

# Watershed Monitoring and Assessment Program



## Urban Creeks Monitoring Report Part A: Low Impact Development (LID) Monitoring Status Report

*Water Year 2023 (October 2022 – September 2023)*

Submitted in compliance with provision C.8.h.iii.(3) of NPDES Permit No. CAS612008,  
Order No. R2-2022-018

**March 31, 2024**

This report is submitted by the agencies participating in the



City of Campbell  
City of Cupertino  
City of Los Altos  
Town of Los Altos Hills  
Town of Los Gatos

City of Milpitas  
City of Monte Sereno  
City of Mountain View  
City of Palo Alto  
City of San José

City of Santa Clara  
City of Saratoga  
City of Sunnyvale  
County of Santa Clara  
Valley Water

**Prepared for:**

**Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP)**

**Prepared by:**

**EOA, Inc.  
1410 Jackson St., Oakland, CA 94612**



# TABLE OF CONTENTS

Table of Contents .....	ii
List of Acronyms .....	iii
<b>1.0 Introduction.....</b>	<b>1</b>
<b>2.0 LID Monitoring Requirements.....</b>	<b>2</b>
2.1 Technical Advisory Group.....	2
2.2 Reporting Requirements.....	3
<b>3.0 WY 2023 LID Monitoring Accomplishments .....</b>	<b>5</b>
3.1 LID Monitoring TAG .....	5
3.1.1 TAG Members .....	5
3.1.2 TAG Meetings.....	6
3.2 LID Monitoring Plan Development .....	7
3.2.1 Site Selection.....	7
3.2.2 Overall Monitoring Approach .....	8
3.2.3 Data Evaluation .....	10
3.2.4 Quality Assurance Project Plan .....	10
3.2.5 Executive Officer Approval of Monitoring Plan and QAPP .....	10
3.3 Permitting and Monitoring Equipment Installation .....	11
3.4 Cost Tracking.....	13
<b>4.0 Conclusions and Recommendations .....</b>	<b>14</b>
<b>5.0 References .....</b>	<b>15</b>

# LIST OF TABLES

Table 3.1. Fiscal Year 2022-23 costs to develop and implement SCVURPPP LID Monitoring Plan. ....	13
--	----

# LIST OF FIGURES

Figure 3.1. Location and drainage areas of two LID monitoring sites at the Top Golf Public Green Streets Project in San José, CA. ....	9
Figure 3.2. Influent collection device, weir, and ISCO enclosure at the Top Golf Public Green Streets Project in San José, CA. ....	12

## LIST OF ACRONYMS

ACCWP	Alameda Countywide Clean Water Program
AMS	Applied Marine Sciences
BAMSC	Bay Area Municipal Stormwater Collaborative
BASMAA	Bay Area Stormwater Management Agency Association
BMP	Best Management Practices
CCCWP	Contra Costa Clean Water Program
EMC	Event Mean Concentration
EO	(Regional Water Board) Executive Officer
FY	Fiscal Year
GSI	Green Stormwater Infrastructure
KEI	Kinnetic Environmental, Inc.
LID	Low Impact Development
MQO	Measurement Quality Objective
MRP	Municipal Regional Permit
ND	Non-detect
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PCBs	Polychlorinated Biphenyls
PFAS	Per- And Polyfluoroalkyl Substances
QAPP	Quality Assurance Project Plan
QAPrP	Quality Assurance Program Plan
QA/QC	Quality Assurance/Quality Control
RL	Reporting Limit
ROS	Regression on Order Statistics
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SFEI	San Francisco Estuary Institute
SMCWPPP	San Mateo Countywide Water Pollution Prevention Program
SSA	Solano Stormwater Alliance
SWAMP	Surface Water Ambient Monitoring Program
TAG	Technical Advisory Group
TCM	Treatment Control Measure
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
UCMR	Urban Creeks Monitoring Report
WY	Water Year

## 1.0 INTRODUCTION

This *Urban Creeks Monitoring Report (UCMR) Part A: Low Impact Development (LID) Monitoring Status Report, Water Year<sup>1</sup> (WY) 2023* was prepared by the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP or Program), on behalf of its 15 member agencies (13 cities/towns, the County of Santa Clara, and Valley Water), which are subject to the 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 2023) conducted in compliance with provision C.8.d (LID Monitoring) of the MRP.<sup>2</sup> Consistent with the requirements of provision C.8.d, LID monitoring activities in WY 2023 focused on planning rather than sample collection. This report summarizes LID monitoring planning actions during WY 2023.

---

<sup>1</sup> 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 2023 (WY 2023) began on October 1, 2022 and concluded on September 30, 2023.

<sup>2</sup> Monitoring data collected pursuant to other C.8 provisions (e.g., Pollutants of Concern Monitoring, Pesticides & Toxicity Monitoring, and Trash Monitoring) are reported in other Parts of the SCVURPPP Urban Creeks Monitoring Reporting series (UCMR) for WY 2023.

## 2.0 LID MONITORING REQUIREMENTS

Low Impact Development (LID) is 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 (EOA 2019). Incorporation of post-construction LID measures into new development and redevelopment projects has been a key aspect of SCVURPPP stormwater management for nearly 20 years, and each iteration of provision C.3 of the MRP has prescribed progressively 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. 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 Santa Clara 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. The LID Monitoring Plans must explain how the monitoring will address the management questions, describe the LID facilities that will be monitored, list monitoring parameters and analytical methods, describe monitoring equipment and methods, establish a monitoring schedule, describe data evaluation methods, include a Quality Assurance Project Plan (QAPP), provide annual cost estimates for implementation of the plan, and explain how sampling and analytical methodologies will be regionally consistent. Permittees must submit their LID 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 Plans by October 1, 2023.

### 2.1 Technical Advisory Group

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). The TAG

includes impartial science advisors and Water Board staff. The TAG will be asked to review and make recommendations on the LID Monitoring Plans (including their study design, analysis methods, results, and conclusions) prior to submission of the Plans to the 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.

## 2.2 Reporting Requirements

Permittees are required to submit annual LID Monitoring Status Reports no later than March 31 with each Urban Creeks Monitoring Report, reporting on all data collected during the foregoing water year. Provision C.8.h.iii.(1) requires that LID Monitoring Status Reports include the information listed below. Because provision C.8.d (LID Monitoring) implementation in WY 2023 was focused on planning rather than sample collection, the WY 2023 LID Monitoring Status Report will not include elements related to sample collection and data review.

- (a) A summary of the LID Monitoring Methods and study designs used in the preceding water year, at each sampled LID component, facility or system.
- (b) A summary table that lists monitoring samples collected during the preceding water year during the Permit term, including at a minimum, the following information for each sample location: Site ID; the name or ID of the LID component, facility or system name; latitude and longitude of the LID component, facility or system; type of LID component, facility or system (e.g., bioretention); characteristics and land use of the tributary drainage area of the LID component, facility or system; other management actions and controls present in the tributary drainage area of the LID component, facility or system; sample dates; and concentrations of parameters measured.
- (c) A summary of lessons learned, progress made, and interim conclusions, for all samples collected during the previous water year.
- (d) For all data generated during the preceding water year, a statement of data quality.
- (e) The raw data generated by the preceding water year, made available to the Water Board and third parties.
- (f) An outline of steps (including but not limited to study designs, methods and sites) for the upcoming water year.
- (g) An analysis of the data, including the following:
  - a. Identification and analysis of any trends in stormwater or receiving water quality.
  - b. A discussion of the data for each monitoring program component, which includes:
    - i. Monitoring data relative to prior conditions, beneficial uses and applicable water quality standards as described in the Basin Plan, the Ocean Plan, the California Toxics Rule, and other applicable water quality control plans;
    - ii. Where appropriate, hypotheses to investigate regarding pollutant sources, trends, and BMP effectiveness;
    - iii. Identification and prioritization of water quality problems;

- iv. Identification of potential sources of water quality problems;
- v. Description of follow-up actions;
- vi. Evaluation of the effectiveness of existing control measures; and
- vii. Identification of management actions needed to address water quality problems.

## 3.0 WY 2023 LID MONITORING ACCOMPLISHMENTS

During WY 2023, SCVURPPP convened the LID TAG and participated in two TAG meetings, developed an LID Monitoring Plan that meets the requirements of provision C.8.d, worked with regional partners to develop a regional QAPP, and procured and installed monitoring equipment at two Top Golf LID facilities in San Jose.

SCVURPPP continued to work with other countywide stormwater programs as part of the Bay Area Municipal Stormwater Collaborative (BAMSC)<sup>3</sup> LID Monitoring Workgroup. Other members of the group include:

- Alameda Countywide Clean Water Program (ACCWP)
- Contra Costa Clean Water Program (CCCWP)
- San Mateo Countywide Water Pollution Prevention Program (SMCWPPP)
- Solano Stormwater Alliance (SSA)

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

### 3.1 LID Monitoring TAG

#### 3.1.1 TAG Members

During WY 2022, the BAMSC LID Monitoring Workgroup recruited technical experts to serve as LID Monitoring TAG members and convened two TAG meetings. The LID Monitoring TAG members include monitoring experts from throughout California and many have national recognition for their work in developing LID monitoring strategies. More information about the LID Monitoring TAG members and their expertise is provided in the bullets below:

- 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.
- 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 office-based 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.
- 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.

---

<sup>3</sup> 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).

- 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.
- 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.

### 3.1.2 TAG Meetings

During WY 2023, the BAMSC LID Monitoring Workgroup hosted two virtual LID TAG meetings on December 8, 2022 (Meeting #1) and March 21, 2023 (Meeting #2) with the overall goal of leveraging the combined expertise of the TAG members to inform the LID Monitoring Plans and QAPP. Non-regulatory TAG members were financially compensated for their time and effort. The focus and outcomes of the two WY 2023 LID TAG meetings are described below.

- LID TAG Meeting #1 (December 8, 2022). The first LID TAG meeting focused on providing TAG members with a detailed summary of the MRP LID monitoring requirements and how the BAMSC Workgroup members intended to satisfy those requirements. Proposed monitoring approaches were presented including site selection criteria, mechanisms for achieving regional consistency (e.g., common QAPP, methods, field contractors, labs), and potential deviations from standard methods due to permit-required monitoring methods. Each of the BAMSC Workgroup members also presented details of the LID facilities that they plan to monitor.

As an outcome of this meeting, LID monitoring approaches were expanded beyond the minimum MRP requirements summarized in Section 2.0 of this report. Specifically, the list of analytes was also expanded to include total and dissolved zinc. In addition, TAG members recommended collection of additional data to support calculation of water balances at each monitored facility to assess the hydrologic benefit. Thus, continuous wet season (vs. event) flow monitoring at the facility influent and effluent locations was added to the LID monitoring approaches. SCVURPPP also added continuous soil moisture monitoring to begin in the second year of monitoring (i.e., WY 2025) to better understand storage within the facility as well as exfiltration to native soils in unlined facilities and the overall facility water balance.

- LID TAG Meeting #2 (March 21, 2023). The second LID TAG meeting focused on review of the Draft LID Monitoring Plans which were submitted to TAG members on March 1, 2023, with discussion centered around specific review topics. These topics included sampling approach drivers (e.g., compliance with permit requirements, representative samples to address management questions), storm event criteria & representativeness, sample handling protocols, quality assurance (blanks, field duplicates), flow measurement options, water balance, data evaluation methods, use of censored data

(i.e., non-detects), and assessment of operations and maintenance (O&M) at the facilities. Each BAMSC Workgroup member also presented new and updated details of the LID facilities that they plan to monitor.

As an outcome of this meeting, SCVURPPP updated the LID Monitoring Plan by adding: a discussion on how the SCVURPPP facilities compare to those monitored by other BAMSC members; additional facility design details; more information on how O&M will be assessed, including a new regionally-consistent facility maintenance assessment form; water balance calculation details; and options for estimating censored data. The regional QAPP was also updated to include more information on field and equipment blanks. In response to TAG member recommendations, SCVURPPP also added field studies to estimate facility exfiltration rates to native soils (i.e., discharge to groundwater).

### 3.2 LID Monitoring Plan Development

During WY 2023, SCVURPPP developed and submitted an LID Monitoring Plan that meets the requirements of provision C.8.d of MRP 3.0 and includes additional monitoring approaches added as a result of LID TAG member recommendations. SCVURPPP also worked with BAMSC LID Monitoring Workgroup members to develop and submit a Regional QAPP that describes the procedures that will be used to ensure the monitoring data meet project requirements. The sections below briefly summarize the SCVURPPP LID Monitoring Plan (SCVURPPP 2023b) and Regional QAPP (AMS 2023) which were both submitted to the Regional Water Board for EO approval on May 1, 2023. These documents can be reviewed for specific details about the LID facility design, monitoring equipment, laboratory methods, field procedures, storm criteria, and statistical methods used in the data evaluation.

#### 3.2.1 Site Selection

SCVURPPP reviewed the permit requirements and agreed 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 that must be collected annually (n=3) and during the permit term (n=25). SCVURPPP then identified ideal criteria for the selection of LID facilities that could be monitored using the methods prescribed in the MRP. Criteria developed by SCVURPPP include critical criteria that must be met for sampling to be feasible and preferred criteria that would facilitate permitting and data evaluation.

Critical criteria:

- Accessible influent and effluent sample locations - single inflow location preferred. Example project types include: bioretention with underdrain, planter boxes or tree wells;
- Adequate space for monitoring equipment – ensure enough space is available to install a utility box to house sampling equipment for the duration of the project; and
- Safe location – 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.

Preferred criteria:

- Public LID Project – to facilitate easier access/permission to install equipment;

- Old industrial and/or old urban land use areas in the drainage area – to increase the likelihood that the influent contains measurable quantities of the required monitoring analytes; and
- Project built since 2013 - to ensure the facility meets current MRP sizing and design criteria.

SCVURPPP then identified LID facilities in the county that could meet these criteria. This process included review of the SCVURPPP Stormwater Treatment Measure Data Portal (<https://www.scvurppp.org/gsi/index.php>) which maps and provides basic information about all Green Stormwater Infrastructure (GSI) projects in the county, meetings with city staff to discuss design details about promising facilities, and reconnaissance visits to several LID facilities to confirm opportunities for influent and effluent monitoring locations and to envision how the required monitoring equipment could be installed. Unsurprisingly, very few existing public LID facilities met the critical criteria, primarily because the influent and/or effluent pipes at most facilities cannot be instrumented, making it impossible to collect flow-weighted samples using automated samplers as required by the MRP.

The Top Golf Public Green Street Project located in the City of San José was found to meet most of the site selection criteria.<sup>4</sup> This project, built in 2022, includes five concrete flow-through bioretention planter boxes in the public right-of-way, with two that are suitable for monitoring using the methods prescribed in the MRP (Treatment Control Measure (TCM) 4 and TCM 6). The location and drainage areas of the two Top Golf facilities are shown in Figure 3.1.

### 3.2.2 Overall Monitoring Approach

SCVURPPP worked with BAMSC LID Monitoring Workgroup members to develop regionally-consistent approaches to monitoring and data evaluation, informed by TAG member recommendations.

- Stormwater sampling - Stormwater sampling of paired influent and effluent water quality and flow volume will be conducted at two or more LID/GSI facilities during multiple storm events throughout the permit term. Stormwater sampling will provide data on individual bioretention facilities treating defined drainage areas to evaluate the pollutant removal and hydrologic benefits of these facilities and changes over time (Management Question 1). Flow-weighted composite samples will be used to estimate pollutant treatment effectiveness by comparing influent vs. effluent water quality at each monitoring location. Hydrology will be evaluated by identifying sources and sinks of water flow into and out of each facility and directly measuring each where possible.
- Assessing O&M Impacts - Ongoing O&M actions at monitored LID/GSI facilities will be documented during periodic site assessments to evaluate the necessary level of O&M required to maintain proper functioning of the facilities (Management Question 2). Documenting O&M actions will provide qualitative and quantitative data.

---

<sup>4</sup> A second project, the River Oaks Stormwater Capture Project, was also identified for potential LID monitoring; however, because this project has not yet been constructed, it was included in the LID Monitoring Plan as a placeholder.

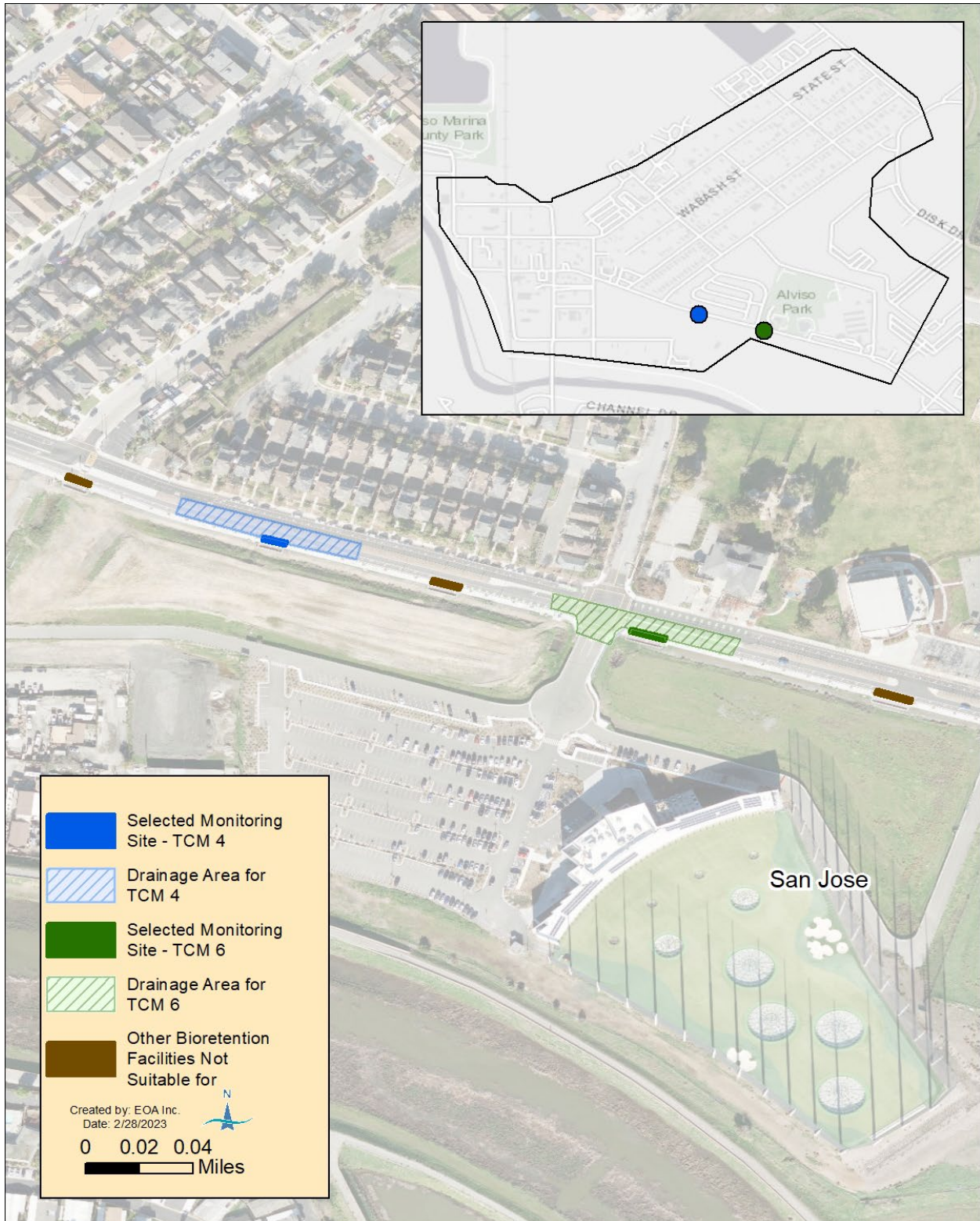


Figure 3.1. Location and drainage areas of two LID monitoring sites at the Top Golf Public Green Streets Project in San José, CA.

### 3.2.3 Data Evaluation

The data evaluation methods will employ a combination of graphical and statistical testing to evaluate differences in paired influent and effluent parameters for individual storm events and across multiple events of the monitored LID facilities. The parameters that will be evaluated include pollutant event mean concentrations (EMCs), pollutant loads, runoff volumes and peak flow rates. If desired, total PCBs reported by the laboratory using the standard substitution technique of non-detect (ND) =0 can be replaced with one using the robust Regression on Order Statistics (ROS) method. Statistically significant differences between influent and effluent parameters will be tested using paired t-tests, equivalent non-parametric tests, or Paired Prentice-Wilson tests depending on the distribution and/or presence of censored data.

Maintenance assessments will be reviewed to identify the types and frequencies of maintenance standards at each facility. Catchment-level activities and conditions recorded on the assessment forms will also be reviewed to identify potential explanatory or contributing factors for maintenance deficiencies identified. In addition, pollutant data will be reviewed as a function of time since previous maintenance activities.

### 3.2.4 Quality Assurance Project Plan

A key element of any monitoring program is a comprehensive 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)<sup>5</sup>. In the interest of achieving regional consistency among LID Monitoring conducted by MRP Permittees, the BAMSC LID Monitoring Workgroup developed a common QAPP for LID Monitoring. The QAPP is SWAMP comparable to the extent practical, including requirements for field and laboratory quality assurance/quality control (QA/QC) samples (e.g., blanks, duplicates) and documentation, MQOs, sampling and handling protocols, and target Reporting Limits (RLs) for analytical constituents.

### 3.2.5 Executive Officer Approval of Monitoring Plan and QAPP

As stated above, the SCVURPPP LID Monitoring Plan (SCVURPPP 2023b) and Regional QAPP (AMS 2023) were submitted to the Regional Water Board on May 1, 2023 for EO approval. Preliminary verbal approval of the selected monitoring sites and monitoring approaches was granted during a meeting with Regional Water Board staff and BAMSC LID Workgroup members on June 9, 2023. This verbal approval gave SCVURPPP the confidence to purchase the monitoring equipment and seek permits for equipment installation. On August 23, 2023, the EO issued a formal written "Conditional Approval of Final Low Impact Development Monitoring Plans" to the five participating Stormwater Program managers.

The Conditional Approval adds several new and potentially significant monitoring requirements and requires development and submittal of revised monitoring plans and QAPP to provide expanded discussion and/or clarification of selected topics. Most of the new requirements, especially those asking for additional explanation and clarification will be added to the revised SCVURPPP LID Monitoring Plan and Regional QAPP. However, some are the subject of an

---

<sup>5</sup> The current version of the SWAMP QAPrP is available here:  
[https://www.waterboards.ca.gov/water\\_issues/programs/swamp/docs/swamp-qaprp-2022.pdf](https://www.waterboards.ca.gov/water_issues/programs/swamp/docs/swamp-qaprp-2022.pdf)

ongoing series of meetings during which BAMSC monitoring experts will explain to Regional Water Board staff potential logistical constraints to their implementation, the extent of resources necessary if pursued, and/or will seek clarification on the intent of the new requirements. The first of these meetings was held on September 8, 2023. During this meeting Regional Water Board staff agreed that monitoring in WY 2024 can follow the approaches described in the May 1, 2023 LID Monitoring Plans and QAPP (i.e., SCVURPPP 2023b and AMS 2023), but additional meetings and further discussion with the TAG is needed to resolve several remaining issues. These include, but are not limited to, addition of continuous turbidity monitoring, analysis of dissolved mercury, field filtering (vs. lab filtering) for dissolved parameters, addition of influent/effluent sample tubing field blanks at the end of each wet season, and refinement of storm criteria.

### **3.3 Permitting and Monitoring Equipment Installation**

Following verbal approval from Regional Water Board staff of the site selection (i.e., Top Golf monitoring sites) and basic LID monitoring approaches, SCVURPPP contracted with Kinetic Environmental, Inc. (KEI) to purchase and install monitoring equipment. The equipment list includes four ISCO automated samplers (two for each monitored facility: influent and effluent), a steel enclosure to house the ISCOs, six flow gages (three for each facility: influent, effluent, overflow), sample collection devices, rain gauge, carboys, tubing, and many accoutrements. KEI began in-house testing and programming of the equipment immediately upon delivery to verify that it performed within the strict specifications necessary for collecting measurements and samples within the small inlet and outlet pipes of the LID facilities and according to the Monitoring Plan requirements. To prevent sample contamination, KEI also cleaned the tubing, carboys, and other equipment that might come in contact with sample water according to the protocols described in the Monitoring Plan (SCVURPPP 2023b). Following cleaning, equipment blanks were collected and submitted to the laboratories for analysis of all parameters.<sup>6</sup>

City of San José staff were contacted to obtain official permissions and an encroachment permit. The permitting process required development of a traffic control plan because the sidewalk and bike path would be blocked during equipment installation. A few minor details of the Monitoring Plan had to be revised as a result of the encroachment permit. For example, each of the Top Golf LID facilities has two inlets. The original plan was to block one inlet so that all influent samples and flow rates could be collected/measured at one location. This approach was not approved by the City; therefore, KEI designed an influent collection tray that combines the influent from the two inlets into one pipe that is equipped with a small weir to facilitate flow monitoring (Figure 3.2).

Installation of the equipment at the two Top Golf LID facilities was conducted in September and completed in time for monitoring to begin with the start of WY 2024.

---

<sup>6</sup> Results of the equipment rinsate blanks and other pre-sampling QA/QC samples will be described and submitted with the WY 2024 LID Monitoring Status Report.



Figure 3.2. Influent collection device, weir, and ISCO enclosure at the Top Golf Public Green Streets Project in San José, CA.

### 3.4 Cost Tracking

Provision C.8.d.i.(1)(g) of the MRP requires that annual cost estimates for the implementation of the LID Monitoring Plan are provided to the Regional Water Board. SCVURPPP budgets on a Fiscal Year (FY) basis; therefore, the costs listed in Table 3.1 are for the period of July 1, 2022 – June 30, 2023 (i.e., FY 2022-23) and do not include the full cost of purchasing or installing monitoring equipment or laboratory fees associated with testing the equipment.

**Table 3.1. Fiscal Year 2022-23 costs to develop and implement SCVURPPP LID Monitoring Plan.**

<b>Cost Type</b>	<b>Amount (FY 2022-23)</b>
<b>Program Costs</b> (planning, communications, LID TAG & BAMSC Workgroup participation, permitting, oversight, etc.)	\$84,100
<b>TAG Member Honorarium</b>	\$4,000
<b>Subcontractor (AMS) Costs</b> (QAPP development)	\$5,600
<b>Subcontractor (KEI) Costs</b> (equipment, site reconnaissance)	\$6,100
<b>TOTAL</b>	<b>\$104,800</b>

The costs associated with LID monitoring during FY 2023-24, which coincides with the first year of monitoring (WY 2024), will be reported in the WY 2024 LID Monitoring Status Report which will be submitted in March 2025. In subsequent FYs, costs will be reported consistent with MRP provision C.20 and the cost reporting framework acceptable to the Water Board Executive Officer.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

In WY 2023, SCVURPPP prepared for LID Monitoring to begin at the start of WY 2024 by implementing the following provision C.8.d planning tasks:

- Worked with BAMSC LID Monitoring Workgroup members to convene and participate in two LID TAG meetings.
- Developed and submitted a March 1, 2023 draft and May 1, 2023 final LID Monitoring Plan (SCVURPPP 2023b).
- Participated in the development of a draft and final Regional QAPP (AMS 2023).
- Began discussions with Regional Water Board staff to address new LID monitoring and reporting requirements described in the Conditional Approval of the LID Monitoring Plan and QAPP.
- Obtained the necessary permits and permissions to install monitoring equipment at two LID facilities at the Top Golf Public Green Street Project located in the City of San José.
- Worked with a subcontractor (KEI) to purchase, test, and install LID monitoring equipment at the Top Golf LID facilities.

Specific WY 2024 tasks will include:

- SCVURPPP will work with Co-permittees (e.g., City of San José) and subcontractors (e.g., KEI) to conduct LID monitoring at two facilities at the Top Golf Public Green Street Project in San José according to methods and procedures described in the SCVURPPP LID Monitoring Plan (SCVURPPP 2023b) and Regional QAPP (AMS 2023). A minimum of three (with a goal of six) monitoring events will be conducted, each consisting of an influent and effluent sample. In addition, hydrologic conditions will be monitored throughout the WY 2024 wet season and the facilities will be periodically assessed for O&M.
- SCVURPPP will participate in the LID Monitoring TAG, which will meet on April 19, 2024 to discuss selected new requirements from the Regional Water Board's Conditional Approval letter and preliminary lessons learned from implementation of the LID Monitoring Plans in WY 2024.
- SCVURPPP will update the LID Monitoring Plan to include new requirements from the Conditional Approval letter as refined through TAG discussions. Similarly, SCVURPPP will work with BAMSC LID Monitoring Workgroup members to update the Regional QAPP.
- 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

- AMS (Applied Marine Sciences). 2023. Quality Assurance Project Plan. Municipal Regional Stormwater Permit No. CAS612008. Order No. R2-2022-0018. Low Impact Development Monitoring. Prepared by AMS for the Bay Area Municipal Stormwater Collaborative. Version 1.0. May 1, 2023.
- EOA, Inc. 2019. Green Stormwater Infrastructure Handbook. Guidance for Integrating Green Stormwater Infrastructure in Public Streetscapes, Parking Lots and Parks. Prepared for the Santa Clara Valley Urban Runoff Pollution Prevention Program. September 2019.
- SCVURPPP (Santa Clara Valley Urban Runoff Pollution Prevention Program). 2023a. Draft Low Impact Development (LID) Monitoring Plan for the Santa Clara Valley During MRP 3.0. Prepared by EOA, Inc. March 1, 2023.
- SCVURPPP (Santa Clara Valley Urban Runoff Pollution Prevention Program). 2023b. Low Impact Development (LID) Monitoring Plan for the Santa Clara Valley During MRP 3.0. Prepared by EOA, Inc. May 1, 2023.
- 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.
- 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.