEPA is not required.

### 2.3.3. Countywide Data Collection and Reporting

Upon receipt of the municipal data, each countywide stormwater program reviews the submitted Screening Forms and compiles the data into a countywide data management system. The data management system was developed at the regional level for consistency across the countywide stormwater programs. The data management system provides a mechanism for the countywide stormwater programs to gather and store the data submitted by the municipalities that is needed for annual reporting requirements and for the data evaluation. The data management system is an Excel spreadsheet-based tool for storing and managing the data from each Permittee. The tool also calculates the estimated loads avoided by the implementation of the Building Demolition Protocols using the assessment methodology and data inputs described in Section 3.

The countywide stormwater programs enter all of the pertinent information from the Screening Forms and supporting data into the data management system. This includes all the information that is needed for reporting and evaluation purposes. On an annual basis, the countywide stormwater program compiles and reports the following information on behalf of their members in their Program Annual Report:

- Documentation of (a) the number of applicable structures that applied for a demolition permit during the reporting year, and (b) a running list of the applicable structures that applied for a demolition permit (since the date the PCBs control protocol was

implemented) that had material(s) with PCBs at 50 ppm or greater, with the address, demolition date, and brief description of PCBs control method(s) used.

### 2.3.4. Regional Data Collection

The data management system described above was developed cooperatively by the countywide stormwater programs to facilitate the compilation and evaluation of the program data at the regional level. For this evaluation, the countywide stormwater programs merged their data into a single regional data set.

# 3. EFFECTIVENESS EVALUATION METHODS

This section describes the methods used to evaluate the effectiveness of the Building Demolition Protocols. The protocol effectiveness was evaluated both quantitatively and qualitatively based on six years of implementation of the Protocols by MRP Permittees, as described below.

## 3.1. Quantitative Evaluation Methods

Prior to MRP 2, Permittees worked together (through BASMAA) with Water Board staff to develop an assessment methodology framework to quantify PCBs loads reduced through implementation of the Building Demolition Protocols, summarized below and in the MRP 2 Fact Sheet (SFBRWQCB 2015). The basis for this methodology is described in BASMAA's 2014 Integrated Monitoring Report Part B (BASMAA, 2014) and in EOA 2020 (Appendix A). This assessment methodology provides the basis for the quantitative evaluation of the Building Demolition Protocols.

### 3.1.1. Overview of Assessment Methodology

The assessment started with a compilation of all the data gathered across the region on implementation of the Building Demolition Protocols, as described in Section 2.3. Information collected over six years (July 1, 2019, to June 30, 2025) was compiled into a single regional database containing information about PCBs sample results from priority building materials in applicable structures. This information was used to calculate the reduction in PCBs loading to stormwater runoff resulting from implementation of the program as described in Equation 1 and to validate the assumptions in the MRP about program implementation.

**Equation 1.** $Load\ of\ PCBs\ Reduced = N \bullet M \bullet SW \bullet E_f$

Where:

| | | |
|---|---|---|
| $N$ | = | Number of applicable structures with PCBs concentrations ≥ 50 ppm demolished each year (structures/yr) |
| $M$ | = | Average mass of PCBs per applicable structure with PCBs concentrations ≥ 50 ppm (kg/structure) |
| $SW$ | = | Average fraction of PCBs that enters the MS4 due to demolition without demolition program controls (dimensionless fraction) |
| $E_f$ | = | Average fraction of PCBs prevented by new demolition program controls from entering MS4 (dimensionless fraction) |

Table 3-1 presents the values assumed by the Water Board in MRP 2 for each of the four terms as stated the MRP 2 Factsheet. Based on these assumptions, the Water Board assigned a 2 kg/yr load reduction for implementing the Building Demolition Protocols across the MRP area (SFBRWQCB 2015).

**Table 3-1. Terms in MRP 2 Factsheet used in Equation 1 to stipulate the loading of PCBs to MS4s reduced by implementing the Building Demolition Protocols.**

| Term | Variable | Description | MRP 2 Value | Units |
|---|---|---|---|---|
| 1 | *N* | Number of applicable structures demolished per year with PCBs concentrations ≥ 50 ppm | 50 | applicable structures/year |
| 2 | *M* | Average mass of PCBs per applicable structure with PCBs concentrations ≥ 50 ppm | 5 | kg/applicable structure |
| 3 | *SW* | Average fraction of PCBs that enters the MS4 due to demolition without controls | 0.01 | dimensionless fraction |
| 4 | $E_f$ | Average fraction of PCBs prevented by controls[1] from entering MS4 (i.e., assumed effectiveness of controls) | 0.8 | dimensionless fraction |

[1]The term "controls" referred to existing construction controls in 2015.

The MRP 2 and MRP 3 Fact Sheets note that each of the terms could be represented by a range of values, and the information available to estimate the values of these terms shown in Table 3-1 was limited at the time of development in 2015. As part of this MRP 3 evaluation, the regional data compilation described above and additional literature searches were used to evaluate and refine, as appropriate, the values of the four terms. For the first two parameters, data evaluation was conducted using the information generated by the municipalities from the demolition control program. The last two parameters were evaluated using literature research. Additional information on the assumed values for each of these terms is provided below.

### 3.1.2. Term 1: Number of Applicable Structures Demolished Per Year

The MRP 2 Factsheet assumed that 50 applicable structures with PCBs concentrations 50 ppm or greater are demolished per year in the Bay Area (SFBRWQCB 2015). This value was based on data from the Bay Area Air Quality Management District (BAAQMD) on the number of building demolitions that had asbestos, as described in a San Francisco Estuary Institute report (SFEI 2011). BAAQMD regulations require that a "J Number" be obtained prior to applying for a permit for demolition of an existing structure or renovations removing greater than 100 square feet of asbestos material within the San Francisco Bay air basin. The quantity of "J Numbers" issued from April 2010 to March 2011 for commercial and industrial buildings in the SF Bay Area was 521. SFEI (2011) assumed that 46% of demolitions were of structures built between 1950 and 1980 and that 36% of those buildings had PCBs concentrations in caulk at 50 ppm or greater. Multiplying (521) x (0.46) x (0.36) results in an estimated 86 buildings demolished per year that were built between 1950 and 1980 and had PCBs concentration in caulks/sealants greater than or equal to 50 ppm. Based upon information in the SFEI 2011 study and considering that the scope of the program to manage PCBs during demolitions excludes wood frame and single-family residential buildings, Water Board staff assumed 50 applicable structures with PCBs concentrations 50 ppm of greater are demolished per year in the Bay Area (SFBRWQCB 2015).

As part of the Building Demolition Protocols that began in July 2019, applicants for demolition permits are required to submit a Screening Form for each applicable structure that documents

whether the applicable structure has PCBs concentrations 50 ppm of greater. This information was compiled into a regional database and used to calculate a regional annual average number of applicable structures with PCBs concentrations 50 ppm or greater that were demolished throughout the MRP area and were subject to the Protocols.

### 3.1.3. Term 2: Average Mass of PCBs per Applicable Structure

The MRP 2 Factsheet assumed an average applicable structure with PCBs concentrations 50 ppm or greater in the Bay Area contains 5 kg of PCBs in caulk (SFBRWQCB 2015).

Equation 2 was used to calculate the average mass of PCBs per applicable structure that was subject to the Protocols using data provided on the Screening Forms. The PCBs concentrations in each priority building material (*Ci*) were provided on the Screening Form for each applicable structure in units of mg of PCBs per kg of priority building material[2] (ppm). The quantity of each priority building material (*Qi*) that was used in Equation 2 was provided on the Screening Form in units of linear feet (ft) for caulk and rubber window gaskets, and square feet ($ft^2$) for thermal or fiberglass insulation and mastic adhesives. The newly calculated average accounts for the five priority building materials that are addressed in the Protocols - caulk, rubber window gaskets, thermal insulation, fiberglass insulation, and adhesive mastics.

**Equation 2.** $Mass\ of\ PCBs\ per\ Structure\ (mg) = [\sum n\ (Ci \cdot Qi \cdot Fi)]$

Where:

| | | |
|---|---|---|
| *Ci* | = | Concentration of PCBs in priority building material i (ppm) |
| *Qi* | = | Quantity of priority building material i (linear feet or square feet) |
| *Fi* | = | Conversion factor – mass of priority building material per linear foot of priority building material i (kg/ft) or mass of priority building material i per square foot of priority building material i ($kg/ft^2$) |

**<u>Estimate of Quantity of Material</u>**

When the concentration of PCBs was provided without an associated quantity of material, the quantity was estimated based on the number of samples collected for the specific material. As described in the BASMAA Building Demolition Protocol guidance on conducting the screening assessment (BASMAA 2019; Attachment C in Appendix B), a specific number of samples are required to be collected for each unique priority building material based on the estimated quantity of the material as shown in Table 3-2. The assumed quantity per sample, based on the midpoint of the quantity range of the suspect priority building material divided by the number of samples collected, is also shown in Table 3-2.

[2] The unit mg/kg is the unit reported by analytical laboratories and is equivalent to the unit part per million (ppm)

**Table 3-2.Priority Building Material Quantities Assumed Based on Number of Samples Collected**

| Priority Building Material Category | Quantity of Suspect Building Material (per BASMAA protocol) | Assumed Material quantity (Midpoint of the range) | Required Number of Samples Collected (per BASMAA protocol) | Assumed Quantity Per Sample for *Qi* |
|---|---|---|---|---|
| Caulks/gaskets | 0-50 linear feet | 25 linear feet | 1 | 25 linear feet/sample |
| Caulks/gaskets | 50-250 linear feet | 150 linear feet | 3 | 50 linear feet/sample |
| Caulks/gaskets | 250-1,000 linear feet | 625 linear feet | 5 | 125 linear feet/sample |
| Caulks/gaskets | 1,000-2,500 linear feet | 1,750 linear feet | 7 | 250 linear feet/sample |
| Caulks/gaskets | >2,500 linear feet | 2,500 linear feet | 9 | 278 linear feet |
| Mastics/adhesive | 0-1,000 square feet | 500 square feet | 3 | 167 square feet/sample |
| Mastics/adhesive | 1,000-5,000 square feet | 3,000 square feet | 5 | 600 square feet/per sample |
| Mastics/adhesive | >5,000 square feet | 5,000 square feet | 7 | 714 square feet/per sample |

**Estimate of Mass of Priority Building Materials**

Conversion factors were used to estimate the mass of priority building materials for the quantity of material reported (or assumed) on the Screening Form. The conversion factors that were used for this calculation were developed as described in the assessment methodology (EOA 2020, Appendix A) based on data collected from common priority building material dimensions and densities used in typical building construction and were gathered through literature review, product technical specifications, building construction guidelines, and other relevant resources (Panke and Cook 1992, Scheffler and Connolly 1996, Jester 1995). The best (average or mid-range) value of the conversion factors that are provided in Table 2 of Appendix A is summarized in Table 3-3. In some cases, available data was incomplete or did not match the categories in Table 3-3. Conversion factors that are not specific to the priority building material's application or material type were therefore developed by averaging across applications/types, consistent with Appendix A, and are listed with the "Unspecified" values in Table 3-3.

**Table 3-3. Conversion Factors to Calculate the Mass of Priority Building Materials for the Quantity Reported.**

| Priority Building Material Category | Descriptions of Typical Application | Conversion Factor | Units |
|---|---|---|---|
| Caulk | Around windows or window frames; around door frames | 0.02 | kg/ft |
| Caulk | Expansion joints between concrete sections (e.g., floor segments) | 0.04 | kg/ft |
| Caulk | Unspecified | 0.03 | kg/ft |
| Rubber Window Gaskets | Around window or window frames | 0.03 | kg/ft |
| Thermal or Fiberglass Insulation | Around HVAC systems/ heaters/ boilers | 0.82 | $kg/ft^2$ |
| Thermal or Fiberglass Insulation | Around heated transfer piping | 0.16 | $kg/ft^2$ |
| Thermal or Fiberglass Insulation | Inside walls or crawl spaces (loose fiberglass fill/batting) | 0.21 | $kg/ft^2$ |
| Thermal or Fiberglass Insulation | Inside walls or crawl spaces (rigid fiberglass foam board) | 0.17 | $kg/ft^2$ |
| Thermal or Fiberglass Insulation | Unspecified | 0.32 | $kg/ft^2$ |
| Adhesive Mastics | Below carpet and floor tiles | 0.10 | $kg/ft^2$ |
| Adhesive Mastics | On, under or between roofing materials and flashing | 0.50 | $kg/ft^2$ |
| Adhesive Mastics | Unspecified | 0.30 | $kg/ft^2$ |

### 3.1.4. Term 3: Average fraction of PCBs that Enter the MS4 due to Demolition without Controls

The average fraction of PCBs that enter the MS4 due to demolition without controls was estimated at 0.01 based upon professional judgment (i.e., 1% of PCBs in building materials enter MS4s due to demolition without any construction site controls). The MRP 2 Factsheet (SFBRWQCB 2015) used this value in Equation 1 for Term 3 (see Table 3-1). An online search did not identify any new research or relevant studies that may have occurred more recently to update the value assumed for Term 3.

### 3.1.5. Term 4: Average fraction of PCBs Prevented by Controls from Entering MS4

The average effectiveness of standard construction phase controls at preventing PCBs from entering storm drains was estimated to be 80 percent, based mainly upon professional judgment (i.e., 80% of PCBs were prevented from entering MS4s by the construction practices

in place to manage PCBs during building demolition in 2015). The MRP 2 Factsheet (SFBRWQCB 2015) used this value in Equation 1 for Term 4 (see Table 3-1). As described in Section 1.1.2, the Permittees were required to enhance their construction site control programs to minimize migration of PCBs into the MS4 during demolition activities during MRP 3. Data are not available to assess the increase in effectiveness of the improvements, thus the analysis presented in Section 4 considers an increase in effectiveness to 85%, 90%, and 95%.

## 3.2. Qualitative Evaluation Methods

Since the start of this program, Permittees have participated in a number of forums to discuss implementation of the Building Demolition Protocols, including BAMSC MPC and countywide stormwater program meetings. During MRP 3, BAMSC conducted a regional project that formed a workgroup comprised of municipal staff and countywide stormwater program representatives to facilitate improved information sharing amongst Permittees and to discuss the need for minor updates to and guidance on the implementation of the Protocols. Subsequently, the Contra Costa Clean Water Program (CCCWP) developed a regionwide qualitative survey to identify common Permittee questions and needs in implementing the Building Demolition Protocols. The goals of the regional project were developed based on the results of this survey,

The intent of the BAMSC regional project and workgroup was to facilitate information sharing amongst Permittees on their experiences in implementing the program as well as discuss challenges and successes experienced to date. Information gained through this workgroup, Permittee discussions at BAMSC MPC, and discussions at countywide stormwater program meetings over the past year provided input for the qualitative evaluation.

# 4. RESULTS AND DISCUSSION

This section presents the quantitative and qualitative results of the effectiveness evaluation of the Building Demolition Protocols, discusses strengths and limitations**,** and provides recommendations for continued implementation.

## 4.1. Summary of the Data

The data collected by municipalities on applicable structures from the Screening Forms submitted between July 2019 and June 2025 (i.e., six years of data) were compiled into a regional data set that is presented in Appendix D. These data were used to calculate updated values for each of the terms in Equation 1 (Section 3.1.1) as summarized below.

### 4.1.1. Term 1: Number of Applicable Structures Demolished Per Year

A total of 63 Screening Forms for applicable structures that contained priority building materials with PCBs concentrations 50 ppm or greater were submitted by Permittees to the countywide stormwater programs from July 2019 to June 2025 (Table 4-1). The total number of applicable structures demolished per year varied significantly depending on the year, from a low of four in fiscal year (FY) 2023/2024 to a high of 19 applicable structures in FY 2019/2020.

**Table 4-1. Number of Applicable Structures Demolished per Fiscal Year containing Priority Building Materials with PCBs Concentrations ≥ 50 ppm by County.**

| County | Number of applicable structures demolished per Fiscal Year with PCBs concentrations ≥ 50 ppm | | | | | |
|---|---|---|---|---|---|---|
| | 2019/2020 | 2020/2021 | 2021/2022 | 2022/2023 | 2023/2024 | 2024/2025 |
| Alameda | 11 | 5 | 6 | 4 | 1 | 0 |
| Contra Costa | 0 | 2 | 3 | 0 | 0 | 2 |
| Santa Clara | 6 | 1 | 2 | 3 | 3 | 2 |
| San Mateo | 2 | 3 | 4 | 1 | 0 | 2 |
| Solano | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 19 | 11 | 15 | 8 | 4 | 6 |

The data presented in Table 4-1 demonstrate that, on average,11 applicable structures per year were demolished that contained building materials with PCBs concentrations 50 ppm or greater. This is significantly less than the 50 applicable structures per year that was assumed for Term 1 in MRP 2. This average value (11 applicable structures per year) only accounts for structures that had PCBs concentrations 50 ppm or greater in priority building materials where the Screening Forms were submitted to municipalities by the project proponents.

The discrepancy between the observed and assumed number of applicable structures per year that contained building materials with PCBs concentrations 50 ppm or greater is likely due, at least in part, to the inputs used to estimate this number prior to MRP 2. The estimated number

of applicable structures demolished per year was an assumed fraction of the total number of J Number permits issued by the BAAQMD from April 2010 to March 2011 (SFEI 2011). J Number permits are also issued for partial demolitions which are not included in the current Protocol. This number was also based on a single year of data (April 2010 to March 2011) and does not consider periods of high and low economic activity which drives redevelopment.

### 4.1.2. Term 2: Average Mass of PCBs per Applicable Structure

The concentrations of PCBs in priority building materials were tabulated by the countywide stormwater programs for their respective county from laboratory reports/and or summary tables provided by the applicant to the Permittee. Summary statistics, calculated from the tabulated and aggregated data to assess the relative PCBs contributions from each respective material category, are detailed in Table 4-2. Region-wide, there were 256 samples that reported PCBs 50 ppm or greater. The priority building material category for caulks and sealants was the most common material identified with samples that had PCBs 50 ppm or greater (57%). The caulks and sealants priority building material category also demonstrated the highest mean (58,767 ppm), median (11,270 ppm), and maximum concentrations (537,000 ppm) for all priority building materials tested.

**Table 4-2. Summary Statistics of PCBs Concentrations ≥ 50 ppm in Priority Building Materials from Applicable Structures.**

| Priority Building Material | Count of Samples with PCBs concentrations ≥50 ppm (n) | Min | Mean | Median | Max |
|---|---|---|---|---|---|
| | | PCBs Concentrations (ppm) | | | |
| Caulks and Sealants | 147 | 50 | 58,767 | 11,270 | 537,000 |
| Rubber Window Gaskets | 44 | 56 | 694 | 310 | 6,400 |
| Thermal Insulation | 6 | 66 | 452 | 191 | 1,800 |
| Fiberglass Insulation | 12 | 53 | 2,707 | 783 | 25,000 |
| Adhesive/Mastics | 47 | 50 | 2,231 | 250 | 36,000 |
| **TOTAL** | **256** | | | | |

A small number of applicants also submitted data for non-priority building materials that demonstrated PCBs concentrations of 50 ppm or greater. These materials were not required to be tested for PCBs but were nevertheless reported by applicants. These non-priority building materials included fiberglass ceiling tiles from a building in Santa Clara County (the City of San Jose) and two buildings in Alameda County (the cities of San Leandro and Oakland, respectively) that tested for paint and concrete substrate. Summary statistics were calculated from the tabulated and aggregated data for these non-priority building materials as shown in Table 4-3. Of the non-priority building materials tested and reported, paint was the common contributor based on the total number of samples that tested over 50 ppm for PCBs (n=17). Paints also demonstrated the highest mean (13,241 ppm), median (3,100 ppm), and maximum concentrations (93,000 ppm) for all non-priority building materials tested and reported by applicants. However, since only a small percentage of applicants submitted these data, they

have not been included in the calculation of total PCBs mass per building presented in Table 4-4, thus the total mass value presented is conservative.

**Table 4-3. Summary Statistics of PCBs Concentrations in Non-Priority Building Materials in Applicable Structures with PCBs concentrations ≥ 50 ppm.**

| Non-Priority Building Material | Count of Samples with PCBs concentrations ≥ 50 ppm (n) | Min | Mean | Median | Max |
|---|---|---|---|---|---|
| | | PCBs Concentrations (ppm) | | | |
| Concrete | 3 | 54 | 88 | 61 | 150 |
| Paint | 17 | 51 | 13,241 | 3,100 | 93,000 |
| Fiberglass Ceiling Tile | 1 | 620 | 620 | 620 | 620 |

Using Equation 2 and the methodology described in Section 3.1.3, the total mass of PCBs in priority building materials per applicable structure was calculated for each applicable structure that had at least one sample with demonstrated PCBs concentrations of 50 ppm or greater in priority building materials (Table 4-4). For tested materials in which the quantities of materials were missing, the quantity was estimated using the total number of samples taken and tested for a respective material at the building (See Section 3.1.3).

**Table 4-4. Calculated Mass of PCBs contained in Priority Building Materials per Applicable Structure with demonstrated PCBs concentrations ≥ 50 ppm.**

| County | Build ID | Calculated Mass of PCBs (kg) |
|---|---|---|
| Alameda | B2022-00683 | 0.10 |
| | 2022-23_EM-01 | 1.5 |
| | 2021-22_AC-1 | 0.00011 |
| | B2105059 | 0.000042 |
| | BER-3 | 1.5 |
| | Hay-01 Bldg 1 | 0.0092 |
| | Hay-1 | 0.0010 |
| | Hay-2 | 0.0091 |
| | 411 Industrial Pkwy | 0.0010 |
| | DUB-1 | 0.53 |
| | 2020-21_FRE-1 | 0.058 |
| | FRE-3 | 0.00077 |
| | 2020-21_FRE-5 | 0.087 |
| | 22300 City Center Dr. | 0.66 |
| | 2019-20_Fre-1 | 0.0055 |
| | GE Site - Slab G - Center | 0.00050 |
| | GE Site BLD - 01 | 0.013 |
| | GE Site BLD - 02 | 0.00046 |
| Alameda | GE Site BLD - 04 | 0.0091 |
| | GE Site BLD - 08 | 0.000084 |
| | GE Site BLD - 17 | 0.0065 |

| County | Build ID | Calculated Mass of PCBs (kg) |
|---|---|---|
| | GE Site BLD - 18 | 0.00092 |
| | GE Site BLD - 20 | 0.020 |
| | Port BLD - 01 | 31 |
| | OAK-07 | 0.000027 |
| | OAK-06 | 5.6 |
| | OAK-11 | 0.024 |
| Contra Costa | SHIPPING/RECEIVING BLDG. | 0.0019 |
| | HELIUM BUILDING | 0.000034 |
| | CC-1 | 18 |
| | 102 | 2.1 |
| | CON-01 | 0.035 |
| | 2800 Mitchell_Bldg300/310 | 0.0090 |
| | D24012 (warehouse) | 0.35 |
| San Mateo | SMC-2 | 0.00033 |
| | SMC-6 | 0.0082 |
| | SMC-17 | 1.4 |
| | SMC-28 | 0.0029 |
| | SMC-29 | 170 |
| | SM-42 | 0.0023 |
| | SM-55 | 1.5 |
| | SM-56 | 4.5 |
| | SM-57 | 3.1 |
| | SM-61 | 0.61 |
| | SM-70 | 0.63 |
| | SM-71 | 1.0 |
| Santa Clara | SC-003B | 0.013 |
| | SC-005 | 0.26 |
| | SC-028 | 0.020 |
| | SC-031 | 0.034 |
| | SC-043 | 0.010 |
| | SC-053SJ | 0.13 |
| | SC-063 | 0.049 |
| | SC-089 | 0.0046 |
| | SC-091 | 22 |
| | SC-099 | 8.3 |
| Santa Clara | SC-103 | 0.32 |
| | SC-109 | 13 |
| | SC-126 | 0.013 |

| County | Build ID | Calculated Mass of PCBs (kg) |
|---|---|---|
| | SC-136 | 0.0014 |
| | SC-141 | 0.0080 |
| | SC-155 | 0.051 |
| | SC-156 | 0.054 |
| **TOTAL** | **65** | **288** |

Priority building materials in the 63 applicable structures reported to municipalities as part of the Building Demolition Protocols that had priority building materials 50 ppm or greater contained a total of 288 kg of PCBs, as calculated. The average mass for these applicable structures was 5 kg of PCBs per building (See Table 4-5), which is the same value that was estimated in MRP 2.

It is important to note that the overall range of PCBs contained in applicable structures varied widely (e.g., from <0.00003 kg up to 170 kg in a single structure). As such, the median calculated mass (0.024 kg) is much less than the average (5 kg). Applicable structures containing extremely high concentrations of PCBs significantly influence the mean and the total overall mass of PCBs removed through implementation of the Protocols. A single applicable structure (SMC-29) is responsible for more than half of the calculated mass captured by the Protocols. There were 170 kg of PCBs reported from this applicable structure, which is an order of magnitude higher than the next highest applicable structure (Port BLD -01; 31 kg). The high mass in SMC-29 is due to some of the highest concentrations of PCBs tested in caulk (up to 330,000 ppm) combined with the high quantity of caulk materials found in the building.

**Table 4-5. Summary Statistics of Calculated Mass of PCBs contained in Building Materials in Applicable Structures with PCBs Concentrations ≥ 50 ppm.**

| Count of Applicable Structures with PCBs concentrations ≥ 50 ppm | Min | Mean | Median | Max |
|---|---|---|---|---|
| | PCBs Mass per Building (kg) | | | |
| 63 | 0.000027 | 5 | 0.024 | 170 |

Importantly, the Protocol does not require PCBs testing (and submittal of the associated data) for priority building materials that are subject to asbestos, lead, or other hazardous materials abatement and disposal requirements. This “asbestos exemption” means that if priority building materials contain asbestos and will be abated under an associated waste program, that priority building material need not be sampled for PCBs under the Building Demolition Protocols. The purpose of this exemption was to reduce the burden on demolition permit applicants to test these materials for PCBs, as these materials were already subject to appropriate abatement and disposal procedures. While the existing asbestos, lead, and other hazardous materials programs require proper abatement and disposal of these materials, the amount of PCBs mass for those materials is not included on the Screening Forms and cannot be quantified. Thus, the average mass of PCBs per building reported in Table 4-5 is conservative and likely an underestimate.

### 4.1.3. Terms 3 and 4

A literature review was conducted to evaluate whether new information was available to support modifying the assumptions used for Term 3, the average fraction of PCBs that enter the MS4

due to demolition without controls, and Term 4, the average fraction of PCBs prevented from entering the MS4 through implementation of the Building Demolition Protocols. The review did not identify any recent studies that provide a quantitative estimate of the fraction of PCBs in building materials that may enter the MS4 during demolition in the absence of the protocols, nor did it identify studies that directly measured the effectiveness of the protocols under real-world demolition conditions. Therefore, no updates are proposed for Term 3. For Term 4, the analysis assumes the effectiveness of controls has increased from 80 % (0.8 for Term 4) to 85% (0.85), 90% (0.90), or 95% (0.95).

## 4.2. PCBs Loads Reduced

The PCBs loads reduced across the MRP region due to implementation of the Protocols from July 2019 to June 2025 were calculated using Equation 1 and the updated Terms 1 and 2 presented in Sections 4.1.1 and 4.1.2 (Table 4-6). Table 4-7 lists the PCBs load reduced using an assumption of 0.85, 0.90, or 0.95 for Term 4.

**Table 4-6.Comparison of PCBs Load Reduced between MRP Assumed Values and Observed Values over the Protocol's Implementation between July 2019 and June 2025.**

| Term | Symbol | Term Definition | Units | MRP 2 Assumed Value | Observed Value[1] |
|---|---|---|---|---|---|
| 1 | *N* | Number of applicable structures demolished per year with PCBs concentrations ≥ 50 ppm | applicable structures/year | 50 | 11 |
| 2 | *M* | Average mass of PCBs per applicable structure with PCBs concentrations ≥ 50 ppm | kg/applicable structure | 5 | 5 |
| 3 | *SW* | Average fraction of PCBs that enters the MS4 due to demolition without controls[1] | dimensionless fraction | 0.01 | 0.01 |
| 4 | $E_f$ | Average fraction of PCBs prevented by controls[1] from entering MS4 (i.e., assumed effectiveness of controls) | dimensionless fraction | 0.8 | 0.8 |
| | | **PCBs Load Reduced[1]** | kg/yr | 2 | 0.44 |

[1] PCBs load reduced calculated using Equation 1. $Load\ of\ PCBs\ Reduced = N \bullet M \bullet SW \bullet E$f.

**Table 4-7. Effect of Modifying Term 4 on PCBs Load Reduced over the Protocol's Implementation from July 2019 through June 2025.**

| Term | Symbol | Term Definition | Units | Assumed Value | PCBs Load Reduced[1] |
|---|---|---|---|---|---|
| 4 | $E_f$ | Average fraction of PCBs prevented by controls[1] from entering MS4 (i.e., assumed effectiveness of controls) | dimensionless fraction | 0.8 | 0.44 |
| 4 | $E_f$ | Average fraction of PCBs prevented by controls[1] from entering MS4 (i.e., assumed effectiveness of controls) | dimensionless fraction | 0.85 | 0.47 |
| 4 | $E_f$ | Average fraction of PCBs prevented by controls[1] from entering MS4 (i.e., assumed effectiveness of controls) | dimensionless fraction | 0.90 | 0.50 |
| 4 | $E_f$ | Average fraction of PCBs prevented by controls[1] from entering MS4 (i.e., assumed effectiveness of controls) | dimensionless fraction | 0.95 | 0.52 |

[1] PCBs load reduced calculated using Equation 1. $Load\ of\ PCBs\ Reduced = N \bullet M \bullet SW \bullet E$f.

The calculated average annual PCBs loads to stormwater reduced due to six years of implementation of the Protocols was at least 0.44 kg per year. This result is less than 25% of the 2 kg/yr load avoidance that was assumed in MRP 2. This lower level of load reduction resulted from the lower average number of buildings demolished each year that were captured by the Protocols and had PCBs at 50 ppm or greater (11 applicable structures per year), compared with the number assumed for Term 1 in the MRP (50 applicable structures per year).

Despite the smaller-than-predicted PCBs loads reduced due to implementation of the Building Demolition Protocols, the data collected document that the Protocols have provided substantial reductions in the mass of PCBs released to stormwater that otherwise would have occurred in the absence of the Protocols over the past six years. Based on the total mass of PCBs in the buildings that were subject to the Protocols identified in Table 4-4 (288 kg), the total mass of PCBs to stormwater that was reduced over six years of implementation was 2.3 kg (288 kg * 0.01 * 0.80). This finding highlights the importance of the Building Demolition Protocols.

It is important to note that there is a finite inventory of applicable structures with PCBs concentrations 50 ppm or greater in the Bay Area. The number of buildings that are demolished in a given year is a function of large-scale processes such as economic or socio-economic and political shifts, which may occur as a result of physical phenomena (e.g., large seismic events) or other factors, such as that experienced during the COVID-19 pandemic. If there are fewer buildings demolished each year, it will take longer to achieve the maximum PCBs loads reduced. However, continued implementation of the Protocols is the best way to ensure that PCBs load reductions are realized.

## 4.3. Qualitative Evaluation

Forums to discuss implementation of the Protocols, three BAMSC regional workgroup meetings, and the CCCWP regionwide survey provided qualitative information to further evaluate the

effectiveness of the Protocols. Among the information acquired were successes and challenges Permittees have encountered while implementing the Protocols, identification of additional implementation support, and areas for future Protocol improvements. The major takeaways from the regional workgroup, MPC meetings, countywide stormwater program discussions, and CCCWP survey include the following:

- The Protocols were an unprecedented program to regulate water quality pollutant of concern impacts of demolition projects that was informed by an extensive stakeholder (USEPA, Water Board, demolition contractors, environmental assessment consultants, and Permittees) engagement process during MRP 2. Some of the initial processes created and others that were added during MRP 3 have been found to be cumbersome or in need of clarification.

- Permittees have found that the low occurrence of demolition permit applications subject to the Building Demolition Protocols results in knowledge gaps across municipal staff that are on the front lines of informing permit applicants about the requirements of the Protocol and reviewing the completed Screening Forms and associated data to ensure they are complete. Additional tools and support are needed to provide ongoing instruction and information for staff overseeing implementation of the Protocols. The following recommendations were suggested to help fill the identified knowledge gaps.

    1. Create online recorded training for municipal staff who oversee implementation of the Protocols due to the infrequency of applicable structures in some municipalities and staff turnover.

    2. Develop additional guidance and tools for permittees to facilitate implementation of the Protocols (e.g., Instructions for Permittee implementation, flow charts, etc.).

    3. Develop a Frequently Asked Questions fact sheet that addresses many of the common Permittee questions that have arisen about how to implement the Protocols.

- Permittees have also found that it is difficult to conduct timely stormwater inspections prior to removal of PCBs-containing building materials due to existing language requiring notification prior to demolition, as opposed to prior to removal of PCBs-containing building materials.

The following recommendations were made to update the Building Demolition Protocols.

1. Simplify the forms and streamline the offramp process for non-applicable structures.

2. Clarify language and create and implement standard notification form(s) for the start of demolition and completion of demolition to facilitate inspections.

3. Remove the sampling exemption for projects with co-occurring asbestos abatements (i.e., the “asbestos exemption”).

Overall, Permittees feel they are effectively implementing the Protocols, but some updates and additional guidance (as noted above) could help improve implementation. Permittees will continue to discuss implementation of the Building Demolition Protocols at future BAMSC MPC and countywide stormwater program meetings to further identify additional questions and

challenges with implementing the Protocols, as they arise, in an ongoing effort to improve the overall success of the Protocols.

# 5. CONCLUSIONS

The development and implementation of the Building Demolition Protocols has been an unprecedented effort to address releases of PCBs from building materials into urban stormwater runoff during demolition projects. The results of the effectiveness evaluation highlight several strengths and successes, as well as some important limitations and lessons learned that should be considered as the Protocol continues to evolve.

### 5.1.1. Strengths and Successes of the Building Demolition Protocols

Except for the two Permittees granted an exemption, all Permittees have implemented the Building Demolition Protocols since July 1, 2019. In addition, Permittees began implementing enhanced construction site controls to minimize migration of PCBs into the MS4 in 2023 (LWA 2023, Appendix C). As estimated, these efforts have prevented at least 2.3 kg of PCBs from release to urban stormwater and eventually the Bay, supporting Permittees in making progress towards achieving the urban stormwater PCBs TMDL wasteload allocation. Specific successes of the Building Demolition Protocols are identified here.

1. BASMAA/BAMSC provided important support and worked closely with Permittees and other stakeholders to develop the Building Demolition Protocols. The tools, guidance, and training provided to Permittees, demolition contractors, and other stakeholders have been a key factor in the overall successful implementation of these Protocols.

2. Since implementation began, there has been continued support to Permittees through the countywide stormwater programs on implementing the Building Demolition Protocols and with collecting and compiling the screening assessment data. These data collection efforts have produced a regional inventory of PCBs testing results for priority building materials that allows calculation of the PCBs mass that was prevented from reaching stormwater due to the Protocols.

3. The calculated average mass of PCBs per building was approximately 5 kg. This is an interesting outcome because the average mass of PCBs per building that was assumed in MRP 2 (i.e., Term 2) was also 5 kg. This result clearly supports continued use of 5 kg per building for Term 2. Data indicate that there is a wide range of PCBs mass per building across the 63 applicable structures that underwent the screening assessment, ranging from less than 1 kg up to 170 kg per building. Therefore, continuing to calculate the PCBs mass for each building that undergoes screening assessment will provide more specific information on the PCBs mass addressed via these Protocols. These results also highlight the importance of the screening assessments to identify buildings that have PCBs in priority building materials.

4. Six years of implementation have given municipal staff firsthand experience conducting screenings, reviewing technical documentation, coordinating notifications, and reviewing demolition inspection reports. Permittees have gained valuable insight into which parts of the Protocols work well and which may need revision.

### 5.1.2. Limitations and Challenges

Because of the novelty of the requirements to develop a program to manage PCBs-containing materials and wastes during building demolition activities, there have been many unknowns and challenges encountered in developing and implementing the Building Demolition Protocols.

Some specific limitations and challenges of the current Building Demolition Protocols are identified here.

- The calculated value for Term 1 (the average number of applicable structures that are demolished each year that had PCBs concentrations 50 ppm or greater in priority building materials) was lower than the assumed value in the MRP. There are several potential reasons that could be responsible for this difference, including:
    - Assumptions regarding the number of applicable structures demolished each year (i.e., 50) were based on a single year of data (April 2010-March 2011) for buildings regulated via the BAAQMD asbestos program, which in retrospect may not have been representative of the types of structures and demolitions covered by the Building Demolition Protocols.
    - Because asbestos and PCBs often co-occur in building materials, a portion of the applicable buildings in the Bay Area that contain materials with PCBs greater than 50ppm are not included in the regional PCBs inventory and therefore are not captured in the monitoring data submitted under the current protocols.
    - The economic conditions and/or assumptions about building life expectancy that existed at the time MRP 2 was developed may have changed, resulting in fewer building demolitions each year. As economic and other conditions that drive building demolition can vary over time, the number of building demolitions per year are expected to vary substantially in the future.
- Municipalities face challenges related to infrequent building-demolition activity, which leads to staff unfamiliarity with the Protocols. Staff turnover further results in uneven implementation and a need for continuous retraining.
- Current notification requirements (before demolition, not before PCBs-containing or other hazardous material removal) create barriers, often leaving municipalities with limited opportunity to verify pollutant controls before materials are disturbed.
- Some of the current forms are complex and detailed, while also leaving out some important information. These forms should be updated based on lessons learned during the first six years of implementation.
- The estimated amount of material removed is the most commonly incomplete data field in applicant package materials, resulting in a potential underestimate of material quantities based on the number of samples collected.

These types of limitations and challenges are difficult to avoid when developing an entirely new program. As implementation has moved forward, many challenges have been identified and addressed through regional and countywide collaboration. The ongoing regional coordination structure (through BAMSC MPC, countywide program meetings, and dedicated workgroups) continues to strengthen municipal implementation and foster shared problem-solving.

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# Appendix A

# *MEMORANDUM*

**TO:** **BASMAA MPC Committee**

**FROM:** **Lisa Sabin and Jon Konnan, EOA, Inc.**

**DATE:** **September 23, 2020**

**SUBJECT:** **Managing PCBs in Building Demolition – Regional Collaboration for a Data Collection and Assessment Program**

## 1. BACKGROUND

The San Francisco Bay Area Municipal Regional Stormwater Permit (SFBRWQCB 2015, referred to as the MRP) Provision C.12.f requires Permittees to manage PCBs-containing materials and wastes during building demolition activities. Provision C.12.f.ii(3) requires development of a data collection and assessment methodology program by July 1, 2019 to quantify PCBs loads reduced through implementation of the new program for controlling PCBs during building demolition, which began implementation on that date. Provision C.12.f.iii requires Permittees to submit the data collection and assessment methodology with their Fiscal Year (FY) 2019/20 Annual Reports, and states that this reporting should be at the regional level on behalf of all Permittees.

This technical memorandum provides administrative and technical support at the regional level for ongoing efforts by MRP Permittees to comply with data collection, evaluation, and reporting requirements under MRP Provision C.12.f. by:

- Documenting the regional process to collect data from the new program for controlling PCBs during building demolition;
- Presenting the assessment methodology to calculate PCBs loads reduced via the building demolition program;
- Documenting the results of additional literature searches and data gathering efforts conducted to set the stage for refining and reducing uncertainty in the parameters of the assessment methodology equation;
- Describing how data generated from the new demolition control program will be incorporated into the assessment methodology, including providing conversion factors needed for the load reduction calculations; and
- Addressing the MRP Provision C.12.f.iii requirement to submit the data collection and assessment methodology with their FY 2019/20 Annual Reports.

This technical memorandum was developed by the countywide stormwater management programs in the MRP area working together through the Bay Area Stormwater Management Agencies Association (BASMAA) Monitoring and Pollutants of Concern (MPC) Committee (via an informal regional collaboration). The information provided builds upon a previous BASMAA effort that outlined a conceptual approach for the regional data collection process and assessment methodology (BASMAA 2018).

# 2. REGIONAL DATA COLLECTION PROCESS

This section documents the regional data collection process for the new programs to manage PCBs-containing building materials during demolition that began on July 1, 2019. This process was developed through a collaborative effort by municipalities subject to the MRP, the associated countywide stormwater management programs, and BASMAA. The regional data collection process focuses on collecting, compiling, and evaluating the data generated by the new programs on a regional basis. In addition, when sufficient amounts of new data have been collected, the data will support:

- Development of a revised estimate of the reduction in PCBs loading to stormwater runoff resulting from implementation of the new program.
- Evaluation of various aspects of the PCBs management program and the effectiveness of potential future refinements.

The regional data collection process involves collection of data from individual permit applicants at the municipal level, followed by compilation of data for applicable structures[1] at the countywide level, and data evaluation and reporting at the regional level. The process is described below.

1. The municipality informs demolition permit applicants that their projects are subject to the MRP Provision C.12.f requirements, necessitating, at a minimum, an initial screening for priority PCBs–containing materials.
2. For every demolition project, applicants complete and submit a version of BASMAA's model "PCBs Screening Assessment Form" (Screening Form) or equivalent to the municipality. For non-applicable buildings, applicants simply check the boxes, certify, and submit to the municipality.
3. The municipality reviews the Screening Form to make sure it is filled out correctly and is complete and works with the applicant to correct any deficiencies.
4. The municipality then issues the demolition permit or equivalent, according to its procedures.
5. The countywide programs compile the completed Screening Forms and any supporting documents (at a minimum annually, but quarterly is preferred). Municipalities submit forms for applicable structures only to the countywide program; forms for exempt sites need not be submitted. The countywide program compiles the forms and works with the other MRP countywide programs to manage and evaluate the data, and to assist Permittees with associated MRP reporting requirements.

To facilitate a regional approach, the countywide programs developed a regional data management system to compile and evaluate all the data generated by the new programs to manage PCBs during building demolition. The data management system also provides a mechanism for Permittees to gather

[1] Applicable structures are buildings built or remodeled from January 1, 1950 through December 31, 1980, with the following exemptions: single-family residential buildings, wood-framed buildings, and partial building demolitions.

and store the data needed for other closely related reporting requirements, such as submitting the number of applicable structures that applied for a demolition permit that reporting year and a running list of those structures that had materials with PCBs concentrations ≥ 50 ppm, including addresses and estimated demolition dates, with their FY 2019/20 Annual Reports.

The regional data management system is an Excel spreadsheet-based tool for storing and managing the data from each Permittee. The tool also calculates the estimated loads avoided throughout the region via implementation of the new management program, using the assessment methodology and data inputs described below.

# 3. ASSESSMENT METHODOLOGY

This section describes the assessment methodology and refined data inputs for estimating the loads of PCBs to municipal separate storm sewer systems (MS4s) that are avoided due to implementation of new controls to manage PCBs in building materials during demolition activities. To-date, the load of PCBs reduced through management of PCBs during demolition has been calculated using Equation 1:

**Equation 1.** $$Load\ of\ PCBs\ Reduced = N \bullet M \bullet SW \bullet E_f$$

Where:

$N$ = Number of applicable structures with PCBs concentrations ≥ 50 ppm demolished each year (structures/yr)

$M$ = Average mass of PCBs per applicable structure with PCBs concentrations ≥ 50 ppm (kg/structure)

$SW$ = Average fraction of PCBs that enters the MS4 due to demolition without new demolition program controls (dimensionless fraction)

$E_f$ = Average fraction of PCBs prevented by new demolition program controls from entering MS4 (dimensionless fraction)

The MRP 2.0 Factsheet (SFBRWQCB 2015) provides values for each of the four terms in Equation 1 that were used to stipulate the load reduction for implementing the new demolition control program across the MRP area, which was a total of 2 kg/yr. Table 1 presents the values used for each of the four terms in the Factsheet to derive the 2 kg/yr PCBs load reduction credit. The Factsheet notes that each of the terms could be represented by a range of values and the information available to estimate the values of these terms shown in Table 1 was limited.

BASMAA (2018) summarized the above MRP 2.0 Factsheet approach and other previous efforts to estimate PCBs loads from demolition and potential loads reduced by control programs. It also presented a conceptual approach to refining the 2 kg/year PCBs load reduction estimate by describing methods to potentially refine the values of each of the four Equation 1 parameters shown in Table 1. Building upon the approach described in that document, additional literature searches and data gathering efforts were conducted to set the stage for refining and reducing uncertainty in the values of the four terms. For the first two parameters, data will be incorporated as they are generated from the new demolition control programs. The results of these efforts are presented below.

**Table 1. Terms in MRP 2.0 Factsheet (SFBRWQCB 2015) equation used to stipulate the loading of PCBs to MS4s avoided by implementing demolition control measures.**

| Term | Symbol | Term Definition | Value | Units |
|---|---|---|---|---|
| 1 | *N* | Number of applicable structures demolished per year with PCBs concentrations ≥ 50 ppm | 50 | structures/year |
| 2 | *M* | Average mass of PCBs per applicable structure with PCBs concentrations ≥ 50 ppm | 5 | kg/structure |
| 3 | *SW* | Average fraction of PCBs that enters MS4s due to demolition without controls[1] | 0.01 | dimensionless fraction |
| 4 | $E_f$ | Average fraction of PCBs prevented by controls[1] from entering MS4 (i.e., assumed effectiveness of controls) | 0.8 | dimensionless fraction |

1. The term "controls" refers to the proposed new demolition management program, not existing construction controls.

## Term 1: Number of Applicable Structures Demolished Per Year

### Current Basis

A study conducted by the San Francisco Estuary Institute (SFEI) reported a medium estimate of 521 building demolitions per year in commercial and industrial land uses in the study area, based on Bay Area Air Quality Management District (BAAQMD) asbestos abatement permitting data.[2] The SFEI study also reported the following medium estimates: 46% of the demolished buildings were built between 1950 and 1980 and 36% had PCBs concentration in caulks/sealants greater than 50 ppm (Klosterhaus et al. 2011). Multiplying (521) x (0.46) x (0.36) results in an estimated 86 commercial and industrial buildings demolished per year that were built between 1950 and 1980 and had PCBs concentration in caulks/sealants greater than 50 ppm.

Based upon information in the SFEI study and considering that the scope of the program to manage PCBs during demolition is limited to exclude wood frame buildings, the MRP Factsheet assumed 50 applicable structures with PCBs concentrations ≥ 50 ppm are demolished per year in the Bay Area (SFBRWQCB 2015).

### Basis for Refinement

Data gathered during the new demolition control programs will be used to document the number of applicable structures with PCBs concentrations ≥ 50 ppm that are demolished each year throughout the MRP area. These data will be used to calculate a regional annual average number of applicable

[2] The BAAQMD regulations require that a "J Number" be applied for and obtained before applying for a building permit for demolition of an existing structure or renovations removing greater than 100 square feet of asbestos material within the San Francisco Bay air basin.

structures with PCBs concentrations ≥ 50 ppm that are demolished. This regional annual average value will be used for Term 1 in Equation 1 (see Table 1).

As part of implementing the new demolition controls that began in July 2019, applicants for demolition permits are required to submit a Screening Form to the municipality with jurisdiction for each applicable structure. Permittees will submit these forms to their countywide stormwater programs, which will document the number of applicable structures with PCBs concentrations ≥ 50 ppm within each jurisdiction that are demolished each year. This information will be compiled in the regional database described previously (Section 2) and used to calculate an annual average number of applicable structures with PCBs concentrations ≥ 50 ppm that are demolished each year in the region. Use of these real-world data collected in the MRP area will substantially reduce the uncertainty that is currently associated with the estimated value for Term 1 that was used in the MRP 2.0 Factsheet.

## Term 2: Average Mass of PCBs per Applicable Structure

### Current Basis

The SFEI study included estimating the mass of PCBs in caulks in Bay Area buildings and releases to stormwater runoff during renovation and demolition (Klosterhaus et al. 2011). Using a blind sampling approach, the SFEI study collected 25 caulk samples from the exterior of ten commercial and industrial buildings constructed in the study area between 1950 and 1980. The study area was the portion of the San Francisco Bay Area covered by the MRP: Alameda, Contra Costa, Santa Clara, and San Mateo Counties, and the cities of Fairfield, Suisun, and Vallejo. The caulk samples were analyzed for PCBs, which were detected in 88% of the samples, with 40% exceeding 50 ppm, the concentration at which caulk falls under U.S. Environmental Protection Agency (USEPA) regulations (Federal Register 2010). Detectable PCBs concentrations ranged over six orders of magnitude, from 1 to 220,000 ppm. These data were consistent with previous studies in other cities (Klosterhaus et al. 2011).

A geographic information system (GIS)–based approach was then used to estimate the number, area, and volume of currently standing buildings in the study area that were built during the era of greatest PCBs use in caulk. The approach used historical imagery and contemporary land use and involved characterization of randomly selected buildings within the study area, with the result scaled up to extrapolate total building counts and areas in the MRP footprint. Various assumptions, including the frequency of anticipated PCBs detection and PCBs concentrations in the caulk, average mass of caulk per unit building volume, and average building volume, were then applied to calculate an estimate of the total PCBs mass in building caulk in the study area. The evaluation resulted in a mid–range estimate of 10,500 kg PCBs in caulk in buildings located in the study area (low and high estimates were 767 and 46,000 kg, respectively), which equated to an average of 4.7 kg PCBs per building (low and high estimates were 0.6 and 16 kg per building, respectively). The estimate included caulk located on both the interior and exterior of buildings (Klosterhaus et al. 2011). Based upon the information in the SFEI study, the MRP Factsheet assumed an average applicable structure with PCBs concentrations ≥ 50 ppm in the Bay Area contains 5 kg of PCBs (SFBRWQCB 2015).

### Basis for Refinement

Data gathered as part of the new demolition control programs will be used to document the quantities and associated PCBs concentrations of priority materials in each applicable structure with PCBs concentrations ≥ 50 ppm. These data will be used to calculate a regional average mass of PCBs per

applicable structure with PCBs concentrations ≥ 50 ppm in priority materials. This calculated regional average mass will be used for the value of Term 2 in Equation 1 (see Table 1).

Because of the new program to manage PCBs in building materials during demolition activities, Permittees have the opportunity to gather real-world data to estimate the mass of PCBs in priority materials in each applicable structure with PCBs concentrations ≥ 50 ppm that is demolished in the region. Over time, these data will be compiled into a dataset that can be used to calculate a regional average mass. This calculated average will account for five priority building materials that potentially contain PCBs previously identified for the program (caulk, rubber window gaskets, thermal insulation, fiberglass insulation, and mastic adhesives), while the estimate in the MRP Factsheet (Table 1) is based upon caulk only.

The information provided in the Screening Form includes two types of data that are needed to calculate the mass of PCBs per applicable structure with PCBs concentrations ≥ 50 ppm: (1) the quantity of each priority material in the structure, and (2) the concentration of PCBs in each priority material in the structure. These data will be used as inputs in Equation 2 to calculate the total mass of PCBs in the five priority materials for each applicable structure with PCBs concentrations ≥ 50 ppm that undergoes demolition beginning July 1, 2019.

**Equation 2.** $$Mass\ of\ PCBs\ per\ Structure\ (mg) = [\sum_{i=1}^{n}(C_i \bullet Q_i \bullet F_i)]$$

Where:

$C_i$ = Concentration of PCBs in priority material i (mg/kg)

$Q_i$ = Quantity of priority material i (linear feet or square feet)

$F_i$ = Conversion factor – mass of priority material per linear foot of priority material i (kg/ft) or mass of priority material i per square foot of priority material i (kg/ft$^2$)

Equation 2 only accounts for the PCBs mass associated with the five priority building materials, so may represent an underestimate of the total PCBs mass in a given building. However, the extent of the underestimate would be small if the five priority materials contain most of the PCBs mass in a building.

The PCBs concentrations in each priority material ($C_i$) that will be used in Equation 2 is provided on the Screening Form for each applicable structure in units of mg of PCBs per kg of priority material (mg/kg).[3]

[3] Please note that this memorandum does not provide guidance on determining a representative PCBs concentration when multiple samples are collected from a single homogeneous area of a building material, per the sampling protocol (e.g., applying average vs. geomean vs. median to determine central tendency when multiple sample results are available). This type of determination should be made once sufficient data are available about PCBs concentration distributions in building material samples (e.g., after two or three years of data have been collected).

The quantity of each priority material ($Q_i$ ) that will be used in Equation 2 is provided on the Screening Form in units of linear feet (ft) for caulk and rubber window gaskets, and square feet ($ft^2$) for thermal or fiberglass insulation and mastic adhesives. Conversion factors ($F_i$) for each priority material i were developed to provide the mass of priority material per linear foot or per square foot using Equation 3.

**Equation 3.** $$\boldsymbol{F_i = (D_i \times \rho_i)}$$

Where:

$F_i$ = mass of priority material i per linear foot (of caulk or rubber window gaskets) of i (kg/ft) or mass of priority material i per square foot (of insulation or mastic) of i ($kg/ft^2$)

$D_i$ = Assumed dimensions of priority material i ($ft^2$ or ft)

- For caulk and rubber window gaskets, this represents the assumed cross-sectional area of the caulk bead or the gasket in square feet.
- For insulation and mastic, this represents the thickness of the layer of material in feet.

$\rho_i$ = Assumed density of priority material i ($kg/ft^3$)

Conversion factors that were developed for each priority building material are shown in Table 2. For caulk and rubber window gaskets, the conversion factors estimate the mass of material per linear foot (kg/ft). For thermal or fiberglass insulation and mastic adhesives, the conversion factors estimate the mass of material per square foot ($kg/ft^2$). Table 2 identifies typical applications for each priority material and the associated conversion factors that were developed for that application. The conversion factors are presented as a range of values and a "Best" value based on the average or mid-range value.

To develop the conversion factors shown in Table 2, data on common priority material dimensions and densities used in typical building construction were gathered through literature review, product technical specifications, building construction guidelines, and other relevant resources (Panke and Cook 1992, Scheffler and Connolly 1996, Jester 1995). The ranges of assumed dimensions and densities that were used to develop the conversion factors are shown in Table 3. Additional information on the assumptions and data used to populate Table 3 and develop the conversion factors shown in Table 2 is presented below.

***Product Dimensions***

Multiple construction guides were consulted to identify typical dimensions for common applications of priority materials in building construction. For caulk or rubber gaskets, Table 3 provides a range of typical heights and widths of applications around windows and doorframes, and for caulk, also between concrete expansion joints. For fiberglass or thermal insulation, Table 3 provides a range of typical thicknesses for applications used around HVAC systems, heathers, boilers, and pipes, and inside walls or crawl spaces. For mastic adhesives, Table 3 provides typical thicknesses of the material used under or between roofing material and flashing or used on surfaces between carpet and floor tiles. These dimensions apply to newly applied or installed products and may not reflect the dimensions of an aged/weathered product but represent the best information currently readily available.

**Table 2. Conversion factors developed to calculate the mass of each priority material per building.**

| Priority Material Category | Descriptions of typical application | Material[1,2,3] | Conversion Factors | | | | |
|---|---|---|---|---|---|---|---|
| | | | Range | | | Best (Average or mid-range value) | Units |
| Caulk | Around windows or window frames; around door frames | polysulfide caulk | 0.009 | - | 0.04 | 0.02 | kg/ft |
| | Expansion joints between concrete sections (e.g., floor segments) | polysulfide caulk | 0.01 | - | 0.15 | 0.04 | kg/ft |
| Rubber Window Gaskets | Around windows or window frames | Butyl Rubber | 0.02 | - | 0.06 | 0.03 | kg/ft |
| Thermal or Fiberglass Insulation | Around HVAC systems/ heaters/boilers | Felt Insulation | 0.09 | - | 2.3 | 0.82 | $kg/ft^2$ |
| | | Unfaced Blanket Fiberglass | 0.03 | - | 0.28 | 0.16 | $kg/ft^2$ |
| | Around heated transfer piping | Fiberglass Pipe Insulation | 0.06 | - | 0.62 | 0.26 | $kg/ft^2$ |
| | Inside walls or crawl spaces | Loose Fiberglass Fill/Batting | 0.17 | - | 0.24 | 0.21 | $kg/ft^2$ |
| | | Rigid Fiberglass Foam Board | 0.03 | - | 0.45 | 0.17 | $kg/ft^2$ |
| Adhesive Mastics | Below carpet and floor tiles | Floor Mastic | 0.06 | - | 0.13 | 0.10 | $kg/ft^2$ |
| | On, under or between roofing materials and flashing | Roof Mastic | 0.30 | - | 0.74 | 0.50 | $kg/ft^2$ |

1. Panke and Cook, 1992.
2. Scheffler, M. and Connolly, J. 1996.
3. Jester, T.C. 1995.

***Product Densities***

The density information reported in Table 3 was gathered from readily available commercial literature on a range of reported densities for the five priority materials. Where possible, information on products that were used in the 1950s to 1980s time period and that were known to contain PCBs were used. However, because this type of product-specific information was not readily available, much of the information used to estimate typical product densities (and dimensions) was based on commercially available products that are currently in use for similar types of building and construction applications. For example, prior to 1980, polysulfide caulks and sealants were frequently formulated with PCBs and are commonly found in buildings constructed between 1950 and 1980. Although currently available polysulfide sealants do not contain PCBs, the densities of these types of sealants were used in Table 3 as reasonable approximations of the densities of polysulfide sealants used in the past. Similarly, the densities for other priority materials shown in Table 3 are primarily based on current use products that are similar to products used in the past.

In addition to the lack of technical data on products in use during the 1950s – 1980s, there is a lack of data about the impact of age and weathering on priority material densities. Loss of volatile material will reduce product densities over time, while other weathering factors, such as compression or stretching, may increase or decrease densities over time. In an attempt to better account for age and weathering, available literature was reviewed to identify information on the densities of priority materials in construction and demolition debris and wastes. This type of information was not found on the specific priority materials of interest. However, US EPA (2016) provides estimates for the weight to volume ratios (i.e., densities) of a number of construction and demolition (C&D) waste categories. These categories include concrete, asphalt paving, roofing, wood, gypsum board, metal, rock/gravel/dirt and sand, and bulk waste. The bulk waste category is a generic catchall grouping for the remainder of C&D debris that does not fit into one of the other categories. Although the materials that are included in this generic category are not specified, the priority materials would likely all fall into the generic bulk waste category when disposed.

Therefore, in the absence of other data, the density for C&D bulk waste may be somewhat comparable to the densities of aged/weathered priority materials and can be compared to the densities of new products provided in Table 3. The average priority material densities in Table 3 range from about 1 kg/ft$^3$ to 40 kg/ft$^3$, with an average of 12 kg/ ft$^3$ across all priority materials. The C&D bulk waste density of 8 kg/ft$^3$ fits within the range of the priority material densities reported in Table 3 and is about 30% less than the average density across all priority materials. This comparison is limited because of the unknown composition of C&D bulk waste but suggests the densities in Table 3 are reasonable approximations for aged/weathered materials.

***Average Conversion Factors***

Use of the conversion factors shown in Table 2 requires information on the application and material type of the priority building material. It is anticipated that in some cases the available data may be incomplete or may not match the categories in Table 2. Conversion factors that are not specific to the priority building material's application or material type were therefore developed by averaging across applications/types (Table 4). When calculating the mass of PCBs removed from a demolition site, conversion factors from Tables 2 and/or 4 should be selected as appropriate given the level of information available about the associated sample(s).

**Table 3. Dimensions and densities for typical construction applications of priority materials used to develop conversion factors.**

| Priority Material Category | Descriptions of typical application | Material | Typical Product Dimensions (Inches) | | | | | | Typical Product Density (kg/ft$^3$) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Width | | | Depth/Thickness | | | | | |
| | | | Low | Mid | High | Low | Mid | High | Low | Mid | High |
| Caulk[1,2,3,4,5] | Around windows or window frames; around door frames | polysulfide caulk | 0.25 | 0.38 | 0.50 | 0.13 | 0.19 | 0.25 | | 42 | |
| | Expansion joints between concrete sections (e.g., floor segments) | polysulfide caulk | 0.25 | 0.5 | 1 | 0.125 | 0.25 | 0.5 | | 42 | |
| Rubber Window Gaskets[5] | Around windows or window frames | butyl rubber | 0.30 | 0.40 | 0.50 | 0.20 | 0.30 | 0.40 | | 41 | |
| Thermal/Fiberglass Insulation[5] | Around HVAC systems/ heaters/boilers | felt insulation[6] | n/a | | | 1.0 | 3.0 | 5.0 | 1.1 | 3.3 | 5.4 |
| | | unfaced blanket fiberglass[7] | | | | 0.5 | 2.8 | 5 | | 0.68 | |
| | Around heated transfer piping | fiberglass pipe insulation[8] | | | | 1.0 | 2.0 | 3.0 | 0.68 | 1.6 | 2.5 |
| | Inside walls or crawl spaces | loose fiberglass fill/batting[9] | | | | | 3.5 | | 0.59 | 0.70 | 0.82 |
| | | rigid fiberglass foam board[10] | | | | 1.0 | 2.5 | 4.0 | 0.32 | 0.84 | 1.4 |
| Adhesive Mastics[5] | Below carpet and floor tiles | floor mastic[11] | n/a | | | 0.13 | 0.19 | 0.25 | | 6.2 | |
| | On, under or between roofing materials and flashing | roof mastic[12] | | | | 0.13 | 0.19 | 0.25 | 29 | 32 | 36 |

1 Pfeiffer M.J., Darwin, D., 1987.
2 Panke, J.R. and John P. Cook. 1992.
3 Hammer & Hand. 2016.
4 M. Scheffler, M. and J. Connolly, J. 1996.
5 Jester, T.C. 1995.
6 Owens-Corning Thermafiber Industrial Felt
7 Owens-Corning unfaced fiber glass blanket
8 Owens-Corning fiberglass pipe insulation
9 Owens-Corning Loose fill insulation and NIST Fiberglass Batt (wall and ceiling insulation)
10 Owens-Corning Foamular Products - rigid polyurethane foam (PUR/PIR)
11 Latricrete Premium Mastic
12 Henry Company Pro-Grade Flashing Cement, Pro-Grade Plastic Cement and Pro-Grade Repair Cement

**Table 4. Average conversion factors developed to calculate the mass of each priority material per building.**

| Priority Material Category | Conversion Factor | Units |
|---|---|---|
| Caulk | 0.03 | kg/ft |
| Rubber Window Gaskets | 0.03 | kg/ft |
| Thermal/Fiberglass Insulation | 0.32 | $kg/ft^2$ |
| Adhesive Mastics | 0.30 | $kg/ft^2$ |

## Term 3: Average fraction of PCBs that enters MS4 due to demolition without controls

### Current Basis

The average fraction of PCBs that enters the MS4 due to demolition without controls has been estimated at 0.01, based upon professional judgment (i.e., 1% of PCBs in building materials enter MS4s due to demolition without additional controls beyond standard construction site controls). The MRP 2.0 Factsheet (SFBRWQCB 2015) used this value in Equation 1 for Term 3 (see Table 1).

The one percent value presumably incorporates losses to the environment both at the site and during disposal and recycling. Conceptually, this approach assumes that without controls, the transport and fate of the PCBs–containing materials that were in the demolished building fall within three general categories:

1. Released during the demolition (e.g., as part of an initially airborne plume of small particles) and settled in a "halo" around the site. Any wash waters used during the demolition (e.g., during cleaning of equipment, onsite or offsite) that are not fully contained and treated or disposed of could also transport PCBs–containing materials to the MS4.
2. Removed from the site and disposed of as part of the general waste stream (e.g., at a landfill), with some fraction potentially released to the environment during the handling, transport, and disposal process (e.g., during transportation of waste materials by truck to a landfill).
3. Removed from the site with recycled materials, with some fraction potentially released to the environment during the handling, transport, and recycling process (e.g., during transportation of waste materials by truck to a transfer station or recycling facility) or returned to the environment with recycled materials.

This methodology assumes that all PCBs–containing materials released into the environment via any of the above three categories eventually enter the MS4. For example, permanent storage in onsite or offsite pervious areas is assumed to be negligible. All three transport and fate categories are presumably

incorporated into the third term of Equation 1, the average fraction of PCBs that enters MS4s due to demolition without controls.

This methodology also assumes that the effectiveness of any existing controls (e.g., proper offsite disposal of PCBs–containing materials, erosion and sediment controls, and other routine construction site controls) is incorporated into the third term of Equation 1.

## Basis for Refinement

BASMAA (2018) summarized the readily available information and studies on the release of PCBs to stormwater from building materials during demolition activities. Building upon those efforts, a follow-up literature review was conducted in 2019 to identify any additional information that could be used to refine the assumed fraction of PCBs that enters MS4s due to demolition without controls in Equation 1, Term 3 (see Table 1). This literature review was also conducted to identify new information that could be used to refine Term 4 (i.e., the fraction of PCBs prevented by controls from entering MS4s). This section summarizes the literature review efforts and identifies the outcomes for Term 3. The literature review outcomes for Term 4 are presented in the next section.

### *Literature Review*

The literature review conducted in 2019 built upon the information summarized in BASMAA (2018). The Google search engine as well as specific scientific literature databases and government websites were searched, including:

- Google Scholar
- Google Books
- SpringerLink
- Wiley Online Library
- American Chemical Society
- ScienceDirect.com
- Elsevier
- US EPA Website

Major search terms (and similar variations or combinations of these terms) that were used included the following:

- PCBs transport and fate
- PCBs in soils/stormwater/demolition/building materials/building demolition/building renovation
- PCBs in caulk/rubber window gaskets/thermal insulation/fiberglass insulation/mastic
- PCBs contaminated sites/cleanup sites/remediation sites
- PCBs in school buildings
- Remediation of PCBs in buildings/building materials
- Construction and Demolition Debris/Waste

- Demolition dust and stormwater impacts
- Soil contamination from PCB-containing caulk/materials/buildings
- PCBs in soil after demolition
- PCB contamination from polysulfide sealants
- PCB-contaminated soil/demolition dust
- Mass of PCBs in Building materials
- Fate of PCBs in the environment/urban environment/caulk/building materials
- PCBs Source apportionment
- PCBs Waste characterization
- Accumulation rates of PCBs in soils
- PCB cleanup and disposal programs
- Managing remediation waste from PCB cleanups
- Handling and disposal of PCBs waste
- Improved recycling practices/BMP effectiveness and stormwater impacts
- PCBs sources/emissions/releases from caulk/buildings/schools
- PCBs emissions during demolition/renovation/abatement/replacement/removal of caulk
- Dust from demolition and construction sites

In addition, online searches were performed to identify any new research that had cited one or more of the studies previously described in BASMAA (2018). These citations were reviewed to identify any relevant studies that may have occurred more recently and relied upon these earlier studies.

***Literature Review Outcomes***

The 2019 literature review did not find any new information to validate, refine, or further reduce uncertainty in the assumed value that was used in the MRP 2.0 Factsheet for the fraction of PCBs entering MS4s due to demolition activity without controls in Equation 1, Term 3 (see Table 1). To date, the vast majority of research on the release of PCBs contained in building materials has focused on human health risks and quantifying human exposures via air, ingestion, and/or dermal pathways. It appears the release of PCBs to stormwater from building materials in general, and specifically during demolition or renovation activities has not been quantitatively studied, outside of the limited studies reported previously in BASMAA (2018). These earlier studies developed conceptual models and thought experiments to estimate the fraction of PCBs released based on the limited measurement data available. Without new measurement data, however, further attempts to improve upon these efforts and reduce uncertainty in the current estimate of Term 3 are not warranted.

BASMAA (2018) recommends exploring whether disposal and/or recycling practices have improved in recent years such that less PCBs would be lost to the environment via these pathways. Evidence was not found during the literature review of improved recycling or disposal practices implemented in the Bay Area in recent years that would result in reduced releases of PCBs to MS4s from demolition materials.

This finding is further supported by anecdotal information about recycling facilities in the South Bay Area. Over the past 5+ years Santa Clara Valley MRP Permittees have been investigating sources of PCBs to public ROWs in industrial areas and have frequently targeted facilities where demolition materials are brought on site for recycling. These investigations have documented poor housekeeping practices, visible scrap material and soils tracking off sites, and general lack of appropriate stormwater BMPs at many of these types of facilities which have resulted in citations during municipal stormwater inspections. Overall, these investigations have found large inconsistencies in materials handling practices across facilities, and even at the same facility over time. Although not a quantitative assessment, this information suggests that it is unlikely consistent improvements in recycling practices across facilities have occurred in recent years.

## Term 4: Average fraction of PCBs prevented by new controls from entering MS4

### Current Basis

The estimated fraction of PCBs prevented by new controls from entering MS4s has been estimated at 0.8, based mainly upon professional judgment (i.e., 80% of PCBs are prevented from entering MS4s due to the new programs to manage PCBs during building demolition). The MRP 2.0 Factsheet (SFBRWQCB 2015) used this value in Equation 1 for Term 4 (see Table 1).

### Basis for Refinement

As described above, a review of readily available literature was conducted in 2019 to identify any new information that could be used to refine the assumed effectiveness of controls to prevent PCBs from entering MS4s (Term 4). The literature review efforts are summarized in the above section on Term 3. This section presents the outcomes of the literature review for Term 4.

#### *Literature Review Outcomes*

The 2019 literature review did not find any new information to validate, refine, or further reduce uncertainty in the assumed value that was used in the MRP 2.0 Factsheet for the fraction of PCBs prevented by new controls from entering MS4s. However, BASMAA (2018) identified two earlier studies that estimated 99% capture of PCBs contained in caulk removed from buildings using appropriate abatement measures (high power vacuums and power washing during removal). Based on these data, a reasonable assumption is that the new control programs will be similarly effective at capturing PCBs in priority materials that, prior to demolition, are removed from a building using appropriate abatement methods. Given the new programs are focused on controlling PCBs in priority materials only, the use of a lower (80%) value for the overall effectiveness of the controls at preventing PCBs from entering MS4s (Term 4) appears reasonable.

#### *Using Data from New Program on PCBs Mass in Priority Building Materials*

The new management program implemented by Permittees as of July 1, 2019 requires that demolition project proponents identify priority materials in applicable buildings, collect representative samples for analysis, and report the concentrations of PCBs. When a sample concentration is equal to or greater than 50 ppm, the estimated amount of material in the building associated with that sample (and presumably removed and properly disposed of before the demolition occurs) is also reported. These concentration and quantity data can be combined to determine the mass of PCBs presumably removed from the building before demolition. These data represent an estimate of the mass of PCBs removed from the building via removal of the priority materials (rather than the estimate provided in the MRP 2.0

Factsheet of the total mass of PCBs in the building in all PCBs-containing materials). Thus, the value of Term 4 in Equation 1 and Table 1 may be set to 1 when evaluating the PCBs load avoided using PCBs mass in priority building materials data from the new program, since it may be assumed that the program removes 100% of the priority materials with PCBs ≥ 50 ppm that were identified by the sampling protocol.

# 4. POTENTIAL FUTURE REFINEMENTS TO THIS METHODOLOGY

It should be noted that the new program for controlling PCBs during building demolition is in its early stages, having begun implementation only recently (i.e., on July 1, 2019). The data generated during the first fiscal year of the program have not yet been compiled and evaluated. As experience is gained in implementing the program and the associated data are collected and evaluated, and/or new information becomes available from any other source, the need may arise to revise the data collection and assessment methodology presented in this memorandum. As needed, staff from the countywide programs in the MRP area will work with MRP Permittee and Regional Water Board staff to make any future refinements to the program and methodology.

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# Appendix B

# PCBs in Priority Building Materials: Model Screening Assessment Applicant Package

## Managing PCBs–Containing Building Materials during Demolition: Guidance, Tools, Outreach and Training

Bay Area Stormwater Management Agencies Association

**August 2018**
**(Revised November 2019 and May 2023)**

This document is a deliverable of the Bay Area Stormwater Management Agencies Association (BASMAA) project *Managing PCBs−Containing Building Materials during Demolition: Guidance, Tools, Outreach and Training*. BASMAA developed guidance, tools, and outreach and training materials to assist with San Francisco Bay Area municipal agencies' efforts to address the requirements of Provision C.12.f. of the Bay Area Municipal Regional Stormwater Permit (referred to as the MRP). Provision C.12.f. of the MRP requires Permittees to manage PCBs–containing building materials during demolition. This document was updated to include additional requirements in MRP 3.0 (Order No. R2-2022-0018) Provision C.12.g.

We gratefully acknowledge the BASMAA Steering Committee for this project, which provided overall project oversight (during 2018 and earlier), including during the development of this and other project deliverables:

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- Kevin Cullen, Program Manager, Fairfield-Suisun Urban Runoff Management Program
- Matt Fabry, Program Manager, San Mateo Countywide Water Pollution Prevention Program
- Gary Faria, Supervisor, Inspection Services, Building Inspection Division, Contra Costa County
- Napp Fukuda, Deputy Director - Watershed Protection Division, City of San José
- Ryan Pursley, Chief Building Official, Building Division, City of Concord
- Pam Boyle Rodriguez, Manager, Environmental Control Programs – Stormwater, City of Palo Alto
- Jim Scanlin, Program Manager, Alameda Countywide Clean Water Program
- Melody Tovar, Regulatory Programs Division Manager, City of Sunnyvale

We also gratefully acknowledge the project Technical Advisory Group, which provided feedback from a variety of project stakeholders during development of selected project deliverables:

| Stakeholder Group | Representative(s) |
|---|---|
| Regulatory – stormwater/PCBs | Luisa Valiela and Carmen Santos, U.S. EPA Region 9 |
| Regulatory – stormwater/TMDL | Jan O'Hara, San Francisco Bay Regional Water Quality Control Board |
| Regulatory – experience with related program (asbestos management) | Ron Carey and Richard Lew, Bay Area Air Quality Management District |
| Industry – demolition contractors | Avery Brown, Ferma Corporation |
| Industry – remediation consultants | John Martinelli, Forensic Analytical Consulting<br>John Trenev, Bayview Environmental Services, Inc. |
| MRP Permittee – large municipality | Patrick Hayes, City of Oakland |
| MRP Permittee – medium municipality | Kim Springer, San Mateo County Office of Sustainability |
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# PCBs in Priority Building Materials: Model Screening Assessment Applicant Package

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**C** – Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition

## DISCLAIMER

Information contained in BASMAA products is to be considered general guidance and is not to be construed as specific recommendations for specific cases. BASMAA is not responsible for the use of any such information for a specific case or for any damages, costs, liabilities, or claims resulting from such use. Users of BASMAA products assume all liability directly or indirectly arising from use of the products.

The material presented in this document is intended solely for the implementation of a municipal regulatory program required by the San Francisco Bay Area Regional Water Quality Control Board Municipal Regional Stormwater Permit for the protection of water quality under the Clean Water Act.

BASMAA prepared the tools and guidance herein to assist MRP Permittees' efforts to address the requirements of Provision C.12.f. of the MRP. The project team received input from a variety of stakeholders during development of the tools and guidance, including regulators (San Francisco Bay Regional Water Quality Control Board, U.S. EPA, and Bay Area Air Quality Management District staff), Bay Area municipal agency staff, and industry representatives.

This document does not address other environmental programs or regulations (e.g., PCBs regulations under the Toxic Substances Control Act (TSCA); federal, state, or local regulations for hazardous material handling and hazardous waste disposal; health and safety practices to mitigate human exposure to PCBs or other hazardous materials; recycling mandates; and abatement at sites with PCBs (or other contaminants). The Applicant is responsible for knowing and complying with all relevant laws and regulations.

The mention of commercial products, their source, or their use in connection with information in BASMAA products is not to be construed as an actual or implied approval, endorsement, recommendation, or warranty of such product or its use in connection with the information provided by BASMAA.

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# Process Overview

This document provides a model PCBs in Priority Building Materials Screening Assessment process to be conducted by demolition project proponents (Applicants). A flow chart illustrating the above processes is provided in **Attachment A**.

Applicants proposing to demolish buildings must conduct the PCBs screening assessment. Through the PCBs screening assessment Applicants will:

1) Determine whether the building proposed for demolition is likely to have PCBs-containing building materials (see discussion of applicable structure); and
2) Determine whether PCBs are present at a concentration equal to or greater than 50 parts per million (ppm) in building materials.

Use the *PCBs Screening Assessment Form* (**Attachment B**) to summarize and certify the information required by the municipality to issue the demolition permit. The form is divided into four parts:

- **Part 1** provide Applicant information and project location.
- **Part 2** complete the questions to identify whether the project involves an *applicable structure.* If the demolition does not involve an applicable structure, the form may be certified and submitted without completing Part 3.
- **Part 3** complete the questions to provide the concentrations of PCBs in any *priority building materials*.
- **Part 4** certify the information being submitted.

Water quality within the San Francisco Bay Region is regulated by the San Francisco Bay Area Regional Water Quality Control Board (Regional Water Board).

The Regional Water Board issues the Municipal Regional Permit (MRP)[1] that regulates discharges of stormwater runoff. The MRP includes provisions for reducing discharges of polychlorinated biphenyls (PCBs) in stormwater runoff and requires municipalities to implement a program to manage priority PCBs–containing building materials during demolition.

Existing federal and state regulations create the framework for managing PCBs in building materials once those PCBs are identified through this program and for disposing of wastes containing PCBs.

Note that fluorescent light ballasts, polyurethane foam furniture, and Askarel fluid used in transformers, all of which may contain PCBs, are typically managed during pre-demolition activities under current regulations and programs that require removal of universal waste and outdated transformers. For this process it is assumed that those materials will be evaluated and managed under those existing programs.

This screening process is part of a program for water quality protection and was designed in accordance with requirements in the MRP.[1] It does not address other environmental programs or regulations (e.g., PCBs regulations under the Toxic Substances Control Act (TSCA); federal, state, or local regulations for hazardous material handling and hazardous waste disposal; health and safety practices to mitigate human exposure to PCBs or other hazardous materials; recycling mandates; or abatement at sites with PCBs (or other contaminants). **The Applicant is responsible for complying with all relevant laws and regulations. See the Federal and State PCBs Regulations section for additional information.**

[1] A National Pollutant Discharge Elimination System (NPDES) permit issued to municipalities in the counties of Alameda, Contra Costa, San Mateo, and Santa Clara, and the Cities of Fairfield, Suisun City, and Vallejo.

# Applicant Instructions for Completing the PCBs Screening Assessment Form

Applicants for demolition permits or other permits that involve the complete demolition of a building must conduct an assessment to screen for PCBs in *priority building materials*. *Use the PCBs Screening Assessment Form*, to summarize and certify the information needed by the municipality to issue a demolition permit. The form is provided in **Attachment B**. If the project includes the demolition of multiple buildings complete one form for each building to be demolished.

**Key Definitions**

**Demolition** means the wrecking, razing, or tearing down of any entire building. The definition is intended to be consistent with the demolition activities undertaken by contractors with a C-21 Building Moving/Demolition Contractor's License.

**Priority Building Materials** are:

1. Caulk;
2. Thermal insulation;
3. Fiberglass insulation;
4. Adhesive mastics; and
5. Rubber window gaskets.

**Buildings** are structures with a roof and walls standing more or less permanently in one place. Buildings are intended for human habitation or occupancy.

**Applicable Structure** is defined as building constructed or remodeled between January 1, 1950 and December 31, 1980. Wood framed buildings and single-family residential buildings are not an Applicable Structure regardless of the age of the building.

## Part 1. Owner and project information

Complete the owner and consultant information and the project location information.

For the Type of Construction select one of the following options:

- **Wood Frame** (Buildings constructed with lumber or timbers, which make up the studs, plates, joists, and rafters.)
- **Masonry Construction** (Buildings constructed with concrete blocks or bricks as the load bearing walls typically with the floors and ceilings constructed with wooden joists.)
- **Steel Frame Construction** (Buildings constructed with steel studs or steel columns and steel joists or trusses to support floors and roofs. Includes light gauge steel construction and high-rise steel construction.)
- **Concrete Frame** (Buildings constructed with reinforced concrete columns, concrete beams, and concrete slabs.)
- **Pre-Engineered** (Buildings constructed with pre-engineered parts bolted together.)

## Part 2. Is building subject to the screening requirement based on type, use, and age of the building?

Part 2 documents the determination of whether the proposed demolition will affect an *applicable structure*. If the demolition does not affect an *applicable structure*, then the assessment is complete, and the form can be certified.

This determination screens out buildings that are a lower priority with regard PCBs-containing materials and provides an off-ramp from the rest of the screening process.

***Question 2.a: Is the building to be demolished wood framed and/or single family residential?***

- If YES the PCBs Screening Assessment is complete, skip to the certification in Part 4.
- If NO, continue to Question 2.b.

***Question 2.b: Was the building to be demolished constructed or remodeled between January 1, 1950 and December 31, 1980?***

- If YES continue to Question 2.c.
- If NO, the PCBs Screening Assessment is complete, skip to the certification in Part 4.

***Question 2.c: Is the proposed demolition a complete demolition of the entire building (as defined in key definitions of this document)?***

- If YES continue to Part 3.
- If NO, the PCBs Screening Assessment is complete, skip to the certification in Part 4.

Studies have found the highest concentrations of PCBs in building materials in buildings that were built or remodeled from 1950 to 1980.

For this process, the date that the building permit was issued will be used to determine applicability.

## Part 3. Report concentrations of PCBs in priority building materials

Part 3 documents the results of the assessment of PCBs concentrations in *priority building materials*.[2] Part 3 is only required for proposed demolition of an *applicable structure*, as determined in Part 2. Check the option used.

- **Option 1** Conduct representative sampling and analysis of the *priority building materials* per the *Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition* (August 2018) provided in **Attachment C**.
- **Option 2** Use existing sampling results of the *priority building materials*. Applicants who have conducted sampling prior to the publication of the protocol may use that data provided it is consistent with the protocol (e.g., analytical methods, sample collection frequency, QA/QC). It is anticipated that prior sampling results will rarely be available and that most Applicants will need to use Option 1.

### *3.a Option 1 – Conduct representative sampling*

Check this box if you conducted representative sampling and analysis of the *priority building materials* per the *Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition* (August 2018) (**Attachment C**).

- Complete the applicable tables for each priority building material.
- Attach the contractor's report[3] documenting the evaluation results.
- Attach (or include in the contractor's report) the QA/QC checklist (see **Attachment C**, Section 2.2.4).
- Attach copies of the analytical data reports.

[2] The applicant is responsible for conducting the assessment, including collecting samples, chemical analysis, and documentation of the results.

[3] The contractor's report of the findings of the PCBs building material evaluation. See section 3 of Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition (Attachment C).

### *3.a Option 2 – Use existing sampling records*

In some cases, a property owner may have conducted sampling of the *priority building materials* for PCBs. If such data exist, you may use these data to demonstrate the concentration of PCBs in the *priority building materials* for the PCBs screening. However, if the sampling must be consistent with the *Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition.*

- Complete the applicable tables for each priority building material.
- Attach the contractor's report/statement that the results are consistent with the *Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition*.
- Attach copies of the analytical data reports.

### *Part 3 Tables Summarize concentrations of PCBs in priority building materials*

Use these tables to summarize the concentrations of PCBs in the *priority building materials*.

- Each page of the table is for a different material. Duplicate the pages as needed to report all concentration data.
- A blank page is provided. Applicants have the option of submitting PCBs concentration data on other materials in addition to the *priority building materials*.

*Column 1: required for all priority building material PCBs concentrations*

- Use column 1 to report all PCBs concentrations in the *priority building materials*. Provide short description of the sample location, concentration.

*Column 2: only required for PCBs concentrations ≥50 ppm*

- Use column 2 to estimate the amount of material associated with each sample.

Note: MRP Provisions C.12.g.ii (3) and (4) require municipalities to enhance their construction site stormwater program for demolition sites where PCBs are detected at concentrations of ≥50 ppm. These additional requirements may include the implementation of enhanced erosion control, sediment control, and good housekeeping BMPs to minimize migration of PCBs into the storm drainage system during demolition. Check with the municipality issuing the demolition permit for BMP requirements. Additionally, the site may be inspected more frequently to ensure the proper implementation of the BMPs. As noted in Part 4, the Applicant must keep the municipality informed of the demolition schedule.

## Part 4. Certification

- Complete the certification. The certification must be signed by the property owner or the owner's agent or legal representatives and the consultant who completed the application form. Completing and signing the certification indicates that the Applicant:
  - Has provided information in the form that is true, accurate, and complete.
  - Understands the responsibility for knowing and complying with all relevant laws and regulations related to reporting, abating, and handling and disposing of PCBs materials and wastes.
  - For demolition sites where PCBs are detected at concentrations ≥50 ppm:
    - Will notify the Regional Water Board, US EPA, and the municipality at least five working days in advance of the of the start of demolition.

- Within five working days after the demolition is complete, will notify the municipality of the actual demolition date(s).
- Within five working days of it being determined, will notify the municipality whether advance approval from the U.S. EPA is required for this site.[4]
- If it is determined[5] that advance approval from the U.S. EPA is <u>not</u> required for this site, will submit the hazardous waste manifest for the disposal of PCBs materials to the municipality within five working days of it becoming available. If advance approval from the U.S. EPA is required for this site, submittal of the hazardous waste manifest is not required.

Regarding your responsibility for knowing and complying with all relevant laws and regulations related to reporting, abating, and handing and disposing of PCBs materials and wastes, there are significant penalties for submitting false information.

Regarding your responsibility to follow through with the above notifications and submittals, consequences for lack of compliance may include:

- Revoking site development/building permits;
- Referral to appropriate regulatory agencies; and/or
- Fines or other penalties.

For further information, contact the municipality with jurisdiction over the demolition.

[4] Provision C.12.g.iii (4) states: " Beginning with their 2024 Annual Report, Permittees shall provide the following: ...and for those cases where notification and advance approval from the U.S. EPA is not required and were approved for demolition after June 30, 2023, the hazardous waste manifest prepared for transportation of the material to a disposal facility." It appears that the intent is that it is necessary to provide the manifest when EPA is not involved with the site remediation. Under some circumstances (that should be described in available EPA guidance) these types of PCBs remediations can be self-implemented and do not necessarily require any involvement by EPA staff. If self-implemented and EPA is not involved, then the municipality should require the Applicant to submit the manifest to the municipality so that the municipality can provide it in its Annual Report.

[5] The Applicant makes this determination.

# Federal and State PCBs Regulations

Applicants that determine PCBs exist in priority building materials must follow applicable federal and state laws. This may include reporting to U.S. Environmental Protection Agency (USEPA), the San Francisco Bay Regional Water Quality Control Board, and the California Department of Toxic Substances Control (DTSC). These agencies may require additional sampling and abatement of PCBs.

Depending on the approach for sampling and removing building materials containing PCBs, you may need to notify or seek advance approval from USEPA before building demolition. Even in circumstances where advance approval from USEPA is not required before the demolition activity, the disposal of PCBs waste is regulated under Toxic Substances Control Act (TSCA).

Additionally, the disposal of PCBs waste is subject to California Code of Regulations (CCR) California Code of Regulations (CCR) Title 22, Section Division 4.5, Chapter 12, Standards Applicable to Hazardous Waste Generators.

Building owners and employers need to consider worker and public safety during work involving hazardous materials and wastes including PCBs.

In addition, see below Notes Regarding Federal and State PCBs Regulations.

***Notes Regarding Federal and State PCBs Regulations***

1. See 40 Code of Federal Regulations (CFR) 761.3 for important information relative to disposal of PCBs-containing building materials, including definitions of PCBs bulk product wastes and PCBs remediation wastes. Also see the memorandum dated October 24, 2012 “PCB Bulk Product Waste Reinterpretation” from Suzanne Rudzinski, Director, Office of Resource Conservation and Recovery, EPA.

2. Disposal of PCBs wastes are subject to TSCA requirements such as manifesting of the waste for transportation and disposal. See 40 CFR 761 and 40 CFR 761, Subpart K.

3. TSCA-regulated does not equate solely to materials containing PCBs at or above 50 ppm. There are circumstances in which materials containing PCBs below 50 ppm are subject to regulation under TSCA. See 40 CFR 761.61(a)(5)(i)(B)(2)(ii).

4. Disposal of PCBs wastes are subject to California Code of Regulations (CCR) Title 22, Section Division 4.5, Chapter 12, Standards Applicable to Hazardous Waste Generators.

5. California hazardous waste regulatory levels for PCBs are 5 ppm based on the Soluble Threshold Limit Concentration test and 50 ppm based on the Total Threshold Limit Concentration test, see CCR, Title 22, Section 66261.24, Table III.

## Agency Contacts

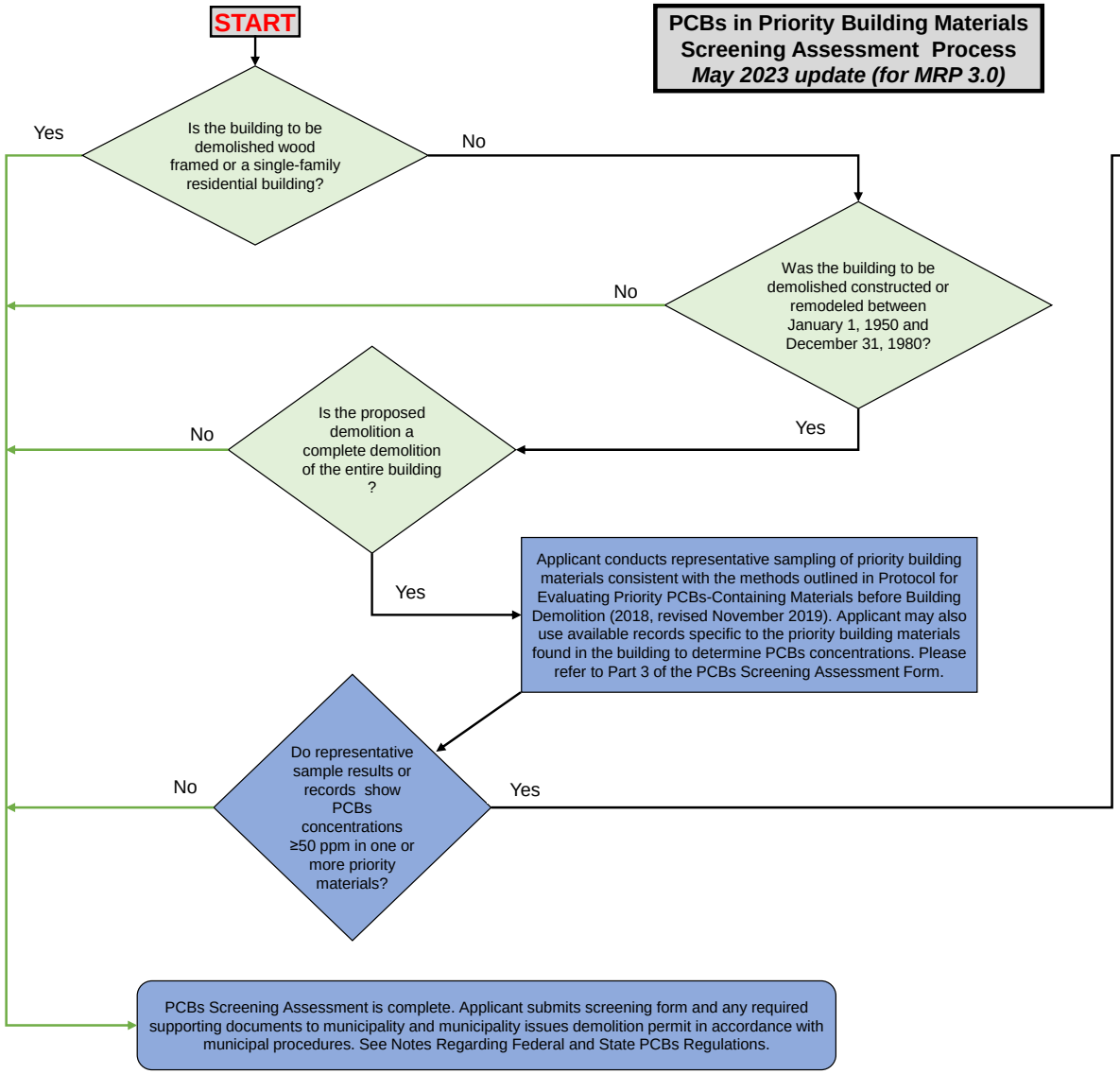
Applicants should contact the appropriate agencies and review the relevant guidance and information about PCBs in building materials. Municipal staff are not able to advise you on the requirements of the applicable federal and state laws.

| Agency | Contact | Useful Links |
|---|---|---|
| US Environmental Protection Agency | Carmen Santos (415) 972-3360<br>santos.carmen@epa.gov | https://www.epa.gov/pcbs (EPA PCB website)<br><br>https://www.epa.gov/pcbs/questions-and-answers-about-polychlorinated-biphenyls-pcbs-building-materials (PCBs in Building Materials Fact Sheet and Q/A Document)<br><br>https://www.epa.gov/pcbs/pcb-facility-approval-streamlining-toolbox-fast-streamlining-cleanup-approval-process (USEPA PCB Facility Approval Streamlining Toolbox (PCB FAST))<br><br>https://www.epa.gov/pcbs/polychlorinated-biphenyls-pcbs-building-materials#Test-Methods (See Information for Contractors Working in Older Buildings that May Contain PCBs) |
| San Francisco Bay Regional Water Quality Control Board | Imtiaz-Ali Kalyan (510) 622-2499<br>Imtiaz-Ali.kalyan@waterboards.ca.gov<br><br>Cheryl Prowell (510) 622-2499<br>Cheryl.Prowell@waterboards.ca.gov | https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/sfbaypcbstmdl.shtml<br><br>https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/sitecleanupprogram.html |
| Department of Toxic Substances Control | Regulatory Assistance Office<br>1-800-72TOXIC<br>RAO@dtsc.ca.gov | http://www.dtsc.ca.gov/SiteCleanup/Brownfields/upload/PUB_SMP_Guide-to-Selecting-a-Consultant.pdf |
| California Division of Occupational Safety and Health (known as Cal/OSHA) | CalOSHA Consultations Services<br>1-800-963-9424 | https://www.dir.ca.gov/dosh/consultation.html |

# Attachment A
# Process Flow Chart

# PCBs in Priority Building Materials Screening Assessment Process

***May 2023 update (for MRP 3.0)***




**Positive screening**

Applicant submits screening form and any required supporting documents to municipality. Municipality issues demolition permit in accordance with municipal procedures. The exact order of the below steps may vary depending on the site.

Notify municipality, the San Francisco Bay Regional Water Quality Control Board, and U.S. EPA at least five working days in advance of the start of the demolition.

Within five working days of it being determined, notify municipality whether advance approval from the U.S. EPA is required for this site.

Follow applicable federal and state requirements for notification and abatement. See Notes Regarding Federal and State PCBs Regulations.

If PCBs concentrations ≥50 ppm were found, MRP Provisions C.12.g.ii (3) and (4) require municipalities to enhance their construction site stormwater program. These requirements may require the implementation of enhanced erosion control, sediment control, and good housekeeping BMPs to minimize migration of PCBs into the storm drainage system during demolition. Check with the municipality issuing the demolition permit for BMP requirements. Additionally, the site may be inspected more frequently to ensure the proper implementation of the BMPs. As noted in Part 4, keep the municipality informed of the demolition schedule.

Within five working days after the demolition is complete, notify municipality of the actual demolition date(s).

If you determine that advance approval from the U.S. EPA is not required for this site, submit the hazardous waste manifest for the disposal of PCBs materials to municipality within five working days of it becoming available. If advance approval from the U.S. EPA is required for this site, submittal of the hazardous waste manifest is not required.

# Attachment B
# PCBs in Priority Building Materials Screening Assessment Form

# PCBs Screening Assessment Form
## *May 2023 Update (for MRP 3.0)*

| For Municipality Use Only | |
|---|---|
| Date Received | |
| File # | |

This screening process is part of a program for water quality protection and was designed in accordance with requirements in the Bay Area regional municipal stormwater NPDES permit (referred to as the Municipal Regional Permit). This process **does not** address other environmental programs or regulations (e.g., PCBs regulations under the Toxic Substances Control Act (TSCA); federal, state, or local regulations for hazardous material handling and hazardous waste disposal; health and safety practices to mitigate human exposure to PCBs or other hazardous materials; recycling mandates; or abatement at sites with PCBs or other contaminants). **The applicant is responsible for knowing and complying with all relevant laws and regulations. See the Federal and State PCBs Regulations section for additional information.**

**Complete all applicable parts of the PCBs Screening Assessment Form and submit with your demolition permit application. See *"PCBs in Priority Building Materials: Model Screening Assessment Applicant Package, Applicant Instructions for Completing the PCBs Screening Assessment Form."***

***All Applicants must complete Part 1 and Part 2.***

| **Part 1. Owner/Consultant and project information** | | |
|---|---|---|
| **Owner Information** | | |
| Name | | |
| Address | | |
| City | State | Zip |
| Contact (Agent) | | |
| Phone | Email | |
| **Consultant Information** | | |
| Firm Name | | |
| Address | | |
| City | State | Zip |
| Contact Person | | |
| Phone | Email | |
| **Project Location[1]** | | |
| Address | | |
| City | State CA | Zip |
| APN (s) | | |
| Year Building was Built | Type of Construction | |
| Estimated Demolition Date | | |

[1]If the project includes the demolition of multiple buildings complete one form for each building to be demolished.

| **Part 2. Is building subject to the PCBs screening requirement based on type, use, and age of the building?** | | | |
|---|---|---|---|
| 2.a | Is the building to be demolished wood framed and/or single family residential? | ☐ Yes | ☐ No |
| | ➢ If the answer to question 2.a is **Yes**, the PCBs Screening Assessment is complete, skip to Part 4.<br>➢ If the answer is **No**, continue to Question 2.b. | | |
| 2.b | Was the building to be demolished constructed or remodeled between January 1, 1950 and December 31, 1980? | ☐ Yes | ☐ No |
| | ➢ If the answer to Question 2.b is **No** the PCBs Screening Assessment is complete, skip to Part 4.<br>➢ If the answer is **Yes**, continue to Question 2.c. | | |
| 2.c | Is the proposed demolition a complete demolition of the entire building? | ☐ Yes | ☐ No |
| | ➢ If the answer to Question 2.c is **No** the PCBs Screening Assessment is complete, skip to Part 4.<br>➢ If the answer is **Yes**, complete Part 3. | | |

***The results of Part 2 determine whether the building is an Applicable Structure[1] (i.e., the answer to question 2.a is No and 2.b is Yes) and the proposed demolition is a complete demolition of the entire building, (i.e., the answer to question 2.c is Yes) and therefore the Applicant must complete Part 3 and the Part 3 tables (see below for these tables).***

## Part 3. Report concentrations of PCBs in priority building materials[2]

***Note: if a material has been determined to contain asbestos, lead or other hazardous substances and will be abated under an associated waste program, that material need not be sampled for PCBs under this program.***

***Option 1. Conduct Representative Sampling.*** *Applicants conducted representative sampling and analysis of the priority building materials per the Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition (2018, revised November 2019) (Attachment C of the PCBs in Priority Building Materials: Model Screening Assessment Applicant Package).*

***Option 2. Use Existing Sampling Records.*** *Applicants possess existing sample results that are consistent with the Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition (2018, revised November 2019) (Attachment C of the PCBs in Priority Building Materials: Model Screening Assessment Applicant Package).*

3.a Select option and report PCBs concentrations in the priority building materials and the source of data for each of the priority building materials. Provide the required supporting information.

| ☐ Option 1 Conduct Representative Sampling | ☐ Option 2 Use Existing Sampling Records |
|---|---|
| ☐ Summarize results on Part 3 Tables; and provide the following supporting information (all three of the below types of documentation are required):<br>☐ Contractor's report documenting the assessment results;<br>☐ *QA/QC checklist (see Attachment C, section 3.2.4); and*<br>☐ Copies of the analytical data reports. | ☐ Summarize results on Part 3 Tables; and provide the following supporting information (both of below types of documentation are required):<br>☐ Contractor's report/statement documenting that the results are consistent with the *Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition.*<br>☐ Copies of the analytical data reports. |

[1]An Applicable Structure is defined as a building constructed or remodeled between January 1, 1950 and December 31, 1980. Wood framed buildings and single-family residential buildings are not an Applicable Structure regardless of the age of the building. See *PCBs in Priority Building Materials: Model Screening Assessment Applicant Package, Applicant Instructions for Completing the PCBs Screening Assessment Form*.

[2]The Priority Building Materials are: 1. Caulk; 2. Thermal insulation; 3. Fiberglass insulation; 4. Adhesive mastics; and 5. Rubber window gaskets.

***All Applicants must complete Part 4.***

## Part 4. Certification

I certify that the information provided in this form is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that I understand my responsibility for knowing and complying with all relevant laws and regulations related to reporting, abating, and handing and disposing of PCBs materials and wastes. I understand there are significant penalties for submitting false information. I will retain a copy of this form and the supporting documentation for at least 5 years.

I further certify that if the demolition site has an Applicable Structure[1] containing building materials with PCBs concentrations of 50 ppm or greater[2] at the time such structure undergoes demolition:

(1) I will notify *<municipality to add its name>*, the San Francisco Bay Regional Water Quality Control Board, and U.S. EPA at least five working days in advance of the start of the demolition.

(2) Additional notifications:

a. Within five working days after the demolition is complete, I will notify *<municipality to add its name>* of the actual demolition date(s).

b. Within five working days of it being determined, I will notify *<municipality to add its name>* whether advance approval from the U.S. EPA is required for this site.[3]

c. If it is determined[4] that advance approval from the U.S. EPA is not required for this site, I will submit the hazardous waste manifest for the disposal of PCBs materials to *<municipality to add its name>* within five working days of it becoming available. If advance approval from the U.S. EPA is required for this site, submittal of the hazardous waste manifest is not required.

Signature:_____ Date: _____
(Property Owner/Agent/Legal Representative)

Print/Type:_____
(Property Owner/Agent/Legal Representative Name)

Signature:_____Date: _____
(Consultant Completing Application Form)

Print/Type:_____
(Consultant Completing Application Form)

[1]Applicable Structure is defined as building constructed or remodeled between January 1, 1950 and December 31, 1980. Wood framed buildings and single-family residential buildings are not an Applicable Structure regardless of the age of the building. See *PCBs in Priority Building Materials: Model Screening Assessment Applicant Package, Applicant Instructions for Completing the PCBs Screening Assessment Form*

[2]If PCBs are detected at concentrations ≥50 ppm, MRP Provisions C.12.g.ii (3) and (4) require municipalities to enhance their construction site stormwater program. These requirements may require the implementation of enhanced erosion control, sediment control, and good housekeeping BMPs to minimize migration of PCBs into the storm drainage system during demolition. Check with the municipality issuing the demolition permit for BMP requirements. Additionally, the site may be inspected more frequently to ensure the proper implementation of the BMPs. As noted in Part 4, keep the municipality informed of the demolition schedule.

[3]Provision C.12.g.iii (4) states: " Beginning with their 2024 Annual Report, Permittees shall provide the following: ...and for those cases where notification and advance approval from the U.S. EPA is not required and were approved for demolition after June 30, 2023, the hazardous waste manifest prepared for transportation of the material to a disposal facility." It appears that the intent is that it is necessary to provide the manifest when EPA is not involved with the site remediation. Under some circumstances (that should be described in available EPA guidance) these types of PCBs remediations can be self-implemented and do not necessarily require any involvement by EPA staff. If self-implemented and EPA is not involved, then the municipality should require the Applicant to submit the manifest to the municipality so that the municipality can provide it in its Annual Report.

[4]The Applicant makes this determination.

Applicants that determine PCBs exist in building materials must follow applicable federal and state laws. This may include reporting to U.S. Environmental Protection Agency (USEPA), the San Francisco Bay Regional Water Quality Control Board, and the California Department of Toxic Substances Control (DTSC). These agencies may require additional sampling and abatement of PCBs. Depending on the approach for sampling and removing building materials containing PCBs, you may need to seek advance approval from USEPA before building demolition. Even in circumstances where advance approval from USEPA is not required before the demolition activity, the disposal of PCBs waste is regulated under TSCA and the California Code of Regulations. See below Notes Regarding Federal and State PCBs Regulations.

***Notes Regarding Federal and State PCBs Regulations***

1.See 40 Code of Federal Regulations (CFR) 761.3 for important information relative to disposal of PCBs-containing building materials, including definitions of PCBs bulk product wastes and PCBs remediation wastes. Also see the memorandum dated October 24, 2012 "PCB Bulk Product Waste Reinterpretation" from Suzanne Rudzinski, Director, Office of Resource Conservation and Recovery, EPA.

2. Disposal of PCBs wastes are subject to the Toxic Substances Control Act (TSCA) requirements such as manifesting of the waste for transportation and disposal. See 40 CFR 761 and 40 CFR 761, Subpart K.

3. TSCA-regulated does not equate solely to materials containing PCBs at or above 50 ppm. There are circumstances in which materials containing PCBs below 50 ppm are subject to regulation under TSCA. See 40 CFR 761.61(a)(5)(i)(B)(2)(ii).

4. Disposal of PCBs wastes are subject to California Code of Regulations (CCR) Title 22, Section Division 4.5, Chapter 12, Standards Applicable to Hazardous Waste Generators.

5. California hazardous waste regulatory levels for PCBs are 5 ppm based on the Soluble Threshold Limit Concentration test and 50 ppm based on the Total Threshold Limit Concentration test, see CCR, Title 22, Section 66261.24, Table III.

| Agency | Contact | Useful Links |
|---|---|---|
| US Environmental Protection Agency | Carmen Santos (415) 972-3360<br>santos.carmen@epa.gov | https://www.epa.gov/pcbs (EPA PCBs website)<br>https://www.epa.gov/pcbs/questions-and-answers-about-polychlorinated-biphenyls-pcbs-building-materials (PCBs in Building Materials Fact Sheet and Q/A Document)<br>https://www.epa.gov/pcbs/pcb-facility-approval-streamlining-toolbox-fast-streamlining-cleanup-approval-process (USEPA PCB Facility Approval Streamlining Toolbox (PCB FAST))<br>https://www.epa.gov/pcbs/polychlorinated-biphenyls-pcbs-building-materials#Test-Methods (See Information for Contractors Working in Older Buildings that May Contain PCBs) |
| San Francisco Bay Regional Water Quality Control Board | Imtiaz-Ali Kalyan (510) 622-2499<br>Imtiaz-Ali.kalyan@waterboards.ca.gov<br>Cheryl Prowell (510) 622-2408<br>Cheryl.Prowell@waterboards.ca.gov | https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/sfbaypcbstmdl.shtml<br>https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/siteecleanupprogram.html |
| Department of Toxic Substances Control | Regulatory Assistance Office<br>1-800-72TOXIC<br>RAO@dtsc.ca.gov | http://www.dtsc.ca.gov/SiteCleanup/Brownfields/upload/PUB_SMP_Guide-to-Selecting-a-Consultant.pdf |
| California Division of Occupational Safety and Health (Cal/OSHA) | CalOSHA Consultations Services<br>1-800-963-9424 | https://www.dir.ca.gov/dosh/consultation.html |

| **Part 3 Caulk Applications Table** | | | |
|---|---|---|---|
| ***Column 1.*** *Report all PCBs concentrations for each homogenous area of caulking area (see Attachment C, Section 3.2.2). Use sample designators/descriptions from laboratory report.* | | ***Column 2.*** *Complete for each concentration ≥ 50 ppm* | |
| **Caulk Application Sample Description** | **Concentration (mg/kg)** | **Estimate Amount of Material** | **Units** |
| *Example:* | | | |
| *Caulk Sample 1* | *320* | *48* | *Linear Feet* |
| 1. | | | Linear Feet |
| 2. | | | Linear Feet |
| 3. | | | Linear Feet |
| 4. | | | Linear Feet |
| 5. | | | Linear Feet |
| 6. | | | Linear Feet |
| 7. | | | Linear Feet |
| 8. | | | Linear Feet |
| 9. | | | Linear Feet |
| 10. | | | Linear Feet |

*Duplicate page if additional space is needed.*

| **Part 3 Fiberglass Insulation Applications Table** | | | |
|---|---|---|---|
| ***Column 1.*** *Report all PCBs concentrations for each homogenous area of fiberglass insulation (see Attachment C, Section 3.2.2). Use sample designators/descriptions from laboratory report.* | | ***Column 2.*** *Complete for each concentration ≥ 50 mg/kg* | |
| **Fiberglass Insulation Application Sample Description** | **Concentration (mg/kg)** | **Estimate Amount of Material** | **Units** |
| *Example:* | | | |
| *Fiberglass Insulation Sample 1* | *78* | *86* | *Square Feet* |
| 1. | | | Square Feet |
| 2. | | | Square Feet |
| 3. | | | Square Feet |
| 4. | | | Square Feet |
| 5. | | | Square Feet |
| 6. | | | Square Feet |
| 7. | | | Square Feet |
| 8. | | | Square Feet |
| 9. | | | Square Feet |
| 10. | | | Square Feet |

*To estimate the square footage of insulation wrapped around pipes use the formula to calculate the lateral area of a cylinder $2\pi rh$. Where r is the pipe radius and h is the pipe length. Duplicate page if additional space is needed.*

| **Part 3 Thermal Insulation Applications Table** | | | |
|---|---|---|---|
| ***Column 1.*** *Report all PCBs concentrations for each homogenous area of thermal insulation (see Attachment C, Section 3.2.2). Use sample designators/descriptions from laboratory report.* | | ***Column 2.*** *Complete for each concentration ≥ 50 mg/kg* | |
| **Thermal Insulation Application Sample Description** | **Concentration (mg/kg)** | **Estimate Amount of Material** | **Units** |
| *Example:* | | | |
| *Thermal Insulation Sample 1* | *20* | | *Square Feet* |
| 1. | | | Square Feet |
| 2. | | | Square Feet |
| 3. | | | Square Feet |
| 4. | | | Square Feet |
| 5. | | | Square Feet |
| 6. | | | Square Feet |
| 7. | | | Square Feet |
| 8. | | | Square Feet |
| 9. | | | Square Feet |
| 10. | | | Square Feet |

*To estimate the square footage of insulation wrapped around pipes use the formula to calculate the lateral area of a cylinder $2\pi rh$. Where r is the pipe radius and h is the pipe length. Duplicate page if additional space is needed.*

| **Part 3 Adhesive Mastic Applications Table** | | | |
|---|---|---|---|
| ***Column 1.*** *Report PCBs concentrations for each homogenous area of mastic (see Attachment C, Section 3.2.2. Use sample designators/descriptions from laboratory report.)* | | ***Column 2.*** *Complete for each concentration ≥ 50 mg/kg* | |
| **Adhesive Mastic Application Sample Description** | **Concentration (mg/kg)** | **Estimate Amount of Material** | **Units** |
| *Example:* | | | |
| *Adhesive Mastic Sample 1* | *87.4* | *800* | *Square Feet* |
| 1. | | | Square Feet |
| 2. | | | Square Feet |
| 3. | | | Square Feet |
| 4. | | | Square Feet |
| 5. | | | Square Feet |
| 6. | | | Square Feet |
| 7. | | | Square Feet |
| 8. | | | Square Feet |
| 9. | | | Square Feet |
| 10. | | | Square Feet |

*Duplicate page if additional space is needed.*

| **Part 3 Rubber Window Gasket Applications Table** | | | |
|---|---|---|---|
| ***Column 1.*** *Report PCBs concentrations for each gasket (see Attachment C, Section 3.2.2). Use sample designators/descriptions from laboratory report.* | | ***Column 2.*** *Complete for each concentration ≥ 50 mg/kg* | |
| **Rubber Window Gasket Application Sample Description** | **Concentration (mg/kg)** | **Estimate Amount of Material** | **Units** |
| *Example:* | | | |
| *Window Gasket Sample 1* | *70* | *75* | *Linear Feet* |
| 1. | | | Linear Feet |
| 2. | | | Linear Feet |
| 3. | | | Linear Feet |
| 4. | | | Linear Feet |
| 5. | | | Linear Feet |
| 6. | | | Linear Feet |
| 7. | | | Linear Feet |
| 8. | | | Linear Feet |
| 9. | | | Linear Feet |
| 10. | | | Linear Feet |

*Duplicate page if additional space is needed.*

| **Part 3 Other Materials Table** | | | |
|---|---|---|---|
| ***Column 1.*** *Optional: Use this form to report PCBs concentration data from materials other than priority building materials. Report PCBs concentrations for each material and homogeneous area. Use sample designators/descriptions from laboratory report.* | | ***Column 2.*** *Complete for each concentration ≥ 50 mg/kg* | |
| **Material Sample Description** | **Concentration (mg/kg)** | **Estimate Amount of Material** | **Units** |
| *Example:* | | | |
| *Wall paint Sample 1* | *228* | *1500* | *Square Feet* |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |

*Duplicate page if additional space is needed.*

# Attachment C
# Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition

# Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition

## Managing PCBs–Containing Building Materials during Demolition: Guidance, Tools, Outreach and Training

Bay Area Stormwater Management Agencies Association

**August 2018**
**(Revised November 2019)**

This document is a deliverable of the Bay Area Stormwater Management Agencies Association (BASMAA) project *Managing PCBs−Containing Building Materials during Demolition: Guidance, Tools, Outreach and Training*. BASMAA developed guidance, tools, and outreach and training materials to assist with San Francisco Bay Area municipal agencies' efforts to address the requirements of Provision C.12.f. of the Bay Area Municipal Regional Stormwater Permit (referred to as the MRP). Provision C.12.f of the MRP requires Permittees to manage PCBs–containing building materials during demolition.

We gratefully acknowledge the BASMAA Steering Committee for this project, which provided overall project oversight, including during the development of this and other project deliverables:

- Reid Bogert, Stormwater Program Specialist, San Mateo Countywide Water Pollution Prevention Program (BASMAA Project Manager)
- Amanda Booth, Environmental Program Analyst, City of San Pablo
- Kevin Cullen, Program Manager, Fairfield-Suisun Urban Runoff Management Program
- Matt Fabry, Program Manager, San Mateo Countywide Water Pollution Prevention Program
- Gary Faria, Supervisor, Inspection Services, Building Inspection Division, Contra Costa County
- Napp Fukuda, Deputy Director - Watershed Protection Division, City of San José
- Ryan Pursley, Chief Building Official, Building Division, City of Concord
- Pam Boyle Rodriguez, Manager, Environmental Control Programs – Stormwater, City of Palo Alto
- Jim Scanlin, Program Manager, Alameda Countywide Clean Water Program
- Melody Tovar, Regulatory Programs Division Manager, City of Sunnyvale

We also gratefully acknowledge the project Technical Advisory Group, which provided feedback from a variety of project stakeholders during development of selected project deliverables:

| Stakeholder Group | Representative(s) |
|---|---|
| Regulatory – stormwater/PCBs | Luisa Valiela and Carmen Santos, U.S. EPA Region 9 |
| Regulatory – stormwater/TMDL | Jan O'Hara, San Francisco Bay Regional Water Quality Control Board |
| Regulatory – experience with related program (asbestos management) | Ron Carey and Richard Lew, Bay Area Air Quality Management District |
| Industry – demolition contractors | Avery Brown, Ferma Corporation |
| Industry – remediation consultants | John Martinelli, Forensic Analytical Consulting<br>John Trenev, Bayview Environmental Services, Inc. |
| MRP Permittee – large municipality | Patrick Hayes, City of Oakland |
| MRP Permittee – medium municipality | Kim Springer, San Mateo County Office of Sustainability |
| MRP Permittee – small municipality | Amanda Booth, City of San Pablo |

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## DISCLAIMER

Information contained in BASMAA products is to be considered general guidance and is not to be construed as specific recommendations for specific cases. BASMAA is not responsible for the use of any such information for a specific case or for any damages, costs, liabilities or claims resulting from such use. Users of BASMAA products assume all liability directly or indirectly arising from use of the products.

The material presented in this document is intended solely for the implementation of a municipal regulatory program required by the San Francisco Bay Area Regional Water Quality Control Board Municipal Regional Stormwater Permit for the protection of water quality under the Clean Water Act.

BASMAA prepared the tools and guidance herein to assist MRP Permittees' efforts to address the requirements of Provision C.12.f. of the MRP. The project team received input from a variety of stakeholders during development of the tools and guidance, including regulators (San Francisco Bay Regional Water Quality Control Board, U.S. EPA, and Bay Area Air Quality Management District staff), Bay Area municipal agency staff, and industry representatives.

This document does not address other environmental programs or regulations (e.g., PCBs regulations under the Toxic Substances Control Act (TSCA); federal, state, or local regulations for hazardous material handling and hazardous waste disposal; health and safety practices to mitigate human exposure to PCBs or other hazardous materials; recycling mandates; and abatement at sites with PCBs (or other contaminants). The applicant is responsible for knowing and complying with all relevant laws and regulations.

The mention of commercial products, their source, or their use in connection with information in BASMAA products is not to be construed as an actual or implied approval, endorsement, recommendation, or warranty of such product or its use in connection with the information provided by BASMAA.

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**Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition**

## 1. INTRODUCTION

The San Francisco Bay Region Municipal Regional Stormwater NPDES permit, referred to as the Municipal Regional Permit (MRP)[1], includes provisions that implement stormwater-related aspects of the Total Maximum Daily Load (TMDL) for polychlorinated biphenyls (PCBs) in the Bay. 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 milligrams per kilogram (mg/kg) (equivalent to parts-per-million, or ppm), the target management level, or greater in applicable structures at the time such structures undergo demolition[2], so that PCBs do not enter municipal storm drain systems. Applicable structures include, at a minimum, non-residential structures constructed or remodeled between the years 1950 and 1980 with building materials such as caulking and thermal insulation with PCBs concentrations of 50 ppm or greater. Single-family residential and wood frame structures 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 structures that existed pre-1980 within its jurisdiction were single-family residential and/or wood-frame structures.[3]

Permittees were 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 structures at the time such structures undergo demolition;
2. A method for identifying applicable structures prior to their demolition; and
3. Method(s) for ensuring PCBs are not discharged to the municipal storm drain from demolition of applicable structures.

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

- Implement or cause to be implemented the PCBs management protocol for ensuring PCBs are not discharged to municipal storm drains from demolition of applicable structures via vehicle track-out, airborne releases, soil erosion, or stormwater runoff.
- Develop an evaluation 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 structures.

On behalf of MRP Permittees, the Bay Area Stormwater Management Agencies Association (BASMAA) conducted a regional project to assist MRP Permittees to achieve compliance with

---

[1] The Municipal Regional Stormwater Permit, Order No. R2-2015-0049, was adopted November 19, 2015.
[2] Demolition means the wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations (40 CFR., Part 61, Subpart M).
[3] The City of Clayton provided evidence to support an exemption from the requirement.

Provision C.12.f. The regional project developed guidance materials, tools, protocols and training materials and conducted outreach. The goal was 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 implement the new program.

This document is the deliverable for Task 3 of the regional project, which is to develop a protocol for the assessment of prioritized PCBs-containing building materials prior to demolition. The full scope of work for the regional project is presented in the Project team's *Proposal for Tools, Protocol, Outreach & Training Work Plan: PCBs Materials Management during Building Demolition Project* (dated January 31, 2017; revised March 2017). If materials are found or known to contain PCBs, those materials must be managed appropriately and according to all applicable local, state, and federal requirements. Guidance on the management of PCBs-containing materials is beyond the scope of this document.

To establish the PCBs protocol, currently established protocols were evaluated that are widely accepted in the building demolition industry for other Federal- and State-regulated constituents of concern. This document provides applicable examples of sampling and evaluation procedures for building materials potentially contaminated with asbestos-containing material (ACM)[4] and lead-based paint (LBP)[5], which are summarized and referenced in Appendix C. These components include guidance on sampling frequencies, laboratory sample analysis, quality assurance and quality control procedures, and reporting.

[4] Asbestos-containing material (ACM) means any material or product which contains more than one percent asbestos.

[5] Lead-based paint (LBP) is any paint, varnish, shellac, or other coating that contains lead equal to or greater than 1.0 mg/cm$^2$ as measured by XRF device or laboratory analysis, or 0.5 percent by weight (5,000 ppm or 5,000 mg/kg) as measured by laboratory analysis.

## 2. PCBS BUILDING MATERIAL EVALUATION PROTOCOL

This section presents the evaluation protocol for identifying building materials in structures constructed or remodeled between the years 1950 and 1980[6] that may contain a significant mass of PCBs. Once identified as containing PCBs at concentrations exceeding 50 ppm, these materials should be properly managed prior to building demolition, to ensure PCBs are not discharged to the municipal storm drain system.

This protocol is not intended to address all PCBs-containing materials that may be disturbed during building demolition. Additional sampling is likely to be required to comply with USEPA and Cal/OSHA regulations pertaining to the management, removal and disposal of PCBs-containing materials.

For this program, it is assumed that organizations and staff qualified to sample, test, remediate, and dispose of PCBs at the building site will coordinate processes for other hazardous building materials at the building site, to ensure proper sampling, testing, remediation, and disposal or all statutorily required hazardous materials handling.

### 2.1 Priority Building Materials to be Tested

A prioritized list of PCBs-containing materials is provided in Appendix A. Building materials were evaluated based upon the following criteria:

- **Source Material** – Does the building material contain PCBs through the original product manufacturing process or was the building material contaminated (impregnated) with PCBs from an adjacent building material that already contained PCBs? For the evaluation, building materials originally manufactured with PCBs at or above 50 mg/kg were prioritized.
- **Concentration** – Building materials were evaluated based on readily available existing data regarding ranges of PCBs concentrations identified in the materials.
- **Prevalence** – A prevalence factor was assigned based upon best professional judgement of the prevalence of occurrence of the PCBs-containing materials in buildings, which ranged from highly prevalent to low prevalence.
- **Ease of Removal –** Building materials were evaluated based on their attachment to the building, which ranged from “very easily removed” to “difficult to remove,” under the assumption that higher ease of removal results in higher feasibility and lower costs for removing a material before demolition.

[6] Single-family residential and wood frame structures are exempt.

- **Flaking/Crumbling** – Building materials were evaluated based on their tendency to flake or crumble during disturbance or demolition, which could lead to a higher likelihood of entering stormwater as a result of building demolition.

- **PCBs Removed by Other Waste Program –** This factor addresses materials that are removed from buildings because of other waste management programs (e.g., Universal Waste Rule). Fluorescent light ballasts[7], polyurethane foam furniture, and Askarel fluid used in transformers, all of which may contain PCBs, are typically managed during pre-demolition activities under current regulations and programs that require removal of universal waste and outdated transformers. For this program it is assumed that those materials will be evaluated and managed under those existing programs.

Material prioritization was conducted by assigning a score on a scale of 1 to 5 (low to high) for each criterion. The final score for each material type was calculated as the average of the scores assigned to the six criteria. The materials given the highest scores through the prioritization analysis are shown below, along with their typical locations in a building. For this evaluation, thermal insulation and fiberglass insulation were grouped together as they tend to be co-located and are typically managed together.

Many building materials may contain PCBs. The building owner is responsible for identifying and handling all hazardous materials in accordance with all applicable laws, including all materials with 50 ppm or more PCBs. For purposes of obtaining a demolition permit, the building owner must sample at least the limited number of priority building materials listed below[8] (along with typical locations where they are found) using the protocols described in Section 2.2. This protocol is only for sampling of priority building materials. Building materials coming into contact with priority building materials are not the focus of this protocol.

1. Caulks and Sealants:
   a. Around windows or window frames (e.g., window glazing putty, window caulking, etc.);
   b. Around door frames; and
   c. Expansion joints between concrete sections (e.g., floor segments).
2. Thermal/Fiberglass Insulation and Other Insulating Materials:
   a. Around HVAC systems,

[7] Fluorescent light ballasts that contain PCBs are not required to be managed under the Universal Waste Rule Program but are recommended by the EPA to be identified in a pre-demolition survey of a structure and to be managed with the removal of other required wastes in the abatement process.

[8] Applicants may use existing sampling results of the priority building materials. Applicants who have conducted sampling prior to the publication of this protocol may use that data provided it is consistent with this protocol (e.g., analytical methods, sample collection frequency, and QA/QC).

   b. Around heaters,
   c. Around boilers,
   d. Around heated transfer piping, and
   e. Inside walls or crawls spaces.

3. Adhesive/Mastic:
   a. Below carpet and floor tiles;
   b. On, under, or between roofing materials and flashing.

4. Rubber Window Seals/Gaskets:
   a. Around windows or window frames.

Examples of the prioritized PCBs-containing building materials and what they may look like in a building planned for demolition are provided in Appendix B.

It should be noted that some materials that are being evaluated for PCBs in this protocol may also be associated with asbestos, lead, or other hazardous substances. Since this protocol follows pre-established asbestos management program guidelines and procedures, the sampling frequency, types of building materials, and surveying techniques overlap with the PCBs survey protocol. If a material has been determined to contain asbestos, lead or other hazardous substances and will be abated under an associated waste program, that material need not be sampled for PCBs under this program.

## 2.2 PCBs Sampling Procedures

### 2.2.1 Sampling Equipment

Building materials that are planned to be collected for laboratory analysis should be placed in laboratory-supplied glass jars with Teflon-sealed lids following procedures established in USEPA Method 8082 / 8082A. Samples should be collected with either factory-sealed or decontaminated equipment that will be used to remove a representative building material sample (i.e., scissors, tweezers, pliers, spoons, or putty knife).

For sampling equipment (i.e., scissors, tweezers, pliers, spoons, putty knife, etc.) that will be decontaminated, the following three bucket wash procedure should be performed, which is in general accordance with standard decontamination procedures defined in SESDPROC-205-R3 (USEPA, 2015):

- In the first bucket, mix a residue free cleaning detergent (e.g., Alconox®), with distilled water to generate the recommended detergent concentration specified in the product directions;

- Fill the second bucket with distilled water;
- Fill the third bucket with distilled water;
- Clean the equipment in the first bucket with the cleaning detergent, then rinse in the second and then the third bucket. If the second bucket becomes slightly discolored during the rinse, change the contents of the second bucket with distilled water. Change the third bucket, if any dirt or material is observed in the water, since the third bucket needs to stay clean as it is the final rinse; and
- At the end of cleaning, let the equipment air dry in a clean area before use in sample collection. The rinse water should then be drummed and sampled for disposal. The planned disposal facility should be contacted to determine the required sample analysis for the rinse water characterization and profiling and that the disposal procedures comply with state and federal regulations.

If disposable sampling tools are used, the above decontamination procedures do not apply. Additionally, decon with certain solvents (e.g., hexane) may be utilized for cleaning of tar-like substances, followed with the standard decontamination procedures listed above. It is recommended that equipment is air-dried per the procedure above, but it is up to the discretion of the environmental professional to use alternative drying methods if time constraints for air-drying is prohibitive.

### 2.2.2 Sample Collection Frequency

For the four prioritized building materials, the following collection techniques and frequency should be followed.

***Caulking***

Three different types of caulking should be evaluated:

1. Window caulking;
2. Door frame caulking; and
3. Floor and expansion joint caulking.

For each type of caulking material identified, the following number of samples should be collected:

- Collect at least one sample from each homogenous area that contains less than 50 linear feet of caulking;
- Collect at least three samples from each homogenous area that contains between 50 and 250 linear feet of caulking;
- Collect at least five samples from each homogenous area that contains between 250 and 1,000 linear feet of caulking;

- Collect at least seven samples from each homogenous area that contains between 1,000 and 2,500 linear feet of caulking; and
- Collect at least nine samples from each homogenous area that contains greater than 2,500 linear feet of caulking.

If homogenous caulking material is found throughout the building, samples should be spatially distributed so as to not collect the required number of samples from one area. In addition, the width or cross-sectional area of the caulking bead is not relevant for determining the linear footage to be sampled. It is also recommended that the sampler performing the evaluation inspect the entire building prior to sample collection to insure proper distribution is performed.

### *Thermal/Fiberglass Insulation*

For thermal/fiberglass insulation:

- Collect at least one bulk sample from each homogeneous area.

### *Adhesive/Mastic*

For each type of adhesive/mastic material identified, the following number of samples should be collected:

- Collect at least three samples from each homogenous area less than 1,000 square feet;
- Collect at least five samples from each homogenous area between 1,000 and 5,000 square feet; and
- Collect at least seven samples from each homogenous area greater than 5,000 square feet.

If homogenous adhesive/mastic material is found throughout the building, samples should be spatially distributed so as to not collect the required number of samples from one area. It is recommended that the sampler performing the evaluation inspect the entire building prior to sample collection to insure proper distribution is performed.

### *Rubber Window Seals/Gaskets*

For rubber window seals/gaskets identified, the following number of samples should be collected:

- Collect at least one sample from each homogenous area that contains less than 50 linear feet of caulking (of any width or cross-sectional are of bead);
- Collect at least three samples from each homogenous area that contains between 50 and 250 linear feet of caulking;
- Collect at least five samples from each homogenous area that contains between 250 and 1,000 linear feet of caulking;

- Collect at least seven samples from each homogenous area that contains between 1,000 and 2,500 linear feet of caulking; and
- Collect at least nine samples from each homogenous area that contains greater than 2,500 linear feet of caulking.

If homogenous rubber window seals/gaskets are found throughout the building, samples should be spatially distributed so as to not collect the required number of samples from one area. It is also recommended that the sampler performing the evaluation inspect the entire building prior to sample collection to insure proper distribution is performed.

### 2.2.3 Sample Analysis and Preservation

Samples collected to evaluate building materials for PCBs should be analyzed for Aroclors by EPA Method 8082/8082A[9] by an accredited analytical laboratory. The reporting limit goal should be 500 micrograms per kilogram (µg/kg).[10] The laboratory should be contacted before sampling to confirm that it can meet the reporting limit objectives.

Samples should be chilled and then kept cool between 0 and 6 degrees Celsius (32 and 42.8 degrees Fahrenheit) during storage and transportation to the laboratory following procedures established in USEPA Method 8082/8082A. Proper chain-of-custody[11] procedures should be followed from the time the samples are collected until they are delivered to the laboratory for analysis. Holding times for EPA Method 8082/8082A are sample extraction within 14 days of sample collection and analysis of the extract within 40 days of extraction. <u>However, PCBs are very stable in a variety of matrices and holding times may be extended to as long as one year. Once extracted, analysis of the extract should take place within 40 days.</u>

### 2.2.4 Quality Assurance and Quality Control

For this program, general quality assurance and quality control (QA/QC) procedures will be utilized. The following checklist should be used by the contractor performing the evaluation:

- QA/QC Checklist:
    - Proper specified sampling equipment was used (pre-cleaned or other, stainless steel);

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[9] 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. EPA Method 8082/8082A is an acceptable method to quantify PCBs. Analysis of PCBs congeners is not required to meet the permit requirement.

[10] The reporting limit can be modified to account for necessary dilutions or interferences, as determined by the laboratory. This reporting limit, which is below the target management level of 50 mg/kg, was selected to allow for data to be collected on the concentration of PCBs in building materials.

[11] Chain-of-custody is the procedure to document, label, store, and transfer samples to personnel and laboratories. For a detailed list of procedures, refer to the *Sample and Evidence Management*, Operating Procedure (SESDPROC-005-R2), January 29, 2013

- Proper decontamination procedures were followed;
- Sampling collection spatial frequency was met;
- A National Environmental Laboratory Accreditation Program (NELAP) laboratory or a California-ELAP (CA-ELAP) were utilized;
- Samples were received by the laboratory within proper temperature range;
- Samples were extracted and analyzed within the method holding time for EPA Method 8082/8082A; and
- Sample reporting limit met data quality objectives.

## 2.3 Reporting and Notifications

The following considerations are applicable to reporting and notification:

- Assessment results must be submitted to the applicable Permitting Authority by the project applicant;
- Applicants that determine PCBs exist in priority building materials must follow applicable federal and state laws. This may include reporting to USEPA, the San Francisco Bay Regional Water Quality Control Board, and the California Department of Toxic Substances Control (DTSC). These agencies may require additional sampling and abatement of PCBs.
- Depending on the approach for sampling and removing building materials containing PCBs, applicants may need to notify or seek advance approval from USEPA before building demolition. Even in circumstances where advance notification to or approval from USEPA is not required before the demolition activity, the disposal of PCBs waste is regulated under TSCA.
- The disposal of PCBs waste is subject to California Code of Regulations (CCR) Title 22, Section Division 4.5, Chapter 12, Standards Applicable to Hazardous Waste Generators.
- Building owners and employers need to consider worker and public safety during work involving hazardous materials and wastes including PCBs.

For further information, applicants should refer to the *PCBs in Priority Building Materials Screening Assessment Applicant Package*, BASMAA, July 2018.

## 3. REFERENCES

Guidelines for Asbestos Sampling:

- https://www.epa.gov/asbestos/asbestos-laws-and-regulations

Guidelines for Lead-Based Paint Evaluations:

- Environmental Protection Agency (EPA) - Created the Renovation, Repair, and Painting (RRP) Rule which requires training and certification for anyone working for compensation in pre-1978 residential structures, day care centers, and schools where known or assumed lead-based paint is impacted. The EPA website with complete information on this regulation is https://www.epa.gov/lead/renovation-repair-and-painting-program.
- California Department of Public Health (CDPH) - Created "Title 17" which includes lead testing and abatement provisions in residential and public structures in California. Several important definitions are contained in Title 17 including Abatement, Clearance Inspection, Containment, Lead-Based Paint.
- Lead Contaminated Dust and Soil, Lead Hazard, and Lead Hazard Evaluation. Title 17 establishes that lead testing be performed using XRF equipment or by paint chip sample analysis in California. Lead test kits are not accepted. It also establishes testing in California be performed by a State certified lead inspector/assessor if the testing is related to a project involving compensation.
- Department of Housing and Urban Development (HUD) - Created the HUD Guidelines which contain protocols for lead testing and abatement.

EPA Method 8082A – Polychlorinated Biphenyls (PCBs) by Gas Chromatography

- https://www.epa.gov/sites/production/files/2015-07/documents/8082a.pdf

SESDPROC-205-R3, *Field Equipment Cleaning and Decontamination*, replaces SESDPROC-205-R2. December 18, 2015

- https://www.epa.gov/sites/production/files/2016-01/documents/field_equipment_cleaning_and_decontamination205_af.r3.pdf

SESDPROC-005-R2, *Sample and Evidence Management*, Operating Procedure, January 29, 2013

- https://www.epa.gov/sites/production/files/2015-06/documents/Sample-and-Evidence-Management.pdf

# APPENDIX A

# PCBs Building Material Prioritization Worksheet

# Appendix A - PCBs Building Materials Prioritization

| Material | Material Class | Median/Average/Single Reported Concentration (ppm) | Minimum (ppm) | Maximum (ppm) | PCBs Source Material? (Rating values: source = 5, or not source = 1) | Concentration (Rating values: 1 to 5, higher value means higher concentration) | Prevalence of PCBs Containing Material in Buildings (Rating values: high = 5, medium = 3, or low = 1) | Ease of Removal (Rating values: 1 to 5, higher value means easier to remove) | Flaking/ Crumbling (Rating values: 1 to 5, higher value means more likely to flake/crumble) | PCBs Removed by Other Waste Program? (Rating values: not removed by other = 5, or removed = 1) | Prioritization Score |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Caulking (sealant, plaster)** | **Caulk/sealant/tape/glue** | | **0.001** | **752,000** | **5** | **5** | **5** | **3** | **5** | **5** | **4.67** |
| **Thermal insulation** | **Insulation** | | | **73,000** | **5** | **5** | **5** | **4** | **4** | **5** | **4.67** |
| **Fiberglass insulation** | **Insulation** | | | **39,158** | **5** | **4** | **5** | **4** | **4** | **5** | **4.50** |
| **Adhesives/mastic** | **Caulk/sealant/tape/glue** | | | **3,100** | **5** | **3** | **5** | **3** | **5** | **5** | **4.33** |
| **Rubber gaskets** | **Gaskets/Rubber** | | | **84,000** | **5** | **5** | **3** | **3** | **4** | **5** | **4.17** |
| Wool felt gaskets | Gaskets/Rubber | | | 688,498 | 5 | 5 | 3 | 3 | 4 | 5 | 4.17 |
| Cloth/paper insulating material | Insulation | | | 12,000 | 5 | 4 | 3 | 4 | 4 | 5 | 4.17 |
| Foam rubber insulation | Insulation | | | 13,100 | 5 | 4 | 3 | 4 | 4 | 5 | 4.17 |
| Ceiling tiles coated w/flame resistant sealant | Internal nonstructural surface | | 53 | 110,000 | 5 | 5 | 5 | 3 | 2 | 5 | 4.17 |
| Backer rod | Caulk/sealant/tape/glue | | | 99,000 | 1 | 5 | 5 | 3 | 5 | 5 | 4.00 |
| Roofing/siding material | External nonstructural surface | | 0 | 30,000 | 5 | 4 | 5 | 3 | 2 | 5 | 4.00 |
| Paint (complete removal) | Paint/pigment/coatings | | 0.001 | 97,000 | 5 | 5 | 5 | 1 | 3 | 5 | 4.00 |
| Insulating materials in electric cable | Electrical | | 0 | 280,000 | 5 | 5 | 3 | 4 | 1 | 5 | 3.83 |
| Adhesive tape | Caulk/sealant/tape/glue | | | 1,400 | 5 | 3 | 1 | 3 | 5 | 5 | 3.67 |
| Surface coating | Paint/pigment/coatings | | | 255 | 5 | 3 | 5 | 1 | 3 | 5 | 3.67 |
| Coal-tar enamel coatings | Paint/pigment/coatings | | | 1,264 | 5 | 3 | 5 | 1 | 3 | 5 | 3.67 |
| Grout | Caulk/sealant/tape/glue | | | 9,100 | 5 | 4 | 1 | 2 | 5 | 5 | 3.67 |
| Cove base | Internal nonstructural surface | | | 170 | 5 | 3 | 3 | 4 | 2 | 5 | 3.67 |
| Plastics/plasticizers | Electrical | | | 13,000 | 5 | 4 | 3 | 3 | 1 | 5 | 3.50 |
| GE silicones | Caulk/sealant/tape/glue | <1.9 | 0 | 1.8 | 5 | 1 | 3 | 2 | 5 | 5 | 3.50 |
| Glazing | Caulk/sealant/tape/glue | Up to 100% liquid PCBs | | 51 | 5 | 2 | 3 | 3 | 3 | 5 | 3.50 |
| Flooring and floor wax/sealant | Internal nonstructural surface | Maximum likely >50 | | 51 | 5 | 2 | 3 | 3 | 2 | 5 | 3.33 |
| Light ballast | Light ballasts | Minimum likely <50 | 49 | 1,200,000 | 5 | 5 | 3 | 5 | 1 | 1 | 3.33 |
| Anti-fouling compounds | Paint/pigment/coatings | | | 59,000 | 5 | 4 | 1 | 1 | 3 | 5 | 3.17 |
| Polyurethane foam (furniture) | Caulk/sealant/tape/glue | | | 50 | 5 | 2 | 1 | 5 | 5 | 1 | 3.17 |
| Askarel fluid/cutting oils/hydraulic fluid | Oils/dielectric fluids | | | 450,000 | 5 | 5 | 1 | 5 | 2 | 1 | 3.17 |
| Fire retardant coatings | Paint/pigment/coatings | | | 59,000 | 5 | 4 | 1 | 1 | 3 | 5 | 3.17 |
| Waterproofing compounds | Paint/pigment/coatings | | | 59,000 | 5 | 4 | 1 | 1 | 3 | 5 | 3.17 |
| Electrical wiring | Electrical | | | 14 | 5 | 1 | 3 | 4 | 1 | 5 | 3.17 |
| Concrete | Concrete/stone | 2.5 | 0.001 | 17,000 | 1 | 4 | 3 | 1 | 4 | 5 | 3.00 |
| Foam rubber | Gaskets/Rubber | | | 1,092 | 1 | 3 | 1 | 3 | 4 | 5 | 2.83 |
| Soil/sediment/sand | Soil/dust | 0.15 | 0.001 | 581 | 1 | 3 | 1 | 2 | 5 | 5 | 2.83 |
| Brick/mortar/cinder block | Concrete/stone | | | 1,100 | 1 | 3 | 3 | 1 | 4 | 5 | 2.83 |
| Wood | Wood | | | 380 | 1 | 3 | 3 | 3 | 2 | 5 | 2.83 |
| Door frame | Internal nonstructural surface | | | 102 | 1 | 2 | 3 | 4 | 2 | 5 | 2.83 |
| Metals surfaces in contact with caulk/sealant | Metal surfaces | 448 | 51 | 448 | 1 | 3 | 1 | 2 | 4 | 5 | 2.67 |

# Appendix A - PCBs Building Materials Prioritization

| Material | Material Class | Median/Average/Single Reported Concentration (ppm) | Minimum (ppm) | Maximum (ppm) | PCBs Source Material? (Rating values: source = 5, or not source = 1) | Concentration (Rating values: 1 to 5, higher value means higher concentration) | Prevalence of PCBs Containing Material in Buildings (Rating values: high = 5, medium = 3, or low = 1) | Ease of Removal (Rating values: 1 to 5, higher value means easier to remove) | Flaking/ Crumbling (Rating values: 1 to 5, higher value means more likely to flake/crumble) | PCBs Removed by Other Waste Program? (Rating values: not removed by other = 5, or removed = 1) | Prioritization Score |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Asphalt | Concrete/stone | | | 140 | 1 | 2 | 1 | 2 | 4 | 5 | 2.50 |
| Carpet | Internal nonstructural surface | | 0.46 | 9.7 | 1 | 1 | 1 | 5 | 2 | 5 | 2.50 |
| Stone (granite, limestone, marble, etc.) | Concrete/stone | | | 130 | 1 | 2 | 1 | 1 | 4 | 5 | 2.33 |
| Air handling system | Air system | | 0.46 | 9.7 | 1 | 1 | 1 | 3 | 1 | 5 | 2.00 |

# APPENDIX B

# Priority Building Materials

# Photographic Log

# Appendix B

## Priority Building Materials to be Tested for PCBs

**Photograph 1**

**<u>Window Caulking</u>:**

**Damaged caulking around a window.**

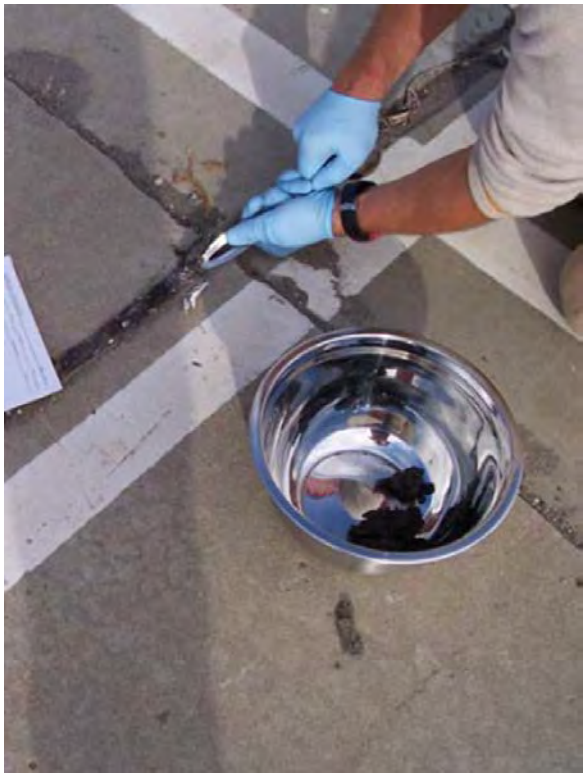
**Photograph 2**

**<u>Window Caulking</u>:**

**Worn and cracked caulking around a window.**

## Appendix B

## Priority Building Materials to be Tested for PCBs

| | |
|---|---|
| **Photograph 3** | |
| **<u>Door Frame Caulking</u>:**<br><br>**Caulking on an interior door or window frame.** | |
| **Photograph 4** |  |
| **<u>Floor and Expansion Joint Caulking</u>:**<br><br>**Caulking material placed in concrete expansion joints.** | |

## Appendix B

## Priority Building Materials to be Tested for PCBs

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| **Photograph 5** | |
| **<u>Thermal Insulation</u>:**<br><br>**Foam-style thermal insulation material along wall.** | |
| **Photograph 6** | |
| **<u>Thermal Insulation</u>:**<br><br>**Damaged floor foam insulation.** | |

## Appendix B

## Priority Building Materials to be Tested for PCBs

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| **Photograph 7** | |
| **<u>Thermal Insulation</u>:**<br><br>**Damaged felt-style thermal insulation.** | |
| **Photograph 8** | |
| **<u>Thermal Insulation</u>:**<br><br>**Exposed/damaged fiberglass insulation.** | |

## Appendix B

## Priority Building Materials to be Tested for PCBs

| | |
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| **Photograph 9** | |
| **<u>Thermal Insulation</u>:**<br><br>**Exposed and damaged pipe insulation.** | |

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|---|---|
| **Photograph 10** | |
| **<u>Thermal Insulation</u>:**<br><br>**Pipe insulation.** | |

## Appendix B

## Priority Building Materials to be Tested for PCBs

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| **Photograph 11** | |
| **<u>Adhesive / Mastic</u>:**<br><br>**Adhesive/mastic on a roof surface.** | |
| **Photograph 12** | |
| **<u>Adhesive / Mastic</u>:**<br><br>**Adhesive beneath a carpet.** | |

## Appendix B

## Priority Building Materials to be Tested for PCBs

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|---|---|
| **Photograph 13** | |
| **<u>Adhesive / Mastic:</u>**<br><br>**Adhesive remnants on flooring.** | |
| **Photograph 14** | |
| **<u>Adhesive / Mastic:</u>**<br><br>**Exposed adhesive on roofing.** | |

## Appendix B

## Priority Building Materials to be Tested for PCBs

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|---|---|
| **Photograph 15** | |
| **<u>Rubber Window Seal/Gasket:</u>**<br><br>**Grey rubber window seal/gasket in a wood type frame.** | |
| **Photograph 16** | |
| **<u>Rubber Window Seal/Gasket:</u>**<br><br>**Off white rubber window seal/gasket in an aluminum type frame.** | |

# APPENDIX C

# Currently Established Building Material Evaluation Protocols

# 1. CURRENTLY ESTABLISHED BUILDING MATERIAL EVALUATION PROTOCOLS

This section presents evaluation protocols for ACM and LBP, which provide a foundation for the PCBs protocol summarized in Section 3. This section includes guidance on sampling frequencies, laboratory sample analysis, quality assurance and quality control procedures derived from regulatory procedures for ACM and LBP.

## 1.1 Asbestos Containing Material Evaluation Procedures

Asbestos bulk sampling procedures are specified in several Federal regulations, implemented primarily by the United States Environmental Protection Agency (EPA) as well as the Occupational Safety and Health Administration (OSHA). The Consumer Product Safety Commission (CPSC) and the Mine Safety and Health Administration (MSHA) specify additional regulations and procedures, but these are generally less applicable to evaluation procedures.

The foundational regulations pertaining to asbestos sampling in buildings are the Asbestos Hazard Emergency Response Act (AHERA; Toxic Substances Control Act [TSCA] Title II) (15 U.S.C. § 2641-2656) as well as the Asbestos School Hazard Abatement Reauthorization Act (ASHARA). EPA promulgated regulations under AHERA to require inspection of schools for asbestos-containing building materials, and to perform resultant corrective actions. Furthermore, AHERA tasked the EPA with developing a plan for accreditation of asbestos inspectors. ASHARA extended funding for asbestos programs at schools and expanded accreditation requirements to cover asbestos abatement at commercial buildings other than schools.

Pursuant to AHERA, the Asbestos-Containing Materials in Schools rule (40 CFR Part 763, Subpart E) details specific requirements for building material inspections at schools, preparation of asbestos management plans, and implementation of response actions. EPA regulation on asbestos related to structure demolition is specified in subpart M of the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations (40 CFR Part 61, Subpart M).

The following sections summarize the evaluation procedures specified in the Asbestos-Containing Materials in Schools rule as well as the Asbestos NESHAP regulations. Both OSHA and EPA worker protection requirements are also discussed.

### 1.1.1 Asbestos-Containing Materials in Schools Rule

The following sections summarize the inspection, re-inspection, sampling, analysis, and evaluation procedures specified in the Asbestos-Containing Materials in Schools rule (40 CFR Part 763, Subpart E).

***Evaluation***

For each inspection and re-inspection of asbestos-containing building material (ACBM)[12], the local education agency shall have an accredited inspector provide a written evaluation of all friable known or assumed ACBM. The evaluation shall consider the following:

- Location and amount of material, both in total quantity and as a percentage of the functional space;
- Condition of the material, specifying:
  - Type of damage or significant damage (e.g., flaking, blistering, water damage, or other signs of physical damage);
  - Severity of damage (e.g., major flaking, severely torn protective jackets, as opposed to occasional flaking, minor tears to jackets);
  - Extent or spread of damage over large areas or large percentages of the homogeneous[13] area;
- Whether the material is accessible;
- The material's potential for disturbance;
- Known or suspected causes of damage or significant damage (e.g., air erosion, vandalism, vibration, water); and
- Preventive measures that could potentially eliminate the reasonable likelihood of undamaged ACBM from becoming significantly damaged.

The inspector shall classify and give reasons in the written evaluation for classifying the ACBM and suspected ACBM assumed to be ACM into one of the following categories:

---

[12] Asbestos-containing building material (ACBM) means surfacing ACM, thermal system insulation ACM, or miscellaneous ACM that is found in or on interior structural members or other parts of a building.

[13] Homogenous refers to a substance or area that is uniform in texture, color, and general physical appearance and properties.

1. Damaged or significantly damaged thermal system insulation ACM;
2. Damaged friable surfacing ACM;
3. Significantly damaged friable surfacing ACM;
4. Damaged or significantly damaged friable miscellaneous ACM;
5. ACBM with potential for damage;
6. ACBM with potential for significant damage; and
7. Any remaining friable ACBM or friable suspected ACBM.

***Inspection and Re-inspection***

Inspect any building that is to be used as a school, prior to such use, by an accredited inspector. In emergency situations, inspect the building within 30 days of commencement of such use.

For each area of the building, complete the following inspection procedure:

- Visually inspect the area to identify suspected ACBM;
- Touch suspected ACBM to determine friability (Friable material is material that may be crumbled or pulverized by hand pressure alone. Note that thermal system insulation that has retained its structural integrity and that has an undamaged protective jacket or wrap that prevents fiber release shall be treated as non-friable.);
- Categorize all areas into homogenous areas of friable suspected ACBM and non-friable suspected ACBM;
- Assume that some or all the homogeneous areas are ACBM, and for each homogeneous area that is not assumed to be ACBM, collect and submit samples for bulk analysis. Do not sample areas that an accredited inspector assumes to contain ACBM. For uncertain areas, collect and bulk samples and submit for analysis (see Sampling below);
- Assess friable material in areas where samples are collected, in areas where samples are not collected but ACBM is assumed to be present, and in areas identified in previous inspections;
- Record the following information and submit a copy for inclusion in an asbestos management plan, within 30 days of the inspection:

- An inspection report including the signature, state of accreditation, and accreditation number of each inspector, as well as the date of the inspection;
- A comprehensive inspection inventory, including the date and locations of samples, locations of areas assumed to contain friable ACBM, and locations of areas assumed to contain non-friable ACBM;
- A description of the manner used to determine sampling locations;
- A list of all categorized and identified homogenous areas into surfacing material, thermal system insulation, or miscellaneous material; and
- Evaluations made of friable material.

Repeat this process as a re-inspection at least once every 3 years after a management plan is in effect. Reassess the condition of friable known or assumed ACBM previously identified. Identify any homogenous areas with material that has become friable since the last inspection or re-inspection and collect and submit samples of the material.

***Sampling***

Collect samples in a statistically random manner that is representative of each homogeneous area.

- For surfacing material, the number of samples to be collected is as follows:
  - Collect at least three samples from each homogenous area less than 1,000 square feet;
  - Collect at least five samples from each homogenous area between 1,000 and 5,000 square feet; and
  - Collect at least seven samples from each homogenous area greater than 5,000 square feet.
- For thermal system insulation:
  - Collect at least one bulk sample from each homogeneous area that is not assumed to be ACM;
  - Collect at least one bulk sample from each homogeneous area of patched insulation that is not assumed to be ACM, if the patched section is less than six linear or square feet;

- Where cement or plaster is used on fittings such as tees, elbows or valves, collect samples to determine if material is ACM or not;
- If the accredited inspector determines that the thermal system insulation is fiberglass, foam glass, rubber, or other non-ACBM, samples are not required to be collected;

- For miscellaneous material, collect bulk samples from each homogeneous area of friable material that is not assumed to be ACM.

***Analysis***

Samples should be analyzed by laboratories accredited by the National Bureau of Standards (NBS). The laboratories must have received interim accreditation for polarized light microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program until the NBS PLM laboratory accreditation program for PLM is operational.

Samples should be analyzed for asbestos content by PLM using the "Interim Method for the Bulk Determination of Asbestos in Bulk Insulation Samples", found at Appendix E to Subpart E of 40 CFR Part 763. Samples should not be composited.

A homogenous area is considered not to contain ACM only if the results of all samples from that area show asbestos in concentrations of 1 percent or less. An area is considered to contain ACM if at least one sample from the area shows asbestos in concentrations greater than 1 percent.

Submit the name and address of each laboratory performing the analysis, the date of the analysis, and the person performing the analysis for inclusion into the management plan within 30 days of the analysis.

## 1.2 Lead-Based Paint (LBP) Evaluation Procedures

Lead-Based Paint (LBP) evaluation procedures are codified in various federal and state regulations.

Title IV of the Toxic Substances Control Act (TSCA) as well as other authorities in the Residential Lead-Based Paint Hazard Reduction Act of 1992 directs the EPA to regulate lead-based paint hazards. The primary Federal regulations and guidelines related to LBP evaluation procedures include:

- The Lead Renovation, Repair and Painting Program (RRP) Rule (40 CFR 745, Subpart E);
- The National Lead Laboratory Accreditation Program (TSCA Section 405(b)); and
- The Housing and Urban Development (HUD) Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (2012 Edition) (pursuant to Section 1017 of the Residential Lead-Based Paint Hazard Reduction Act of 1992, A.K.A. "Title X")

Furthermore, the California Department of Public Health (CDPH) Title 17, California Code of Regulations, Division 1, Chapter 8 "Accreditation, Certification, and Work Practices for Lead-Based Paint and Lead Hazards," specifies some LBP evaluation procedures as part of the accreditation program.

The HUD Guidelines provide the most comprehensive procedures for LBP evaluations and are referenced by many other regulations.

There are three primary methods of performing LBP evaluation: test kits, X-ray Fluorescence (XRF) devices, and laboratory testing of paint chips. Sampling procedures for each method are detailed in the following sections.

Under CDPH Title 17, certified Lead Inspector/Assessors are required to use XRF devices or laboratory analysis, and not test kits.

### 1.2.1 LBP Sampling Procedures: Test Kits

In 2008, the EPA published the RRP rule, which, among other things, established criteria for lead test kits for use in LBP evaluation. Lead test kits recognized by EPA before September 1, 2010, must meet only the negative response criterion outlined in 40 CFR 745.88(c)(1):

> *For paint containing lead at or above the regulated level, 1.0 mg/cm$^2$ or 0.5% by weight, a demonstrated probability (with 95% confidence) of a negative response less than or equal to 5% of the time must be met.*

Lead test kits recognized after September 1, 2010, must meet both the negative response and positive response criteria outlined in 40 CFR 745.88(c)(1) and (2). The positive-response criterion states:

*For paint containing lead below the regulated level, 1.0 mg/cm$^2$ or 0.5% by weight, a demonstrated probability (with 95% confidence) of a positive response less than or equal to 10% of the time must be met.*

To date, no lead test kit has met both criteria[14]. However, three lead test kits recognized before September 1, 2010, exist and are recognized by EPA:

- 3M™ LeadCheck™, manufactured by the 3M Company, for use on wood, ferrous metal, drywall, and plaster surfaces;
- D-Lead®, manufactured by ESCA Tech, Inc., for use on wood, ferrous metal, drywall, and plaster surfaces; and
- The Commonwealth of Massachusetts lead test kit, for use only on drywall and plaster surfaces.

Test kits cannot determine the concentration of lead, only presence or absence at best. For this reason, test kits are best used by homeowners or other non-professionals as a preliminary evaluation before using an XRF device or laboratory analysis of paint chips.

In California, test kits are not utilized as XRF is shown to be more reliable for testing of lead concentrations in paint.

There are currently no detailed sampling procedures for test kits that would be applicable to PCBs evaluation. However, test kit technology may be a useful paradigm for PCBs evaluation if a kit can be developed to test PCBs at an acceptable concentration that uses a repeatable methodology to meet the data quality objectives.

### 1.2.2 LBP Sampling Procedures: XRF Devices

The following sections summarize LBP evaluation procedures for XRF devices, including description of sampling equipment, collection techniques and frequency, sample analysis, and quality assurance.

#### *LBP Analyzers*

According to the HUD Guidelines, portable XRF devices are the most common primary analytical method for inspections in housing because of their versatility in analyzing a

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[14] US EPA, Lead Test Kits, https://www.epa.gov/lead/lead-test-kits, accessed September 19, 2017.

wide variety of surface types, non-destructive measurement, high speed, and low cost per sample. Each XRF device must have a HUD-issued XRF Performance Characteristic Sheet (PCS), which contains information about XRF readings taken on specific surface types, calibration check tolerances, and interpretation of XRF readings.

### *Collection Techniques and Frequency*

HUD Guidelines provide separate sampling techniques for single- and multi-family housing. However, the general approach to sampling is the following seven-step procedure:

- List all testing combinations of building components and substrates (e.g., wood doors, metal doors, plaster walls, concrete walls);
- Select testing combinations. A numbering system, floor plan, sketch or other system may be used to document which testing combinations were tested;
- Perform XRF testing, including calibration;
- Collect and analyze paint-chip samples as needed;
- Classify XRF and paint-chip results;
- Evaluate the work and results to ensure the quality of the inspection; and
- Document the findings in a summary and in a complete technical report.

Because of the large surfaces and quantities of paint involved, and the potential for spatial variation, HUD Guidelines recommend taking at least four readings per room, with special attention paid to surfaces that clearly have different painting history. The selection of test locations should be representative of locations most likely to be coated with old paint or other lead-based coatings, such as areas with thick paint; areas with worn or scraped off paint should be avoided.

For large buildings with many similar units, HUD Guidelines recommend testing a designated sample of units to provide 95% confidence that most units are below the lead standard. The sample size should be carefully chosen using statistical techniques (see HUD Guidelines, Table 7.3).

### *Sample Analysis*

Portable XRF devices expose a surface to X-ray or gamma radiation and measure the emission of characteristic X-rays from each element in the analyzed surface. The XRF

reading is compared with a range specified in the PCS for the specific XRF device being used and the specific substrate beneath the painted surface.

When discrepancies exist between the PCS, HUD Guidelines, and the XRF device's manufacturer's instructions, the most stringent guideline should be followed.

***Quality Assurance***

HUD Guidelines provide several techniques for evaluation of inspection quality.

A knowledgeable observer independent of the inspection firm should be present for as much XRF testing as possible, especially if they have knowledge of LBP evaluation and/or the paint history of the facility.

The client should ask the inspector to provide copies of the results as soon as possible, or daily, allowing for immediate review.

Data from HUD's private housing lead-based paint hazard control program show that it is possible to successfully retest painted surfaces without knowing the exact spot which was tested. Therefore, the client may consider selecting 10 testing combinations for retesting at random from the already compiled list of all testing combinations, using the XRF device used for the original measurements, if possible. The average of the 10 repeat XRF results should not differ from the 10 original XRF results by more than the retest tolerance limit. The procedure for calculating the retest tolerance limit is specified in the PCS. If the limit is exceeded, the procedure should be repeated using 10 different testing combinations. If the retest tolerance limit is exceeded again, the original inspection is considered deficient.

Currently XRF technology and methods are not applicable to PCBs building material evaluation, as the precision is not adequate to provide a concentration that could be relied upon for this program.

### 1.2.3 LBP Sampling Procedures: Laboratory Testing of Paint Chips

The following sections summarize LBP evaluation procedures for XRF devices, including the description of sampling equipment, collection techniques and frequency, sample analysis, and quality assurance.

Laboratory analysis of paint chip samples is only recommended by HUD for inaccessible areas or building components with irregular (non-flat) surfaces that cannot be tested using

XRF devices, for confirmation of inconclusive XRF results, or for additional confirmation of conclusive XRF results.

Unlike XRF analysis, paint chip collection techniques may be more directly applicable to potential PCBs collection techniques.

### *Sampling Equipment*

Common hand tools can be used to scrape paint chips from a surface; specialized equipment is not necessary. However, HUD Guidelines recommend that samples should be collected in sealable rigid containers rather than plastic bags, which generate static electricity and make laboratory transfer difficult.

### *Collection Techniques*

HUD Guidelines, which are consistent with ASTM E1729, Standard Practice for Field Collection of Dried Paint Samples for Subsequent Lead Determination, recommend that only one paint chip needs to be taken for each testing combination, although additional samples are recommended for quality control.

The paint chip sample should be taken from a representative area that is at least 4 square inches in size. The dimensions of the surface area must be accurately measured to the nearest $1/16^{th}$ of an inch so that laboratory results can be reported in units of $mg/cm^2$. Paint chip collection should include collection of all the paint layers from the substrate, but collection of actual substrate should be minimized. Any amount of substrate included in the sample may cause imprecise results.

### *Sample Analysis*

A laboratory used for LBP analysis must be recognized under EPA's National Lead Laboratory Accreditation Program (NLLAP) for the analysis of lead paint; however, States or Tribes may operate an EPA-authorized lead-based paint inspection certification program with different requirements.

There are several standard laboratory techniques to quantify lead in paint chip samples, including Atomic Absorption Spectroscopy, Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES), Anodic Stripping Voltammetry, and Potentiometric Stripping Analysis.

For analytical methods that require sample digestion, samples should be pulverized so there is adequate surface area to dissolve the sample before laboratory instrument

measurement. In some cases, the amount of paint collected from a 4-square-inch area may exceed the amount of paint that can be analyzed successfully. It is important that the actual sample mass analyzed not exceed the maximum mass the laboratory has successfully tested using the specified method. If subsampling is required to meet analytical method specifications, the laboratory must homogenize the paint chip sample (unless the entire sample will eventually be analyzed, and the results of the subsamples combined). Without homogenization, subsampling would likely result in biased, inaccurate lead results. If the sample is properly homogenized and substrate inclusion is negligible, the result can be reported as a loading, in milligrams per square centimeter ($mg/cm^2$), the preferred unit, or as percent by weight, or both.

### *Quality Assurance*

Laboratory reference materials processed with the paint chip samples for quality assurance purposes should have close to the same mass as those used for paint-chip samples (refer to ASTM methods E1645, E1613, E2051, and E1775).

### *Reporting*

The laboratory report for analysis of paint chip samples should include at a minimum, the information outlined in the EPA National Lead Laboratory Accreditation Program Laboratory Quality System Requirements, Revision 3.0, section 5.10.2, Test Reports[15]. In addition to those minimum requirements, test reports containing the results of sampling must include specified sampling information, if available.

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[15] National Lead Laboratory Accreditation Program: Laboratory Quality System Requirements https://www.epa.gov/sites/production/files/documents/lqsr3.pdf, accessed September 20, 2017.

# APPENDIX D

# Document Revision History

**Protocol for Evaluating Priority PCBs-Containing Materials before Building Demolition**

**Summary of Revisions November 2019**

1. The description of currently established building material evaluation protocols for asbestos and lead-based paint were moved from Section 2 to Appendix C.
2. Both window glazing putty and window caulking were added as examples within the "Caulks and Sealants" category to the list of priority materials to sample in Section 2.1.
3. Added clarification in Section 2.1 that sampling of the priority building materials listed in the protocol is required at a minimum. Sampling of building materials coming into contact with priority building materials is not required specifically by this protocol, but may or may not be part of any subsequent remediation. Also clarified that applicants who have conducted sampling prior to the publication of the protocol may use that data provided it is consistent with the protocol.
4. California-ELAP was added to Section 2.2.4 as an acceptable accreditation for a laboratory used to analyze priority building materials for PCBs (in addition to the national NELAP accreditation).
5. Added a clarification to Section 2.2.1 that decontamination with certain solvents (e.g., hexane) may be utilized for cleaning of tar-like substances off of sampling tools, followed with the standard decontamination procedures listed in the protocol. It is recommended that equipment is air-dried, but it is up to the discretion of the environmental professional to use alternative drying methods if time constraints for air-drying are prohibitive.
6. Section 2.2.3 was revised to increase the reporting limit from 50 to 500 micrograms per kilogram and to allow for the reporting limit to be modified to account for necessary dilutions or interferences, as determined by the laboratory.
7. Minor edits were made to the text throughout to correct typographical errors and improve clarity. In addition, clarifying edits to nomenclature were made to the photo log in Appendix B.

# Appendix C

# TECHNICAL MEMORANDUM

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**DATE:** May 1, 2023

**TO:** Bay Area Municipal Stormwater Collaborative Steering Committee

**COPY TO:**

**SUBJECT:** **Construction Site Control Program Enhancement Options for Demolition Sites Subject to the PCBs Management Program**

This memorandum transmits the construction site enhancement options deliverable of the Bay Area Municipal Stormwater Collaborative (BAMSC) Managing Project of Regional Benefit*: PCBs during Building Demolition – Guidance Update*.

This work product provides guidance for Permittees to identify appropriate construction site control program enhancements to minimize migration of PCBs into the storm drainage system during demolition in accordance with the requirements of the Municipal Regional Stormwater Permit (MRP 3.0) Provision C.12.g.

MRP 3.0 provides latitude for Permittees to select the enhancements best suited to their C.6 Construction Site Control Program. The options identified in this memorandum provide Permittees with a robust but flexible framework that allows for tailoring the enhancements to their C.6 Construction Site Control Programs for demolition sites subject to the PCBs Management Program. The options were reviewed by the Regional Project Workgroup and subsequently by the Countywide Programs and updated based on the input provided.

Per the requirements of MRP 3.0, the enhancements must be implemented no later than July 1, 2023, and rainy season inspections must commence with the 2023 rainy season.

## Purpose and Background

In accordance with MRP 2.0 requirements, Permittees began requiring applicants for building demolition permits (or the equivalent) to evaluate the potential for polychlorinated biphenyl (PCBs) in select building materials (PCBs in Building Material Program). The evaluation process was outlined in the *PCBs in Priority Building Materials: Model Screening Assessment Applicant Package* (BASMAA 2018, Revised 2019). This process defines the buildings that must be evaluated (Applicable Structures[1]) and details the protocol to screen building materials for PCBs, resulting in the removal of priority PCBs-containing building materials prior to demolition.

MRP 3.0 Provision C.12.g requires that Permittees inspect demolition sites subject to the PCBs Management Program[2] during demolition (C.12.g.ii (3)) beginning with the 2023 rainy season (October 1-April 30). Provision C.12.g.ii (4) requires that Permittees enhance their construction site control programs to minimize migration of PCBs into the municipal separate storm sewer system (MS4) [3] during demolition beginning July 1, 2023.

This document outlines options for Permittees to enhance their construction site control programs to meet the requirements of MRP 3.0 Provisions C.12.g.ii (3) and (4), which state (emphasis added):

> *C.12.g.ii (3)* *Beginning the 2023 rainy season,* ***Permittees shall inspect demolition sites with applicable structures containing building materials with PCBs concentrations of 50 ppm or greater*** *pursuant to Provision C.6 to ensure that effective construction pollutant controls are used to prevent discharge into the MS4.*
>
> *C.12.g.ii (4)* ***Permittees shall enhance their construction site control program to minimize migration of PCBs into the MS4 from applicable structures containing building materials with PCBs concentrations of 50 ppm or greater*** *during demolition activities. Enhancements may include inspecting demolition sites monthly during demolition activities in the dry season (May – September) and requiring the demolition contractors to sweep the project sites and the streets around the property with street sweepers that will effectively remove sediment and dust. Implementation of enhancements shall begin no later than July 1, 2023.*

[1] Applicable Structures are defined as buildings constructed or remodeled between January 1, 1950 and December 31, 1980. Wood framed buildings and single-family residential buildings are not Applicable Structures regardless of the age of the building.

[2] For brevity, buildings subject to the PCBs Management Program are Applicable Structures containing building materials with PCBs concentrations ≥ 50 ppm.

[3] The MS4 is defined in MRP 3.0 as "A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains), as defined in 40 CFR 122.26(b)(8)…" See the MRP 3.0 Glossary for the full definition.

## Construction and PCBs Control Programs Established During MRP 2.0

Permittees implement a Construction Site Control Program pursuant to MRP Provision C.6 and a program to ensure that PCBs containing materials are removed prior to the general demolition of applicable buildings (MRP Provision C.12.g).

Under the existing C.6 Construction Site Control Program, Permittees

- Require applicants for grading permits to develop, submit, and implement erosion control plans with site- and seasonally-specific best management practices (BMPs) (C.6.c and C.6.d);
- Provide wet season[4] reminders (C.6.e); and
- Inspect sites monthly during the wet season with follow-up inspections as warranted (C.6.e).

Under the PCBs in Building Material Program, Permittees require applicants to assess building materials for PCBs before issuing the demolition permit. If PCBs are detected, the applicant is responsible for properly handling and disposing of the PCBs-containing materials in accordance with state and federal laws and regulations before commencing general demolition (e.g., knocking down the structures).[5]

## Construction Program Enhancement Options for Demolition Sites Subject to the PCBs Management Program

MRP 3.0 provides latitude for Permittees to select the enhancements best suited to their C.6 Construction Site Control Programs.

**Table 1** summarizes the existing and required actions for the PCBs Management Program. The main addition is a wet season inspection of demolition sites subject to the PCBs Management Program. Note that if a project is otherwise subject to the C.6 construction site inspections, the requirement to conduct monthly wet season inspections applies.

The menu presented in **Table 2** provides inspection and other site control enhancement options for Permittees' consideration.

To address the requirements of C.12.g, Permittees need to implement the controls in **Table 1 <u>and</u>** select a set of options to enhance their Construction Site Control Program for demolition sites subject to the PCBs Management Program from **Table 2**.

The options provided in **Table 2** were identified by considering: existing C.6 Construction Site Control Program requirements; recommendations and requirements included in MRP 3.0; and other regulatory programs, such as the requirements in the 2022 Construction Stormwater General Permit (CGP).[6]

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[4] Per MRP 3.0 Provision C.6.e, for the purposes of inspections, wet season is defined as October 1 through April 30.
[5] Removal of PCBs-containing materials is typically defined as part of the demolition phase, so this document uses the term *general demolition* to characterize the dismantling or knocking down of the structure that occurs following the PCBs-removal action.
[6] Order 2022-0057-DWQ.

It is up to each Permittee to select their enhancement option(s). For example, depending on a particular program, a Permittee may prefer to enhance their Construction Site Control Program by augmenting the number and type of inspections performed by municipal inspectors, while for other Permittees it may be preferable to specify BMPs for the applicant to implement. Once selected, Permittees will need to revise their Construction Site Control Program to implement the selected enhancement(s).

**Table 3** provides a supplemental set of BMPs that could be established if a municipality chooses to require a specific set of BMPs for demolition projects, in accordance with the corresponding option provided in **Table 2**.

Overall, the process of selecting options from these tables is intended to provide Permittees with a robust but flexible framework that allows for tailoring the enhancements to their C.6 Construction Site Control Programs.

**Table 1. C.12.g Baseline Controls for Demolition Sites Subject to the PCBs Management Program[7] (Implement all Controls)**

| Action | Practice | Notes |
|---|---|---|
| General Demolition Wet Season[8] Inspections | • Inspect demolition projects once during general demolition[9] during the wet season. | • Required by C.12.g ii (3).<br>• Inspection would focus on the demolition activity and stormwater BMPs implemented for this activity.<br>• If the site falls under the C.6.e Construction Site Inspection Program (i.e., ≥ 1 acre, hillside site, or high priority site) monthly inspections also apply. |
| Complete Any PCBs Abatement Action Before General Demolition Activities | • Require applicants to test the priority building materials for PCBs before demolition and to properly handle and dispose of any PCBs-containing materials in accordance with state and federal laws and regulations. | • Required by C.12.g.ii (1)<br>• The PCBs in Building Materials Program requires testing of priority building materials for PCBs before demolition. If PCBs are detected, the materials must be properly handled and disposed in accordance with state and federal laws and regulations. |
| Construction Site Control Program BMP Requirements | • Review Erosion Control Plan BMPs related to the demolition phase submitted by applicant. | • Required by C.6.c and C.6.d.<br>• Continue to implement the municipal program for reviewing applicant Erosion Control Plan and BMPs submittals. |

[7] For brevity, this means demolition sites with applicable structures containing building materials with PCBs concentrations of 50 ppm or greater. See the *PCBs in Priority Building Materials: Model Screening Assessment Applicant Package* for additional detail on applicable structures.
[8] Per MRP 3.0 Provision C.6.e, for the purposes of inspections, wet season is defined as October 1 through April 30.
[9] Removal of PCBs-containing materials is typically defined as part of the demolition phase, so this table uses the term *general demolition* to characterize the dismantling or knocking down of the structure that occurs following the PCBs-removal action.

**Table 2. C.12.g ii (4) Construction Site Control Program Enhancement Options for Demolition Sites Subject to the PCBs Management Program[10]**
**(Select an Appropriate Set of Options for your Municipality)**

| Enhancement Options | Practice | Notes |
|---|---|---|
| **Municipal Inspection Options** | | |
| 1. Demolition Phase Dry Season Inspection(s)[11] | • Dry season inspection(s) of demolition projects during general demolition.[12] | • This would be an enhanced effort;[13] dry season inspections are not required for C.6 projects.<br>• Inspection frequency would be determined by the municipality.<br>• Inspection(s) would focus on the demolition activity and BMPs implemented for this activity. |
| 2. Demolition Phase Wet Season[14] Inspections | • Additional wet season inspections during general demolition. | • This would be an enhanced effort beyond the required single wet season inspection identified in **Table 1**.<br>• Increased inspection frequency would be determined by the municipality.<br>• Inspection(s) would focus on the demolition activity and BMPs implemented for this activity. |
| 3. Pre-Con Inspection | • Inspection of demolition projects prior to commencement of the general demolition. | • This would be an enhanced effort; pre-con inspections are not required for C.6 projects.<br>• Inspection would focus on the preparation of the demolition site and the BMPs planned to be implemented, and general stormwater awareness. |

[10] For brevity, this means demolition sites with applicable structures containing building materials with PCBs concentrations of 50 ppm or greater. See the *PCBs in Priority Building Materials: Model Screening Assessment Applicant Package* for additional detail on applicable structures.
[11] The dry season is May 1 through September 30; see footnote 13.
[12] Removal of PCBs-containing materials is typically defined as part of the demolition phase, so this table uses the term *general demolition* to characterize the dismantling or knocking down of the structure that occurs following the PCBs-removal action.
[13] The term enhanced effort is relative to the MRP requirements for C.6 or C.12. Some municipalities may have programs that go beyond the MRP requirements. In this case these existing efforts would be characterized as enhancements relative to C.12.g (4) because they exceed the MRP requirements.
[14] Per MRP Provision C.6.e, for the purposes of inspections, wet season is defined as October 1 through April 30.

**Table 2. C.12.g ii (4) Construction Site Control Program Enhancement Options for Demolition Sites Subject to the PCBs Management Program[10]**
**(Select an Appropriate Set of Options for your Municipality)**

| Enhancement Options | Practice | Notes |
|---|---|---|
| **Specified Applicant BMP Options** | | |
| 1. Street Sweeping – Demolition Phase | • Require daily sweeping of project and adjacent streets using vacuum or regenerative air sweepers to effectively remove sediment, dust, and debris throughout the general demolition phase. | • Part of C.6 sediment control BMP suite.<br>• Adds minimum frequency.<br>• Limits enhancement to the highest risk period. |
| 2. Street Sweeping – All Phases | • Require daily sweeping of project and adjacent streets throughout the project using vacuum or regenerative air sweepers to effectively remove sediment, dust, and debris. | • Part of sediment control BMP suite.<br>• Adds minimum frequency.<br>• Enhancement throughout project to address potential pollutant halo effect. |
| 3. Cover Demolition Debris – Wet Season | • Cover demolition debris with an impermeable liner (or equivalent) during wet season or when rain is forecast. | • Part of C.6 good site management BMP suite.<br>• CGP minimum BMP for demolition sites.<br>• Enhancement specifies covering demolition debris during the wet season. |
| 4. Cover Demolition Debris – Wet and Dry Season | • Cover demolition debris with an impermeable liner (or equivalent) at all times. | • Part of C.6 good site management BMP suite.<br>• Enhancement specifies covering demolition debris at all times to address both wind and water migration. |
| 5. Specified BMPs for Demolition Projects | • Establishing a set of BMP requirements for demolition projects. See **Table 3** for an example set of BMPs.<br>• Review Erosion Control Plans to ensure BMPs are included. | • MRP requires submittal and approval of Erosion Control Plans for C.6 regulated projects.<br>• MRP requires use of site-specific, seasonally and phase appropriate BMPs.<br>• This enhancement would specify BMPs for projects subject to the PCBs Management Program based on the C.6 BMP categories. |

**Table 3. Example Set BMPs Options for Demolition Project Erosion Control Plans (See Table 2 Option 5)**

| C.6 BMP Category | Specific BMP |
|---|---|
| Erosion Control | Provide temporary soil stabilization with hydroseeding, soil binders, or erosion control blankets for all disturbed soils within 14-days of the area becoming inactive. |
| Erosion Control | Provide temporary soil stabilization with erosion control blankets or geotextiles disturbed soils in the demolition zone when rain is predicted. |
| Erosion Control | Use water and/or dust palliatives to manage dust during the demolition process. Dust control water must be managed to prevent runoff or collected for proper disposal. |
| Run-on and Runoff Control | Use earth dikes, drainage swales and/or other controls to direct run-on away from demolition site and debris storage areas. |
| Run-on and Runoff Control | Use earth dikes, drainage swales and/or other controls to direct runoff from the site to sediment controls. |
| Sediment Control | Install site perimeter controls (e.g., wattles, silt fences) around the project site. |
| Sediment Control | Install perimeter controls (e.g., wattles, silt fences) around the demolition area and debris management areas. |
| Sediment Control | Install stabilized entrances to minimize sediment track-out. |
| Sediment Control | Sweep streets and pavement on the project site and adjacent streets using vacuum or regenerative air sweepers to effectively remove sediment, dust, and debris. |
| Sediment Control | Install inlet protection at all on-site and off-site storm drain inlets that receive project runoff. |
| Good Site Management<br>Dust Management | Use manual tools or tools that employ misters, e.g., wet sanders to generate lower dust volumes. Water must be collected for proper disposal. |
| Good Site Management<br>Dust Management | Construct work containment zones to prevent spread of potentially contaminated dust – use plastic sheeting, vacuum, and/or install a decontamination area. |
| Good Site Management<br>Waste Management | Cover demolition debris with an impermeable liner or place into covered leak tight debris bins. |
| Good Site Management<br>Waste Management | Properly dispose of wastes (debris, liquid, and BMPs). Maintain waste disposal records (e.g., manifests, bills of lading) and submit to the local agency and EPA as required. |
| Good Site Management<br>Materials Management | Decontaminate equipment before storing outdoors or using in other parts of the project. |
| Non-Stormwater Management | Contain decontamination water in covered leak-tight containers inside a building or inside secondary containment. |

# Appendix D

**Appendix E - Regional Effectiveness Evaluation of the Protocol for Managing PCBs-containing Materials During Building Demolition Compiled Data for Priority Building Materials containing ≥ 50 ppm PCBs.**

| Building ID | Building Contains Concentrations ≥ 50 ppm PCBs? | FY | County | Permittee | Priority Building Material Application | Application Sample Description | Total PCBs Concentration (ppm) | Concentration ≥ 50 ppm (Y/N) | Unique Material ID | Estimated Amount of Material | Material Units (linear-ft or $ft^3$) | Material Type used for conversion factor | Best (Average or mid-rage value) (kg/linear-feet) or (kg/ft2) | Best (Average or mid-rage value) PCBs Mass (kg) | Assumed Quantity? (Y/N) - GC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SC-003B | Yes | 2019-20 | Santa Clara | Mountain View | Thermal Insulation | 300-DUCT-8 Fiberglass HVAC duct insulation with cloth lagging Attic | 81 | Y | SC-003B-1 | 1,000 | ft2 | Insulation - HVAC/blanket fiberglass | 0.16 | 0.013 | |
| SC-005 | Yes | 2019-20 | Santa Clara | Palo Alto | Caulk | Floor expansion joint | 2,386 | Y | SC-005-1 | 47 | linear-ft | Caulk - expansion joints | 0.04 | 0.0045 | |
| SC-005 | Yes | 2019-20 | Santa Clara | Palo Alto | Caulk | Floor expansion joint | 11,270 | Y | SC-005-1 | 47 | linear-ft | Caulk - expansion joints | 0.04 | 0.021 | |
| SC-005 | Yes | 2019-20 | Santa Clara | Palo Alto | Caulk | Floor expansion joint | 14,250 | Y | SC-005-1 | 47 | linear-ft | Caulk - expansion joints | 0.04 | 0.027 | |
| SC-005 | Yes | 2019-20 | Santa Clara | Palo Alto | Fiberglass Insulation | Black wrap and fiberglass insulation on pipe | 676 | Y | SC-005-2 | 1,935 | ft2 | Insulation - HVAC/blanket fiberglass | 0.16 | 0.21 | |
| SC-028 | Yes | 2019-20 | Santa Clara | Sunnyvale | Caulk | 650-02-04 to 650-02-06 Gray Expansion Joint | 1,100 | Y | SC-028-1 | 450 | linear-ft | Caulk - expansion joints | 0.04 | 0.020 | |
| SC-031 | Yes | 2019-20 | Santa Clara | Sunnyvale | Caulk | 525-07-017 to -019 Tan Expansion Joint | 490 | Y | SC-031-1 | 900 | linear-ft | Caulk - expansion joints | 0.04 | 0.018 | |
| SC-031 | Yes | 2019-20 | Santa Clara | Sunnyvale | Caulk | 525-12-032 to -34 Gray Expansion Joint | 630 | Y | SC-031-2 | 650 | linear-ft | Caulk - expansion joints | 0.04 | 0.016 | |
| SC-043 | Yes | 2019-20 | Santa Clara | Sunnyvale | Caulk | Gray Expansion Joint Caulking, 390/394-PCB-A05 | 91 | Y | SC-043-1 | 2,750 | linear-ft | Caulk - expansion joints | 0.04 | 0.010 | |
| SC-053SJ | Yes | 2019-20 | Santa Clara | San Jose | Rubber Window Gasket | 170-2-B.7/4.0-PCB27 BLACK GASKET | 11 | N | SC-053SJ-1 | 1,092 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00036 | |
| SC-053SJ | Yes | 2019-20 | Santa Clara | San Jose | Rubber Window Gasket | 170-2-C.5/1.0-PCB28 BLACK GASKET | 10 | N | SC-053SJ-1 | 1,092 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00033 | |
| SC-053SJ | Yes | 2019-20 | Santa Clara | San Jose | Rubber Window Gasket | 170-2-D.5/1.0-PCB29 BLACK GASKET | 16 | N | SC-053SJ-1 | 1,092 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00052 | |
| SC-053SJ | Yes | 2019-20 | Santa Clara | San Jose | Rubber Window Gasket | 170-2-E.5/1.0-PCB30 BLACK GASKET | 11 | N | SC-053SJ-1 | 1,092 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00036 | |
| SC-053SJ | Yes | 2019-20 | Santa Clara | San Jose | Rubber Window Gasket | 170-2-EXT-B.1/2.5-PCB31 BLACK GASKET | 6.7 | N | SC-053SJ-1 | 1,092 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00022 | |
| SC-053SJ | Yes | 2019-20 | Santa Clara | San Jose | Rubber Window Gasket | 170-3-C/2.8-PCB32 BLACK GASKET | 7.1 | N | SC-053SJ-1 | 1,092 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00023 | |
| SC-053SJ | Yes | 2019-20 | Santa Clara | San Jose | Rubber Window Gasket | 170-3-E.1/1.0-PCB33 BLACK GASKET | 29 | N | SC-053SJ-1 | 1,092 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00094 | |
| SC-053SJ | Yes | 2019-20 | Santa Clara | San Jose | Rubber Window Gasket | 170-3-B.9/1.0-PCB34 BLACK GASKET | 63 | Y | SC-053SJ-1 | 1,092 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0020 | |
| SC-053SJ | Yes | 2019-20 | Santa Clara | San Jose | Rubber Window Gasket | 170-3-A.9/1.7-PCB35 BLACK GASKET | 66 | Y | SC-053SJ-1 | 1,092 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0022 | |
| SC-053SJ | Yes | 2019-20 | Santa Clara | San Jose | Rubber Window Gasket | 170-3-F.0/3.5-PCB36 BLACK GASKET | 6.9 | N | SC-053SJ-1 | 1,092 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00023 | |
| SC-053SJ | Yes | 2019-20 | Santa Clara | San Jose | Caulk | 170-2-EXT-C/4-PCB45 GREY CAULK PRECASTED WINDOW FRAME CAULK | 2,400 | Y | SC-053SJ-2 | 2,400 | linear-ft | Caulk - window/door frames | 0.02 | 0.12 | |
| SC-053SJ | Yes | 2019-20 | Santa Clara | San Jose | Caulk | 170-MP-B.8/1.8/PCB51 GREY CAULK CAULK BETWEEN PRECAST AND DOOR FRAME | 160 | Y | SC-053SJ-2 | 2,400 | linear-ft | Caulk - window/door frames | 0.02 | 0.0077 | |
| SC-063 | Yes | 2020-21 | Santa Clara | Sunnyvale | Caulk | 755-PCB-CAULK Exterior expansion joint caulking -A | 1,200 | Y | SC-063-1 | 467 | linear-ft | Caulk - expansion joints | 0.04 | 0.022 | |
| SC-063 | Yes | 2020-21 | Santa Clara | Sunnyvale | Caulk | 755-PCB-CAULK Exterior expansion joint caulking -B | 1,400 | Y | SC-063-1 | 467 | linear-ft | Caulk - expansion joints | 0.04 | 0.026 | |
| SC-063 | Yes | 2020-21 | Santa Clara | Sunnyvale | Caulk | 755-PCB-CAULK Exterior expansion joint caulking -C | 47 | N | SC-063-1 | 467 | linear-ft | Caulk - expansion joints | 0.04 | 0.00088 | |
| SC-089 | Yes | 2021-22 | Santa Clara | San Jose | Caulk | PCB-15A Sidewalk Seam Sealant - GreyBuilding 1, Exterior - Northern Side of Building at Central Concrete Walkway | 2,300 | Y | SC-089-1 | 50 | linear-ft | Caulk - expansion joints | 0.04 | 0.0046 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-1EXT-D/4.5-P1 CAULK GREY CONCRETE/CONCRETE N SOLID FLAT WORK CAULK JOINT | 38 | N | SC-091-1 | 250 | linear-ft | Caulk - expansion joints | 0.04 | 0.00038 | |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-1EXT-G/1-P2 CAULK GREY CONCRETE/CONCRETE N SOLID FLAT WORK CAULK JOINT | 570 | Y | SC-091-1 | 250 | linear-ft | Caulk - expansion joints | 0.04 | 0.0057 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-1EXT-N/3.5-P3 CAULK GREY CONCRETE/CONCRETE N SOLID FLAT WORK CAULK JOINT | 540 | Y | SC-091-1 | 250 | linear-ft | Caulk - expansion joints | 0.04 | 0.0054 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-1EXT-M.5/2-P5 CAULK GREY CONCRETE/CONCRETE N SOLID FLAT WORK CAULK JOINT | 1,200 | Y | SC-091-1 | 250 | linear-ft | Caulk - expansion joints | 0.04 | 0.012 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-1EXT-H.6/1-P6 CAULK GREY CONCRETE/CONCRETE N SOLID FLAT WORK CAULK JOINT | 3,800 | Y | SC-091-1 | 250 | linear-ft | Caulk - expansion joints | 0.04 | 0.038 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-1EXT-D/1.4-P7 CAULK GREY CONCRETE/CONCRETE N SOLID FLAT WORK CAULK JOINT | 710 | Y | SC-091-1 | 250 | linear-ft | Caulk - expansion joints | 0.04 | 0.0071 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-2EXT-E.2/5-P17 CAULK TAN CONCRETE/CONCRETE Y SOLID CAULK PRE CAST WITH | 260,000 | Y | SC-091-2 | 278 | linear-ft | Caulk - expansion joints | 0.04 | 2.9 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-REXT-F.8/5-P18 CAULK TAN CONCRETE/CONCRETE Y SOLID CAULK PRE CAST WITH | 220,000 | Y | SC-091-2 | 278 | linear-ft | Caulk - expansion joints | 0.04 | 2.4 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-REXT-K.2/5-P19 CAULK TAN CONCRETE/CONCRETE Y SOLID CAULK PRE CAST WITH | 220,000 | Y | SC-091-2 | 278 | linear-ft | Caulk - expansion joints | 0.04 | 2.4 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-REXT-H.2/5-P20 CAULK TAN CONCRETE/CONCRETE Y SOLID CAULK PRE CAST WITH | 310,000 | Y | SC-091-2 | 278 | linear-ft | Caulk - expansion joints | 0.04 | 3.4 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-REXT-J.2/5-P21 CAULK TAN CONCRETE/CONCRETE Y SOLID CAULK PRE CAST WITH | 250,000 | Y | SC-091-2 | 278 | linear-ft | Caulk - expansion joints | 0.04 | 2.8 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-REXT-G.8/5-P22 CAULK TAN CONCRETE/CONCRETE N SOLID LOOK LIKE REPLACEMENT CAULK | 290,000 | Y | SC-091-2 | 278 | linear-ft | Caulk - expansion joints | 0.04 | 3.2 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-REXT-L.8/5-P23 CAULK TAN CONCRETE/CONCRETE N SOLID LOOK LIKE REPLACEMENT CAULK | 230,000 | Y | SC-091-2 | 278 | linear-ft | Caulk - expansion joints | 0.04 | 2.6 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-REXT-D.2/5-P24 CAULK TAN CONCRETE/CONCRETE N SOLID LOOK LIKE REPLACEMENT CAULK | 110,000 | Y | SC-091-2 | 278 | linear-ft | Caulk - expansion joints | 0.04 | 1.2 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-REXT-E.5/5-P25 CAULK TAN CONCRETE/CONCRETE N SOLID LOOK LIKE REPLACEMENT CAULK | 110,000 | Y | SC-091-2 | 278 | linear-ft | Caulk - expansion joints | 0.04 | 1.2 | Y |
| SC-091 | Yes | 2021-22 | Santa Clara | Santa Clara County | Caulk | 03-110-1EXT-D/4.5-P26 CAULK GREY CONCRETE/CONCRETE Y SOLID QA #1 FLAT WORK | 280 | Y | SC-091-1 | 250 | linear-ft | Caulk - expansion joints | 0.04 | 0.0028 | Y |
| SC-099 | Yes | 2022-23 | Santa Clara | San Jose | Adhesive Mastic | 145SMO-1-K.1/5.6-P5 Floor Tile Mastic On Concrete | 2,500 | Y | SC-099-1 | 13,250 | ft2 | Mastics - carpet/floor ties | 0.1 | 3.3 | |
| SC-099 | Yes | 2022-23 | Santa Clara | San Jose | Adhesive Mastic | 145SMO-1-D.8/1.2-P10 Floor Tile Adhesive | 88 | Y | SC-099-2 | 19,700 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.17 | |
| SC-099 | Yes | 2022-23 | Santa Clara | San Jose | Adhesive Mastic | 145SMO-1-K.5/3.1-P18 Black Tar/Mastic On Concrete | 459 | Y | SC-099-1 | 13,250 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.61 | |
| SC-099 | Yes | 2022-23 | Santa Clara | San Jose | Adhesive Mastic | 145SMO-1-J.0/3.5-P19 Black Tar/Mastic On Concrete | 85 | Y | SC-099-1 | 13,250 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.11 | |
| SC-099 | Yes | 2022-23 | Santa Clara | San Jose | Adhesive Mastic | 145SMO-1-K.0/1.3-P24 Black Tar/Mastic On Concrete | 1,950 | Y | SC-099-1 | 13,250 | ft2 | Mastics - carpet/floor ties | 0.1 | 2.6 | |
| SC-099 | Yes | 2022-23 | Santa Clara | San Jose | Caulk | 145SMO-1EXT-A.0/2.5-P26 Grey Caulking Between Concrete Seams | 29,100 | Y | SC-099-3 | 500 | linear-ft | Caulk - expansion joints | 0.04 | 0.58 | |
| SC-099 | Yes | 2022-23 | Santa Clara | San Jose | Caulk | 145SMO-1EXT-C.0/4.0-P28 Grey Caulk Between Concrete Sections | 5,740 | Y | SC-099-3 | 500 | linear-ft | Caulk - expansion joints | 0.04 | 0.11 | |
| SC-099 | Yes | 2022-23 | Santa Clara | San Jose | Caulk | 145SMO-1EXT-M.0/3.8-P31 Grey Caulk Between Concrete Sections | 43,000 | Y | SC-099-3 | 500 | linear-ft | Caulk - expansion joints | 0.04 | 0.86 | |
| SC-103 | Yes | 2022-23 | Santa Clara | Sunnyvale | Caulk | Black Sealant on West Exterior Window Frames Between window panes and wood window frame) | 41,000 | Y | SC-103-1 | 350 | linear-ft | Caulk - window/door frames | 0.02 | 0.29 | |
| SC-103 | Yes | 2022-23 | Santa Clara | Sunnyvale | Fiberglass Insulation | Pink batt insulation on ducting above ceiling areas of SOC Bldg 400 | 53 | Y | SC-103-2 | 3,250 | ft2 | Insulation - walls/crawl space rigid fiberglass | 0.17 | 0.029 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Caulk | P 01 Miscell. (Caulk) Expansion Joint (pebbled facade), Gray | 150,000 | Y | SC-109-1 | 168 | linear-ft | Caulk - expansion joints | 0.04 | 1.0 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Caulk | P 02 Miscell. (Caulk) Expansion Joint (pebbled facade), Gray | 240,000 | Y | SC-109-1 | 168 | linear-ft | Caulk - expansion joints | 0.04 | 1.6 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Caulk | P 03 Miscell. (Caulk) Expansion Joint (pebbled facade), Gray | 500,000 | Y | SC-109-1 | 168 | linear-ft | Caulk - expansion joints | 0.04 | 3.4 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Caulk | P 04 Miscell. (Caulk) Expansion Joint (pebbled facade), Gray | 450,000 | Y | SC-109-1 | 168 | linear-ft | Caulk - expansion joints | 0.04 | 3.0 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Caulk | P 05 Miscell. (Caulk) Expansion Joint (pebbled facade), Gray | 510,000 | Y | SC-109-1 | 168 | linear-ft | Caulk - expansion joints | 0.04 | 3.4 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Rubber Window Gasket | P 06 Miscell. (Gasket) Rubber Gasket Grey / Exterior / Interior Windows | 1,700 | Y | SC-109-2 | 980 | linear-ft | Rubber Window Gaskets | 0.03 | 0.050 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Rubber Window Gasket | P 07 Miscell. (Gasket) Rubber Gasket Grey / Exterior / Interior Windows | 270 | Y | SC-109-2 | 980 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0079 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Rubber Window Gasket | P 08 Miscell. (Gasket) Rubber Gasket Grey / Exterior / Interior Windows | 300 | Y | SC-109-2 | 980 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0088 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Rubber Window Gasket | P 09 Miscell. (Gasket) Rubber Gasket Grey / Exterior / Interior Windows | 490 | Y | SC-109-2 | 980 | linear-ft | Rubber Window Gaskets | 0.03 | 0.014 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Rubber Window Gasket | P 10 Miscell. (Gasket) Rubber Gasket Grey / Exterior / Interior Windows | 290 | Y | SC-109-2 | 980 | linear-ft | Rubber Window Gaskets | 0.03 | 0.009 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Rubber Window Gasket | P 11 Miscell. (Gasket) Rubber Gasket Black / Exterior / Interior Windows | 210 | Y | SC-109-3 | 480 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0030 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Rubber Window Gasket | P 12 Miscell. (Gasket) Rubber Gasket Black / Exterior / Interior Windows | 270 | Y | SC-109-3 | 480 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0039 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Rubber Window Gasket | P 13 Miscell. (Gasket) Rubber Gasket Black / Exterior / Interior Windows | 180 | Y | SC-109-3 | 480 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0026 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Rubber Window Gasket | P 14 Miscell. (Gasket) Rubber Gasket Black / Exterior / Interior Windows | 320 | Y | SC-109-3 | 480 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0046 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Rubber Window Gasket | P 15 Miscell. (Gasket) Rubber Gasket Black / Exterior / Interior Windows | 350 | Y | SC-109-3 | 480 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0050 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Adhesive Mastic | P 16 Miscell. (Mastic) Carpet Mastic / Yellow & Black | 290 | Y | SC-109-4 | 65 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0019 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Adhesive Mastic | P 17 Miscell. (Mastic) Carpet Mastic / Yellow & Black | 200 | Y | SC-109-4 | 65 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0013 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Adhesive Mastic | P 18 Miscell. (Mastic) Carpet Mastic / Yellow & Black | 180 | Y | SC-109-4 | 65 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0012 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Adhesive Mastic | P 19 Miscell. (Mastic) Carpet Mastic / Yellow & Black | 230 | Y | SC-109-4 | 65 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0015 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Adhesive Mastic | P 20 Miscell. (Mastic) Carpet Mastic / Yellow & Black | 240 | Y | SC-109-5 | 385 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0092 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Adhesive Mastic | P 21 Miscell. (Mastic) Carpet Mastic / Yellow & Black | 41 | N | SC-109-5 | 385 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0016 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Adhesive Mastic | P 22 Miscell. (Mastic) Carpet Mastic / Yellow & Black | 46 | N | SC-109-5 | 385 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0018 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Adhesive Mastic | P 23 Miscell. (Mastic) Carpet Mastic / Yellow & Black | 8.0 | N | SC-109-5 | 385 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.00031 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Caulk | P 36 Miscell. (Caulking) Caulking Black / Windows Exterior | 0.42 | N | SC-109-6 | 82 | linear-ft | Caulk - window/door frames | 0.02 | 0.00000069 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Caulk | P 37 Miscell. (Caulking) Caulking Black / Windows Exterior | 148 | Y | SC-109-6 | 82 | linear-ft | Caulk - window/door frames | 0.02 | 0.00024 | |
| SC-109 | Yes | 2022-23 | Santa Clara | Mountain View | Caulk | P 38 Miscell. (Caulking) Caulking Black / Windows Exterior | 170 | N | SC-109-6 | 82 | linear-ft | Caulk - window/door frames | 0.02 | 0.00028 | |
| SC-126 | Yes | 2023-24 | Santa Clara | San Jose | Thermal Insulation | P043 Duct Insulation Yellow - Large Rectangular | 300 | Y | SC-126-1 | 200 | ft2 | Insulation - HVAC/blanket fiberglass | 0.16 | 0.010 | |
| SC-126 | Yes | 2023-24 | Santa Clara | San Jose | Thermal Insulation | P067 Duct Insulation Yellow Square | 67 | Y | SC-126-2 | 120 | ft2 | Insulation - HVAC/blanket fiberglass | 0.16 | 0.0013 | |
| SC-126 | Yes | 2023-24 | Santa Clara | San Jose | Thermal Insulation | P069 Duct Insulation Yellow - Large | 66 | Y | SC-126-3 | 160 | ft2 | Insulation - HVAC/blanket fiberglass | 0.16 | 0.0017 | |
| SC-136 | Yes | 2023-24 | Santa Clara | Sunnyvale | Caulk | PCB-4A Exterior Light Gray Expansion Joint Exterior Wall Joints | 860 | Y | SC-136-1 | 25 | linear-ft | Caulk - expansion joints | 0.04 | 0.00086 | Y |
| SC-136 | Yes | 2023-24 | Santa Clara | Sunnyvale | Caulk | PCB-4B Exterior Light Gray Expansion Joint Exterior Wall Joints | 540 | Y | SC-136-2 | 25 | linear-ft | Caulk - expansion joints | 0.04 | 0.00054 | Y |
| SC-141 | Yes | 2023-24 | Santa Clara | Santa Clara | Caulk | P018 Caulk/Sealant Expansion Joint, Building-Sidewalk | 66 | Y | SC-141-1 | 50 | linear-ft | Caulk - expansion joints | 0.04 | 0.00013 | |
| SC-141 | Yes | 2023-24 | Santa Clara | Santa Clara | Rubber Window Gasket | P008 Gasket Exterior Windows | 100 | Y | SC-141-2 | 495 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0015 | |
| SC-141 | Yes | 2023-24 | Santa Clara | Santa Clara | Rubber Window Gasket | P013 Gasket Exterior Windows | 57 | Y | SC-141-2 | 495 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00085 | |
| SC-141 | Yes | 2023-24 | Santa Clara | Santa Clara | Rubber Window Gasket | P014 Gasket Exterior Windows | 288 | Y | SC-141-2 | 495 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0043 | |
| SC-141 | Yes | 2023-24 | Santa Clara | Santa Clara | Rubber Window Gasket | P027 Gasket Interior Doors | 79 | Y | SC-141-3 | 140 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00033 | |
| SC-141 | Yes | 2023-24 | Santa Clara | Santa Clara | Rubber Window Gasket | P028 Gasket Interior Doors | 79 | Y | SC-141-3 | 140 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00033 | |
| SC-141 | Yes | 2023-24 | Santa Clara | Santa Clara | Rubber Window Gasket | P029 Gasket Interior Doors | 78 | Y | SC-141-3 | 140 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00033 | |
| SC-141 | Yes | 2023-24 | Santa Clara | Santa Clara | Rubber Window Gasket | P030 Gasket Interior Doors | 40 | N | SC-141-3 | 140 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00017 | |
| SC-141 | Yes | 2023-24 | Santa Clara | Santa Clara | Rubber Window Gasket | P031 Gasket Interior Doors | 22 | N | SC-141-3 | 140 | linear-ft | Rubber Window Gaskets | 0.03 | 0.000092 | |
| SC-155 | Yes | 2024-25 | Santa Clara | Santa Clara County | Caulk | CK-4-1,2,3,4,5 Grey Caulking Interior: Concrete Walls, Columns (500 LF) | 1,900 | Y | SC-155-1 | 500 | linear-ft | Caulk - expansion joints | 0.04 | 0.038 | |
| SC-155 | Yes | 2024-25 | Santa Clara | Santa Clara County | Caulk | GK-8-1,2,3 Grey Exterior Expansion Joint Exterior: Partial Walls at Entrances (100 LF) | 3,300 | Y | SC-155-2 | 100 | linear-ft | Caulk - expansion joints | 0.04 | 0.013 | |
| SC-156 | Yes | 2024-25 | Santa Clara | Sunnyvale | Adhesive Mastic | PCB-5A Black Floor Mastic | 210 | Y | SC-156-1 | 500 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.011 | Y |
| SC-156 | Yes | 2024-25 | Santa Clara | Sunnyvale | Adhesive Mastic | PCB-6A Black Floor Mastic | 860 | Y | SC-156-2 | 500 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.043 | Y |
| SMC-2 | Yes | 2019-20 | San Mateo | Menlo Park | Caulk | Caulking - 13 | 55 | Y | SMC-2-1 | 200 | linear-ft | Caulk - unspecified | 0.03 | 0.00033 | |
| SMC-6 | Yes | 2019-20 | San Mateo | South San Francisco | Rubber Window Gasket | Black Window/Door Frame Sealant - 1 | 247 | Y | SMC-6-1 | 1,100 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0082 | |
| SMC-17 | Yes | 2020-21 | San Mateo | San Carlos | Caulk | Wall Joint Sealant Samples (12) | 52 | Y | SMC-17-1 | 140 | linear-ft | Caulk - expansion joints | 0.04 | 0.00029 | |
| SMC-17 | Yes | 2020-21 | San Mateo | San Carlos | Caulk | Wall Joint Sealant Samples (12) | 250,000 | Y | SMC-17-1 | 140 | linear-ft | Caulk - expansion joints | 0.04 | 1.4 | |
| SMC-28 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 4- Beige Caulk | 97 | Y | SMC-28-1 | 360 | linear-ft | Caulk - expansion joints | 0.04 | 0.0014 | |
| SMC-28 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 3 - Beige Expansion Joints (PCB-11,12,13,14,15) | 102 | Y | SMC-28-2 | 360 | linear-ft | Caulk - expansion joints | 0.04 | 0.0015 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 10 - Grey HVAC Caulk (10-001,002,003) | 0.17 | N | SMC-29-1 | 175 | linear-ft | Caulk - expansion joints | 0.04 | 0.0000012 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 10 - Grey HVAC Caulk (10-001,002,003) | 360 | Y | SMC-29-1 | 175 | linear-ft | Caulk - expansion joints | 0.04 | 0.0025 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 14 - Black Caulk (14-001,002,003) | 50 | Y | SMC-29-2 | 100 | linear-ft | Caulk - expansion joints | 0.04 | 0.00020 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 14 - Black Caulk (14-001,002,003) | 290 | Y | SMC-29-2 | 100 | linear-ft | Caulk - expansion joints | 0.04 | 0.0012 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 15 - Black Caulk (15-001,002,003) | 2,700 | Y | SMC-29-3 | 16,750 | linear-ft | Caulk - expansion joints | 0.04 | 1.8 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 15 - Black Caulk (15-001,002,003) | 180,000 | Y | SMC-29-3 | 16,750 | linear-ft | Caulk - expansion joints | 0.04 | 121 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 16 - Grey Caulk (16-001,002,003) | 170,000 | Y | SMC-29-4 | 1,275 | linear-ft | Caulk - expansion joints | 0.04 | 8.7 | |

**Appendix E - Regional Effectiveness Evaluation of the Protocol for Managing PCBs-containing Materials During Building Demolition Compiled Data for Priority Building Materials containing ≥ 50 ppm PCBs.**

| Building ID | Building Contains Concentrations ≥ 50 ppm PCBs? | FY | County | Permittee | Priority Building Material Application | Application Sample Description | Total PCBs Concentration (ppm) | Concentration ≥ 50 ppm (Y/N) | Unique Material ID | Estimated Amount of Material | Material Units (linear-ft or ft$^2$) | Material Type used for conversion factor | Best (Average or mid-rage value) (kg/linear-feet) or (kg/ft2) | Best (Average or mid-rage value) PCBs Mass (kg) | Assumed Quantity? (Y/N) - GC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 16 - Grey Caulk (16-001,002,003) | 330,000 | Y | SMC-29-4 | 1,275 | linear-ft | Caulk - expansion joints | 0.04 | 17 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 17 - Light Grey Caulk (17-001,002,003) | 18,000 | Y | SMC-29-5 | 3,250 | linear-ft | Caulk - expansion joints | 0.04 | 2.3 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 17 - Light Grey Caulk (17-001,002,003) | 110,000 | Y | SMC-29-5 | 3,250 | linear-ft | Caulk - expansion joints | 0.04 | 14 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 18 - Grey Caulk (18-001,002,003) | 7,560 | Y | SMC-29-6 | 500 | linear-ft | Caulk - expansion joints | 0.04 | 0.15 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 18 - Grey Caulk (18-001,002,003) | 174,000 | Y | SMC-29-6 | 500 | linear-ft | Caulk - expansion joints | 0.04 | 3.5 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 19 - Black Caulk (19-001,002,003) | 21 | N | SMC-29-7 | 1,275 | linear-ft | Caulk - expansion joints | 0.04 | 0.0011 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Caulk | Type 19 - Black Caulk (19-001,002,003) | 120 | Y | SMC-29-7 | 1,275 | linear-ft | Caulk - expansion joints | 0.04 | 0.0061 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Fiberglass Insulation | Type 23 - Yellow Fiberglass Insulation (23-001,002,003) | 520 | Y | SMC-29-8 | 4,500 | ft2 | Insulation - walls/crawl space rigid fiberglass | 0.17 | 0.40 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Fiberglass Insulation | Type 23 - Yellow Fiberglass Insulation (23-001,002,003) | 1,000 | Y | SMC-29-8 | 4,500 | ft2 | Insulation - walls/crawl space rigid fiberglass | 0.17 | 0.77 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Fiberglass Insulation | Type 28 - Yellow Fiberglass Insulation (28-001,002,003) | 890 | Y | SMC-29-9 | 2,250 | ft2 | Insulation - walls/crawl space rigid fiberglass | 0.17 | 0.34 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Rubber Window Gasket | Type 20 - Black Gasket (20-001,002,003) | 18 | N | SMC-29-10 | 1,275 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00069 | |
| SMC-29 | Yes | 2020-21 | San Mateo | Redwood City | Rubber Window Gasket | Type 20 - Black Gasket (20-001,002,003) | 640 | Y | SMC-29-10 | 1,275 | linear-ft | Rubber Window Gaskets | 0.03 | 0.024 | |
| SM-42 | Yes | 2021-22 | San Mateo | Menlo Park | Caulk | Expansion Caulk (211228.50-PCB12 | 340 | Y | SM-42-1 | 50 | linear-ft | Caulk - expansion joints | 0.04 | 0.00068 | |
| SM-42 | Yes | 2021-22 | San Mateo | Menlo Park | Caulk | Expansion Caulk (211228.50-PCB13 | 790 | Y | SM-42-1 | 50 | linear-ft | Caulk - expansion joints | 0.04 | 0.0016 | |
| SM-55 | Yes | 2021-22 | San Mateo | Redwood City | Fiberglass Insulation | 406-13P Yellow Batt Insulation(Older) | 1,200 | Y | SM-55-1 | 1,500 | ft2 | Insulation - walls/crawl space rigid fiberglass | 0.17 | 0.31 | |
| SM-55 | Yes | 2021-22 | San Mateo | Redwood City | Adhesive Mastic | 0427-01P Black Vinyl Floor Tile (VFT)Mastic(Under Faux Wood Flooring) | 5,000 | Y | SM-55-2 | 1,166 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.58 | |
| SM-55 | Yes | 2021-22 | San Mateo | Redwood City | Adhesive Mastic | 0427-02P Black VFT Mastic(Under Faux Wood Flooring) | 5,000 | Y | SM-55-2 | 1,166 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.58 | |
| SM-55 | Yes | 2021-22 | San Mateo | Redwood City | Adhesive Mastic | 0427-03P Black VFT Mastic(Under Faux Wood Flooring) | 580 | Y | SM-55-2 | 1,166 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.068 | |
| SM-56 | Yes | 2021-22 | San Mateo | South San Francisco | Fiberglass Insulation | 0427-101P Pink Batt Insulation (Older) | 25,000 | Y | SM-56-1 | 1,000 | ft2 | Insulation - walls/crawl space rigid fiberglass | 0.17 | 4.3 | |
| SM-56 | Yes | 2021-22 | San Mateo | South San Francisco | Fiberglass Insulation | 0427-102P Yellow Batt Insulation(Older) | 1,200 | Y | SM-56-2 | 1,000 | ft2 | Insulation - walls/crawl space rigid fiberglass | 0.17 | 0.20 | |
| SM-57 | Yes | 2021-22 | San Mateo | Burlingame | Adhesive Mastic | 1379-10-8-22 | 56 | Y | SM-57-1 | 50 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.00028 | |
| SM-57 | Yes | 2021-22 | San Mateo | Burlingame | Adhesive Mastic | 1379-10-8-24 | 290 | Y | SM-57-1 | 50 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0015 | |
| SM-57 | Yes | 2021-22 | San Mateo | Burlingame | Caulk | 1379-10-8-28 | 43,000 | Y | SM-57-2 | 375 | linear-ft | Caulk - expansion joints | 0.04 | 0.65 | Y |
| SM-57 | Yes | 2021-22 | San Mateo | Burlingame | Caulk | 1379-10-8-29 | 56,000 | Y | SM-57-2 | 375 | linear-ft | Caulk - expansion joints | 0.04 | 0.84 | Y |
| SM-57 | Yes | 2021-22 | San Mateo | Burlingame | Caulk | 1379-10-8-30 | 64,000 | Y | SM-57-2 | 375 | linear-ft | Caulk - expansion joints | 0.04 | 0.96 | Y |
| SM-57 | Yes | 2021-22 | San Mateo | Burlingame | Caulk | 1379-10-8-31 | 15,000 | Y | SM-57-2 | 375 | linear-ft | Caulk - expansion joints | 0.04 | 0.23 | Y |
| SM-57 | Yes | 2021-22 | San Mateo | Burlingame | Caulk | 1379-10-8-32 | 15,000 | Y | SM-57-3 | 700 | linear-ft | Caulk - expansion joints | 0.04 | 0.42 | Y |
| SM-61 | Yes | 2022-23 | San Mateo | South San Francisco | Rubber Window Gasket | PCB-03C Exterior-Front Office-North East | 57 | Y | SM-61-1 | 288 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00049 | |
| SM-61 | Yes | 2022-23 | San Mateo | South San Francisco | Rubber Window Gasket | PCB-03D Exterior-Front Office-North | 68 | Y | SM-61-1 | 288 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00059 | |
| SM-61 | Yes | 2022-23 | San Mateo | South San Francisco | Caulk | PCB-04C Exterior-Front Office-North East Window Caulking | 24,000 | Y | SM-61-2 | 128 | linear-ft | Caulk - window/door frames | 0.02 | 0.061 | |
| SM-61 | Yes | 2022-23 | San Mateo | South San Francisco | Caulk | PCB-04D Exterior-Front Office-North Window Caulking | 84,000 | Y | SM-61-2 | 128 | linear-ft | Caulk - window/door frames | 0.02 | 0.22 | |
| SM-61 | Yes | 2022-23 | San Mateo | South San Francisco | Caulk | PCB-04E Exterior-Front Office-West Window Caulking | 130,000 | Y | SM-61-2 | 128 | linear-ft | Caulk - window/door frames | 0.02 | 0.33 | |
| SM-70 | Yes | 2024-25 | San Mateo | Menlo Park | Caulk | Exterior Concrete Wall Expansion Joint Compound - NW Corner (PCB105A) | 45,000 | Y | SM-70-1 | 67 | linear-ft | Caulk - expansion joints | 0.04 | 0.12 | |
| SM-70 | Yes | 2024-25 | San Mateo | Menlo Park | Caulk | Exterior Concrete Wall Expansion Joint Compound - West Wall (PCB105B) | 62,000 | Y | SM-70-1 | 67 | linear-ft | Caulk - expansion joints | 0.04 | 0.17 | |
| SM-70 | Yes | 2024-25 | San Mateo | Menlo Park | Caulk | Exterior Concrete Wall Expansion Joint Compound - SW Corner (PCB105C) | 35,000 | Y | SM-70-1 | 67 | linear-ft | Caulk - expansion joints | 0.04 | 0.09 | |
| SM-70 | Yes | 2024-25 | San Mateo | Menlo Park | Caulk | Exterior Concrete Wall Expansion Joint Compound - East Wall (PCB105E) | 96,000 | Y | SM-70-1 | 67 | linear-ft | Caulk - expansion joints | 0.04 | 0.26 | |
| SM-71 | Yes | 2024-25 | San Mateo | Menlo Park | Fiberglass Insulation | Yellow Fiberglass Duct Insulation (PCB108A) | 1,700 | Y | SM-71-1 | 2,400 | ft2 | Insulation - HVAC/blanket fiberglass | 0.16 | 0.65 | |
| SM-71 | Yes | 2024-25 | San Mateo | Menlo Park | Adhesive Mastic | Black Tile Mastic (PCB100A) | 50 | Y | SM-71-2 | 3,400 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.017 | |
| SM-71 | Yes | 2024-25 | San Mateo | Menlo Park | Adhesive Mastic | Yellow Tile Mastic (PCB101A) | 2,800 | Y | SM-71-3 | 332 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.093 | |
| SM-71 | Yes | 2024-25 | San Mateo | Menlo Park | Adhesive Mastic | Yellow Tile Mastic (PCB101B) | 400 | Y | SM-71-3 | 332 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.013 | |
| SM-71 | Yes | 2024-25 | San Mateo | Menlo Park | Adhesive Mastic | Yellow Tile Mastic (PCB101C) | 510 | Y | SM-71-3 | 332 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.017 | |
| SM-71 | Yes | 2024-25 | San Mateo | Menlo Park | Adhesive Mastic | Yellow Tile Mastic (PCB101D) | 2,500 | Y | SM-71-3 | 332 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.083 | |
| SM-71 | Yes | 2024-25 | San Mateo | Menlo Park | Adhesive Mastic | Yellow Tile Mastic (PCB101E) | 3,300 | Y | SM-71-3 | 332 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.11 | |
| SM-71 | Yes | 2024-25 | San Mateo | Menlo Park | Adhesive Mastic | Yellow/Black Tile and Carpet Mastic (PCB102E) | 150 | Y | SM-71-4 | 4,050 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.06 | |
| Oak-11 | Yes | 2023-24 | Alameda | Oakland | Caulk | Caulk Sample 1 | 320 | Y | Oak-11_Caulk - unspecified | 48 | linear-ft | Caulk - unspecified | 0.03 | 0.00046 | |
| Oak-11 | Yes | 2023-24 | Alameda | Oakland | Fiberglass Insulation | Fiberglass Insulation Sample 1 | 78 | Y | Oak-11_Insulation - Fiberglass unspecified | 86 | ft2 | Insulation - Fiberglass unspecified | 0.32 | 0.0021 | |
| Oak-11 | Yes | 2023-24 | Alameda | Oakland | Adhesive Mastic | Adhesive Mastic Sample 1 | 87 | Y | Oak-11_Mastics - unspecified | 800 | ft2 | Mastics - unspecified | 0.3 | 0.021 | |
| Oak-11 | Yes | 2023-24 | Alameda | Oakland | Rubber Window Gasket | Window Gasket Sample 1 | 70 | Y | Oak-11_Rubber Window Gaskets | 75 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00016 | |
| B2022-00683 | Yes | 2022-23 | Alameda | Berkeley | Adhesive Mastic | VFT Mastic | 550 | Y | B2022-00683_Mastics - roofing/flashing | 167 | ft2 | Mastics - roofing/flashing | 0.5 | 0.046 | |
| B2022-00683 | Yes | 2022-23 | Alameda | Berkeley | Adhesive Mastic | VFT Mastic | 450 | Y | B2022-00683_Mastics - roofing/flashing | 167 | ft2 | Mastics - roofing/flashing | 0.5 | 0.038 | |
| B2022-00683 | Yes | 2022-23 | Alameda | Berkeley | Adhesive Mastic | VFT Mastic | 250 | Y | B2022-00683_Mastics - roofing/flashing | 167 | ft2 | Mastics - roofing/flashing | 0.5 | 0.021 | |
| 2022-23_EM-01 | Yes | 2022-23 | Alameda | Emeryville | Caulk | Caulking | 7,000 | Y | 2022-23_EM-01_Caulk - unspecified | 2,000 | linear-ft | Caulk - unspecified | 0.03 | 0.42 | |
| 2022-23_EM-01 | Yes | 2022-23 | Alameda | Emeryville | Rubber Window Gasket | Window Gasket | 3,500 | Y | 2022-23_EM-01_Rubber Window Gaskets | 10,000 | linear-ft | Rubber Window Gaskets | 0.03 | 1.1 | |
| OAK-07 | Yes | 2022-23 | Alameda | Oakland | Caulk | Batch House, south wall on east side (window caulking) | 53 | Y | OAK-07_Caulk - window/door frames | 25 | linear-ft | Caulk - window/door frames | 0.02 | 0.000027 | Y |
| OAK-06 | Yes | 2022-23 | Alameda | Oakland | Adhesive Mastic | Plant building, roof, exterior corrogated siding (galbestos tar) | 36,000 | Y | OAK-06_Mastics - roofing/flashing | 167 | ft2 | Mastics - roofing/flashing | 0.5 | 3.0 | Y |
| OAK-06 | Yes | 2022-23 | Alameda | Oakland | Adhesive Mastic | Plant building, roof, lower edge of exterior siding (tar mastic) | 5,500 | Y | OAK-06_Mastics - roofing/flashing | 167 | ft2 | Mastics - roofing/flashing | 0.5 | 0.46 | Y |
| OAK-06 | Yes | 2022-23 | Alameda | Oakland | Adhesive Mastic | Plant building, south side, skylight corrogated siding (galbestos tar ) | 25,000 | Y | OAK-06_Mastics - roofing/flashing | 167 | ft2 | Mastics - roofing/flashing | 0.5 | 2.1 | Y |
| BER-3 | Yes | 2021-22 | Alameda | Berkeley | Caulk | Black Rubber Window Seal | 240 | Y | BER-3_Caulk - window/door frames | 125 | linear-ft | Caulk - window/door frames | 0.02 | 0.00060 | Y |
| BER-3 | Yes | 2021-22 | Alameda | Berkeley | Caulk | Black Sealant (Window Frame to Window) | 10 | N | BER-3_Caulk - window/door frames | 125 | linear-ft | Caulk - window/door frames | 0.02 | 0.000024 | Y |
| BER-3 | Yes | 2021-22 | Alameda | Berkeley | Caulk | Black Soft Window Seal | 19 | N | BER-3_Caulk - window/door frames | 125 | linear-ft | Caulk - window/door frames | 0.02 | 0.000048 | Y |
| BER-3 | Yes | 2021-22 | Alameda | Berkeley | Caulk | Black Soft Window Seal | 210 | Y | BER-3_Caulk - window/door frames | 125 | linear-ft | Caulk - window/door frames | 0.02 | 0.00053 | Y |
| BER-3 | Yes | 2021-22 | Alameda | Berkeley | Caulk | Black Window Sealant/Window Frame to Window) | 84 | Y | BER-3_Caulk - window/door frames | 125 | linear-ft | Caulk - window/door frames | 0.02 | 0.00021 | Y |
| BER-3 | Yes | 2021-22 | Alameda | Berkeley | Caulk | Black/Gray Window Frame Sealant (Window Frame to Concrete) | 80,000 | Y | BER-3_Caulk - window/door frames | 380 | linear-ft | Caulk - window/door frames | 0.02 | 0.61 | |
| BER-3 | Yes | 2021-22 | Alameda | Berkeley | Caulk | Brick Material Immediately Adjacent to Exterior Gray Seam Sealant (and 2 inches in) | 3,400 | Y | BER-3_Caulk - expansion joints | 120 | linear-ft | Caulk - expansion joints | 0.04 | 0.016 | |
| BER-3 | Yes | 2021-22 | Alameda | Berkeley | Caulk | Exterior Gray Seam Sealant (adjacent to outer boundary of exterior brick walkway) | 170,000 | Y | BER-3_Caulk - expansion joints | 120 | linear-ft | Caulk - expansion joints | 0.04 | 0.82 | |
| BER-3 | Yes | 2021-22 | Alameda | Berkeley | Caulk | Gray Window Frame Sealanton Concrete | 1,700 | Y | BER-3_Caulk - window/door frames | 380 | linear-ft | Caulk - window/door frames | 0.02 | 0.013 | |
| BER-3 | Yes | 2021-22 | Alameda | Berkeley | Rubber Window Gasket | Black Window Seal/Soft Window Sealant (Window Frame to Window) | 61 | Y | BER-3_Rubber Window Gaskets | 480 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00088 | |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Adhesive Mastic | Black adhered to tile floor | 0.45 | N | Hay-01 Bldg 1_Mastics - carpet/floor ties | 714 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.000032 | Y |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Adhesive Mastic | Black adhered to tile floor | 0.42 | N | Hay-01 Bldg 1_Mastics - carpet/floor ties | 714 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.000030 | Y |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Adhesive Mastic | Black adhered to tile floor | 13 | N | Hay-01 Bldg 1_Mastics - carpet/floor ties | 714 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.00095 | Y |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Adhesive Mastic | Black adhered to tile floor | 14 | N | Hay-01 Bldg 1_Mastics - carpet/floor ties | 714 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0010 | Y |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Adhesive Mastic | Black adhered to tile floor | 52 | Y | Hay-01 Bldg 1_Mastics - carpet/floor ties | 714 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0037 | Y |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Adhesive Mastic | Black adhered to tile floor | 8.0 | N | Hay-01 Bldg 1_Mastics - carpet/floor ties | 714 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.00057 | Y |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Adhesive Mastic | Black adhered to tile floor | 13 | N | Hay-01 Bldg 1_Mastics - carpet/floor ties | 714 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.00089 | Y |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Adhesive Mastic | Black adhered to tile floor | 10 | N | Hay-01 Bldg 1_Mastics - carpet/floor ties | 714 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.00074 | Y |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Caulk | Gray | 0.42 | N | Hay-01 Bldg 1_Caulk - unspecified | 125 | linear-ft | Caulk - unspecified | 0.03 | 0.0000016 | Y |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Caulk | Gray | 0.70 | N | Hay-01 Bldg 1_Caulk - unspecified | 125 | linear-ft | Caulk - unspecified | 0.03 | 0.0000026 | Y |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Caulk | Gray | 2.3 | N | Hay-01 Bldg 1_Caulk - unspecified | 125 | linear-ft | Caulk - unspecified | 0.03 | 0.0000086 | Y |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Caulk | Gray | 2.2 | N | Hay-01 Bldg 1_Caulk - unspecified | 125 | linear-ft | Caulk - unspecified | 0.03 | 0.0000083 | Y |
| Hay-01 Bldg 1 | Yes | 2021-22 | Alameda | Hayward | Caulk | Gray | 330 | Y | Hay-01 Bldg 1_Caulk - unspecified | 125 | linear-ft | Caulk - unspecified | 0.03 | 0.0012 | Y |
| Hay-1 | Yes | 2021-22 | Alameda | Hayward | Rubber Window Gasket | window gasket | 1,300 | Y | Hay-1_Rubber Window Gaskets | 25 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0010 | |
| Hay-2 | Yes | 2021-22 | Alameda | Hayward | Adhesive Mastic | PCB-C1 | 76 | Y | Hay-2_Mastics - unspecified | 100 | ft2 | Mastics - unspecified | 0.3 | 0.0023 | |
| Hay-2 | Yes | 2021-22 | Alameda | Hayward | Adhesive Mastic | PCB-C2 | 88 | Y | Hay-2_Mastics - unspecified | 100 | ft2 | Mastics - unspecified | 0.3 | 0.0026 | |
| Hay-2 | Yes | 2021-22 | Alameda | Hayward | Adhesive Mastic | PCB-C3 | 140 | Y | Hay-2_Mastics - unspecified | 100 | ft2 | Mastics - unspecified | 0.3 | 0.0042 | |
| B2105059 | Yes | 2021-22 | Alameda | Oakland | Caulk | Beige caulking 1 | 56 | Y | B2105059_Caulk - unspecified | 25 | linear-ft | Caulk - unspecified | 0.03 | 0.000042 | Y |
| 2021-22_AC-1 | Yes | 2021-22 | Alameda | San Leandro | Caulk | Window Sealant(gladd frame interface) East windows | 50 | Y | 2021-22_AC-1_Caulk - window/door frames | 50 | linear-ft | Caulk - window/door frames | 0.02 | 0.000050 | Y |
| 2021-22_AC-1 | Yes | 2021-22 | Alameda | San Leandro | Caulk | Window Sealant(gladd frame interface) Southwest windows | 57 | Y | 2021-22_AC-1_Caulk - window/door frames | 50 | ft2 | Caulk - window/door frames | 0.02 | 0.000057 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Adhesive Mastic | Carpet Adhesive + Tice Mastic | 53 | Y | DUB-1_Mastics - carpet/floor ties | 900 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0048 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Adhesive Mastic | Carpet Adhesive + Tice Mastic | 25 | N | DUB-1_Mastics - carpet/floor ties | 900 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0023 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Adhesive Mastic | Carpet Adhesive + Tice Mastic | 25 | N | DUB-1_Mastics - carpet/floor ties | 900 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0023 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Adhesive Mastic | Carpet Adhesive + Tice Mastic | 25 | N | DUB-1_Mastics - carpet/floor ties | 900 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0023 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Adhesive Mastic | carpet adhesive Lobby | 440 | Y | DUB-1_Mastics - carpet/floor ties | 3,600 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.16 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Adhesive Mastic | Subfloor VFT Mastic | 25 | N | DUB-1_Mastics - carpet/floor ties | 900 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0023 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Adhesive Mastic | VFT Black Mastic | 25 | N | DUB-1_Mastics - carpet/floor ties | 900 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0023 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Adhesive Mastic | VFT Black Mastic | 25 | N | DUB-1_Mastics - carpet/floor ties | 900 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0023 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Adhesive Mastic | VFT Mastic West Exit Lobby | 740 | Y | DUB-1_Mastics - roofing/flashing | 900 | ft2 | Mastics - roofing/flashing | 0.5 | 0.33 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Caulk | Concrete Floor Caulking 1 | 42 | N | DUB-1_Caulk - expansion joints | 1,100 | linear-ft | Caulk - expansion joints | 0.04 | 0.0018 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Caulk | Concrete Floor Caulking 2 | 52 | Y | DUB-1_Caulk - expansion joints | 1,100 | linear-ft | Caulk - expansion joints | 0.04 | 0.0023 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Caulk | Concrete Floor Caulking 3 | 44 | N | DUB-1_Caulk - expansion joints | 1,100 | linear-ft | Caulk - expansion joints | 0.04 | 0.0019 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Caulk | Concrete floor caulking 4 | 51 | Y | DUB-1_Caulk - expansion joints | 1,100 | linear-ft | Caulk - expansion joints | 0.04 | 0.0022 | Y |
| DUB-1 | Yes | 2020-21 | Alameda | Dublin | Caulk | Concrete floor caulking 5 | 180 | Y | DUB-1_Caulk - expansion joints | 1,100 | linear-ft | Caulk - expansion joints | 0.04 | 0.0079 | Y |
| 2020-21_FRE-1 | Yes | 2020-21 | Alameda | Fremont | Thermal Insulation | Thermals System Insulation | 1,800 | Y | 2020-21_FRE-1_Insulation - Fiberglass unspecified | 100 | ft2 | Insulation - Fiberglass unspecified | 0.32 | 0.058 | |
| FRE-3 | Yes | 2020-21 | Alameda | Fremont | Caulk | window caulk/glaze (OF) | 670 | Y | FRE-3_Caulk - window/door frames | 50 | linear-ft | Caulk - window/door frames | 0.02 | 0.00067 | Y |
| FRE-3 | Yes | 2020-21 | Alameda | Fremont | Caulk | window caulk/glaze (OF) | 25 | N | FRE-3_Caulk - window/door frames | 50 | linear-ft | Caulk - window/door frames | 0.02 | 0.000025 | Y |
| FRE-3 | Yes | 2020-21 | Alameda | Fremont | Caulk | window caulk/glaze (OF) | 76 | Y | FRE-3_Caulk - window/door frames | 50 | linear-ft | Caulk - window/door frames | 0.02 | 0.000076 | Y |
| 2020-21_FRE-5 | Yes | 2020-21 | Alameda | Fremont | Adhesive Mastic | downstairs; wall (concrete) & ceiling | 110 | Y | 2020-21_FRE-5_Mastics - carpet/floor ties | 300 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0033 | |
| 2020-21_FRE-5 | Yes | 2020-21 | Alameda | Fremont | Caulk | downstairs; concrete expansion joint (SE Wall) | 28,000 | Y | 2020-21_FRE-5_Caulk - expansion joints | 75 | linear-ft | Caulk - expansion joints | 0.04 | 0.084 | |
| 411 Industrial Pkwy | Yes | 2020-21 | Alameda | Hayward | Rubber Window Gasket | Gasket sampled | 1,300 | Y | 411 Industrial Pkwy_Rubber Window Gaskets | 25 | linear-ft | Rubber Window Gaskets | 0.03 | 0.0010 | |

**Appendix E - Regional Effectiveness Evaluation of the Protocol for Managing PCBs-containing Materials During Building Demolition Compiled Data for Priority Building Materials containing ≥ 50 ppm PCBs.**

| Building ID | Building Contains Concentrations ≥ 50 ppm PCBs? | FY | County | Permittee | Priority Building Material Application | Application Sample Description | Total PCBs Concentration (ppm) | Concentration ≥ 50 ppm (Y/N) | Unique Material ID | Estimated Amount of Material | Material Units (linear-ft or $ft^2$) | Material Type used for conversion factor | Best (Average or mid-rage value) (kg/linear-feet) or (kg/ft2) | Best (Average or mid-rage value) PCBs Mass (kg) | Assumed Quantity? (Y/N) - GC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2019-20_Fre-1 | Yes | 2019-20 | Alameda | Fremont | Adhesive Mastic | Baseboard Mastic | 50 | Y | 2019-20_Fre-1_Mastics - carpet/floor ties | 1,100 | linear-ft | Mastics - carpet/floor ties | 0.1 | 0.0055 | |
| 22300 City Center Dr. | Yes | 2019-20 | Alameda | Hayward | Adhesive Mastic | Residual floor | 29 | N | 22300 City Center Dr._Mastics - carpet/floor ties | 83 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.00024 | |
| 22300 City Center Dr. | Yes | 2019-20 | Alameda | Hayward | Adhesive Mastic | Residual floor | 4.4 | N | 22300 City Center Dr._Mastics - carpet/floor ties | 83 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.000037 | |
| 22300 City Center Dr. | Yes | 2019-20 | Alameda | Hayward | Adhesive Mastic | Residual floor | 66 | Y | 22300 City Center Dr._Mastics - carpet/floor ties | 83 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.00055 | |
| 22300 City Center Dr. | Yes | 2019-20 | Alameda | Hayward | Caulk | Window, black | 7.8 | N | 22300 City Center Dr._Caulk - window/door frames | 50 | linear-ft | Caulk - window/door frames | 0.02 | 0.0000078 | Y |
| 22300 City Center Dr. | Yes | 2019-20 | Alameda | Hayward | Caulk | Window, black | 135 | Y | 22300 City Center Dr._Caulk - window/door frames | 50 | linear-ft | Caulk - window/door frames | 0.02 | 0.00014 | Y |
| 22300 City Center Dr. | Yes | 2019-20 | Alameda | Hayward | Caulk | Window, black | 29 | N | 22300 City Center Dr._Caulk - window/door frames | 50 | linear-ft | Caulk - window/door frames | 0.02 | 0.000029 | Y |
| 22300 City Center Dr. | Yes | 2019-20 | Alameda | Hayward | Caulk | Expansion joint, gray | 6,660 | Y | 22300 City Center Dr._Caulk - expansion joints | 1,000 | linear-ft | Caulk - expansion joints | 0.04 | 0.27 | |
| 22300 City Center Dr. | Yes | 2019-20 | Alameda | Hayward | Caulk | Expansion joint, gray | 9,600 | Y | 22300 City Center Dr._Caulk - expansion joints | 1,000 | linear-ft | Caulk - expansion joints | 0.04 | 0.38 | |
| 22300 City Center Dr. | Yes | 2019-20 | Alameda | Hayward | Caulk | Expansion joint, gray | 114 | Y | 22300 City Center Dr._Caulk - expansion joints | 1,000 | linear-ft | Caulk - expansion joints | 0.04 | 0.0046 | |
| 22300 City Center Dr. | Yes | 2019-20 | Alameda | Hayward | Rubber Window Gasket | Black | 265 | Y | 22300 City Center Dr._Rubber Window Gaskets | 20 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00016 | |
| 22300 City Center Dr. | Yes | 2019-20 | Alameda | Hayward | Rubber Window Gasket | Black | 660 | Y | 22300 City Center Dr._Rubber Window Gaskets | 20 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00040 | |
| 22300 City Center Dr. | Yes | 2019-20 | Alameda | Hayward | Rubber Window Gasket | Black | 806 | Y | 22300 City Center Dr._Rubber Window Gaskets | 20 | linear-ft | Rubber Window Gaskets | 0.03 | 0.00048 | |
| GE Site - Slab G - Center | Yes | 2019-20 | Alameda | Oakland | Caulk | Wooden expansion joint material | 125 | Y | GE Site - Slab G - Center_Caulk - expansion joints | 100 | linear-ft | Caulk - expansion joints | 0.04 | 0.00050 | |
| GE Site BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Adhesive Mastic | Flooring adhesive | 39 | N | GE Site BLD - 01_Mastics - carpet/floor ties | 47 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.00018 | |
| GE Site BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Adhesive Mastic | Flooring adhesive | 129 | Y | GE Site BLD - 01_Mastics - carpet/floor ties | 47 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.00060 | |
| GE Site BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Adhesive Mastic | Flooring adhesive | 174 | Y | GE Site BLD - 01_Mastics - carpet/floor ties | 47 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.00081 | |
| GE Site BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Caulk | Interior window caulking | 10 | N | GE Site BLD - 01_Caulk - window/door frames | 1,778 | linear-ft | Caulk - window/door frames | 0.02 | 0.00037 | |
| GE Site BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Caulk | Interior window caulking | 26 | N | GE Site BLD - 01_Caulk - window/door frames | 1,778 | linear-ft | Caulk - window/door frames | 0.02 | 0.00094 | |
| GE Site BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Caulk | Interior window caulking | 46 | N | GE Site BLD - 01_Caulk - window/door frames | 1,778 | linear-ft | Caulk - window/door frames | 0.02 | 0.0016 | |
| GE Site BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Caulk | Interior window caulking | 8.3 | N | GE Site BLD - 01_Caulk - window/door frames | 1,778 | linear-ft | Caulk - window/door frames | 0.02 | 0.00030 | |
| GE Site BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Caulk | Interior window caulking | 4.8 | N | GE Site BLD - 01_Caulk - window/door frames | 1,778 | linear-ft | Caulk - window/door frames | 0.02 | 0.00017 | |
| GE Site BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Caulk | Interior window caulking | 82 | Y | GE Site BLD - 01_Caulk - window/door frames | 1,778 | linear-ft | Caulk - window/door frames | 0.02 | 0.0029 | |
| GE Site BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Caulk | Interior window caulking | 12 | N | GE Site BLD - 01_Caulk - window/door frames | 1,778 | linear-ft | Caulk - window/door frames | 0.02 | 0.00041 | |
| GE Site BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Caulk | Interior window caulking | 39 | N | GE Site BLD - 01_Caulk - window/door frames | 1,778 | linear-ft | Caulk - window/door frames | 0.02 | 0.0014 | |
| GE Site BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Caulk | Interior window caulking | 89 | Y | GE Site BLD - 01_Caulk - window/door frames | 1,778 | linear-ft | Caulk - window/door frames | 0.02 | 0.0032 | |
| GE Site BLD - 04 | Yes | 2019-20 | Alameda | Oakland | Adhesive Mastic | Flooring adhesive | 66 | Y | GE Site BLD - 04_Mastics - carpet/floor ties | 600 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0040 | |
| GE Site BLD - 04 | Yes | 2019-20 | Alameda | Oakland | Adhesive Mastic | Flooring adhesive | 85 | Y | GE Site BLD - 04_Mastics - carpet/floor ties | 600 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0051 | |
| GE Site BLD - 08 | Yes | 2019-20 | Alameda | Oakland | Rubber Window Gasket | Rubber Gasket | 56 | Y | GE Site BLD - 08_Rubber Window Gaskets | 50 | linear-ft | Rubber Window Gaskets | 0.03 | 0.000084 | Y |
| GE Site BLD - 18 | Yes | 2019-20 | Alameda | Oakland | Caulk | Wooden expansion joint material | 61 | Y | GE Site BLD - 18_Caulk - expansion joints | 167 | linear-ft | Caulk - expansion joints | 0.04 | 0.00041 | |
| GE Site BLD - 18 | Yes | 2019-20 | Alameda | Oakland | Caulk | Wooden expansion joint material | 46 | N | GE Site BLD - 18_Caulk - expansion joints | 167 | linear-ft | Caulk - expansion joints | 0.04 | 0.00031 | |
| GE Site BLD - 18 | Yes | 2019-20 | Alameda | Oakland | Caulk | Wooden expansion joint material | 32 | N | GE Site BLD - 18_Caulk - expansion joints | 167 | linear-ft | Caulk - expansion joints | 0.04 | 0.00021 | |
| GE Site BLD - 20 | Yes | 2019-20 | Alameda | Oakland | Fiberglass Insulation | Felt at Tank Saddles, Black | 58 | Y | GE Site BLD - 20_Insulation - HVAC/felt insulation | 117 | ft2 | Insulation - HVAC/felt insulation | 0.82 | 0.0055 | |
| GE Site BLD - 20 | Yes | 2019-20 | Alameda | Oakland | Fiberglass Insulation | Felt at Tank Saddles, Black | 104 | Y | GE Site BLD - 20_Insulation - HVAC/felt insulation | 117 | ft2 | Insulation - HVAC/felt insulation | 0.82 | 0.0099 | |
| GE Site BLD - 20 | Yes | 2019-20 | Alameda | Oakland | Thermal Insulation | Felt at Tank Saddles, Black | 44 | N | GE Site BLD - 20_Insulation - HVAC/felt insulation | 117 | ft2 | Insulation - HVAC/felt insulation | 0.82 | 0.0042 | |
| Port BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Caulk | Exterior wall seam sealant - West wall | 537,000 | Y | Port BLD - 01_Caulk - expansion joints | 560 | linear-ft | Caulk - expansion joints | 0.04 | 12 | |
| Port BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Caulk | Exterior wall seam sealant - north wall | 432,000 | Y | Port BLD - 01_Caulk - expansion joints | 560 | linear-ft | Caulk - expansion joints | 0.04 | 9.7 | |
| Port BLD - 01 | Yes | 2019-20 | Alameda | Oakland | Caulk | Exterior wall seam sealant - north wall | 426,000 | Y | Port BLD - 01_Caulk - expansion joints | 560 | linear-ft | Caulk - expansion joints | 0.04 | 9.5 | |
| GE Site BLD - 02 | Yes | 2019-20 | Alameda | Oakland | Caulk | Exterior window glazing compound (Partial Areas - North and East Sides) | 139 | Y | GE Site BLD - 02_Caulk - window/door frames | 125 | linear-ft | Caulk - window/door frames | 0.02 | 0.000035 | |
| GE Site BLD - 02 | Yes | 2019-20 | Alameda | Oakland | Caulk | Exterior window glazing compound (Partial Areas - North and East Sides) | 18 | N | GE Site BLD - 02_Caulk - window/door frames | 125 | linear-ft | Caulk - window/door frames | 0.02 | 0.000044 | |
| GE Site BLD - 02 | Yes | 2019-20 | Alameda | Oakland | Caulk | Exterior window glazing compound (Partial Areas - North and East Sides) | 15 | N | GE Site BLD - 02_Caulk - window/door frames | 125 | linear-ft | Caulk - window/door frames | 0.02 | 0.000038 | |
| GE Site BLD - 02 | Yes | 2019-20 | Alameda | Oakland | Caulk | Exterior window glazing compound (Partial Areas - North and East Sides) | 11 | N | GE Site BLD - 02_Caulk - window/door frames | 125 | linear-ft | Caulk - window/door frames | 0.02 | 0.000028 | |
| GE Site BLD - 17 | Yes | 2019-20 | Alameda | Oakland | Caulk | Slab Expansion Joint Sealant,Clear/Gray | 64 | Y | GE Site BLD - 17_Caulk - expansion joints | 1,100 | linear-ft | Caulk - expansion joints | 0.04 | 0.0028 | |
| GE Site BLD - 17 | Yes | 2019-20 | Alameda | Oakland | Caulk | Slab Expansion Joint Sealant,Clear/Gray | 53 | Y | GE Site BLD - 17_Caulk - expansion joints | 1,100 | linear-ft | Caulk - expansion joints | 0.04 | 0.0023 | |
| GE Site BLD - 17 | Yes | 2019-20 | Alameda | Oakland | Caulk | Slab Expansion Joint Sealant,Clear/Gray | 31 | N | GE Site BLD - 17_Caulk - expansion joints | 1,100 | linear-ft | Caulk - expansion joints | 0.04 | 0.0014 | |
| SHIPPING/RECEIVING BLDG. | Yes | 2021-22 | Alameda | Richmond | Adhesive Mastic | 9X9 GRAY FLOOR TILE/MASTIC | 540 | Y | SHIPPING/RECEIVING BLDG._Mastics - carpet/floor ties | 35 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.0019 | Y |
| SHIPPING/RECEIVING BLDG. | Yes | 2021-22 | Alameda | Richmond | Adhesive Mastic | GRAY VINYL BASE COVE/MASTIC | 13 | N | SHIPPING/RECEIVING BLDG._Mastics - carpet/floor ties | 35 | ft2 | Mastics - carpet/floor ties | 0.1 | 0.000046 | |
| HELIUM BUILDING | Yes | 2021-22 | Alameda | Richmond | Caulk | FLOOR CAULKING | 1.9 | N | HELIUM BUILDING_Caulk - expansion joints | 10 | linear-ft | Caulk - expansion joints | 0.04 | 0.00000076 | Y |
| HELIUM BUILDING | Yes | 2021-22 | Alameda | Richmond | Caulk | FLOOR CAULKING | 82 | Y | HELIUM BUILDING_Caulk - expansion joints | 10 | linear-ft | Caulk - expansion joints | 0.04 | 0.000033 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Coping selant | 11 | N | CC-1_Caulk - expansion joints | 633 | linear-ft | Caulk - expansion joints | 0.04 | 0.00028 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Coping selant | 14,000 | Y | CC-1_Caulk - expansion joints | 633 | linear-ft | Caulk - expansion joints | 0.04 | 0.35 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Coping selant | 22,000 | Y | CC-1_Caulk - expansion joints | 633 | linear-ft | Caulk - expansion joints | 0.04 | 0.56 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Door frame sealant | 33,000 | Y | CC-1_Caulk - window/door frames | 73 | linear-ft | Caulk - window/door frames | 0.02 | 0.048 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Door frame sealant | 25,000 | Y | CC-1_Caulk - window/door frames | 73 | linear-ft | Caulk - window/door frames | 0.02 | 0.037 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Door frame sealant | 75,000 | Y | CC-1_Caulk - window/door frames | 73 | linear-ft | Caulk - window/door frames | 0.02 | 0.11 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior door frame sealant | 53,000 | Y | CC-1_Caulk - window/door frames | 60 | linear-ft | Caulk - window/door frames | 0.02 | 0.064 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior door frame sealant | 24 | N | CC-1_Caulk - window/door frames | 60 | linear-ft | Caulk - window/door frames | 0.02 | 0.000029 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior door frame sealant | 28 | N | CC-1_Caulk - window/door frames | 60 | linear-ft | Caulk - window/door frames | 0.02 | 0.000034 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior siding panel sealant | 9,100 | Y | CC-1_Caulk - window/door frames | 5,111 | linear-ft | Caulk - window/door frames | 0.02 | 0.93 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior siding panel sealant | 42 | N | CC-1_Caulk - expansion joints | 5,111 | linear-ft | Caulk - expansion joints | 0.04 | 0.0086 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior siding panel sealant | 48 | N | CC-1_Caulk - expansion joints | 5,111 | linear-ft | Caulk - expansion joints | 0.04 | 0.010 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior siding panel sealant | 10 | N | CC-1_Caulk - expansion joints | 5,111 | linear-ft | Caulk - expansion joints | 0.04 | 0.0020 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior siding panel sealant | 16 | N | CC-1_Caulk - expansion joints | 5,111 | linear-ft | Caulk - expansion joints | 0.04 | 0.0033 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior siding panel sealant | 21,000 | Y | CC-1_Caulk - expansion joints | 5,111 | linear-ft | Caulk - expansion joints | 0.04 | 4.3 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior siding panel sealant | 67 | Y | CC-1_Caulk - expansion joints | 5,111 | linear-ft | Caulk - expansion joints | 0.04 | 0.014 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior siding panel sealant | 21 | N | CC-1_Caulk - expansion joints | 5,111 | linear-ft | Caulk - expansion joints | 0.04 | 0.0043 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior siding panel sealant | 23,000 | Y | CC-1_Caulk - expansion joints | 5,111 | linear-ft | Caulk - expansion joints | 0.04 | 4.7 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior window frame sealant | 10 | N | CC-1_Caulk - window/door frames | 200 | linear-ft | Caulk - window/door frames | 0.02 | 0.000040 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior window frame sealant | 35,000 | Y | CC-1_Caulk - window/door frames | 200 | linear-ft | Caulk - window/door frames | 0.02 | 0.14 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior window frame sealant | 13 | N | CC-1_Caulk - window/door frames | 200 | linear-ft | Caulk - window/door frames | 0.02 | 0.000052 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior window frame sealant | 30,000 | Y | CC-1_Caulk - window/door frames | 200 | linear-ft | Caulk - window/door frames | 0.02 | 0.12 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior window frame sealant | 14,000 | Y | CC-1_Caulk - window/door frames | 200 | linear-ft | Caulk - window/door frames | 0.02 | 0.056 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior window frame sealant | 41,000 | Y | CC-1_Caulk - window/door frames | 200 | linear-ft | Caulk - window/door frames | 0.02 | 0.16 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior window frame sealant | 26,000 | Y | CC-1_Caulk - window/door frames | 200 | linear-ft | Caulk - window/door frames | 0.02 | 0.10 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior window frame sealant | 24,000 | Y | CC-1_Caulk - window/door frames | 200 | linear-ft | Caulk - window/door frames | 0.02 | 0.10 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Exterior window frame sealant | 22,000 | Y | CC-1_Caulk - window/door frames | 200 | linear-ft | Caulk - window/door frames | 0.02 | 0.088 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Thermal Insulation | Fiberglass pipe insulation | 400 | Y | CC-1_Insulation - fiberglass piping | 9,000 | linear-ft | Insulation - fiberglass piping | 0.26 | 0.94 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Gray interior window sealant | 37,000 | Y | CC-1_Caulk - window/door frames | 1,333 | linear-ft | Caulk - window/door frames | 0.02 | 0.99 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Gray interior window sealant | 890 | Y | CC-1_Caulk - window/door frames | 1,333 | linear-ft | Caulk - window/door frames | 0.02 | 0.024 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Gray interior window sealant | 17,000 | Y | CC-1_Caulk - window/door frames | 1,333 | linear-ft | Caulk - window/door frames | 0.02 | 0.45 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Gray interior window sealant | 16,000 | Y | CC-1_Caulk - window/door frames | 1,333 | linear-ft | Caulk - window/door frames | 0.02 | 0.43 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Gray interior window sealant | 20,000 | Y | CC-1_Caulk - window/door frames | 1,333 | linear-ft | Caulk - window/door frames | 0.02 | 0.53 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Gray interior window sealant | 14,000 | Y | CC-1_Caulk - window/door frames | 1,333 | linear-ft | Caulk - window/door frames | 0.02 | 0.37 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Gray interior window sealant | 17,000 | Y | CC-1_Caulk - window/door frames | 1,333 | linear-ft | Caulk - window/door frames | 0.02 | 0.45 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Gray interior window sealant | 37,000 | Y | CC-1_Caulk - window/door frames | 1,333 | linear-ft | Caulk - window/door frames | 0.02 | 0.99 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Gray interior window sealant | 18,000 | Y | CC-1_Caulk - window/door frames | 1,333 | linear-ft | Caulk - window/door frames | 0.02 | 0.48 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Rubber Window Gasket | Gray rubber window seal | 1,000 | Y | CC-1_Rubber Window Gaskets | 1,333 | linear-ft | Rubber Window Gaskets | 0.03 | 0.040 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Rubber Window Gasket | Gray rubber window seal | 570 | Y | CC-1_Rubber Window Gaskets | 1,333 | linear-ft | Rubber Window Gaskets | 0.03 | 0.023 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Rubber Window Gasket | Gray rubber window seal | 420 | Y | CC-1_Rubber Window Gaskets | 1,333 | linear-ft | Rubber Window Gaskets | 0.03 | 0.017 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Rubber Window Gasket | Gray rubber window seal | 1,800 | Y | CC-1_Rubber Window Gaskets | 1,333 | linear-ft | Rubber Window Gaskets | 0.03 | 0.072 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Rubber Window Gasket | Gray rubber window seal | 1,300 | Y | CC-1_Rubber Window Gaskets | 1,333 | linear-ft | Rubber Window Gaskets | 0.03 | 0.052 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Rubber Window Gasket | Gray rubber window seal | 320 | Y | CC-1_Rubber Window Gaskets | 1,333 | linear-ft | Rubber Window Gaskets | 0.03 | 0.013 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Rubber Window Gasket | Gray rubber window seal | 500 | Y | CC-1_Rubber Window Gaskets | 1,333 | linear-ft | Rubber Window Gaskets | 0.03 | 0.020 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Rubber Window Gasket | Gray rubber window seal | 560 | Y | CC-1_Rubber Window Gaskets | 1,333 | linear-ft | Rubber Window Gaskets | 0.03 | 0.022 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Rubber Window Gasket | Gray rubber window seal | 1,300 | Y | CC-1_Rubber Window Gaskets | 1,333 | linear-ft | Rubber Window Gaskets | 0.03 | 0.052 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Walkway expansion joint sealant | 10 | N | CC-1_Caulk - expansion joints | 60 | linear-ft | Caulk - expansion joints | 0.04 | 0.000024 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Walkway expansion joint sealant | 10 | N | CC-1_Caulk - expansion joints | 60 | linear-ft | Caulk - expansion joints | 0.04 | 0.000024 | |
| CC-1 | Yes | 2021-22 | Contra Costa | Contra Costa County | Caulk | Walkway expansion joint sealant | 16,000 | Y | CC-1_Caulk - expansion joints | 60 | linear-ft | Caulk - expansion joints | 0.04 | 0.038 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Caulk | Caulk-contrete panels | 130,000 | Y | 102_Caulk - expansion joints | 133 | linear-ft | Caulk - expansion joints | 0.04 | 0.69 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Caulk | Caulk-contrete panels | 82,000 | Y | 102_Caulk - expansion joints | 133 | linear-ft | Caulk - expansion joints | 0.04 | 0.44 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Caulk | Caulk-contrete panels | 74,000 | Y | 102_Caulk - expansion joints | 133 | linear-ft | Caulk - expansion joints | 0.04 | 0.39 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Caulk | Caulk-exterior vent | 80 | Y | 102_Caulk - expansion joints | 20 | linear-ft | Caulk - expansion joints | 0.04 | 0.000064 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Caulk | Caulk-exterior vent | 25 | N | 102_Caulk - expansion joints | 20 | linear-ft | Caulk - expansion joints | 0.04 | 0.000020 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Caulk | Caulk-wall panels | 54 | Y | 102_Caulk - expansion joints | 800 | linear-ft | Caulk - expansion joints | 0.04 | 0.0017 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Caulk | Caulk-wall panels | 120 | Y | 102_Caulk - expansion joints | 800 | linear-ft | Caulk - expansion joints | 0.04 | 0.0038 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Caulk | Caulk-wall panels | 60 | Y | 102_Caulk - expansion joints | 800 | linear-ft | Caulk - expansion joints | 0.04 | 0.0019 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Fiberglass Insulation | Fiberglass-insulation/jacket | 38 | N | 102_Insulation - Fiberglass unspecified | 10 | linear-ft | Insulation - Fiberglass unspecified | 0.32 | 0.00012 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Adhesive Mastic | Mastic - Baseboard | 20 | N | 102_Mastics - carpet/floor ties | 50 | linear-ft | Mastics - carpet/floor ties | 0.1 | 0.00010 | |

**Appendix E - Regional Effectiveness Evaluation of the Protocol for Managing PCBs-containing Materials During Building Demolition Compiled Data for Priority Building Materials containing ≥ 50 ppm PCBs.**

| Building ID | Building Contains Concentrations ≥ 50 ppm PCBs? | FY | County | Permittee | Priority Building Material Application | Application Sample Description | Total PCBs Concentration (ppm) | Concentration ≥ 50 ppm (Y/N) | Unique Material ID | Estimated Amount of Material | Material Units (linear-ft or $ft^2$) | Material Type used for conversion factor | Best (Average or mid-rage value) (kg/linear-feet) or (kg/ft2) | Best (Average or mid-rage value) PCBs Mass (kg) | Assumed Quantity? (Y/N) - GC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Adhesive Mastic | Mastic - Baseboard | 25 | N | 102_Mastics - carpet/floor ties | 50 | linear-ft | Mastics - carpet/floor ties | 0.1 | 0.00013 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Adhesive Mastic | Mastic - Baseboard | 25 | N | 102_Mastics - carpet/floor ties | 50 | linear-ft | Mastics - carpet/floor ties | 0.1 | 0.00013 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Adhesive Mastic | Mastic - Baseboard | 6,300 | Y | 102_Mastics - carpet/floor ties | 50 | linear-ft | Mastics - carpet/floor ties | 0.1 | 0.032 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Rubber Window Gasket | Rubber - Wall panel | 230 | Y | 102_Rubber Window Gaskets | 2,200 | ft2 | Rubber Window Gaskets | 0.03 | 0.015 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Rubber Window Gasket | Rubber - Wall panel | 1,400 | Y | 102_Rubber Window Gaskets | 2,200 | ft2 | Rubber Window Gaskets | 0.03 | 0.092 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Rubber Window Gasket | Rubber - Wall panel | 6,400 | Y | 102_Rubber Window Gaskets | 2,200 | ft2 | Rubber Window Gaskets | 0.03 | 0.42 | |
| 102 | Yes | 2020-21 | Contra Costa | Contra Costa County | Rubber Window Gasket | Rubber - Wall panel | 510 | Y | 102_Rubber Window Gaskets | 2,200 | ft2 | Rubber Window Gaskets | 0.03 | 0.034 | |
| CON-01 | Yes | 2019-20 | Contra Costa | Concord | Caulk | Caulk | 550 | Y | CON-01_Caulk - unspecified | 2,100 | linear-ft | Caulk - unspecified | 0.03 | 0.035 | |
| D24012 (warehouse) | Yes | 2024-25 | Contra Costa | Walnut Creek | Caulk | Expansion Joint Caulking | 17,000 | Y | D24012 (warehouse)_Caulk - expansion joints | 166 | linear-ft | Caulk - expansion joints | 0.04 | 0.11 | |
| D24012 (warehouse) | Yes | 2024-25 | Contra Costa | Walnut Creek | Caulk | Expansion Joint Caulking | 15,000 | Y | D24012 (warehouse)_Caulk - expansion joints | 166 | linear-ft | Caulk - expansion joints | 0.04 | 0.10 | |
| D24012 (warehouse) | Yes | 2024-25 | Contra Costa | Walnut Creek | Caulk | Expansion Joint Caulking | 21,000 | Y | D24012 (warehouse)_Caulk - expansion joints | 166 | linear-ft | Caulk - expansion joints | 0.04 | 0.14 | |
| 2800 Mitchell_Bldg300/310 | Yes | 2024-25 | Contra Costa | Walnut Creek | Caulk | Penetration Mastic (Caulk) | 120 | Y | 2800 Mitchell_Bldg300/310_Mastics - roofing/flashing | 150 | ft2 | Mastics - roofing/flashing | 0.5 | 0.0090 | |

# Appendix 21

- BAMSC Climate Change Adaptation Report for the San Francisco Bay Region, September 2026

BAY AREA MUNICIPAL STORMWATER (BAMS) COLLABORATIVE

# Climate Change Adaptation Report for the San Francisco Bay Region

## Submitted in compliance with the San Francisco Bay Municipal Regional Stormwater National Pollutant Discharge Elimination System Permit, Order No. R2-2022-0018, Provision C.21.b.v.

**Prepared on behalf of:**

Alameda Countywide Clean Water Program

Contra Costa Clean Water Program

San Mateo Countywide Water Pollution Prevention Program

Santa Clara Valley Urban Runoff Pollution Prevention Program

Solano Stormwater Alliance

**FINAL DRAFT: August 5, 2026**

**DUE: September 30, 2026**

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# ACRONYMS

**ACCWP:** Alameda Countywide Clean Water Program

**ART:** Adapting to Rising Tides

**AMP:** Asset Management Plan

**BAAD:** Bay Area Air District

**BAMS Collaborative:** Bay Area Municipal Stormwater Collaborative

**BASMAA:** Bay Area Stormwater Management Agencies Association

**BCDC:** Bay Conservation and Development Commission

**BMP:** best management practice

**BSM:** biotreatment soil media

**CAP/CARP/CAAP:** climate action/adaptation/resilience plan

**CASQA:** California Stormwater Quality Association

**CBOs:** community-based organizations

**C/CAG:** City/County Association of Governments of San Mateo County

**CCAR:** Climate Change Adaptation Report

**CCCWP:** Contra Costa Clean Water Program

**CoF**: consequence of failure

**CoSMoS**: Coastal Storm Modeling System

**CRC:** Climate Resilient Communities

**CRRG:** Climate Resilience Resources Guide

**GCM:** global climate model

**GILE:** Green Infrastructure Leadership Exchange

**GSI:** green stormwater infrastructure

**IDF:** intensity-duration-frequency

**LID:** low impact development

**LoF:** likelihood of failure

**MRP:** Municipal Regional Stormwater Permit

**MS4:** municipal separate storm sewer system

**MWELO:** Model Water Efficient Landscape Ordinance

**NOAA:** National Oceanic Atmospheric Administration

**NPDES:** National Pollutant Discharge Elimination System

**O&M:** operation and maintenance

**OPC:** Ocean Protection Council

**RCP:** representative concentration pathway

**RSAP:** Regional Shoreline Adaptation Plan

**SCVURPPP**: Santa Clara Valley Urban Runoff Pollution Prevention Program

**SLR:** sea level rise

**SMCWPPP**: San Mateo Countywide Water Pollution Prevention Program

**SSA:** Solano Stormwater Alliance

**USGCRP:** United States Global Change Research Program

**WHC**: water holding capacity

**WUI**: wildland urban interface

# GLOSSARY

**Asset management:** Ongoing and long-term management of stormwater systems to ensure that there is sufficient investment for maintenance, repair, replacement, and upgrades of the components to maintain the system's service life and minimize potential for damage or failures.

**Bay Area Municipal Stormwater Collaborative (BAMS Collaborative):** An association of Bay Area stormwater permittees that share information and resources to assist stormwater permit compliance.

**Bioretention:** A type of LID/GSI measure designed to retain stormwater runoff, filter stormwater runoff through biotreatment soil media and plant roots, and either infiltrate stormwater runoff to underlying soils, as allowed by site conditions, or release treated stormwater runoff to the storm drain system, or both.

**Biotreatment Soil Media (BSM):** An engineered media for treating stormwater runoff that meets the specification developed by BASMAA and approved by the Water Board in 2016, per the requirements in MRP Provision C.3, and consists of specific types and amounts of sand and compost.

**Climate change:** Long-term shifts in average weather patterns at local, regional, or global scales. Climate change effects can result in warming, droughts and water scarcity, fires, rising sea levels, flooding, catastrophic storms, and declining biodiversity.

**Climate change vulnerability:** The degree to which a system is susceptible to, or unable to function with, adverse effects of climate change, including climate variability and extremes.

**Cloudburst:** Events in which an extreme amount of precipitation falls in a short period of time, which can create flood conditions.

**Coastal flood:** Covering or accumulation of water over normally dry coastal land as a result of high or rising tides or storm surges.

**Community-based organizations (CBOs):** Public or private nonprofit organizations aimed at making desired improvements to a community's social health, well-being, and overall functioning.

**Underserved Populations/Communities:** Groups that have limited or no access to resources or that are otherwise disenfranchised. These areas often suffer more from a variety of economic, health, and environmental burdens which may be related, such as poverty, unemployment, air and water pollution, presence of hazardous wastes, poor infrastructure, and short-term or chronic health issues.

**Drawdown:** A process wherein a stormwater treatment facility drains and returns to the dry weather condition.

**Erosion:** The wearing away and transport of the land surface by natural forces such as wind or water.

**Evapotranspiration:** The sum of processes by which water moves from the land surface to the atmosphere via evaporation and transpiration.

**Extreme heat:** Rising long-term average temperatures and increased heat waves, which are periods of excessive heat, often combined with excessive humidity.

**Filtration:** Process in which suspended solids or other substances are removed from water, such as stormwater runoff, using one or more types of filter media.

**Fire weather:** Weather conditions conducive to triggering and sustaining wildfires, usually based on a set of indicators and combinations of indicators including temperature, soil moisture, humidity, and wind.

**Flow-through Planter:** A type of LID/GSI measure designed to treat stormwater by intercepting runoff from a roof or other impervious surface and slowly draining it through biotreatment soil media into an underdrain.

**Green stormwater infrastructure (GSI):** Stormwater and rainwater infrastructure that uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, GSI refers to the patchwork of natural and landscaped areas that provides habitat, flood protection, cleaner air, and cleaner water. At the scale of a neighborhood, street, or site, GSI refers to stormwater management systems that mimic nature by soaking up, storing, and/or improving the quality of water.

**Green streets:** A holistic stormwater management approach that incorporates vegetation, soil, and engineered systems (e.g., permeable pavements) to slow, filter, and cleanse stormwater runoff across entire, or segments of, streets.

**Grey infrastructure:** Conventional stormwater infrastructure in the built environment which utilizes concrete or other impervious structures for stormwater management such as gutters, channels, and pipes.

**Groundwater recharge:** Natural or artificial replenishment of groundwater supplies through infiltration or injection of water, typically captured stormwater.

**Heavy precipitation with pluvial flood:** Overflowing or accumulation of water over areas that are not normally submerged and often caused by unusually heavy rain. Pluvial floods are rain floods versus river (fluvial) floods.

**Hydrologic benefits:** Refers to GSI benefits related to stormwater volume and flow, such as reducing peak flow, minimizing local flooding, infiltration for groundwater recharge, and direct or indirect reuse.

**Hydrological drought:** A period with large runoff and water deficits in rivers, lakes, and reservoirs.

**Imperviousness:** Surfaces such as roads, sidewalks, rooftops, and parking lots that prevent or significantly inhibit rainfall from infiltrating into native soils and groundwater.

**Infiltration:** Flow of water into and through subsurface soils, where it may reach underlying groundwater.

**Localized flooding:** Smaller-scale ponding or flooding that occurs in low-lying areas after a rain event and caused by localized drainage problems within the watershed.

**Low Impact Development:** A land planning and engineering design approach with a goal of reducing stormwater runoff and mimicking a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and infiltrating, storing, detaining, evapotranspiring, and/or biotreating stormwater runoff close to its source, or onsite.

**Municipal Regional Stormwater Permit (MRP):** The regional stormwater permit issued by the San Francisco Bay Regional Water Quality Control Board to 103 permittees, including municipalities and other agencies.

**Municipal separate storm sewer (MS4s):** A system of conveyances owned or operated by a public body, which are designed or used for collecting or conveying stormwater and discharging to surface waters.

**National Pollutant Discharge Elimination System (NPDES) permit:** An authorization, license, or equivalent control document issued by EPA or a U.S. state agency to implement the requirements of the NPDES program, under the CWA. The NPDES program was established to regulate municipal sanitary sewer and industrial discharges and was expanded in 1987 to incorporate stormwater.

**Nature-based solutions:** Actions to protect, sustainably manage, or restore natural ecosystems, or mimic natural processes, that address societal challenges such as climate change, human health, food and water security, and disaster risk reduction effectively and adaptively, simultaneously providing human well-being and biodiversity benefits. Examples include large open natural spaces, riparian areas, wetlands, living shorelines, and greening of steep hillsides, all of which provide hydrology and water quality benefits.

**Non-potable uses:** Water used for non-drinking purposes, such as toilet flushing, clothes washing, and irrigation.

**One Water:** One Water is an approach that views and manages all water—whether from the tap, a stream, a storm, an aquifer, or a sewer—in a collaborative, integrated, inclusive, and holistic manner that centers around core principles of water equity, water affordability and water access. The One Water approach is important in managing finite water resources for long-term resilience and reliability to meet both community and ecosystem needs.

**Operations and maintenance (O&M):** Regular performance of activities required to inspect and implement preventative and corrective of facilities (i.e., GSI measures) in perpetuity.

**Pervious pavement:** A porous urban surface composed of pavers, concrete, or asphalt with an underlying stone reservoir which catches precipitation and surface runoff and allows it to infiltrate into the native soil .

**Regional project:** Larger-scale GSI measures that capture and manage runoff from a large drainage area upstream of the project.

**Resilience:** The capacity of a community, business, or natural environment to prevent, withstand, respond to, and recover from a disruption.

**Retention:** The capture and long-term storage of stormwater, where it will either eventually infiltrate to subsurface soils and groundwater or evaporate.

**River flood:** Overflowing or accumulation of water over areas that are not normally submerged and often caused by unusually heavy rain. Fluvial floods are river floods versus rain (pluvial) floods.

**Stormwater capture and use:** Refers to systems, such as cisterns or rain barrels, designed to capture, retain, and treat stormwater for direct beneficial use at the point of capture, such as irrigation.

**Treatment media:** Different types of media, such as sand or carbon, that are used to treat stormwater runoff by filtering out pollutants.

**Urban heat island:** Urbanized areas that experience higher temperatures than surrounding and outlying areas due to the greater retention and reflection of heat by structures and impervious surfaces, as compared to areas with more vegetation and soil.

**Watershed:** An area of land that drains rainfall and runoff into a specific waterbody, which can vary greatly in size. Some watersheds encompass many smaller subwatersheds.

# EXECUTIVE SUMMARY

The Bay Area Municipal Stormwater (BAMS) Collaborative, an association of Bay Area stormwater management agencies, developed this Climate Change Adaptation Report (CCAR) to jointly satisfy a requirement of the Municipal Regional Stormwater Permit (MRP) issued by the San Francisco Bay Regional Water Quality Control Board (Water Board) in 2022. Provision C.21.b.v of the MRP requires Permittees to identify potential climate change-related threats to stormwater assets, assess potential impacts that may occur over the next 50 years, and identify approaches to address those potential impacts. The CCAR includes projected impacts and descriptions of stormwater management adaptation strategies, policies, and programs to assist Permittees address the coming changes.

Climate change is affecting stormwater management programs in Northern California and worldwide. How Bay Area Permittees respond to impacts on stormwater quality-related assets from climate change over the remainder of this century remains to be seen, and flexible strategies will be needed to address potentially costly impacts if current climate projections are realized. However, Permittees can improve climate resiliency with thoughtful planning, foresight and creativity. Applying integrated, adaptive approaches when integrating green stormwater infrastructure (GSI) into land development and transportation projects can lessen future impacts to Permittees' hard assets. Given the anticipated high costs municipalities may incur in adapting to rising tides and other impacts, prioritizing cost-effective approaches with the greatest benefits will be crucial.

The CCAR is intended to provide a menu of potential adaptation approaches for Permittee consideration and future evaluation, rather than establishing regional recommendations, expectations, or new standards for design, operation, maintenance, or asset management. Given the significant costs that may be associated with climate adaptation, Permittees need flexibility to evaluate the appropriateness, feasibility, effectiveness, and cost implications of specific adaptation measures based on local priorities, available resources, asset conditions, and future regulatory direction.

The CCAR builds on the Climate Resilience Resources Guide (CRRG) developed by the Green Infrastructure Leadership Exchange (GILE) and the San Mateo Countywide Water Pollution Prevention Program (GILE, 2023). While various types of stormwater assets will be affected by climate change and are considered in the CCAR, the report focuses on GSI assets, continuing the CRRG's focus on that infrastructure category. However, vulnerability of all assets, including GSI, non-low impact development (LID) controls, and trash controls, is addressed.

The CRRG provides strategy recommendations to improve GSI climate resilience in four practice categories: policies, planning, design, and operations and maintenance. It also identifies four categories of climate-related vulnerabilities that apply to GSI: human health and vulnerable populations, biodiversity, urban heat island, and water scarcity/stress. The CRRG lists recommendations to assist permittees with design, construction, and maintenance adaptation strategies for GSI measures related to those vulnerabilities and climate impact drivers.

While the CRRG was national in scope, the CCAR takes a Bay Area-specific approach to those topics, with customized adaptation strategies for the region. Following an introduction and linkage to Bay Area Permittees' Asset Management Plans, the CCAR describes Bay Area climate

projections over the next 50 years and anticipated climate threats and potential hazards to Bay Area stormwater quality assets. These sections are followed by potential adaptation strategies in the areas of policy and planning, engineering and landscape design, and operation and maintenance. Finally, the CCAR presents a summary of the potential strategies and recommendations for next steps at the Permittee, countywide, and regional levels.

The feasibility and applicability of each potential adaptation strategy identified in the CCAR can be evaluated by individual Permittees and Countywide Stormwater Programs as opportunities arise and as resources allow. The potential strategies are summarized in Table EX-1 with more specific information in Sections 2, 3, 4 and 5.

**Table EX-1. Summary of CCAR Potential Asset Adaptation Strategies**

| Issue | Potential CCAR Adaptation Strategies |
|---|---|
| 1. GSI-related Planning | • Coordinate GSI planning with other municipal plans including climate adaptation, action and resilience plans; general plan updates; urban forestry; and other plans related to sustainability, transportation, public works, and community outreach.<br>• Consider watershed and "One Water" approaches, where appropriate, to coordinate implementation of projects that improve the resilience, maintenance, or long-term performance of stormwater quality-related assets.<br>• Participate in and utilize countywide, regional, and state-wide planning efforts, as appropriate, to increase effectiveness. |
| 2. GSI-related Policies | • Integrate GSI into other appropriate and related policies.<br>• Consider GSI siting priorities related to addressing equity and climate impacts on historically disadvantaged and/or affected neighborhoods as appropriate.<br>• Work together with CBOs and other organizations to get buy-in from residents and businesses related to GSI approaches and projects. |
| 3. Asset Vulnerability and Siting (all asset types) | • Review asset locations in comparison to regional maps that show where sea level rise and other climate-related hazards are projected to impact existing and future assets.<br>• Consider design, maintenance, and/or relocation strategies to address impacts. |
| 4. Sizing Guidance (all asset types) | • Update rainfall records to include the most current data and incorporate the data into revised tools and guidance for stormwater quality asset sizing criteria as appropriate. |
| 5. GSI Design and Construction | • Review guidance documents, standard/typical stormwater control measure/GSI details and specifications for updates to improve resilience and prepare for climate impacts.<br>• Collaborate regionally on revisions to the BSM specification.<br>• Consider changes to plant palettes, irrigation systems, mulch details, infiltration designs, inlet/outlet structures, underdrains, tree-based GSI, rainwater harvesting systems, pervious pavement reflectivity, urban soils, etc., to address potential climate impacts.<br>• Integrate feedback from maintenance practices and experience into designs and construction. |
| 6. GSI Operation and Maintenance | • Consider options for hard stormwater asset and vegetation maintenance practices that provide cost-effective adaptation strategies<br>• Create conditions for more resilient landscapes (e.g., healthy plants and diverse habitats with native plants, animals and pollinators)<br>• Train professionals and create green jobs with GSI maintenance education to improve the performance of GSI systems. |

# 1 INTRODUCTION

The Climate Change Adaptation Report (CCAR) was developed in compliance with Provision C.21.b.v of the Municipal Regional Stormwater National Pollutant Discharge Elimination System Permit (MRP) adopted by the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) as Order No. R2-2022-0018 in 2022. The MRP regulates stormwater discharges from municipal separate storm sewer systems (MS4s) owned and/or operated by 79 cities, counties, and other public agencies (i.e., Phase I Permittees) in the San Francisco Bay Area. This report was cooperatively developed for these Permittees through the Bay Area Municipal Stormwater (BAMS) Collaborative.[1]

## 1.1 BACKGROUND

Provision C.21 of the current MRP (known as MRP 3) requires that each Permittee develop and implement an Asset Management Plan that includes an asset inventory, condition assessment, and actions to address the maintenance of stormwater quality-related hard assets constructed during MRP 3 and previous permit terms pursuant to relevant MRP Provisions (e.g., C.2, C.3, C.10). The effects of climate change are expected over time to potentially influence the condition, performance and maintenance of existing assets as well as the design and construction of future assets. Therefore, it is prudent for Permittees to assess the range and scale of potential climate-related impacts on stormwater control measures in the Bay Area and to evaluate how these impacts may affect current and future infrastructure planning/policy, design, maintenance, and rehabilitation/replacement best practices to ensure effective climate adaptation and resilience of public infrastructure.

MRP Provision C.21.b.v requires Permittees to:

"Complete a Climate Change Adaptation Report to identify potential climate change-related threats to assets and appropriate adaptation strategies. The report shall assess existing, new, and increasing threats from climate change to the condition of Permittees' inventoried hard assets over the next 50 years and identify approaches that Permittees may implement to address those threats, such as the modification of design standards and countywide technical guidance documents."

The CCAR is required to be submitted to the Regional Water Quality Control Board with the Permittees' 2026 Annual Reports. The CCAR was prepared as part of a BAMS Collaborative Project of Regional Benefit on behalf of all MRP Permittees. The preparation of the CCAR was overseen by the BAMS Collaborative CCAR Work Group with representatives from the Alameda Countywide Clean Water Program (ACCWP), Contra Costa Clean Water Program (CCCWP), San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), and Solano Stormwater Alliance (SSA), and their

[1] The BAMS Collaborative was organized in 2021 by the Board of Directors for the Bay Area Stormwater Management Agencies Association (BASMAA) to continue the information sharing and permittee advocacy functions of BASMAA in an informal manner after BASMAA's dissolution. The BAMS Collaborative continues BASMAA's mission to encourage information sharing and cooperation, and to develop products and programs that are required and/or more cost-effectively completed regionally than locally.

member agencies.

## 1.2 PURPOSE

The CCAR's purpose is to:

- Assess and evaluate the range of Bay Area-specific threats (including types and scales) from climate change to the condition, performance, and maintenance of Permittees' inventoried hard assets (as defined in MRP 3) over the next 50 years;
- Identify and recommend Bay Area-specific, stormwater-related strategies to adapt to expected changes and increase climate resilience, such as the modification of planning approaches, policies, design standards, and design and maintenance guidance and procedures.

## 1.3 APPROACH

The CCAR will serve as a regional framework with guidance for Permittees in adapting assets to address climate-related risks and offering direction that can be incorporated into countywide Provision C.3 guidance manuals and asset management plans, as appropriate. The CCAR was developed at a regional scale but includes strategies that may be implemented at the countywide and/or local levels.

The MRP requires that the CCAR assess threats from climate change to the condition of Permittees' inventoried hard assets, which generally fall into one of three types of stormwater quality controls: Low Impact Development (LID)/Green Stormwater Infrastructure (GSI); non-LID controls (such as high flow rate media systems); and trash controls. Section 2 describes the categories and classes of assets within these control types and the associated types of threats. While climate change-related storm intensity and sea level rise will potentially impact most types of stormwater quality-related hard assets (with the severity depending on location), a broader range of climate change effects including urban heat, drought, biodiversity loss, and saltwater intrusion will impact vegetated systems, primarily the LID/GSI types. For this reason, the majority of the CCAR analyses and strategies focus on LID/GSI systems.[2]

The CCAR builds upon research conducted by other public agencies around the country and the world related to climate adaptation strategies for GSI. That work has been compiled by the Green Infrastructure Leadership Exchange (GILE), Geosyntec Consultants, and SMCWPPP in the Climate Resilience Resources Guide (CRRG 2023), which outlines GSI planning, design, and O&M considerations to address climate resilience.

Other key resources for the CCAR included:

- The San Mateo County City/County Association of Governments (C/CAG) OneWatershed Climate Resilience Framework Project, an equitable climate adaptation approach focused on integrated watershed management;
- The San Mateo County Flood and Sea Level Rise Resiliency District ("OneShoreline") guidance on public infrastructure resilience planning and design standards;

[2] The geospatial vulnerability of all asset control types is discussed in Section 4.

- Climate scenarios presented in the San Francisco Bay Conservation and Development Commission (BCDC) Regional Shoreline Adaptation Plan;
- Cal-Adapt online climate data tools;
- Resilient and regenerative landscaping guidance; and
- Local Climate Action Plans, Urban Forestry plans, and GSI Plans as applicable.

MRP Permittees have implemented LID programs and measures on parcel-based projects since 2003 using guidance such as BASMAA's "Start at the Source" guide[3] and subsequently developed technical guidance for the design and implementation of LID in public and private development and redevelopment projects. LID measures have improved urban resilience to climate change by reducing reliance on gray infrastructure[4] and helping to restore natural hydrologic processes. As Permittee programs have expanded with GSI planning and implementation, these benefits have increased. Using GSI Plans, municipal Permittees had identified locations for GSI implementation and strategies for improvement. Permittees have also worked to increase the public's awareness of GSI and how GSI benefits communities, as described in their GSI Plans and annual reports.

As required by MRP Provision C.21.b.v, the CCAR describes the adaptation strategies that are currently being implemented or may be implemented by Permittees in the future to address the impacts of climate change on water quality assets and, specifically, GSI. These strategies are detailed in Section 5.

[3] More information can be found at: https://basmaa.org/wp-content/uploads/2021/04/basmaa_start-at-the-source-site-design-guidance-manual_1999.pdf

[4] Gray infrastructure is defined in the CCAR as conventional stormwater infrastructure in the built environment which utilizes concrete or other impervious structures for stormwater management such as gutters, channels, and pipes.

# 2 ASSET MANAGEMENT PLANS AND ASSET INVENTORY

## 2.1 ASSET MANAGEMENT PLANS

As mentioned in Section 1.1, each Bay Area Permittee subject to the MRP was required to develop and implement an Asset Management (AM) Plan that includes an asset inventory, condition assessment, and actions to address the operation and maintenance (O&M) of publicly owned stormwater quality-related hard assets. Permittees completed AM Plans and submitted them to the Regional Water Board with their FY 2024-25 Annual Reports.

The AM Plan provides a rational framework for long-term O&M planning, comprising the following elements:

- Identifying and categorizing assets;
- Characterizing the conditions of assets;
- Prioritizing O&M activities;
- Managing and analyzing asset data; and
- Determining current and future costs.

The AM Plans include approaches for evaluating the condition of assets based on a set of parameters. Typical parameters for LID/GSI and Non-LID systems include:

- For vegetated systems - plant health, plant coverage, presence of weeds, presence of mulch, and presence/condition of irrigation system;
- For both vegetated and non-vegetated systems - presence of trash/debris; level of erosion/sedimentation; structural issues; drainage and standing water; and clogging or blockage of inlets or outlets.

A strategy for prioritizing and scheduling O&M of inventoried assets may be informed by the findings from a risk analysis. Assets that are determined to be at higher risk of failure can be prioritized for maintenance, allowing greater access to necessary resources for maintaining their condition. Assets with a lower risk of failure will still need access to resources for maintenance, but at a lower level or frequency.

Two primary components for determining risk are: Likelihood of Failure (LoF) and Consequence of Failure (CoF). LoF is a measure of the probability that an asset will fail due to considerations such as asset condition, function, location, or age. An asset's condition can be the sole basis for the LoF, but if more information is available, it can be determined as a composite score or consideration that includes information such as asset age, maintenance history, and capacity. Other LoF factors for LID/GSI and Non-LID may include consideration of location in a high pedestrian traffic area and the presence of pumps to convey runoff into a treatment measure.

CoF is a measure of the magnitude of impact (e.g., on public safety, water quality, and permit compliance) an asset will have if it fails. Potential CoF for LID/GSI and Non-LID include size of drainage area (i.e., small, medium, or large area, with the larger resulting in greater impact to water quality), cost of repair/replacement, and proximity to public space (i.e., visibility and negative public opinion).

## 2.2 ASSET TYPES AND CONSIDERATIONS

The asset inventory consists of three primary stormwater control types: LID/GSI; non-LID treatment systems; and trash controls. The asset categories and classes identified for each of these control types are presented in Table 2-1. Table 2-2 presents an overview of the climate change-related threats that may impact each control type and asset category.

As discussed in Section 1.3, most of the climate impact discussion within the CCAR focuses on vegetated LID/GSI and vegetated non-LID systems (i.e., systems with living components that are most affected by threats of increased heat, drought, biodiversity loss, etc.). However, structural non-LID systems and trash capture assets are included in the vulnerability assessment in Section 4, as all assets may be threatened by storm intensification, sea level rise and accompanying groundwater rise. The sizing of non-LID systems and trash capture assets may also be adjusted as rainfall records and sizing guidance are updated, as described in Section 5.2.2.

## 2.3 LINKAGE BETWEEN ASSET MANAGEMENT PROGRAMS AND CLIMATE IMPACTS ON ASSETS

The condition assessment and risk analysis approach described in Section 2.1 is based on traditional AM concepts but is a relatively new concept for stormwater quality hard assets. The approach will be tested and adaptively managed over time as experience is gained with implementation and more data are gathered.

The influence of climate change on LID/GSI and vegetated non-LID assets will be addressed in both the short term and long term. In the short term, the condition assessments can provide direct observation of the effects of heat, drought, and flooding on the parameters listed in Section 2.1 (e.g., plant health and coverage, erosion, standing water, etc.). Based on these observations, actions such as replanting or shoring up inlet areas to prevent erosion can be taken as appropriate to restore conditions as part of routine maintenance or minor rehabilitation of an asset. While it may not be clear whether these effects are directly caused by climate change or other factors, maintenance frequencies and associated costs may increase as these types of conditions are observed more often.

In the long term, climate impacts could result in the need for more significant maintenance, rehabilitation, or replacement of an asset, especially as the asset ages. In cases where major rehabilitation or replacement is required, Permittees may consider maintenance actions guided the design considerations for climate resilience presented in Section 5.2 of the CCAR.

At this stage of implementation of AM programs, it is difficult to say exactly how climate impacts will influence a particular asset's O&M frequency and prioritization. Consideration of climate-related exposure may be integrated into AM programs as they evolve. The risk analyses or best professional judgment based on condition assessments may need to consider additional parameters. For example, exposure of an asset to a specific climate hazard based on its location (such as flooding, sea level rise, and/or groundwater rise) could become a more important factor in assessing its LoF.

The costs of AM programs are likely to increase as more rehabilitation or significant maintenance is required. To prepare for these scenarios and adaptively manage AM programs, it will be

important for Permittees to focus on collecting asset-specific maintenance and cost data to inform long-term actions.

**Table 2-1. Asset Control Types, Categories, and Classes**

| Control Type | Asset Category | Asset Class |
|---|---|---|
| LID/GSI | Biotreatment Systems | • Bioretention lined with underdrain<br>• Bioretention unlined with underdrain<br>• Bioretention unlined w/o underdrain<br>• Flow-through planter lined with underdrain<br>• Tree well filter with bioretention soil with underdrain<br>• Tree well filter with bioretention soil w/o underdrain<br>• Green Roof |
| | Infiltration Systems | • Infiltration trench<br>• Subsurface infiltration system<br>• Dry wells<br>• Pervious pavement with underdrain<br>• Pervious pavement w/o underdrain |
| | Capture and Use Systems | • Rainwater harvesting (e.g., cisterns)<br>• Stormwater capture and use (regional) |
| Non-LID Treatment Systems | High Flow Rate Media Systems | • Media filters (e.g., Vault-based high flowrate media filters)<br>• Media filter with vegetation (e.g., Tree-box-type high flowrate biofilters)<br>• Sand filters |
| | Others | • Extended detention basin<br>• Vegetated swale<br>• Constructed wetlands<br>• Hydromodification vault<br>• Hydromodification basin<br>• Water Quality Pond |
| Trash Controls | Full Trash Capture Systems/Devices | • Hydrodynamic separator<br>• Debris separating baffle box<br>• GSRD - Gross solids removal device<br>• Netting devices<br>• Surface inlet baskets/screens<br>• Outflow screens (e.g., CPS) |
| | Partial Trash Capture Devices | • Auto retractable screen (ARS)<br>• Fixed screen |
| | Other Types of Trash Control Devices | • Interceptors<br>• Debris Rack<br>• Media Filters |

**Table 2-2. Asset Control Types, Categories, and Related Climate Change Impacts**

| Control Type | Asset Category | Related Climate Change Impacts | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Storm Intensity/ Flooding | Sea Level Rise | Ground-water Rise | Salt-water Intrusion | Heat | Drought | Biodiversity Loss |
| LID/GSI | Biotreatment Systems | ● | ● | ● | ● | ● | ● | ● |
| | Infiltration Systems (non-vegetated) | ● | ● | ● | | | | |
| | Capture and Use Systems | ● | ● | | | | | |
| Non-LID Treatment Systems | High Flow Rate Media Systems (vegetated) | ● | ● | ● | ● | ● | ● | ● |
| | High Flow Rate Media Systems (non- vegetated) | ● | ● | ● | | | | |
| | Other Types of Non-LID Systems (older vegetated systems) | ● | ● | ● | ● | ● | ● | ● |
| Trash Controls | Full Trash Capture Systems/Devices | ● | ● | ● | | | | |
| | Partial Trash Capture Devices | ● | ● | | | | | |
| | Other Types of Trash Control Devices | ● | ● | | | | | |

# 3 BAY AREA CLIMATE THREAT ASSESSMENT

To support the development of the CCAR, information was collected from Bay Area planning agencies to summarize climate projections, climate-related threats to stormwater quality assets, and assessments of impacts to these assets. Publicly available regional datasets and planning tools were used to provide a consistent approach when considering future climate conditions relevant to asset planning and adaptation over the 21st century.

Section 3.1 summarizes regional climate projections relevant to stormwater quality assets, including sea level rise and coastal flooding, as well as projected changes in temperature, precipitation, drought, and wildfire conditions over the next 50 years. Section 3.2 builds on these projections by describing existing, new, and increasing climate-related threats to assets, such as flooding, groundwater rise, saltwater intrusion, and compound stressors, that are expected to intensify under future climate conditions. Section 3.3 then examines how these threats may translate into specific hazards and potential impacts to assets, including considerations related to scale, vulnerability, and community and equity outcomes.

## 3.1 BAY AREA CLIMATE PROJECTIONS FOR THE NEXT 50 YEARS

Climate projections and the potential threats to assets presented in the CCAR are based on the BCDC 2024 Regional Shoreline Adaptation Plan (RSAP) and California's Fourth Climate Change Assessment San Francisco Bay Area Region Report (Ackerly et al. 2018). Combined, these datasets represent the best available data for the Bay Area at the time the CCAR was produced.[5]

- BCDC's RSAP projections are derived from the California Ocean Protection Council (OPC) Sea Level Rise Guidance: 2024 Science and Policy Update. The projections reflect a range of plausible future conditions to support risk-informed planning over multiple time horizons. This dataset provides regionally consistent sea level rise scenarios intended to support shoreline and near-shore planning across the Bay Area.
- California's Fourth Climate Change Assessment is based on statistically downscaled climate projections from 32 global climate models into California-specific daily temperature and precipitation data (Pierce et al. 2018). The projections provide statewide coverage at approximately six-kilometer resolution to support regional and local climate impact analyses projections.

In addition to the figures presented in the section below, Appendix A provides six tables that summarize key regional and county-level climate projection resources available to Permittees to understand local climate impacts. The tables provide links to data platforms, planning tools, and guidance documents that Permittees may reference to inform consideration of future climate conditions across planning, project development, retrofit, and maintenance activities.

[5] California's Fifth Climate Change Assessment San Francisco Bay Area Region Report is expected to be completed Summer 2026.

### 3.1.1 Sea Level Rise and Coastal Flooding

Sea level rise is one of the most significant and well-documented climate threats facing the Bay Area. Sea level rise, coastal flood hazards, and groundwater rise projections are drawn from BCDC's RSAP. These scenarios are summarized in Table 3-1 below.

**Table 3-1. Climate Scenarios (based on California OPC 2024 Sea Level Rise Guidance)**

| Time Frame | Emissions Scenario | California SLR Guidance Scenario |
|---|---|---|
| 2050 | Intermediate | 0.8 feet (9.6 inches) |
| 2100 | Intermediate | 3.1 feet (37 inches) |
| 2100 | Intermediate-High | 4.9 feet (59 inches) |
| 2100 | High | 6.6 feet (79 inches) |

The RSAP recommends that adaptive planning for sea level rise threats to existing and planned infrastructure be conducted using the four sea level rise scenarios. The four coastal flood hazards: tidal inundation, storm surge, emergent groundwater, and shallow groundwater are illustrated in Figure 3-1 below.

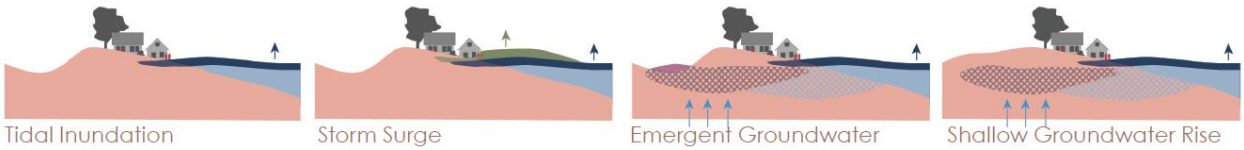


*Figure 3-1. Four types of coastal flood hazards (BCDC 2024)*

Data from Adapting to Rising Tides (ART) Sea Level Rise flood maps are used to represent future flooding from sea level rise, tidal inundation, and storm surge, while United States Geological Survey's (USGS) Coastal Storm Modeling System (CoSMoS) groundwater hazard maps represent shallow groundwater and emergent groundwater (BCDC 2025). Figure 3-2 is from the 2024 RSAP and provides a planning-level overview of projected sea level rise and coastal flooding conditions under the selected sea level rise scenarios. Permittees can view and download the data for the figure on the RSAP Atlas map viewer.[6] Figure 3-2 is included for informational purposes and is not intended to represent site-specific conditions or to substitute for project-level analyses.

[6] More information can be found at: https://rsap-atlas.bcdc.ca.gov/; to view the figure, select Coastal Flood Hazards under the Map Layers list.

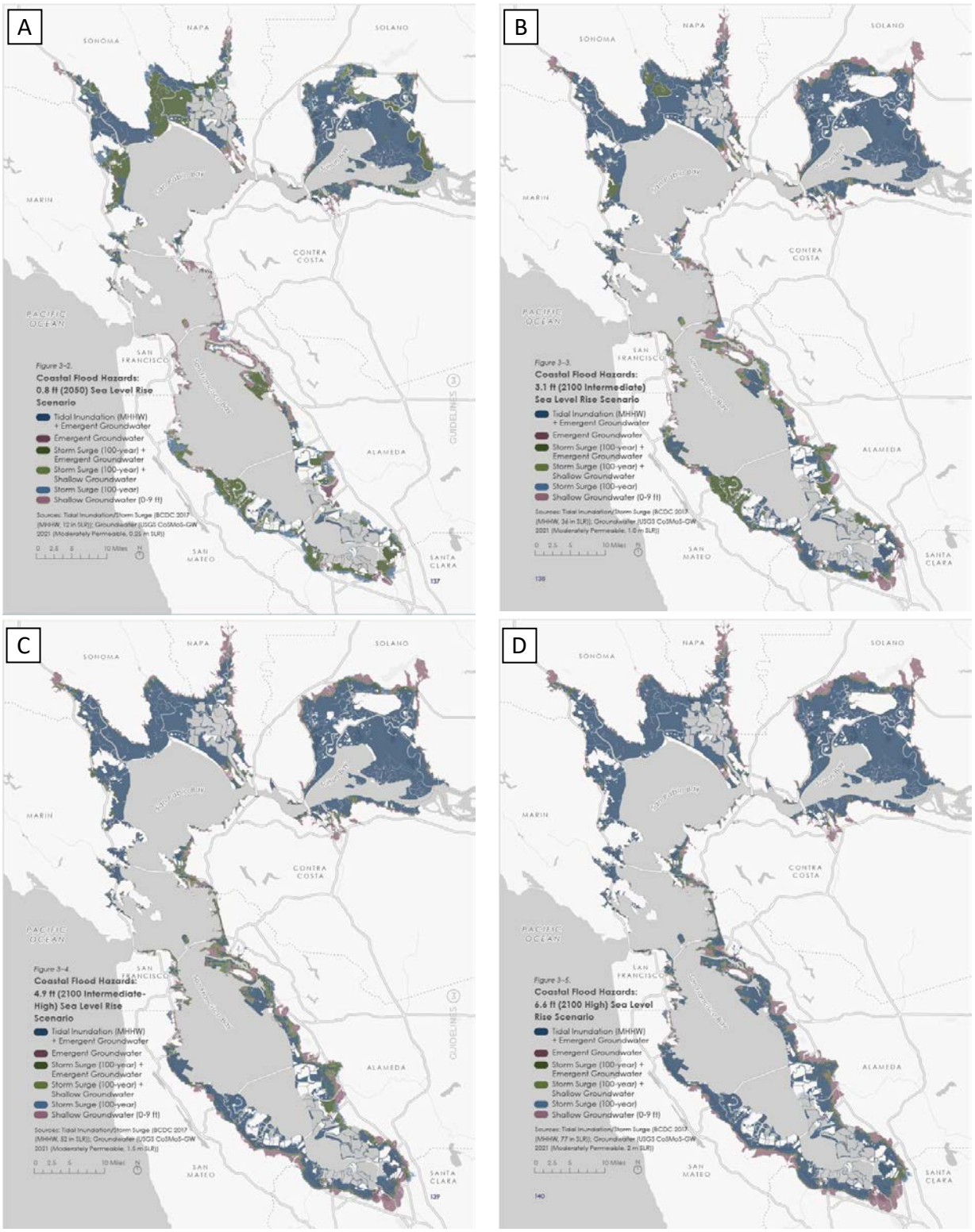


*Figure 3-2. Extent of coastal flood hazards under four climate scenarios: (A) 2050 intermediate, (B) 2100 intermediate, (C) 2100 intermediate-high, and (D) 2100 high (BCDC 2024). Full page versions of these maps are available on pages 137-140 at: https://www.bcdc.ca.gov/wp-content/uploads/sites/354/2024/12/regional-shoreline-adaptation-plan.pdf*

Sea level rise is already affecting portions of the Bay Area and is projected to accelerate through the mid and late-21st century. Observed sea levels in the Bay Area have risen by approximately 8-9 inches since 1900 (Ackerly et. al. 2018). Under intermediate-to-high emissions scenarios, regional sea level rise of approximately 1-3 feet by 2050 and up to 3-6.5 feet by 2100 is projected for San Francisco Bay (OPC 2024).

### 3.1.2 Extreme Heat, Precipitation, and Wildfire

Regional climate projections and historical trends in temperature, precipitation, snowpack, extreme storms, drought, and sea level are summarized in California's Fourth Climate Change Assessment San Francisco Bay Area Summary Report (2018). The report examines projections from 2006 to 2100 under two emissions scenarios: Representative Concentration Pathway (RCP)[7] 4.5, where global greenhouse gas emissions peak around 2040 and then decline, and RCP 8.5, where emissions rise through 2100. Key findings for temperature, precipitation, drought, and wildfire are below:

1. *Temperature*: Average and extreme ambient air temperatures are projected to increase across the Bay Area, with inland areas experiencing greater warming than coastal locations. Heat waves are expected to become longer, more frequent, and more severe. The Bay Area is expected to warm by approximately 3.3°F by mid-century under RCP 4.5, increasing to about 4.4°F under RCP 8.5. Differences between emissions pathways become more pronounced by late century, with projected warming of roughly 4.2°F under RCP 4.5 versus 7.2°F under RCP 8.5. Coastal cooling from fog and onshore winds is expected to buffer some of the surface temperature increase in coastal and bay regions, while Bay Area regions further inland warm at a faster rate (Cal-Adapt, Ackerley et al. 2018). How climate change will alter the highly localized processes and microclimates remains uncertain.
2. *Precipitation*: While total annual precipitation is expected to remain variable, heavy rainfall events are projected to deliver a greater proportion of annual rainfall over shorter durations. Climate projections indicate an increase in the frequency and intensity of extreme precipitation events in California, including in the Bay Area, driven in part by stronger atmospheric rivers[8] under warming conditions (Cal-Adapt; USGCRP 2023). End-of-century projections indicate that the largest daily precipitation events (measured in inches of rainfall per day) increase by roughly 6 to 21% under RCP 4.5, with increases of up to 37% under RCP 8.5 (Ackerley et. al. 2018).
3. *Drought*: Regional climate assessments project an increase in the frequency and duration of droughts in California due to rising temperatures, increased evapotranspiration, and highly variable precipitation patterns (California's Fourth Climate Change Assessment, USGCRP 2023).

[7] RCPs are defined as a numeric value that represents the increase in radiative forcing in the year 2100 above pre-industrial levels (e.g., RCP 8.5 represents +8.5 Watts per square meter over pre-industrial levels by the end of the century).

8 An atmospheric river is a long, narrow band of concentrated water vapor in the atmosphere that transports moisture, typically from tropical regions, and can produce heavy rain or snow when it reaches land.

4. *Wildfire*: Future wildfire risk in the Bay Area is expected to be influenced by both climate change and land-use patterns. California's Mediterranean climate is inherently fire-prone, with wet winters fostering vegetation growth and dry summers drying fuels to highly flammable conditions. In the San Francisco Bay region, despite a strong coastal-to-inland moisture gradient, fire risk is not generally limited by fuel availability. A warming climate, prolonged drought, and shifting precipitation patterns are expected to lead to more frequent fires and greater area burned, particularly in wildland–urban interface zones (Ackerly et. al. 2018). However, risk may decline in some areas as development becomes more densely urbanized.

Cal-Adapt provides publicly accessible information on projected changes in temperature, precipitation, extreme heat, drought, and other climate variables under RCP 4.5 and RCP 8.5. Countywide climate projections are illustrated using figures developed from Cal-Adapt's climate tools[9] from the Fourth Climate Change Assessment. A figure was generated by Cal-Adapt for each County, illustrating projections of the following for RCP 4.5 and RCP 8.5:

1. Number of extreme heat days per year, defined as days between April and October when daily maximum temperatures exceed the 98th percentile of observed historical conditions (1961–1990);
2. Maximum amount of daily precipitation (over a 24-hour period) each year; and
3. Annual average acres burned.

These figures, provided in Appendix B, show the average and range of results from four global climate models, selected to represent a range of potential conditions. The Cal-Adapt climate tools calculate projected averages for modeled historical and two projected time horizons: mid-century (2035-2064) and end-century (2070-2099). Cal-Adapt data can also be downloaded to analyze climate projections from the four global climate models at a local level. Permittees are encouraged to consult Cal-Adapt directly to select datasets, scenarios, and planning horizons appropriate to their specific project context.

User-facing Cal-Adapt tools based on the Fifth California Climate Change Assessment are currently being expanded and expected to be rolled out throughout 2026. The Cal-Adapt Analytics Engine[10] provides access for highly technical users to California's most up-to-date climate data, developed for the Fifth California Climate Change Assessment.

For extreme precipitation, global climate model (GCM) rainfall projections available through Cal-Adapt can be statistically downscaled to an hourly timescale for use in continuous simulation hydrologic models used for GSI sizing; however, this process can be complex and uncertain. One study found that temporal downscaling smoothed peak intensities, requiring additional statistical matching of daily totals to historical storm hyetographs to better represent short-duration extremes (Havens et al. 2020).

[9] More information and Cal-Adapt climate tools can be found at: https://cmip5.cal-adapt.org/tools
[10] More information and Cal-Adapt Analytics Engine datasets are available at: https://analytics.cal-adapt.org/data/

Another resource for evaluating future precipitation patterns is the set of updated rainfall intensity-duration-frequency (IDF) curves[11] developed by Lawrence Berkeley National Laboratory and the Pathways Climate Institute in Volume 2 of the *San Francisco Bay Area Precipitation in a Warmer World* report (Mak et al. 2023), which incorporates projected changes in precipitation for 2050 and 2100 under a high-emissions scenario. These curves indicate increasing intensity under a warming climate across a range of storm durations and frequencies and include methods for scaling results from National Oceanic and Atmospheric Administration's (NOAA) Atlas 14 stations (e.g., Downtown San Francisco and SFO) to other Bay Area locations and time horizons under different climate scenarios. For full trash capture devices, which are designed to treat the 1-year, 1-hour storm, these updated, locally scaled IDF projections could be considered when designing or retrofitting devices to ensure they continue to perform effectively under future precipitation patterns.

### 3.1.3 Climate Projection Scenario Guidance

Consistent with the scenario-based approach used for sea level rise and other climate threats in this section, it is recommended that Permittees evaluate planned and/or existing stormwater quality assets and their performance across a range of future climate conditions rather than relying on a single projection or historical design standard. This includes consideration of multiple emissions scenarios (e.g., RCP 4.5 and RCP 8.5 or equivalent) and planning horizons (mid-century and end-of-century), consistent with the datasets presented in Sections 3.1.1 and 3.1.2 and available through tools such as Cal-Adapt.

For precipitation, where projections indicate increasing variability and more intense storm events but remain uncertain in magnitude and timing, this approach may be applied by evaluating a range of potential changes in storm intensity until the NOAA Atlas 15 Volume 2[12] is released. NOAA's Atlas 15 Volume 2 will provide precipitation frequency estimates projected into the future instead of a current snapshot.

Evaluating multiple scenarios provides a consistent basis for design assumptions, helps bracket uncertainty, and supports risk-informed and adaptive decision-making for planning, retrofit, and asset management activities.

## 3.2 EXISTING, NEW, AND INCREASING CLIMATE-RELATED THREATS TO BAY AREA ASSETS

Regional climate assessments show changes in precipitation patterns, temperature, sea level, wildfire activity, and extreme events that are expected to increasingly affect stormwater infrastructure and presumed water quality outcomes in the Bay Area. In addition, climate stressors are increasingly likely to occur in combination, for example, prolonged drought followed by extreme precipitation, or sea level rise coinciding with major storm events. These compound conditions can exceed original design assumptions for stormwater quality assets, resulting in reduced performance, accelerated degradation, or cascading failures. Recognizing and planning for these interactions is critical to ensuring

[11] IDF curves describe the relationship between the probability of a given amount of rain falling (intensity), for a certain amount of time (duration), and how often this combination will impact the area of interest (frequency).
[12] More information on the release of NOAA Atlas 15 at https://water.noaa.gov/about/atlas15

long-term resilience and regulatory reliability. The subsections below summarize key climate-related threats to assets in the Bay Area.

### 3.2.1 Sea Level Rise and Coastal Flooding

Sea level rise increases the frequency, depth, and duration of coastal flooding, particularly when combined with king tides[13], storm surge[14], and extreme precipitation. Low-lying shoreline areas are expected to experience more frequent nuisance flooding, episodic inundation during storm events, and permanent inundation over time, particularly under compound flood conditions. These processes threaten developed shorelines and stormwater infrastructure (BCDC 2024, USGCRP 2023). For stormwater quality assets, these impacts introduce site-specific constraints on inundation frequency and reduced downstream discharge capacity that Permittees may consider when planning new facilities, evaluating system performance, and establishing maintenance needs.

### 3.2.2 Groundwater Rise, Saltwater Intrusion, and Tidal Exacerbation

Rising sea levels are increasingly linked to rising groundwater tables in low-lying areas adjacent to the Bay (i.e., as sea levels rise, so will groundwater levels). Recent studies and regional planning efforts have identified groundwater rise as a growing but often less-recognized climate threat, capable of extending inland beyond mapped coastal flood zones, particularly where elevated groundwater, high tides, and intense rainfall occur concurrently (BCDC 2024).

Groundwater rise can cause persistent or seasonal flooding, reduce subsurface drainage capacity, and mobilize legacy contamination in soil and fill materials. In shoreline and estuarine areas, saltwater intrusion into groundwater systems may increase as hydrostatic pressure increases. Tidal backwater effects in stormwater conveyance systems are expected to worsen as higher mean sea levels reduce hydraulic gradients and increase the duration of tidally influenced conditions (BCDC 2024, OPC 2024). For GSI specifically, groundwater rise may limit storage volume and infiltration, and salinity may affect soil and plant health.

### 3.2.3 Extreme Precipitation, Inland Flooding, and Erosion

More intense precipitation, longer dry periods, and increased wildfire activity are projected to increase sediment, debris, and pollutant loading to stormwater systems. These changes increase the risk of inland flooding along creeks, channels, and urban drainage networks, particularly in highly impervious watersheds. More intense rainfall also elevates erosion risk in both urban and natural channels, leading to channel instability, sediment transport, and downstream deposition. Projected increases in extreme precipitation and erosion highlight the importance of evaluating asset design assumptions related to sizing, sediment management, and maintenance demands, particularly in areas prone to inland flooding.

Extreme precipitation impacts may be amplified when they follow wildfire or extended drought conditions, because vegetation loss, soil disturbance, hydrophobic soils, and accumulated sediment or debris can increase runoff rates, erosion, and pollutant loading. In coastal and low-

[13] A king tide is the highest predicted high tide of the year, caused by the alignment of the moon and sun.
[14] A storm surge is the temporary rise in sea level driven by storm winds, above the normal tide.

lying areas, inland flooding may also coincide with elevated Bay water levels, tidal backwater, or groundwater rise, reducing drainage capacity and prolonging flooding.

### 3.2.4 Urban Heat, Drought, and Energy Outages

Longer dry periods and more severe droughts are projected due to increased evapotranspiration and precipitation variability. These conditions exacerbate urban heat island effects in densely developed areas (USGCRP 2023). Extreme heat and extended dry periods have direct implications for the hydraulic and biological functions of GSI and other vegetated treatment systems, and can interact with other stressors by weakening vegetation, reducing soil moisture, increasing irrigation demand, and limiting the ability of vegetated stormwater quality assets to recover before subsequent intense storm events.

Energy systems are also vulnerable to these conditions. Extreme heat increases electricity demand, while drought can constrain energy generation and transmission. Climate-driven power outages, including public safety shutoff events, are expected to remain a regional risk (Ackerley et. al. 2018). If extreme heat conditions contribute to power outages, electrically dependent stormwater assets, monitoring systems, pumps, or irrigation systems may face additional operational constraints during periods when system performance is already stressed.

### 3.2.5 Wildfire

Wildfire frequency and severity are projected to increase statewide, including in watersheds contributing runoff to Bay Area urban systems. Even when wildfires occur outside dense urban centers, their impacts extend across the region. Wildfire impacts are often realized through subsequent climate stressors, particularly extreme precipitation events that occur before burned watersheds have stabilized. Postfire conditions can alter watershed hydrology, increase erosion and sediment transport, and affect downstream loading of stormwater treatment controls during subsequent storm events. These cascading effects may be exacerbated when postfire storms coincide with already saturated conditions, elevated groundwater, or constrained downstream discharge capacity. Additionally, these impacts may occur in urban areas far removed from burn locations, which are typically closer to wildland-urban interfaces, highlighting the importance of regional watershed considerations in GSI planning.

## 3.3 POTENTIAL HAZARDS TO ASSETS DUE TO CHANGES IN CLIMATE

### 3.3.1 Scale of Hazards

Assets in the Bay Area, especially GSI, are exposed to climate-driven threats that operate across multiple spatial and temporal scales. While individual GSI features are typically small and distributed, climate stressors often act at the watershed, neighborhood, or regional scale, influencing hydrology, groundwater levels, vegetation health, and maintenance demands beyond individual asset boundaries.

For example, extreme precipitation events can exceed design storage and infiltration capacity over short durations, particularly at facilities without dedicated overflow bypass or with limited bypass capacity, leading to surface bypass, localized flooding, erosion, and sediment accumulation; repeated exceedances can gradually reduce long-term performance at site to watershed scales. In contrast, drought affects GSI and other vegetated assets over seasonal to multi-year timescales

through increased sediment loading, vegetation stress, and maintenance demands. Rising temperatures, sea-level rise, and groundwater rise operate at neighborhood to regional scales over decades but can impair GSI functionality in the short term through prolonged saturation, reduced infiltration capacity, saline intrusion, or structural degradation when hydrologic thresholds are exceeded. Vulnerabilities of GSI and other assets under specific climate threats are detailed below in Section 3.3.2.

This underscores the importance of evaluating asset vulnerability at multiple scales and time horizons. Climate-related impacts may not cause immediate failure but can incrementally reduce system function, reliability, and service life. Understanding the type, magnitude, and scale of these hazards, in combination with site conditions, design assumptions, and maintenance capacity, is critical for prioritizing adaptation strategies, informing design modifications, and ensuring long-term resilience of assets across the Bay Area.

### 3.3.2 Asset Impacts

Finding ways to increase the "resilience" of GSI and other assets is key to improving their performance and cost-effectiveness in the face of climate change impacts. Understanding how climate threats may affect assets helps Permittees identify appropriate adaptation strategies (see Sections 4 and 5) to address anticipated impacts within their jurisdictions. The vulnerabilities summarized in Table 3-2 include identified stressors affecting GSI and other assets under changing climate conditions. Similar to findings from other municipal green infrastructure guidance (e.g., Denver Green Continuum Streets Guidelines), projected increases in precipitation intensity, heat, and drought can affect GSI performance through increased sediment loading, vegetation stress, and maintenance demands.

**Table 3-2. Summary of Climate-Related Threats and Associated Asset Vulnerabilities**

| Climate Threat | Asset Vulnerabilities | Additional Considerations |
|---|---|---|
| Sea level rise and coastal flooding | • Permanent or episodic inundation during extreme tides or storm surge events.<br>• Reduced drainage gradients or tidal backwater in systems with underdrains.<br>• Prolonged submergence in saltwater may increase corrosion of metal devices.<br>• Other vulnerabilities related to groundwater rise due to sea level rise (see two rows below). | Particularly relevant to infiltration-based GSI and trash capture devices in shoreline-adjacent and tidally influenced watersheds, which will increase due to sea level rise. |
| Extreme precipitation | • Exceed the design storage and infiltration capacity of systems sized using historical rainfall records.<br>• Increase the likelihood of surface flooding, bypass flows, and reduced treatment and capture effectiveness.<br>• Cause erosion, scour, or damage to surface inlets, overflow structures, and conveyance elements. | N/A |

| Climate Threat | Asset Vulnerabilities | Additional Considerations |
|---|---|---|
| | • Cause damage or clogging of trash capture devices due to larger mobilization of trash, sediment, debris, and floatables.<br>• Mobilize previously captured pollutants, reducing net water quality benefits. | |
| Groundwater rise | • Reduced infiltration, sub-surface storage, and hydraulic capacity.<br>• Vegetation stress, reduced vigor, or mortality, due to altered soil chemistry.<br>• Limited discharge capacity of underdrains, outlets, and overflow/bypass structures. | Particularly relevant to infiltration-based GSI and trash capture devices but also applies to those systems with underdrains. |
| Extreme heat and drought | • Vegetation stress, reduced vigor, or mortality, particularly where plant palettes are not drought-tolerant.<br>• Higher evapotranspiration losses, leading to drier soil conditions between storm events.<br>• Accelerated degradation of system materials, such as liners and plastic components, under prolonged heat exposure.<br>• Increased maintenance demands, such as irrigation, replanting, or media rehabilitation. | Retrofit stormwater treatment systems often use electrically powered pumps to raise stormwater into treatment systems, which are at risk during power outages caused by extreme heat. |
| Wildfire | • Overloading of media with ash and fine particulates.<br>• Degraded soil structure and reduced permeability.<br>• Increased nutrients, metal concentrations, and other toxic contaminants that may affect treatment performance. | |

### 3.3.3 Community and Equity Considerations

Climate change disproportionately affects low-income and historically underserved communities, creating compounded risks for both residents and the GSI intended to support them. In the Bay Area, many of these communities are located in lower-lying areas with increased vulnerability to sea-level rise, groundwater rise, and flooding (C/CAG and Caltrans 2021). These conditions place heightened and overlapping stressors on GSI assets and the surrounding built environment. Because vulnerability and risk are a composite of exposure, sensitivity, potential impact or consequences, and available resources (or adaptive capacity), areas projected to experience the highest exposure to climate change threats in the future may differ from those at greatest risk of impact from that exposure.

Climate-driven stressors such as extreme heat, drought, and flooding introduce equity-related threats that can affect long-term performance, maintenance needs, and community acceptance of

GSI. Hotter and drier conditions may increase vegetation stress and maintenance demands in neighborhoods with limited municipal resources, while flooding and sea-level rise can reduce GSI effectiveness or accelerate asset degradation where drainage infrastructure is constrained. Without intentional planning, these dynamics risk reinforcing inequities by concentrating environmental burdens while limiting access to GSI resilience benefits.

Equitable distribution of GSI is therefore a critical consideration in climate resilience planning; however, GSI implementation is often driven by technical feasibility, regulatory requirements, development patterns, and/or opportunities to support gray infrastructure improvements, which can unintentionally deprioritize underserved areas. As a result, communities most exposed to climate threats, such as those located in low-lying areas near the Bay or in a floodplain, often overlap with socially vulnerable communities shaped by historical disinvestment and inequitable infrastructure planning. These overlapping conditions can contribute to higher risks of underinvestment and delayed or less effective implementation of stormwater infrastructure.

Addressing these challenges requires integrating social and equity-based considerations alongside engineering criteria during GSI planning and design. This includes combining physical climate data with social, demographic, and infrastructure indicators to better understand vulnerability and prioritize investments.

An example of an equity-centered, watershed-scale approach aligned with these principles is the San Mateo County OneWatershed Climate Resilience Framework (C/CAG 2025).[15] The framework integrates climate hazard exposure data with community-scale input to identify climate vulnerabilities and prioritize resilience investments across water infrastructure in San Mateo County. It was developed through a community co-creation process that engaged residents, community leaders, and a collaborating community-based organization, ensuring that lived experiences from historically underserved communities were incorporated alongside technical analyses of climate threats such as flooding, sea-level rise, extreme heat, and drought. By defining vulnerability as a function of exposure, sensitivity, impact, and adaptive capacity, the OneWatershed Framework helps differentiate between areas with high climate exposure and those at greatest risk due to social inequities, limited resources, or inadequate infrastructure.

Early, consistent, and inclusive public engagement, ideally in partnership with community-based organizations, can help align GSI projects with community priorities, address concerns related to maintenance and neighborhood impacts, and build trust and adaptive capacity over time.

To support consistent and transparent consideration of equity in climate resilience planning, Permittees may consider incorporating a set of qualitative and quantitative indicators when evaluating vulnerability and prioritizing GSI investments. Example indicators may include urban heat or flood vulnerability indices, tree canopy coverage, and disadvantaged community status using tools such as CalEnviroScreen[16] or regional datasets like the Metropolitan Transportation Commission's Equity Priority Communities.[17]

[15] More information can be found at: https://flowstobay.org/onewatershed/
[16] More information can be found at: https://oehha.ca.gov/calenviroscreen
[17] More information can be found at: https://mtc.ca.gov/planning/transportation/access-equity-mobility/equity-priority-communities

# 4 GEOSPATIAL VULNERABILITY OF ASSETS

This section continues to describe the risks of climate change impacts to stormwater quality assets, focusing on climate threats and vulnerabilities that are closely associated with the geospatial location of assets, including LID/GSI, non-LID systems, and trash capture devices. Strategies and resources that local agencies can use to identify existing vulnerable assets and plan for installation of future assets in less vulnerable locations are provided below.

## 4.1 EXISTING PERMITTEE ASSETS

The key locations where existing assets could be at risk due to the effects of climate change include:

1. Low-lying areas near the Bay or coastal shorelines where assets could be permanently or episodically inundated from sea level rise, tidal flows, storm surge, and groundwater rise, as well as increased runoff volumes from the contributing upstream watershed;
2. Areas with a higher risk of wildfire, such as in hilly, windy areas or areas in the wildland-urban interface (WUI); and
3. Those parts of the Bay Area where droughts and heat waves could be more extreme and impact vegetated assets more significantly.

Table 3-2 describes the specific asset vulnerabilities related to those types of locations.

A key adaptation strategy is to assess the vulnerability of a Permittee's inventory of assets based on location, understand the potential impacts to maintenance of those assets, and adjust maintenance programs accordingly. For low-lying Bay or coastal shorelines, Permittees can view and download data from the Adapting to Rising Tides Sea Level Rise flood maps from the BCDC 2024 Regional Shoreline Adaptation Plan, as described in Section 3.1.1, to assess which of their existing assets may be at risk from sea level rise and associated threats. There are several ways of conducting these vulnerability assessments, depending on the size of the asset inventory being managed by a Permittee:

1. Permittees with a relatively small asset inventory can pan and zoom with online maps and tools to locate existing assets, and note which ones are vulnerable to sea level rise and associated threats. Then appropriate steps can be taken to assess and track how asset conditions are impacted in these areas and adjust inspection and maintenance frequencies as needed.
2. For Permittees with larger asset inventories, a more efficient process would be to download geospatial data, view in GIS with asset layers and other information to delineate vulnerable areas, tag assets that are more at risk, assess and track how asset conditions are impacted, and adjust risk analyses and/or asset management plans accordingly.

A similar approach can be taken to evaluate heat, drought, and wildfire threat. As described in Section 3.2.1, Cal-Adapt provides publicly accessible information on projected changes in temperature, precipitation, extreme heat, drought, and other climate variables under two climate scenarios. Appendix B contains figures illustrating countywide climate projections developed from Cal-Adapt's climate tools from the Fourth Climate Change Assessment. The figures illustrate the number of extreme heat days per year, the maximum amount of daily precipitation each year, and

the average annual acres burned. Cal-Adapt data can also be downloaded to analyze climate projections at a local level. Permittees are encouraged to consult Cal-Adapt directly to select datasets, scenarios, and planning horizons appropriate to their specific project context. The selection of the predicted climate scenario is up to each jurisdiction and should be consistent with local climate/sustainability plans.

Once existing asset locations have been assessed for climate risk, this information can be factored into asset management programs to guide maintenance level and frequency, as those programs evolve. Some existing GSI assets in low-lying areas near the Bay, including large underground full trash capture devices, that cannot be relocated to higher ground may need to be retrofitted with alternative outlet structures or stormwater pumps to convey runoff from underdrains now impeded by sea-level rise, tidal surges, or groundwater intrusion.

## 4.2 NEW ASSETS

For treatment systems associated with Regulated Projects, locations are determined by the project. Climate threats associated with that location may not be avoided but can be mitigated through the design strategies presented herein. The resources described under Section 4.1, Existing Permittee Assets, can be used to determine the expected severity of the climate threat at a particular location and the associated level of risk to be considered during design and future maintenance efforts. If it is determined that the risks cannot be successfully mitigated at that location, alternative (offsite) compliance may need to be considered.

Planning for non-regulated GSI retrofit projects may be able to take the geospatial nature of climate threats into account (unless GSI is being incorporated into a project with a set location). Again, the same resources mentioned above can be used to evaluate opportunities for GSI projects at select locations with reduced risk of inundation, flooding, wildfire, drought, and heat effects. This could result in cost savings for future maintenance and a longer facility useful life. An adaptation planning strategy could include deprioritizing the installation of future assets in locations of greater vulnerability.

Watershed-scale or One Water approaches can be used, where appropriate, to coordinate implementation of projects that improve the resilience, maintenance, or long-term performance of stormwater quality-related assets. An example of watershed-scale, climate-resilient project planning is the San Bruno Creek OneWatershed Climate Resilience Plan Pilot Study (C/CAG 2026), which demonstrates application of the OneWatershed Framework (C/CAG 2025) in the San Bruno Creek watershed. The following approach from the OneWatershed Framework (or similar) could be applied to guide planning and implementation of new GSI assets:

1. *"Identify multiagency, multi-stakeholder collaborative partnerships specific to the communities in the target watershed.*
2. *Assess watershed-scale vulnerability of water infrastructure and assets to climate hazards*
    a. *Compile climate change hazard and community vulnerability data available, along with local studies.*
    b. *Conduct a community vulnerability assessment to understand community sensitivity to, potential impact from, and adaptive capacity to moderate harm from climate threats.*

c. *Use the outcomes of 2a and 2b to identify vulnerable infrastructure assets within the watershed.*

3. *Identify and prioritize climate resilience projects."*

Additional details and lessons learned from applying this approach are provided in the San Bruno Creek OneWatershed Climate Resilience Plan Pilot Study (C/CAG 2026).

# 5 ADAPTATION STRATEGIES

Section 5 presents discussions of climate change adaptation strategies related to: policy and planning; location of assets; community engagement; engineering and landscape design; operation and maintenance; and implementation and adaptive management. These discussions focus primarily on GSI and vegetated non-LID systems; although many of the strategies can be applied to other types of assets as well.

## 5.1 POLICY AND PLANNING STRATEGIES[18]

### 5.1.1 Benefits of GSI for Climate Resilience

Municipalities can better prepare for climate change impacts by understanding how it affects their GSI assets and the benefits of climate resilience. The CRRG identifies six benefits from creating more climate resilient assets in advance of increasing climate impacts, including:

1. Managing localized urban flooding;
2. Preventing and reducing erosion;
3. Reducing urban heat impacts;
4. Improving air quality;
5. Water supply augmentation; and
6. Human health benefits.

While the most severe impacts of climate change may be decades away, there are incentives to act in the near term. Early adoption of policies and plans that include strategies for adapting to climate change can lead to:

- Lower cost to implement asset changes with more time to plan and finance adaptations;
- Lower cost of maintaining assets that are more resilient to impacts;
- Lower risk to other community assets when GSI assets are resilient and less likely to fail;
- Improved functioning of existing traditional infrastructure and/or postponed infrastructure upgrades;
- More resilient GSI assets that are better at protecting pollinators, plants, and wildlife, which can provide biodiversity benefits; and
- Better outcomes for GSI assets that can take many years to attain maximum benefits, such as large stature trees.

While locating, designing and installing more resilient GSI assets may have higher upfront costs, the long-term benefits could exceed the initial investments. For example, on a municipal-wide scale, policies that prevent GSI from being located in areas projected to be impacted by sea level rise could reduce costs. On green street projects, policies requiring that stormwater curb extension designs include a high-flow bypass, a feature that is not currently included in most bioretention areas, will incur capital costs to implement, but including that feature could reduce maintenance costs in the long-term by reducing erosion and mulch issues. Engaging community and policymakers throughout the process helps to broaden support so that chosen strategies

[18] References to climate action plans, One Water initiatives, urban forestry programs, equity considerations, and related planning efforts are included only as examples of planning coordination opportunities where they support adaptation of stormwater quality-related assets. These references are not intended to expand the scope of MRP Provision C.21.b.v or establish new planning requirements for Permittees.

deliver the desired effects and benefits.

### 5.1.2 Integrating GSI and Climate Policies and Programs

Another method for municipalities to realize the benefits of adaptation planning, such as those listed in Section 5.1.1, is to integrate GSI goals and concepts into climate action plans, policies and programs, such as those cited in Section 5.1.7, and work with community-based organizations (CBOs) on their plans and programs. One example of integrating resilience and CBO partnerships in the San Francisco Bay Area is the use of regenerative landscaping principles, first developed in Alameda County by StopWaste through the Bay-Friendly landscaping program. Working with local watershed organizations, the next generation of workers can be trained to design and maintain GSI measures that incorporate resilient design and maintenance features.

### 5.1.3 GSI and Equity (with respect to climate impacts)

Including resilience considerations in approaches for planning and siting GSI can simultaneously improve climate resilience, quality of life factors, and underperforming infrastructure. Where local agencies elect to consider equity, adaptation investments for stormwater quality-related assets may be prioritized based on documented climate-related vulnerabilities or service needs.

For example, as described in the CRRG, C/CAG used a multi-pronged set of equity criteria, including projected increases in urban heat and low rates of vehicle ownership, to prioritize GSI as part of its Sustainable Streets Master Plan and GSI projects. The City of Tucson's "Tucson Clean and Beautiful" program offers utility rebate programs that fund GSI with trees to reduce urban heat. Tucson also uses the Tree Equity Score software developed by American Forests, which uses canopy coverage, climate, demographic, and socioeconomic data.

The CBO, Climate Resilient Communities, worked with the C/CAG and other stakeholders to create the OneWatershed Climate Resilience Framework (Framework). The Framework supports collaborative efforts across the County to achieve long-term, strategic climate resilience. Using a "community co-creation" approach with quantitative data for direction and local knowledge to implement multi-benefit projects that address resilience and regulatory needs, the Framework integrates equity seamlessly into the project goals, input and process.

The organization Save the Bay created a vision for Bay Smart Communities in 2019[19] to answer questions related to climate change, water resources, and environmental justice. The effort brought together multiple stakeholders, including the CBO, Breakthrough Communities[20] in Oakland, and resulted in a report and a "Bay Smart Communities" program that charts a course for future actions integrating GSI, urban forestry, equity, transportation, growth and water resources.

It is well documented that poor neighborhoods in the US have not received as much investment in urban forestry compared with wealthier neighborhoods, resulting in a lower average tree canopy coverage. Using metrics that are based on infrastructure level of service, as opposed to economic or racial metrics, can consider equity and be seen as a more neutral approach. However, to avoid "green gentrification" that may result from improvements in formerly neglected neighborhoods, some jurisdictions integrate their Capital Improvement Program planning with other policies and

[19] More information can be found at: https://savesfbay.org/bay-smart-communities/
[20] More information can be found at: https://www.breakthroughcommunities.info/

programs that create and preserve affordable housing to avoid displacement.

The City of Boise, Idaho, uses two metrics for prioritizing GSI projects: canopy coverage and localized flooding. The City looks for areas with minimal street trees and underperforming gray infrastructure when deciding where to build and retrofit existing City infrastructure. In the City's Capital Improvement Program, planting of new street trees that also function as stormwater treatment systems is prioritized. These "tree well filters" often use suspended pavement systems that both increase the soil volume for new trees and provide space for bioretention to treat roadway runoff from adjacent impervious roadway surfaces. More soil volume allows trees to grow to large stature without causing heaving of sidewalks and other problems. This strategy reduces localized flooding and provides more shade for the neighborhood as the trees grow over time. The strategy also prioritizes infrastructure improvements in neighborhoods that may have been neglected in the past and where the greatest need exists.

### 5.1.4 Working with the Public and Other Local Organizations

Watershed organizations, such as "Friends of Creek" groups, and schools are other examples of community stakeholders that municipalities can partner with for success. The CRRG's Section 3.3 provides more details on how community outreach and engagement can create triple-bottom-line successes and bring communities together to address the impacts of climate change. For example, the San Francisco Estuary Institute, has several programs that make connections between the San Francisco Bay, water resources and resilient landscaping. A project in 2018 produced the San Francisco Bay Shoreline Adaptation Atlas which provides information on sea level rise and adaptations to climate change.[21]

Another organization working on integrating climate resiliency and GSI is the Watershed Project in Richmond. The Watershed Project created the North Richmond Collaborative Shoreline Adaptation Project which brings together the community and various stakeholders in the North Richmond area to address challenges and adaptation strategies.[22]

### 5.1.5 GSI Siting – New and Existing GSI Asset Policies

As discussed in Section 3, existing and future GSI assets near the Bay will face greater challenges due to the impacts of climate change. Therefore, policies and plans may need to be updated to include strategies for retrofitting existing impacted assets and for designing/siting new GSI.

The OneShoreline Planning Policy Guidance (OneShoreline 2023) from San Mateo County contains many recommendations for adaptation-related policies and model actions that can be included in municipal plans and Development Standards. One of the Guidance's model actions recommends that municipalities collaborate with OneShoreline to evaluate and, if necessary and feasible, amend building codes, zoning ordinances, and other standards to ensure that development projects adequately assess impacts from sea level rise, shallow groundwater, and other factors

[21] More information can be found at https://www.sfei.org/projects/san-francisco-bay-shoreline-adaptation-atlas
[22] More information can be found at https://thewatershedproject.org/our-programs/climate-ready-communities/shoreline/

affecting siting and design. It also includes a specific stormwater-related recommendation that the assets be designed to function under "Future Conditions"[23] for the life of the project.

Other potential siting policies include the following:

- Prioritize siting new public GSI and trash control assets upland from the Bay and out of the projected sea level rise-affected areas, where feasible. This will likely be a challenge for large trash control devices that are often located at the bottom of the watersheds for maximum cost-effectiveness.
- Promote GSI measures that can be located above grade, such as flow-through planters and green roofs, in vulnerable areas to avoid groundwater issues and rising water levels. In 2017, the City and County of San Francisco enacted the Better Roofs program with requirements that new and redevelopment projects use green/living roofs and/or solar PV systems.[24]
- Consider including GSI siting and technical information in municipal development guidelines for Priority Development Areas (sections of Bay Area communities that have been designated for new and redevelopment) to set expectations and standards for project proponents. An example of such guidelines is Emeryville's Stormwater Guidelines for Green, Dense Redevelopment (City of Emeryville 2005).

### 5.1.6 GSI Scope and Scale

Given the likely disruption climate change will bring to the Bay Area, there are questions about the benefits a small number of GSI systems in a watershed can realistically provide. A watershed approach is always the goal for stormwater management and may be even more needed in the future. Larger-scale regional GSI assets may become more prevalent in the future, such as the "Cloudburst" strategies and designs for flood parks and other areas first developed in Copenhagen, Denmark, and now in use in New York City and Hoboken, New Jersey.

A local example of a flood park is in Hayward. The park was constructed by the Alameda County Flood Control and Water Conservation District in 2015. The district's "creative solution was to build a detention basin to temporarily hold excess water during heavy rainstorms. The two-acre detention basin was built at a playing field near Mt. Eden High School, owned by the Hayward Unified School District. The entire field was dug out and deepened to hold up to 3 feet of stormwater. The basin was then graded so that once the Hayward Unified School District completes its improvements, it can be used as an ADA-compliant soccer field when dry."[25]

### 5.1.7 Examples of Climate Action and Resiliency Plans

Permittees have been developing climate action plans for over twenty years. Some plans include resilience and adaptation strategies related to stormwater management. As plans are developed

[23] The document uses the term "Future Conditions" to refer to water-related hazards associated with climate change such as, but not limited to, sea level rise, flooding, etc.
[24] More information can be found at: https://sfplanning.org/resource/zoning-administrator-bulletin-no-11-better-roofs-ordinance

and/or updated, GSI measures that utilize the strategies in the CCAR can be integrated into actions in those plans. Where local climate action plans identify projects affecting stormwater infrastructure, Permittees may consider coordinating implementation to improve the resilience of stormwater quality-related assets.

Examples of Bay Area regional and local climate action plans that include consideration of resilience strategies related to GSI include the following:

- Bay Area Air District (Air District), Bay Area Regional Climate Action Plan (2026). The Air District coordinated with many other regional agencies to summarize State goals and approach to climate action, current trends, legislation, and aspects of the actions from over 80 city and county climate-related plans in the Bay Area. Guided by nine foundational climate action principles, developed in partnership with Bay Area CBOs focused on climate justice and equity, the plan lists diverse greenhouse gas reduction actions to improve the climate and create a more resilient Bay Area. While the plan focuses on reducing GHG emissions and air pollution, it also contains resilience, sustainability, and regenerative actions that integrate rural/agricultural and urban issues related to water, greening, stormwater, nature-based solutions, and urban forestry.
- City of San José, Climate Adaptation and Resilience Plan (2026). The plan identifies foundational measures, policies, and strategies to help increase climate resilience and better protect vulnerable communities throughout San José. One of the plan's structural measures highlights the importance of GSI and the use of nature-based solutions to help reduce flooding risks, improve water quality, and strengthen long-term climate resilience (City of San José 2026).
- City of Mountain View, Biodiversity and Urban Forest Plan (2026). The plan includes discussion of GSI systems, habitat, vulnerable species, pollinators and other topics not typically included in urban forest plans.
- City of East Palo Alto, 2030 Climate Action Plan (2023). The 2023 plan is an update to the City's 2011 Climate Action Plan and includes adaptation strategies, GSI, climate resilience and projects with SMCWPPP and Climate Resilient Communities (CRC), securing grant funding to construct rain gardens on residential properties for to reduce localized flooding.
- In Contra Costa County, several municipalities have adopted climate action, resilience, and/or adaptation plans that include GSI:
    - Contra Costa County, Climate Action and Adaptation Plan Update (2024). The plan includes actions such as "NI-5: Minimize heat island effects through the use of cool roofs, green infrastructure, tree canopy, cool paint and pavement, and other emerging strategies.
    - City of El Cerrito, Climate Action & Adaptation Plan (2024). The plan contains GSI integration, a climate vulnerability assessment and an adaptation section aimed at extreme heat, wildfire smoke, flooding, and other local hazards. Equity and engagement are embedded.
    - City of Richmond, Sea Level Rise Adaptation & Resiliency Plan (in development). The plan's fact sheet includes references to natural systems and stormwater.

- City of Walnut Creek, Sustainability Action Plan (2023). The plan covers adaptation and resilience incorporating GSI and urban forestry in over 125 actions organized into near-/mid-/long-term timeframes, including air-quality response, local resilience hubs, waste-and-materials resilience, and transport/land-use measures that reduce risk during heat or smoke events.
- City of San Ramon, Climate Action Plan (2025). The plan has sections on nature-based solutions and integrates the City's GI Plan with nature-based carbon sequestration strategies.
- City of Martinez, Climate Action Plan (2009). The first climate action plan in the County, it contains adaptation components and is useful as a baseline reference.

Outside of the Bay Area, there are many examples of GSI integration with climate change adaptation. The City and County of Denver created the Green Continuum Streets Guidelines (City/County of Denver 2021). The guidelines present findings on current and projected increases in urban heat in the region, with a focus on heat in street environments. The guidelines present strategies to reduce roadway heat primarily through enhanced street tree planting. Figure 5-1 includes the graphic from the guidelines that demonstrates a key concept of climate change: some feedback loops can be either negative or positive, depending on the actions taken. If landscaping and tree canopy are reduced, urban heat and energy consumption increase – exacerbating climate change. But the opposite action can create a regenerative feedback loop: when urban areas are retrofitted with stormwater forestry systems, urban cooling and carbon sequestration are achieved – reducing greenhouse gas emissions and cooling the planet.

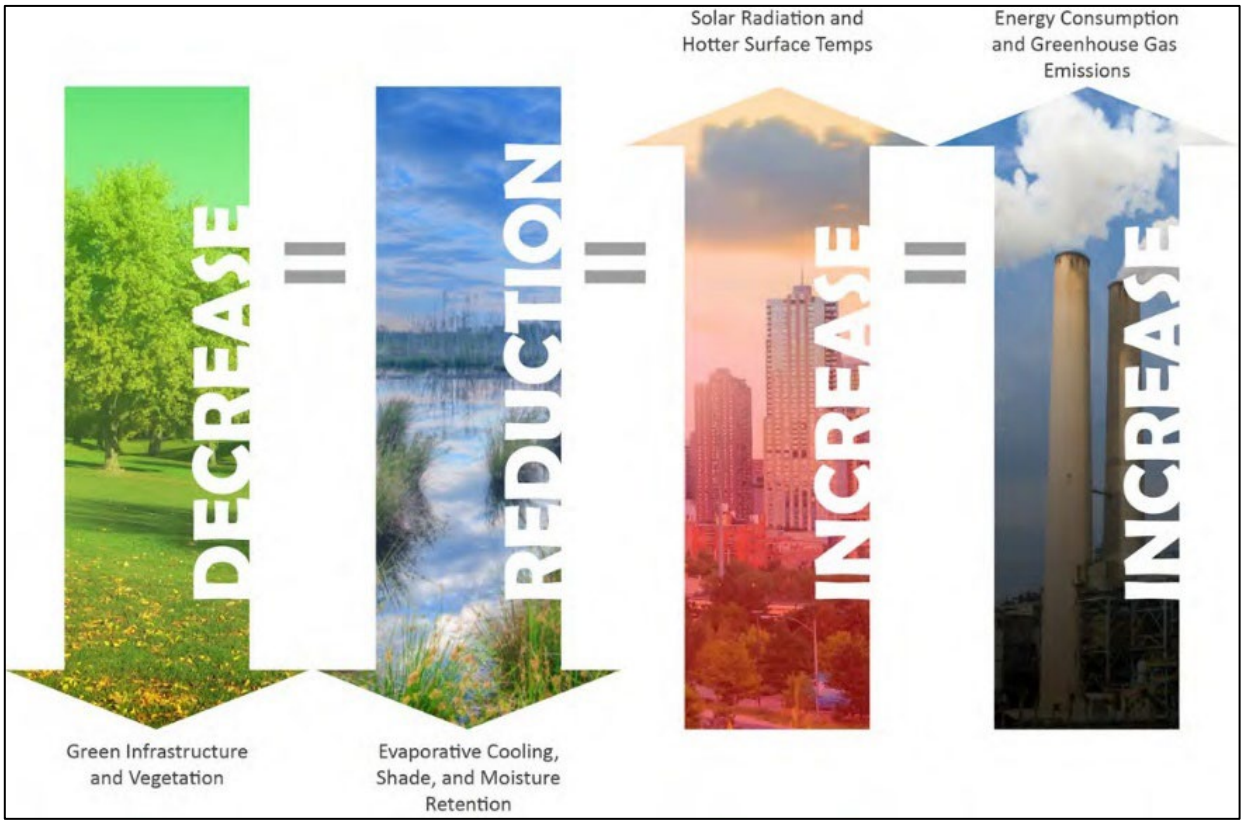


*Figure 5-1. The Climate/Energy Feedback Loop – Credit: City/County of Denver*

Similar to Denver's research, the Environmental Protection Agency has compiled information on urban heat and reduction strategies using vegetation, trees, and GSI on its website.[26]

## 5.2 ENGINEERING AND LANDSCAPING DESIGN STRATEGIES

To adapt to a changing climate, engineered GSI systems will likely need modifications to typical design and construction practices, as well as a feedback process for adaptive management. This section of the CCAR identifies possible strategies for creating more resilient, beneficial stormwater infrastructure, along with ideas for adaptive management.

### 5.2.1 CRRG GSI Design and Construction Adaptation Strategies

As described earlier, the CCAR builds on the CRRG's work by applying the adaptation strategies identified at the national scale to the conditions and impacts relevant to the Bay Area. The design and construction adaptation strategies identified in the CRRG are summarized in Table 5-1.

**Table 5-1. Summary of CRRG Design and Construction Adaptation Strategies**

| GSI Measure Category | CRRG Design and Construction Adaptation Strategy |
|---|---|
| 1. Infiltration | • Manage increased flows<br>• Retain more water<br>• Prevent sea-level rise backup into underdrains<br>• Create conditions for cooler and shadier systems |
| 2. Collection and Use | • Manage increased flows<br>• Retain more water<br>• Prevent subsurface water intrusion<br>• Prevent sea-level rise backup into underdrains |
| 3. Vegetated LID | • Manage increased flows<br>• Retain more water<br>• Increase vegetation health/resilience<br>• Create conditions allowing larger, more resilient trees<br>• Prevent subsurface water intrusion<br>• Prevent sea-level rise backup into underdrains<br>• Find new water sources for vegetation |

### 5.2.2 Bay Area Precipitation Record Updates

The MRP contains flow-based, volume-based, and combination flow/volume-based sizing criteria for LID/GSI and non-LID systems. The application of some of these criteria, such as capture of 80% of average annual runoff, is based on tools developed in the early 2000's using historical rainfall data.

Recent scientific research has demonstrated that storms will become more intense and extreme precipitation will occur more frequently as a result of climate change. The degree of severity depends on which future warming scenarios are represented in predictive climate models.

[26] More information can be found at: https://www.epa.gov/heatislands/using-trees-and-vegetation-reduce-heat-islands

However, as discussed in Section 3, it is challenging to accurately convert daily precipitation predictions from downscaled Global Climate Models, such as those available from Cal-Adapt, to representative hourly time series required to run hydrologic models for analysis of stormwater capture facilities. One study showed that the Global Climate Model scenarios produce a wide range of results for the sizing of GSI facilities with a 48-hour drawdown time or less, making it difficult to recommend a future planning scenario for GSI sizing (Havens, et al. 2020).

Another resource described in Section 3 is the set of updated rainfall intensity-duration-frequency (IDF) curves developed by Lawrence Berkeley National Laboratory and the Pathways Climate Institute in Volume 2 of the San Francisco Bay Area Precipitation in a Warmer World report (Mak et al. 2023). For full trash capture devices, which are designed to treat the 1-year, 1-hour storm, these updated, locally scaled IDF projections could be considered when designing or retrofitting devices to ensure they continue to perform effectively under future precipitation patterns.

While predicting future rainfall patterns is challenging, the historic rainfall records for the sizing tools can at a minimum be extended up to current times. Using more recent rainfall data, Permittees can update tools such as sizing tables/curves and modeling software that assist designers in sizing stormwater quality assets that are more resilient to current and near-term conditions. These tools include the following:

- The Bay Area Hydrology Model (BAHM), which was updated in 2023 to extend the rainfall time series from 2013 to 2022;
- Sizing worksheets for volume-based, flow-based, and combination flow/volume-based LID/GSI measures; and
- Guidance documents that provide sizing calculations for treatment measures.

### 5.2.3 CCAR GSI Design and Construction Adaptation Strategies

Drawing on work from the CRRG and other sources, the CCAR identifies a suite of related and additional strategies municipalities may consider using to modify plans, designs, and construction details to improve resilience. Most of the strategies focus on biotreatment systems, specifically ensuring that they support healthy plant growth while also improving water quality and meeting design, engineering, construction, and maintenance needs. The CCAR strategies are examples of potential future considerations and not necessarily regional recommendations or expectations. The strategies are summarized in Table 6-1.

**Biotreatment Soil Media (BSM) Specification**

Healthy plants and biotreatment performance are dependent on the right soil media. The changing climate is affecting the performance of the typical soil media used for bioretention areas, called Biotreatment Soil Media (BSM). BASMAA, now known as the BAMS Collaborative, created the BASMAA Regional BSM Specification in 2010 and last updated it in 2016. It is expected that the BASMAA BSM specification will be reviewed for possible changes during the upcoming MRP reissuance to improve performance and respond to climate impacts.

The BSM Specification has two options for the creation of an acceptable BSM, including testing and supplier information:

- Option 1 (the “typical method”) allows vendors to produce or obtain the compost and sand

components, test them separately, then blend the components within given percentage ranges. The blended BSM is provided to customers with test results from compost and sand testing laboratories using BSM samples collected and tested within 120 days of delivery. It does not require that the final media be tested again for permeability or other parameters, however that information is often provided voluntarily by the suppliers.

- Option 2 (the "alternative method") allows for more flexibility on the part of the supplier related to the components or "ingredients" in the BSM but does require the vendor to obtain additional testing results from a geotechnical laboratory related to the permeability of a BSM sample after it has been compacted using one of two standard compaction tests. Option 2 is not used very often because of the risk of creating a BSM product that does not meet the specification requirements and the costs of the additional laboratory testing.

The BASMAA BSM specification has several advantages that have been realized over the last 10 years:

- It has created a relatively simple and standardized method that BSM suppliers have become accustomed to, which has created a relatively consistent BSM product across the marketplace in the Bay Area for new and redevelopment projects to purchase for their newly installed biotreatment systems.
- It does not require extensive or expensive laboratory testing.
- It uses commonly available materials – compost and "concrete sand" - that typically meet similar specifications from other agencies, such as Caltrans, which makes obtaining the materials easier and more affordable.
- The cost is similar to the prices of other landscape planting media.
- The compost fraction provides readily available nutrients to plants in the landscape by feeding the soil in a regenerative method instead of relying on synthetic fertilizers that feed the plants directly.
- The relatively high fraction of the sand component in the BSM specification – compared with typical planting soil - creates a product with a relatively high permeability, which allows the biotreatment system to treat runoff in a smaller footprint, taking up less land in a region with extremely high land costs. This keeps the overall cost of constructing LID treatment systems down in development projects, reducing cost pressure on land developers and the purchasers/users of completed projects.
- The high permeability of the BSM allows biotreatment areas to dry out within 72 hours, avoiding standing water and possible vector problems (primarily mosquitoes).
- Supplying BSM uses a large amount of compost, which helps compost producers with market development, and California municipalities comply with State regulations that require the procurement of compost and mulch to stimulate the market for these products.

The "typical method" in Option 1 of the BASMAA BSM specification also creates a product that has these disadvantages:

- The large amounts of sand (60-70%) create a media with low water-holding capacity

(WHC). The BSM therefore dries out quickly after each storm.

- The low WHC of the BSM results in either high levels of irrigation needed to keep plants healthy or increased water-related stress for the vegetation if there is no irrigation system and the vegetation needs to survive with only natural rainfall/runoff. The amount of irrigation needed and/or levels of water-related stress in vegetation correlate with increases in the average temperature of the climate where the biotreatment facility is located. In milder areas of the Bay Area, vegetation in biotreatment facilities can survive without irrigation, but in hotter areas it can suffer – even with high irrigation.
- Trees (especially large ones) planted in BSM require more irrigation than small plants and shrubs and will require even more during the next extended drought.
- The relatively large amounts of compost (30-40%) and sand with no other components to provide soil structure create a BSM that may export nutrients in some situations. However, there is evidence that export diminishes over time as the roots of the plants grow into the full BSM profile and when beneficial bacteria and fungi become established.[27] Additionally, the amount of compost and organic matter in the BSM gradually declines as it mineralizes, and as nutrients are taken up by the plants.
- Many suppliers in the Bay Area have had trouble meeting the ¼ inch sieve requirement in the compost gradation.

There are amendments that have promising characteristics for improving BSM performance. Biochar appears to be a powerful new strategy for improving soil structure, water holding capacity, soil life, pollutant removal and sequestering carbon. Adding 10 percent biochar to the BSM "recipe" can double water holding capacity.[28]

Bearing in mind the advantages and disadvantages described above with the existing BSM specification, there are several possible strategies to consider:

- Review research being done by others on BSM specifications around North America and recommend modifications to the BASMAA BSM specification to improve the WHC.
- Consider creating two separate BSM specifications for biotreatment areas with and without underdrains.
- Encourage use of the "alternative method" of the BSM specification to create products that have more WHC, such as by using biochar and other amendments.
- For improved tree health in biotreatment areas, consider "hybrid" design approaches to soil media. A hybrid design could include use of the typical BSM in one part of the system and a more standard planting soil in an adjacent area of the system that tree roots can be encouraged to grow into over time.

**Biotreatment Area Plant Palette**

When biotreatment areas were first designed in the Bay Area, it was thought that they would

[27] More information can be found at: BSM Literature Review (BASMAA 2016) https://basmaa.org/wp-content/uploads/2021/01/basmaaliteraturereviewbioretentiondesignfortreehealth.pdf and BSM Report (Owen et al. 2023) https://repository.library.noaa.gov/view/noaa/33059/noaa_33059_DS1.pdf

[28] More information can be found at: https://link.springer.com/article/10.1186/2251-6832-4-44

function like marshy or riparian landscapes that were regularly inundated or wet for extended periods. Therefore, the plant palette would match that design philosophy. However, it has become apparent that, given the combination of the sandy BSM specification and the Bay's Mediterranean climate, biotreatment areas are wet for only brief periods, and the BSM dries out quickly after rain events. This has led to changes in design over the last few years, with drought-tolerant plant palettes from dry landscapes being considered.

In addition, the State of California has many regulations and programs related to the efficient use of water and irrigation for vegetation, including through the Department of Water Resources,[29] the increasingly strict Model Water Efficient Landscape Ordinance (MWELO),[30] and regulations for irrigated turf in AB 1572.[31] These State regulations have affected plant and irrigation designs.

There are some possible strategies to consider in response to these changes:

- Continue selecting plants that are drought-tolerant and perform well in very sandy soils.
- Consider the use of "bioretention sod" products that are typically blends of drought-tolerant, native turf grasses designed for biotreatment areas. While some agencies have various issues with tall grass landscapes, these products can:
    - Avoid the use of mulch because they have 100% soil coverage;
    - Have "instant" plant establishment - as a rolled-out sod product – providing less potential erosion of the BSM underneath the sod;
    - Include grass species with roots that can grow to reach native soils beneath the BSM (e.g., some native bunch grass roots can grow 10 feet deep); and,
    - Use mechanical equipment for raised height grass mowing, possible resulting in lower maintenance costs compared to the typical biotreatment area design with bunch grasses and mulch that require more manual labor. For more information, see landscape maintenance strategies in Section 5.3.1.

**Mulch Considerations**

Mulch is defined as the layer of material covering bare soil – it can consist of rock, wood or other materials. Stormwater landscapes have special mulch needs, and the most suitable type can vary depending on the system design, plant palette and the location's microclimate.

Rock mulch has often been used to protect sandy BSM from erosion – especially in biotreatment areas that receive higher flows with significant erosion potential. Historically, Bay Area biotreatment area designs have often featured a "dry creek bed" aesthetic that uses a lot of rock. Increasing urban heat and more frequent droughts from climate change is causing designers to re-examine that practice. In hotter parts of the Bay Area, excessive rock mulch retains heat that can have negative impacts on vegetation and plant water use. For these reasons, many stormwater programs are now recommending the application of wood mulch in stormwater landscapes.

[29] More information can be found at: https://water.ca.gov/Programs/All-Programs/Climate-Change-Program
[30] More information can be found at: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Model-Water-Efficient-Landscape-Ordinance
[31] More information can be found at: https://saveourwater.com/#1

A minimum of three inches of recycled wood mulch over exposed soil areas is required by the MWELO in most new landscapes with some exceptions. Wood mulch has many benefits[32]:

- Reduces the growth of unwanted plants;
- Regulates soil temperature and evaporation;
- Decreases the need for watering of plants;
- Adds aesthetic value; and
- Protects soil from erosion by wind and water forces.

In particular, wood mulch is recommended[33] over rock mulch because wood mulch:

- Adds organic matter to the soil;
- Provides nutrients for soil microorganisms and plants;
- Creates demand for locally produced recycled material such as tree trimmings, including branches, twigs, leaves, and bark;
- Improves soil structure;
- Increases soil water retention;
- Absorbs rainwater and releases it slowly; and
- Keeps organic materials out of landfills.

Industrial (high heat) composting of the wood mulch before application in a biotreatment area provides additional benefits[34]:

- Reduces pathogens that may occur in vegetation, such as Sudden Oak Death and pests[35];
- Helps the mulch float less and knit together to stay in place;
- Inoculates the mulch with beneficial flora and fauna[36];
- Increases moisture content and water-holding capacity;
- Decreases flammability;[37] and
- Adds compost particles and organic matter.

The decreased flammability of composted wood mulch[38] can also be of use in those biotreatment areas that are near or in the Wildland-Urban Interface or areas that may have a higher risk of fire[39]

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[32] More information can be found at: https://ucanr.edu/site/uc-master-gardener-program-contra-costa-county/article/mulch-its-got-you-covered
[33] More information can be found at: https://ucanr.edu/program/uc-master-gardener-program/mulch
[34] More information can be found at: https://www.biocycle.net/whats-unique-about-composted-mulches/
[35] More information can be found at: https://www.researchgate.net/publication/6823308_Composting_is_an_effective_treatment_option_for_sanitization_of_Phytophthora_ramorum-infected_plant_material
[36] More information can be found at: https://calrecycle.ca.gov/organics/compostmulch/
[37] More information can be found at: https://naes.agnt.unr.edu/PMS/Pubs/1510_2011_95.pdf
[38] More information can be found at: https://firesafemarin.org/wp-content/uploads/Mulch-Shaorun-et-al.-FSJ.pdf
[39] More information can be found at: https://firesafemarin.org/create-a-fire-smart-yard/mulch/

including urban biotreatment areas where people are more likely to toss burning cigarette butts.

To create consistency in the marketplace for composted wood mulch used in bioretention areas and provide a standard for permittees and designers to reference, Bay Area agencies partnered to develop the "Biotreatment Wood Mulch" or "BWM" specification in 2022.[40] Some Bay Area GSI guidance documents are now recommending the pairing of BWM and BSM in biotreatment areas.

Figures 5-2 and 5-3 show images of uncomposted and composted mulch for comparison.

*Figure 5-2. Uncomposted Wood Mulch*

*Figure 5-3. Composted Wood Mulch*

In summary, mulch-related strategies for combating the effects of increased urban heat and droughts from climate change include:

- Using composted wood mulch;
- Including a deeper mulch section (4-6 inches) over the BSM as needed; and
- Reducing the use of large rock and gravel mulches (except as needed for erosion protection).

See Section 5.3.1 for more information on mulch maintenance strategies.

**Irrigation Practices**

As with mulch and soil, climate change impacts such as heat and drought are affecting plant health through the lens of water usage of vegetation in biotreatment areas.

There are several types of strategies related to irrigation and climate change adaptation:

- Irrigation design for water conservation;
- Irrigation design for plant health; and
- Irrigation water sources.

Conservation of water is critical for the future of California's arid and Mediterranean landscapes.

[40] More information can be found at: https://scvurppp.org/wp-content/uploads/2021/08/Biotreatment-Area-Wood-Mulch-Spec-8-1-21-Final.pdf

Irrigation controllers with “smart” features that can detect current and future rain events are now required for certain new and retrofitted landscapes, but many controllers without those features still exist.

The design and maintenance of irrigation systems in bioretention areas can be critical to vegetation health. As the knowledge of bioretention area design improves and maintenance best management practices are further developed with feedback given to designers, it is now understood that irrigation system designs for typical landscapes may not work best for bioretention areas. The BSM plays a large role in the differences. In a typical landscape, water from drip emitters flows out in a pyramidal pattern in the section view of the soil. But in a bioretention area, the BSM is so permeable that the water flows directly downward without spreading. This can lead to irrigation water “missing” the plant roots if the emitter is not directly above the root area of the plant. To address that problem, some designers are moving to overhead spray irrigation emitters (with pop-up emitters) instead of emitters that are on the soil surface or subsurface.

Diversifying the sources of irrigation water can have several advantages, including: a more resilient and diverse water portfolio during droughts, more plant diversity with high-water demand plants, and saving potable water for the highest and best uses.

However, there are potential challenges with alternative sources of water for irrigation of biotreatment areas including: regulatory barriers for the use of non-potable water (e.g., public health concerns); higher salt content in recycled water from wastewater treatment facilities which can harm sensitive plant species; irrigation system maintenance challenges (e.g., additional pre-treatment equipment and increased sediment that can block emitters); and erratic or limited supplies in some seasons.

Strategies that could be employed related to irrigation design and water sources:

- Conserve irrigation water by replacing irrigation controllers in existing landscapes;
- Compare water use rates and plant health resulting from surface drip, subsurface drip, and overhead spray;
- Consider using overhead spray for biotreatment area plant health as needed; and
- Consider diversifying the sources of irrigation water for biotreatment areas to increase resilience and conserve potable water.

**Biotreatment Infiltration and Groundwater Issues**

Most biotreatment systems in the Bay Area are not lined with impermeable materials to allow beneficial infiltration of stormwater into native soil and to provide more soil volume for vegetation. However, with sea level rise, it is projected that salty/brackish Bay water could intrude into groundwater areas near the Bay margin, and seasonal groundwater levels could rise. This could cause groundwater to rise into biotreatment areas, depending on factors such as coincidence of storms and high tide, the depth of the biotreatment area, historical fill practices, local soil types, depth to groundwater, and local geology. Rising groundwater can also create upward hydraulic pressure on a GSI system. If the rising groundwater is salty or brackish, it could affect the health of the plants in the GSI measures.

Strategies to counteract these impacts can include:

- Lining and/or containerizing more biotreatment areas with impermeable materials (adding weight to counteract any uplift if needed; and
- Shallower biotreatment design and construction, where feasible.

**Underdrains in High-Seasonal Groundwater and Tidal Locations**

A significant number of new GSI built in the Bay Area as part of new and redevelopment projects is in low-lying areas near the Bay. As the soil in those areas is most often clayey bay mud, GSI systems typically have underdrains that are connected to storm drain pipes that discharge to the Bay. As sea levels rise in combination with storm surges and high tides, these underdrains are likely to fail to perform if their outlets are submerged more often. Higher groundwater levels could also rise into underdrains in unlined biotreatment or pervious pavement systems and could result in temporary flooding, biofouling, and/or standing water in GSI systems for extended periods of time.

Design strategies to address these conditions could include the following:

- Installing flap gates, backflow preventers, or other types of systems in underdrains or adjacent storm drain pipes that can reduce backflow from rising Bay waters;
- Consider using pumps to convey treated water from underdrains to discharge points (not recommended due to the reliability and maintenance needs of pumps, but may be necessary in some situations).

**Trees in GSI**

Integrating trees into urban GSI can provide many additional benefits beyond typical trees in streets or parking lots but there are important considerations to get the GSI design right. Large trees in GSI can provide critical shade and cooling of people, smaller biotreatment area vegetation, soil, pavement and buildings that will be crucial with a hotter and drier climate. The CRRG identifies these benefits, including reducing and infiltrating runoff and improving water quality. Trees can be an important strategy in mitigating urban climate change impacts, but it is essential to recognize that the warmer, drier, and windier climate is already stressing urban forests. The CCAR identifies some additional strategies for the Bay Area to assist trees in GSI to be more resilient in a Mediterranean climate and the conditions in typical biotreatment areas. While there are important engineering, design, and maintenance concepts and practices that can be used to improve the resiliency and ecosystem services of urban trees, there are also keystone policies that can have a bigger impact on the urban forest, such as the establishment of minimum soil volumes for new tree planting and better funding of forestry programs.

Some of the challenges with maintaining healthy and resilient trees in GSI include:

- BSM: As described in the BSM section, there are challenges with the current BSM water holding capacity and soil structure, which can affect trees even more than small plants and shrubs. The same strategies for improving the BSM apply to trees as well.
- Irrigation and drought: Closely related to irrigation challenges, the main difference with trees in GSI compared to small plants and shrubs is the quantity of water that may be

needed to keep large trees alive during drought periods – especially if only BSM is provided for root growth.

- Shift in species: There is a movement among some arborists and landscape architects to specify more tree species from hotter climates in recognition of the changing climate. This trend will likely involve experimentation and stimulate debate.
- Pathogens and pests: Climate change and world trade are continuing to create conditions where plant-related diseases and insects that are deleterious to certain tree species are causing severe damage. While researchers are developing and identifying disease-resistant tree varieties, it does not appear to be fast enough to counter the spread of these diseases. However, with better tree planting conditions and maintenance, trees may become more resilient and resistant. If trees are less stressed, they may be able to fight off pests and disease more easily. Healthy planting soil for new trees that supports and is inoculated with the flora and fauna such as described in the "soil-food web,"[41] can be crucial to maintaining tree health.
- Wind: Similar to disease and insects, more severe wind events are damaging many urban trees, causing many to wonder if trees are worth planting. But the structural issues of planting trees in small pits are not new. With improved planting conditions and stronger root systems, trees will be less likely to fall over.
- Fire: Species of trees that are more susceptible to combustion and the spreading of fire should be considered carefully when planted in or near urban sections of the Bay Area. This could include some non-native tree species.
- Groundwater: Infiltration of Bay water into shallow groundwater areas and groundwater rise, especially water with a higher salt content, could severely affect trees near the Bay.

Strategies for adaptation include:

- Provide more rootable soil volume using better designs: more open space, suspended pavement systems, etc.
- Provide better WHC and soil structure in BSM and/or designs where tree roots can access soil with better WHC.
- Keep soil and tree roots cool with suspended pavement systems and composted wood mulch (but keeping mulch at least 6 inches away from tree trunk flares).
- Inspect nursery stock before and during planting.
- Enhance programs for urban forest planting, structural pruning, and maintenance as resources allow.

[41] More information can be found at: https://en.wikipedia.org/wiki/Soil_food_web

**Rainwater Harvesting and Use**

Rainwater harvesting in cisterns (larger, typically non-residential systems) is uncommon in the Bay Area, for several reasons. Holding large amounts of rainwater during the rainy season to use in the dry season is usually cost-prohibitive for sites with relatively small landscapes and there are regulations that make certain uses of rainwater more challenging.[42] The rare Bay Area successful rainwater harvesting system typically exists where there is high toilet flushing demand or high irrigation demand, such as a hospital or a golf course. However, rainwater harvesting will likely become more common and important in the future as climate change impacts increase and the current impediments to use change. As weather patterns change, become more erratic, and deviate more frequently from historic patterns, and as potable water prices increase, the holding and using of rainwater may begin to have a different cost calculation.

New designs, products and systems are entering the market, offering more options for GSI designers. For example, could rooftop tanks on buildings that function as tuned liquid mass dampers for seismic safety (such as the 50,000-gallon tank on the 62-story One Rincon Hill South Tower in San Francisco) be used as cisterns for rainwater harvesting? Similarly, One Rincon's 50,000-gallon water tank in the basement, being used for firefighting purposes, could possibly be combined with a rainwater harvesting system. Above and below-ground cisterns and structural cells for holding water may be used more effectively in the Bay Area's GSI systems in the future. Designs can be better integrated to consider holding water after rain events and releasing it to supplement and/or replace scarce irrigation supplies in the future. The designs need to be cognizant of the fact that soils need to dry out occasionally between storms, but, similar to the rise of "smart irrigation controllers," we may see the rise of "smart cistern controllers" and other more complex rainwater-use systems.

Potential strategies include:

- Consider different capacities of water-holding systems above and below ground in combination with biotreatment areas to measure benefits.
- Consider using data from existing Bay Area systems with cisterns as stand-alone measures or integrated with subsurface infiltration chambers to measure actual performance versus modeled/estimated performance.

**Pervious Pavement Surfacing for Heat Reduction**

Pervious pavement, as with any other type of pavement, can be constructed with high-albedo materials to increase sunlight reflection and reduce heat absorption, thereby reducing the urban heat island effect. While that option may not be as feasible with porous asphalt due to its typical dark color, there does not seem to be any impediment to light-colored concrete pavers or pervious concrete products. Some jurisdictions and/or building codes have specifications and/or

[42] More information can be found at: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/onsite_nonpotable_reuse_regulations.html

requirements related to cool roofs, so cool pavement could be a similar practice and requirement, while also adding the advantages of pervious pavement to the discussion.

Strategies to consider:

- Consider GSI policies and/or design specifications that require lighter color, more reflective (high albedo) pavement products;
- Consider policies and/or grant programs with incentives for pervious pavement and higher incentives for pavement with high albedo.

**Urban Soil Restoration**

Protecting existing landscapes, trees and healthy soils in new development projects is a key strategy of the LID approach. Improving and restoring urban soils can also be a key strategy for adapting to climate impacts through improved permeability, groundwater recharge, water-holding capacity, healthier plants and trees, and reduced irrigation demand. All of these changes create a more resilient urban landscape that can be critical during heat waves and droughts. But soils in urban areas are often already degraded from previous pavement, roadway, and building construction and/or from historic practices, including compaction and lime soil stabilization treatments or contamination from concrete slurry, pesticides, and other chemicals.

Restoring urban soils is a key aspect of China's "sponge city" concept,[43] developed by landscape architect and planner Kongjian Yu in the early 2000s and adopted as one of the country's nationwide urban construction policies in 2014. Similar to Copenhagen's "cloudburst" approach,[44] Australia's Sustainable Urban Design[45] and the USA's LID approach, sponge cities use new designs for parks, streets and other infrastructure to slow, spread and sink stormwater. But sponge cities focus more on the restoration of urban soils and use nature-based concepts, such as living soils and the "soil-food-web" concepts[46], that have also been developed in the United States by Dr. Elaine Ingham and others. The "Soils for Salmon" program[47] in the Seattle area and the Bay Area's home composting education program known as ReScape regenerative principles (formerly known as Bay-Friendly Landscaping) are also good examples of holistic soil practices and programs for urban soil renewal. Soil permeability and structure are greatly improved with the incorporation of organic content into the soil and the inoculation of microscopic and macroscopic animals, plants, and fungi, which is typically achieved with compost addition.

Microforests, also known as Miyawaki forests, are small, densely planted, and fast-growing urban landscapes, typically on retrofitted and impacted land, that can have a big effect on soil permeability and health. The fast-growing and dense vegetation and trees can create shade, cooling and biodiversity improvements in relatively short periods of time. The Berkeley Unified

[43] More information can be found at: https://en.wikipedia.org/wiki/Sponge_city
[44] More information can be found at: https://www.asla.org/awards-events-main-landing/honors-awards/pro-student-awards/2016-professional-awards/171784
[45] More information can be found at: https://www.susdrain.org/delivering-suds/using-suds/background/sustainable-drainage.html
[46] More information can be found at: https://soilfoodweb.com/how-it-works/
[47] More information can be found at: https://www.soilsforsalmon.org/

School District and the City of Berkeley have installed several microforest projects.[48] A microforest project in New Jersey saw a 50-fold increase in permeability a few years after soil restoration and planting.[49]

Strategies to consider:

- Incorporate organic content into soils before planting (typically with compost) to improve soil structure, carbon sequestration and soil life. This is typically required now in California as part of the Department of Water Resources MWELO regulations. See the BSM strategy section for information on the benefits and challenges of using compost in GSI.
- Use compost and mulch as soil amendments and soil improvements, as these actions restore soils, increase water holding capacity, sequester carbon, and can count towards procurement requirements for cities and counties regulated by the State's recovered organic waste program (SB 1383).[50]
- Incentivize urban microforest projects and consider integrating the projects with GSI design features.

**Manage Increased Flows from More Extreme Storm Intensities**

More intense storms will be challenging for biotreatment system resilience, but there are some design strategies that can be considered. The GSI approach of "slow it, spread it, sink it" can be applied.

In typical Bay Area urban roadways with center crowns, curbs, gutters and sidewalks, most of the runoff flow is designed to be concentrated and conveyed in the gutter during rain events with the destination of a storm drain. While concentration of flow is a typical aspect of traditional gray infrastructure, flow concentration is in opposition to GSI principles. In stormwater curb extensions, intense rain events can cause significant erosion, mulch disturbance, and/or plant damage because the design of the curb extension inherently places the inlet in the gutter area and concentrates the runoff stream. "Flow spreading" and "flow splitting" design elements can be utilized to dilute the flow into more manageable volumes and reduce the impacts of rain intensity.

Examples of flow spreading, conveyance, or energy dissipating systems include "green gutters" (described in SMCWPPP's GI Design Guide[51]), check dams, channels, runnels, trench drains, dry creek beds, bioswales, valley gutters, riprap, strategically placed blockages, and forebays. These types of systems can be constructed of pervious and/or impervious materials using roughened surfaces, multiple openings, and/or flush curbs to slow and distribute runoff to multiple entry areas into the main vegetated section of the bioretention area.

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[48] More information can be found at: http://berkeleyca.gov/sites/default/files/documents/2024-10-29 Item 14 Council Referral and Contract%20 Green Pocket Forest for Miyawaki Forest Design and Installation(1).pdf
[49] More information can be found at: https://www.nytimes.com/2025/07/22/climate/new-jersey-tiny-forests.html?unlocked_article_code=1.dlA.Mh9W._EuaQf7EOxVP&smid=url-share
[50] More information can be found at: https://calrecycle.ca.gov/organics/slcp/faq/recycledproducts/
[51] More information can be found at: https://flowstobay.org/data-resources/resources/green-infrastructure-design-guide/

Examples of flow splitting systems can include open or closed boxes or vaults with weirs, channels, and/or pipes set at elevations to divert low flows to GSI and high flows back to gray infrastructure. These systems need to be carefully engineered to meet permit-required hydraulic sizing criteria and not erroneously bypass stormwater around treatment systems.

Mirroring the redundancy of natural systems can also assist the designer of GSI in creating resilient and higher performing treatment measures that do not fail readily from one poorly designed element in the system. A single inlet that is easily blocked by one large plastic bag, causing flow to bypass a whole GSI measure, is an example of non-redundant design.

## 5.3 OPERATION AND MAINTENANCE STRATEGIES

### 5.3.1 Landscape Maintenance Strategies

As climate impacts increase stress on vegetation, erosion of BSM, and possibly loading of sediment in biotreatment areas, proper operation and maintenance practices will be critical to sustaining the performance of stormwater treatment systems. Typical biotreatment measures in the Bay Area have used small- to medium- sized native and other Mediterranean-climate-appropriate perennial plants, such as bunch grasses surrounded by wood mulch, for the last twenty years or so. Maintaining those landscapes typically involves manual labor. But with a changing climate, these vegetation maintenance practices can be reviewed to see if any changes are warranted or would increase GSI asset resilience. For the most part, maintenance practices are dependent on the landscape design (see related sections in Section 5.2.2), but additional climate adaptation strategies can be considered for operation and maintenance.

Potential adaptation strategies for maintenance are summarized in Table 6-1. These strategies are examples of potential future considerations and not necessarily regional recommendations or expectations.

**Landscape design's influence over maintenance**

As discussed in the design and construction strategies section, decisions on the elements (e.g., plant palette, mulch, irrigation and inlets) of vegetated stormwater treatment systems can lead to success or failure in the short and long terms and can create challenges for cost-effective maintenance. Maintenance of vegetated systems is likewise crucial to success. Impacts from climate change such as increased urban heat, drought, and more intense storms will exacerbate and possibly expose any problems with those decisions more rapidly. Maintenance adaptation strategies are partly reliant on landscape design and construction factors but can also be stand-alone measures.

In the first ten years of vegetated stormwater treatment system implementation in the Bay Area (i.e., from the late 90's to mid-2000's), "bioswales" were often built with conventional turf grasses, such as fescues, that were regularly mowed and mimicked the aesthetic of existing decorative, non-functional turf areas in parking lots and areas around commercial buildings. This approach also had the added advantage of using a landscape type that maintenance crews were familiar with, thereby minimizing the new maintenance training needed. But as the concepts of Integrated Pest Management and other holistic, sustainable landscape practices, such as the principles of

Bay-Friendly Landscaping,[52] became more common, turf-centered biotreatment began to be questioned. Practitioners began to look for other designs to avoid the environmental impacts of mowing, pesticides, chemical fertilizers and heavy water use that turf upkeep usually involves.

A planting design using bunch grasses and mulch eventually became the standard in the Bay Area. However, the new designs were not implemented with sufficient training for landscape maintenance professionals, who have appeared to struggle with how to maintain them. For example, the most commonly-used plant species in the Bay Area – the California Gray Rush (*Juncus patens*) – should be cared for differently from turf grass and common bunch grasses for the best plant outcomes and does not need much pruning. The lack of adequate maintenance training, in addition to the desire of clients to keep landscapes "tidy," often results in rushes being damaged with unnecessary pruning, as shown in Figure 5-4 below. The desired condition is shown in Figure 5-5. Unfortunately, the unneeded maintenance creates plant stress. Repeated poor care causes vegetation decline and eventual replacement after a few years, resulting in poor aesthetics and increased costs.

*Figure 5-4. Poorly pruned rushes (ball shape)*

*Figure 5-5. Rushes with recommended minimal pruning*

Other maintenance issues relate to irrigation systems that rely on drip emitters (see Section 5.2.2) and, along with the sandy BSM, can exacerbate the plant care problems. In addition, complex landscape designs with many plant species of plants in scattershot placement do not help maintenance crews care for them properly, when especially many look similar after maturity and during dry summer periods. More feedback from maintenance crews to landscape architects and engineers is needed to inform and improve the design process.

Simpler plant and irrigation designs – especially for roadway GSI assets - can improve plant health, reduce maintenance costs, and lead to more resilient biotreatment areas that can better survive future droughts and heat waves. In street applications of GSI, such as the stormwater curb extension shown in Figure 5-6, simple plant layouts can allow maintenance crews to more easily identify plants and maintain irrigation lines and emitters. Figure 5-7 shows what the simple plant layout looks like after a few months, when the vegetation has matured. The two plant species are

[52] More information on Bay-Friendly Landscaping (now known as ReScape) can be found at: www.rescapeca.org

still easy to locate, identify, and manage. The straight lines of the plant rows can also help maintenance crews find the emitters if they are also placed parallel to those lines.

*Figure 5-6. Simple vegetation layout, at planting stage (Credit: City of San José)*

*Figure 5-7. Simple planting design, at maturity (Credit: City of San José)*

Bioretention sod has challenges and benefits that merit further discussion for GSI, including possible increased climate resiliency. It often uses native grasses that can be mowed mechanically. Figure 5-8 shows the appearance of biotreatment sod upon installation. Figure 5-9 shows the sod after plant establishment. More discussion and consideration of sod as an option is needed to determine which grass varieties, mowing frequencies, grass heights, and irrigation types are optimal for maintenance. Typically, drip emitters are used for biotreatment area irrigation, but sod may perform better when used with overhead irrigation spray. Municipal maintenance budgets are limited and there may be cost savings with sod if it can be maintained with mechanical equipment, such as electric mowers, rather than with manual labor, as is typical with biotreatment areas.

*Figure 5-8. Bioretention sod at installation*

*Figure 5-9. Bioretention sod after a few months of growth*

In summary, possible landscape maintenance strategies include:

- Consider simple vegetation layouts to save on labor costs, maintain irrigation systems more

easily, and maintain plants in a healthy condition more easily.

- Retrofit irrigation emitters to overhead spray where appropriate.
- Provide more training and education for GSI maintenance professionals.
- Consider bioretention sod for biotreatment areas.

**Increase the use and depth of composted wood mulch**

As discussed in the design and construction strategies section of the CCAR, the right mulch can be a very important resiliency strategy in stormwater landscapes to retain moisture, protect the BSM from erosion, and cool the soil, reducing plant stress. Therefore, addressing the maintenance of mulch is also an adaptation strategy.

Mulch is required by the State's MWELO regulations to be maintained at a depth of three inches. This requirement is a minimum, so deeper mulch is an option and may provide greater benefits for plant health and cost savings in weed control. More frequent inspection and/or replacement of mulch to ensure maintenance of the three-inch (or greater) depth is also an option.

For example, Caltrans has utilized a wood mulch depth of 6 inches in locations where maintenance crews, due to budget constraints, are not expected to be able to visit very often. Mulch should be kept several inches away from plant stems, tree trunks and root flares to avoid root and stem rot, but otherwise it can be an effective way to keep the soil cool and moist during droughts and heat waves. This saves water, improves plant health, and increases resiliency. Wood mulch also decomposes, adding organic matter to the soil and improving water-holding capacity. Composted wood mulch is even more effective in providing these benefits due to its increased water-holding capacity and inoculation with beneficial microbes and fungi.

Maintenance strategies to consider include:

- Ensure mulch is inspected to verify that the required mulch depth is maintained;
- Increase the required depth of mulch where appropriate; and
- Require the use of composted wood mulch and refer to the regional composted wood mulch specification.

The CRRG also provides recommendations (see Figure 5-10) for reviewing operation and maintenance procedures to improve climate resilience, which may be useful. Similar types of activities and data collection are being conducted as part of Permittees' asset management programs.

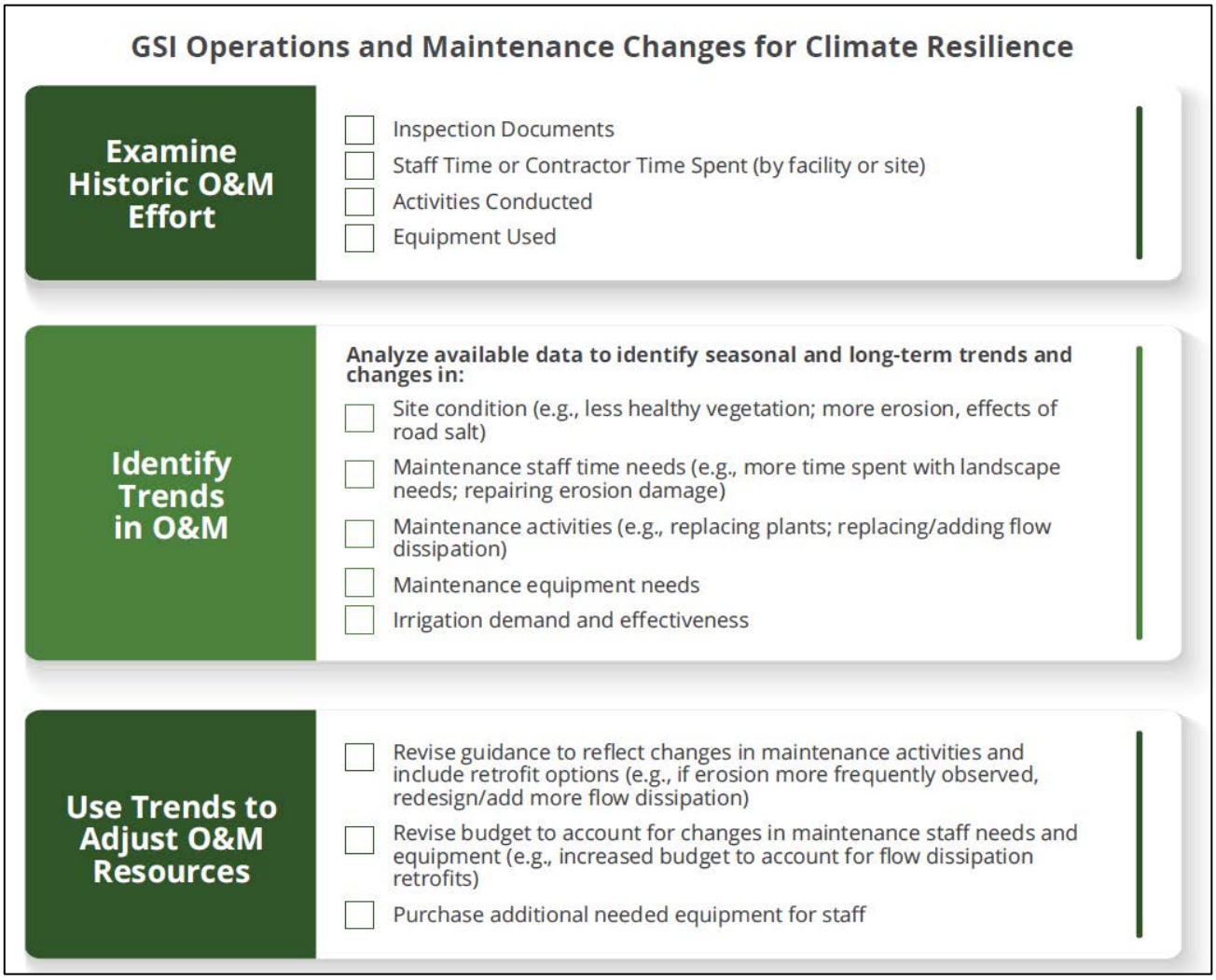


*Figure 5-10. CRRG O&M Recommendations*

## 5.4 IMPLEMENTATION AND ADAPTIVE MANAGEMENT

As the impacts of climate change continue to be felt in the Bay Area and affect stormwater quality assets, Permittees may need to implement appropriate management actions. These actions will be most effective if they are based on coordination with and feedback from municipal staff involved with asset planning, design, engineering, construction, and maintenance, in order to learn from successes and mistakes. This section summarizes potential adaptive approaches for existing and new assets, and identifies stakeholder organizations that may assist with the process.

### 5.4.1 Adaptation Strategies for Existing Assets

Permittees can use adaptive management to take advantage of opportunities to improve previously constructed assets that may not be performing optimally and consider utilizing the adaptation strategies in the CCAR. These opportunities may include:

- Assets with design or construction defects;
- Assets that are difficult to maintain due to various factors, such as a lack of irrigation water connection.
- Assets that could take advantage of newer technologies to improve performance; and
- Proprietary systems that are no longer maintainable or are not performing well.

Existing assets that need rehabilitation can be prioritized based on Permittees' asset management programs. These prioritization approaches include criteria determined by the Permittee, such as the importance of the asset, observed conditions that may reflect the severity of climate change impacts, and the consequences of failure if the asset is not rehabilitated. Once an asset is identified for rehabilitation, using the design, construction, and maintenance strategies in the CCAR may be useful and help avoid the need for extensive rehabilitation in the future.

### 5.4.2 Adaptation Strategies for New Assets

The planning and siting of new assets can be examined using adaptation strategies in Sections 4 and 5 and include the following considerations:

- Locate assets where sea level rise, groundwater intrusion, and other impacts of climate change will have the least potential for damage.
- Locate assets where they will have the most potential for multiple beneficial outcomes, including improved water quality, equity, and environmental justice as appropriate.

### 5.4.3 Bay Area Stakeholder Involvement with Adaptation Strategies

Involving more stakeholder organizations can assist in adapting stormwater quality assets to climate change and may result in more successful strategies. Stakeholders may include:

- CBOs and other organizations involved with watersheds, resiliency, climate change, transportation, environmental justice and/or equity such as Save the Bay, Acterra, the Watershed Project, Grassroots Ecology, Transform, Breakthrough Communities, and Climate Resilient Communities;
- Community organizations involved with GSI design, construction, and maintenance such as ReScape;

- Business and trade organizations such as the Bay Area Chapters of the California Landscape Contractors Association, American Society of Civil Engineers and the American Society of Landscape Architects, and the Bay Area Business Council;
- Bay Area parts of California's public universities (including the UC Extension), colleges and school districts and private education organizations;
- Agricultural organizations such as the Resource Conservation Districts, ranchers and farmers;
- Bay Area tribal organizations including recognized federal tribes as well as non-recognized tribal organizations;
- Public health organizations;
- Technology companies involved in data collection, GIS mapping, and interpretation;
- News organizations and journals such as "KneeDeep Times"[53] that educate the public on watershed issues;
- Regional planning and regulatory agencies such as the Association of Bay Area Governments, the Bay Area Air District, the Metropolitan Transportation Commission, the Bay Conservation and Development Commission and the Regional Water Board;
- Regional organizations representing public agencies, such as the Bay Area Clean Water Agencies (BAWCA), Bay Area Flood Protection Agencies (BAFPA), and the Bay Area Planning Directors Association (BAPDA);
- Regional scientific research organizations such as the San Francisco Estuary Institute; and,
- Regional government organizations such as the San Francisco Estuary Partnership and the Bay Area Regional Collaborative which coordinate regional climate action, adaptation, and sustainability efforts across the San Francisco Bay Area.

[53] More information is available at: https://www.kneedeeptimes.org/

# 6 SUMMARY AND RECOMMENDATIONS

The CCAR is intended to provide a menu of potential adaptation approaches for consideration and future evaluation, rather than establishing requirements, expectations, or new standards for design, operation, maintenance, or asset management. Given the significant costs that may be associated with climate adaptation, Permittees and other organizations need the flexibility to evaluate the appropriateness, feasibility, effectiveness, and cost implications of specific adaptation measures based on priorities, available resources, asset conditions, and future regulatory direction. Implementation of any Permittee-related adaptation strategy should occur through each Permittee's planning, design, asset management, and capital improvement processes.

The feasibility and applicability of each potential adaptation strategy identified in the CCAR can be evaluated as opportunities arise and as resources allow. Potential strategies to be considered for implementation at the Permittee(P), Countywide Program (C), and Regional (R) levels are summarized in Table 6-1.

**Table 6-1. Summary of CCAR Potential Asset Adaptation Strategies and Implementation Levels**

| Category | Potential CCAR Adaptation Strategies | Implementation Level* | | |
|---|---|---|---|---|
| | | P | C | R |
| 1. GSI-related Planning | • Coordinate GSI planning with other municipal plans including climate adaptation, action and resilience plans; general plan updates; urban forestry; and other plans related to sustainability, transportation, public works, and community outreach. | ♦ | | |
| | • Consider watershed and "One Water" approaches, where appropriate, to coordinate implementation of projects that improve the resilience, maintenance, or long-term performance of stormwater quality-related assets | ♦ | ♦ | ♦ |
| | • Participate in and utilize countywide, regional, and state-wide planning efforts, as appropriate, to increase effectiveness. | ♦ | ♦ | ♦ |
| 2. GSI-related Policies | • Integrate GSI into other appropriate and related policies. | ♦ | | |
| | • Consider GSI siting priorities related to addressing equity and climate impacts on historically disadvantaged and/or affected neighborhoods as appropriate. | ♦ | | |
| | • Work together with CBOs and other organizations to get buy-in from residents and businesses on GSI approaches and projects. | ♦ | ♦ | |
| 3. Asset Vulnerability and Siting (all asset types) | • Review asset locations in comparison to regional maps that show where sea level rise and other climate-related hazards are projected to impact existing and future assets. | ♦ | | |
| | • Consider design, maintenance, and/or relocation strategies to address impacts. | ♦ | | |
| 4. Sizing Guidance (all asset types) | • Update rainfall records to include the most current data and incorporate the data into revised tools and guidance for stormwater quality asset sizing criteria as appropriate. | | ♦ | ♦ |

| Category | Potential CCAR Adaptation Strategies | Implementation Level* | | |
|---|---|---|---|---|
| | | P | C | R |
| 5. GSI Design and Construction | • Review guidance documents, standard/typical stormwater control measure/GSI details and specifications for updates to improve resilience and prepare for climate impacts. | ● | ● | ● |
| | • Collaborate regionally on revisions to the BSM specification. | | ● | ● |
| | • Consider changes to plant palettes, irrigation systems, mulch details, infiltration designs, inlet/outlet structures, underdrains, tree-based GSI, rainwater harvesting systems, pervious pavement reflectivity, urban soils, etc., to address potential climate impacts. | ● | ● | |
| | • Integrate feedback from maintenance practices and experience into designs and construction. | ● | | |
| 6. GSI Operation and Maintenance | • Consider options for hard stormwater asset and vegetation maintenance practices that provide cost-effective adaptation strategies | ● | ● | ● |
| | • Create conditions for more resilient landscapes (e.g., healthy plants and diverse habitats with native plants, animals and pollinators) | ● | ● | |
| | • Train professionals and create green jobs with GSI maintenance education to improve the performance of GSI systems. | ● | ● | ● |

* Codes for implementation levels: P = Permittee, C = Countywide Program, R = Regional

Permittees, Countywide Stormwater Programs, and regional organizations can consider the following next steps related to the potential strategies in Table 6-1, as resources allow:

A. Permittees:

1. Consider using information in local climate action/resilience plans to guide decision-making for asset management and updating those plans with GSI information when feasible and appropriate.
2. Update GSI Plans and/or Asset Management Plans with climate adaptation strategies from the CCAR when appropriate.
3. Update policies, ordinances, and/or standard operating procedures as appropriate to address anticipated climate change impacts on stormwater quality assets.

B. Countywide Stormwater Programs:

1. Update Countywide guidance on LID, GSI, and trash controls as appropriate to include recommended CCAR strategies. For example, update stormwater treatment measure sizing guidance using recent rainfall data, such as that compiled for the Bay Area Hydrology Model.
2. Provide guidance/training to Permittees and share information with regional partners.
3. Participate in regional coordination at the BAMS Collaborative.

C. BAMS Collaborative and other regional organizations:

1. Participate in BSM specification updates in collaboration with Regional Water Board staff.
2. Share information, guidance and strategies with member agencies and other regional organizations.
3. Continue to participate in promotion of GSI implementation, including climate adaptation strategies, in partnership with other regional organizations and the California Stormwater Quality Association.

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# APPENDIX A

## Appendix A – Region-wide and County Climate Data and Planning Resources

Table A-1. Region-Wide Climate Data and Planning Resources

| Climate Data or Planning Resource | Resource Name (with link) | Resource Type | Description |
|---|---|---|---|
| Sea level rise and coastal flooding | Adapting to Rising Tides Bay Area: Regional Sea Level Rise Vulnerability and Adaptation Study (2020) | Regional Study | Outlines the worst-case scenario for impacts and consequences to four critical regional system, transportation networks, vulnerable communities, future growth areas, and natural lands, for different flooding scenarios in the absence of action. |
| Sea level rise and coastal flooding | Regional Shoreline Adaptation Plan: One Bay Vision, Strategic Regional Priorities, and Subregional Shoreline Adaptation Plan Guidelines (2024) | Regional Plan | Plan to address rising sea levels in San Francisco Bay. Local governments in the Bay Area are required to develop Subregional Shoreline Adaptation Plans (Plans), per SB 272. The RSAP Atlas is a tool to help create Plans that comply with these requirements. It includes region-wide data on coastal flood hazards, community vulnerability, existing conditions, Strategic Regional Priorities, and nature-based adaptation suitability. |
| Sea level rise and coastal flooding | ART Bay Shoreline Flood Explorer (2017) | Interactive Tool, Data Download | Intended to be used as a planning guide to understand where our shoreline is at risk from current and future flooding from sea level rise and storms. The flooding depicted is not inherently tied to any time or emissions-based projections. Its use of a Total Water Level approach emphasizes various flooding scenarios to focus attention on incremental action, despite uncertainties in predicting storms and the rate of sea level rise. |
| Sea level rise and coastal flooding | RSAP Atlas (Beta) (2024) | Interactive Tool, Data Download | Provides access to regional datasets to help local governments develop Plans. It contains data on coastal flood hazards, community vulnerability, environmental assets, and critical infrastructure. Use of the Atlas is not required, but helps ensure alignment with RSAP Guidelines and standards for Plans. You can generate Plan submittals using the Plan Assistant, explore coastal flood hazards and exposure, and download data for further analysis. |
| Sea level rise, coastal flooding, and groundwater | Hazard Map – Our Coast, Our Future (n.d.) | Interactive Tool, Data Download | Provides coastal California resource managers and land use planners with resources to understand, visualize, and adapt to sea level rise, coastal storms, and emergent groundwater. It is a platform for data visualization, synthesis, and download of all output products from the USGS CoSMoS in California. |
| Wildfire | CalFire Fire Hazard Severity Zone Viewer (2024) | Interactive Tool | Viewer shows very high, high, and moderate fire hazard severity zones in local and state responsibility areas. |
| Extreme Precipitation | San Francisco Bay Area Precipitation in a Warmer World (2023) | San Francisco Study | Volumes 1 and 2 collectively provide climate-informed projections of future rainfall (IDF curves) in the Bay Area and translate those projections into practical methods, datasets, and design guidance for updating stormwater infrastructure planning and engineering. Includes guidance on how to scale IDF curves projections to other Bay Area NOAA Atlas 14 stations. |
| Extreme precipitation, extreme heat, wildfire, drought, and sea level rise | Tools \| Cal-Adapt (2018) | Data Visualization, Data Download | Provides a way to explore peer-reviewed data that portrays how climate change might affect California at the state and local level. This data is available through downloads, visualizations, and the Cal-Adapt API for your research, outreach, and adaptation planning needs. |

## Appendix A – Region-wide and County Climate Data and Planning Resources

Table A-2. Alameda County Climate Data and Planning Resources

| Climate Data or Planning Resource | Resource Name (with link) | Resource Type | Description |
|---|---|---|---|
| Sea level rise and coastal flooding | Adapting to Rising Tides: Alameda County Shoreline Vulnerability Assessment (2015) | Countywide Study | Includes spatial mapping of flood exposure, evaluation of impacts to infrastructure, communities, and natural resources, and scenario-based projections of future conditions. It also compiles adaptation strategies and planning considerations organized by asset type and risk, along with a framework for assessing vulnerability and prioritizing responses at a regional scale. |
| Flooding, drought and wildfires | Alameda County Local Hazard Mitigation Plan (2021) | Countywide Plan | Identifies the natural hazards in our area, determines how they will impact our community, and develops strategies to lessen the effects of those hazards and create a more disaster-resilient Alameda County. The plan includes a discussion of Climate Change Adaptation. |
| Sea level rise, coastal flooding, and groundwater | Hayward Regional Shoreline Adaptation Master Plan (2021) | Hayward Plan | Evaluates shoreline conditions, climate risks, and vulnerable assets, and identifies how sea level rise will impact natural habitats and critical infrastructure over time. It presents a coordinated set of multi-benefit adaptation strategies—combining nature-based and engineered solutions—along with conceptual designs and a preferred shoreline approach. The document also includes policy guidance, project prioritization, and cost considerations to serve as a roadmap for long-term shoreline resilience and implementation. |
| Sea level rise and coastal flooding | Oakland/Alameda Resilience Study (2016) | Oakland and Alameda Study | Evaluates current and future risks from sea level rise, storm flooding, and seismic hazards to critical infrastructure, communities, and natural systems within a focused study area. It includes detailed exposure and vulnerability assessments across multiple sectors and assets, identifies key cross-cutting planning issues, and analyzes how interconnected systems and community characteristics influence risk. It also develops adaptation responses and implementation approaches through a collaborative, multi-agency process to improve long-term resilience. |
| Sea level rise, coastal flooding, and groundwater | Alameda Shoreline Adaptation Plan (in progress) | Alameda Plan | Anticipated completion by the end of 2027. This plan will identify strategies, adaptation pathways, and priority projects to address sea level rise, groundwater impacts, and existing flood risks along the shoreline. It will also evaluate potential land use changes and policy options, and include an implementation plan to guide future action. |
| Wildfire | Community Wildfire Protection Plan for Alameda County (2025) | Countywide Plan | Provides a comprehensive, scientifically based analysis of wildfire related to the hazards and risk of wildland-urban-interface areas in Alameda County. The plan contains an assessment of wildfire hazards and risk. It prioritizes actions to address hazardous fuels and reduce structural ignitability. |

## Appendix A – Region-wide and County Climate Data and Planning Resources

Table A-3. Contra Costa County Climate Data and Planning Resources

| Climate Data or Planning Resource | Resource Name (with link) | Resource Type | Description |
|---|---|---|---|
| Sea level rise, coastal flooding, drought, wildfires, extreme heat and extreme precipitation | Contra Costa County Hazard Mitigation Plan (2024) | Countywide Plan | The plan identifies potential hazards that could negatively impact County operations and assesses the risk and vulnerability of life safety and County assets for each hazard. This plan also establishes strategies and priorities to mitigate risk from natural, human-caused, and technological hazards, identifies specific mitigation projects to pursue for each identified hazard, guides the County in associated risk management activities, and establishes eligibility for future mitigation program funds. |
| Sea level rise and coastal flooding | Adapting to Rising Tides: Contra Costa County Assessment and Adaptation Project (2017) | Countywide Study | Summarizes a comprehensive planning process that includes detailed exposure and vulnerability assessments across multiple sectors, asset categories, and representative sites to understand risks from sea level rise and flooding. It presents key planning issues and a suite of adaptation responses that link identified vulnerabilities to potential strategies, partnerships, and actions. The report also includes evaluation criteria and implementation guidance to support decision-making and advance climate resilience planning across the county. |
| Sea level rise and coastal flooding | Contra Costa Resilient Shoreline Plan (in progress) | Countywide Plan | Will use existing assessments, reports, and studies as a foundation to inform localized sea level rise adaptation strategies and implementation measures while coordinating efforts to address sea level rise impacts across the entire 90-mile Contra Costa shoreline and aligning with regional sea level rise adaptation efforts. These localized adaptation strategies and implementation measures will be rooted in science and aligned with community values. Integral to the Plan development process will be a participatory engagement process to ensure that all relevant and interested stakeholders have the resources and support to fully engage in this work and that the Plan centers community members' vision and priorities for a resilient shoreline. |
| Sea level rise, coastal flooding, and groundwater | Richmond Sea Level Rise Adaptation and Resiliency Plan (in progress) | Richmond Plan and Story Map | Will investigate Richmond's vulnerability to sea level rise and create a management framework for sea level rise adaptation. The plan will include a sea level rise vulnerability analysis, an adaptation vision document reflecting the community's sea level rise goals, and the identification of specific adaptation measures to promote shoreline restoration and protection. |
| Sea level rise, coastal flooding, and groundwater | Contra Costa Hazardous Materials Commodity Flow Study with Special Focus on Sea Level Rise and Flood Risk (2019) | Countywide Study | The study focused on determining the potential effects/consequences of a chemical spill on critical and vulnerable populations and facilities in the shoreline communities of Contra Costa County. The primary focus of the Flow Study was to look at these potential effects/consequences with respect to hazardous chemical transport by rail through the County, particularly within areas of the county where rail lines may be susceptible to rising tides and flooding risks from climate change. |

## Appendix A – Region-wide and County Climate Data and Planning Resources

Table A-4. San Mateo County Climate Data and Planning Resources

| Climate Data or Planning Resource | Resource Name (with link) | Resource Type | Description |
|---|---|---|---|
| Sea level rise, coastal flooding, drought and wildfires | San Mateo County Local Hazard Mitigation Plan (2021) | Countywide Plan | Evaluates hazard vulnerabilities and outlines mitigation actions that local jurisdictions will implement to minimize injuries, property damage, and community disruptions caused by disasters. It addresses both natural and human-caused hazards, including flooding, drought, wildfires, landslides, severe weather, terrorism, cyber threats, pandemics, and the impacts of climate change. The Department of Emergency Management is starting the process of organizing the resources required for the plan to update it. |
| Sea level rise and coastal flooding | County of San Mateo Sea Level Rise Vulnerability Assessment (2018) | Countywide Plan | Assessment takes a risk-based approach, using best available existing data, to understand and communicate about the County's vulnerability to sea level rise. It lays the groundwork for the preparation of a transparent decision-making process for near- and long-term steps. The approach supports a sea level rise preparedness strategy that identifies risks to life and safety, recognizes the natural and beneficial functions of the County's natural areas, and considers impacts and benefits to community populations, especially those with increased vulnerability. |
| Sea level rise, coastal flooding and groundwater | County of San Mateo South Coast Sea Level Rise Vulnerability Assessment and Adaptation Report (2022) | Countywide Plan | Includes an introduction and overview of sea level rise science, an overview of the South Coast's past and present social and geographic settings, including a summary of social vulnerability, a sea level rise vulnerability assessment, and an adaptation report. The vulnerability assessment provides projections of the extent of coastal hazards and of the physical and economic impacts to community assets like buildings, roads, farmland, and coastal access infrastructure. The adaptation report provides an overview of sea level rise adaptation strategies and provides an example adaptation pathway for an at-risk stretch of State Route 1. |
| Extreme heat | San Mateo County Extreme Heat Dashboard (2021) | Interactive Tool | Shows the predicted number of high heat days that will occur in the future. Users can select a Temperature Threshold to see how many days per year will be hotter than that temperature during a certain Year Range. Users can select a Carbon Pathway to understand how different levels of green gas emissions will affect air temperature, Geography to see heat predictions at the census block, block group, and city levels, Population Characteristic to understand where communities may be more vulnerable to heat impacts, and Statistic Type, which will allow users to compare the average and maximum temperatures produced by climate models. |
| Extreme precipitation, extreme heat, wildfire, drought, sea level rise, coastal flooding and groundwater | San Mateo County OneWatershed Dashboard (2025) | Interactive Tool | Displays results of the climate impact shared-risk analysis for San Mateo County OneWatershed assets. The shared-risk analysis will examine the location and relative magnitude of climate impacts to water infrastructure and resources in San Mateo County based on existing studies and reports compiled during the data inventory process. |

## Appendix A – Region-wide and County Climate Data and Planning Resources

Table A-5. Santa Clara County Climate Data and Planning Resources

| Climate Data or Planning Resource | Resource Name (with link) | Resource Type | Description |
|---|---|---|---|
| Sea level rise, flooding, drought, wildfires, extreme precipitation and extreme heat | Santa Clara County Multi-Jurisdictional Hazard Mitigation Plan (2023) | Countywide Plan | Identifies natural and human-caused hazards, evaluates community risk and vulnerabilities, and outlines long-term strategies to reduce loss of life, property damage, and future disaster costs. The plans are designed to break the cycle of damage, repair, and repetitive losses by focusing on proactive mitigation actions. |
| Wildfire | Santa Clara County Community Wildfire Protection Plan (2023) | Countywide Plan | Provides a countywide scale of wildfire risk and protection needs, brings together all responsible wildfire management and suppression entities in the planning area to address the identified needs and provides a framework for future planning and implementation of necessary mitigation measures. |
| Extreme heat, wildfire and drought | County of Santa Clara Climate Impact Compendium (n.d.) | Resource Webpage | The County of Santa Clara Public Health Department, in collaboration with the Office of Sustainability and funding from the Centers for Disease Control, has developed a compendium of climate impact data and resources. Use the tools within it to learn about the people and places most vulnerable to climate impacts. Jurisdictions can use these tools to identify and address inequities, encourage engagement with communities at higher risk, build local plans, and support regional solutions. |
| Extreme heat, wildfire, sea level rise and riverine flooding | Silicon Valley 2.0 Climate Change Preparedness Tool (2025) | Interactive Tool | Supports the entire County of Santa Clara with climate risk assessment, adaptation and resilience planning. Users can use the tool to (1) learn how the County's climate is expected to change over the next century, (2) understand the impacts of climate change to the different County areas, (3) identify which infrastructure assets are at risk by different climate-related impacts, and to what degree, (4) learn which socially vulnerable communities are most vulnerable to climate hazards, and (5) assess the level of economic risk climate change poses to infrastructure assets. |
| Riverine flooding and extreme heat | Santa Clara County Resilience Project Mapping (2023) | Interactive Tool | This tool locates High-Value Intervention Areas (HVIAs) - socially vulnerable areas with the highest natural hazard risk - to help identify where nature-based solutions, which integrate natural features into the built environment, can provide a positive impact, regionally and locally. This tool also identifies important community assets and opportunities, such as schools, parks, community centers, and existing and planned projects from agencies near or within the HVIAs. Community members and planners can leverage these community assets and opportunities to implement nature-based solutions and improve resilience to climate impacts. |

## Appendix A – Region-wide and County Climate Data and Planning Resources

Table A-6. Solano County Climate Data and Planning Resources

| Climate Data or Planning Resource | Resource Name (with link) | Resource Type | Description |
|---|---|---|---|
| Flooding, drought, wildfire, extreme precipitation, extreme heat and sea level rise | Solano County Multi-Jurisdictional Hazard Mitigation Plan (2022) | Countywide Plan | Identifies risks and ways to minimize damage from natural and manmade disasters. The plan is a comprehensive resource document that serves many purposes such as enhancing public awareness, creating a decision tool for management, promoting compliance with State and Federal program requirements, enhancing local policies for hazard mitigation capability, and providing inter-jurisdictional coordination. |
| Sea level rise | Solano County Sea Level Rise Strategic Plan (2011) | Countywide Plan | Provides an overview of sea level rise and investigates its potential effects on Solano County. The SLRSP further identifies properties and resources susceptible to sea level rise and presents protection and adaptation strategies. It evaluates both a short-term and a long-term scenario, assessing vulnerabilities using 16 inches of SLR at mid-century (2050) and 55 inches at the end of the century (2100). |
| Sea level rise, coastal flooding and groundwater | Solano Bayshore Resiliency Project (in progress) | Project that will result in Countywide Plans | A collaborative, multi-jurisdictional adaptation planning effort facilitated through the Solano Resiliency Roundtable and aligned with BCDC's Regional Shoreline Adaptation Plan. This project includes comprehensive community outreach and engagement, sea level rise vulnerability assessment, and development of a multi-jurisdictional regional shoreline action plan for unincorporated Solano County and the cities of Vallejo, Fairfield, Suisun City, and Benicia. |
| Wildfire | Solano County Community Wildfire Protection Plan (2023) | Countywide Plan | The plan aims to provide a comprehensive assessment of wildfire risk and protection needs across the county, bringing together various stakeholders involved in wildfire management and suppression. By identifying gaps and deficiencies, the CWPP provides a framework for future planning and implementation of mitigation measures. It also includes a list of actionable projects to mitigate the identified risks. |

# APPENDIX B

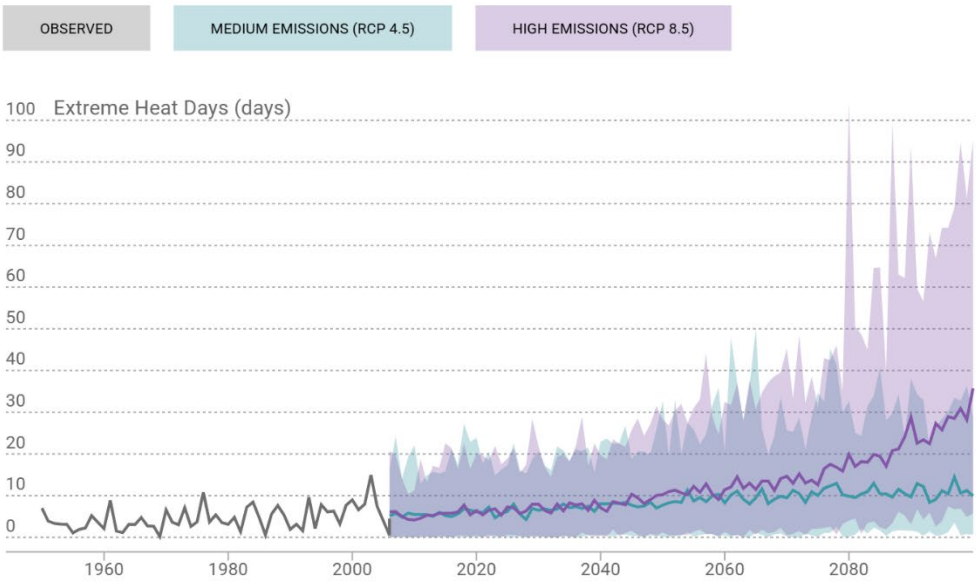
# Local Climate Change Snapshot for San Mateo County

California

## Extreme Heat Days

Number of days in a year when daily maximum temperature is above a threshold temperature of 85.7 °F

Note: Threshold temperature used in this tool is location specific. It is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at a location.




1 Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2 Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

3 Data presented are aggregated over all LOCA grid cells that intersect San Mateo County boundary.

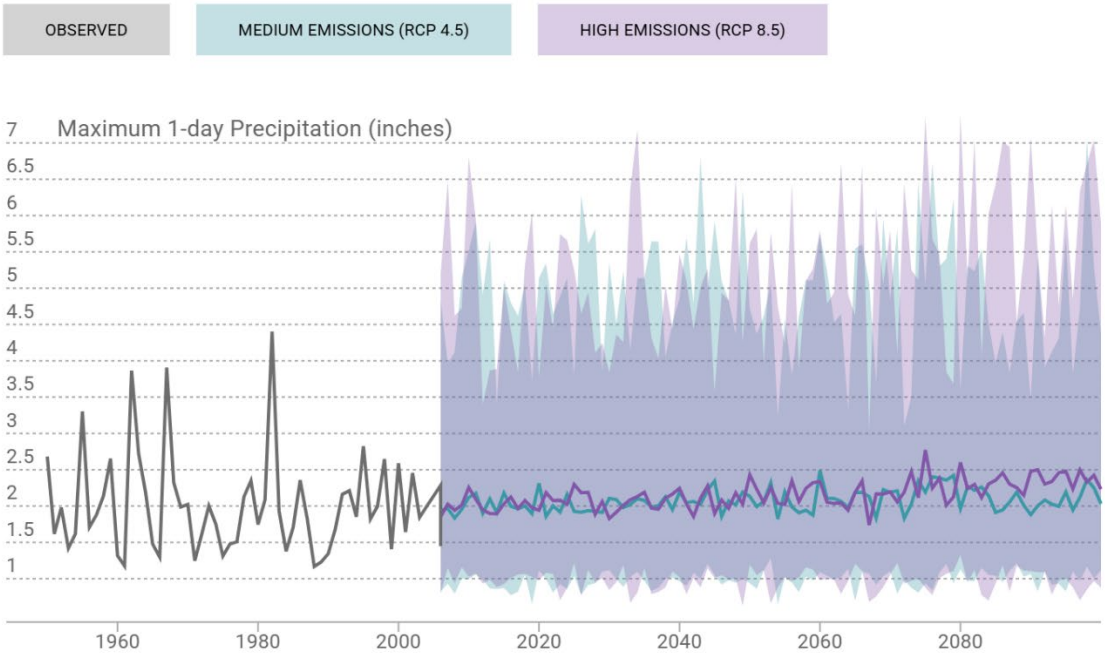
4 Threshold temperature for a location is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at that location.

# Local Climate Change Snapshot for San Mateo County

California

## Maximum 1-day Precipitation

The maximum daily precipitation amount for each year. In other words, the greatest amount of daily rain or snow (over a 24 hour period) for each year.




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

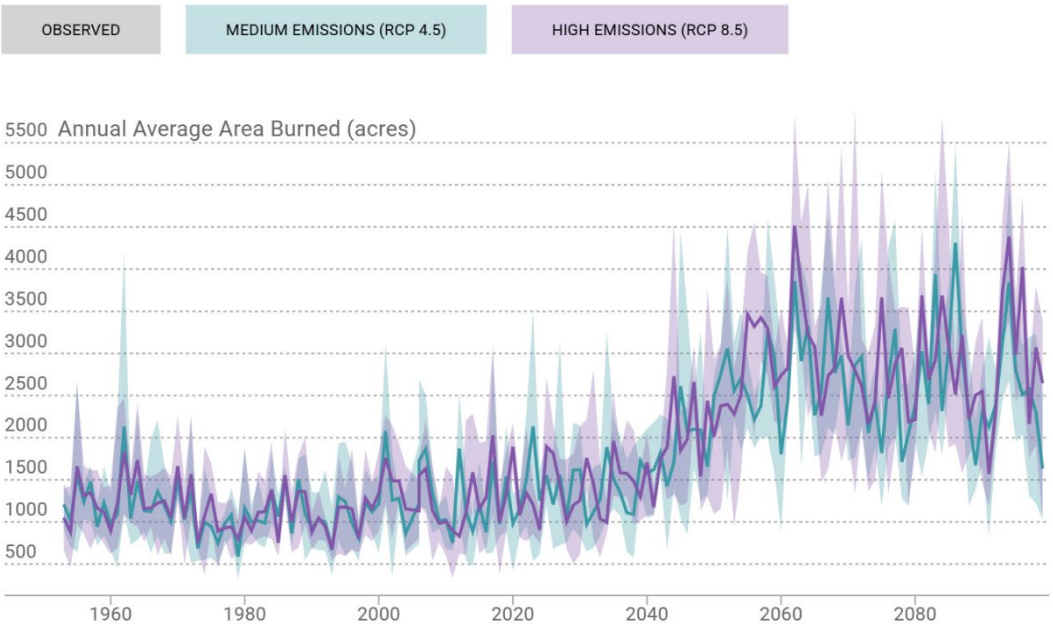
3Data presented are aggregated over all LOCA grid cells that intersect San Mateo County boundary.

# Local Climate Change Snapshot for San Mateo County

California

## Annual Average Area Burned

Average of the area projected to be at risk to burning in a year.




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

3Data presented are aggregated over all LOCA grid cells that intersect San Mateo County boundary.

4San Mateo County boundary may contain locations outside the combined fire state and federal protection responsibility areas. These locations were excluded from wildfire simulations and have no climate projections.

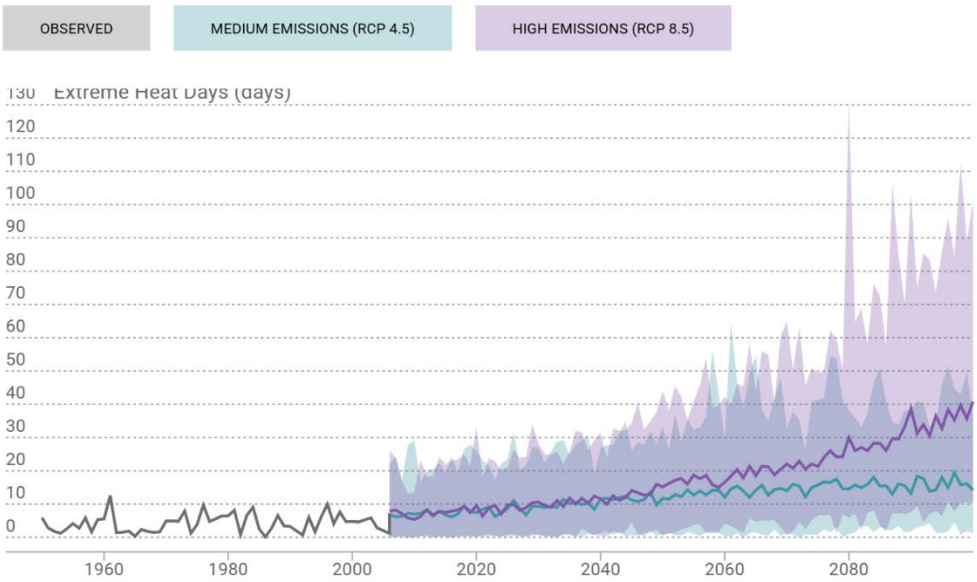
# Local Climate Change Snapshot for Santa Clara County

California

## Extreme Heat Days

Number of days in a year when daily maximum temperature is above a threshold temperature of 92.7 °F

Note: Threshold temperature used in this tool is location specific. It is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at a location.




1 Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2 Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

3 Data presented are aggregated over all LOCA grid cells that intersect Santa Clara County boundary.

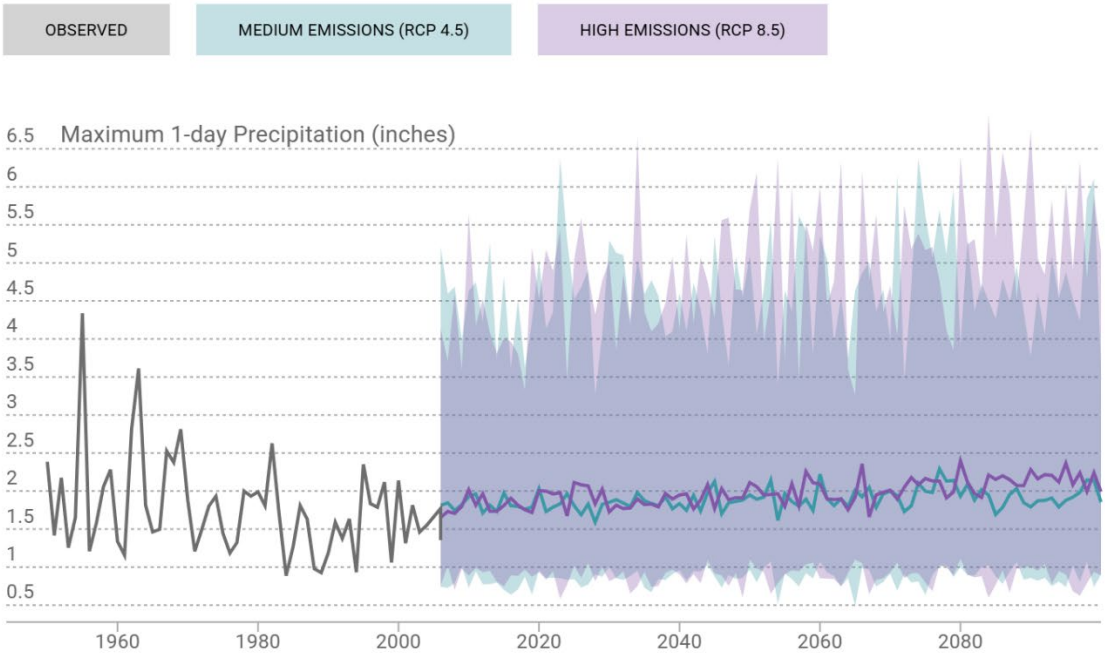
4 Threshold temperature for a location is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at that location.

# Local Climate Change Snapshot for Santa Clara County

California

## Maximum 1-day Precipitation

The maximum daily precipitation amount for each year. In other words, the greatest amount of daily rain or snow (over a 24 hour period) for each year.




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

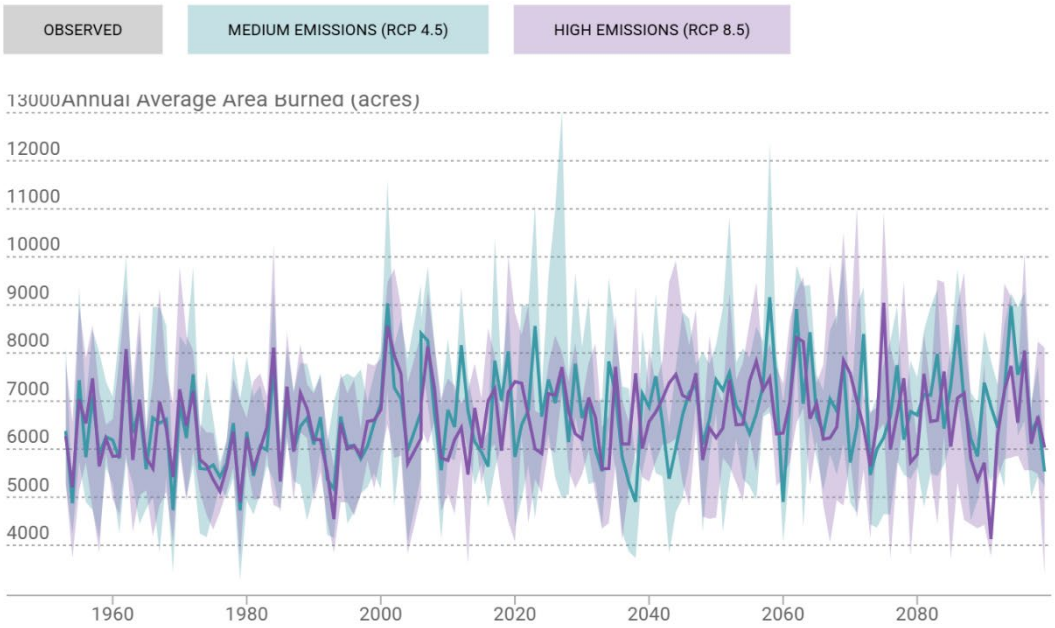
3Data presented are aggregated over all LOCA grid cells that intersect Santa Clara County boundary.

# Local Climate Change Snapshot for Santa Clara County

California

## Annual Average Area Burned

Average of the area projected to be at risk to burning in a year.




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

3Data presented are aggregated over all LOCA grid cells that intersect Santa Clara County boundary.

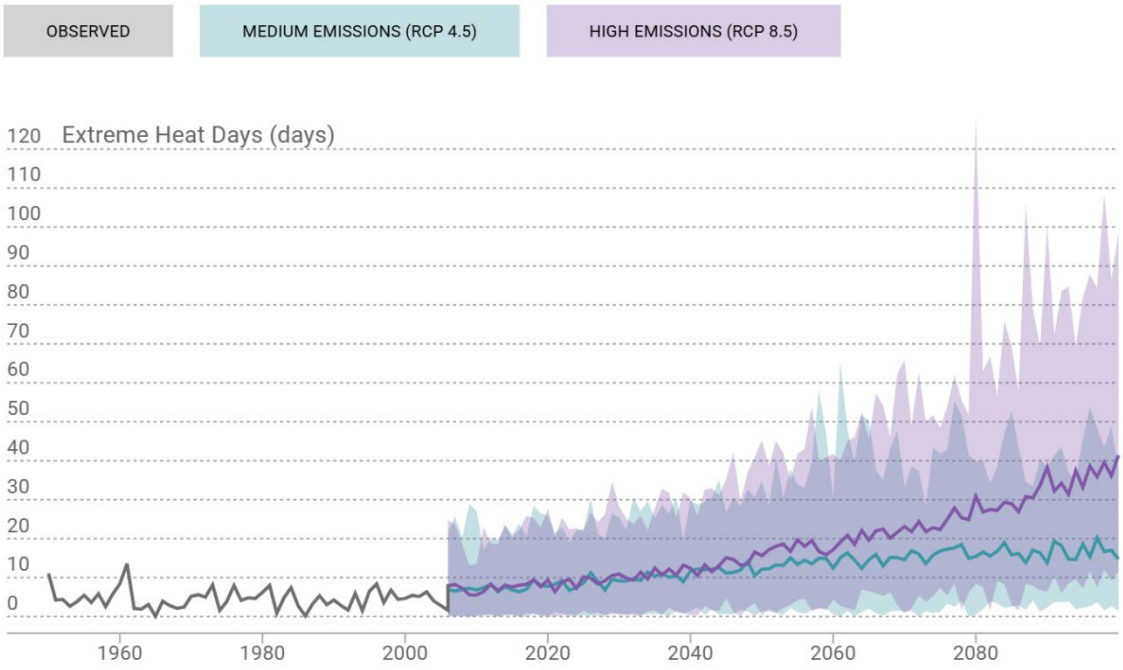
4Santa Clara County boundary may contain locations outside the combined fire state and federal protection responsibility areas. These locations were excluded from wildfire simulations and have no climate projections.

# Local Climate Change Snapshot for Alameda County

California

## Extreme Heat Days

Number of days in a year when daily maximum temperature is above a threshold temperature




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

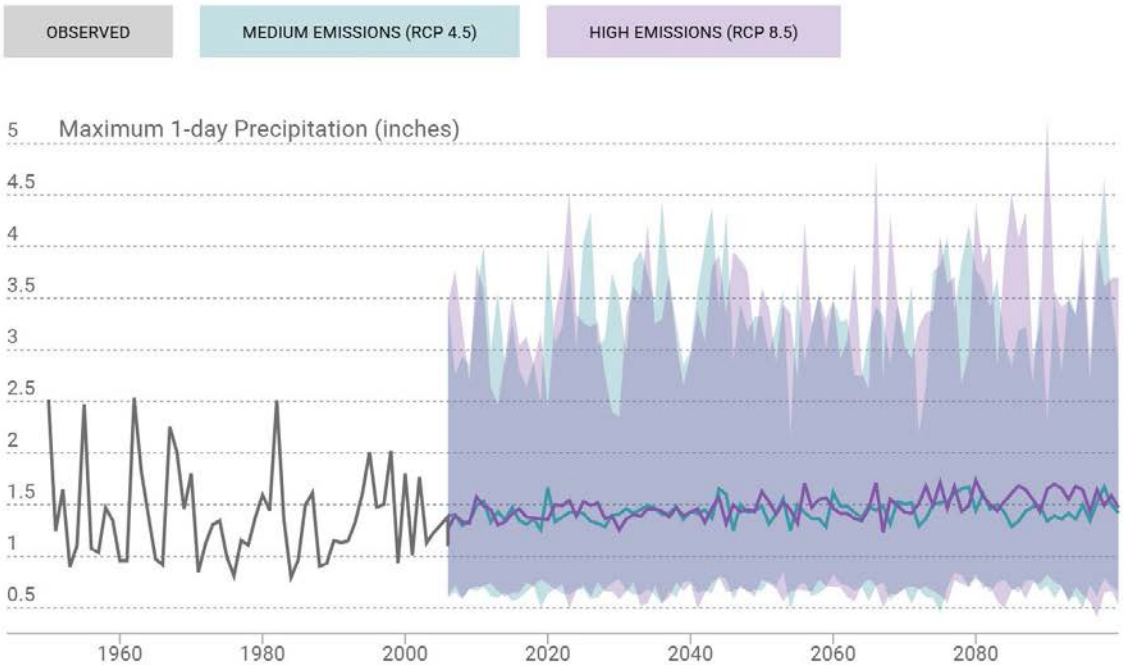
3Data presented are aggregated over all LOCA grid cells that intersect Alameda County boundary.

# Local Climate Change Snapshot for Alameda County

California

## Maximum 1-day Precipitation

The maximum daily precipitation amount for each year. In other words, the greatest amount of daily rain or snow (over a 24 hour period) for each year.




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

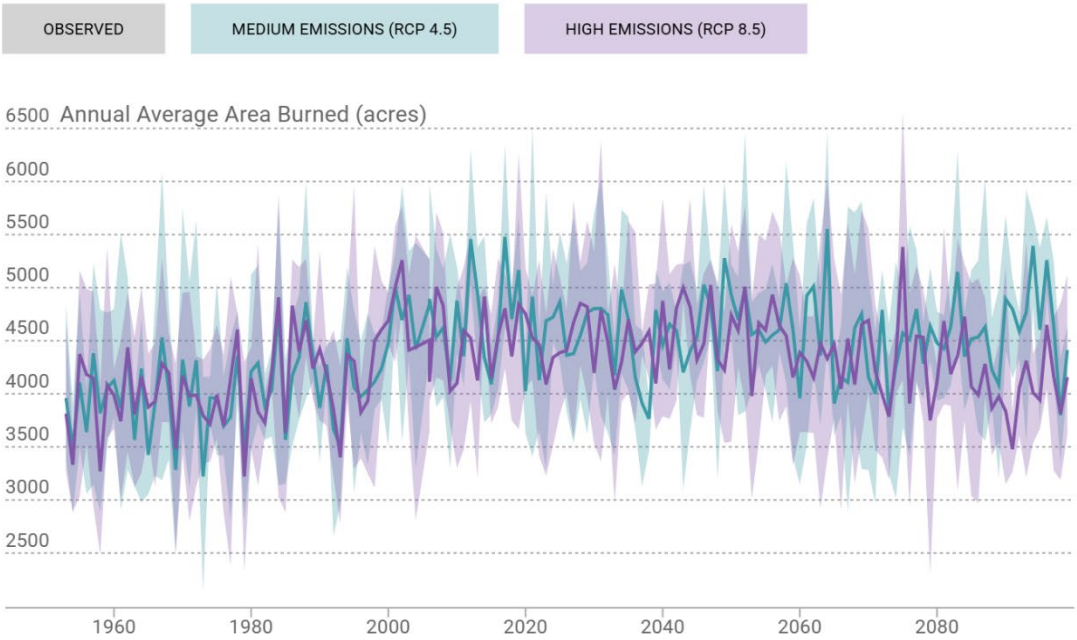
3Data presented are aggregated over all LOCA grid cells that intersect Alameda County boundary.

# Local Climate Change Snapshot for Alameda County

California

## Annual Average Area Burned

Average of the area projected to be at risk to burning in a year.




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

3Data presented are aggregated over all LOCA grid cells that intersect Alameda County boundary.

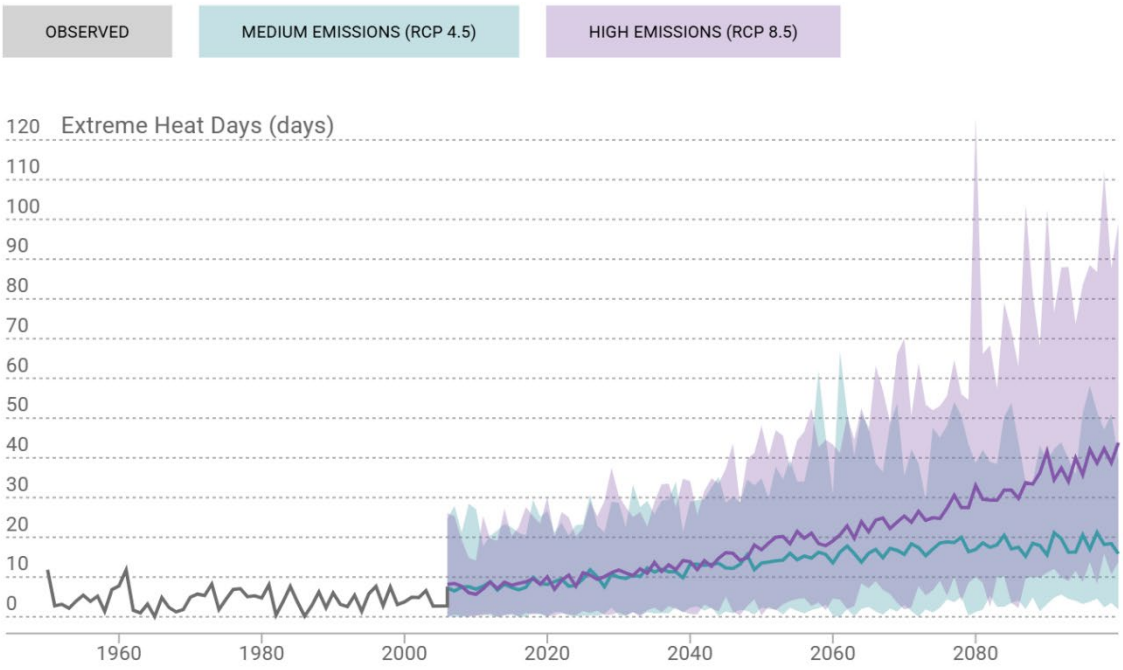
4Alameda County boundary may contain locations outside the combined fire state and federal protection responsibility areas. These locations were excluded from wildfire simulations and have no climate projections.

# Local Climate Change Snapshot for Contra Costa County

California

## Extreme Heat Days

Number of days in a year when daily maximum temperature is above a threshold temperature




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

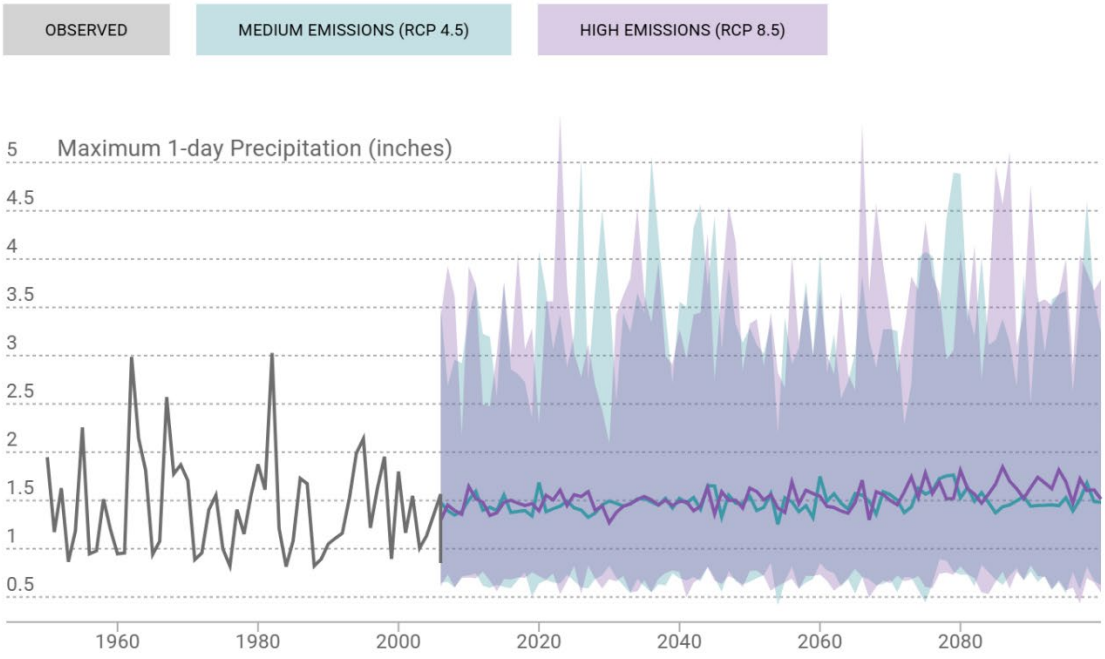
3Data presented are aggregated over all LOCA grid cells that intersect Contra Costa County boundary.

# Local Climate Change Snapshot for Contra Costa County

California

## Maximum 1-day Precipitation

The maximum daily precipitation amount for each year. In other words, the greatest amount of daily rain or snow (over a 24 hour period) for each year.




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

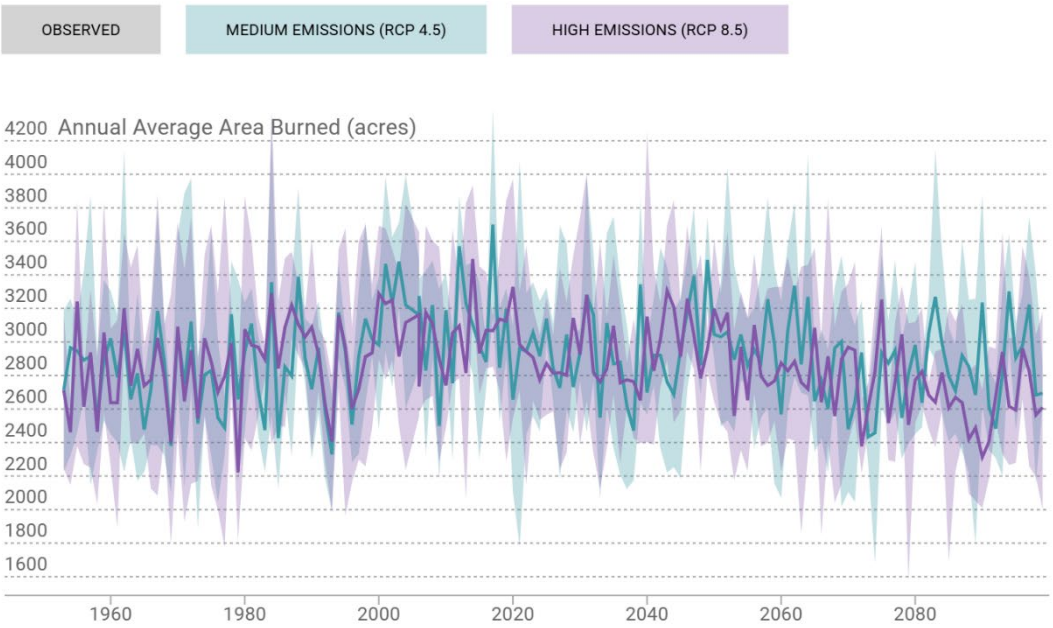
3Data presented are aggregated over all LOCA grid cells that intersect Contra Costa County boundary.

# Local Climate Change Snapshot for Contra Costa County

California

## Annual Average Area Burned

Average of the area projected to be at risk to burning in a year.




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

3Data presented are aggregated over all LOCA grid cells that intersect Contra Costa County boundary.

4Contra Costa County boundary may contain locations outside the combined fire state and federal protection responsibility areas. These locations were excluded from wildfire simulations and have no climate projections.

# Local Climate Change Snapshot for Solano County

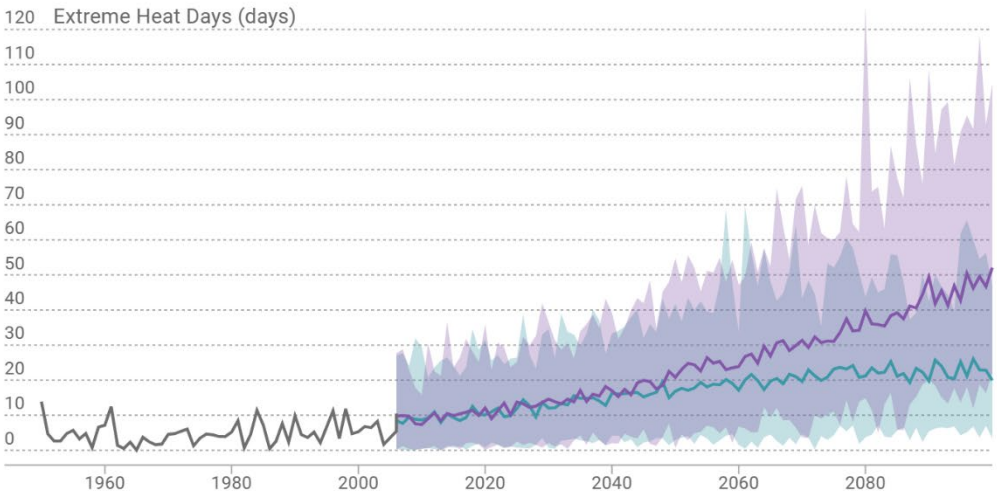
California

## Extreme Heat Days

Number of days in a year when daily maximum temperature is above a threshold temperature of 100.2 °F

Note: Threshold temperature used in this tool is location specific. It is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at a location.

OBSERVED | MEDIUM EMISSIONS (RCP 4.5) | HIGH EMISSIONS (RCP 8.5)




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

3Data presented are aggregated over all LOCA grid cells that intersect Solano County boundary.

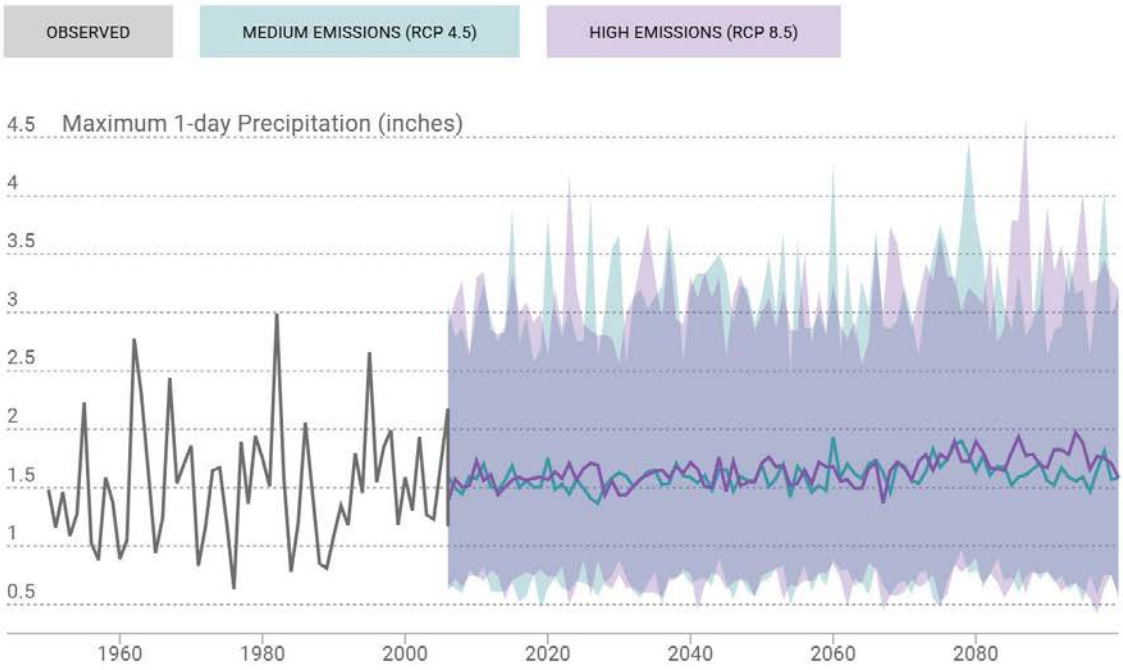
4Threshold temperature for a location is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at that location.

# Local Climate Change Snapshot for Solano County

California

## Maximum 1-day Precipitation

The maximum daily precipitation amount for each year. In other words, the greatest amount of daily rain or snow (over a 24 hour period) for each year.




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

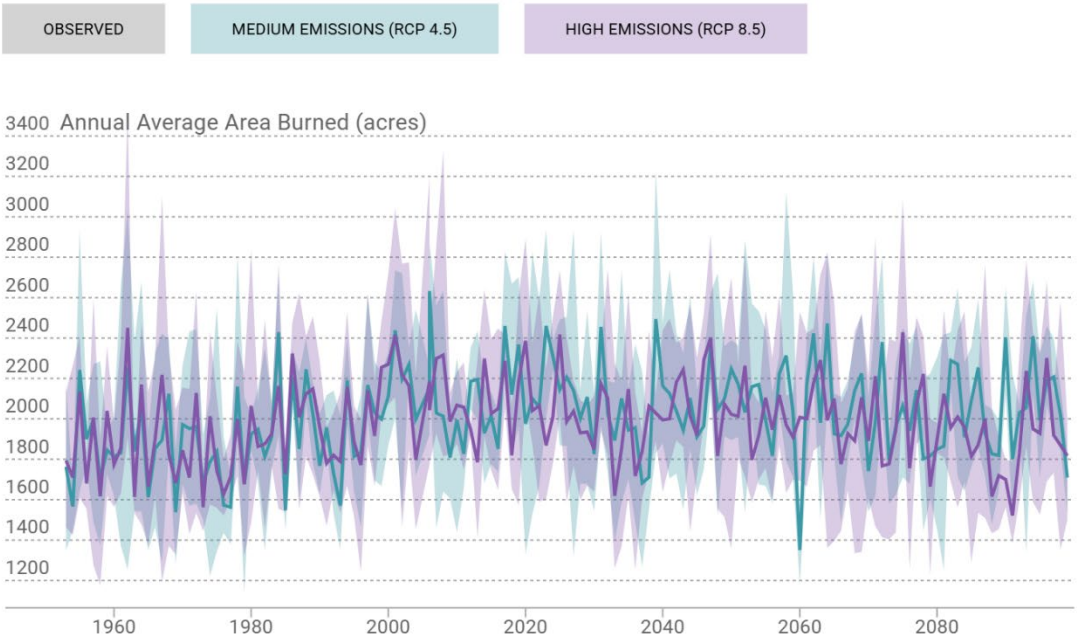
3Data presented are aggregated over all LOCA grid cells that intersect Solano County boundary.

# Local Climate Change Snapshot for Solano County

California

## Annual Average Area Burned

Average of the area projected to be at risk to burning in a year.




1Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.

2Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.

3Data presented are aggregated over all LOCA grid cells that intersect Solano County boundary.

4Solano County boundary may contain locations outside the combined fire state and federal protection responsibility areas. These locations were excluded from wildfire simulations and have no climate projections.

# Appendix 22

- CASQA 2026 Pesticides Annual Report, California Stormwater Quality Association, August 2026
- CASQA Our Water Our World (OWOW) 2026 Annual Report, California Stormwater Quality Association, August 2026

CASQA

California Stormwater Quality Association®

*Dedicated to the Advancement of Stormwater Quality Management, Science and Regulation*

# 2026 Pesticides Annual Report

Prepared by the California Stormwater Quality Association

**August 2026**

# Preface

## ADVANCING SUSTAINABLE STORMWATER MANAGEMENT

*The California Stormwater Quality Association (CASQA) is a nonprofit corporation that advances sustainable stormwater management protective of California water resources. With well over 2,000 members, CASQA's membership is comprised of diverse range of stormwater quality management organizations and individuals, including cities, counties, special districts, federal agencies, state agencies, ports, universities and school districts, wastewater agencies, water suppliers, industries, and consulting firms throughout the state. Collectively, CASQA represents over 34 million people in California.*

*CASQA's Vision for Sustainable Stormwater Management[1] (Vision) defines the actions needed to manage stormwater as an essential component of the state's water resources, support human and ecological needs, protect water quality, and enhance and restore California's waterways. There are four guiding principles to achieve this Vision. Like the legs of a chair, each Principle is essential and all four must be in place to support the whole.*

Principle #1: Program Implementation: *Projects and programs that use stormwater as a resource, protect water quality and beneficial uses, and efficiently minimize pollution are critical for sustainable stormwater management. Stormwater capture and true source control (identifying and mitigating a pollutant at its source) are the primary drivers of these solutions, with effective BMPs providing an important supportive role.*

Principle #2: Permits, Regulations, and Legislation: *Permits, regulations, and legislation need to focus on effectiveness and desired outcomes to support sustainable stormwater management. Regulatory and legislative actions must align with and support the other components of the Vision – advancing stormwater capture, true source control, effective BMPs, increasing public education and awareness focused on stormwater as a resource, and securing funding to support these solutions.*

Principle #3: Public Education: *Public awareness, understanding, and support is essential to sustainable stormwater management. The key shift is viewing stormwater as a resource that must be protected and integrated into overall water resource management.*

Principle #4: Funding: *Significant financial investment is required to achieve sustainable stormwater management. Stormwater is the most underfunded portion of the water sector and substantial funding is needed to bring these solutions forward.*

## 2026 PESTICIDES ANNUAL REPORT

*This report, 2026 Pesticides Annual Report, advances Principle #1 by addressing pesticide pollution through source control solutions. CASQA has identified Current Use Pesticides as a Water Quality Priority, requiring solutions at a statewide scale. To advance true source control for pesticides, 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. This report describes CASQA's regulatory engagement activities from July 2025 through June 2026.*

[1] https://www.casqa.org/wp-content/uploads/2022/10/final_-_vision_for_sustainable_stormwater_management_-_10-07-2020.pdf

## Acknowledgements

*This report was prepared by CASQA with consulting services from Stephanie Hughes and Tammy Qualls.*

*Funding to support this work was provided from Alameda Countywide Clean Water Program, Contra Costa Clean Water Program, Fairfield-Suisun Urban Runoff Management Program, Marin Countywide Stormwater Pollution Prevention Program, Napa Countywide Stormwater Pollution Prevention Program, Sacramento Stormwater Quality Partnership, San Mateo Countywide Water Pollution Prevention Program, Santa Clara Valley Urban Runoff Pollution Prevention Program, Sonoma County Water Agency, and the Solano Stormwater Alliance.*

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# Section 1. Introduction

## 1.1 **IMPORTANCE OF CASQA'S EFFORTS TO** IMPROVE PESTICIDE REGULATION

*For decades, the uses of certain pesticides in urban areas – even when applied in compliance with pesticide regulations – have adversely impacted urban water bodies. Currently, several pesticides are present in California urban water bodies at concentrations above aquatic toxicity thresholds.[2] Our member agencies face substantial costs to comply with pesticides-related Total Maximum Daily Loads (TMDLs), California State Water Board Toxicity Provisions, and additional permit requirements. Throughout California, more municipalities will be subject to similar requirements, as additional TMDLs and Basin Plan Amendments are adopted (Table 1). Meanwhile, while local agencies in California have authority over their own use of pesticides, they are pre-empted by state law from regulating pesticide use by consumers and businesses to address these sources of pollution in stormwater.*

*Consistent with CASQA's Vision for Sustainable Stormwater Management (Vision), our efforts focus on reducing pesticide pollution at the source. Minimizing pesticide pollution before it can occur, as opposed to attempting to remove pesticides from the environment, is essential to sustainable stormwater management. True source control (the elimination of a pollutant at its source) and the use of alternative products offers the most effective and economical approach to eliminating pesticides that impair the beneficial uses of California's waterways.*

[2] *California Integrated Report (Clean Water Act Section 303(d) List and 305(b) Report) https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2020_2022_integrated_report.html*

Table 1. California TMDLs, Statewide Water Quality Control Plans, and Basin Plan Amendments Addressing Currently Registered Pesticides and/or Toxicity in Urban Watersheds[3, 4, 5]

| Water Board Region | Water Body | Pesticide | Status |
|---|---|---|---|
| **Statewide** | *Statewide Water Quality Control Plan amendments for urban pesticides reduction ["Urban Pesticides Amendments"] (Inland Surface Waters, Enclosed Bays & Estuaries, and Ocean)* | *All Pesticides/All pesticide-related toxicity* | *In preparation* |
| | *Sediment Quality Objectives (Enclosed Bays & Estuaries)* | *Sediment Toxicity[6]* | *Approved* |
| | *Toxicity Provisions (Inland Surface Waters and Enclosed Bays & Estuaries)* | *Toxicity* | *Approved May 2023[7]* |
| **San Francisco Bay (Region 2)** | *All Bay Area Urban Creeks* | *All Pesticide-Related Toxicity* | *Approved* |
| **Central Coast (Region 3)** | *Santa Maria River Watershed* | *Pyrethroids, Toxicity* | *Approved* |
| | *Lower Salinas River Watershed* | *Pyrethroids, Toxicity, Malathion, Chlorpyrifos, Diazinon[9]* | *Amended by Central Coast Water Board, June 2024[8]* |
| | *San Lorenzo River Watershed (Santa Cruz)* | *Chlorpyrifos[9]* | *Approved* |
| **Los Angeles (Region 4)** | *Marina del Rey Harbor* | *Copper (Marine antifouling paint)[10]* | *Approved* |
| | *Oxnard Drain 3 (Ventura County)* | *Bifenthrin, Toxicity* | *EPA-Adopted Technical TMDL* |
| | *Calleguas Creek, its Tributaries and Mugu Lagoon* | *Water & Sediment Toxicity[6]* | *Approved* |

[3] *Excludes pesticides that are not currently registered in California, such as organochlorine pesticides.*
[4] *https://www.waterboards.ca.gov/water_issues/programs/tmdl/*
[5] *https://www.waterboards.ca.gov/water_issues/programs/tmdl/2020_2022state_ir_reports_final/apx_d_adopted_tmdls_list.pdf*
[6] *These TMDLs/Plan provisions can trigger toxicity testing stressor source identification studies, and additional follow up, even when toxicity is linked to current pesticides.*
[7] *https://www.waterboards.ca.gov/water_issues/programs/state_implementation_policy/tx_ass_cntrl.html*
[8] *https://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/salinas/oppesticides/*
[9] *Use prohibited in urban areas (diazinon) or no meaningful use due to use limitations (chlorpyrifos).*
[10] *Primarily addresses pesticides that are directly discharged and should not ordinarily appear in stormwater (marine antifouling paint).*

| Water Board Region | Water Body | Pesticide | Status |
|---|---|---|---|
| | | Diazinon & Chlorpyrifos[9] | |
| | McGrath Lake (Ventura County) | Sediment Toxicity[6] | Approved |
| | Colorado Lagoon (Long Beach) | Sediment Toxicity[6] | Approved |
| | Dominguez Channel; Greater Los Angeles & Long Beach Harbor | Sediment Toxicity[6] | Approved |
| | Ballona Creek Estuary | Sediment Toxicity[6] | Approved |
| **Central Valley (Region 5)** | Sacramento River and San Joaquin River Basins | Pyrethroids | Approved |
| | Sacramento-San Joaquin River Delta Waterways | Diazinon & Chlorpyrifos[9] | Approved |
| | Sacramento & Feather Rivers | Diazinon & Chlorpyrifos[9] | Approved |
| | Sacramento County Urban Creeks | Diazinon & Chlorpyrifos[9] | Approved |
| | Lower San Joaquin River | Diazinon & Chlorpyrifos[9] | Approved |
| **Lahontan (Region 6)** | Pesticide Discharge Prohibition | All Pesticides | Approved[11] |
| **Santa Ana (Region 8)** | Newport Bay | Copper (Marine antifouling paint)[10] | Adopted by Santa Ana Water Board[12] |
| | San Diego Creek, and Upper and Lower Newport Bay | Toxicity (Diazinon & Chlorpyrifos)[9,13] | EPA-Adopted Technical TMDL |
| **San Diego (Region 9)** | Shelter Island Yacht Basin (San Diego Bay) | Copper (Marine antifouling paint)[10] | Approved |
| | Chollas Creek | Diazinon[9] | Approved |

[11] https://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/pesticidebpa.shtml
[12] https://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/tmdl_metals.html
[13] 23 CA Code of Regs 3977

# Section 2. Pesticide Program Activities

*The following pesticide program activities support the development of an effective pesticide regulatory system based primarily on existing statutes. This effort includes timely identification and mitigation of urban water quality impacts and proactively prevents additional problems through the registration and registration review processes.*

## 2.1 REGULATORY TRACKING

*CASQA actively tracks a range of regulatory activities to identify potential issues and opportunities for engagement. This effort includes reviewing Federal Register and California Department of Pesticide Regulation (DPR) notices to flag regulatory actions that may affect high priority active ingredients requiring further review. Through this tracking, CASQA can identify gaps in current procedures and highlight potential urban runoff-related impacts. CASQA also reviews relevant regulatory actions, guidance documents, and work plans from the United States Environmental Protection Agency (EPA) and DPR to assess their alignment with urban runoff concerns and determine whether additional input is warranted.*

*Activities at the State and Regional Water Boards are monitored to identify opportunities for improving TMDLs, Basin Plan Amendments, and National Pollutant Discharge Elimination System (NPDES) permits. A monthly summary titled Pesticides Regulatory Action Items documents regulatory tracking efforts and informs future engagement. This summary is distributed to the CASQA True Source Control Subcommittee. See Attachment 1: Pesticides Regulatory Action Items for the most recent update.*

## 2.2 REGULATORY COMMUNICATIONS

*To maintain strong working relationships and to provide early input, CASQA maintains communications with both EPA and DPR. These communications may be formal through comment letters in response to regulatory actions or informal to share areas of concern or collaboration. The purpose is to provide information sharing about immediate issues or ongoing efforts and inform EPA and DPR about issues confronting the stormwater community. Early communication on upcoming proceedings can reduce the need for time-intensive letters and add context.*

## 2.3 EDUCATION

*Through presentations and discussions with EPA, DPR, Water Boards, and CASQA members, CASQA provides education on the urban runoff-related challenges of the existing pesticide regulatory process, educational efforts to support process improvements, and report on achievements. Through these educational activities, CASQA encourages 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, and inform development of new pesticides by manufacturers and selection of pesticides by professional users.*

## 2.4 PARTICIPATION IN FEDERAL AND STATE ADVISORY GROUPS

*When opportunities allow, CASQA may serve on policy and scientific advisory committees convened by EPA, DPR, and the Water Boards. Through this participation, CASQA can contribute technical information, identify data gaps, and foster collaboration in the development of more effective pesticide regulatory system. CASQA closely follows relevant advisory groups such as EPA's Pesticide Program Dialogue Committee (PPDC), DPR's Pesticide Registration and Evaluation Committee (PREC), and DPR's Pest Management Advisory Committee (PMAC).*

*CASQA will also monitor newly established DPR advisory committees, including the Sustainable Pest Management (SPM) Advisory Committee and the Scientific Prioritization and Review Committee (SPARC). These committees provide new opportunities for stakeholder engagement and science-based input on DPR's sustainable pest*

*management, pesticide evaluation, and risk-mitigation efforts. Additional information on both committees is provided in Section 3.2 of this report.*

### 2.5 PESTICIDE WATCH LIST

*To prioritize pesticide regulatory efforts, CASQA updates its Pesticide Watch List annually based on a combination of new scientific and regulatory literature and data analysis of the California Water Boards Statewide Ambient Monitoring Program, DPR, the U.S. Geological Survey (USGS), DPR, and MS4 monitoring. The Pesticide Watch List prioritizes pesticides based on their current and potential impacts to water quality from urban uses.*

### 2.6 PARTNERSHIPS

*CASQA and the Bay Area Clean Water Agencies (BACWA) continue to work on parallel efforts to effect long-term systemic changes in the pesticide regulatory process. CASQA and BACWA combine resources to track stormwater and wastewater priorities into a unified monthly Pesticides Action Plan. Partnering with BACWA to coordinate the review of EPA and DPR pesticide regulatory actions allows for increasing the capacity and value of our collective pesticide program activities.*

## Section 3. Annual Program Implementation

### 3.1 REGULATORY ENGAGEMENT

*At any given time, there are dozens of pesticides with current or pending actions before EPA or DPR. Addressing these regulatory concerns is critical because some pesticides may pose an immediate threat to water quality and create compliance risks for MS4s. In addition, regulatory decisions made by EPA and DPR often remain in place for many years – typically revisited only once every fifteen years – making early engagement essential to avoid long-term consequences for stormwater programs. Our engagement with EPA and DPR seeks to reinforce source control measures and alternatives as an effective strategy to reduce pesticide pollution.*

*Table 2 summarizes recent CASQA and partner activities in responding to regulatory actions, along with the latest outcomes. For additional details on ongoing pesticide registrations, see Attachment 2: Regulatory Participation Outcomes and Effectiveness Assessment Summary Tables.*

Table 2. Recent Regulatory Activities and Outcomes

| Regulatory Action or Concern | Activity | Partner Support | Outcomes and notes |
|---|---|---|---|
| *Fipronil Preliminary Aquatic Risk Assessment* | *Comment Letter to EPA (July 6, 2020)* | *BACWA*<br>*CA DPR*<br>*CA Dept. of Justice*<br>*SF Water Board*<br>*State Water Board* | *Not Successful. Although EPA incorporated the monitoring data submitted by CASQA and partners, EPA did not address key CASQA and partner recommendations, including:*<br>• *Include impervious surfaces in risk modeling, including perimeter treatments and crack-and-crevice treatments.*<br>• *Add urban mitigation measures after acknowledging that urban concentrations exceed aquatic benchmarks.* |
| *Cyhalothrins (gamma and lamda)- Clarification and Correction on Interim Decision (ID)* | *Comment Letter to EPA (January 11, 2020)* | *BACWA*<br>*CA DPR*<br>*SF Water Board*<br>*NACWA*<br>*City of Salinas* | *Partial Success. CASQA commented to EPA that the Cyhalothrins Proposed Interim Decision (PID) did not provide mitigation measures to address the documented impacts of pyrethroid use in non-agricultural areas. After evaluating human health impacts, EPA moved forward with a proposed mitigation to restrict application of cyhalothrin on residential lawns and turf, such as homes, parks, and schools. Although EPA proposed this mitigation to protect human health, it will have a net effect of reduction of use of cyhalothrins in outdoor urban areas, which may protect aquatic life.* |
| *Isocyloseram Proposed Registration of a New Active Ingredient* | *Comment Letter: June 10, 2025* | *BACWA*<br>*SF Water Board*<br>*NACWA*<br>*Center for Biological Diversity* | *Partial Success. Isocycloseram, a new pesticide with proposed urban outdoor uses, appears to be more toxic than existing pesticides (including pyrethroids) with parallel uses.*<br> <br>*In its November 2025 Response to Comments, EPA used several of the warning statements that CASQA suggested for the pesticide label, including a graphic submitted by CASQA and partners (see right). Warning statements include "Do not apply to storm drains." And "Do not pour down drains or sewers.", among others.*<br>*EPA did not incorporate several CASQA recommendations intended to reduce stormwater exposure. Most notably, EPA declined to apply the existing pyrethroid perimeter-band spray restrictions to isocycloseram. While pyrethroid labels generally limit applications on impervious surfaces to a narrow 1-inch band, EPA allowed isocycloseram perimeter applications up to 7 feet wide on impervious surfaces, despite the compound's high aquatic toxicity and similar outdoor urban use pattern.* |

| Regulatory Action or Concern | Activity | Partner Support | Outcomes and notes |
|---|---|---|---|
| | | | |
| *EPA Endangered Species Act (ESA) Draft Fungicides Strategy* | *Comment Letter to EPA (July 2026)* | *BACWA NACWA SF Water Board* | *Pending. EPA released its Endangered Species Act (ESA) Draft Fungicides Strategy (Strategy) and limited the Strategy to conventional agricultural fungicides. CASQA and partners submitted comment letters requesting a timeline for addressing ESA impacts from non-agricultural fungicides. CASQA has sought the non-agricultural analysis required under the ESA since at least 2019, and EPA has confirmed its intent to complete that analysis multiple times since CASQA's 2019 comments.*<br><br>*CASQA's urban pesticide watchlist identifies more than 48 fungicides of concern with potential stormwater pathways to endangered and threatened species. If EPA omits fungicide uses that drain to storm drains from ESA analysis, the analysis will not identify corresponding mitigation measures, increasing the risk of downstream aquatic toxicity.*<br><br>*CASQA recommended completing the existing fungicide strategy by incorporating elements of previous ESA workplans that addressed applications to impervious surfaces and developing broad mitigation measures to minimize exposure to listed species from outdoor residential pesticide uses.* |

## 3.2 PARTICIPATION IN FEDERAL AND STATE ADVISORY GROUPS

*As presented in Table 3, CASQA remains actively involved with various agencies and advisory groups that affect urban pesticide use and pest management. In addition to the PPDC and PMAC, new advisory groups are currently being initiated by DPR, such as a Scientific Advisory Committee, Sustainable Pest Management Committee, and an Environmental Justice Advisory Committee.*

Table 3. Participation in Federal and State **Efforts to Support CASQA's Goals**

| Agency or Conference | Latest Outcomes |
|---|---|
| *EPA's Pesticide Program Dialogue Committee (PPDC)* | *Prior to the PPDC's charter lapsing in October 2025, the PPDC served as a 40-member advisory committee chaired by the Director of Office of Pesticide Programs (OPP). The committee included representatives from growers, industry, environmental organizations, public health organizations, farmworker groups, and state, local, and tribal governments. The PPDC held biannual public meetings. Over the last decade, CASQA, BACWA, and their partners have presented at PPDC meetings and received important EPA updates.*<br><br>*In July 2026, OPP staff stated that they are seeking renewal of the PPDC charter and may provide an update in the second half of 2026.* |
| *EPA's State FIFRA Issues Research and Evaluation Group (SFIREG)*[14] | *The SFIREG and it's working committees provide a platform for the states and EPA to resolve challenges to successful implementation of pesticide programs and policies in the USA and territories. SFIREG's activities are supported by a grant through EPA, in recognition of the strong co-regulatory relationship required by the states' primacy role in pesticide enforcement and/or certification programs.*<br><br>*CASQA and its partners review updates from SFIREG meetings twice a year, which provide important updates on EPA schedule and upcoming topics. The last meeting was held June 2-4, 2026.* |
| *DPR's Pesticide Registration and Evaluation Committee (PREC)* | *CASQA attends the quarterly PREC meetings. This interagency committee provides advice and guidance to DPR on the proposed registration, renewal, and reevaluation of pesticide products. The PREC may also provide advice to DPR on proposed regulatory development and reform initiatives, evolving public policy and program implementation issues, environmental monitoring data related to pesticide use, and science issues associated with evaluating and reducing risks.*<br><br>*The PREC meetings provide CASQA with useful updates from DPR as well as the opportunity to ask questions to DPR staff and receive immediate responses.* |

[14] *https://aapco.org/2015/07/30/sfireg-3/*

| | |
|---|---|
| *DPR's Sustainable Pest Management (SPM) Advisory Committee* | *The SPM Advisory Committee advises DPR on goals, tactics, policies, and partnerships that support the implementation of SPM statewide. The newly established, limited-term committee will meet quarterly over three years and serve as an advisory body to discuss barriers and opportunities for SPM adoption across California and inform DPR's work to foster pest management approaches that promote human health and safety, ecosystem resilience, agricultural sustainability, community wellbeing, and economic vitality. This committee has 18 members, spanning a range of geographic and professional areas. These experts will advise DPR on the barriers and opportunities for SPM adoption and bring cross-sector perspectives needed to advance SPM implementation across California. This committee held their first meeting on June 15, 2026.*<br><br>*The meeting focused on introducing DPR staff and committee members. DPR presented background materials on SPM.*<br><br>*CASQA looks forward to continued engagement on supporting this committee's efforts.* |
| *DPR's Scientific Prioritization and Review Committee (SPARC)* | *The SPARC is a newly created committee focused on advising DPR on prioritizing actions for their continuous evaluation and mitigation process by providing science-based recommendations to inform DPR's transparent, data-driven process for identifying and addressing potential risks to human health and the environment from pesticide use. In April 2026, 12 members were selected to serve on the committee. The first committee meeting has been scheduled for August 7, 2026. CASQA looks forward to engagement on the committee's efforts.* |
| *DPR's Pest Management Advisory Committee (PMAC)* | *Although CASQA does not currently have a member on the PMAC, our urban partner agency, BACWA, participates on the PMAC. Urban participation on the PMAC has resulted in expanded focus by DPR on urban pest management and water quality issues and generated funding for urban IPM research and implementation programs.* |
| *DPR's Environmental Justice Advisory Committee (EJAC)* | *EJAC will support DPR's inclusion and consideration of diverse perspectives to inform its decision-making processes and foster equitable outcomes for communities most impacted by pest management decisions. This advisory committee, established by AB 652, is tasked with advising DPR on policies and programs that address environmental justice concerns – particularly those of communities living in areas of high pesticide use.*<br><br>*EJAC held its first meeting in April 2026. Although it currently has an agricultural focus, CASQA will continue to review EJAC meeting agendas and meeting minutes to see if urban issues are discussed.* |

## 3.3 UPDATED PESTICIDE WATCH LIST

*A key tool for identifying near-term regulatory concerns is the Pesticide Watch List. To maintain the Pesticide Watch List, scientific literature, government reports, and monitoring studies are reviewed 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 Pesticide Watch List, as shown on Table 4, serves as a management tool to help focus efforts on the most important pesticides*

*from the perspective of MS4 agencies.[15] The Pesticide Watch List serves as a benchmark to prioritize activities, but it is not based on a comprehensive review of all pesticides. As a result, during regulatory tracking, 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.*

*The 2026 investigation assessed Watch List chemicals, incorporating information from the following surface water monitoring programs:*

- DPR*: (1) Study 329. Surface Water Monitoring for Pesticides in Urban Areas of Northern California (FY2023-2024), McClanahan 2025 and (2) Study 320. Ambient Surface Water and Mitigation Monitoring in Urban Areas in Southern California (FY2023-2024), Budd 2025.*
- San Francisco Estuary Institute (SFEI)*: Heberger, Matthew, Rebecca Sutton, Nina Buzby, Jennifer Sun, Diana Lin, Miguel Mendez, Michelle Hladik, James Orlando, Corey Sanders, and Edward T. Furlong. Current-Use Pesticides, Fragrance Ingredients, and Other Emerging Contaminants in San Francisco Bay Margin Sediment and Water. SFEI Contribution No. 934. San Francisco Estuary Institute, Richmond, CA, 2020.*
- Delta Regional Monitoring Program: *Current Use Pesticides monitoring data (available from CEDEN).*
- State Water Board: *Stream Pollution Trends (SPoT) Monitoring Program. Khan, B, et al., Pyrethroid-driven toxicity and its relationships with urban land use: Findings from 15 years of statewide monitoring in California watersheds, Science of The Total Environment, Volume 999, 15 October 2025, 180330*
- MS4/NPDES monitoring*: The Bay Area Municipal Stormwater Collaborative and the Southern California Stormwater Monitoring Coalition.*
- United States Geological Services (USGS) Monitoring*: USGS California Stream Quality Assessment (CSQA) Sandstrom, M., Nowell, L., Mahler, B., Van Metre, P., New-generation Pesticides Are Prevalent in California's Central Coast Streams, Science of the Total Environment, 806, 2022*

*The available data were compared to aquatic toxicity thresholds, represented by Aquatic Life Benchmarks (ALBs) established by EPA based on Ecological Risk Assessments. For the DPR data sets, this comparison was performed by DPR and reported in the associated study reports. Following the review of monitoring data, additional factors were checked, including section 303(d) impaired waters listings and pesticide product uses. Based on the review, the following Watch List updates were implemented:*

- Confirmation of Priority 1 pesticides. *The data continues to support pyrethroids, particularly bifenthrin, as a Priority 1 water quality concern. Bifenthrin concentrations show reductions in northern California surface water data, but comparable reductions are not evident in southern California, where concentrations remain higher and more variable. Statewide sediment results also indicate that bifenthrin remains a major contributor to pyrethroid-related toxicity. CASQA will share these findings with DPR to support continued discussion of pyrethroid mitigation, enforcement, and source-control opportunities.*
- Watch List criteria change*: Expanded the definition of Priority 3 criteria to better explain the criteria. Added the following to this definition: "or is highly toxic with a pathway to the storm drain and has been detected in urban monitoring."*
- Addition of note: *Added note to "Unknown" section of Watch List: "EPA will be reviewing many antimicrobials and fungicides in the next decade, so we expect to see more data on these two classes of pesticides."*

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[15] *The first Watch List was published by the UP3 in 2005.*

- Clarification of definition: *Added a footnote to Chromium Pesticides in Priority 3 to clarify that they include dichromic acid/chromic acid, chromated arsenicals, and other chromium pesticides. The footnote explicitly lists dichromic acid because of increasing concern about its use and to support clear Watch List tracking.*

- Addition of PFAS (Per- and polyfluoroalkyl substances) designation*: Due to increasing concern of PFAS in stormwater, an asterisk was added to all pesticides that are PFAS as well as the definition of PFAS as a footnote, with citations. The footnote and citations are similar to those BACWA included in their 2026 wastewater watch list.*

- Pesticides of increasing concern that warrant moving up in priority or being added to list:
    - *Dicamba: Dicamba was moved from Priority 4 to Priority 3 based on concerning urban monitoring data. Dicamba was previously listed as a footnote under phenoxy herbicides in Priority 4.*
    - *MCPA: MCPA remained in Priority 4 but was listed separately from phenoxy herbicides to support individual tracking.*
    - *Propiconazole: Propiconazole was moved from Priority 4 to Priority 3 based on toxicity to freshwater invertebrates and fish and frequent detections in urban stormwater monitoring within two orders of magnitude of the chronic fish Aquatic Life Benchmark.*
    - *Boscalid: Boscalid was added to Priority 4 because use is increasing and DPR added it to its urban monitoring list.*
    - *Diflubenzuron: Diflubenzuron was added to Priority 4. This new termite pesticide is registered for use in CA as a bait. It is toxic to invertebrates and was added to DPR's urban surface water priority monitoring list, which qualifies it for placement in Priority 4.*
    - *Isothiazolinones: Isothiazolinones was added to Priority 4. One of the isothiazolinones—4,5-dichloro-2-octyl-3(2H)-isothiazolone (DCOIT)—was already on the Priority 4 list. Isothiazolinones of interest also include 2-methyl-4-isothiazolin-3-one (MIT), 5- chloro-2-methyl-4-isothiasolin-3-one (CMIT), 1,2 Benzisothiazolin-3-one (BIT), and 2-n-Octyl-4-isothiazoline-3-one (OIT), and 1,2-Benzisothiazol-3(2H)-one,2-butyl (BBIT). While EPA is behind in registration review, data are expected through the 2027 Bay Area RMP stormwater monitoring program.*
    - *Etoxazole: Etoxazole was added to Priority 4. This pesticide is very highly toxic to aquatic invertebrates. It is currently registered in CA for industrial, commercial, and residential use in a granular formulation for spider mites. There is also a fogger product available that is supposed to be used only inside greenhouses. This pesticide is a world-wide concern and was added to the EU stormwater pesticide monitoring list in recent years.*
    - *Tetraniliprole: Tetraniliprole was added to Priority 4. This pesticide is newer, having been registered in 2020. Outdoor urban use includes "urban areas", golf courses, recreational areas, and ornamental turf. It is highly toxic to invertebrates. Use appears to be expanding in CA.*
    - *Dinotefuran: Dinotefuran (a neonic) was moved from "Keep Watching" to Priority 4. Recent DPR stormwater monitoring shows that this pesticide is present in more than 40% of all stormwater monitoring samples; no samples exceed ALBs.*
- Pesticides of decreasing concern that have been demoted on the prioritization list:
    - *Malathion: Malathion was moved from Priority 1 to Priority 3 as there have been no ALB exceedances in recent years.*
    - *Simazine: Simazine was moved from Priority 2 to Priority 3 as it is not detected as frequently as before. Detection levels are no longer approaching ALBs.*

Table 4. Pesticide Watch List

| Priority | Basis for Priority Assignment | Pesticides | |
|---|---|---|---|
| *1* | *Monitoring data exceeding benchmarks; linked to toxicity in surface waters; urban 303(d) listings* | *Diuron*<br>*Fipronil**<br>*Imidacloprid*<br>*Pyrethroids with significant monitoring data:*[16]<br>• *Bifenthrin**<br>• *Cyfluthrin**<br>• *Cyhalothrin (lambda)**<br>• *Cypermethrin*<br>• *Deltamethrin/Tralomethrin*<br>• *Esfenvalerate/Fenvalerate*<br>• *Permethrin* | |
| *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* | *Carbendazim/Thiophanate-methyl*<br>*Chlorantraniliprole*<br>*Clothianidin (Neonic)*<br>*Copper pesticides*[17]<br>*Creosote (PAHs)*<br>*Indoxacarb**<br>*Pendimethalin*<br>*Polyhexamethylenebiguanidine (PHMB)*[17]<br>*Pyrethroids with little or no monitoring data*[16],*<br>*Thiamethoxam (Neonic, degrades into Clothianidin)*<br>*Zinc pesticides (including Ziram)*[17]<br>*2,4-D*[18] | |
| *3* | *Pesticide contains a Clean Water Act Priority Pollutant; 303(d) listing for pesticide, degradate, or contaminant in any watershed; or is highly toxic with a pathway to the stormdrain and has been detected in urban monitoring.* | *Arsenic pesticides*<br>*Bensulide*<br>*Chromium pesticides*[19]<br>*Dicamba*<br>*Dichlorvos (DDVP)*<br>*Malathion* | *Naled*<br>*Naphthenates*<br>*Propiconazole*<br>*Silver pesticides*[17]<br>*Simazine*<br>*Trifluralin** |
| *4* | *High or unknown toxicity (parent or degradate) and urban use pattern associated with water pollution; synergist for higher tier pesticide; on DPR urban monitoring priority list* | *Antimicrobials in paints/coatings*<br>*Abamectin*<br>*Quaternary Ammonium Compounds (QACs)*[17, 20]<br>*Azoxystrobin*<br>*Bacillus sphaericus*[17]<br>*Bacillus thuringiensis (Bti)*[17]<br>*Boscalid*<br>*Bromacil* | *MCPA*<br>*Methomyl*<br>*Methoprene*[17]<br>*Mineral bases, weak*[17]<br>*Mineral oil (aliphatic)*[17]<br>*Methoxyfenozide*<br>*Methyl anthranilate*[17]<br>*MGK-264*<br>*Novaluron** |

*[16] Pyrethroids with little or no urban monitoring data include Allethrins, Cyphenothrin, Etofenprox, Flumethrin, Imiprothrin, Metofluthrin, Momfluorothrin, Prallethrin, Sumethrin [d-Phenothrin], Tau-Fluvalinate Tetramethrin. Etofenprox is included in SoCal analytes but has not been detected; there continue to be no NorCal monitoring data for etofenprox.*
*[17] Used in pools, spas, and/or fountains.*
*[18] These pesticides may have dioxins as contaminants; there are several bay and estuary 303(d) listings for dioxin compounds.*
*[19] Includes dichromic acid/chromic acid, chromated arsenicals, and other chromium pesticides.*
*[20] QACs found in stormwater include DDACs, ADBAC, ETMACs, BACs, EBAC, and others. Pools spas, and fountains can be a source of QACs in stormwater but the main sources of QACs in stormwater are undetermined at this time.*

| Priority | Basis for Priority Assignment | Pesticides | |
|---|---|---|---|
| | | *N-Bromosulfamates*[17]<br>*Busan-77*[17]<br>*Carbaryl*<br>*Chlorinated isocyanurates*[17]<br>*Chlorine*[17]<br>*Chlorine dioxide*[17]<br>*Chlorfenapyr**<br>*Chlorothalonil*[18]<br>*Chlorsulfuron*<br>*Isothiazolinones*[17, 21]<br>*DDAC*[17]<br>*Dichlobenil*<br>*Diflubenzuron**<br>*Dinotefuran (Neonic)*<br>*Dithiopyr**<br>*Etoxazole**<br>*Halohydantoins*[17]<br>*Hydramethylnon**<br>*Hypochlorites*[17]<br>*Imazapyr*<br>*Isoxaben*<br>*Mancozeb* | *Oryzalin*<br>*Oxadiazon*<br>*Oxyfluorfen**<br>*PCNB*<br>*Peroxyacetic acid*[17]<br>*Phenoxy herbicides*[22]<br>*Piperonyl butoxide (PBO)*<br>*Prodiamine**<br>*Pyrethrins*<br>*Pyriproxyfen*[17]<br>*Sodium bromide*[17]<br>*Sodium chlorite*[17]<br>*Sodium percarbonate*[17]<br>*Sodium tetraborate*[17]<br>*Spinosad/Spinetoram*<br>*Sulfometuron-methyl*<br>*Tebuconazole*<br>*Terbuthylazine*[17]<br>*Tetrapraniliprole*<br>*Triclopyr*<br>*Trimethoxysilyl quats* |
| *5* | *Frequent questions from partners*[23] | *Glyphosate* | *Metaldehyde* |
| *Keep Watching* | *Urban pesticides that may threaten water quality depending on approved urban use patterns.* | *Acetamiprid*<br>*(Neonic) Cyantraniliprole*<br>*Flupyradifurone (Neonic-like)*<br>*Isocycloseram** | *Sulfoxaflor (Neonic-like)**<br>*Veratridine (pyrethroid replacement)* |
| *None* | *No tracking trigger* | *Most of the >1,000 existing pesticides* | |
| *Unknown* | *Lack of information. No systematic screening has ever been completed for urban pesticides.* | *Unknown. EPA will be reviewing many antimicrobials and fungicides in the next decade, so we expect to see more data on these two classes of pesticides.* | |

## 3.4 PARTNERSHIPS

*CASQA and BACWA continued to combine resources to track stormwater and wastewater priorities into a unified monthly pesticide action plan (see Attachment 1: Pesticides Regulatory Action Items for the most recent update).*

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*[21] Isothiazolinones include 2 methyl-4-isothiazolin-3-one (MIT), 5-chloro-2-methyl-4-isothiasolin-3-one (CMIT), 1,2, Benzisothiazolin-3-one (BIT), 4,5-dichloro-2-octyl-3(2H)-isothiazolone (DCOIT), 1,2-Benzisothiazol-3(2H)-one, 2-butyl (BBIT), and 2-n-Octyl-4-isothiazoline-3-one (OIT).*
*[22] Includes, 2,4-DP and MCPP (Mecoprop). 2,4-D, Dicamba, and MCPA are listed separately.*
*[23] Chlorpyrifos and Diazinon, while often asked about, have near zero or no urban uses, respectively.*
** Contains Perfluoroalkyl and polyfluoroalkyl substances or "PFAS," a class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom. (Based on the definition set by the Organisation for Economic Co-operation and Development (OECD). The state of Minnesota compiled a list of PFAS pesticides here: https://www.mda.state.mn.us/environment-sustainability/pfas-pesticide-active-inert-ingredients Full OECD PFAS definition here: https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/07/reconciling-terminology-of-the-universe-of-per-and-polyfluoroalkyl-substances-a7fbcba8/e458e796-en.pdf*

*CASQA will continue to seek opportunities to support DPR's efforts across the SPM focus areas, and work with BACWA on areas of shared priority.*

# Section 4. Assessment of Progress

*Since the mid-1990s, CASQA (and its predecessor organization the Stormwater Quality Task Force) has worked toward a future in which the pesticide regulatory structure at the state and federal level regulates pesticide uses to protect water quality. CASQA's long-term pesticide program activities focus less on specific pesticides and more on instilling systematic process improvements. A central aspect of achieving these changes involves supporting key initiatives at EPA, DPR, and the Water Boards that make progress toward these changes*

## 4.1 STATE-LEVEL PROGRESS

*At the state level, DPR has made significant progress in addressing pesticide impacts in surface waters receiving urban runoff. DPR continues to implement improved registration processes and responses to observed water quality problems. DPR also continues to implement and evaluate mitigation measures for observed problems with pyrethroids and fipronil.*

*DPR's transition to Sustainable Pest Management (SPM), a holistic, systems-based approach, offers opportunities for broader improvement. The 2023 SPM Roadmap identifies improved data, research and outreach, increased adoption of SPM, and pest-preventive urban design as key leverage points for urban implementation. DPR's 2026 Continuous Evaluation and Mitigation Update increases transparency by identifying active actions and next steps. As described in Section 3.2, the SPM Advisory Committee and SPARC provide additional avenues for stakeholder input and science-based prioritization.*

*Furthermore, in 2014, the State Water Board established an urban pesticides reduction project (now titled the Statewide Urban Pesticide Provisions or UPP) as a top priority under the comprehensive stormwater strategy, known as "Strategy to Optimize Resource Management of Stormwater" or STORMS. CASQA has been actively supporting the development of the UPP since their inception.*

*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 process with the requirements of the Clean Water Act and MS4 permits. The goal is to embody this process in the State's UPP and the Management Agency Agreement (MAA) between DPR and the Water Boards*

## 4.2 FEDERAL-LEVEL PROGRESS

*CASQA's engagement with EPA focuses on promoting the standardization in labeling, enhancing modeling of pesticide use and water quality impacts, and ensuring Endangered Species Act (ESA) considerations are incorporated into regulatory decisions. Our regulatory activities, as described by Table 2, show moderate success in addressing pesticide registration decisions. However, EPA analyses do not show a clear understanding of key urban uses, and it is still unclear if upcoming risk management decisions for pyrethroids, imidacloprid and other neonicotinoids will provide any additional protection of urban water bodies. Consequently, further engagement on pesticide registration decisions is necessary to effectively communicate the impacts of urban use pesticides to water quality.*

## Section 5. Looking Forward

*In the coming year, CASQA will continue to address near-term pesticide concerns and seek long-term regulatory change. In the coming year, CASQA will continue engagement on specific regulatory actions for priority pesticides at the federal level, while continuing to support DPR in their rollout of the SPM initiative and their proposed Pesticide Prioritization Process. The pesticide program's priority focus areas include:*

*(1) Seek near-term changes in pesticide regulatory actions:*

- *Support completion of DPR action on fipronil water pollution, including implementation of effective education for professional users regarding restrictions on its outdoor urban use.*
- *Advocate for the enforcement of DPR's existing mitigation measures for pyrethroids and fipronil and recommend adoption of additional mitigation measures as warranted.*
- *Support completion of DPR's evaluation of the impacts of neonicotinoid pesticides on aquatic organisms.*
- *Continue to respond to EPA pesticide registration decisions, including proposed registrations of new active ingredients with potential urban water-quality implications.*

*(2) Seek long-term changes in the pesticide regulatory structure:*

- *Continue engagement with EPA regarding incorporating their ESA obligation in registrations and re-registrations, including recommending the use of pictograms in labels, and seeking opportunities in California for EPA's future regional and vulnerable species pilot programs.*
- *Continue engagement with DPR regarding the SPM Roadmap specific to urban implementation programs and opportunities, including engagement with the SPM Advisory Committee and SPARC.*
- *Support DPR's pesticide prioritization process as an effective pathway to prioritize pesticides under their continuous evaluation and mitigation process.*
- *Encourage and assist the Water Boards to continue to implement its MAA with DPR to prevent and mitigate pesticide impairments through more effective pesticide regulation.*

*CASQA will continue to seek opportunities to coordinate on high-priority regulatory actions with the Water Boards and other water quality stakeholders to take advantage of efficiencies and increased effectiveness. Attachment 1: Pesticides Regulatory Action Items details the prioritization and estimated schedule of future pesticide regulatory items, which serves as the basis for planning future pesticide regulatory activities.*

# Attachment 1: Pesticides Regulatory Action Items

## Estimated CA DPR Schedule (Next 12 months):

| Priority | Topic | Estimated Due Date | Wastewater / Stormwater | Item | Water Quality Issue |
|---|---|---|---|---|---|
| 1 | *Investigation of Total Release Foggers (TRFs) and Intent to Begin Reevaluation* | *6/26/26* | | *Reevaluation of indoor TRFs* | *Monitoring data; toxicity* |
| 1 | *Fipronil Pet Product Aquatic Risk Analysis (details below)* | *June 2026* | | *Mitigation Options Document* | *Monitoring data; Anticipated 303(d) listings* |
| 1 | *Non-Agricultural Outdoor Neonicotinoids (details below)* | *July 2027* | | *Re-evaluation Determination* | *DPR found human health risks for Acetamiprid, Dinotefuran, and Imidacloprid, which may necessitate product label changes or product bans.* |

## Estimated US EPA Schedule (Next 12 months):

| Priority | Topic | Estimated Due Date | Wastewater / Stormwater | Item | Water Quality Issue |
|---|---|---|---|---|---|
| *high* | *Draft ESA Fungicide Strategy* | *6/29/26* | | *ESA Strategy* | *Varied; review is needed to screen these for water quality issues* |
| *unknown* | *New Antimicrobials and Fungicides* | *various* | | *various* | *Varied; many of these pesticides are showing up for the first time at the PID level; review is needed to screen these for water quality issues* |
| 1 | *Diuron* | *2026* | | *BE (ESA)* | *303(d) listings* |
| 3 | *o-phenyl phenol* | *2026* | | *PID* | *Toxicity. Used in cooling towers, paints, cleaners, etc.* |
| 4 | *Dicamba* | *2026* | | *PID* | *Toxicity, stormwater monitoring data* |
| 4 | *Peroxy Compounds (peroxyacetic acid)* | *2026* | | *PID (re-release)* | *Fountain chemical* |
| 4 | *Piperonyl butoxide (PBO)* | *2026* | | *PID* | *Pyrethroid synergist* |
| 4 | *Pyrethrins* | *2026* | | *PID* | *Related to pyrethroids, but less stable and less toxic* |
| 4 | *Tebuconazole* | *2026* | | *PID* | *Fungicide* |
| 4 | *MGK-264* | *Uncertain* | | *PID* | *Pyrethroid synergist* |
| 1 | *Fipronil* | *2027* | | *PID* | *Monitoring data; Anticipated 303(d) listings* |

*Key: RA = Risk Assessment; PID = Proposed Interim Decision; BE (ESA) = Biological Evaluation (Endangered Species Act); CA DPR = California Department of Pesticide Regulation; US EPA = United States Environmental Protection Agency*

# Attachment 2: Regulatory Participation Outcomes and Effectiveness Assessment Summary Tables

## Cyhalothrins (Gamma and Lambda) Regulatory Participation Outcome and Effectiveness Assessment Summary Table

| | |
|---|---|
| Pesticide: | Cyhalothrins (Gamma and Lambda), EPA–HQ–OPP–2010–0479 and EPA–HQ–OPP–2010–0480 |
| Use: | *Broad area uses in golf courses, lawns and turf, landscapes, and building perimeter treatments.* |
| Why we care: | *Highly toxic to aquatic invertebrates. Recurring exceedances of aquatic toxicity thresholds in water quality monitoring. Multiple 303(d) listings as well as adopted and pending TMDLs.* |
| Actions taken: | *CASQA sent a comment letter to EPA on the cyhalothrins Proposed Interim Decision (PID) on January 11, 2021. In February 2020, CASQA also sent a comment letter to EPA on the Pyrethroids and Pyrethrins Ecological Risk Mitigation Proposal.* |
| Status: | *In September 2021, EPA released the Interim Registration Review Decision (ID). In February 2026, EPA released a Clarification and Correction to the ID.* |

Next steps: *EPA will complete an endangered species determination and any necessary consultation with the Services.*

| CASQA 1/11/2020 Comments to EPA on the Cyhalothrins PID | EPA Response<br>*Clarification and Correction to the September 2021 Lambda-Cyhalothrin and Gamma-Cyhalothrin Interim Registration Review Decision, posted February 2026.* | Did EPA incorporate **CASQA's** comment? |
|---|---|---|
| Risk Mitigation Must be Protective of Urban Surface Waters<br><br>*CASQA recommends that the EPA design a clear schematic graphic for product labels, review proposed label language text, and edit as needed to provide clear and consistent descriptions of pervious and impervious surfaces, and provide California-specific labels for outdoor structural pest control pyrethroids products consistent with regulations implemented by CDPR.*<br><br>*"CASQA strongly supports the '"Required Label Language for Lambda-and Gamma-Cyhalothrin End-use products with outdoor, urban, non-agricultural uses".' As defined in PID Appendix B, pp. 88-90, as a minimum level of mitigation required* | *To mitigate the risk to adults and children resulting from post-application exposure to products containing lambda-cyhalothrin and gamma-cyhalothrin on residential lawns, EPA added a new label restriction:*<br><br>**"Do not apply directly to residential lawns and turf in residential** settings (e.g., homes, parks, schools, athletic fields or any other area **frequented by the general public)."** *(Clarification and Correction, pp. 2-3)* | Partially. *EPA kept the label language from the PID in the ID. Further, the 2026 correction to restrict residential lawn applications may reduce impacts to urban areas.* |

| CASQA 1/11/2020 Comments to EPA on the Cyhalothrins PID | EPA Response<br>*Clarification and Correction to the September 2021 Lambda-Cyhalothrin and Gamma-Cyhalothrin Interim Registration Review Decision, posted February 2026.* | Did EPA incorporate **CASQA's** comment? |
|---|---|---|
| *to address the known risks to aquatic species from outdoor / urban uses of cyhalothrins. However, the Cyhalothrins PID does not provide any additional mitigation measures…to address the documented impacts of pyrethroid use in urban (non-agricultural) areas, and the risks to aquatic life of continued use of pyrethroid pesticides. This is despite significant evidence presented both in EPA's risk assessments and in our previous comment letters…consideration for possible additional mitigation measures should be afforded for each pyrethroid known through documented sources to contribute to surface water pollution." (CASQA's Comments, pp. 2-3)* | | |

## Fipronil Regulatory Participation Outcome and Effectiveness Assessment Summary Table

| | |
|---|---|
| Pesticide: | Fipronil, EPA-HQ-OPP-2011–0448 |
| Use: | *Broad area uses in golf courses, lawns and turf, landscapes, and building perimeter treatments (trench or rod, building structure, and soil surface applications).* |
| Why we care: | *Highly toxic to aquatic invertebrates. Recurring exceedances of aquatic toxicity thresholds in water quality monitoring.* |
| Actions taken: | *CASQA submitted a comment letter on the Preliminary Aquatic Risk Assessment (June 2020).* |
| Status: | *EPA prepared a response to comments and Revised Risk Assessment in 2021 which was published to their docket in November 2025 (in parallel with a 2025 revised Health Risk Assessment).* |

| | |
|---|---|
| Next steps: | *EPA will issue a Proposed Interim Decision. Timeline is uncertain due to delays at EPA.* |

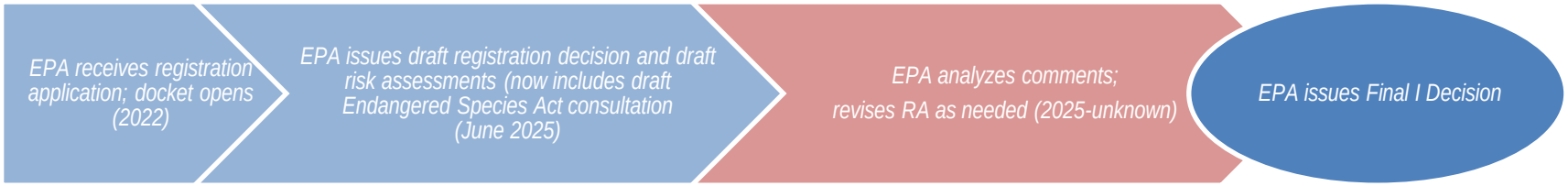
| CASQA Comments to EPA (7/6/20) on Fipronil: Draft Ecological Risk Assessment for Registration Review | EPA Response<br>*Fipronil: Response to Comments on the Draft Ecological Risk and Drinking Water Assessments for Registration Review (Feb 16, 2021; published Nov. 2025) pp. 72-74; and Fipronil: Revised Draft Ecological Risk Assessment for Registration Review (April 13, 2021; published Nov. 2025).* | Did EPA incorporate **CASQA's** comment? |
|---|---|---|
| Comment #1: Monitoring Data Cited in Fipronil ERA Should be Updated<br><br>*The Fipronil ERA appropriately cites California Department of Pesticide Regulation (CDPR) water quality monitoring data, but the data cited are outdated and incomplete. CASQA recommends the EPA update their monitoring data to include more recent studies done by CDPR. CDPR studies continue to show high levels of detection of fipronil and its degradates in surface water samples from urban areas.* | *EPA provided an updated summary of monitoring data using more recent data.*<br><br>*"EFED (Environmental Fate and Effects Division) appreciates CASQA comments and the reference to the California Department of Pesticide Regulation's (CDPR) Surface Water Database … Monitoring data were queried for fipronil and its major degradates (sulfide, sulfone and amide) on October 15, 2020 from CDPR's website. The monitoring samples* | Yes. |

| CASQA Comments to EPA (7/6/20) on Fipronil: Draft Ecological Risk Assessment for Registration Review | EPA Response<br>*Fipronil: Response to Comments on the Draft Ecological Risk and Drinking Water Assessments for Registration Review (Feb 16, 2021; published Nov. 2025) pp. 72-74; and Fipronil: Revised Draft Ecological Risk Assessment for Registration Review (April 13, 2021; published Nov. 2025).* | Did EPA incorporate **CASQA's** comment? |
|---|---|---|
| | *were taken from California rivers, creeks, agricultural drains, urban streams and estuaries." (Response to Comments, p. 10)*<br><br>*"In the most recent southern California study (Budd, 2019), fipronil was detected in 76% of samples, with 73% at concentrations above EPA's aquatic life benchmark for invertebrate chronic toxicity (0.011 ppb). In a separate study from northern California, Ensminger, (2019), fipronil was detected in 48% of samples, in all cases above EPA's aquatic life benchmark for invertebrate chronic toxicity (0.011 ppb)." (Response to Comments, p. 10)* | |
| Comment #2: Risk Assessment Modeling Underestimates Risk from Urban Outdoor Uses<br><br>*CASQA recommends that applications to impervious surfaces without subsequent runoff over pervious surfaces, including but not limited to perimeter treatment uses, crack and crevice treatment uses, and spot treatment uses, be included in the risk assessment modeling.*<br><br>*"According to the most recent available (2017) pesticide use data, virtually all fipronil applied to outdoor surfaces in California is applied as "structural pest control", in areas covered by municipal stormwater NPDES permits. … assessments of risks from pesticide applications to impervious surfaces are essential for non-agricultural pesticide uses, because transport in urban runoff from impervious surfaces to surface waters via the storm drainage system is the transport pathway known to contribute most to observed water quality pollution from pesticide uses in urban areas. This is especially true where pesticides are applied to surfaces that are* | *"Currently, the Agency does not quantitatively assess crack and crevice nor spot treatment uses. These uses are considered unlikely to result in appreciable aquatic exposure as compared to agricultural and wide-area non-agricultural applications. EFED acknowledges that many of the non-agricultural uses (e.g., perimeter treatment of commercial/ institutional/ industrial premises/ equipment) may contribute to fipronil residues in urban discharge into surface water. However, uses are not wide-area but are restricted to treatment of building perimeters and walls. And, in many cases, application rates listed in Appendix A of the DRA are one to several orders of magnitude lower than the application rate for perimeter treatments. Thus, assessment of perimeter treatment uses is considered protective for other outdoor uses." (Response to Comments, p. 11)* | No. *EPA did not update their risk estimates to include the additional urban uses and did not address the comment about how current EPA perimeter treatment modeling is only assessed over pervious surfaces, rather than impervious* |

| CASQA Comments to EPA (7/6/20) on Fipronil: Draft Ecological Risk Assessment for Registration Review | EPA Response<br>*Fipronil: Response to Comments on the Draft Ecological Risk and Drinking Water Assessments for Registration Review (Feb 16, 2021; published Nov. 2025) pp. 72-74; and Fipronil: Revised Draft Ecological Risk Assessment for Registration Review (April 13, 2021; published Nov. 2025).* | Did EPA incorporate **CASQA's** comment? |
|---|---|---|
| *hydraulically connected directly to the storm drainage system." (CASQA's Comments, pp. 2-3)*<br><br>*"The Fipronil ERA's description of modeling with respect to inclusion of applications to impervious surfaces for the perimeter (structural) ant treatment scenario needs clarification. ERA Section 8 text and tables indicate that impervious surface applications were modeled… (However), only runoff that flows over pervious surfaces (sod or lawn) was modeled in the residential perimeter treatment scenario." (CASQA's Comments, p. 3)* | | *surfaces hydraulically connected to the storm drain system.* |
| Comment #3: Additional Mitigation Measures Are Needed<br><br>*CASQA recommends that EPA evaluate as part of the review process whether current California-specific label restrictions are sufficient to mitigate risks to aquatic life in urban surface waters. CASQA also recommends that EPA refine labels for pre-construction termiticide applications to prevent discharge to water bodies from water that contacts pesticide-treated soil. Specifically, CASQA recommends that EPA add a requirement that after a pre-construction termiticide treatment, applicators must post signage identifying sites treated and date treated, stating the need to cover the site and maintain the plastic cover in place until foundation is poured, and manage any water that collects in the treated area before the foundation is poured in accordance with applicable (storm)water quality and hazardous waste laws.* | *No published response.* | No. *EPA acknowledges urban values surpass aquatic benchmarks, but mitigation measures, including urban mitigation, are not discussed in the risk assessment.* |

## Isocycloseram Regulatory Participation Outcome and Effectiveness Assessment Summary Table

| | |
|---|---|
| Pesticide: | Isocycloseram, EPA-HQ-OPP-2021-0641 |
| Use: | *Broad-spectrum contact insecticide to be used as a gel, spray, spot, void, perimeter or crack-and-crevice treatment with proposed urban/suburban uses for cockroaches, ants, and termites.* |
| Why we care: | *Very highly toxic to aquatic invertebrates and toxic to fish.* |
| Actions taken: | *CASQA submitted a comment letter on the new active ingredient registration decision in June 2025.* |
| Status: | *EPA published response to comments in November 2025.* |




| | |
|---|---|
| Next steps: | *No Federal action until new uses added and/or registration review.* |

| CASQA Comments to EPA (6/10/25) on Memorandum Supporting Proposed Decision to Approve Registration for the New Active Ingredient of Isocycloseram | EPA Response *(Response to Public Comments on EPA's Registration of the New Active Ingredient, Isocycloseram, Nov. 19, 2025, pp. 72-74)* | Did EPA incorporate **CASQA's comment?** |
|---|---|---|
| Comment #1: Isocycloseram appears to be more toxic than existing pesticides with parallel outdoor uses.<br><br>*Given that isocycloseram has equal or greater chronic toxicity and shares similar urban applications, CASQA does not recommend that approved registration of isocycloseram.*<br><br>*"The draft ERA states that isocycloseram is very highly toxic to aquatic invertebrates and toxic to fish. Isocycloseram is particularly toxic to estuarine/marine invertebrates under chronic exposure…When comparing chronic toxicity to aquatic invertebrates, isocycloseram is more toxic than fipronil, imidacloprid, and several pyrethroids with the same outdoor* | *"EPA's risk assessment indicates, using modeling, that isocycloseram can potentially enter surface water and affect aquatic invertebrates. However, the chemical is unlikely to move into groundwater in concentrations high enough to affect aquatic invertebrates in subterranean habitats. EPA modeled exposure from outdoor residential, urban, and industrial use patterns of isocycloseram and characterized risks to aquatic invertebrates based on the sensitivity of those species coupled with the magnitude of exposure from proposed uses of isocycloseram… Label mitigations intended to reduce runoff from agricultural fields have the potential to reduce risk to aquatic taxa by approximately one order of magnitude… Additionally, because of stormwater* | No. *EPA has considered the risks of urban usage of isocycloseram, but label mitigations are focused on reducing agricultural runoff based on their findings.* |

| CASQA Comments to EPA (6/10/25) on Memorandum Supporting Proposed Decision to Approve Registration for the New Active Ingredient of Isocycloseram | EPA Response<br>*(Response to Public Comments on EPA's Registration of the New Active Ingredient, Isocycloseram, Nov. 19, 2025, pp. 72-74)* | Did EPA incorporate **CASQA's comment?** |
|---|---|---|
| *uses. In addition, several of the isocycloseram degradates are also highly toxic to aquatic invertebrates, similar to fipronil." (CASQA's Comments, p. 2)* | *contamination concerns, isocycloseram labels limit sewer/drain applications locations and specifically prohibit use in storm drains to help limit the exposure from residential uses. The BE and registration decision identify multiple compulsory mitigation measures for the general label to reduce the movement/transport of isocycloseram via run-off/erosion and spray drift." (Response to Comments, pp. 72-73)* | |
| Comment #2: Perimeter band spray on pesticide labels **–** use label language established for pyrethroids<br><br>*Given the toxicity of isoclycloseram, CASQA recommends requiring pesticide registrants to submit revises labels for urban pesticides, using a process similar to the development of the pyrethroid labels which have narrower perimeter band spray widths when proximate to impervious surfaces.*<br><br>*"From 2019 to 2020, EPA worked extensively with pyrethroid registrants to develop perimeter band label language that was both effective against pests as well as protective of aquatic life. This reduced the band spray width (for pyrethroids) for some applications on impervious surfaces to be just 1-inch wide, greatly reducing the possibility of run-off over impervious surfaces which enter the storm drain system and flow untreated to surface waters. The pyrethroids perimeter band label, which is used for ten pyrethroids of varying toxicities, allows for a seven-foot perimeter band only when the application is over pervious surfaces, such as soil, mulch or lawn." (CASQA's Comments, p. 3)* | *"EPA is maintaining a 7-ft perimeter band for outdoor handheld treatments because modeling conducted for handheld applications that have perimeter band restrictions in EPA's risk assessment considers applications to impervious surfaces. The highest EECs for residential use were obtained with 'ResidentialBSS' scenario. The curve number associated with this scenario accounts for 38% impervious area in EPA's standard quarter acre lot assumption. Therefore, EPA's modeling incorporates the potential for applications to both pervious and impervious surfaces without needing to aggregate different scenarios (e.g. residential and impervious) or restrict applications to impervious surfaces as was done with the pyrethroids. Since the exposure estimates already include the potential for application to impervious areas, no additional label instructions are required to address the exposure concerns for the perimeter band treatments." (Response to Comments, pp. 73 – 74)* | No*. EPA did not include the additional mitigation language to address exposure concerns for the perimeter band in isocycloseram products.* |

| CASQA Comments to EPA (6/10/25) on Memorandum Supporting Proposed Decision to Approve Registration for the New Active Ingredient of Isocycloseram | EPA Response<br>*(Response to Public Comments on EPA's Registration of the New Active Ingredient, Isocycloseram, Nov. 19, 2025, pp. 72-74)* | Did EPA incorporate **CASQA's comment?** |
|---|---|---|
| *Comment #3: Clarify urban labels so that isocycloseram is not applied in or around storm drains.*<br><br>*CASQA recommends that the following be added or clarified on all non-agricultural labels:*<br><br>*"All urban labels: Under 'SECTION 5.0 USE RESTRICTIONS AND PRECAUTIONS' add the following bullet points:*<br>o *'DO NOT apply in or around storm drains.'*<br>o *'Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes, reservoirs, rivers, permanent streams, wetlands or natural ponds, estuaries and commercial fish farm ponds).'*<br>o *'Do not apply or irrigate to the point of runoff.'*<br>*Proposed A22128 Cockroach Gel Bait label:*<br>o *Under Section '3.0 PRODUCT INFORMATION' where 'sewers' are included in allowed treatment areas add statement that 'Use is prohibited in or near storm drains.'*<br>o *Under Section '4.1.2 Outdoor Use', where label language allows use in 'drains leading to sewers' add clarification that 'Use is prohibited in or near storm drains.'*<br>o *Under 'SECTION 5.0 USE RESTRICTIONS AND PRECAUTIONS' on all urban labels add the following bullet point: 'DO NOT apply in or around storm drains.'"*<br>*(CASQA's Comments, p. 4)* | *"While products should not be used in sewers or drains, some products may be used around perimeters of sewers or drains. For these products, EPA has added the following statements and graphic to reduce down-the-drain exposure pathways. To be clear, a product could contain one or more of these statements, as appropriate: 'Do not pour down drains or sewers. Call your local solid waste agency for local disposal options.'*<br><br>• *'When applying near sewers or drains, only apply using a coarse, low-pressure spray.' {only for A21550 400SC (EPA Reg. No. 100-1707)}*<br><br>• *'When applying near drains or sewers (that are not storm or runoff drainage systems), only apply to the external perimeters (mouth/rim of sewer) and underside of sewer lids. Do not apply inside sewers or drains.'*<br><br>• *'Do not apply to storm drains.'*<br><br>• *'Do not use on washable textiles or fabrics.'" (Response to Comments, p. 74)"* | Partially. *EPA used/modified several of the warning statements that CASQA suggested to improve outdoor, urban labels.* |
| Comment #4: A sixty-day comment period is more appropriate for stakeholder engagement | *"While not mandated by law, EPA offers an opportunity for public engagement when the proposed decision memo is published for a new active ingredient. A public comment* | No. |

| CASQA Comments to EPA (6/10/25) on Memorandum Supporting Proposed Decision to Approve Registration for the New Active Ingredient of Isocycloseram | EPA Response<br>*(Response to Public Comments on EPA's Registration of the New Active Ingredient, Isocycloseram, Nov. 19, 2025, pp. 72-74)* | Did EPA incorporate **CASQA's comment?** |
|---|---|---|
| *CASQA recommends that EPA provide a sixty-day comment period for all new pesticide registrations, draft environmental risk assessments, and draft biological evaluations.* | *period was held for 30 days based on the normal practice." (Response to Comments, p. 74)* | |

CASQA

California Stormwater Quality Association®

*Dedicated to the Advancement of Stormwater Quality Management, Science and Regulation*

# Our Water, Our World 2026 Annual Report

Prepared by the California Stormwater Quality Association

**August 2026**

# Preface

## ADVANCING SUSTAINABLE STORMWATER MANAGEMENT

The California Stormwater Quality Association (CASQA) is a nonprofit corporation that advances sustainable stormwater management protective of California water resources. With well over 2,000 members, CASQA's membership is comprised of a diverse range of stormwater quality management organizations and individuals, including cities, counties, special districts, federal agencies, state agencies, ports, universities and school districts, wastewater agencies, water suppliers, industries, and consulting firms throughout the state. Collectively, CASQA represents over 34 million people in California.

CASQA's *Vision for Sustainable Stormwater Management*[1] (Vision) defines the actions needed to manage stormwater as an essential component of the state's water resources, support human and ecological needs, protect water quality, and enhance and restore California's waterways. There are four guiding principles to achieve this Vision. Like the legs of a chair, each Principle is essential and all four must be in place to support the whole.

Principle #1: Program Implementation: Projects and programs that use stormwater as a resource, protect water quality and beneficial uses, and efficiently minimize pollution are critical for sustainable stormwater management. Stormwater capture and true source control (identifying and mitigating a pollutant at its source) are the primary drivers of these solutions, with effective BMPs providing an important supportive role.

Principle #2: Permits, Regulations, and Legislation: Permits, regulations, and legislation need to focus on effectiveness and desired outcomes to support sustainable stormwater management. Regulatory and legislative actions must align with and support the other components of the Vision – advancing stormwater capture, true source control, and effective BMPs, increasing public education and awareness focused on stormwater as a resource, and securing funding to support these solutions.

Principle #3: Public Education: Public awareness, understanding, and support is essential to sustainable stormwater management. The key shift is viewing stormwater as a resource that must be protected and integrated into overall water resource management.

Principle #4: Funding: Significant financial investment is required to achieve sustainable stormwater management. Stormwater is the most underfunded portion of the water sector and substantial funding is needed to bring these solutions forward.

## OUR WATER, OUR WORLD ANNUAL REPORT

The Our Water, Our World (OWOW) program advances Principle #1 by focusing on true source control to address the use of Current Use Pesticides. CASQA has identified Current Use Pesticides as a Water Quality Priority, requiring solutions at a statewide scale. OWOW also advances Principle #3 through its public education components. The goal of OWOW is to support a statewide integrated pest management (IPM) outreach program that provides direct-to-consumer information and education on less-toxic IPM practices. This report describes the OWOW program activities from July 2025 through June 2026.

[1] https://www.casqa.org/wp-content/uploads/2022/10/final_-_vision_for_sustainable_stormwater_management_-_10-07-2020.pdf

## Acknowledgements

OWOW is funded by CASQA, as well as the organizations implementing the program (see Table 1 in Section 2 of this report), and is sponsored by the Bay Area Clean Water Agencies (BACWA).

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# Section 1. Introduction

Our Water, Our World (OWOW) is an award-winning partnership between municipal agencies, garden centers, and hardware stores that sell pest control products. Initiated in 1998, the program focuses on less-toxic, eco-friendly products and techniques, as many common pesticides harm sensitive species and ecosystems when they reach local creeks, bays, and the ocean.

OWOW started as a pilot project in 1998, in just a handful of stores, initiated by the Central Contra Costa Sanitation District, the City of Palo Alto Regional Water Quality Control Plant, and the Marin Countywide Stormwater Pollution Prevention Program. The program quickly grew and was administered by the former Bay Area Stormwater Management Agencies Association from 1999 to 2021. During that time, over 130 agencies in 16 counties implemented the program, working in approximately 239 stores. Starting in January 2022, the program was transferred to the California Stormwater Quality Association (CASQA), to provide statewide access to this important and successful outreach program.

From a stormwater management perspective, OWOW is an excellent opportunity and cost-efficient way to educate the public and reduce toxicity in waterways from current use pesticides. Several municipalities utilize OWOW to meet permit requirements, including the San Francisco Bay Area Municipal Regional Permit,[2] the Central Valley Region-wide MS4 Permit,[3] and the Phase II – Small MS4 General Permit.[4]

# Section 2. Program Elements

The OWOW program consists of several elements that are integral to its effectiveness.

## 2.1 INTEGRATED PEST MANAGEMENT (IPM) ADVOCATES

IPM Advocates are individuals who have been trained on how to engage with retailers and the public. They provide local implementation of the program on behalf of participating agencies. Local implementation generally consists of coordinating with participating retailers to offer in-store displays, shelf tags, in-store presentations and training for store employees, and advice to customers about pest management methods that are healthier for people and the environment.

## 2.2 EDUCATIONAL MATERIALS

In pesticide-retailing stores, consumers are directed to less-toxic products and techniques through:

- Fact sheet displays near pest products to educate the public on various pest management topics.
- Shelf tags to guide customers to less-toxic products.
- Display posters with QR codes linking directly to the OWOW website and fact sheets.

[2] Municipal Regional Stormwater NPDES Permit, California Regional Water Quality Control Board – San Francisco Bay Region, 2022. Order R2-2022-0018, NPDES NO. CAS612008, as amended, CA.
[3] NPDES Permit and Waste Discharge Requirements General Permit for Discharges from MS4s, California Regional Water Quality Control Board – Central Valley, 2016. Order R5-2016-0040, NPDES NO. CAS0085324, CA
[4] NPDES Permit and Waste Discharge Requirements for Storm Water Discharges from Small MS4s, California State Water Resources Control Board, 2013. Water Quality Order 2013-0001-DWQ, NPDES General Permit No. CAS000004, as amended, CA.

On the OWOW website, consumers can view the following:

- All 18 fact sheets.
- Stores participating in the OWOW program.
- A database of less-toxic products and their active ingredients.

### 2.3 TRADE SHOWS

OWOW representatives provide exhibits annually at trade shows to educate store buyers on less-toxic products. Participation in these events helps ensure stores carry less-toxic products.

## Section 3. Partnerships

The program is administered by CASQA and implemented by local cities and counties. IPM Advocates and University of California Statewide IPM Program (UC IPM) serve as collaborative partners.

CASQA manages and provides the central services necessary to operate and maintain the OWOW program, including the development of education materials (e.g., less-toxic product lists, label files, and active ingredient lists), creation and updates of outreach materials, operation and updates to the OWOW website, vendor (i.e., retail partners and pesticide distributors) outreach, preparation of an annual report, fulfillment of outreach materials orders, and program management and development.

Municipal agencies subscribe to OWOW through CASQA and implement the OWOW program in their local retail stores by contracting with IPM Advocates, using municipal staff, or other contractors. Implementation may occur by a single agency at stores within their jurisdiction or organized at a regional scale, where agencies combine resources to implement the OWOW program at select stores used by multiple jurisdictions. In addition, municipal agencies conduct outreach to inform residents about the OWOW program. Table 1 provides the list of agencies implementing OWOW as of June 30, 2026. Bay Area Clean Water Agencies (BACWA) continues to support the OWOW program as a sponsor.

IPM Advocates are trained individuals who support the local implementation of the OWOW program. They provide retail stores, nurseries, hardware stores, and garden centers with direct-to-consumer information, IPM tools, products, and practices. IPM Advocates are the link between the municipalities and the retailers where they reach consumers. The active IPM Advocates include Suzanne Bontempo, Julie Barbour, and Maris Sidenstacker.

UC IPM provides research and expertise on IPM practices promoted throughout the state and maintains a website of less-toxic IPM practices for nearly 1,000 home, garden, landscape, and turf pests. OWOW continues to draw on these public resources to support its educational materials and outreach on less-toxic pest management.

## Table 1. Agencies Implementing OWOW

### Bay Area and Northern California

Alameda County
Alameda County Flood Control & Water Conservation District
Alameda Countywide Clean Water Program
City of Alameda
City of Albany
City of American Canyon
City of Antioch
City of Belmont
City of Belvedere
City of Benicia
City of Berkeley
City of Brentwood
City of Brisbane
City of Burlingame
City of Calistoga
City of Campbell
City of Clayton
City of Cloverdale
City of Concord
City of Cotati
City of Cupertino
City of Daly City
City of Dublin
City of East Palo Alto
City of El Cerrito
City of Emeryville
City of Fairfield
City of Foster City
City of Fremont
City of Half Moon Bay
City of Hayward
City of Healdsburg
City of Hercules
City of Lafayette
City of Larkspur
City of Livermore
City of Los Altos
City of Martinez
City of Menlo Park
City of Mill Valley
City of Millbrae
City of Milpitas
City of Monte Sereno
City of Mountain View
City of Napa
City of Newark
City of Novato
City of Oakland
City of Oakley
City of Orinda
City of Pacifica
City of Palo Alto
City of Petaluma
City of Piedmont
City of Pinole
City of Pittsburg
City of Pleasant Hill
City of Pleasanton
City of Redwood City
City of Richmond
City of San Bruno
City of San Carlos
City of San José
City of San Leandro
City of San Mateo
City of San Pablo
City of San Rafael
City of San Ramon
City of Santa Clara
City of Santa Rosa
City of Saratoga
City of Sausalito
City of Sebastopol
City of South San Francisco

Bay Area and Northern California (Continued)

City of St. Helena
City of Suisun City
City of Sunnyvale
City of Ukiah
City of Union City
City of Vallejo
City of Walnut Creek
Contra Costa Clean Water Program
Contra Costa County
Contra Costa County Flood Control and Water Conservation District
Fairfield-Suisun Sewer District
Marin County
Marin County Flood Control and Water Conservation District
Marin Countywide Stormwater Pollution Prevention Program
Mendocino County
Napa County
Napa County Flood Control and Water Conservation District
Napa Countywide Stormwater Pollution Prevention Program
Russian River Watershed Association
San Mateo County
San Mateo Countywide Water Pollution Prevention Program
Santa Clara County
Santa Clara Valley Urban Runoff Pollution Prevention Program
Santa Clara Valley Water District (Valley Water)
Solano Stormwater Alliance
Sonoma County
Sonoma County Water Agency
The San Mateo County Flood and Sea Level Rise Resiliency District
Town of Atherton
Town of Colma
Town of Corte Madera
Town of Danville
Town of Fairfax
Town of Hillsborough
Town of Los Altos Hills
Town of Los Gatos
Town of Moraga
Town of Portola Valley
Town of Ross
Town of San Anselmo
Town of Tiburon
Town of Windsor
Town of Woodside
Town of Yountville
Vallejo Flood and Wastewater District
Zone 7 Water Agency

Central Valley, Tahoe, and Inland Areas

City of Ceres
City of Citrus Heights
City of Davis
City of Dixon
City of Elk Grove
City of Escalon
City of Folsom
City of Galt
City of Lathrop
City of Lincoln
City of Lodi
City of Manteca
City of Merced
City of Modesto
City of Patterson
City of Rancho Cordova
City of Riverbank
City of Rocklin
City of Roseville
City of Sacramento
City of Stockton
City of Tracy
City of Turlock
City of West Sacramento
City of Woodland

Central Valley, Tahoe, and Inland Areas (Continued)

El Dorado County
Fresno Metropolitan Flood Control District
Mountain House Community Service District
Sacramento County
Sacramento Stormwater Quality Partnership
San Joaquin County
Stanislaus County

Central Coast

City of Buellton
City of Carmel-by-the-Sea
City of Carpinteria
City of Del Rey Oaks
City of Goleta
City of Guadalupe
City of Lompoc
City of Marina
City of Monterey
City of Pacific Grove
City of Sand City
City of Santa Barbara
City of Santa Maria
City of Seaside
City of Solvang
Monterey Regional Storm Water Management Program
Monterey County
Santa Barbara County

Southern California

City of Santa Clarita

Sponsor

Bay Area Clean Water Agencies

# Section 4. Annual Program Implementation

This section describes the OWOW outreach services conducted between July 2025 and June 2026.

## 4.1 IPM ADVOCATES

Several municipalities contracted with IPM Advocates to implement the OWOW program at local stores. IPM Advocates shared their knowledge with store staff and held educational events for customers.

During the 2025-2026 reporting year, demand from municipalities for IPM Advocate services exceeded availability capacity, limiting coverage of some retail locations. In response, CASQA has initiated a program planning initiative to improve support and guide future growth (see Section 5. Program Development for more information).

### In-Store Coordination

An in-store coordination meeting was not held during the 2025–2026 reporting year because program development efforts focused on the structured planning process described in Section 5. Future in-store coordination efforts will be informed by the outcomes of this planning process.

## 4.2 EDUCATIONAL OUTREACH MATERIALS

Educational materials include fact sheets on specific pests, gardening methods, and pesticide applications, shelf tags to identify eco-friendly products in stores, and the OWOW website that makes the materials accessible to the public. Examples of OWOW outreach materials are provided in Appendix A, and all are accessible on the OWOW website.

### Fact Sheets

The OWOW program has 18 fact sheets. Between July 2025 and June 2026, three fact sheets were revised and translated into Spanish: (1) *Hiring an IPM Company,* (2) *Moles, Voles, and Gophers,* and (3) *Snails and Slugs* . Currently, 14 of the 18 fact sheets are available in Spanish, and efforts continue to translate the entire fact sheet series. As each fact sheet is updated, QR codes are added (both English and Spanish versions) to help consumers easily navigate to the OWOW website.

In January 2022, posters with trackable QR codes were developed to encourage consumers to digitally access the OWOW fact sheets in pesticide aisles. These trackable QR codes record which fact sheets consumers view in retail stores. Based on the tracking data collected between July 2025 and June 2026, the three most viewed fact sheets were (1) *Ants*, (2) *Rats and Mice,* and (3) *Fleas*. Table 2 presents a summary of QR code scans for each fact sheet. Additionally, Figure 1: *OWOW by the Numbers* provides an overview of engagement with our educational outreach materials, including total QR code scans, fact sheet views, and website activity.

### Website

The OWOW website provides public access to fact sheets, the less-toxic product database, and the Store Finder, an interactive map allowing users to search for participating stores. Updates to the Store Finder are made quarterly. During the 2025 – 2026 reporting year, two stores were added to the OWOW program and made available on the Store Finder. Website visitors increased 26%, from 19,076 unique visitors between July 2024 and June 2025 to 24,095 unique visitors between July 2025 and June 2026. Figure 2 shows the monthly website visitor history trending up since May 2021 (when data were first tracked via QR codes).

## Less-Toxic Pest Product Database

In August 2024, enhancements were made to both the less-toxic product lists and the OWOW website to develop an integrated less-toxic product database hosted on the OWOW website. The database enhances accessibility for both IPM Advocates, who rely on the database to identify less-toxic products, and the public, who can now easily search for products using their phones.

The store-specific product lists will continue to be updated as needed to support the printing of shelf tag labels. Each year, new products are reviewed, and updates are made in consultation with subject matter experts to ensure the information remains current and accurate.

### Table 2. QR Code Scans by OWOW Product from July 2025 to June 2026

| OWOW Product | QR Code Scans | OWOW Product | QR Code Scans |
|---|---|---|---|
| Ants | 233 | Bed Bugs | 67 |
| Rats & Mice | 167 | 10 Most Wanted | 60 |
| Fleas | 166 | Healthy Gardens | 55 |
| Mosquitos | 153 | Weeds | 52 |
| Moles, Voles, & Gophers | 150 | Yellowjackets | 38 |
| Cockroaches | 141 | Lawns | 30 |
| Aphids | 131 | Spanish Fact Sheets | 21 |
| Spiders | 110 | Pesticides Use & Disposal | 16 |
| Roses | 102 | Hiring a Pest Company | 13 |
| Snails & Slugs | 96 | Pesticides & Water Quality | 6 |
| OWOW Website | 93 | | |
| Total QR Code Scans | | 1,897 | |

### Figure 1. OWOW by the Numbers

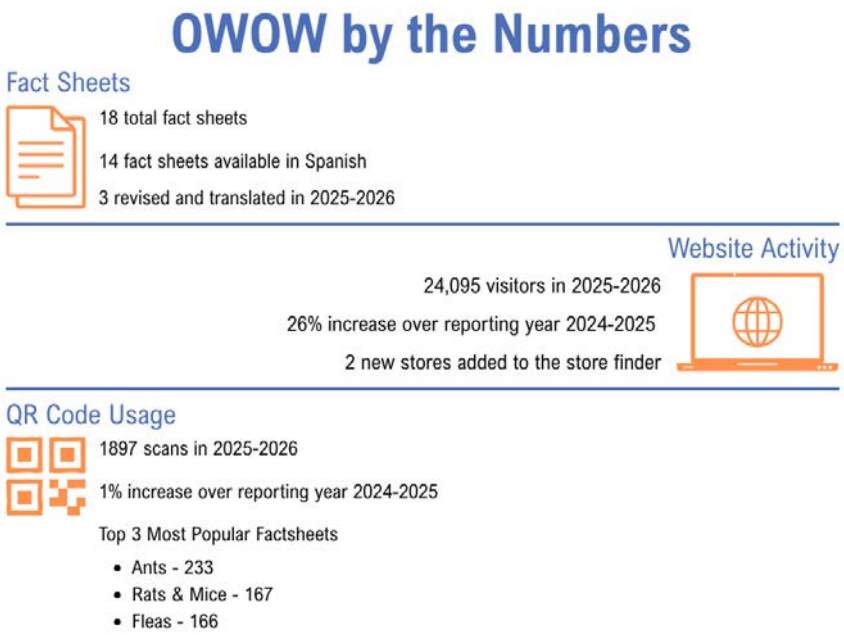
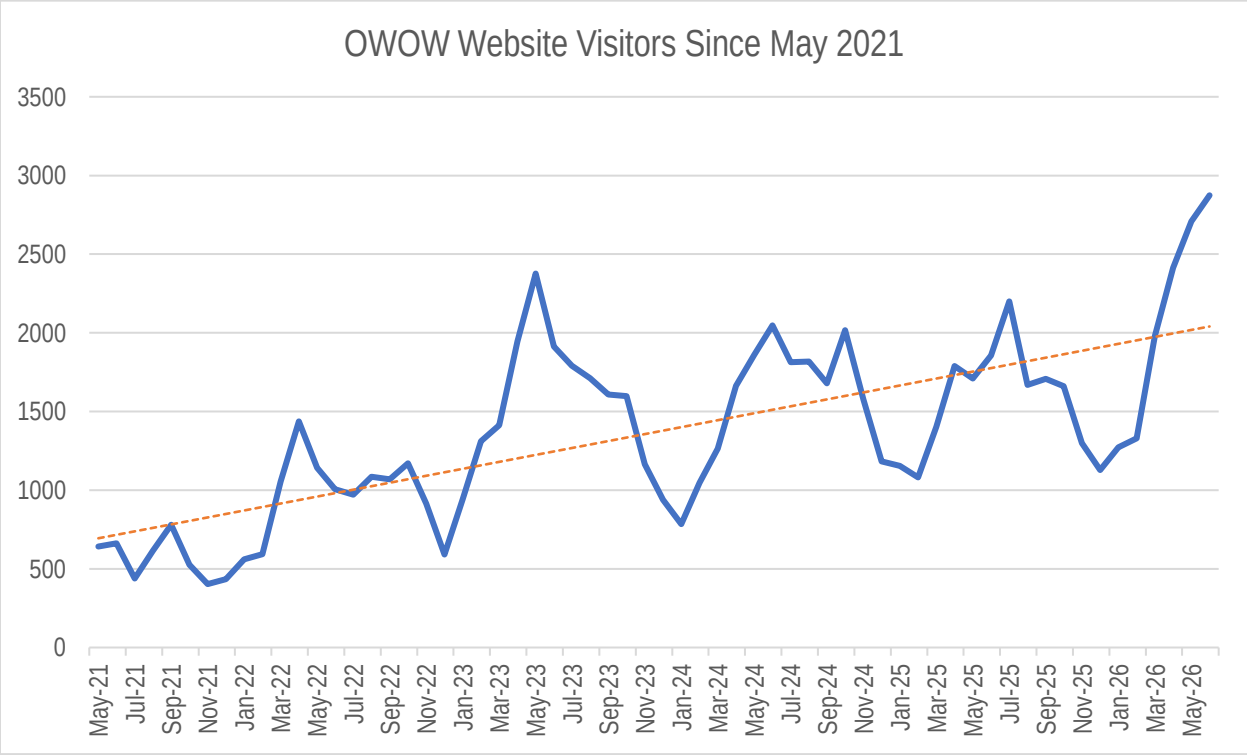


Figure 2. Monthly Website Visitors Since May 2021




## 4.3 VENDOR OUTREACH

Education of vendors and retailers on less-toxic products is a critical step to ensure stores carry less-toxic products.

### Retail Partners

The OWOW program added two new retail partners during the 2025–2026 reporting year, increasing the total number of participating stores to 283. The Home Depot Corporate continues to be a model retail partner and OWOW strives to replicate this partnership with other retailers and vendors. In February 2026, The Home Depot Corporate delivered an internal memorandum to California store managers to facilitate OWOW collaboration in The Home Depot stores (see Appendix B). In addition to The Home Depot, OWOW retail partners include Outdoor Supply Hardware, Ace Hardware, and independent hardware and garden centers throughout California.

### Trade Show Booths

Attending trade shows provides an opportunity to meet pesticide buyers and vendors, learn about the new products coming to the California marketplace, answer questions, and provide mentorship to the retail pesticide buyers and vendors. In 2025 – 2026, trade show attendance was paused to focus efforts on the structured planning process described in Section 5. Future trade show attendance will be informed by the outcomes of this planning process.

## 4.4 TRAINING AND OUTREACH FOR RETAILERS AND CONSUMERS

IPM Advocates and local municipal agency staff/consultants conduct OWOW outreach activities to educate pesticide retailers and consumers at the local level. Local OWOW implementation activities vary between agencies. Many agencies receive tailored OWOW reports from their contracted IPM Advocate with a summary of their local OWOW data (for example, the number of trainings, the number of staff trained, and/or the number of fact sheets distributed).

IPM Advocates and local municipal agency staff/consultants provided OWOW services to approximately 283 participating retailers throughout California. Table 3 provides a summary of outreach activities between July 2025 and June 2026, which were funded by local municipalities' stormwater programs.

Table 3. Summary of Outreach Activities

| Audience | OWOW Outreach Activity |
|---|---|
| Retailers | 283 retailers participated in the OWOW program |
| | 62 trainings conducted |
| | 488 retail staff trained |
| Consumers | 14 in-person classes, presentations, or workshops (749 persons in attendance) |
| | 75 public outreach events |
| | 5,393 person interactions |

IPM Advocates and local municipal agency staff/consultants conducted 62 trainings and trained 488 retail store staff. The training topics included IPM and strategies for managing pest problems with less-toxic and eco-friendly products. Additionally, of the 89 public outreach events to consumers, 14 were classified as in-person classes, presentations, or workshops, reaching a combined total of 749 attendees. The remaining consumer outreach, most often in the form of tabling at public outreach events, included 75 reported events, with 5,393 person interactions.

# Section 5. Program Development

To support a growing demand for OWOW outreach material and IPM Advocates, efforts are underway to advance the OWOW program.

## 5.1 UPDATES IN PROGRESS

### Fact Sheets

In 2026, the *Roses, Healthy Gardens, Weeds, and Lawns* fact sheets are being reviewed for technical accuracy and by public communications specialists. Additionally, these fact sheets will be translated into Spanish and made available on the OWOW website. Once these fact sheet updates are complete, 18 of the 18 OWOW fact sheets will have Spanish translations.

### Program Planning

In July 2025, the OWOW program completed a survey of OWW subscribers to understand the program's needs and reaffirm the program's goal. Key takeaways from the subscriber survey were: 1) a need to understand the program's effectiveness, 2) a desire for implementation flexibility, 3) requests for additional implementation resources, and 4) guidance on how to implement the program. Following the results of the Subscriber Survey, the OWOW program initiated a year and half long program planning project with the goal to improve the program's effectiveness and increase implementation flexibility. The project includes conducting market research on urban pesticide use behaviors and the development of implementation resources based on subscriber needs identified in the Subscriber Survey and the market research. The project's timeline is shown on Figure 3.

The market research consists of two phases. Phase I included a literature review on the pesticide statewide use market and trends, analysis of existing OWOW data, review of existing academic and governmental research, and the development of preliminary audience hypotheses. An additional in-store intercept survey of 24 residents validated the hypothesized audience profiles—the DIY Pragmatist, the Steward, and the Outsourcer. This understanding reinforced the need for audience-specific strategies.

In May 2026, as part of the Phase II market research, a public survey was developed to create audience-specific profiles based on their pesticide use behaviors and motivations for the development of a strategic messaging framework consisting of targeted channels and tactics. As of June 2026, the public survey collected 429 responses with a goal of 800. Preliminary findings showed that 58% of respondents acted only after seeing pests, 37% returned to conventional sprays when a less-toxic method did not work as hoped, and 20% had purchased perimeter spray or granules during the previous 12 months. The research also identified a gap between trusted information sources and actual behavior: 45% of respondents first turned to Google for pest help, although public agencies and experts received the strongest trust ratings. Expected September 2026, the survey results will create quantified audience profiles, a validated messaging mix, and targeted channel maps, which will provide the basis for a suite of subscriber implementation resources scheduled for completion in December 2026.

Figure 3. Program Planning Timeline

## 5.2 FUTURE CONSIDERATIONS

### IPM Advocate Training Program

As described in Section 4.1, IPM Advocates serve as contractors to municipalities to assist with implementation of the in-store component of the program. IPM Advocates were initially trained in 2012 with funding from a Department of Pesticide Regulation (DPR) Alliance Grant. Since that time, some IPM Advocates have moved on from providing IPM Advocate support, reducing the number IPM Advocates available to provide services. Additionally, the OWOW program expanded its service area into the Central Valley, increasing the demand for IPM Advocates. In 2022, to increase IPM Advocate support, CASQA began consideration of developing an IPM Advocate Training Program. In September 2023, CASQA met with DPR representatives to discuss collaboration and funding opportunities for the OWOW program. Based on the scope of training required, the development of an IPM Advocate Training Program will require outside funding support and collaboration with partners such as UC-IPM. Work on advancing the IPM Advocate Training Program is on hold pending the outcomes of program planning, which is currently in development.

# Appendix A: Example Outreach Materials

## Figure A1. Trackable QR Code Poster in Store Aisle

Figure A2: Ants Fact Sheet (Front)

EFFECTIVE ECO-FRIENDLY PEST CONTROL • LESS-TOXIC PRODUCTS

# CONTROLLING ANTS IN YOUR HOME

## ANT CONTROL IS EASY AS 1–2–3!

| 1. Seal the source | 2. Bait them | 3. Monitor |
|---|---|---|
| • Store food in sealed containers<br>• Caulk and weatherstrip cracks and gaps | • Use bait stations and sticky traps, which are more effective than sprays<br>• Choose a bait station with borax (tetraborate decahydrate) or hydramethylnon | • After ants are gone, watch for new ant activity<br>• To avoid a new ant invasion, spread desiccating dust in areas where you see ants<br>• Avoid sprays, which only temporarily get rid of ants |

Argentine ants are frequent invaders in California homes. Their small size (1/8 inch) allows them to enter the home through cracks and crevices. They typically arrive a few at a time at first (the scouts), and then in long lines, following scent trails to a food source.

## A QUICK FIX FOR AN ANT EMERGENCY

1. Find what ants are after (usually food or water) and where they are entering the room (usually through a crack in the wall).
2. Spray lines of ants with soapy water and wipe up. Clean up any food or spills.
3. Block entry points temporarily with a smear of petroleum jelly or a piece of tape.
4. If you can't find an entry point, place a bait station in an out-of-the-way spot on the line the ants have been following. Remember to remove the bait station when the line of ants has disappeared so you don't attract more ants into the house. (See *Tips for Using Ant Baits.*)

## TIPS FOR USING ANT BAITS

Bait stations are much safer for humans, pets, and the environment than sprays. Ants carry small quantities of bait back to the nest to share, reducing the local ant population.

- Use baits with active ingredients borax/tetraborate decahydrate. Bait stations with hydramethylnon should be enclosed.
- Argentine ants change their food preferences frequently. If one bait is not working, try another type. Wait at least a day to see if ants take the bait.
- Place bait stations out of reach from children and pets. Do not spray insecticide around the bait; it will repel the ants.
- Baits may take several weeks to kill the ants. At first you may see more ants coming to the bait, but after a few days to a week you should see fewer ants.
- When ants are gone, remove the bait so you don't attract more ants. Return enclosed bait stations to the original box to save and use again. Put the box inside a sealed plastic bag, and store away from children and pets.

OUR WATER OUR WORLD

Choose eco-friendly products for your home and garden. Look for this symbol before you buy.

# Appendix B: The Home Depot Support Letter

Interoffice
**MEMORANDUM**

**DATE:** February 9, 2026

**TO:** California Store Managers, D28 ASMs and Department Heads

**FROM:** Candace N. Rodriguez

**CC:** Steve Knott, Scott Jacobson, Charles Bayer

**SUBJECT:** Our Water Our World Training

OUR WATER, OUR WORLD is a coalition of organizations whose purpose is to encourage consumers to use environmentally-preferred 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 to inform customers about environmentally-preferred pest management that we merchandise in our store. We have had a partnership with Our Water, Our World for many years, and we have supported their in-store educational efforts annually for the past few years.

An Our Water, Our World (OWOW) representative will be in your store to help train employees and label environmentally-preferred products with shelf-talkers. The representative may also schedule a tabling event to educate consumers. This ties in well with "How-to" weekend events. Please support this additional help in your store.

An OWOW representative will contact you before the training or demonstration date to arrange details. Please contact Joseph Draper of the California Stormwater Quality Association at (559) 492-7507 if you have questions. Please also do not hesitate to reach out to me if you have any questions or concerns at 678-799-2750.

Thank you for your support,

*Candace N. Rodriguez*
Senior Director – Sustainability

from the desk of……
**Candace Rodriguez**
**Senior Director – Sustainability**
THE HOME DEPOT USA, INC.
2455 Paces Ferry Road
Atlanta, GA 30339
(770) 384-3544

INTERNAL USE