URBAN CREEKS MONITORING REPORT

PART D: LOW IMPACT DEVELOPMENT (LID) MONITORING STATUS REPORT

Water Year 2022 (October 2021 – September 2022)



Submitted in Compliance with NPDES Permit No. CAS612008 (Order No. R2-2022-0018) Provision C.8.h.iii.



A Program of the City/County Association of Governments of San Mateo County

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CREDITS

This report is submitted by the participating agencies in the



Water Pollution Prevention Program

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Table of Contents

Table	e of C	ontent	3	. i
List	of Acı	ronyms		ii
1.0	Introduction			
2.0	LID Monitoring Requirements1			
3.0	WY	2022 L	ID Monitoring Accomplishments	2
	3.1	LID M	onitoring TAG	3
	8.1	LID M	onitoring Plan Development	4
		3.2.1	Site Selection	4
		3.2.2	Quality Assurance Project Plan	4
4.0	Recommendations			5
5.0	References			

List of Acronyms

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
LID	Low Impact Development
MRP	Municipal Regional Permit
NPDES	National Pollutant Discharge Elimination System
PCBs	Polychlorinated Biphenyls
QAPP	Quality Assurance Project Plan
QAPrP	Quality Assurance Program Plan
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SMCWPPP	San Mateo Countywide Water Pollution Prevention Program
SWAMP	Surface Water Ambient Monitoring Program
TAG	Technical Advisory Group
UCMR	Urban Creeks Monitoring Report
WY	Water Year

1.0 Introduction

This Urban Creeks Monitoring Report (UCMR) Part D: Low Impact Development (LID) Monitoring Status Report, Water Year¹ (WY) 2022 was prepared by the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP). SMCWPPP is a program of the City/County Association of Governments (C/CAG) of San Mateo County. Each incorporated city and town in the county, OneShoreline, and the County of San Mateo share a common National Pollutant Discharge Elimination System (NPDES) stormwater permit for Bay Area municipalities referred to as the Municipal Regional Permit (MRP).

The MRP was first adopted by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB or Regional Water Board) on October 14, 2009 as Order R2-2009-0074 (SFBRWQCB 2009; referred to as MRP 1.0). On November 19, 2015, the Regional Water Board updated and reissued the MRP as Order R2-2015-0049 (SFBRWQCB 2015; referred to as MRP 2.0). The current, and third, version of the MRP (i.e., MRP 3.0, SFBRWQCB 2022) was issued by the Regional Water Board as Order R2-2022-0018 and became effective July 1, 2022.

This report fulfills the requirements of provision C.8.h.iii.(1) of MRP 3.0 for summarizing LID monitoring accomplishments from the preceding water year (i.e., WY 2022) conducted in compliance with provision C.8.d (LID Monitoring) of the MRP.² Consistent with the requirements of provision C.8.d, LID monitoring activities in WY 2022 focused on planning rather than sample collection. This report summarizes LID monitoring planning actions from July 1, 2022 (when MRP 3.0 became effective) through September 30, 2022 (the end of WY 2022).

2.0 LID Monitoring Requirements

Low Impact Development (LID) is "a sustainable practice that benefits water supply and contributes to water quality protection. Unlike traditional storm water management, which entails collecting and conveying storm water runoff through storm drains, pipes, or other conveyances to a centralized storm water facility, LID focuses on using site design and storm water management to maintain the site's pre-development runoff rates and volumes. The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall" (SMCWPPP 2020). Incorporation of post-construction LID measures into new development and redevelopment projects has been a key aspect of SMCWPPP stormwater management for the past 10+ years, and each iteration of provision C.3 of the MRP has prescribed progressively more and more specific and stringent LID design and siting criteria.

MRP 3.0 is the first version of the MRP to specifically require LID effectiveness monitoring for all Permittees. Provision C.8.d directs Permittees to conduct LID monitoring during the permit term, and identifies specific parameters and monitoring frequencies that must be achieved to address the following management questions:

¹ Most hydrologic monitoring occurs for a period defined as a Water Year, which begins on October 1 and ends on September 30 of the named year. For example, Water Year 2022 (WY 2021) began on October 1, 2021 and concluded on September 30, 2022.

² Monitoring data collected pursuant to other C.8 provisions (e.g., Pollutants of Concern Monitoring, Pesticides & Toxicity Monitoring, and LID Monitoring) are reported in other Parts of the SMCWPPP Urban Creeks Monitoring Reporting series (UCMR) for WY 2022.

- 1. What are the pollutant removal and hydrologic benefits, such as addressing impacts associated with hydromodification, of different types of LID facilities, systems, components, and design variations, at different spatial scales (e.g., single control vs watershed or catchment scale), and how do they change over time?
- 2. What are the minimum levels of O&M necessary to avoid deteriorated LID facilities, systems, and components that reduce pollutant removal and hydrologic performance?

In San Mateo County, a minimum of 25 water quality sampling events must be conducted during the MRP 3.0 permit term, with an annual minimum of three events beginning in WY 2024. Each sampling event must consist of paired flow- (or time) weighted composite samples of the LID facility influent and effluent collected with automated samplers. Provision C.8.d.iv of the MRP specifies that all composite samples must be analyzed for total mercury, total polychlorinated biphenyls (PCBs), total suspended solids (TSS), per- and polyfluoroalkyl substances (PFAS), total petroleum hydrocarbons (TPH), total and dissolved copper, total hardness, and pH. In addition, flow must be measured at both influent and effluent sampling locations.

Permittees are required to submit LID Monitoring Plans at the regional or countywide level that demonstrate how the requirements in provision C.8.d.iii-iv will be met. Permittees must submit their Monitoring Plans to the Regional Water Board Executive Officer (EO) for approval by May 1, 2023 and must begin implementation of their approved or conditionally approved Monitoring Plans by October 1, 2023.

To assist development and implementation of scientifically-sound LID Monitoring Plans, to facilitate regional consistency with respect to sampling and analytical methodology, and to make recommendations about allocation of samples between and within different sites, provision C.8.d.ii requires Permittees to form and convene a Technical Advisory Group (TAG) which includes impartial science advisors and Water Board staff. The TAG will be asked to review and make recommendations regarding the LID Monitoring Plans (including their study design, analysis methods, results, and conclusions) prior to submission of the Plans to the Regional Water Board EO. In order to effectuate this review, the Permittees must submit their draft LID Monitoring Plans to the TAG by March 1, 2023. Prior to the EO's approval or conditional approval of the LID Monitoring Plans, the TAG shall be convened at least biannually. Thereafter, the TAG must be convened at least annually to provide continued feedback regarding the implementation of the LID Monitoring Plans.

3.0 WY 2022 LID Monitoring Accomplishments

During the limited portion of WY 2022 when MRP 3.0 was in effect (i.e., July 1 through September 30, 2022), SMCWPPP made significant progress towards convening the LID TAG and developing an LID Monitoring Plan that will meet the requirements of provision C.8.d.

SMCWPPP joined with other countywide stormwater programs subject to the MRP to form the Bay Area Municipal Stormwater Collaborative (BAMSC)³ LID Monitoring Workgroup. Other members of the group include:

³ The Bay Area Stormwater Management Agencies Association (BASMAA) recently dissolved as a formal non-profit organization, but its members continue to meet as an informal organization called the Bay Area Municipal Stormwater Collaborative (BAMSC).

- Alameda Countywide Clean Water Program (ACCWP)
- Contra Costa Clean Water Program (CCCWP)
- Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP)
- Solano Stormwater Alliance (SSA)

The BAMSC LID Monitoring workgroup meets every other month to discuss the development of LID monitoring plans, site selection, sampling methods, and convening of the TAG.

3.1 LID Monitoring TAG

During WY 2022, the BAMSC LID Monitoring Workgroup recruited technical experts to serve as LID Monitoring TAG members, scheduled the first LID Monitoring TAG meeting to take place on December 8, 2023, and developed an agenda for the meeting. The LID Monitoring TAG members include monitoring experts from throughout California and many have national recognition for their work in development LID monitoring strategies. More information about TAG members and their expertise is provided in the bullets below:

- 4 **Keith Lichten** is a Division Chief at the San Francisco Bay Regional Water Board, where he leads the Board's Clean Water Act stormwater programs. He has worked in stormwater for more than 25 years, including authoring permit language supporting a low impact development approach and foundational language on hydromodification management. He's the current chair of the Environmental and Water Resources Institute of the American Society of Civil Engineers Urban Water Resources Research Council.
- 5 Alicia Gilbreath is an Environmental Scientist at the San Francisco Estuary Institute (SFEI), where she splits her time between field-based monitoring and investigations and officebased data analysis, research and writing. Alicia earned a BA in Philosophy and BS in Psychology from UC Davis, and an MLA with an emphasis in Environmental Planning from UC Berkeley. She joined SFEI's Watersheds Program in 2006. Alicia's work for the Institute has focused on monitoring and modeling pollutant concentrations and loads in stormwater.
- 6 **Dipen Patel** is a Research Engineer at the Office of Water Programs at Sacramento State. He has a PhD in water Quality Management, a master's in Engineering hydrology and BS in chemical engineering, and he's also a professional engineer in the state of California. He has over 20 years of experience in the stormwater field, mostly helping Caltrans with their stormwater program.
- 7 Eric Strecker is a Professional Engineer in both California and Oregon, and has worked for more than 35 years as a water resources engineer assisting both public and private sector clients. His focus has been on the design, monitoring and evaluation of stormwater best management practices, the development of watershed master plans, and overall assessment and management planning to protect aquatic resources. For over 20 years, he was a Principal Investigator for the International BMP Database, the most comprehensive database of LID and other BMP performance field monitoring data sets.
- 8 **Michael K. Stenstrom** is a Distinguished Professor at UCLA in the Civil and Environmental Engineering Department. His research and teaching are in the environmental engineering area with emphasis on biological treatment methods and applications of computing technologies to environmental engineering research. Over the past 15 years he has performed research to characterize stormwater and minimize its impacts on the environment.

8.1 LID Monitoring Plan Development

During WY 2022, SMCWPPP began the process of developing a LID Monitoring Plan that will meet the requirements of provision C.8.d of MRP 3.0.

3.2.1 Site Selection

SMCWPPP reviewed the permit requirements and decided that for practical purposes, monitoring should be conducted at a minimum of two LID facilities in order to meet the required number of sampling events (n=25) that must be collected during the permit term. SMCWPPP then identified ideal criteria for the selection of LID facilities that could be monitored using the methods prescribed in the MRP.

Ideal criteria include:

- <u>Public projects</u> to facilitate easier access/permission to install equipment;
- <u>Old industrial and/or old urban land uses in the drainage area</u> to increase the likelihood that the influent contains measurable quantities of the required monitoring analytes;
- <u>Projects built in 2013 or later</u> to ensure the facility meets MRP sizing and design criteria;
- <u>Accessible influent and effluent sample locations</u> single inflow location preferred. Example project types include bioretention with underdrain, planter boxes and tree wells;
- <u>Adequate space for monitoring equipment</u> space to install a utility box to house sampling equipment for the duration of the project;
- <u>Safe location</u> a location that is safe to access prior to, during, and after storm events, and is safe to store equipment and reduce the risk for vandalism.

SMCWPPP then began the process of identifying LID facilities in the county that could meet these criteria. This process included review of the SMCWPPP Green Infrastructure Story Map (https://www.flowstobay.org/data-resources/maps/green-infrastructure-story-map/) which provides basic information about public Green Stormwater Infrastructure (GSI) projects in the county. SMCWPPP held meetings with city staff to discuss design details about promising facilities, and conducted reconnaissance visits at several LID facilities to confirm opportunities for influent and effluent monitoring locations and to envision how the required monitoring equipment could be installed. As of the end of WY 2022, SMCWPPP was still in the process of identifying sampleable LID facilities.

3.2.2 Quality Assurance Project Plan

A key element of any monitoring program is a comprehensive Quality Assurance Project Plan (QAPP). The QAPP is a written document that describes the procedures that the monitoring project will use to ensure the data it collects and analyzes meet project requirements. In this case, all data must be comparable to the California Surface Water Ambient Monitoring Program (SWAMP). This means that the project Measurement Quality Objectives (MQOs) (i.e., acceptance criteria for the data) must be equivalent to or exceed SWAMP MQOs which are

described in the SWAMP Quality Assurance Program Plan (QAPrP).⁴ In the interest of achieving regional consistency among LID Monitoring conducted by MRP Permittees, the BAMSC LID Monitoring Workgroup initiated a Project of Regional Benefit to develop a common QAPP for LID Monitoring. The QAPP will be SWAMP comparable to the extent practical, including MQOs, sampling and handling protocols, and target Reporting Limits (RLs) for analytical constituents. Work on the QAPP began in WY 2022.

4.0 Recommendations

In WY 2022, SMCWPPP began development of an LID Monitoring Plan that addresses provision C.8.d requirements. In WY 2023, SMCWPPP will continue to comply with provision C.8.d requirements by finalizing the LID Monitoring Plan and preparing to initiate monitoring at the start of WY 2024. In WY 2023, SMCWPPP will continue to comply with provision C.8.d requirements. Specific WY 2023 tasks include:

- SMCWPPP will participate in the LID Monitoring TAG, which will meet on December 8, 2023, and again in March 2023 to inform development of the LID Monitoring Plans.
- SMCWPPP will work with the municipalities to identify sampleable LID facilities and gain approval to conduct monitoring throughout the permit term.
- SMCWPPP will work with members of the BAMSC LID Monitoring Workgroup and the LID Monitoring TAG to develop monitoring approaches and data evaluation methods. These will be documented in the regional QAPP.
- SMCWPPP will develop a draft LID Monitoring Plan for TAG review by March 1, 2023. The draft plan will be updated based on comments received from the TAG and will be submitted by May 1, 2023 to the Regional Water Board EO for approval.
- SMCWPPP will acquire and install the necessary monitoring equipment (e.g., automated samplers and accoutrements) at two LID facilities so that monitoring can begin at the start of WY 2024 (i.e., October 1, 2023).
- The BAMSC LID Monitoring Workgroup will continue to meet, as needed, to continue to facilitate TAG input on monitoring plans, discuss monitoring issues that may arise in the future, and generally support regional consistency across the LID Monitoring conducted in the five counties.

5.0 References

- SFBRWQCB (San Francisco Bay Regional Water Quality Control Board). 2009. Municipal Regional Stormwater NPDES Permit. Order R2-2009-0074, NPDES Permit No. CAS612008. 125 pp plus appendices.
- SFBRWQCB (San Francisco Bay Regional Water Quality Control Board). 2015. Municipal Regional Stormwater NPDES Permit. Order R2-2015-0049, NPDES Permit No. CAS612008. 152 pp plus appendices.

⁴ The current version of the SWAMP QAPrP is available here:

https://www.waterboards.ca.gov/water_issues/programs/swamp/docs/swamp-qaprp-2022.pdf

- SFBRWQCB (San Francisco Bay Regional Water Quality Control Board). 2022. San Francisco Region Water Quality Municipal Regional Stormwater NPDES Permit. Order R2-2022-0018, NPDES Permit No. CAS612008.
- SMCWPPP (San Mateo Countywide Water Pollution Prevention Program). 2020. Green Infrastructure Design Guide. Second Edition.