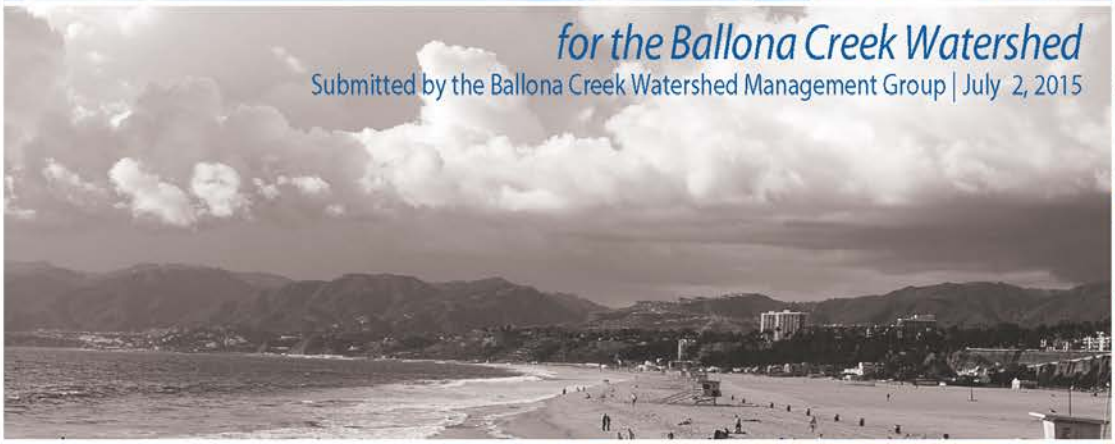
# Coordinated Integrated Monitoring Program (CIMP)

## *for the Ballona Creek Watershed*

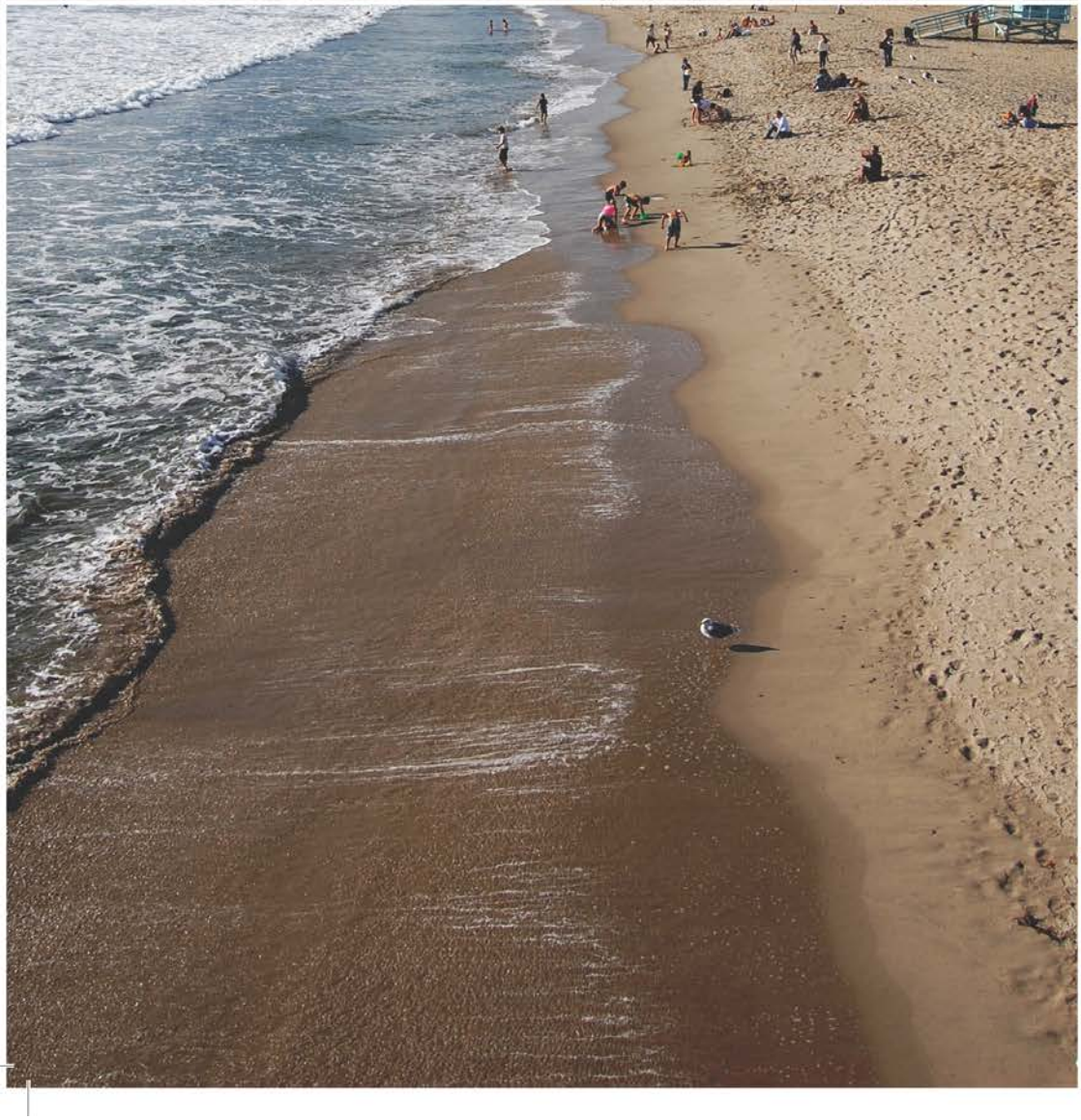
Submitted by the Ballona Creek Watershed Management Group | July 2, 2015













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# List of Acronyms

| | |
|---|---|
| BC | Ballona Creek |
| BCWMG | Ballona Creek Watershed Management Group |
| BMP | Best Management Practice |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CIMP | Coordinated Integrated Monitoring Program |
| CMP | Coordinated Monitoring Program |
| CVRWQCB | Central Valley Regional Water Quality Control Board |
| DDT | Dichloro-diphenyl-trichloroethane |
| DO | Dissolved Oxygen |
| EWMP | Enhanced Watershed Management Program |
| GIS | Geographic Information System |
| HUC | Hydrologic Unit Code |
| IC/ID | Illicit Connection/Illicit Discharge |
| LA | Los Angeles |
| LACDPW | Los Angeles County Department of Public Works |
| LACFCD | Los Angeles County Flood Control District |
| LTA | Long Term Assessment |
| MRP | Monitoring and Reporting Program |
| MS4 | Municipal Separate Storm Sewer System |
| NPDES | National Pollutant Discharge Elimination System |
| NSW | Non-Stormwater |
| OC | Organochlorine |
| PCB | Polychlorinated Biphenyl |
| PMRP | Plastic Pellet Monitoring and Reporting Plan |
| RWL | Receiving Water Limitation |

| | |
|---|---|
| SCCWRP | Southern California Coastal Water Research Project |
| SMC | Stormwater Monitoring Coalition |
| SSC | Suspended Sediment Concentration |
| SW | Stormwater |
| TDS | Total Dissolved Solids |
| TIE | Toxicity Identification Evaluation |
| TKN | Total Kjeldahl Nitrogen |
| TMDL | Total Maximum Daily Load |
| TOC | Total Organic Carbon |
| TRE | Toxicity Reduction Evaluation |
| TSS | Total Suspended Solids |
| USEPA | United States Environmental Protection Agency |
| WBPC | Waterbody-Pollutant Combination |
| WLA | Waste Load Allocation |
| WQBEL | Water Quality Based Effluent Limitation |

# 1 Introduction

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. R4-2012-0175 (Permit) was adopted November 8, 2012 by the Los Angeles Regional Water Quality Control Board (Regional Board) and became effective December 28, 2012. The purpose of the Permit is to ensure the MS4s in Los Angeles County are not causing or contributing to exceedances of water quality objectives set to protect the beneficial uses in the receiving waters. Included as Attachment E to the Permit are requirements for a Monitoring and Reporting Program (MRP). The stated Primary Objectives for the MRP, listed in Part II.A.1 of the MRP, are as follows:

1. Assess the chemical, physical, and biological impacts of discharges from the MS4 on receiving waters.
2. Assess compliance with receiving water limitations (RWLs) and water quality-based effluent limitations (WQBELs) established to implement Total Maximum Daily Load (TMDL) wet weather and dry weather wasteload allocations (WLAs).
3. Characterize pollutant loads in MS4 discharges.
4. Identify sources of pollutants in MS4 discharges.
5. Measure and improve the effectiveness of pollutant controls implemented under the Permit.

Permittees have the option to develop a Coordinated Integrated Monitoring Program (CIMP) to specify approaches for meeting the Primary Objectives of the MRP. The Ballona Creek (BC) Watershed Management Group (BCWMG) has selected to develop and implement a CIMP that is tailored to address the specific needs of the Ballona Creek watershed. This CIMP provides a discussion of the monitoring locations, constituents, monitoring frequency, and general monitoring approach. The attachments and appendices to this CIMP describe additional background information and detail specific analytical and monitoring procedures that will be used to implement this CIMP. The BCWMG CIMP meets the requirements of the MS4 Permit, including all TMDL monitoring requirements.

## 1.1 ENHANCED WATERSHED MANAGEMENT PROGRAM AREA

The Ballona Creek watershed receives drainage from an approximately 128-square mile area of western Los Angeles County. The Ballona Creek Estuary (BCE) and Ballona Creek collectively extend 9.5 miles upstream before going underground into the MS4 network. Ballona Creek flows through residential, commercial, and industrial areas before becoming the BCE, which empties into Santa Monica Bay. Ballona Creek Reaches 1 and 2 (as defined by the Regional Board) and the BCE receive drainage from the jurisdictions that comprise the BCWMG. The BCWMG includes the Cities of Beverly Hills and West Hollywood, and portions of the Cities of Los Angeles, Inglewood, Culver City, and Santa Monica as well as unincorporated areas of the County of Los Angeles and the Los Angeles County Flood Control District (LACFCD). Major tributaries to Ballona Creek include Sepulveda Canyon Channel (Reach 2) and Centinela Creek (Ballona Estuary). Other water bodies in the watershed include the Del Rey Lagoon and the Ballona Wetlands, which are both connected to the Ballona Estuary through tide gates. Note that although Benedict Canyon Channel is identified in TMDLs as a tributary to Ballona Creek, it is a closed channel that daylights where the channel meets Ballona Creek and is not identified in the

Basin Plan as a waterbody in the watershed. As such, it is not considered a tributary for the purposes other than addressing the bacteria TMDL for the watershed. The City of Los Angeles is the responsible agency for the Del Rey Lagoon whose tributary area is approximately 25 acres. The Ballona Wetlands encompass approximately 626 acres (541 acres of natural wetlands area and 85 acres of roads, parking lots, levees and other structures). Approximately 460 acres of the Ballona Wetlands are located within the Ballona Creek watershed and the remaining portion is located in the Marina Del Rey watershed. The Ballona Wetlands are owned and/or managed by the California Department of Fish and Wildlife (CDFW) and the State Land Commission. **Table 1** presents the major water bodies within the BCWMG Enhanced Watershed Management Program (EWMP) area. **Figure 1** displays the BCWMG and the participating jurisdictions.

**Table 1. Waterbodies Associated with the BCWMG EWMP Area**

| Mainstem | Associated Tributaries |
|---|---|
| Ballona Creek Reach 1 | |
| Ballona Creek Reach 2 | Sepulveda Channel |
| Ballona Creek Estuary | Centinela Creek |
| **Lagoons and Wetlands** | |
| Del Rey Lagoon | Ballona Wetlands |
| **Downstream Waters** | |
| Santa Monica Bay | |

The TMDLs addressing water body-pollutant combinations (WBPCs) within or downstream of the EWMP area are presented in **Table 2**. Part XIX.B of the MRP, the TMDL Basin Plan Amendments (BPAs), and United States Environmental Protection Agency (USEPA)-established TMDL documents include TMDL monitoring requirements and recommendations, which are summarized in **Attachment A**.

**Table 2. TMDLs Applicable to the Ballona Creek Watershed EWMP**

| TMDL | Regional Board Resolution Number(s) | Effective Date and/or EPA Approval Date |
|---|---|---|
| Ballona Creek Trash (BC Trash) | 2004-023 | 08/11/2005 |
| Ballona Creek Estuary Toxic Pollutants (BC Toxics TMDL) | 2006-011 | 01/11/2006 |
| | 2013-010 | Not Yet Effective |
| Ballona Creek, Ballona Estuary, and Sepulveda Channel Bacteria (BC Bacteria TMDL) | 2007-015 | 04/27/2007 |
| | 2012-008 | 07/02/2014 |
| Ballona Creek Metals (BC Metals TMDL) | 2007-015 | 10/29/2008 |
| | 2013-010 | Not Yet Effective |
| Santa Monica Bay Nearshore and Offshore Debris (Debris TMDL) | 2010-010 | 03/20/2012 |
| Santa Monica Bay DDTs and PCBs (SMB Toxics) | NA (USEPA TMDL) | 03/26/2012 |
| Ballona Creek Wetlands TMDL for Sediment and Invasive Exotic Vegetation (Wetlands TMDL) | | 03/26/2012 |

The BCWMG agencies have agreed to collectively develop this CIMP. Therefore, this CIMP covers all of the areas served by an MS4 and owned by the MS4 permittees within the watershed. A breakdown of the area by MS4 Permittee and other agencies is provided in **Table 3**. Collectively, the MS4 permittees in the Ballona Creek watershed have jurisdiction over approximately 123 square miles or 96 percent of the total watershed area. The EWMP agencies have no jurisdiction over the land that is owned by the State of California (i.e., California Department of Fish and Wildlife, the State Lands Commission, and California Department of Transportation) and the United States Government. Approximate land area and land use summaries for the participating jurisdictions are listed in **Table 4**, with the most prevalent land use being residential.

**Table 3. Ballona Creek Watershed Land Area Distribution and EWMP Participation**

| Agency | EWMP Agency | Land Area (sq. mi.) | % of EWMP Area |
|---|---|---|---|
| City of Beverly Hills | Yes | 5.7 | 4.6% |
| County of Los Angeles | Yes | 4.9 | 4.0% |
| Culver City | Yes | 4.9 | 4.0% |
| City of Inglewood | Yes | 3.0 | 2.4% |
| City of Los Angeles | Yes | 102.0 | 83.2% |
| City of Santa Monica | Yes | 0.3 | 0.3% |
| City of West Hollywood | Yes | 1.8 | 1.5% |
| LACFCD | Yes | NA | |
| **Area of EWMP Agencies** | | **122.6** | **100%** |
| Caltrans | No | 2.6 | |
| State of California | No | 1.4 | |
| United States Government | No | 1.1 | |
| **Total Watershed Area** | | **127.7** | |

**Table 4. Land Use Summaries of Jurisdictions Participating in the BCWMG**

| | | Percent of Jurisdiction[(1)] | | | |
|---|---|---|---|---|---|
| **Jurisdiction** | **Area (sq. mi.)** | **Res** | **Com/Ind** | **Ag/Nur** | **Open** |
| City of Beverly Hills | 5.4 | 84% | 14% | <1% | 2% |
| County of Los Angeles | 4.6 | 52% | 39% | <1% | 9% |
| Culver City | 4.7 | 54% | 44% | <1% | 2% |
| City of Inglewood | 3.0 | 64% | 32% | <1% | 4% |
| City of Los Angeles | 86.2 | 73% | 24% | <1% | 3% |
| City of Santa Monica | 0.3 | 66% | 33% | <1% | 1% |
| City of West Hollywood | 1.8 | 70% | 29% | <1% | 1% |
| All Jurisdictions | 106.0 | 71% | 25% | <1% | 4% |

1. Land use classifications include: residential (Res), commercial and industrial (Com/Ind), agriculture and nursery (Ag/Nur), and open space (Open). Totals correspond to the percent of the total area considered in the EWMP (i.e., only using open space characterized as golf courses, local parks, and regional parks).

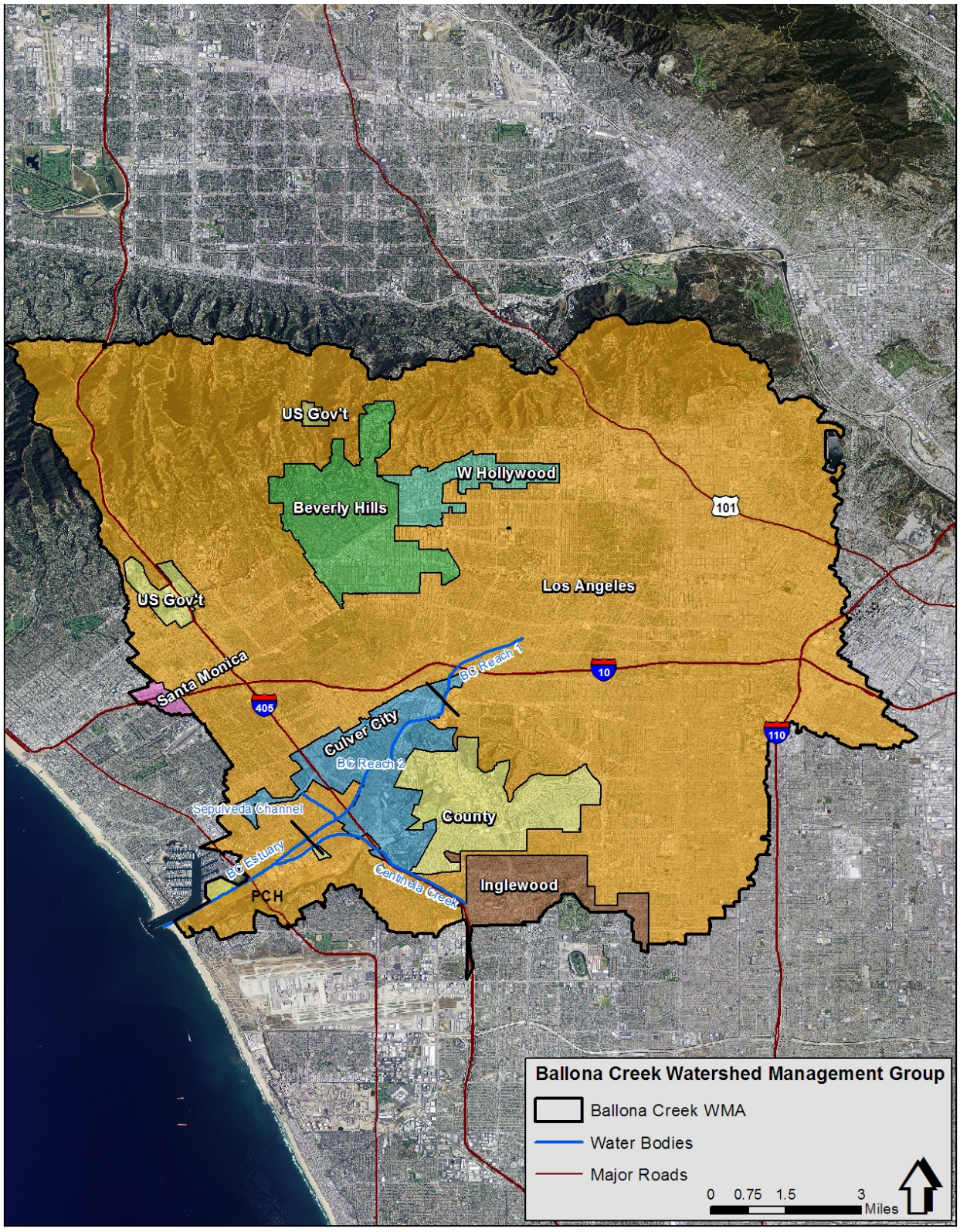


**Figure 1. Jurisdictional Boundaries for the BCWMG**

## 1.2 WATER QUALITY PRIORITIES

As part of the EWMP, the BCWMG analyzed data to determine water quality priorities for the watershed. While the water quality priorities analysis will be finalized as part of the EWMP development, an initial characterization of the water quality priorities has been developed and is briefly summarized in **Attachment A**. The three Permit categories are defined as:

- **Category 1:** WBPCs for which TMDL WQBELs and/or RWLs are established in Part VI.E and Attachments L and O of the MS4 Permit.
- **Category 2:** WBPCs for which data indicate water quality impairment in the receiving water according to the State's Listing Policy, regardless of whether the pollutant is currently on the 303(d) List and for which the MS4 discharges may be causing or contributing.
- **Category 3:** WBPCs for which there are insufficient data to indicate impairment in the receiving water according to the State's Listing Policy, but which exceed applicable receiving water limitations contained in the MS4 Permit and for which MS4 discharges may be causing or contributing to the exceedance.

The Permit categories are utilized in this CIMP to identify parameters that will be monitored at each receiving water and outfall monitoring site. Since the analysis is waterbody specific, different parameters may be monitored at different monitoring sites. **Attachment A** contains a detailed discussion regarding the decision-making process for identifying parameters that will be monitored at each receiving water and outfall monitoring site.

## 1.3 CIMP OVERVIEW

The primary purpose of this CIMP is to outline the process for collecting data to meet the goals and requirements of the MRP. This CIMP is designed to provide the BCWMG the information necessary to guide water quality program management decisions. This CIMP provides information on sample collection and analysis methodologies. Additionally, the monitoring will provide a means to measure compliance with the Permit. The MRP, as outlined in the Permit, is composed of five elements, including:

1. Receiving Water Monitoring
2. Stormwater Outfall Monitoring
3. Non-Stormwater (NSW) Outfall Monitoring
4. New Development/Redevelopment Effectiveness Tracking
5. Regional Studies

In addition to the five elements, which are presented as sections in this CIMP, a specific trash and plastic pellets monitoring section is included. An overview of each of the monitoring types and their monitoring objectives are described in the following subsections.

### 1.3.1 Receiving Water Monitoring

The objectives of the receiving water monitoring include the following:

- Determine whether the RWLs are being achieved;
- Assess trends in pollutant concentrations over time, or during specified conditions; and

- Determine whether the designated beneficial uses are fully supported as determined by water chemistry, as well as aquatic toxicity and bioassessment monitoring.

The receiving water monitoring will provide data to determine whether the RWLs and water quality objectives are being achieved in the BCWMG EWMP area and support management decisions related to EWMP implementation. Over time, the monitoring will allow the assessment of trends in pollutant concentrations. Receiving water monitoring consists of a long term assessment (LTA) monitoring station designed to meet all receiving water permit requirements and additional TMDL monitoring locations necessary to evaluate TMDL requirements, 303(d) listings, and other exceedances of RWLs. Implementation of the BCWMG CIMP will replace existing TMDL monitoring programs.

### 1.3.2 Stormwater Outfall Monitoring

Stormwater outfall monitoring of discharges from the MS4 support meeting three objectives including:

- Determine the quality of stormwater discharge relative to municipal action levels.
- Determine whether stormwater discharge is in compliance with applicable stormwater WQBELs derived from TMDL WLAs.
- Determine whether the discharge causes or contributes to an exceedance of RWLs.

The stormwater outfall monitoring is designed to characterize stormwater discharges from MS4s at representative outfall locations within the EWMP area and support management decisions related to EWMP implementation. Additionally, implementation of the BCWMG CIMP will meet the TMDL outfall monitoring requirements.

### 1.3.3 Non-Stormwater Outfall Program

Objectives of the NSW outfall monitoring include the following:

- Determine whether a discharge is in compliance with applicable NSW WQBELs derived from TMDL WLAs.
- Determine whether a discharge exceeds NSW action levels.
- Determine whether a discharge contributes to or causes an exceedance of RWLs.
- Assist in identifying illicit discharges.

The NSW Outfall Screening and Monitoring Program (NSW Outfall Program) is focused on dry weather discharges to receiving waters from major outfalls. The NSW Outfall Program provides monitoring to evaluate whether the NSW constituent load is adversely impacting the receiving water, serves to assess the Permit requirement to effectively prohibit NSW discharges, and serves to integrate with TMDL outfall monitoring efforts. These in turn support management decisions related to EWMP implementation.

### 1.3.4 New Development and Redevelopment Effectiveness Tracking

Permittees are required to maintain a database to track specific information related to new and redevelopment projects subject to the minimum control measure (MCM) requirements in Part VI.D.7. The Permit contains data tracking requirements in Part X.A of the MRP and in Part VI.D.7.d.iv. The objective of the New Development/Redevelopment effectiveness tracking

is to track whether the conditions in the building permit issued by the Permittee are implemented to ensure the volume of stormwater associated with the design storm is retained on-site as required Part VI.D.7.c.i. of the Permit.

### 1.3.5 Trash and Plastic Pellet Monitoring

The objective of the trash and plastic pellet monitoring is to satisfy the monitoring requirements of the *Ballona Creek Trash TMDL* and *Santa Monica Bay Nearshore and Offshore Debris TMDL* (Debris TMDL) in accordance with the requirement in Part III of the MRP.

### 1.3.6 Regional Studies

Only one regional study is identified in the MRP: Southern California Stormwater Monitoring Coalition (SMC). The Southern California SMC is a collaborative effort between all of the Phase I MS4 NPDES Permittees and NPDES regulatory agencies in Southern California. The Southern California Coastal Water Research Project (SCCWRP) oversees the SMC. There are no SMC sites within the Ballona Creek watershed; however, the BCWMG is conducting bioassessment, toxicity, and water and sediment chemistry monitoring in the Ballona Creek Estuary on the same frequency as the SMC initiated programs. In this manner, the BCWMG is in turn supporting the goals of the SMC.

# 2 Receiving Water Monitoring Program

The objectives of the receiving water monitoring (Part II.E.1 of the MRP) include the following:

a. Determine whether the receiving water limitations are being achieved;
b. Assess trends in pollutant concentrations over time, or during specified conditions; and
c. Determine whether the designated beneficial uses are fully supported as determined by water chemistry, as well as aquatic toxicity and bioassessment monitoring.

The following presents the receiving water monitoring sites, monitoring parameters and frequency, as well as a discussion on monitoring coordination and summary of how the receiving water monitoring program meets the objectives of the MRP. The approach builds off the MRP requirements, the TMDL monitoring requirements (detailed in **Attachment A**), as well as existing monitoring programs in the watershed (detailed in **Attachment A**). Implementation of the BCWMG CIMP will fulfill the requirements of existing TMDL monitoring programs.

## 2.1 RECEIVING WATER MONITORING SITES

The MRP specifies that receiving water monitoring shall be performed at previously designated mass emission stations (unless justification of why monitoring at the mass emission stations will be discontinued is provided), TMDL receiving water compliance points (as designated in TMDL Monitoring Plans approved by the Regional Board Executive Officer), and additional receiving water locations representative of the impacts from MS4 discharges. To address the different monitoring objectives, two types of monitoring sites are included in this CIMP.

- **LTA Receiving Water** – LTA receiving water monitoring is intended to determine if RWLs are achieved, assess trends in pollutant concentrations over time, and determine whether designated uses are supported.
- **TMDL Receiving Water** – TMDL receiving water monitoring is intended to evaluate attainment of, or progress in attaining TMDLs, and support evaluating the status of 303(d) listings and other RWL exceedances specific to other reaches in the watershed.

LTA monitoring provides a long-term record to understand conditions within the EWMP area, for the full suite of parameters, including TMDL parameters. TMDL monitoring addresses TMDL related constituents and provides monitoring locations to assess other identified exceedances of RWLs determined through an analysis of existing and future data.

Both LTA and TMDL monitoring have been ongoing for some time in the BCWMG area. Monitoring similar to LTA monitoring was required on the mainstem of Ballona Creek by the previous MS4 Permit and conducted at the previously designated mass emission station. TMDL monitoring sites were required in Ballona Creek Reaches 1 and 2, Ballona Creek Estuary, Sepulveda Channel, Centinela Creek, Benedict Canyon Channel, and Del Rey Lagoon. To meet the TMDL requirements three Coordinated Monitoring Programs (CMPs) were developed and were considered during CIMP site selection:

- *Ballona Creek, Ballona Estuary, & Sepulveda Channel Bacteria TMDL Coordinated Monitoring Plan* (BC Bacteria CMP)

- *Ballona Creek Metals TMDL and Ballona Creek Estuary Toxic Pollutants TMDL Coordinated Monitoring Plan* (BC Metals and Toxics CMP)
- *Total Maximum Daily Load for Bacteria in Ballona Creek, Ballona Estuary, and Sepulveda Channel: Coordinated Monitoring Plan for Del Rey Lagoon* (Del Rey Lagoon CMP)

The receiving water monitoring sites in the BCWMG EWMP area and the type of monitoring (e.g., LTA or TMDL) that will be conducted at each site are summarized in **Table 5**. The locations of the monitoring sites are shown in **Figure 2**. Each constituent required for monitoring by the MRP is addressed by at least one of the two types of receiving water monitoring. A summary of constituents which will be monitored at each of the receiving water monitoring sites is presented in **Section 2.2**.

The receiving water monitoring sites meet the MRP objectives and support an understanding of potential impacts associated with MS4 discharges. However, as described in the MRP (Part II.E.1), receiving water sites are intended to assess receiving water conditions. An exceedance of a RWL at a receiving water site may not on its own indicate MS4 discharges caused or contributed to the RWL exceedance. As the receiving water sites also receive runoff from non-MS4 sources, including open space and other permitted discharges, the exceedance of a RWL may have been caused or contributed to by a non-MS4 source. A determination regarding whether MS4 discharges caused or contributed to a RWL exceedance should be made using receiving water monitoring data, representative outfall monitoring data, and other pertinent data and information.

**Table 5. Receiving Water Monitoring Sites**

| Site ID | Water Body/Location | Previous Site Name Used in TMDL Coordinated Monitoring Programs | Coordinates | | Monitoring Type | |
|---|---|---|---|---|---|---|
| | | | Latitude | Longitude | LTA | TMDL |
| BC_02_SAW | Ballona Creek Reach 2 at Sawtelle Blvd | BC-2 | 33.998293 | -118.402035 | X | X |
| BC_02_DUQ | Ballona Creek Reach 2 at Duquesne Ave | BCB-2 | 34.017342(1) | -118.389191(1) | | X |
| BC_02_ING | Ballona Creek Reach 2 at Inglewood Blvd | BC-1; BCB-5 | 33.989385(2) | -118.412169(2) | | X |
| BC_01_WAS | Ballona Creek Reach 1 at W Washington Blvd | BCB-1 | 34.032252 | -118.375328 | | X |
| BC_01_NAT | Ballona Creek Reach 1 at National Blvd | BC-3 | 34.027953 | -118.376366 | | X |
| BCC_DUQ | Benedict Canyon Channel upstream of confluence with Ballona Creek | BCB-3 | 34.015141 | -118.390655 | | X |
| SC_CUL | Sepulveda Channel at Culver Blvd | BC-4; BCB-4 | 33.998319 | -118.415671 | | X |
| CC_ING | Centinela Creek at Inglewood Blvd | BCB-7 | 33.987368 | -118.409549 | | X |
| CC_CEN | Centinela Creek at Centinela Ave | BC-5 | 33.985321 | -118.413104 | | X |
| DRL_BCE | Del Rey Lagoon at outlet to the Ballona Creek Estuary | BCB-9 | 33.962820 | -118.451837 | | X |
| BCE_MCC | Ballona Creek Estuary at McConnell Ave | BCB-6 | 33.981657 | -118.422380 | | X |
| BCE_CUL(3) | Ballona Creek Estuary downstream of Culver Blvd | BCE-4 | 33.971000(4) | -118.439000(4) | | X |
| BCE_PAC(3) | Ballona Creek Estuary at Pacific Ave | BCE-2; BCB-8 | 33.963035 | -118.453415 | | X |

1. Monitoring at this site will be suspended until the end of the BC Bacteria TMDL Time Schedule Order (TSO), which is December 15, 2019. A future annual report may propose to move the location of this site to an alternate site (e.g., below the proposed Low Flow Treatment Facility #1).
2. Bacteria monitoring will occur at 33.989891, -118.411571.
3. Bed sediment and fish tissue monitoring site.
4. General vicinity of monitoring site. Actual location where bed sediment and tissue samples are collected may vary slightly.

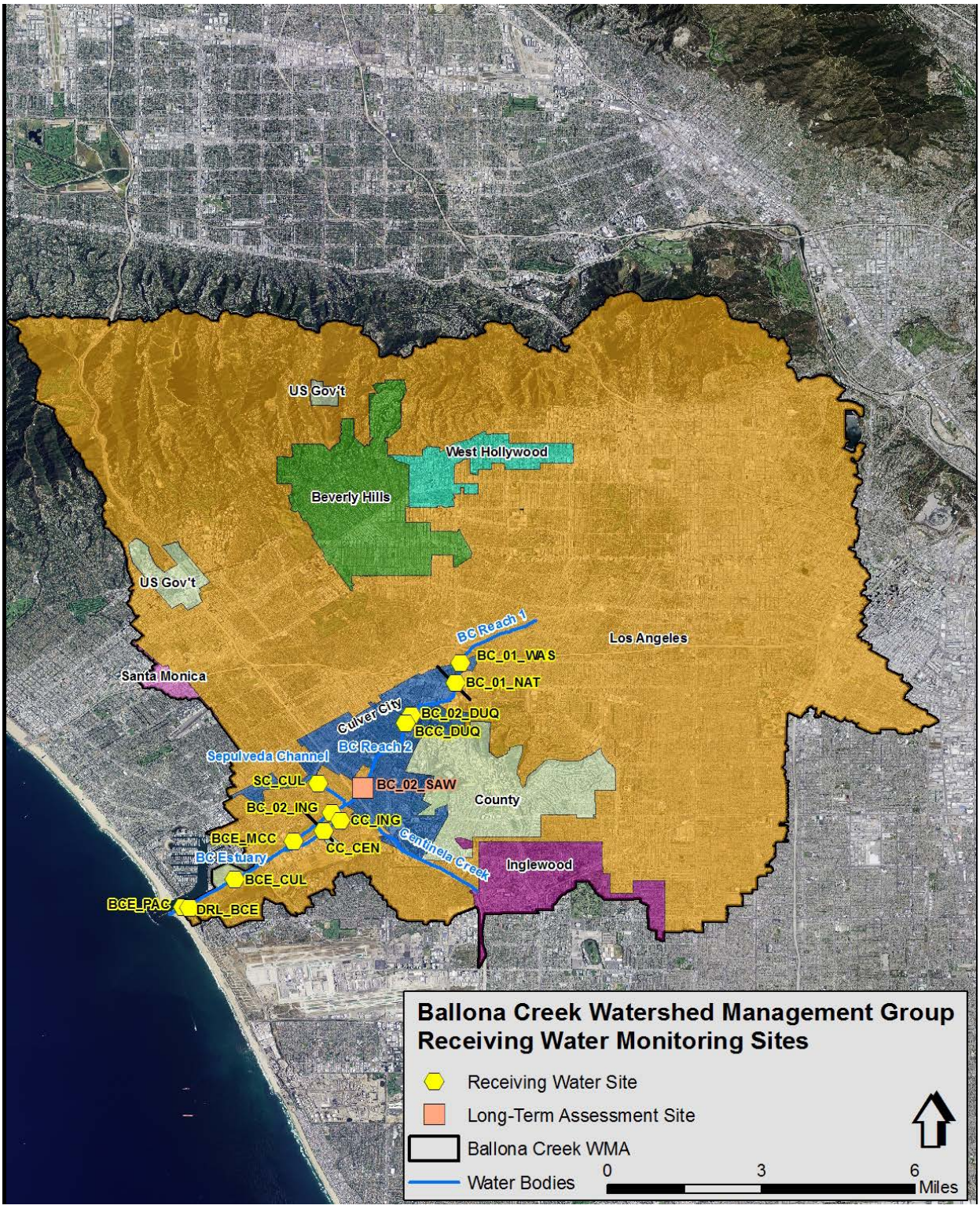


**Figure 2. Overview of Receiving Water Monitoring Sites**

### 2.1.1 Long Term Assessment Monitoring Site

One of the primary objectives of receiving water monitoring is to assess trends in pollutant concentrations over time, or during specified conditions. As a result, the primary characteristic of an ideal receiving water assessment monitoring site is a robust dataset of previously collected monitoring results so that trends in pollutant concentrations over time, or during specified conditions, can be assessed.

This CIMP LTA station will be located at Ballona Creek at Sawtelle Boulevard. There are two current receiving water monitoring sites located at Ballona Creek at Sawtelle Boulevard: (1) the historical mass emission station (S01) and (2) a BC Metals and Toxics CMP site (BC-2). Locating the LTA site at Sawtelle Boulevard will provide a long historical record by which to assess trends over time and evaluate the long-term attainment of RWLs and beneficial uses within the EWMP area. This site will also be utilized to support TMDL monitoring. The location of the LTA monitoring site is shown on **Figure 2**. **Attachment B** provides a summary of the monitoring site, associated attributes, and photographs.

Another primary role of the LTA site is to identify additional constituents for monitoring at other locations within the watershed. If exceedances are observed at the LTA site as described in **Section 2.2** monitoring for those constituents will be added to upstream sites.

### 2.1.2 TMDL Sites

Within the BCWMG EWMP area, TMDL monitoring sites are required in Ballona Creek Reaches 1 and 2, Ballona Creek Estuary, Sepulveda Channel, Centinela Creek, Benedict Canyon Channel, and Del Rey Lagoon. Twelve TMDL sites will be monitored under this CIMP. The following briefly describes how existing TMDL monitoring sites are incorporated into this CIMP. Note that upon approval by the Regional Board Executive Officer, the CIMP will effectively replace the existing CMPs.

The five Tier I water quality monitoring sites monitored as part of the BC Metals and Toxics CMP (BC sites in **Table 5**) will be used as TMDL monitoring sites. Tier II water quality monitoring sites monitored as part of the BC Metals and Toxics CMP were located at outfalls. As a result, the Tier II site concept is fulfilled within this CIMP through the Stormwater Outfall Monitoring Program (**Section 4**) and Non-Stormwater Outfall Program (**Section 5**). Additionally, given that the metals data collected at BC-1 are almost indistinguishable from the data collected at the other BC Metals and Toxics CMP site located in Ballona Creek Reach 2 (BC-2), monitoring at the BC-1 monitoring site will be moved to the Ballona Creek Estuary (BCE_PAC). Details for this analysis are provided in **Attachment B**. Of the six sediment quality and bioaccumulation monitoring sites, two monitoring sites will be utilized to eliminate redundancy because of their similar characteristics. Additional details are provided in **Attachment B**. The sediment and bioaccumulation monitoring sites are the two sites approved by the Regional Board for bioaccumulation monitoring (BC Metals and Toxics CMP monitoring sites BCE-2 and BCE-4). These two sites will be considered representative of the entire Ballona Creek Estuary, which is a modification from the BC Metals and Toxics CMP. Additionally, these sites will be utilized to evaluate attainment of the California Sediment Quality Objectives[1]

[1] Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality. Effective August 25, 2009.

(Phase I SQOs). A stressor identification study, as required by the Phase I SQOs (Section VII.F), will be conducted if sediments fail to meet the narrative protective condition of Unimpacted or Likely Unimpacted. A separate Stressor Identification Work Plan will be developed and submitted to the Regional Board Executive Officer for review and approval prior to initiation of related sampling.

The eight sites included in the BC Bacteria CMP (the BCB-1 through BCB-8 sites in **Table 5**) are also included as TMDL monitoring sites. However, given that the data collected at BCB-2 are almost indistinguishable from the data collected at the other BC Bacteria CMP site located in Ballona Creek Reach 2 (BCB-5), monitoring at the BCB-2 monitoring site will be suspended until the end of the Time Schedule Order (TSO) related to the Bacteria TMDL, which is December 15, 2019. The BCWMG will propose to reinitiate monitoring at the BCB-2 location or an alternate site (e.g., below the proposed Low Flow Treatment Facility #1) in the December 15, 2019 annual report and begin monitoring after receiving approval of the approach from the Regional Board Executive Officer. Details for this analysis are provided in **Attachment B**. The one site included in the Del Rey Lagoon CMP (BCB-9 in **Table 5**) is also a TMDL monitoring site. The TMDL monitoring sites are listed in **Table 5** and shown on **Figure 2**. **Attachment B** provides a summary of the monitoring sites, associated attributes, and photographs.

## 2.2 MONITORED PARAMETERS AND FREQUENCY OF MONITORING

Each constituent required for monitoring by the MRP is addressed by at least one of the two types of receiving water monitoring (LTA or TMDL). Constituents for monitoring were based on the water quality priorities. A summary of constituents, which will be monitored at each of the Ballona Creek mainstem and Ballona Creek Estuary receiving water monitoring sites, is presented in **Table 6**. A summary of constituents, which will be monitored at each of the Ballona Creek tributary receiving water monitoring sites, is presented in **Table 7**. As noted in **Table 6** and **Table 7**, consistent with approach in the Permit, three wet weather monitoring events will take place annually, which is a modification from the BC Metals and Toxics CMP which stated that a maximum of 24 wet weather monitoring events would take place annually. Analytical methods, detection limits, sampling methods, and sample handling procedures are detailed in **Attachment C**. In addition, details regarding the collection of quality assurance/quality control (QA/QC) samples are outlined in **Attachment C**.

Data collected at the LTA site will be used to identify additional constituents for monitoring at other locations within the watershed. Except for constituents for which a TMDL has been established and interim compliance milestone dates have not passed[2], monitoring for a new constituent would be initiated in the Estuary (BCE_PAC), Centinela Creek (CC_CEN), and Sepulveda Channel (SC_CUL) if there are two consecutive exceedances[3] observed during the

[2] For example, the BC Bacteria TMDL final compliance date is July 15, 2021. Given the timeframe for implementation and the significant amount of implementation that will occur prior to the final compliance date (6 years), collection of bacteria data during wet weather throughout the BCWMG EWMP area at this time will not provide meaningful information upon which to make management decisions. As such, wet weather monitoring related to the BC Bacteria TMDL will be conducted at the LTA site to assess trends over time, but in no other locations at this time. The need for such information will be evaluated during EWMP and CIMP implementation and will be added in the future.

[3] Monitoring data which shows that a constituent is meeting an interim compliance milestone will not be considered an exceedance.

same condition (i.e., wet or dry weather) at the LTA site and would continue until the deactivation criterion is triggered. The deactivation criterion is two consecutive samples that do not exceed RWLs during the same condition (i.e., wet or dry weather). The same activation/deactivation criterion was utilized in the BC Metals and Toxics CMP. The two consecutive exceedance/non-exceedance activation/deactivation criteria are used to avoid the possibility of performing additional sampling to compensate for one-time events that may be a result of sampling and/or analytical error. As described in **Section 11**, data collected as part of the BCWMG CIMP will be reviewed and changes to the constituents and frequencies listed in **Table 6** and **Table 7** will be discussed in the annual report and implemented within 45 days of the event which triggers a change.

**Table 6. List of Parameters to be Monitored at Ballona Creek Mainstem and Ballona Creek Estuary Receiving Water Monitoring Sites and Annual Frequency (wet/dry)[1]**

| Parameters | Estuary | | | Reach 1 | | Reach 2 | | |
|---|---|---|---|---|---|---|---|---|
| | BCE_PAC | BCE_CUL | BCE_MCC | BC_01_WAS | BC_01_NAT | BC_02_SAW | BC_02_DUQ | BC_02_ING |
| Flow and field parameters[2] | Frequency is equal to the number of times a site is visited for monitoring | | | | | | | |
| Pollutants identified in Table E-2 of the MRP[3] and not otherwise addressed below | | | | | | 1[4]/1[4] | | |
| Total Coliform, *E. coli*, Enterococcus | 52[5] | | 52[5] | | | | | |
| *E. coli* | | | | 52[5, 6] | | | 52[5, 7] | 52[5] |
| Aquatic Toxicity and Toxicity Identification Evaluation (TIE), if necessary | | | | | | 2/1 | | |
| Hardness | | | | | 3/9 | 3/9 | | |
| Total Suspended Solids (TSS) | 3/2 | | | | 3/9 | 3/9 | | 3/0 |
| Suspended Sediment Concentration (SSC) | | | | | | | | 3/0 |
| TDS and Settleable Solids | | | | | | | | 3/0 |
| Total Organic Carbon (TOC) | | | | | | | | 3/0 |
| Suspended Sediment: Cadmium, Copper, Lead, Silver, Zinc, Chlordane[8], DDT[9], PCBs[10], and PAHs[11] | | | | | | | | 3/0 |
| Tissue: Chlordane[78], DDT[9], and PCBs[10] | Annually | | | | | | | |
| Bed Sediment: TOC, grain size, Cadmium, Copper, Lead, Silver, Zinc, Dieldrin, Chlordane[8], DDT[9], PCBs[10], and PAHs[11] | Annually | Annually | | | | | | |
| Sediment Toxicity Testing | Annually | Annually | | | | | | |
| Bioassessment | Once every 5 years | Once every 5 years | | | | | | |

| Parameters | Estuary | | | Reach 1 | | Reach 2 | | |
|---|---|---|---|---|---|---|---|---|
| | BCE_PAC | BCE_CUL | BCE_MCC | BC_01_WAS | BC_01_NAT | BC_02_SAW | BC_02_DUQ | BC_02_ING |
| Copper (total and dissolved) | 3/2 | | | | 3/9 | 3/9 | | |
| Lead (total and dissolved) | 0/2 | | | | 3/9 | 3/9 | | |
| Zinc (total and dissolved) | 3/0 | | | | 3/9 | 3/9 | | |
| Selenium (total) | | | | | | 3/2 | | |
| Cadmium (total and dissolved) | | | | | 3/0 | 3/0 | | |
| Mercury (total) | 3/2 | | | | 3/2 | 3/2 | | |
| Nickel (total and dissolved) | 0/2 | | | | | | | |
| Silver (total and dissolved) | 3/0 | | | | 3/0 | | | |
| Ammonia | | | | | | 0/2 | | |
| Dibenzo(a,h)anthracene | 0/2 | | | | | | | |
| Indeno(1,2,3-cd)pyrene | 0/2 | | | | | | | |

1. Annual frequency listed as number of wet/dry-weather events per year, respectively (e.g., 3/2 signifies three wet and two dry weather events per year).
2. Field parameters are defined as DO, pH, temperature, and specific conductivity. Flow will not be collected at sites located in the BCE. Consistent with the BC Bacteria CMP. Flow and field parameters will not be monitored during weekly bacteria monitoring events unless additional constituents are monitored at a site during the event.
3. All pollutants identified in Table E-2 of the MRP not already explicitly addressed by monitoring at this site.
4. Monitoring frequency only applies during the first year of monitoring and will be conducted during the first significant rain event of the storm year for wet weather and during the critical dry weather event for dry weather. For constituents identified in Table E-2 of the MRP that are not detected at the Method Detection Limit (MDL) or the result is below the lowest applicable water quality objective, additional monitoring will not be conducted (i.e., the monitoring frequency will become 0/0). For constituents detected above the lowest applicable water quality objective, future monitoring will be conducted at the frequency specified in the MRP (i.e., the monitoring frequency will become 3/2).
5. Monitoring frequency is weekly regardless of the weather condition.
6. Consistent with the data analysis conducted for the BC Bacteria TMDL Staff Report, a 1:1 *E. coli* to fecal coliform ratio will be used.
7. Monitoring at this site will be suspended until the end of the BC Bacteria TMDL TSO, which is December 15, 2019. A future annual report may propose to move the location of this site to an alternate site (e.g., below the proposed Low Flow Treatment Facility #1).
8. As outlined in **Attachment D**, chlordane includes analyses for the following species: alpha-chlordane, gamma-chlordane, oxychlordane, cis-Nonachlor, and trans-Nonachlor.
9. DDT includes analyses for the following species: 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
10. As outlined in **Attachment D**, PCBs includes analyses for all aroclor species when analyzed in water and the following 54 PCB congeners when analyzed in water, tissue, sediment, or suspended solids: 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209.
11. As outlined in **Attachment D**, PAHs includes analyses for the following species: acenaphthene, anthracene, biphenyl, naphthalene, 2,6-dimethylnaphthalene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, perylene, and pyrene.

**Table 7. Summary of Constituents to be Monitored at Ballona Creek Tributary Receiving Water Monitoring Sites and Annual Frequency (wet/dry)[1]**

| Constituents | Del Rey Lagoon | Benedict Canyon Channel | Centinela Creek | | Sepulveda Channel |
|---|---|---|---|---|---|
| | DRL_BCE | BCC_DUQ | CC_ING | CC_CEN | SC_CUL |
| Flow and field parameters[2] | Frequency is equal to the number of times a site is visited for monitoring | | | | |
| Total Coliform, *E. coli*, Enterococcus | 52[3] | | 52[3] | | |
| *E. coli* | | 52[3] | | | 52[3] |
| Hardness | | | | 3/9 | 3/9 |
| TSS | | | | 3/9 | 3/9 |
| SSC | | | | 3/0 | 3/0 |
| TDS and Settleable Solids | | | | 3/0 | |
| Total Organic Carbon (TOC) | | | | 3/0 | |
| Suspended Sediment: Cadmium, Copper, Lead, Silver, Zinc, Chlordane[4], DDT[5], PCBs[6], and PAHs[7] | | | | 3/0 | |
| Copper (total and dissolved) | | | | 3/9 | 3/9 |
| Lead (total and dissolved) | | | | 3/9 | 3/9 |
| Zinc (total and dissolved) | | | | 3/9 | 3/9 |
| Selenium (total) | | | | 3/2 | 3/2 |
| Cadmium (total and dissolved) | | | | 3/0 | |
| Silver (total and dissolved) | | | | 3/0 | |
| Ammonia | | | | | 0/2 |
| Indeno(1,2,3-cd)pyrene | | | | 3/0 | |
| Chrysene | | | | 3/0 | |
| Benzo(a)anthracene | | | | 3/0 | |
| Benzo(k)fluoranthene | | | | 3/0 | |

1. Annual frequency listed as number of wet-weather/dry-weather events per year, respectively (e.g., 3/2 signifies three wet weather and two dry weather events per year).
2. Field parameters are defined as DO, pH, temperature, and specific conductivity. Consistent with the BC Bacteria CMP, flow and field parameters will not be monitored during weekly bacteria monitoring events unless additional constituents are monitored at a site during the event.
3. Monitoring frequency is weekly regardless of the weather condition.
4. As outlined in **Attachment D**, chlordane includes analyses for the following species: alpha-chlordane, gamma-chlordane, oxychlordane, cis-Nonachlor, and trans-Nonachlor.
5. DDT includes analyses for the following species: 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
6. As outlined in **Attachment D**, PCBs includes analyses for the following all aroclor species when analyzed in water and the following 54 PCB congeners when analyzed in water, tissue, sediment, or suspended solids: 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209. The selected PCBs were identified from a variety of sources including the CTR, California Sediment Quality Objectives, and the BIGHT 2013 study.

7. As outlined in **Attachment D**, PAHs includes analyses for the following species: acenaphthene, anthracene, biphenyl, naphthalene, 2,6-dimethylnaphthalene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, perylene, and pyrene as these are the PAHs identified in the California Sediment Quality Objectives.

## 2.3 WEATHER CONDITIONS

Monitoring will occur during dry and wet conditions. Dry weather is defined in the MRP as when the flow of the receiving waterbody is less than 20 percent greater than the base flow or, in the case of an estuary, on days with less than 0.1 inch of rain and those days not less than three days after a rain event of 0.1 inch or greater within the watershed, as measured from at least 50 percent of Los Angeles County Department of Public Works (LACDPW) controlled rain gauges within the watershed. Wet weather conditions are defined in the MRP as when the receiving waterbody has flow that is at least 20 percent greater than its base flow or, in the case of an estuary, during a storm event of greater than or equal to 0.1 inch of precipitation. TMDLs within the Ballona Creek watershed have defined wet weather as when the maximum daily flow rate is equal to or greater than 64 cubic feet per second (cfs) and dry weather as below 64 cfs at the Sawtelle Blvd flow gauge. As such, for the purposes of this CIMP, weather conditions will be defined as follows:

- **Dry Weather:** When the flow of the receiving waterbody is less than 64 cfs at the Sawtelle Blvd flow gauge[4] **and** when there is less than 0.1 inch of rain in the previous three days.
- **Wet Weather:** When the flow of the receiving waterbody is equal to or greater than 64 cfs at the Sawtelle Blvd flow gauge[5] **and** when there is at least 0.1 inch of rain during the targeted storm event.

Note that if rainfall begins after dry weather monitoring has been initiated, then dry weather monitoring will be suspended and continued on a subsequent day when weather conditions meet the dry weather conditions. Generally, grab samples will be collected during dry weather and composite samples will be collected during wet weather. Grab samples will be used for dry weather sampling events because the composition of the receiving water will change less over time; and thus, the grab sample can sufficiently characterize the receiving water. Grab samples during dry weather are consistent with similar programs within the region. However, to sufficiently characterize the receiving water during wet weather, composite samples will generally be used for wet weather sampling events. Grab samples may be utilized to collect wet weather sampling in certain situations, which may include, but are not limited to, when the constituent of interest requires the use of grab samples (e.g., *E. coli* and oil and grease), situations where it is unsafe to collect composite samples, or to perform investigative monitoring where composite sampling or installation of an automatic sample compositor (autosampler) may not be warranted. For safety purposes, when wet weather grab sampling is conducted, samples may be taken from slightly upstream or downstream of the designated monitoring location.

The MRP includes specific criteria for the time of monitoring events. With the exception of bacteria and metals monitoring, most constituents will be monitored during two dry weather monitoring events. For dry weather toxicity monitoring, sampling must take place during the historically driest month. As a result, the dry weather monitoring event that includes toxicity

[4] The wet weather flow trigger for an individual receiving water monitoring location may be set to 20% above the base dry weather flow at that site.
[5] *Ibid.*

monitoring will be conducted in July. The second dry weather monitoring event will take place during January unless sampling during another month is deemed to be necessary or preferable.

All reasonable efforts will be made to monitor the first significant rain event of the storm year (first flush). The targeted storm events for wet weather sampling will be selected based on a reasonable probability that the events will result in substantially increased flows in Ballona Creek over at least 12 hours; however, it may be necessary to target smaller storms in some instances. Sufficient precipitation is needed to produce runoff and increase flow. The decision to sample a storm event will be made in consultation with weather forecasting information services after a quantitative precipitation forecast (QPF) has been determined. All efforts will be made to collect wet weather samples from all sites during a single targeted storm event. However, safety or other factors may make it infeasible to collect some or all samples from a given storm event. For example, storm events that will require field crews to collect wet weather samples during holidays and/or weekends may not be sampled due to sample collection or laboratory staffing constraints. As specified in Attachment E of the MRP Part VIII.C, samples shall be collected for the entire storm water discharge if it is less than 24 hours.

Additional information to support evaluating weather conditions and targeting wet weather sampling events is provided in **Attachment C**.

## 2.4 MONITORING COORDINATION

This CIMP is written to outline the monitoring requirements to assess the BCWMG MS4 Permit requirements. Coordination with other monitoring programs may occur in the future, where data from other programs may be used to fulfill or supplement BCWMG data.

## 2.5 RECEIVING WATER MONITORING SUMMARY

A summary of how the receiving water monitoring program meets the intended objectives of the receiving water monitoring program outlined in Part II.E.1 of the MRP is presented in **Table 8**. The schedule for implementing receiving water monitoring is presented in **Section 13**.

**Table 8. Summary of Receiving Water Monitoring Program Objectives**

| MRP Objective | CIMP Component Meeting Objective |
|---|---|
| Determine whether the RWLs are being achieved. | • Thirteen (13) total receiving water monitoring sites.<br>• Receiving water monitoring sites located as required by TMDLs.<br>• Constituents added for monitoring based on the water quality priorities (i.e., the constituents at the highest risk of exceeding RWLs). |
| Assess trends in pollutant concentrations over time, or during specified conditions. | • Monitoring at previously monitored mass emission station to be continued.<br>• Monitoring at all previously monitored water quality TMDL receiving water monitoring sites to be continued, with one exception to avoid duplicative efforts.<br>• Monitoring at previously monitored sediment and bioassessment TMDL receiving water monitoring sites with longest historical record to be continued.<br>• Monitoring at previously monitored storm-borne sediment receiving water monitoring sites to be continued.<br>• Weekly bacteria monitoring at eight (8) receiving water monitoring sites.<br>• Monitoring during dry weather and wet weather at frequency specified in the MRP.<br>• Constituents added for monitoring based on the water quality priorities. |
| Determine whether the designated beneficial uses are fully supported as determined by water chemistry, as well as aquatic toxicity and bioassessment monitoring. | • At least one monitoring site located in each waterbody specified in the Basin Plan.<br>• Aquatic toxicity monitoring to be conducted during dry and wet weather.<br>• Bioassessment, aquatic toxicity, and water and sediment chemistry monitoring to be conducted in the Ballona Creek Estuary.<br>• Constituents added for monitoring based on the water quality priorities. |

# 3 MS4 Infrastructure Database

To meet the requirements of Part VII.A of the MRP, a map(s) and/or database of the MS4's storm drains, channels, and outfalls must be submitted with this CIMP and include detailed information (as described in the Permit, page E20-21). Each year, the map and associated database are required to be updated to incorporate the most recent characterization data for outfalls with significant NSW discharge.

The NSW Outfall Program requires the development of an MS4 outfall database by the time that this CIMP is submitted. The objective of the MS4 database is to geographically link the characteristics of the outfalls within the BCWMG EWMP area with watershed characteristics including: subwatershed, waterbody, land use, and effective impervious area. The information will be compiled into geographic information systems (GIS) layers as described in the following subsections.

## 3.1 AVAILABLE INFORMATION

A GIS database was submitted concurrently with this CIMP and contains the elements described in **Table 9**. Given that the BCWMG is continually gathering information and that the information being gathered is continually being imported into the BCWMG's GIS layers, **Table 9** represents a snapshot of the elements that are available at the date of submittal of this CIMP.

**Table 9. MS4 Database Elements Submitted with CIMP**

| Permit Requirement | Database Element | Submitted |
|---|---|---|
| VII.A.1 | Surface water bodies within the BCWMG jurisdictions. | X |
| VII.A.2 | Watershed (HUC-12) boundary. | X |
| VII.A.3 | Land use overlay. | X |
| VII.A.5 | Jurisdictional boundaries. | X |
| VII.A.6 | The location and length of all open channel and underground pipes 18 inches in diameter or greater (with the exception of catch basin connector pipes). | X |
| VII.A.7 | The location of all dry weather diversions. | X |
| VII.A.8 | The location of all major MS4 outfalls within the Permittee's jurisdictional boundary. Each major outfall shall be assigned an alphanumeric identifier, which must be noted on the map. | X(1) |
| VII.A.10 | Storm drain outfall catchment areas for each major outfall within the Permittee(s) jurisdiction. | X(2) |
| Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include: | | |
| VII.A.11.a | Ownership | X |
| VII.A.11.b | Coordinates | X |
| VII.A.11.c | Physical description | X |

1. All outfalls greater than 36 inches have been defined. Outfalls that are considered "major" for other reasons as identified in the Permit (see Permit Attachment A page A-11 for complete definition of major outfalls) have not been defined at this time. The database will be updated as information is developed.
2. Storm drain outfalls were linked in the database to the modeling subwatersheds to provide information on the contributing areas. Detailed analysis of storm drain outfall catchment areas will be developed as described in **Table 10**.

## 3.2 PENDING INFORMATION AND SCHEDULE FOR COMPLETION

The elements described in **Table 10** represent pending information that is primarily expected to be an outcome of implementing the NSW Outfall Program as noted in the **Table 10** footnotes. As such, a schedule for completing each of the elements is provided. As the data become available, they will be entered into the GIS and water quality databases. Each year, the storm drains, channels, outfalls, and associated databases will be updated to incorporate the most recent characterization data for outfalls with significant NSW discharge. The updates will be included as part of the annual reporting to the Regional Board.

**Table 10. MS4 Database Elements to Be Developed**

| Permit Requirement | Database Element | To Be Developed | Date of Submission |
|---|---|---|---|
| VII.A.4 | Effective Impervious Area (EIA) overlay (if available). | X | As Available |
| VII.A.9 | Notation of outfalls with significant NSW discharges (to be updated annually). | X(1) | December 2015 |
| VII.A.10 | Detailed analysis of storm drain outfall catchment areas for any new outfall monitoring locations, outfalls identified as having significant NSW discharges, and outfalls addressed by structural BMPs. | X(2) | Ongoing |
| Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include: | | | |
| VII.A.11.d | Photographs of the outfall, where possible, to provide baseline information to track operation and maintenance needs over time | X(3) | December 2015 |
| VII.A.11.e | Determination of whether the outfall conveys significant NSW discharges. | X(1) | December 2015 |
| VII.A.11.f | Stormwater and non-stormwater monitoring data | X(4) | Ongoing |

1. The determination of significant will be made after the initial screening process outlined in this CIMP is completed using the criteria presented in **Section 5.2**.
2. Storm drain outfalls were linked in the database to the modeling subwatersheds to provide information on the contributing areas. Detailed analysis of storm drain outfall catchment areas for the stormwater outfall monitoring sites have been developed and additional detailed analysis for any new outfall monitoring locations, outfalls identified as having significant NSW discharges, and outfalls addressed by structural BMPs will be conducted as needed.
3. These data will be gathered as part of the screening and monitoring program and will be added to the database as they are gathered.
4. These data will be gathered as part of the screening and monitoring program and will be added to a separate water quality database as they are gathered.

# 4 Stormwater Outfall Monitoring

As outlined in the MRP (Part VIII.A of the MRP), stormwater discharges from the MS4 shall be monitored at outfalls and/or alternative access points such as manholes or in channels representative of the land uses within the Permittee's jurisdiction to support meeting the three objectives of the stormwater outfall based monitoring program:

a. Determine the quality of a Permittee's discharge relative to municipal action levels, as described in Attachment G of MS4 Permit;
b. Determine whether a Permittee's discharge is in compliance with applicable WQBELs derived from TMDL WLAs; and
c. Determine whether a Permittee's discharge causes or contributes to an exceedance of RWLs.

## 4.1 STORMWATER OUTFALL MONITORING SITES

Three stormwater outfall monitoring sites were selected for the BCWMG EWMP area with one site located in each of the three major waterbodies (Ballona Creek, Sepulveda Channel, and Centinela Creek). The sites were selected based on an evaluation of the land uses draining to the outfall location, the jurisdictions draining to the outfall location (with an emphasis placed on receiving drainage from as many jurisdictions as possible), the safety and accessibility of the site, and the ability to use autosampler equipment at the location. The primary criterion for selecting the monitoring sites was the representativeness of the land uses within the estimated outfall catchment area as compared to the BCWMG EWMP area as a whole. The selected sites are representative of the land uses within the BCWMG EWMP area as shown in **Table 13**. The data collected at the monitored outfalls will be considered representative of all MS4 discharge within the EWMP area. The resulting data will be applied to all BCWMG members represented by the site, regardless of whether a site is located within a particular jurisdiction. Because of this approach, evaluation of whether BCWMG members caused or contributed to exceedances of WQBELs and/or RWLs may be based on comingled discharges or data not collected within a given jurisdiction.

A "representative" approach to characterizing stormwater discharges is used rather than selecting individual sites for each jurisdiction. The "representative" approach provides the level of information necessary to support management decisions and evaluate whether MS4 discharges cause or contribute to exceedances. The "representative" approach also allows for a coordinated approach aimed at assessing inter-event variability (e.g., for different storm events) in stormwater discharge quality which is much greater than the variability between individual outfall drainages or major land uses. Based on stormwater monitoring results from other programs in California, discharge quality from drainages with similar mixed land uses is not substantially different. Furthermore, due to the high variability in discharge quality at any given site during wet weather, it will be impossible to distinguish statistically between drainages. As such, given the high variability typical of stormwater pollutant levels, and with only a few storm events that can be collected per year given climatic conditions, it will not be possible to make *meaningful* distinctions between drainages, either within land use types, across land use types, or between jurisdictions. Management implementation by the Permittees is also expected to be

relatively consistent throughout the watershed, so additional focus on geographic differences is not necessary. This means that only a handful of sites are needed to adequately characterize residential land use discharge quality within the watershed. Realistically achievable changes in stormwater runoff quality or loads (e.g., 20–50% reductions) are statistically demonstrable only over relatively long periods of time (≥10 years). The approach to monitor one outfall for each major waterbody will provide the representative data needed to meet the specific MRP objectives for stormwater outfall monitoring and support management decisions of the BCWMG. Additional monitoring sites will not provide significant improvements in representation or characterization of discharge quality, or additional information for discharge quality management. For additional details on the analysis to support the approach to one site per major waterbody, please see **Attachment B**.

Summary information for the three stormwater outfall monitoring sites is presented in **Table 11** and the locations are shown on **Figure 3**. **Table 12** identifies the outfalls which would be considered representative of each of the BCWMG members. Additionally, **Table 12** identifies the receiving waters to which the outfall sites may be considered applicable. That is, if an exceedance was observed in a receiving water, the outfall data would be reviewed to determine if an individual BCWMG member caused or contributed to the exceedance.

**Attachment B** presents additional details of the sites. Additionally, alternate sites are identified in **Attachment B** in the event the primary sites are not accessible, are determined to backflow during high flow conditions to the extent that a representative sample cannot be obtained, or are unsafe for sampling. For all three stormwater outfall monitoring sites, if determined to be preferable, sampling may occur at a manhole located upstream of each of the location where the outfall discharges to a receiving water.

**Table 11. Stormwater Outfall Monitoring Sites**

| Site Characteristic | Waterbody The Outfall Directly Discharges To | | |
|---|---|---|---|
| | **Ballona Creek** | **Sepulveda Channel** | **Centinela Creek** |
| **Site Name** | BC_SW_FAI | SC_SW_WAS | CC_SW_LAC |
| **Jurisdiction Where Site is Located** | City of Los Angeles | Culver City | Inglewood |
| **Jurisdictions Discharging to Site** | City of Los Angeles, West Hollywood | City of Los Angeles, Culver City | City of Los Angeles, County of Los Angeles, Inglewood |
| **Drain Name** | BI 0054 –Pico Blvd | BI 0425 Line G - S Culver City | BI 0273 – BI 0443 U1 |
| **Size** | 136 inches | 66 inches | 186 inches |
| **Shape** | Rectangular | Round | Rectangular |
| **Material** | Reinforced Concrete Box | Reinforced Concrete Pipe | Reinforced Concrete Box |
| **Latitude** | 34.03825 | 33.99986 | 33.96777 |
| **Longitude** | -118.36910 | -118.41757 | -118.37057 |

**Table 12. BCWMG Member Represented by Each Stormwater Outfall Monitoring Site[1], [2]**

| Jurisdiction | Site | Ballona Creek | | | Tributaries | |
|---|---|---|---|---|---|---|
| | | Estuary | Reach 2 | Reach 1 | Sepulveda Channel | Centinela Creek |
| Beverly Hills | BC_SW_FAI | X | X | X(D) | | |
| City of Los Angeles | BC_SW_FAI | X | X | X(D) | | |
| | CC_SW_LAC | X | | | | X(D) |
| | SC_SW_WAS | X | X | | X(D) | |
| County of Los Angeles | CC_SW_LAC | X | | | | X(D) |
| Culver City | SC_SW_WAS | X | X | X | X(D) | X |
| Inglewood | CC_SW_LAC | X | | | | X(D) |
| Santa Monica | SC_SW_WAS [3] | X | X | | X(D) | |
| West Hollywood | BC_SW_FAI | X | X | X(D) | | |

1. Jurisdiction either discharges directly or indirectly to waterbody. A direct discharge indicates that an outfall that receives drainage from a jurisdiction discharges directly into the waterbody. An indirect discharge indicates that flow from a jurisdiction is discharged upstream of the waterbody. An X(D) represents the waterbody the outfall directly discharges to.
2. If an exceedance is observed in a waterbody, the paired data collected from the drains discharging directly and/or indirectly to the waterbody will be used to assess whether the BCWMG member caused or contributed to the exceedance.
3. Could be replaced by a more representative site from the Santa Monica Bay CIMP which has identified a monitoring site that likely provides a more representative characterization of the City of Santa Monica's stormwater discharges.

**Table 13. Land Use Summary for Drainage Areas of Major Waterbodies and Corresponding Stormwater Outfall Monitoring Sites (Percent of Drainage Area)**

| Drainage | Percent Land Use[1] | | | | |
|---|---|---|---|---|---|
| | Res | Com | Ind | Ag/Nur | Open |
| EWMP Area | 71% | 20% | 5% | <1% | 4% |
| Ballona Creek (upstream of LTA site) | 71% | 22% | 4% | <1% | 3% |
| BC_SW_FAI | 76% | 19% | 3% | <1% | 2% |
| Sepulveda Channel | 65% | 24% | 2% | <1% | 9% |
| SC_SW_WAS | 86% | 14% | <1% | <1% | <1% |
| Centinela Creek | 62% | 21% | 12% | <1% | 6% |
| CC_SW_LAC | 68% | 14% | 14% | <1% | 5% |

1. Land use classifications include: residential (Res), commercial and industrial (Com/Ind), agriculture and nursery (Ag/Nur), and open space (Open). Totals correspond to the percent of the total area considered in the EWMP.

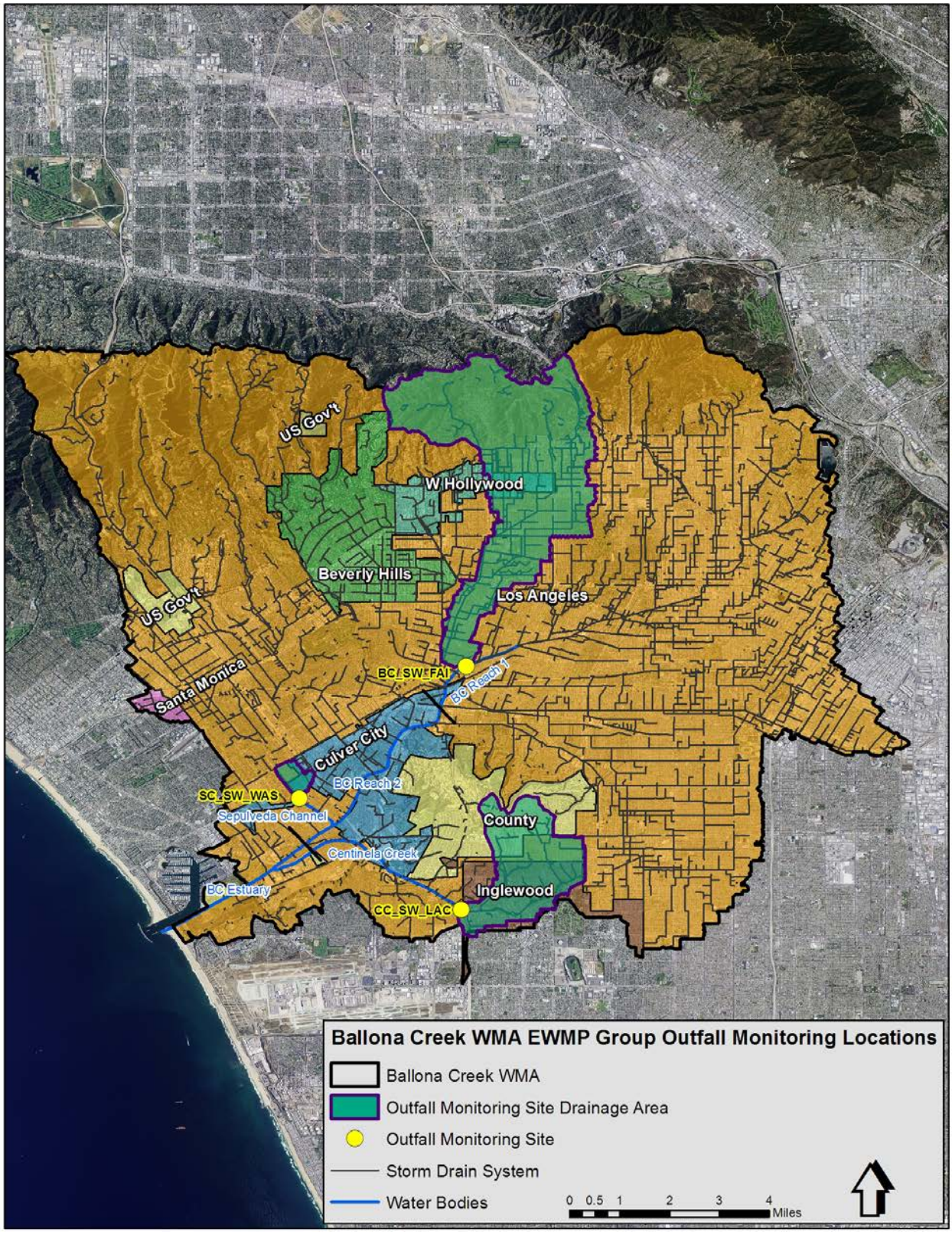


**Figure 3. Stormwater Outfall Monitoring Locations Overview**

## 4.2 MONITORED PARAMETERS AND FREQUENCY

The requirements for parameters to be monitored are outlined in the Part VIII.B.1.c of the MRP. Parameters that will be monitored during three events at each stormwater outfall monitoring site are presented in **Table 14** and are based on the monitoring requirements of the waterbody to which they discharge, as well as downstream waterbodies. This list was generated from the current list of constituents monitored during wet weather in the receiving waters and will be updated as the constituents monitored during wet weather in the waterbody to which they discharge, as well as downstream waterbodies, are updated and/or changed based upon the data collected at the individual outfall site. Outfalls will be monitored for all required constituents except toxicity. Toxicity monitoring will occur when triggered by receiving water toxicity monitoring and Toxicity Identification Evaluation (TIE) results. Wet weather events for stormwater outfall monitoring will occur simultaneously with receiving water monitoring to the extent possible. To be consistent with receiving water monitoring, stormwater outfall monitoring will consist of collecting composite samples (except in certain situations as described in **Section 2.3**). Wet weather conditions for targeted storm events are described in **Section 2.3** and **Attachment C**. Analytical methods, detection limits, sampling methods, sample handling procedures, and details regarding the collection of QA/QC samples are detailed in **Attachment C**.

**Table 14. List of Parameters for Stormwater Outfall Monitoring**

| Parameters[1] | Receiving Water to Which Outfall is Discharging | | |
|---|---|---|---|
| | Ballona Creek | Centinela Creek | Sepulveda Channel |
| Flow, hardness, pH, dissolved oxygen, temperature, and specific conductivity | X | X | X |
| Table E-2 pollutants of the MRP detected above relevant objectives and not otherwise addressed below | X | X | X |
| *E. coli* | X | X | X |
| TSS | X | X | X |
| SSC | X | X | X |
| TDS | X | | X |
| Settleable Solids | X | | X |
| Chlordane[2] | X | X | X |
| DDTs[2] | X | X | X |
| PCBs[2] | X | X | X |
| PAHs[2] | X | X | X |
| Copper (total and dissolved) | X | X | X |
| Lead (total and dissolved) | X | X | X |
| Zinc (total and dissolved) | X | X | X |
| Mercury (total) | X | X | X |
| Cadmium (total and dissolved) | X | X | X |
| Silver (total and dissolved) | X | X | X |
| Indeno(1,2,3-cd)pyrene | | X | |
| Chrysene | | X | |
| Benzo(a)anthracene | | X | |

| Parameters[1] | Receiving Water to Which Outfall is Discharging | | |
|---|---|---|---|
| | Ballona Creek | Centinela Creek | Sepulveda Channel |
| Benzo(k)fluoranthene | | X | |

1. As described in **Section 11**, data collected as part of this CIMP will be reviewed and changes to the constituents and frequencies as a result of exceedances in the receiving waters or as a result of toxicity testing will be discussed in the annual report and implemented starting no later than the first CIMP event of the next monitoring year (i.e., the first event after July 1 of the year following the annual report submittal).
2. See **Table 6** for a summary of the constituents that comprise chlordane, DDTs, PCBs, and PAHs.

## 4.3 STORMWATER OUTFALL MONITORING SUMMARY

A summary of how the stormwater outfall monitoring program meets the intended objectives of the stormwater outfall monitoring program outlined in Part VIII.A of the MRP is presented in **Table 15**. The schedule for implementing stormwater outfall monitoring is presented in **Section 13**.

**Table 15. Summary of Stormwater Outfall Monitoring Program Objectives**

| MRP Objective | CIMP Component Meeting Objective |
|---|---|
| Determine the quality of a Permittee's discharge relative to municipal action levels, as described in Attachment G of MS4 Permit. | • Stormwater outfall monitoring sites chosen using a representative land use approach.<br>• Stormwater outfall monitoring sites chosen to be representative of entire BCWMG EWMP area.<br>• Extensive list of constituents being collectively monitored at stormwater outfall monitoring sites. |
| Determine whether a Permittee's discharge is in compliance with applicable WQBELs derived from TMDL WLAs. | • Stormwater outfall monitoring sites located in waterbodies with applicable WQBELs.<br>• Stormwater outfall monitoring sites chosen using a representative land use approach.<br>• List of constituents based on the water quality priorities which includes constituents with WQBELs derived from TMDL WLAs. |
| Determine whether a Permittee's discharge causes or contributes to an exceedance of RWLs. | • One stormwater outfall monitoring site located in each waterbody.<br>• Monitoring frequency equal to receiving water monitoring frequency to enable determination of whether the Permittee's discharge is causing or contributing to any observed exceedances of water quality objectives in the receiving water.<br>• Stormwater outfall monitoring sites chosen using a representative land use approach.<br>• List of constituents based on the monitoring requirements of the waterbody to which they discharge, as well as downstream waterbodies. |

# 5 Non-Stormwater Outfall Program

The objectives of the NSW Outfall Program include the following (Part II.E.3 of the MRP):

a. Determine whether a Permittee's discharge is in compliance with applicable NSW WQBELs derived from TMDL WLAs;
b. Determine whether a Permittee's discharge exceeds NSW action levels, as described in Attachment G of the MS4 Permit;
c. Determine whether a Permittee's discharge contributes to or causes an exceedance of RWLs; and
d. Assist a Permittee in identifying illicit discharges as described in Part VI.D.10 of the MS4 Permit.

Additionally, the outfall screening and monitoring process is intended to meet the following objectives (Part IX.A of the MRP):

1. Develop criteria or other means to ensure that all outfalls with significant NSW discharges are identified and assessed during the Permit term.
2. For outfalls determined to have significant NSW flow, determine whether flows are the result of illicit connections/illicit discharges (IC/IDs), authorized or conditionally exempt NSW flows, natural flows, or from unknown sources.
3. Refer information related to identified IC/IDs to the IC/ID Elimination Program (Part VI.D.10 of the Permit) for appropriate action.
4. Based on existing screening or monitoring data or other institutional knowledge, assess the impact of NSW discharges (other than identified IC/IDs) on the receiving water.
5. Prioritize monitoring of outfalls considering the potential threat to the receiving water and applicable TMDL compliance schedules.
6. Conduct monitoring or assess existing monitoring data to determine the impact of NSW discharges on the receiving water.
7. Conduct monitoring or other investigations to identify the source of pollutants in NSW discharges.
8. Use results of the screening process to evaluate the conditionally exempt NSW discharges identified in Parts III.A.2 and III.A.3 of the Permit and take appropriate actions pursuant to Part III.A.4.d of the Permit for those discharges that have been found to be a source of pollutants. Any future reclassification shall occur per the conditions in Parts III.A.2 or III.A.6 of the Permit.
9. Maximize the use of Permittee resources by integrating the screening and monitoring process into existing or planned CIMP efforts.

## 5.1 NON-STORMWATER OUTFALL SCREENING AND MONITORING PROGRAM

The NSW Outfall Program is focused on NSW discharges to receiving waters from major outfalls (i.e., discharges occurring during dry weather). The NSW Outfall Program is designed to

be complimentary to the individual BCWMG members IC/ID programs, established under Part VI.D.10 of the Permit.

In summary, the intent of the NSW Outfall Program is to demonstrate that the Permittees are effectively prohibiting NSW discharges that are not exempt or conditionally exempt discharges to receiving waters and to assess whether NSW discharges are causing or contributing to exceedances of RWLs. By detecting, identifying, and eliminating illicit discharges, the NSW Outfall Program will demonstrate Permittees' efforts to effectively prohibit NSW discharges to and from the MS4. Where NSW discharges are deemed "significant", the program will discern whether they are illicit, exempt, or conditionally exempt, and demonstrate whether the discharges may be causing or contributing to exceedances of RWLs.

For the receiving water and stormwater outfall monitoring programs, sufficient information is available, including guidance from the MRP, to support the identification of sites and begin the process of initiating water quality monitoring upon approval of this CIMP. For the NSW Outfall Program, the MRP specifies a process for screening, investigating, and ultimately monitoring. The outfall screening and investigation is intended to be completed prior to initiating monitoring for all constituents of interest at an individual outfall. A summary of the approach to address the required elements of the NSW Outfall Program is presented in **Table 16**. **Figure 4** presents a NSW Outfall Program flow diagram. Detailed discussion of each element is provided in the following subsections.

The water quality priorities and corresponding receiving water conditions were used to establish an approach for the NSW Outfall Program to ensure that, if actions must be taken at a storm drain, there is a corresponding water quality issue in the receiving water. Based on a review of the available information, *E. coli* was identified as the water quality priority that appears to be most appropriate to use when determining the significance of a NSW discharge for the following reasons:

1. Of the constituents addressed by TMDLs for which WQBELs and RWLs were incorporated into the Permit, *E. coli* consistently exceeds RWLs and the final dry weather compliance date for the BC Bacteria TMDL has passed. Metals appear to consistently meet the dry weather RWLs. All other TMDL related WQBELs and RWLs are primarily associated with wet weather discharges.
2. The BC Bacteria TMDL requires Permittees to conduct outfall monitoring.

Although the initial focus of the NSW Outfall Program will be on supporting and integrating the requirements with the BC Bacteria TMDL, this approach will consider the broader requirements of the Permit. Additionally, the NSW Outfall Program will likely be modified over time to reflect changing priorities within the BCWMG EWMP area.

**Table 16. Summary of the NSW Outfall Program Elements**

| Element | Description | Timing of Completion Identified in the Permit MRP |
|---|---|---|
| 1. Outfall Screening | Because data required to implement the NSW Outfall Program are not available, the Permittees will implement a screening process to determine which outfalls exhibit significant NSW discharges and those that do not require further investigation. | Prior to initiating source investigations. |
| 2. Identification of outfalls with significant NSW discharge (Part IX.C of the MRP) | Based on data collected during the Outfall Screening process, Permittees will identify MS4 outfalls with significant NSW discharges. | |
| 3. Inventory of Outfalls with NSW discharge (Part IX.D of the MRP) | Permittees will develop an inventory of major MS4 outfalls with known significant NSW discharges and those requiring no further assessment. | |
| 4. Prioritized source investigation (Part IX.E of the MRP) | The Permittees will use the data collected as part of the Outfall Screening process to prioritize outfalls for source investigations. | |
| 5. Identify sources of significant NSW discharges (Part IX.F of the MRP) | For outfalls exhibiting significant NSW discharges, the Permittees will perform source investigations per the established prioritization. | Source investigations will be conducted for 25% of the outfalls with significant NSW discharges by December 28, 2015 and 100% by December 28, 2017. |
| 6. Monitoring NSW discharges exceeding criteria (Part IX.G of the MRP) | Using the information collected during screening and source investigation efforts, the Permittees will monitor outfalls that have been determined to convey significant NSW discharges comprised of either unknown or non-essential conditionally exempt NSW discharges, or continuing discharges attributed to illicit discharges. | Monitoring will commence within 90 days of completing the source investigations or after this CIMP has been approved by the Regional Board Executive Officer, whichever is later. |

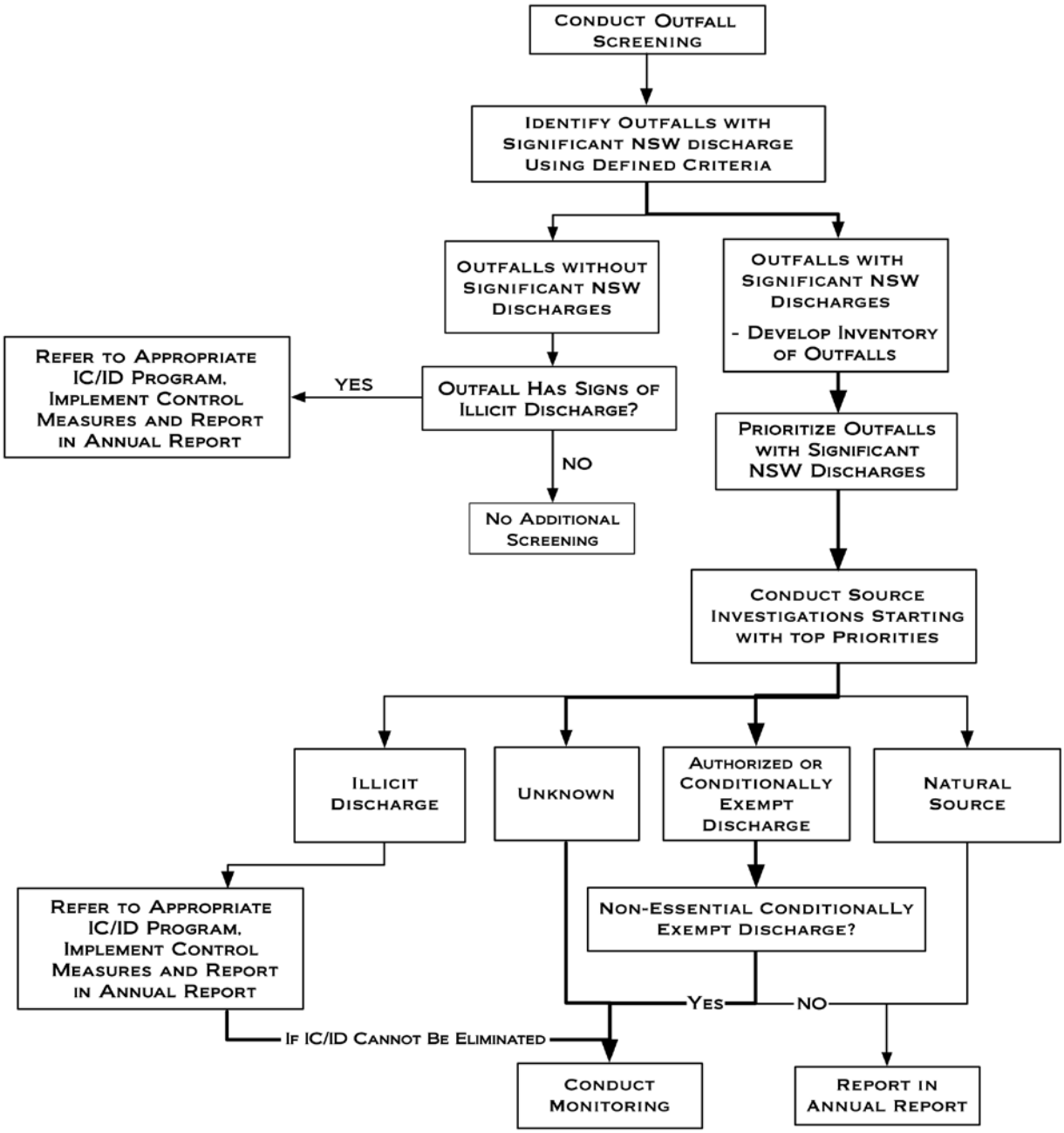


**Figure 4. NSW Outfall Program Flow Diagram**

## 5.2 IDENTIFICATION OF OUTFALLS WITH SIGNIFICANT NON-STORMWATER DISCHARGES

The data necessary to identify significant NSW discharges are not available at this time. Thus, outfall screening is necessary to collect the information to identify major outfalls exhibiting significant NSW discharges and develop the information needed for the inventory of outfalls with significant NSW discharges. The MRP (Part IX.C.1) states that other characteristics, as determined by the Permittee and incorporated within the screening program, may be used to determine significant NSW discharges. Data will be collected during the Outfall Screening

process to focus efforts on discharges that have, or the potential to have, an impact on receiving waters. For the reasons stated above (i.e., *E. coli* consistently exceeds RWLs, the final dry weather compliance date for the BC Bacteria TMDL has passed, and the BC Bacteria TMDL requires Permittees to conduct outfall monitoring), *E. coli* loading will serve as the primary characteristic for determining significant NSW discharges. **Table 17** presents the components of the Outfall Screening process and the characteristics that will be utilized to determine the outfalls with significant NSW discharges.

**Table 17. Approach for Establishing an Outfall Screening Process Utilizing *E. coli* Loading as the Key Characteristic for Determining Significant Non-Stormwater Discharges**

| Component | Description |
|---|---|
| **Characteristics for Defining Significant NSW Discharges** | In June 2012, a three-day field effort ("recon") was conducted along Ballona Creek and Sepulveda Channel to document the locations and bacteriological water quality of dry weather discharges. During the recon event, a total of 34 sites were sampled, and another 40 sites were surveyed. The recon event revealed that the highest-ranked sites, in terms of *E. coli* loading rate, represented 93% of the load from all 74 sites surveyed. The information from the recon indicates that using the 10% threshold captures an overwhelming majority of the loading. As a result, the top 10% of the ranked outfalls will be determined to be significant NSW discharges. Before calculating the ranking score, the following two aspects of the discharge will be considered for the discharge:<br>o Does the NSW discharge reach the receiving water during dry weather? If yes, continue through the ranking criteria.<br>o Is the *E. coli* concentration in the NSW discharge above receiving water limits? If yes, continue through the ranking criteria.<br>In addition, until the end of the BC Bacteria TMDL TSO, which is December 15, 2019, the following aspect of the discharge will also be considered before calculating the ranking score:<br>o Is the NSW discharge located downstream of all planned implementation measures (i.e., TSO projects)? If yes, continue through the ranking criteria.<br>The ranking score is calculated as the sum of the two ranking criteria in **bold**:<br>o ***E. coli* loading rate:** for each outfall monitored during the Outfall Screening process, the average *E. coli* loading rate from two outfall surveys will be calculated. The average *E. coli* loading rates from all outfalls will be ranked from highest to lowest. A ranking score will be applied to each outfall based on the deciles (10th percentile, 20$^{th}$ percentile, etc.,) of its average *E. coli* loading rate.<br>o ***Number of dry weather exceedance days at the nearest downstream receiving water site:*** a ranking score will also be applied to outfalls based on the number of dry weather exceedance days exhibited at the nearest downstream receiving water site. The total number of dry weather (summer dry and winter dry) exceedance days during the Outfall Screening process will be used. Each receiving water site will be ranked from highest to lowest based on the total number of exceedance days. |
| **Data Collection** | Data that will be collected include accurate flow measurements and *E. coli* concentration. Additionally, the information needed to complete the inventory as described in **Section 5.3** will be collected. |
| **Frequency** | Twice as part of the initial screening process and one rescreening during the re-assessment (per Part IX.B.2 of the MRP) of the NSW program which will occur prior to December 28, 2017. The planned date for the outfall rescreening will be determined by the BCWMG and included in the Annual Report (along with any program changes identified from the re-assessment). |

## 5.3 INVENTORY OF MS4 OUTFALLS WITH NON-STORMWATER DISCHARGES

An inventory of MS4 outfalls will be developed identifying those outfalls with known significant NSW discharges and those requiring no further assessment (Part IX.D of the MRP). If the MS4 outfall requires no further assessment, the inventory will include the rationale for the determination of no further action required. Potential rationale for a determination of no further action could include: 1) the outfall does not have flow; 2) the outfall does not have a known significant NSW discharge; or 3) discharges observed were determined to be exempted. The inventory will be recorded in the database required in Part VII.A of the MRP. Each year, the inventory will be updated to incorporate the most recent characterization data for outfalls with significant NSW discharges.

The following physical attributes of outfalls with significant NSW discharges will be included in the inventory and will be collected as part of the Outfall Screening process:

a. Date and time of last visual observation or inspection
b. Outfall alpha-numeric identifier
c. Description of outfall structure including size (e.g., diameter and shape)
d. Description of receiving water at the point of discharge (e.g., natural, soft-bottom with armored sides, trapezoidal, concrete channel)
e. Latitude/longitude coordinates
f. Nearest street address
g. Parking, access, and safety considerations
h. Photographs of outfall condition
i. Photographs of significant NSW discharge (or indicators of discharge) unless safety considerations preclude obtaining photographs
j. Estimation of discharge rate
k. All diversions either upstream or downstream of the outfall
l. Observations regarding discharge characteristics such as turbidity, odor, color, presence of debris, floatables, or characteristics that could aid in pollutant source identification.

## 5.4 PRIORITIZED SOURCE IDENTIFICATION

Once the major outfalls exhibiting significant NSW discharges have been identified through the Outfall Screening process and incorporated into the inventory, Part IX.E of the MRP requires that the Permittees prioritize the outfalls for further source investigations.

Once the prioritization is completed, a source identification schedule will be developed. The schedule will focus on the outfalls with the highest ranking scores first and ensure that source investigations are completed on no less than 25% of the outfalls with significant NSW discharges by December 28, 2015 and 100% by December 28, 2017.

As the approach for identifying significant NSW discharges already focuses on ranking outfalls based upon each outfall's individual ranking score, the following prioritization criteria will be utilized initially and may be revised as priorities in the EWMP area change:

1. Outfalls with the highest ranking score based on considerations related to *E. coli*.
2. Outfalls for which monitoring data exist and indicate recurring exceedances of one or more of the NSW Action Levels identified in Attachment G of the Permit.

## 5.5 SIGNIFICANT NON-STORMWATER DISCHARGE SOURCE IDENTIFICATION

As described in the Fact Sheet for the Permit, the screening and source identification components of the program are used to identify the source(s) and point(s) of origin of the NSW discharge. Based on the prioritized list of major outfalls with significant NSW discharges, investigations must be conducted to identify the source(s) or potential source(s) of non-stormwater flows.
Part IX.A.2 of the MRP requires Permittees to classify the source investigation results into one of four endpoints outlined as follows and summarized in **Table 18**:

A. Illicit connections or illicit discharges: If the source is determined to be an illicit discharge, the Permittee must implement procedures to eliminate the discharge consistent with IC/ID requirements (Permit Part VI.D.10) and document actions.
B. Authorized or conditionally exempt NSW discharges: If the source is determined to be an NPDES permitted discharge, a discharge subject to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or a conditionally exempt essential discharge, the Permittee must document the source. For non-essential conditionally exempt discharges, the Permittee must conduct monitoring consistent with Part IX.G of the MRP to determine whether the discharge should remain conditionally exempt or be prohibited.
C. Natural flows: If the source is determined to be natural flows, the Permittee must document the source.
D. Unknown sources: If the source is unknown, the Permittee must conduct monitoring consistent with Part IX.G of the MRP.

**Table 18. Summary of Endpoints for Source Identification**

| Endpoint | Follow-up | Action Required by Permit |
|---|---|---|
| A. Illicit Discharge or Connection | Refer to IC/ID program | Implement control measures and report in annual report. Monitor if cannot be eliminated. |
| B. Authorized or Conditionally Exempt Discharges[1] | Document and identify if essential or non-essential | Monitor non-essential discharges |
| C. Natural Flows | End investigation | Document and report in annual report |
| D. Unknown | Refer to IC/ID program | Monitor |

1. Discharges authorized by a separate NPDES permit, a discharge subject to a Record of Decision approved by USEPA pursuant to section 121 of CERCLA, or is a conditionally exempt NSW discharge addressed by other requirements. Conditionally exempt NSW discharge addressed by other requirements are described in detail in Part III.A. Prohibitions – Non-Stormwater Discharges of the Permit.

Source investigations will be conducted using site-specific procedures based on the characteristics of the NSW discharge and the techniques utilized by the individual Permittee's IC/ID program conducting the investigation. Investigations could include:

- Gathering field measurements to characterize the discharge.
- Following dry weather flows from the location where they are first observed in an upstream direction along the conveyance system.
- Compiling and reviewing available resources including past monitoring and investigation data, land use/MS4 maps, aerial photography, and property ownership information.

Where investigations determine the NSW source to be authorized, natural, or essential conditionally exempt flows, the investigation will be concluded and the next highest priority outfall will then be investigated. Where investigations determine that the source of the discharge is non-essential conditionally exempt, an illicit discharge, or is unknown – further investigation will be considered to eliminate the discharge or demonstrate that it is not causing or contributing to receiving water impairments. In some cases, source investigations may ultimately lead to prioritized programmatic or structural BMPs. Where Permittees determine that the NSW discharge will be addressed through modifications to programs or by structural BMP implementation, the Permittee will incorporate the approach into the implementation schedule developed in the EWMP, and the outfall will be lowered in priority for investigation, such that the next highest priority outfall is addressed.

## 5.6 NON-STORMWATER DISCHARGE MONITORING

As outlined in the MRP (Part II.E.3), outfalls with significant NSW discharges that remain unaddressed after source investigation shall be monitored to meet the following objectives:

a. Determine whether a Permittee's discharge is in compliance with applicable NSW WQBELs derived from TMDL WLAs;
b. Determine whether the quality of a Permittee's discharge exceeds NSW action levels, as described in Attachment G of the Permit; and,
c. Determine whether a Permittee's discharge causes or contributes to an exceedance of RWLs.

Thus, outfalls that are determined to convey significant NSW discharges where the source investigations conclude that the source is attributable to a continued illicit discharge (Endpoint A from **Table 18**), non-essential conditionally exempt (Endpoint B from **Table 18**), or unknown (Endpoint D from **Table 18**), must be monitored. Monitoring will begin within 90 days of completing source investigations or after the Executive Officer approves this CIMP, whichever is later.

Monitoring for non-stormwater discharges will be more dynamic than either the receiving water or stormwater outfall monitoring. As non-stormwater discharges are addressed, monitoring at the outfall will cease. Additionally, if monitoring demonstrates that discharges do not exceed any WQBELs, non-stormwater action levels, or water quality standards for pollutants identified on the 303(d) list, monitoring will cease at an outfall after the first year or specific pollutants will be no longer be analyzed. Thus, the number and location of outfalls monitored as well as the pollutants monitored has the potential to change on an annual basis. The process for adapting monitoring locations and frequency is presented in **Section 11**.

### 5.6.1 Non-Stormwater Outfall-Based Monitoring Sites

The Outfall Screening and prioritization processes will result in an inventory of outfalls that are required to be monitored per the Permit requirements. The information to determine the number and location of outfalls requiring monitoring will be available after the screening is completed.

### 5.6.2 Monitored Parameters and Frequency of Monitoring

Part IX.G.2-4 of the MRP specifies the following monitoring frequency for NSW outfall monitoring:

- For outfalls subject to a dry weather TMDL, the monitoring frequency shall be per the approved TMDL monitoring plan or as otherwise specified in the TMDL or as specified in an approved CIMP.
- For outfalls not subject to dry weather TMDLs, four times per year approximately quarterly for first year.
- Monitoring can be eliminated or reduced to twice per year, beginning in the second year of monitoring if pollutant concentrations measured during the first year do not exceed WQBELs, NSW Action Levels, or water quality standards for pollutants identified on the 303(d) List.

While this monitoring frequency is specified in the Permit, it is important to link outfall monitoring with receiving water monitoring to place the data into the appropriate context. Additionally, during the Permit term, outfalls will be screened twice and those with significant NSW discharges will be subject to a source investigation and potentially abatement (e.g., diversion or treatment). To meet the requirements of the BC Bacteria TMDL, all drains, regardless of whether they contain significant NSW discharge will be monitored for *E. coli* and flow during the two screening events. Also, in reviewing water quality data, the other relevant WQBELs during dry weather (i.e., metals) are consistently meeting the dry weather interim targets based on the data analysis conducted during the water quality prioritization process (**Attachment A**). As a result, two dry weather monitoring events will be conducted annually on significant NSW discharges, following the screening events and coordinated with the receiving water monitoring events, to allow an evaluation of whether the significant NSW discharges are causing or contributing to any observed exceedances of water quality objectives in the receiving water. Monitoring may be increased to support management decisions. Additionally, if exceedances of the interim receiving water limits for *E. coli* are observed in receiving waters before TSO expiration (December 15, 2019), monitoring of significant NSW discharges for *E. coli* would increase from two dry weather monitoring events conducted annually to four dry weather monitoring events conducted annually. The non-stormwater outfall monitoring frequencies will be re-evaluated before TSO expiration.

The requirements for constituents to be monitored are outlined in the Part IX.G.1.a-e of the MRP. Outfalls will initially be monitored for all required constituents except toxicity. Toxicity monitoring will occur when triggered by receiving water toxicity monitoring and TIE results. An overview of the constituents required in the MRP for NSW monitoring is listed in **Table 19**. This list was generated from the current list of constituents monitored during dry weather in the receiving waters and will be updated as the constituents monitored during dry weather in the waterbody to which they discharge, as well as downstream waterbodies, are updated and/or

based upon the data collected at the individual outfall site. To be consistent with receiving water monitoring, NSW monitoring will consist of collecting grab samples. Note that constituents associated with suspended sediments transported during wet weather (i.e., PCBs, DDTs, dieldrin, chlordane, and PAHs) are not included in the list of constituents presented in **Table 19** and should not be monitored during NSW outfall monitoring.

Analytical methods, detection limits, sampling methods, and sample handling procedures are detailed in **Attachment C**. In addition, details regarding the collection of QA/QC samples are outlined in **Attachment C**.

**Table 19. List of NSW Outfall Monitoring Parameters**

| Parameters[1] | Receiving Water to Which Outfall is Discharging | | |
|---|---|---|---|
| | Ballona Creek | Centinela Creek | Sepulveda Channel |
| Flow, hardness, pH, dissolved oxygen, temperature, and specific conductivity | X | X | X |
| Table E-2 pollutants detected above relevant objectives and not otherwise addressed below | X | X | X |
| *E. coli* | X | X | X |
| TSS | X | X | X |
| Copper (total and dissolved) | X | X | X |
| Lead (total and dissolved) | X | X | X |
| Zinc (total and dissolved) | X | X | X |
| Mercury (total) | X | X | X |
| Nickel (total and dissolved) | X | X | X |
| Ammonia | X | | X |

1. As described in **Section 11**, data collected as part of this CIMP will be reviewed and changes to the constituents and frequencies as a result of exceedances in the receiving waters or as a result of toxicity testing will be discussed in the annual report and implemented starting no later than the first CIMP event of the next monitoring year (i.e., the first event after July 1 of the year following the annual report submittal).

## 5.7 NON-STORMWATER OUTFALL MONITORING SUMMARY

A summary of how the NSW outfall monitoring program meets the intended objectives of the NSW outfall monitoring program outlined in Part II.E.3 of the MRP is presented in **Table 20**. The schedule for implementing the NSW Outfall Monitoring Program is presented in **Section 13**.

**Table 20. Summary of NSW Outfall Monitoring Program Objectives**

| MRP Objective | CIMP Component Meeting Objective |
|---|---|
| Determine whether a Permittee's discharge is in compliance with applicable NSW WQBELs derived from TMDL WLAs | • List of constituents based on the water quality priorities which incorporate constituents with WQBELs derived from TMDL WLAs.<br>• When implementing the NSW Outfall Program, *E. coli* is used when determining the significance of a NSW discharge because, of the constituents addressed by TMDLs for which WQBELs and RWLs were incorporated into the Permit, *E. coli* consistently exceeds RWLs and the final dry weather compliance date for the BC Bacteria TMDL has passed. |
| Determine whether a Permittee's discharge exceeds NSW action levels, as described in Attachment G of the MS4 Permit. | • Outfalls for which monitoring data exist and indicate recurring exceedances of one or more of the NSW action levels will be prioritized during implementation of the NSW Outfall Program.<br>• Extensive list of constituents being collectively monitored at NSW outfall monitoring sites. |
| Determine whether a Permittee's discharge causes or contributes to an exceedance of RWLs. | • Monitoring frequency equal to the receiving water monitoring frequency during which time all constituents are monitored to enable determination of whether the Permittee's discharge is causing or contributing to any observed exceedances of water quality objectives in the receiving water.<br>• List of constituents based on the monitoring requirements of the waterbody to which they discharge, as well as downstream waterbodies. |
| Assist a Permittee in identifying illicit discharges as described in Part VI.D.10 of the MS4 Permit. | • NSW Outfall Program is designed to be complimentary to IC/ID program.<br>• NSW Outfall Program provides a mechanism for the detection, identification, and elimination of illicit discharges.<br>• Where NSW discharges are deemed "significant", the NSW Outfall Program will discern whether the discharges are illicit, exempt, or conditionally exempt.<br>• If the source identification component of the NSW Outfall Program determines a discharge to be an illicit discharge, the discharge will be referred to the IC/ID program. |

# 6 Trash and Plastic Pellet Monitoring

The monitoring and reporting requirements of the Ballona Creek Trash TMDL (Trash TMDL) and Santa Monica Bay Nearshore and Offshore Debris TMDLs (Debris TMDL) are unique when compared with other components of this CIMP. The monitoring requirements of the Trash TMDLs may be broken up into two categories: (1) Trash and (2) Plastic Pellets. The following subsections detail how the BCWMG will meet the requirements specific to each category.

## 6.1 TRASH

The following BCWMG members are implementing the Ballona Creek Trash and Santa Monica Marine Debris TMDLs through the installation of full capture devices: County of Los Angeles and the cities of Beverly Hills, Inglewood, Los Angeles, and Santa Monica. As such, no specific trash monitoring is required or will be conducted for these jurisdictions.

The following BCWMG members are utilizing a combination of full capture, partial capture systems and/or institutional controls: cities of Culver City and West Hollywood. These jurisdictions are required to measure the effectiveness of partial capture systems and institutional controls through a mass balance approach based on the trash daily generation rate (DGR) for a specific area. Details on how these BCWMG members will conduct the necessary monitoring are presented in **Attachment C**.

## 6.2 PLASTIC PELLETS

Under the Santa Monica Bay Nearshore and Offshore Debris TMDL, jurisdictions identified as responsible parties for point sources of trash in the existing Ballona Creek Trash TMDL shall either prepare a Plastic Pellet Monitoring and Reporting Plan (PMRP) or demonstrate that a PMRP is not required under certain circumstances, as follows:

1. Responsible jurisdictions that have industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets within their jurisdiction shall prepare a PMRP to (i) monitor the amount of plastic pellets being discharged from the MS4; (ii) establish triggers for increased industrial facility inspections and enforcement of SWPPP requirements for industrial facilities identified as responsible for the plastic pellet WLA herein; and (iii) address possible plastic pellet spills.
2. Responsible jurisdictions that have no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets, may not be required to conduct monitoring at MS4 outfalls, but shall be required to include a response plan in the PMRP. In order to be absolved of the requirement to conduct monitoring at MS4 outfalls, documentation of the absence of industrial facilities and activities within the jurisdiction that are related to the manufacturing, handling and transportation of plastic pellets must be provided in the proposed PMRP.
3. An MS4 Permittee may demonstrate to the Regional Board that it has only residential areas within its jurisdiction, and that it has limited commercial or industrial transportation corridors (rail and roadway), such that it is not considered a potential source of plastic pellets to Santa Monica Bay. Such demonstration may be submitted in lieu of a PMRP and must include the municipal zoning plan and other appropriate documentation. The

Executive Officer may approve an exemption from the requirement to prepare a PMRP for the MS4 Permittee on the basis of this demonstration, if appropriate.

The PMRP requirements apply to areas within the BCWMG's jurisdictions that contain industrial facilities that are related to the manufacturing, handling, or transportation of plastic pellets. Each BCWMG Member conducted an analysis to determine which one of the three categories listed above was applicable to their jurisdiction. The plastic pellet use category that each BCWMG Member is subject to and the associated requirement are detailed in **Table 21**. **Appendix 2** presents details on the determination of the categories presented in **Table 21** as well as a detailed PMRP and Spill Response Plan.

**Table 21. BCWMG Member Plastic Pellet Use Category and Associated Requirement**

| BCWMG Member | Category[1] | Requirement |
|---|---|---|
| Los Angeles County | 2 | Spill Response Plan |
| City of Beverly Hills | 2 | Spill Response Plan |
| City of Culver City | 2 | Spill Response Plan |
| City of Inglewood | 2 | Spill Response Plan |
| City of Los Angeles | 1 | Plastic Pellet Monitoring and Reporting Plan (PMRP) |
| City of Santa Monica | 2 | Spill Response Plan |
| City of West Hollywood | 2 | Spill Response Plan |
| LACFCD | 2 | Spill Response Plan |

1. Category 1 denotes jurisdictions that have industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets. Category 2 represents jurisdictions that have no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets

# 7 New Development/Re-Development Effectiveness Tracking

BCWMG members are required to maintain databases to track specific information related to new and redevelopment projects subject to the MCM in Part VI.D.7. The specific data to be tracked is listed in Part X.A of the MRP (**Table 22**). The data will be used to assess the effectiveness of the LID requirements for land development and to fulfill reporting requirements. Although the data requirements are clear, the procedures for reviewing projects, tracking data, and reporting are different for each jurisdiction and may even be different across departments within the same jurisdiction. Due to the complexity of land development processes across jurisdictions, data management and tracking procedures will vary by jurisdiction. As such, the following subsections generally detail the requirements and approaches related to the new and redevelopment tracking requirements. Specifics are available from each BCWMG member.

**Table 22. Required Data to Track for New and Redevelopment Projects per Part X.A of the MRP**

- ✓ Name of the Project
- ✓ Name of the Developer
- ✓ Project location and map(1)
- ✓ Documentation of issuance of requirements to the developer
- ✓ 85th percentile storm event for the project design (inches per 24 hours)
- ✓ 95th percentile storm event for projects draining to natural water bodies (inches per 24 hours)
- ✓ Other design criteria required to meet hydromodification requirements for drainages to natural water bodies
- ✓ Project design storm (inches per 24 hours)
- ✓ Project design storm volume (gallons or million gallons per day)
- ✓ Percent of design storm volume to be retained onsite
- ✓ Design volume for water quality mitigation treatment BMPs (if any)
- ✓ One year, one hour storm intensity(2) (if flow through treatment BMPs are approved)
- ✓ Percent of design storm volume to be infiltrated at an offsite mitigation or groundwater replenishment site
- ✓ Percent of design storm volume to be retained or treated with biofiltration at an offsite retrofit project
- ✓ Location and maps of offsite mitigation, groundwater replenishment, or retrofit sites(1)
- ✓ Date of Certificate of Occupancy

1. Preferably linked to the GIS Storm Drain Map.
2. As depicted on the most recently issued isohyetal map published by the Los Angeles County hydrologist.

The Standard Urban Stormwater Mitigation Program (SUSMP) requirements implemented under the previous MS4 Permit (Order R4-01-182) laid the foundation for the MCMs contained in Part VI.D.7 of the current MS4 Permit. With implementation of the SUSMP, Permittees required post construction BMPs on applicable projects, developed standard requirements for project submittals, and began to track related data. The Permittees will build on the existing procedures for land development to ensure that all required project data is captured.

To meet the requirements of the Permit, internal procedures and data protocols that clearly define departmental roles and responsibilities pertaining to data collection, data management, and tracking will be utilized. These procedures will include points in the process where data are

generated and tracked, who is responsible for tracking the data, and how the data will be managed. Data management protocols and internal procedures, will also consider the land development data tracking requirements contained in Part VI.D.7.d.iv.(1)(a). These requirements are distinct from those listed in the MRP but will be addressed similarly. Data requirements under Part VI.D are contained in **Table 23**.

**Table 23. Required Data to Track for New and Redevelopment Projects per Part VI.D.7.d.iv.(1)(a)**

| | |
|---|---|
| ✓ Municipal Project ID | ✓ Maintenance Records |
| ✓ State Waste Discharge Identification Number | ✓ Inspection Date(s) |
| ✓ Project Acreage | ✓ Inspection Summary(ies) |
| ✓ BMP Type and Description | ✓ Corrective Action(s) |
| ✓ BMP Location (coordinates) | ✓ Date Certificate of Occupancy Issued |
| ✓ Date of Acceptance | ✓ Replacement or Repair Date |
| ✓ Date of Maintenance Agreement | |

# 8 Regional Studies

Only one regional study is identified in the MRP: Southern California SMC. The Southern California SMC is a collaborative effort between all of the Phase I MS4 NPDES Permittees and NPDES regulatory agencies in Southern California. SCCWRP oversees the management and implementation of the SMC.

The goal of the SMC is to develop technical information necessary to better understand stormwater mechanisms and impacts, and develop tools to effectively and efficiently improve stormwater decision-making. One program initiated under the SMC is a Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program (Bioassessment Program). The SMC initiated the Bioassessment Program in 2009. The bioassessments are structured to occur in cycles of five years. Sampling under the first cycle concluded in 2013. The next five-year cycle is scheduled to begin in 2015, with additional special study monitoring scheduled to occur in 2014.

The MRP states that each Permittee shall be responsible for supporting the monitoring described at the sites within the watershed management area(s) that overlap with the Permittee's jurisdictional area. Support for the SMC has included monetary contributions to provide base support to SCCWRP (monitoring plan development, report writing, etc.) and/or in-kind contributions such as providing staff time for monitoring and site assessments. Currently, the SMC is not specifically implementing monitoring within the Ballona Creek watershed. As such, it does not appear that the BCWMG is required to provide support. However, the BCWMG is conducting bioassessment, toxicity, and water and sediment chemistry monitoring in the Ballona Creek Estuary on the same frequency as the SMC initiated programs. In this manner, the BCWMG is in turn supporting the goals of the SMC.

# 9 Special Studies

The MRP states that each Permittee be responsible for conducting special studies required in an effective TMDL or an approved TMDL Monitoring Plan. The effective TMDLs, revised TMDLs, and approved Monitoring Plans relevant to the BCWMG EWMP area do not require the completion of special studies. Special studies may be identified in the future and may either rely upon data collected through this CIMP or may be developed through a separate process.

# 10 Non-Direct Measurements

Environmental data (water, sediment, and tissue data) collected through other monitoring programs in the watershed will be incorporated to the extent practicable. The extent practicable will be dictated by the cost of gathering and compiling information from outside programs. It is not the intent or purpose of this CIMP to compile and analyze all available data. Environmental data reported by other entities will be evaluated for suitability for inclusion in this CIMP database and will be accepted if it meets the following requirements:

- Conducted and documented in accordance with the sampling procedures outlined in this CIMP.
- Sample collection is performed and documented by a competent party in accordance with applicable guidance and this CIMP.
- Sample analysis is conducted using approved analytical methods equivalent to those identified in **Section 9** of **Attachment B** by a certified analytical laboratory.
- Sample collection occurs at an appropriate location to meet the objectives of the MS4 monitoring program as set forth in Attachment E, Parts II.A and II.E.

Non-direct measurements related to tidal measurements will be obtained from the National Oceanic and Atmospheric Administration. Flow and rainfall information will be obtained from the LACDPW as described in **Attachment C**.

# 11 Adaptive Management

The adaptive management process will be utilized on an annual basis to evaluate this CIMP and update the monitoring requirements as necessary. As noted in this CIMP, several monitoring elements are dynamic and may require modifications to the monitoring sites, schedule, frequency or parameters. In particular, the NSW screening program and the toxicity monitoring will likely generate changes that need to be incorporated. This section lays out a range of possible modifications to this CIMP and the process for CIMP revision and update.

## 11.1 INTEGRATED MONITORING AND ASSESSMENT PROGRAM

This CIMP is based on the MRP requirements and analysis of existing data. As monitoring occurs, additional information will be gathered that will require modifications to this CIMP. Every year, an evaluation will be conducted to identify potential modifications resulting from the following:

- TIEs result in the identification of additional constituents that need to be monitored.
- Additional upstream receiving water monitoring is necessary to characterize the spatial extent of a RWL exceedance.
- Additional outfall monitoring is needed in response to RWL exceedances.
- NSW outfall sites will change as discharges are addressed.
- Monitoring data demonstrates that water quality objectives are not being exceeded in the receiving waters.
- Source investigations determine that MS4 discharges are not a source of a constituent.

The results from the monitoring are meant to tie into the EWMP as feedback for the water quality changes resulting from control measures implemented by the BCWMG. As a result, additional changes may be considered during the evaluation based on the control measure implementation needs.

## 11.2 CIMP REVISION PROCESS

This CIMP identifies a range of sampling that will likely result in data that will require changes to ensure monitoring meets the requirements and intent of the MRP and supports EWMP implementation. However, since many of those potential changes are identified in this CIMP, it should not be necessary to obtain Regional Board approval of modifications already considered in this CIMP to ensure timely implementation of appropriate modifications to monitoring. These changes are outlined in this section. Changes identified in this section will be discussed in the annual report and implemented starting no later than the first CIMP monitoring event of the next monitoring year (i.e., the first event after July 1 of the year following the annual report submittal), including:

1. Adding constituents (including but not limited to those which meet the activation criteria described in **Section 2.2**) at receiving water and/or outfall monitoring sites, increasing monitoring frequency, or adding sites as a result of requirements in the MRP (e.g., TIE results), procedures outlined in this CIMP or to further support meeting the monitoring objectives.

2. Discontinuing monitoring for Table E-2 constituents that are not identified as a water quality priority and are not detected at levels above relevant water quality objectives in the first year of monitoring.
3. Modifying methods for consistency with USEPA method requirements or to achieve lower detection limits.
4. Changing analytical laboratories.
5. Implementing the changes associated with conducting at least one re-assessment of the NSW Outfall Program during the Permit term.
6. Modifications to sampling protocols resulting from coordination with other watershed monitoring programs.

The following modifications or adjustments to the CIMP may be proposed by the BCWMG to the Regional Board. These modifications will be proposed by the BCWMG via a letter to the Regional Board or within the Annual Report and may be subject to approval by the Executive Officer of the Regional Board. Approval by the Executive Officer of the Regional Board will be assumed unless written disapproval is received within 90 days of the date the BCWMG submitted the letter or Annual Report containing the BCWMG's request(s) to the Regional Board.

1. Discontinuing monitoring of any non-TMDL constituent at a specified site if there are two consecutive monitoring events for the same condition (i.e., wet or dry weather) with no exceedances observed (i.e., constituents which meet the deactivation criteria described in **Section 2.2**).
2. Relocating an outfall monitoring location determined to be not representative of MS4 discharges in the BCWMG EWMP area (for reasons other than the observed water quality) or because monitoring at the site is not feasible to an outfall monitoring location other than the predetermined alternative outfall site.

Should additional modifications be identified that are not specified in this section that would be major changes to the approach, the modifications will be proposed in the annual report and in a separate letter to the Regional Board requesting Executive Officer approval of the change. Upon receipt of written approval from the Executive Officer, this CIMP will be updated and a revised CIMP will be provided to the Regional Board.

# 12 Data Management and Reporting

**Attachment D** details the procedures for managing and reporting data to meet the goals and objectives of this CIMP and the Permit. The details contained in **Attachment D** serve as a guide for ensuring that consistent protocols and procedures are in place for successful data management and reporting. Data management procedures include data review, verification, and validation.

Annual monitoring reports are required to be submitted by December 15 of every year. The annual monitoring reports will cover the monitoring period of July 1 through June 30. The annual monitoring reports will include the following:

- Watershed Summary Information
    - Watershed Management Area
    - Subwatershed (HUC-12) Descriptions
    - Description of Permittee(s) Drainage Area within the Subwatershed
- Annual Assessment and Reporting
    - Stormwater Control Measures
    - Effectiveness Assessment of Stormwater Control Measures
    - Non-stormwater Water Control Measures
    - Effectiveness Assessment of Non-Stormwater Control Measures
    - Integrated Monitoring Compliance Report
    - Adaptive Management Strategies
    - Supporting Data and Information.

Additionally, analytical data reports are required to be submitted on a semi-annual basis and will include the following:

- Exceedances applicable to WQBELs, RWLs, action levels (including both Municipal Action Levels [for stormwater discharges] and non-stormwater action levels), or aquatic toxicity thresholds
- Corresponding sample dates and monitoring locations.

Semi-annual data reports will be submitted with the annual report and six months prior to the annual report (June of each year). The mid-year data reports will cover the monitoring period of July 1 through December 31.

Furthermore, if any of the authorized or conditionally exempt essential NSW discharges are determined to be a source of pollutants that causes or contributes to an exceedance of applicable RWLs and/or WQBELs, Part III.A.4.e of the Permit requires that the Regional Board be notified within 30 days if the NSW discharge is an authorized discharge with coverage under a separate NPDES permit or authorized by USEPA under CERCLA, or a conditionally exempt essential NSW discharge or emergency NSW discharge.

Details on the reporting requirements from the MRP that will be submitted with the semi-annual analytical data reports and annual monitoring reports are presented in **Attachment D**. In addition to the requirements from the MRP, a discussion of how the reported data are to be used is included in **Attachment D**.

# 13 Schedule for CIMP Implementation

Per the MRP, monitoring shall commence within 90 days after approval of this CIMP by the Executive Officer of the Regional Board. Implementation of all components of this CIMP will commence prior to or within 90 days of approval, except for plastic pellet monitoring, which is scheduled to begin per the Debris TMDL four years from the effective date of the TMDL (March 20, 2016).

The status of implementation of the various components will vary based on the current status of implementation and the feasibility of collecting a sample within 90 days after approval of this CIMP (e.g., stormwater outfall monitoring). During the CIMP approval process, all existing monitoring will continue. Within 90 days of CIMP approval, sample collection for all constituents at all dry weather receiving water sites and all constituents at all existing wet weather receiving water sites will commence. The remaining monitoring will be affected by the feasibility of collecting a sample within 90 days of CIMP approval. The two primary factors affecting the feasibility of sample collection upon approval of this CIMP relate to (1) autosampler installation and (2) monitoring that is dependent upon prerequisite information (e.g., monitoring of significant NSW discharges).

Autosamplers are used to characterize the water quality of a storm event. Receiving water wet weather samples and stormwater outfall samples will generally be collected as composite samples. As such, the installation of an autosampler is necessary before monitoring can commence. Given the continued use of previously monitored receiving water sites in Ballona Creek Reaches 1 and 2, Centinela Creek, and Sepulveda Channel, existing autosampling equipment can be utilized to conduct receiving water monitoring at these sites within 90 days of approval of this CIMP for constituents that were monitored prior to development of this CIMP and those newly identified for monitoring during CIMP development. However, given the addition of receiving water wet weather monitoring in the BCE at Pacific Avenue, an autosampler will likely need to be installed at the BCE_PAC receiving water site before wet weather monitoring can commence. Similarly, an autosampler will likely be installed at each of the three stormwater outfall monitoring sites before stormwater outfall monitoring can commence.

The process for installing autosamplers includes numerous tasks that require multiple agency coordination and permitting. Numerous autosampler stations have been installed throughout the County and provide significant experience in understanding the challenges and timelines for designing, permitting, and installing autosampler stations. The following provides an overview of the tasks and timelines associated with autosampler installation and **Figure 6** presents a graphical representation of what would be considered a relatively straightforward installation timeframe:

- Detailed autosampler site configuration/design, which includes data collection and review, identification of permit requirements, concept design, development of summary technical memos, and review by participating agencies and associated divisions: **12 months**

- Obtaining permits from one or more of the following entities: Army Corps of Engineers, LACFCD, US Fish and Wildlife Service, CA Department of Fish and Game, CA Coastal Commission, and the Regional Board: **3 to 10 months**
- Purchase of equipment via contractor or via agency procurement process (can occur somewhat concurrently with permitting): **2 to 6 months**
- Connecting to power via an upgrade to existing service or establishing new service: **1 to 6 months**
- Construction of monitoring station assuming no bid/award process: **1 month**
- Total time: **18 to 30 months**

To account for the time required for autosampler installation, a phased approach to sampling will be conducted for the wet weather receiving water and stormwater outfall elements of this CIMP (**Figure 5**). To meet the aggressive installation schedule presented in **Figure 5**, the BCWMG has already begun a few of the tasks associated with autosampler installation for select sites. Phasing in the receiving water and stormwater outfall elements of this CIMP will allow evaluation of the sites to determine if any need to be changed due to significant contributions from non-MS4 sources or other reasons that sampling is not feasible at a site and one of the alternate or new sites must be utilized.

- Phase I of CIMP implementation will commence within 90 days after approval of this CIMP. Phase I receiving water monitoring will consist of **all** monitoring other than dry and wet weather monitoring conducted at the BCE_PAC monitoring site due to the need to install an autosampler. Phase I stormwater outfall monitoring will consist of the continuation of the autosampler installation process displayed in **Figure 6** for all three stormwater outfall monitoring sites. The primary challenges experienced during previous autosampler installation processes are permitting by non-BCWMG members (i.e., US Army Corps of Engineers) and establishment of power connections. In extreme cases, these challenges have caused the installation of equipment to take 36 months. However, the typical installation timeframe for conditions similar to the Ballona Creek EWMP area is 18 to 24 months.
- Phase II will commence in October 2015. Phase II (and all subsequent phases) receiving water monitoring will consist of the monitoring conducted during Phase I and the addition of wet weather monitoring conducted at the newly installed BCE_PAC monitoring site. Phase II stormwater outfall monitoring will consist of monitoring conducted at the newly installed BC_SW_FAI monitoring site and the continuation of the autosampler installation process at the CC_SW_LAC and SC_SW_WAS monitoring sites.
- Phase III will commence in October 2016. Phase III stormwater outfall monitoring will consist of the monitoring conducted during Phase II, the addition of stormwater outfall monitoring at the newly installed CC_SW_LAC monitoring site, and the continuation of the autosampler installation process at the SC_SW_WAS monitoring site.
- Phase IV will commence in October 2017. Phase IV stormwater outfall monitoring will consist of the monitoring conducted during Phase III and the addition of stormwater outfall monitoring at the newly installed SC_SW_WAS monitoring site.

As described in **Section 5**, the NSW Outfall Program consists of a process which consists of six elements which occur sequentially:

1. Outfall Screening
2. Identification of outfalls with significant NSW discharge
3. Inventory of outfalls with significant NSW discharge
4. Prioritized source investigation
5. Identify sources of significant NSW discharge
6. Monitoring significant NSW discharges exceeding criteria

To account for the time required to complete all six steps of the NSW Outfall Program, a phased approach to sampling as outlined in the MRP will be conducted for the NSW outfall elements of this CIMP. Phasing in the NSW outfall elements of this CIMP will provide the time necessary to complete each element of the NSW Outfall Program.

- Phase I will commence within 90 days after approval of this CIMP. Phase I NSW monitoring will consist of completion of elements one through three of the NSW Outfall Program and the completion of 25% of the source investigations included in element four of the NSW Outfall Program.
- Phases II and III NSW monitoring will consist of completion of the remaining 75% of the source investigations included in element four of the NSW Outfall Program.
- Phase IV will consist of element six of the NSW Outfall Program.

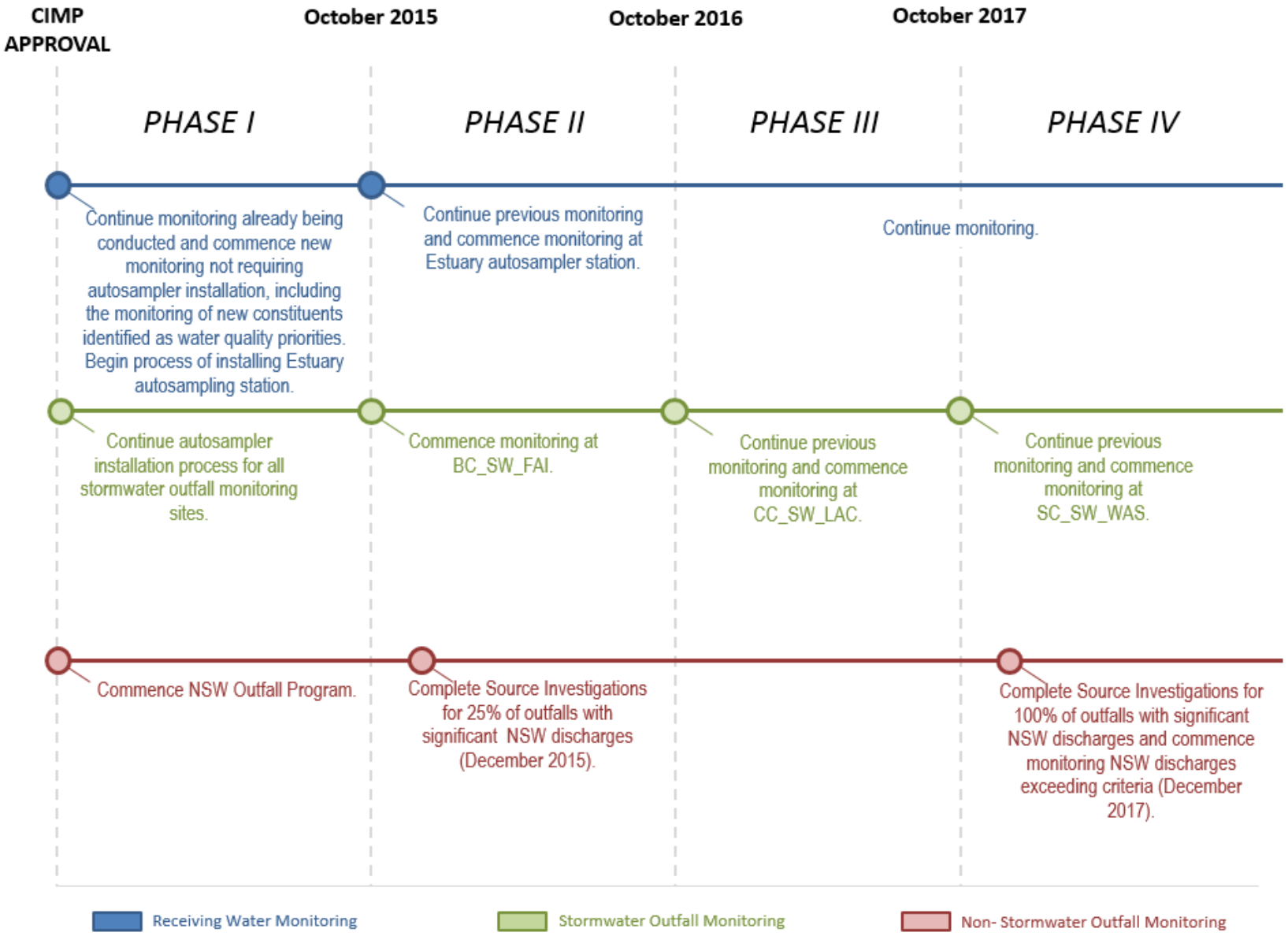


**Figure 5. Implementation Schedule for Major CIMP Elements**

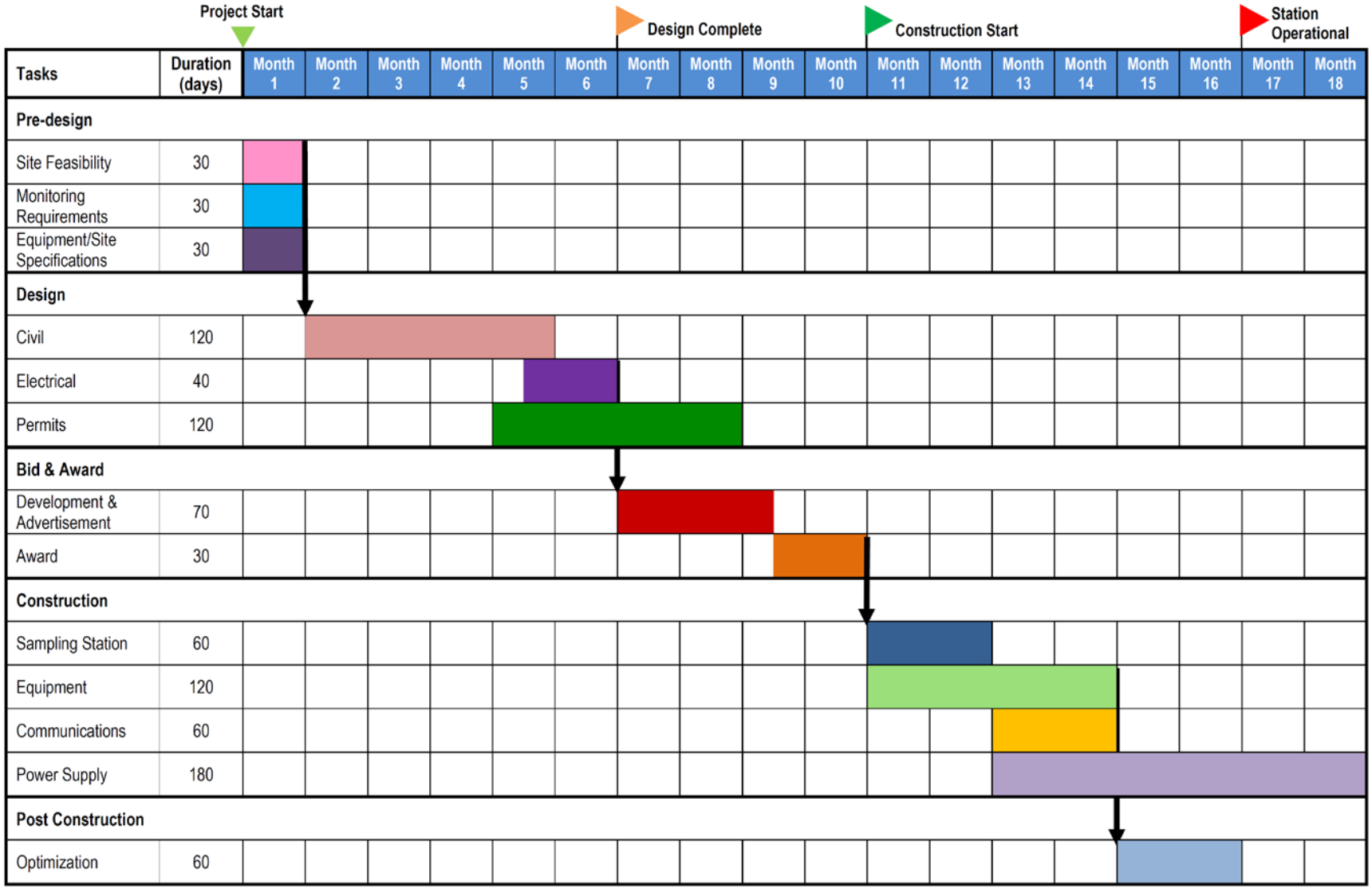


**Figure 6. Typical Duration for the Establishment of a New Sampling Station Assuming a Streamlined Process**

# 14 References

Ballona Creek Monitoring Plan Subcommittee. 2007. *Ballona Creek Metals TMDL and Ballona Creek Estuary Toxic Pollutants TMDL Coordinated Monitoring Plan*. Chaired by the City of Los Angeles. January 10, 2007.

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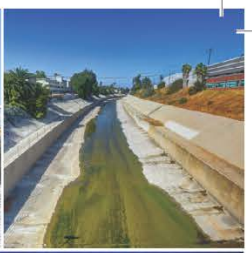
City of Los Angeles, Bureau of Sanitation. 2009. *Total Maximum Daily Load for Bacteria in Ballona Creek, Ballona Estuary, and Sepulveda Channel: Coordinated Monitoring Plan for Del Rey Lagoon*. January 29, 2009.

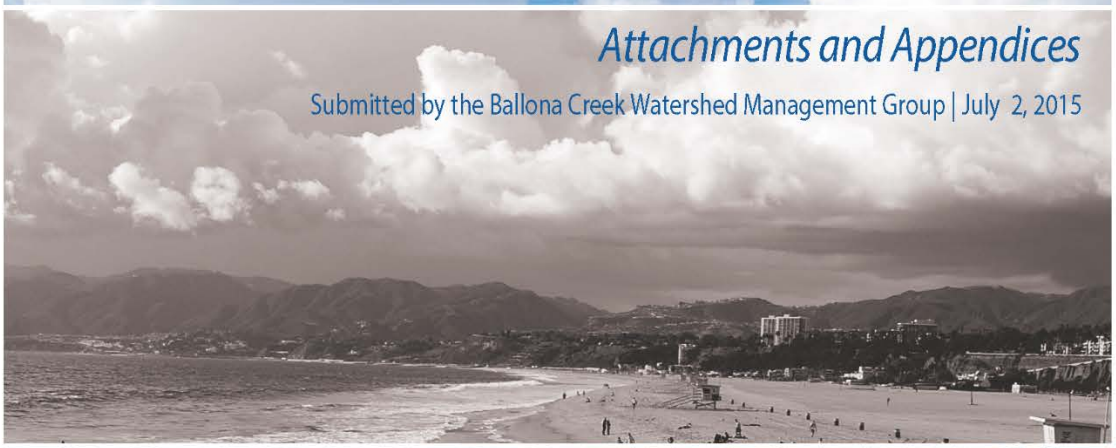
# Coordinated Integrated Monitoring Program (CIMP)
## *for the Ballona Creek Watershed*

## *Attachments and Appendices*

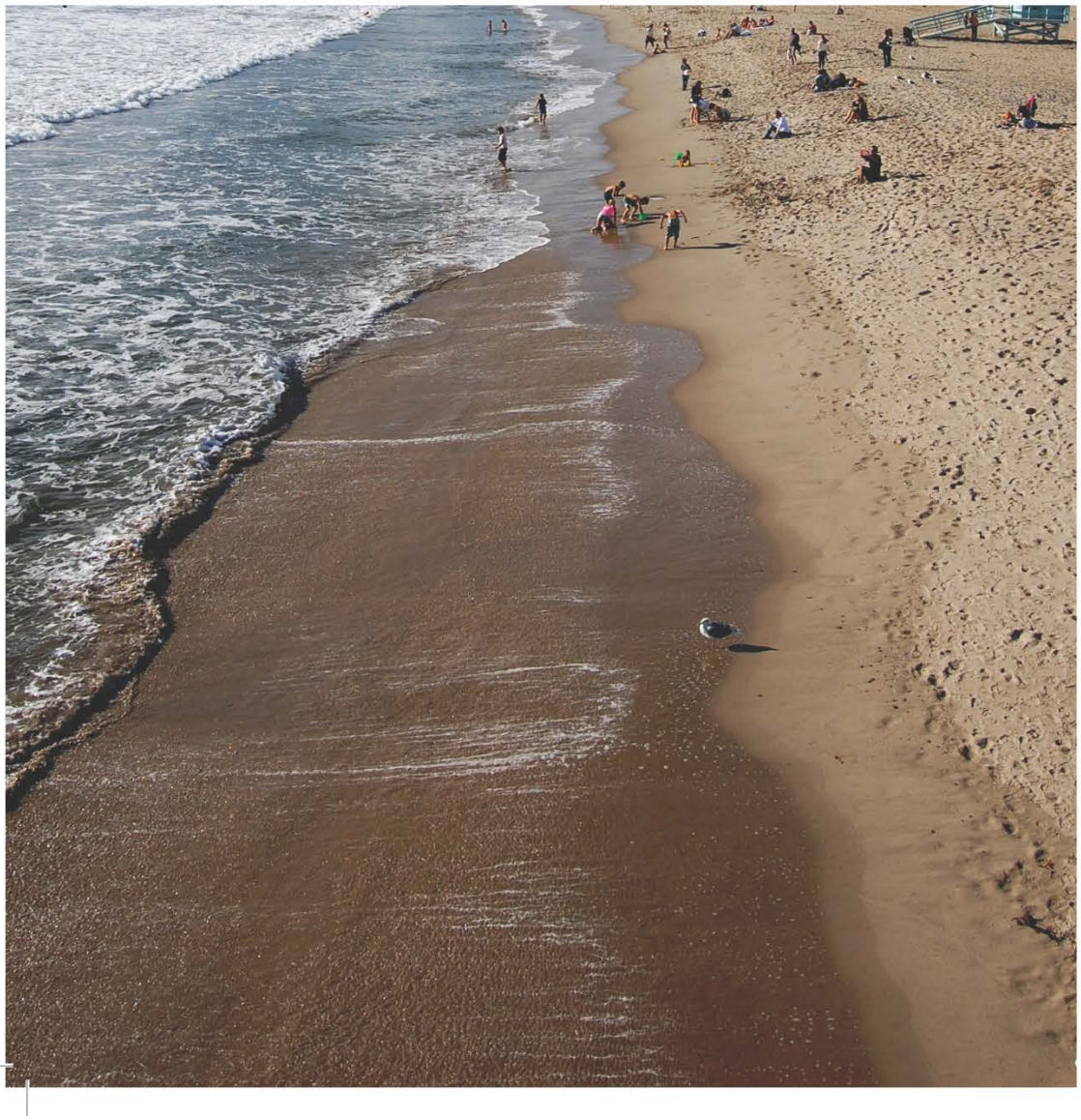
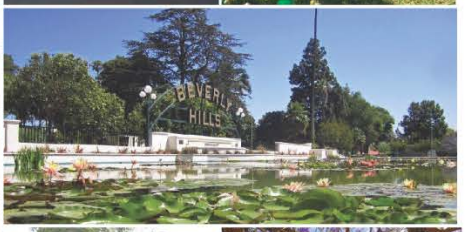
Submitted by the Ballona Creek Watershed Management Group | July 2, 2015













# List of Attachments



# List of Appendices

# Attachment A: Enhanced Watershed Management Plan Area Background

Attachment A summarizes background information on the area addressed by the Coordinated Integrated Monitoring Program (CIMP) that was utilized to support development of the various monitoring components. This Attachment is divided into the following sections:

1. Existing Monitoring Programs
2. TMDL Monitoring Requirements
3. Water Quality Priorities

# 1 Existing Monitoring Programs

Existing watershed monitoring programs provide historical data and information that can be used to support site selection and identification of constituents for monitoring. The following subsections briefly describe the current state of existing monitoring programs relevant to the Ballona Creek Watershed Management Group (BCWMG).

## *1.1 MS4 Permit Monitoring (Mass Emission Monitoring)*

One mass emission station has been monitored to meet the requirements of previous municipal separate storm sewer (MS4) Permits. The Ballona Creek Mass Emission Station, S01, is located at the existing stream gauging station (Stream Gage No. F38C-5) between Sawtelle and Sepulveda Boulevards in the City of Los Angeles (**Figure 1**). This station has been monitored for over 15 years by the Los Angeles County Department of Public Works (LACDPW). The upstream tributary area is 88.8 square miles at this location. To meet the monitoring requirements for this site in the previous MS4 Permit, wet weather samples were generally collected during five storm events per year, and dry weather samples were generally collected during two dry events per year. Constituent types monitored included:

- Chlorinated Pesticides and PCBs
- Conventional Constituents (oil and grease, total phenols, cyanide, pH, and dissolved oxygen (DO))
- General Constituents (chloride, alkalinity, total suspended solids (TSS), turbidity, etc.)
- Herbicides
- Indicator Bacteria
- Metals
- Nutrients (ammonia, nitrate, phosphorus, etc.)
- Organophosphate Pesticides
- Semi-Volatile Organic Compounds

Additionally, as part of the previous MS4 Permit monitoring, temporary receiving water sites were monitored for the same constituents at the following locations: Centinela Creek (TS-07),

Sepulveda Channel (TS-08), Benedict Canyon (TS-09) and the following drains Adams Drain (TS-10), Fairfax Drain (TS-11), and Cochran Drain (TS-12).

## *1.2 Existing Total Maximum Daily Load Monitoring*

There are three coordinated monitoring plans (CMPs) currently being implemented that address three of the seven TMDLs relevant to the BCWMG Enhanced Watershed Management Program (EWMP) area:

1. Ballona Creek Metals TMDL and Ballona Creek Estuary Toxic Pollutants TMDL Coordinated Monitoring Plan (BC Metals and Toxics CMP); and
2. Ballona Creek, Ballona Estuary, & Sepulveda Channel Bacteria TMDL Coordinated Monitoring Plan (BC Bacteria CMP).
3. Total Maximum Daily Load for Bacteria in Ballona Creek, Ballona Estuary, and Sepulveda Channel: Coordinated Monitoring Plan for Del Rey Lagoon (Del Rey Lagoon CMP)

Additionally, the *Ballona Creek, Ballona Estuary, & Sepulveda Channel Bacteria TMDL: TMDL Outfall Monitoring Plan* (BC Bacteria OMP), proposing the number of representative outfalls to be sampled, a sampling frequency, and protocol for enhanced outfall monitoring as a result of an in-stream exceedance, was submitted on April 26, 2013. The BCWMG has not received comments on the BC Bacteria OMP and it has not been approved. As a result, the suggested monitoring has not commenced. The components of the existing BC Bacteria OMP will be considered during CIMP development. **Figure 1** displays the location of the TMDL monitoring sites.

### 1.2.1 BC Metals and Toxics CMP

The BC Metals TMDL portion of the BC Metals and Toxics CMP includes a tiered approach. Tier I monitoring sites represent major portions of the total drainage area considering overlap. Tier II monitoring sites represent between approximately 7 and 20% of the total drainage area. Four Tier I and six Tier II monitoring sites are monitored under the BC Metals and Toxics CMP. The City of Los Angeles Watershed Protection Division (WPD) conducts the monitoring associated with the BC Metals and Toxics CMP. The Tier II sites are upstream of the Tier I sites and are only sampled if there are consistent exceedances of the wasteload allocations (WLAs) at Tier I sites. **Table 1** lists the Tier I and Tier II sites. Dry weather samples are collected monthly and storms are sampled as they occur, so long as there are at least 72 hours of dry weather between storms. The dry and wet weather water quality constituents which are monitored include total and dissolved copper, lead, selenium, and zinc, as well as total hardness. **Table 2** lists the types of monitoring and the associated constituents monitored.

The BCE Toxics TMDL portion of the BC Metals and Toxics CMP includes the same water quality sites as the BC Metals TMDL sites, as well as six sediment quality monitoring locations, two bioaccumulation sites for sport fish, and four bioaccumulation sites for mussels. **Table 1** lists the sediment and bioaccumulation sites. The BC Metals and Toxics CMP scheduled sediment sampling semi-annually for the first year and annually for all subsequent years as well as annual bioaccumulation sampling. **Table 2** lists the types of monitoring, constituents monitored, and the monitoring frequency required for each TMDL.

Please note, in some instances, the revised BC Metals TMDL and revised BCE Toxics TMDL monitoring requirements are not consistent with what is presented in the Metals and Toxics CMP. The CIMP has addressed the required updates and will replace the CMP.

### 1.2.2 BC Bacteria CMP

The BC Bacteria TMDL requires both ambient and TMDL effectiveness monitoring. The City of Los Angeles WPD conducts monitoring under the BC Bacteria CMP. **Table 3** lists the eight monitoring sites monitored under the BC Bacteria CMP. The BC Bacteria TMDL defines three separate compliance seasons: (1) summer dry weather (April 1 – October 31); (2) winter dry weather (November 1 – March 31); and (3) wet weather (days $\geq$ 0.1 inch of rain and the three days following the event). WPD conducts weekly sampling under the Bacteria CMP. Marine/brackish samples collected from the Estuary are tested for total coliform, Escherichia coli (*E. coli*), and enterococcus bacteria. Fresh water samples taken from REC-1 and LREC-1 beneficial use designated areas are tested for *E. coli* and samples taken from REC-2 beneficial use designated areas are tested for fecal coliform.

### 1.2.3 Del Rey Lagoon CMP

The BC Bacteria TMDL also requires a monitoring site at the connecting tide gate between the Del Rey Lagoon and BCE. The City of Los Angeles WPD conducts weekly monitoring under the Del Rey Lagoon CMP for total coliform, *E. coli*, and enterococcus bacteria. **Table 4** lists the one monitoring site monitored under the Del Rey Lagoon CMP.

**Table 1. BC Metals and Toxics CMP Monitoring Sites**

| Monitoring Site | Monitoring Site Type | Monitoring Site Description |
|---|---|---|
| BC-1 | Tier I Water Quality | Ballona Creek at Centinela Ave |
| BC-2 | Tier I Water Quality | Ballona Creek at stream gage No. F38C-R between Sawtelle Blvd and Sepulveda Blvd |
| BC-3 | Tier I Water Quality | Ballona Creek at National Blvd |
| BC-4 | Tier I Water Quality | Sepulveda Channel above confluence with Ballona Creek |
| BC-5 | Tier II Water Quality | Benedict Canyon above confluence with Ballona Creek |
| BC-6 | Tier II Water Quality | Storm drain near La Cienega Blvd discharging to Ballona Creek |
| BC-7 | Tier II Water Quality | Storm drain near Fairfax Ave discharging to Ballona Creek |
| BC-8 | Tier II Water Quality | Within the storm drain where Ballona Creek daylights at Cochran Ave |
| BC-9 | Tier II Water Quality | Storm drain near Adams Blvd discharging to Ballona Creek |
| BC-10 | Tier II Water Quality | Storm drain near Jefferson Blvd discharging to Ballona Creek |
| BCE-1 | Sediment Quality, Non-Random Mussel Bioaccumulation | Located at mouth of Ballona Creek |
| BCE-2 | Sediment Quality, Non-Random Mussel and Fish Bioaccumulation | Located near Pacific Avenue Bridge |
| BCE-3 | Sediment Quality, Random Mussel Bioaccumulation | Randomly selected site between Pacific Street Bridge and self-regulation tide gate |
| BCE-4 | Sediment Quality, Random Mussel and Fish Bioaccumulation | Randomly selected site between Ballona wetlands tide gate and Culver Blvd |
| BCE-5 | Sediment Quality | Randomly selected site between Centinela Creek and Culver Blvd |
| BCE-6 | Sediment Quality | Randomly selected site between Centinela Creek and upper boundary of Ballona Creek (Cochran Ave) |

**Table 2. BC Metals and Toxics CMP Monitoring Types, Associated Constituents, and Frequency**

| TMDL | Monitoring Type | Constituents | Monitoring Frequency |
|---|---|---|---|
| BC Metals TMDL | Water Quality - Dry Weather | Total and dissolved copper, lead, selenium, zinc, and total hardness | Monthly |
| | Water Quality - Wet Weather | | Selected wet weather events |
| BCE Toxics TMDL | Water Quality - Dry Weather | Total and dissolved cadmium, copper, lead, silver, zinc as well as chlordane, DDTs, dieldrin, total PCBs, and total PAHs. | Monthly |
| | Water Quality - Wet Weather | | Selected wet weather events |
| | Storm-Borne Sediment | Cadmium, copper, lead, silver, zinc, chlordane, DDTs, dieldrin, total PCBs, and total PAHs. | Annually |
| | Sediment Quality | | Semi-annually during first year, annually thereafter |
| | Bioaccumulation | | Annually |

**Table 3. BC Bacteria CMP Monitoring Sites and Monitoring Frequency**

| Site ID | Site Name | Description | Frequency |
|---|---|---|---|
| BCB-1 | Washington | Ballona Creek at Washington Blvd | Weekly |
| BCB-2 | Duquesne | Ballona Creek at Duquesne Ave | Weekly |
| BCB-3 | Benedict Canyon | Benedict Canyon Channel upstream of confluence with Ballona Creek | Weekly |
| BCB-4 | Culver | Sepulveda Channel at Culver Blvd | Weekly |
| BCB-5 | Inglewood | Ballona Creek at Inglewood Blvd | Weekly |
| BCB-6 | McConnel | Ballona Creek Estuary at McConnell Ave | Weekly |
| BCB-7 | Centinela Creek | Centinela Creek at Inglewood Blvd | Weekly |
| BCB-8 | Pacific | Ballona Creek Estuary at Pacific Ave | Weekly |

**Table 4. Del Rey Lagoon CMP Monitoring Site and Monitoring Frequency**

| Site ID | Site Name | Description | Frequency |
|---|---|---|---|
| BCB-9 | Del Rey | Del Rey Lagoon tide gate (inside the lagoon) | Weekly |

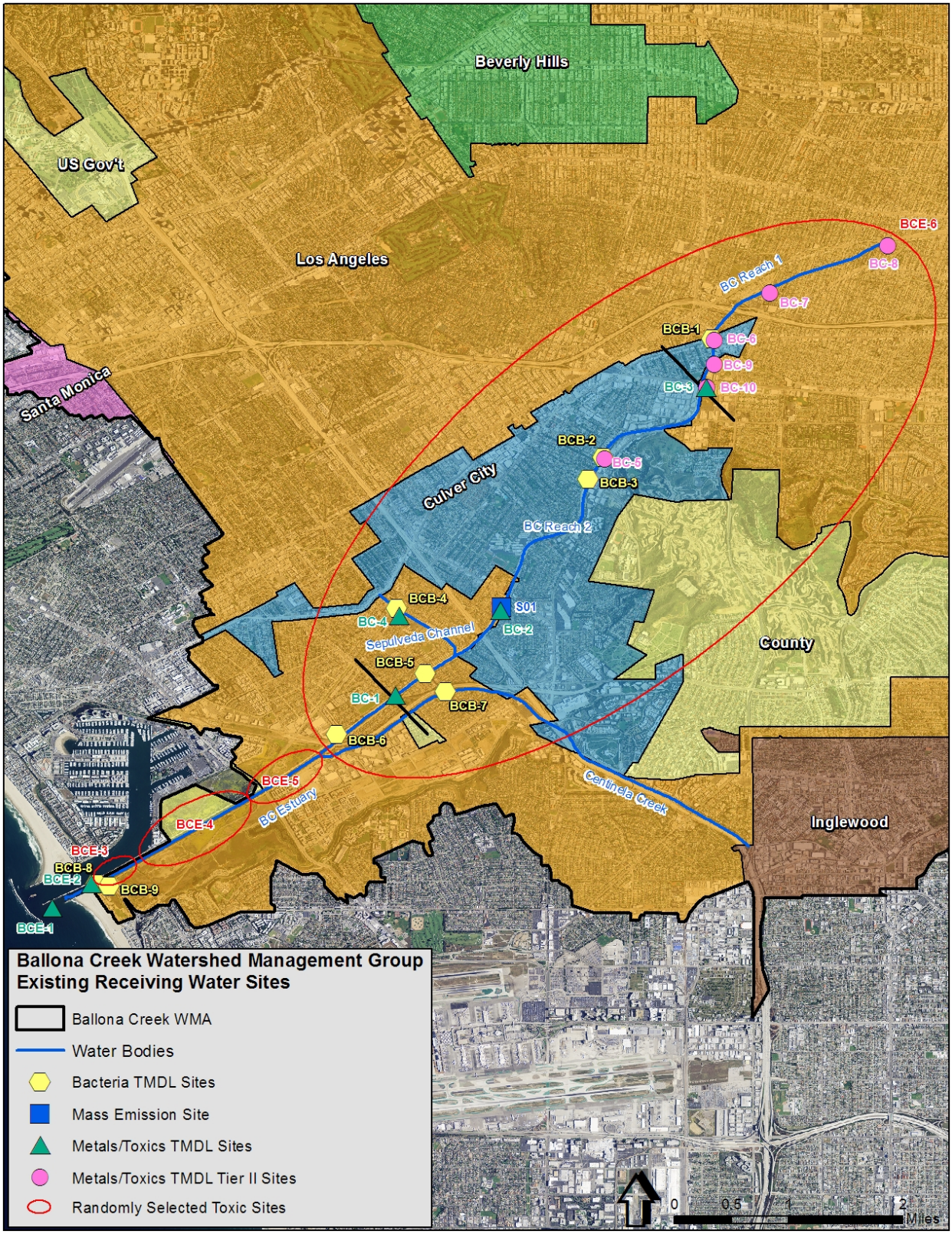



**Figure 1. Existing Sites Currently Monitored in the BCWMG EWMP Area**

# 2 TMDL Monitoring Requirements

One primary objective of the monitoring that will be conducted under the CIMP is fulfilling monitoring requirements established in TMDLs. The TMDLs addressing water body-pollutant combinations within or downstream of the EWMP area are presented in **Table 5**. Part XIX.B of the MRP, the TMDL Basin Plan Amendments (BPAs), and United States Environmental Protection Agency (USEPA)-established TMDL documents include TMDL monitoring requirements and recommendations, which are summarized in the following subsections. Appendix M of the Los Angeles County National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. R4-2012-0175 (Permit) lists the TMDLs directly applicable in the EWMP area. The CIMP details how each of the requirements summarized below are addressed.

**Table 5. TMDLs Applicable to the Ballona Creek Watershed EWMP**

| TMDL | Regional Board Resolution Number(s) | Effective Date and/or EPA Approval Date |
|---|---|---|
| Ballona Creek Trash (BC Trash) | 2004-023 | 08/11/2005 |
| Ballona Creek Estuary Toxic Pollutants (BC Toxics TMDL) | 2006-011 | 01/11/2006 |
| | 2013-010 | Not Yet Effective |
| Ballona Creek, Ballona Estuary, and Sepulveda Channel Bacteria (BC Bacteria TMDL) | 2007-015 | 04/27/2007 |
| | 2012-008 | 07/02/2014 |
| Ballona Creek Metals (BC Metals TMDL) | 2007-015 | 10/29/2008 |
| | 2013-010 | Not Yet Effective |
| Santa Monica Bay Nearshore and Offshore Debris (Debris TMDL) | 2010-010 | 03/20/2012 |
| Santa Monica Bay DDTs and PCBs (SMB Toxics) | NA (USEPA TMDL) | 03/26/2012 |
| Ballona Creek Wetlands TMDL for Sediment and Invasive Exotic Vegetation (Wetlands TMDL) | | 03/26/2012 |

## *2.1 Ballona Creek Trash TMDL*

The BC Trash TMDL requires all Responsible Parties assigned trash WLAs to either install Los Angeles Regional Water Quality Control Board (Regional Board) -approved trash full capture devices or implement partial capture systems and/or institutional controls. Responsible Parties utilizing partial capture systems and/or institutional controls must use a mass balance approach to estimate trash discharged. This is done through a calculated daily generation rate (DGR). The DGR is the average amount of trash accumulated in a specific land area over a 24-hour period. The DGR is used to estimate the amount of trash discharged after a storm event. The sum of all storm event discharges equals the calculated annual trash discharge for a Responsible Party. As such, Responsible Parties utilizing partial capture treatment systems and institutional controls must directly measure the amount of trash deposited in the drainage area during the month of

July each year1. Annual recalculation acts as a measure of the effectiveness of source reduction measures. The recommended method for measuring trash during this time period is to close the catch basins in a manner that prevents trash from being swept into the catch basins, and then to collect trash on the ground via street sweeping, manual pickup, or other comparable means. The DGR and storm event discharge are calculated using the following equations:

DGR = Amount of trash collected during July / 31 days

Storm Event Discharge = [days since last street sweeping * DGR] - Volume of trash from catch basins

## *2.2 Ballona Creek Estuary Toxic Pollutants TMDL*

The BCE Toxics TMDL requires ambient water quality monitoring and TMDL effectiveness monitoring to assess the condition of Ballona Creek and the Estuary and to assess the on-going effectiveness of the Responsible Parties implementation efforts. A revised BCE Toxics TMDL was recently adopted by the Regional Board on December 5, 2013. The revised BCE Toxics TMDL contains modifications to the monitoring requirements presented in the currently effective BCE Toxics TMDL. Most notably, the revised BCE Toxics TMDL no longer requires ambient water quality monitoring, but still requires effectiveness monitoring. **Table 6** summarizes the TMDL monitoring required in the effective and amended BCE Toxics TMDL. As described in detail in **Section 1** of this Attachment, the BCWMG is currently implementing a CMP to meet the monitoring requirements of BCE Toxics TMDL. Implementation of the CIMP will replace the CMP.

[1] Provided no special events are scheduled that may affect the representative nature of this period.

**Table 6. Summary of Toxics TMDL Monitoring Requirements**

| Matrix | Monitoring Type | Effective TMDL Monitoring Requirements | Amended TMDL Monitoring Requirements |
|---|---|---|---|
| Water Samples | Ambient | Monthly samples from Ballona Creek and Estuary of: cadmium, copper, lead, silver, zinc, chlordane, dieldrin, DDT, total PCBs, and total PAHs. | None |
| | TMDL Effectiveness | Wet weather MS4 stormwater samples must be analyzed for: TDS, settable solids, TSS, as well as cadmium, copper, lead, silver, zinc, chlordane, dieldrin, total DDT, total PCBs, total PAHs, and TOC in bulk sediment. | Same as Effective TMDL Monitoring Requirements. |
| Sediment Samples | Ambient | First-year quarterly samples at representative BCE sites analyzed for: cadmium, copper, lead, silver, zinc, chlordane, dieldrin, DDT, total PCBs, and total PAHs.<br>Semi-annually thereafter until TMDL reconsideration in 6th year.<br>Quarterly sediment toxicity testing (lethal and non-lethal). | None |
| | TMDL Effectiveness | Semi-annual samples from random, representative BCE sites analyzed for: cadmium, copper, lead, silver, zinc, chlordane, dieldrin, DDT, total PCBs, total PAHs, TOC, and grain size.<br>Semi-annual sediment toxicity testing (lethal and non-lethal).<br>Accelerated sediment toxicity monitoring is required for all sites considered toxic: six additional tests, approx. every 2 weeks, for 12 weeks.<br>TIE testing is required if survival from any 2 of the accelerated tests is <90%. | Sampling and analysis for the full chemical suite, two toxicity tests, and four benthic indices (sediment triad sampling) every five years.<br>Annual samples analyzed for: cadmium, copper, lead, silver, zinc, chlordane, total DDT, total PCBs, total PAHs, TOC, and grain size.<br>Annual sediment toxicity testing. |
| Bioaccumulation Samples | TMDL Effectiveness | Fish and mussel tissue collected from the Estuary analyzed for constituents on a schedule as determined by the Permittees. | Annual fish and mussel tissue collected from the Estuary analyzed for chlordane, total DDTs, and PCBs. |

## *2.3 Ballona Creek, Ballona Estuary, and Sepulveda Channel Bacteria TMDL*

The BC Bacteria TMDL requires in-stream monitoring to assess TMDL effectiveness based on allowable exceedance days for total coliform, fecal coliform, enterococcus, and E. coli. Responsible Parties must conduct daily or systematic weekly sampling at a minimum of two locations within the BCE and Ballona Creek Reach 2, and at least one location within Ballona Creek Reach 1, Sepulveda Channel, the confluence of Ballona Creek and Centinela Creek, and the confluence of Ballona Creek and Benedict Canyon. Similar monitoring at the connecting tide

gates of Del Rey Lagoon is also required. Responsible Parties were also required to submit an outfall monitoring plan. As described detail in **Section 1** of this Attachment, the BCWMG is currently implementing a CMP to meet the monitoring requirements of this TMDL. Implementation of the CIMP will replace the CMP.

## *2.4 Ballona Creek Metals TMDL*

The BC Metals TMDL requires ambient water quality monitoring and TMDL effectiveness monitoring to assess the condition of Ballona Creek and the BCE and to assess the on-going effectiveness of the Responsible Parties implementation efforts. A revised BC Metals TMDL was recently adopted by the Regional Board on December 5, 2013 and modifies the monitoring requirements to focus on TMDL effectiveness monitoring. In addition, the revised BC Metals TMDL added the requirement to analyze for water column toxicity, and copper, lead, zinc, and selenium in the total recoverable and dissolved fraction. As described detail in **Section 1** of this Attachment, the BCWMG is currently implementing a CMP to meet the monitoring requirements of this TMDL. Implementation of the CIMP will replace the CMP.

## *2.5 Santa Monica Bay Nearshore and Offshore Debris TMDL*

The Debris TMDL requires Responsible Parties to develop a Trash Monitoring and Reporting Plan (TMRP) for Regional Board Executive Officer approval that describes the methodologies that will be used to assess and monitor trash in their responsible areas within the Santa Monica Bay watershed or along Santa Monica Bay. The TMRP is to include a plan to establish a site specific trash baseline water quality-based effluent limitation if Permittees elect to not use the default baseline effluent limitation. Requirements for the TMRP include, but are not limited to, assessment and quantification of trash collected from source areas in the Santa Monica Bay watershed, and shoreline of the Santa Monica Bay. The monitoring plan shall provide details on the frequency, location, and reporting format. Permittees shall propose a metric (e.g., weight, volume, pieces of trash) to measure the amount of trash discharged from their jurisdictional areas.

The Debris TMDL requires all Permittees identified as point sources of trash in the Trash TMDL to either (1) develop and submit a Plastic Pellet Monitoring and Reporting Plan (PMRP) or (2) demonstrate a PMRP is not required. Permittees may demonstrate that a PMRP is not required under certain circumstances, as follows:

1. Jurisdictions with industrial facilities or activities related to plastic pellets must create a PMRP to – (1) monitor the amount of plastic pellets discharged from MS4, (2) establish triggers for increased industrial facility inspection or enforcement, and (3) address possible pellet spills;
2. Jurisdictions without industrial facilities or activities related to plastic pellets may not be required to conduct monitoring at MS4 outfalls, but must provide a spill response plan in the PMRP.
3. Jurisdictions with only residential land uses and limited commercial or industrial transportation corridors may submit information documenting such and be exempt from developing a PMRP.

## 2.6 Santa Monica Bay DDTs and PCBs TMDL

The USEPA-established SMB Toxics TMDL provides monitoring recommendations rather than monitoring requirements. However, the Permit incorporated specific monitoring requirements into the MRP (Part XIX.E) as presented in **Table 7**.

**Table 7. Summary of SMB DDTs and PCBs TMDL Monitoring Requirements**

| TMDL | Monitoring Requirements | Due Date |
|---|---|---|
| SMB Toxics TMDL | Develop coordinated, watershed-wide MRP describing methodologies to be used to monitor and assess DDTs and PCBs in sediment to identify loading to the Bay. Monitoring sediments in catch basins designed for pollutant prevention may be a way for Permittees to quantify load reductions to the Santa Monica Bay. | Submit as part of IMP or CIMP or within 12 months of effective date |

## 2.7 Ballona Creek Wetlands TMDL for Sediment and Invasive Exotic Vegetation

The USEPA-established Wetlands TMDL provides monitoring recommendations rather than monitoring requirements. However, specific monitoring requirements were incorporated into the MRP (Part XIX.E). The MRP requires the Permittees to develop a Sediment Monitoring and Reporting Plan to quantify the annual loading of sediment from the Ballona Creek watershed and the impact from the sediment loading to the Ballona Creek Wetlands.

## 2.8 Summary of TMDL Compliance Points

**Table 8** presents interim and final compliance deadlines for the relevant TMDLs. The numeric water quality-based effluent limitations (WQBELs) and receiving water limitations (RWLs) and the WLAs for the USEPA TMDLs listed in **Table 8** can be found in Attachment M of the Permit. The Permit presents alternative WQBELs and RWLs for the BC Bacteria TMDL, which will become effective upon the effective date of the TMDL amendment (i.e., after USEPA approval of the amendment). The BC Toxics TMDL and BC Metals TMDL were amended on December 5, 2013 by the Regional Board. Revised WQBELs must be incorporated in the Permit by the Regional Board at some point after the effective date of the TMDL amendment. However, for the purposes of developing the EWMP it is recommended that the EWMP consider WQBELs based on both the current and amended TMDLs.

**Table 8. Interim and Final TMDL Compliance Milestones Applicable to the Ballona Creek Watershed**

| TMDL | Water-bodies | Constituents | Compliance Goal | Weather Condition | Compliance Dates and Compliance Milestones (Bolded numbers indicated milestone deadlines within the current Permit term)[1] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | 2018 | 2019 | 2020 | 2021 | 2025 |
| BC Trash | All Water-Bodies | Trash | % Reduction | All | **9/30** | **9/30** | **9/30** | **9/30** | | | | | | | |
| | | | | | **80%** | **90%** | **96.7%** | **100%** | | | | | | | |
| Santa Monica Bay Trash | Santa Monica Bay | Trash | % Reduction | All | | | | | **3/20** | **3/20** | 3/20 | 3/20 | 3/20 | | |
| | | | | | | | | | **20%** | **40%** | 60% | 80% | 100% | | |
| BC Bacteria | Estuary, Centinela Creek, Del Rey Lagoon | Total Coliform, Fecal Coliform, Enterococcus | % of MS4 Area Meets WQBELs | Dry | | **4/27** | | | | | | | | 7/15 | |
| | | | | | | **100%** | | | | | | | | | |
| | Reach 2, Sepulveda Canyon, Benedict Canyon[2] | *Escherichia coli* (*E. coli*) | | Wet | | | | | | | | | | 100% | |
| | Reach 1 | Fecal Coliform | | | | | | | | | | | | | |
| BC Toxics | Estuary | Sediment: Copper, Lead, Zinc, Silver, | % of MS4 Area Meets WQBELs | All | | **1/11** | | **1/11** | | **1/11** | | | | 1/11 | |
| | | DDT, Chlordane, PCBs | | | | **25%** | | **50%** | | **75%** | | | | 100% | |
| Amended BC Toxics | Estuary | Sediment: Copper, Lead, Zinc, Silver, DDT, Chlordane | % of MS4 Area Meets WQBELs or Reduction in Loading | All | | **1/11** | | | **1/11** | **1/11** | | | | 1/11 | 1/11 |
| | | | | | | **25%** | | | **50%** | **75%** | | | | 100% | |
| | | Sediment: PCBs | | | | **25%** | | | **25%** | | | | | 50% | 100% |
| BC Metals | Reach 1, 2, Sepulveda Canyon | Copper, Lead, Zinc, Selenium | % of MS4 Area Meets WQBELs | Dry | **1/11** | | **1/11** | | **1/11** | | | | | 1/11 | |
| | | | | | **50%** | | **75%** | | **100%** | | | | | | |
| | | | | Wet | **25%** | | | | **50%** | | | | | 100% | |

| TMDL | Water-bodies | Constituents | Compliance Goal | Weather Condition | Compliance Dates and Compliance Milestones (Bolded numbers indicated milestone deadlines within the current Permit term)[1] | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | 2018 | 2019 | 2020 | 2021 | 2025 |
| Amended BC Metals | Reach 1, 2, Sepulveda Canyon | Copper, Lead, Zinc | % of MS4 Area Meets WQBELs or Reduction in Loading | Dry | **1/11** | | **1/11** | | **1/11** | | | | | 1/11 | |
| | | | | | **50%** | | **75%** | | **100%** | | | | | | |
| | | | | Wet | **25%** | | | | **50%** | | | | | 100% | |
| Santa Monica Bay DDTs and PCBs | Santa Monica Bay | PCBs and DDT | Meet WLAs | All | USEPA TMDLs, which do not contain interim milestones or implementation schedule. The Permit (Part VI.E.3.c, pg. 145) allows MS4 Permittees to propose a schedule in a EWMP. | | | | | | | | | | |
| BC Wetlands Sediment and Invasive Exotic Vegetation | Wetlands | Sediment and Invasive Species | Meet WLAs | All | | | | | | | | | | | |

1. The Permit term is assumed to be five years from the Permit effective date (i.e., December 27, 2017).
2. Note that although Benedict Canyon Channel is identified in TMDLs as a tributary to Ballona Creek, it is a closed channel that daylights where the channel meets Ballona Creek and is not identified in the Basin Plan as a waterbody in the watershed. As such, it is not considered a tributary for the purposes other than addressing the bacteria TMDL for the watershed.

# 3 Water Quality Priorities

The identification of water quality priorities is an important first step in the EWMP process. The water quality priorities provide the basis for prioritizing implementation and monitoring activities within the EWMP and CIMP. As part of the EWMP development, water quality was characterized and waterbody pollutant combinations (WBPCs) were placed into various categorizes. The information developed as part of the *Work Plan for the Enhanced Watershed Management Program for the Ballona Creek Watershed* (EWMP Work Plan) was utilized to identify locations and constituents for monitoring. Additionally, the historical data utilized for characterization can be used in conjunction with data collected via the CIMP to support future modifications to the CIMP. The following briefly presents relevant key findings of the water quality analysis, the resulting WBPCs, and a description of how the WBPCs are addressed in this CIMP. For additional details on the analysis and results see the EWMP Work Plan.

## *3.1 Summary of Key Findings of Receiving Water Data Analysis*

The following provides a summary of key findings from the receiving water data analysis that affect the monitoring approach contained in this CIMP. It is not intended to be a detailed discussion of all the results of the data analysis. Instead, the summary highlights outcomes of the data analysis that may affect the constituents addressed by the CIMP and/or the way the CIMP approaches addressing the constituent. The key findings are organized as follows:

1. Constituents not on the 303(d) List, but appear to meet the listing requirements.
2. Constituents exceeding objectives, but do not meet the 303(d) listing requirements.
3. Identification of current 303(d) listed constituents not addressed by a TMDL that appear to meet the delisting requirements.

### 3.1.1 Constituents not on the 303(d) List, but Appear to Meet Listing Requirements

The data analysis identified a number of constituents exceeding relevant water quality objectives, at a frequency that appears to meet the 303(d) listing criteria. The following identifies the constituents by waterbody and discusses the frequency of exceedances during relevant conditions (e.g., wet and/or dry weather). **Table 9** presents a summary of the information.

**Table 9. Summary of Key Findings – Constituents not Currently on the 303(d) List, but Appear to Meet Listing Criteria**

| Waterbody | Constituent | Wet/ Dry | % Exceed | % Exceed in Past 5 Years | Source of Water Quality Objective |
|---|---|---|---|---|---|
| Ballona Creek Estuary | Zinc Dissolved | Wet | 13% | NS | CTR Saltwater Acute |
| | Zinc Total | Wet | 19% | NS | CTR Saltwater Acute |
| | Copper Dissolved | Wet | 60% | NS | CTR Saltwater Acute |
| | Copper Total | Wet | 69% | NS | CTR Saltwater Acute |
| | Copper Dissolved | Dry | 48% | 6% | CTR Saltwater Chronic |
| | Copper Total | Dry | 52% | 6% | CTR Saltwater Chronic |
| | Lead Dissolved | Dry | 18% | 0% | CTR Saltwater Chronic |
| | Lead Total | Dry | 21% | 0% | CTR Saltwater Chronic |
| | Nickel Dissolved | Dry | 22% | NS | CTR Saltwater Chronic |
| | Nickel Total | Dry | 26% | NS | CTR Saltwater Chronic |
| | Mercury Total | Wet | 29% | NS | CTR HH Organism |
| | Mercury Total | Dry | 23% | NS | CTR HH Organism |
| | Dibenzo(a,h)anthracene | Dry | 13% | 13% | CTR HH Organism |
| | Indeno(1,2,3-cd)pyrene | Dry | 13% | 13% | CTR HH Organism |
| Ballona Creek Reach 1 | Silver Dissolved | Wet | 10% | 0% | CTR Freshwater Acute |
| | Silver Total | Wet | 10% | 0% | CTR Freshwater Acute |
| | Mercury Total | Wet | 30% | NS | CTR HH Organism |
| | Mercury Total | Dry | 27% | NS | CTR HH Organism |
| Ballona Creek Reach 2 | Benzo(a)anthracene | Wet | 8% | 10% | CTR HH Organism |
| | Mercury Total | Wet | 10% | 0% | CTR HH Organism |
| | Mercury Total | Dry | 22% | 13% | CTR HH Organism |
| | pH | Dry | 24% | 29% | BP Minimum/Maximum |
| Centinela Creek | 4,4'-DDE | Wet | 11% | 19% | CTR HH Organism |
| Sepulveda Channel | pH | Dry | 80% | 0% | BP Minimum/Maximum |

BP = Basin Plan CTR = California Toxics Rule NS = Not Sampled within the past five years
HH Organism = Human Health Organisms only criteria

### 3.1.2 Constituents Exceeding Objectives, but do not Meet the Listing Requirements

The data analysis identified a number of constituents as exceeding relevant water quality objectives, but not at a frequency that meets the 303(d) listing criteria. The following identifies the constituents by waterbody and discusses the frequency of exceedances during relevant conditions (e.g., wet and/or dry weather). **Table 10** presents a summary of the information

**Table 10. Summary of Key Findings – Constituents Exceeding Objectives, but do not Appear to Meet Listing Criteria**

| Waterbody | Constituent | Wet/ Dry | % Exceed | % Exceed in Past 5 Years | Source of Water Quality Objective |
|---|---|---|---|---|---|
| Ballona Creek Estuary | Silver Dissolved | Wet | 6% | NS | CTR Saltwater Acute |
| | Silver Total | Wet | 6% | NS | CTR Saltwater Acute |
| | Zinc Total | Dry | 2% | 0% | CTR Saltwater Chronic |
| Ballona Creek Reach 1 | Cadmium Total | Wet | 5% | 0% | CTR Freshwater Acute |
| Ballona Creek Reach 2 | 3,4 Benzofluoranthene | Wet | 1.7% | 2.6% | CTR HH Organism |
| | 4,4'-DDE | Wet | 1.8% | 2.6% | CTR HH Organism |
| | Ammonia-N | Dry | 3.7% | 6.7% | BP 30-day Acute early life stage fish present |
| | Benzo(a)pyrene | Wet | 1.5% | 2.6% | CTR HH Organism |
| | Bis(2-Ethylhexyl) phthalate | Wet | 6.5% | 5.3% | CTR HH Organism |
| | Bis(2-Ethylhexyl) phthalate | Dry | 7.7% | 0% | CTR HH Organism |
| | Cadmium Total | Wet | 1.9% | 0% | CTR Freshwater Acute |
| | Chrysene | Wet | 1.5% | 2.6% | CTR HH Organism |
| | Indeno(1,2,3-cd)pyrene | Wet | 1.5% | 2.6% | CTR HH Organism |
| | Silver Dissolved | Wet | 1% | 0% | CTR Freshwater Acute |
| | Silver Total | Wet | 1.9% | 0% | CTR Freshwater Acute |
| | alpha-chlordane | Wet | 1.8% | 2.6% | CTR HH Organism |
| | gamma-chlordane | Wet | 1.8% | 2.6% | CTR HH Organism |
| | Diazinon | Wet | 3.3% | 0% | USEPA Freshwater Acute |
| | Oxygen Dissolved | Wet | 4.7% | 0% | BP Single Sample Minimum |
| | Cyanide Total | Wet | 7.1% | 5.3% | CTR Freshwater Acute |
| | | Dry | 3.8% | 0% | CTR Freshwater Chronic |
| | pH | Wet | 9.5% | 15% | BP Minimum/Maximum |
| Centinela Creek | 4,4'-DDT | Wet | 3.7% | 6% | CTR HH Organism |
| | Benzo(a)anthracene | Wet | 4.5% | 6% | CTR HH Organism |
| | Benzo(k)fluoranthene | Wet | 3.7% | 6% | CTR HH Organism |
| | Bis(2-Ethylhexyl) phthalate | Wet | 9% | 9% | CTR HH Organism |
| | Cadmium Total | Wet | 5.3% | 0% | CTR Freshwater Acute |
| | Chrysene | Wet | 3.7% | 6% | CTR HH Organism |
| | Silver Total | Wet | 5.3% | 13% | CTR Freshwater Acute |
| | Indeno(1,2,3-cd)pyrene | Wet | 3.7% | 6% | CTR HH Organism |
| | pH | Wet | 18.2% | NS | BP Minimum/Maximum |
| | | Dry | 33.3% | NS | BP Minimum/Maximum |

| Waterbody | Constituent | Wet/ Dry | % Exceed | % Exceed in Past 5 Years | Source of Water Quality Objective |
|---|---|---|---|---|---|
| Sepulveda Channel | Bis(2-Ethylhexyl) phthalate | Wet | 9.1% | NS | CTR HH Organism |
| | Diazinon | Wet | 9.1% | NS | USEPA Freshwater Acute |
| | Cyanide Total | Wet | 9.1% | NS | CTR Freshwater Acute |

BP = Basin Plan CTR = California Toxics Rule NS = Not Sampled within the past five years
HH Organism = Human Health Organisms only criteria

### 3.1.3 Identification of Current 303(d) Listed Constituents not Addressed by a TMDL that Meet the Delisting Requirements

Two of the three 303(d) listings not addressed by an existing TMDL were identified as potentially meeting delisting requirements: ammonia and cyanide. Cyanide in Ballona Creek was listed based on three of 18 samples exceeding at the County of Los Angeles mass emission station between October 2000 and April 2003. A review of the past 10 years of data indicates that only five of 82 samples exceed the applicable CTR criteria. For toxicants, the maximum number of exceedances allowed for delisting is shown in Table 4.1 (Page 14) of the *Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List* (Listing Policy) and indicates that if the sample size is between 72 and 82 a constituent can be delisted if the number of exceedances is equal to or less than six.

Data for ammonia and pH were collected by the Los Angeles Department of Public Works in Sepulveda Channel (Culver Blvd and at Ballona Creek locations) from May 1988 to July 1994. Additional ammonia, pH, and temperature data were collected by the City of Los Angeles in Sepulveda Channel at Culver Blvd. from May 2009 to October 2009 and by the Regional Board at six stations in Sepulveda Channel in January 2009. Based on the additional data the total number of exceedances is below the maximum number of exceedances allowed to delist per the Listing Policy. As a result, the available data demonstrates that Sepulveda Channel meets the water quality objectives for ammonia.

## *3.2 Waterbody Pollutant Combinations*

Water quality priorities for the EWMP area are based on TMDLs, the 2010 303(d) list, and monitoring data. Based on available information and data analysis, Waterbody Pollutant Combinations (WBPCs) were classified in one of the three Permit defined categories. The process for categorizing water quality priorities is summarized in the EWMP Work Plan. For brevity, only the resulting Categories are presented. **Table 11** presents the Ballona Creek watershed WBPCs in Categories 1, 2 and 3. The three Permit categories are defined as:

- **Category 1:** WBPCs for which TMDL WQBELs and/or RWLs are established in Part VI.E and Attachments L and O of the MS4 Permit.
- **Category 2:** WBPCs for which data indicate water quality impairment in the receiving water according to the *Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List* (Listing Policy), regardless of whether the pollutant is currently on the 303(d) List and for which the MS4 discharges may be causing or contributing.

- **Category 3:** WBPCs for which there are insufficient data to indicate impairment in the receiving water according to the Listing Policy, but which exceed applicable receiving water limitations contained in the MS4 Permit and for which MS4 discharges may be causing or contributing to the exceedance.

To further support development of the Work Plan and EWMP, the three Permit categories were further subdivided into subcategories and each WBPC was assigned to an appropriate subcategory. Additionally, pollutants were identified as belonging to a specific "class". As stated in the Permit (pg. 49, footnote 21), pollutants are considered in a similar class if they have similar fate and transport mechanisms, can be addressed via the same types of control measures, and within the same timeline already contemplated as part of the EWMP for the TMDL. The "classes" are preliminary in nature and may be refined as part of EWMP development. The following classes were identified:

- Metals
- Trash
- Bacteria
- Sediment
- Historical Organics – inclusive of historical pesticides.
- Current Organics – inclusive of current use pesticides and other organics such as PAHs.
- To be determined – used for conditions (pH and dissolved oxygen) that are not pollutants, per se, or constituents where the linkage to another type of constituent will be further investigated during EWMP development.

Constituents that were identified as a water quality priority are included in this CIMP and monitored as described below. Constituents may change subcategories as the monitoring progresses, source investigations occur, and best management practice (BMP) implementation begins. Constituents for which exceedances decrease over time will be removed from the priority list and moved to the monitoring priority categories; or, dropped from the priority list. If the frequency of constituent exceedances increases to a consistent level, for a constituent that is currently not a priority, then the constituent would be reevaluated using the prioritization procedure, likely increasing the priority of the constituent.

**Category 1 WBPCs:** All WBPCs required to be monitored by a TMDL through either a Basin Plan Amendment approved by the Regional Board or through monitoring requirements specified in the MRP will be monitored as part of this CIMP. As further described in **Section 15.5.3** of **Attachment D**, sediment loading is addressed via estimation of loadings from TSS measurements during three storm events. The effect on the wetlands will be assessed if loadings exceed WLAs. Exceedances of WLA will trigger development of an assessment plan.

**Category 2 WBPCs:** All WBPCs that are included on the current 303(d) list will be monitored during the weather condition for which the WBPC is 303(d) listed, if specified, except for cyanide in Ballona Creek Reach 2 given that it can be delisted (as detailed in **Section 3.1.3** of this Attachment), given the low exceedance frequency in the waterbody of 1 of 26 samples in the past 10 years and 0 samples in the past five years during dry weather, and given the low exceedance frequency in the waterbody of 4 of 56 samples in the past 10 years and 1 of 19

samples in the past five years during wet weather. All WBPCs for which data indicate water quality impairment in the receiving water according to the Listing Policy will be monitored as part of this CIMP.

**Category 3 WBPCs:** All WBPCs for which there are insufficient data to indicate impairment in the receiving water according to the Listing Policy, but which have exceeded applicable receiving water limitations in the past five years and for which MS4 discharges may be causing or contributing to the exceedance will be monitored as part of this CIMP during the weather condition for which exceedances of the applicable receiving water limitation have occurred in the past five years. All WBPCs which exceeded applicable receiving water limitations in the past 10 years, but not the past five years based on the available data, will **not** be monitored. If included in Table E-2 of the MRP, these constituents will be monitored during the first year of monitoring. For constituents detected above the lowest applicable water quality objective during the first year of monitoring, future monitoring will be conducted and may be trigger upstream.
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**Table 11. Summary of Ballona Creek Water Body Pollutant Categories**

| Class[1] | Constituents | Ballona Creek | | | | Centinela Creek | Sepulveda Channel | Benedict Channel[2] | Santa Monica Bay |
|---|---|---|---|---|---|---|---|---|---|
| | | Estuary | Wetlands | Reach 1 | Reach 2 | | | | |
| **Category 1A: WBPCs with past due or current Permit term TMDL deadlines with exceedances in the past 5 years. (I = Interim and F = Final Limits)** | | | | | | | | | |
| Trash | Trash | I/F | I/F | I/F | I/F | I/F | I/F | -- | I |
| Bacteria | Total Coliform, Fecal Coliform, Enterococcus | F (Dry) | -- | -- | -- | F (Dry) | -- | | F (Dry) |
| | E. coli | -- | -- | F (Dry) | | | F (Dry) | F (Dry) | -- |
| | Fecal Coliform | | | | F (Dry) | | | | |
| Metals | Copper, Lead, Zinc, Selenium[3] | -- | -- | I (Wet & Dry)/F (Dry) | | | | -- | -- |
| Metals | Sediment: Cadmium, Copper, Lead, Zinc, Silver | I | -- | -- | -- | -- | -- | -- | -- |
| HO | Sediment: PAHs[3], Chlordane, DDT, PCBs | I | -- | -- | -- | -- | -- | -- | -- |
| **Category 1B: WBPCs with TMDL deadlines beyond the Permit term with exceedances in the past 5 years. (F = Final Limits)** | | | | | | | | | |
| Trash | Trash | -- | -- | -- | -- | -- | -- | -- | F |
| Metals | Copper, Lead, Zinc, Selenium[3] | -- | | F (Wet) | | | | -- | -- |
| Metals | Sediment: Cadmium, Copper, Lead, Zinc, Silver | F | -- | -- | -- | -- | -- | -- | -- |
| HO | Sediment: PAHs[3], Chlordane, DDT, PCBs | F | -- | -- | -- | -- | -- | -- | -- |
| Bacteria | Total Coliform, Fecal Coliform, Enterococcus | F (Wet) | -- | -- | -- | F (Wet) | -- | -- | F |
| | E. coli | -- | -- | F (Wet) | | | F (Wet) | F (Wet) | -- |
| | Fecal Coliform | | | | F (Wet) | | | | |
| **Category 1C: WBPCs addressed in USEPA TMDL without a Regional Board Adopted Implementation Plan. (WLA = Wasteload Allocation)** | | | | | | | | | |
| HO | DDT (sediment) | -- | -- | -- | -- | -- | -- | -- | WLA |
| | PCBs (sediment) | -- | -- | -- | -- | -- | -- | -- | WLA |
| Sediment | Sediment | -- | WLA | -- | -- | -- | -- | | -- |

| Class[1] | Constituents | Ballona Creek | | | | Centinela Creek | Sepulveda Channel | Benedict Channel[2] | Santa Monica Bay |
|---|---|---|---|---|---|---|---|---|---|
| | | Estuary | Wetlands | Reach 1 | Reach 2 | | | | |
| **Category 1D: WBPCs with past due or current Permit term TMDL deadlines but have not exceeded in past 5 years.** | | | | | | | | | |
| | None | -- | -- | -- | -- | -- | -- | -- | -- |
| **Category 2A: 303(d) Listed WBPCs or WBPCs that meet 303(d) Listing requirements with exceedances in the past 5 years.** | | | | | | | | | |
| Bacteria | Fecal Coliform (Shellfish Harvesting Advisory) | 303(d) | -- | -- | -- | -- | -- | | -- |
| Metals | Cyanide | -- | -- | -- | Delist | -- | -- | -- | -- |
| Metals | Copper (dissolved and total) | Dry | -- | -- | -- | -- | -- | -- | -- |
| Metals | Mercury (total) | -- | -- | -- | Dry | -- | -- | -- | -- |
| HO | 4,4'-DDE | -- | -- | -- | -- | Wet | -- | -- | -- |
| CO | Benzo(a)anthracene | -- | -- | -- | Wet | -- | -- | -- | -- |
| CO | Dibenzo(a,h)anthracene | Dry | -- | -- | -- | -- | -- | -- | -- |
| CO | Indeno(1,2,3-cd)pyrene | Dry | -- | -- | -- | -- | -- | -- | -- |
| **Category 2B: 303(d) Listed WBPCs or WBPCs that meet 303(d) Listing requirements that are not a "pollutant"[4].** | | | | | | | | | |
| TBD | pH | -- | -- | -- | Dry | -- | Dry | -- | -- |
| **Category 2C: 303(d) Listed WBPCs or WBPCs that meet 303(d) Listing requirements but have not exceeded in past 5 years.** | | | | | | | | | |
| Nutrients | Ammonia | -- | -- | -- | -- | -- | Dry (Delist) | -- | -- |
| Metals | Copper (dissolved and total) | Wet (NS) | -- | -- | -- | -- | -- | -- | -- |
| Metals | Lead (dissolved and total) | Dry | -- | -- | -- | -- | -- | -- | -- |
| Metals | Mercury (total) | Wet (NS)/Dry (NS) | -- | Wet (NS)/Dry (NS) | Wet | -- | -- | -- | -- |
| Metals | Nickel (dissolved and total) | Dry (NS) | -- | -- | -- | -- | -- | -- | -- |
| Metals | Silver (dissolved and total) | -- | -- | Wet | -- | -- | -- | -- | -- |
| Metals | Zinc (dissolved and total) | Wet (NS) | -- | -- | -- | -- | -- | -- | -- |

| Class[1] | Constituents | Ballona Creek | | | | Centinela Creek | Sepulveda Channel | Benedict Channel[2] | Santa Monica Bay |
|---|---|---|---|---|---|---|---|---|---|
| | | Estuary | Wetlands | Reach 1 | Reach 2 | | | | |
| **Category 3A: All other WBPCs with exceedances in the past 5 years.** | | | | | | | | | |
| Nutrients | Ammonia-N | -- | -- | -- | Dry | -- | -- | -- | -- |
| Metals | Silver (total) | -- | -- | -- | -- | Wet | -- | -- | -- |
| HO | 4,4'-DDE | -- | -- | -- | Wet | -- | -- | -- | -- |
| HO | 4,4'-DDT | -- | -- | -- | -- | Wet | -- | -- | -- |
| CO | 3,4 Benzofluoranthene | -- | -- | -- | Wet | -- | -- | -- | -- |
| HO | alpha-chlordane | -- | -- | -- | Wet | -- | -- | -- | -- |
| HO | gamma-chlordane | -- | -- | -- | Wet | -- | -- | -- | -- |
| CO | Benzo(a)anthracene | -- | -- | -- | -- | Wet | -- | -- | -- |
| CO | Benzo(a)pyrene | -- | -- | -- | Wet | -- | -- | -- | -- |
| CO | Benzo(k)fluoranthene | -- | -- | -- | -- | Wet | -- | -- | -- |
| CO | Bis(2-Ethylhexyl) phthalate | -- | -- | -- | Wet | -- | -- | -- | -- |
| CO | Chrysene | -- | -- | -- | Wet | Wet | -- | -- | -- |
| CO | Indeno(1,2,3-cd)pyrene | -- | -- | -- | Wet | Wet | -- | -- | -- |
| **Category 3B: All other WBPCs that are not a "pollutant"[4].** | | | | | | | | | |
| TBD | Dissolved Oxygen | -- | -- | -- | Wet | -- | -- | -- | -- |
| TBD | pH | -- | -- | -- | Wet | Wet/Dry | -- | -- | -- |
| **Category 3C: All other WBPCs that have exceeded in the past 10 years, but not in past 5 years.** | | | | | | | | | |
| CO | Bis(2-Ethylhexyl) phthalate | -- | -- | -- | Dry | Wet (NS) | Wet (NS) | Wet (NS) | -- |
| CO | Diazinon | -- | -- | -- | Wet | -- | Wet (NS) | Wet (NS) | -- |
| Metals | Cadmium (total) | -- | -- | Wet | Wet | Wet | -- | -- | -- |
| Metals | Cyanide (total) | -- | -- | -- | -- | -- | Wet (NS) | -- | -- |
| Metals | Mercury (total) | -- | -- | -- | -- | -- | -- | Wet (NS) | -- |
| Metals | Silver (dissolved and total) | Wet (NS) | -- | -- | Wet | -- | -- | -- | -- |

| Class[1] | Constituents | Ballona Creek | | | | Centinela Creek | Sepulveda Channel | Benedict Channel[2] | Santa Monica Bay |
|---|---|---|---|---|---|---|---|---|---|
| | | Estuary | Wetlands | Reach 1 | Reach 2 | | | | |
| Metals | Zinc (total) | Dry (NS) | -- | -- | -- | -- | -- | -- | -- |

1. Pollutants are considered in a similar class if they have similar fate and transport mechanisms, can be addressed via the same types of control measures, and within the same timeline already contemplated as part of the EWMP for the TMDL. (Permit pg. 49, footnote 21).
2. Note that although Benedict Canyon Channel is identified in TMDLs as a tributary to Ballona Creek, it is a closed channel that daylights where the channel meets Ballona Creek and is not identified in the Basin Plan as a waterbody in the watershed. As such, it is not considered a tributary for the purposes other than addressing the bacteria TMDL for the watershed.
3. The BC Toxics and Metals TMDLs were amended on December 5, 2013 and WLAs associated with these constituents were removed. Associated WQBELs would be expected to be removed when the Permit is updated to incorporate these two TMDLs once they become effective.
4. While pollutants may be contributing to the impairment, it currently is not possible to identify the specific pollutant/stressor.

Note that unless explicitly stated as sediment, constituents are associated with the water column.

I/F = Denotes where the Permit includes interim (I) and/or final (F) effluent and/or receiving water limitations.

NS = Not sampled within the past five years.

303 = WBPC on the 2010 303(d) List where the listing was confirmed during data analysis.

Delist = WBPC on the 2010 303(d) List that could now be delisted.

HO = Historical Organics – inclusive of historical pesticides.

CO = Current Organics – inclusive of current use pesticides and other organics such as PAHs.

TBD = To be determined – used for conditions (pH and dissolved oxygen) that are not pollutants, per se, or constituents where the linkage to another type of constituent will be further investigated during EWMP development.

# 4 LACFCD Background Information

In 1915, the Los Angeles County Flood Control Act established the LACFCD and empowered it to manage flood risk and conserve stormwater for groundwater recharge. In coordination with the United States Army Corps of Engineers the LACFCD developed and constructed a comprehensive system that provides for the regulation and control of flood waters through the use of reservoirs and flood channels. The system also controls debris, collects surface storm water from streets, and replenishes groundwater with storm water and imported and recycled waters. The LACFCD covers the 2,753 square-mile portion of Los Angeles County south of the east-west projection of Avenue S, excluding Catalina Island. It is a special district governed by the County of Los Angeles Board of Supervisors, and its functions are carried out by the Los Angeles County Department of Public Works. The LACFCD service area is shown in **Figure 2**.

Unlike cities and counties, the LACFCD does not own or operate any municipal sanitary sewer systems, public streets, roads, or highways. The LACFCD operates and maintains storm drains and other appurtenant drainage infrastructure within its service area. The LACFCD has no planning, zoning, development permitting, or other land use authority within its service area. The permittees that have such land use authority are responsible under the Permit for inspecting and controlling pollutants from industrial and commercial facilities, development projects, and development construction sites. (Permit, Part II.E)

The Permit language clarifies the unique role of the LACFCD in storm water management programs: "[g]iven the LACFCD's limited land use authority, it is appropriate for the LACFCD to have a separate and uniquely-tailored storm water management program. Accordingly, the storm water management program minimum control measures imposed on the LACFCD in Part VI.D of this Order differ in some ways from the minimum control measures imposed on other Permittees. Namely, aside from its own properties and facilities, the LACFCD is not subject to the Industrial/Commercial Facilities Program, the Planning and Land Development Program, and the Development Construction Program. However, as a discharger of storm and non-storm water, the LACFCD remains subject to the Public Information and Participation Program and the Illicit Connections and Illicit Discharges Elimination Program. Further, as the owner and operator of certain properties, facilities and infrastructure, the LACFCD remains subject to requirements of a Public Agency Activities Program." (Permit, Part II.F)

Consistent with the role and responsibilities of the LACFCD under the Permit, the EWMPs and CIMPs reflect the opportunities that are available for the LACFCD to collaborate with permittees having land use authority over the subject watershed area. In some instances, the opportunities are minimal, however the LACFCD remains responsible for compliance with certain aspects of the MS4 permit as discussed above.

During the development of the CIMP, LACFCD infrastructure was evaluated for monitoring opportunities. The LACFCD will be collaborating with the groups for all of the monitoring.


**Figure 2. Los Angeles County Flood Control District Service Area**

# 5 Watershed Background References


Ballona Creek Monitoring Plan Subcommittee. 2007. *Ballona Creek Metals TMDL and Ballona Creek Estuary Toxic Pollutants TMDL Coordinated Monitoring Plan*. Chaired by the City of Los Angeles. January 10, 2007.

Ballona Creek Monitoring Plan Subcommittee. 2009. *Ballona Creek, Ballona Estuary, & Sepulveda Channel Bacteria TMDL Coordinated Monitoring Plan*. Chaired by the City of Los Angeles. January 29, 2009.

City of Los Angeles, Bureau of Sanitation. 2009. *Total Maximum Daily Load for Bacteria in Ballona Creek, Ballona Estuary, and Sepulveda Channel: Coordinated Monitoring Plan for Del Rey Lagoon*. January 29, 2009.

Ballona Creek Monitoring Plan Subcommittee. 2013. *Ballona Creek, Ballona Estuary, & Sepulveda Channel Bacteria TMDL: TMDL Outfall Monitoring Plan*. Chaired by the City of Los Angeles. April 26, 2013.

LARWQCB. 2001. *Amendments to the Water Quality Control Plan – Los Angeles Region for the Ballona Creek Trash TMDL*. Attachment A to Resolution No. 01-014. Adopted September 19, 2001. Effective August 28, 2002. Revised August 11, 2005.

LARWQCB. 2005. *Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate the Ballona Creek Estuary Toxic Pollutants TMDL*. Attachment A to Resolution No. R05-008. Adopted July 7, 2005. Effective January 11, 2006.

LARWQCB. 2006. *Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate the TMDL for Bacterial Indicator Densities in Ballona Creek, Ballona Estuary, and Sepulveda Channel*. Attachment A to Resolution No. R06-011. Adopted June 8, 2006. Effective April 27, 2007. Revised March 19, 2013.

LARWQCB. 2007. *Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate the Ballona Creek Metals TMDL*. Attachment A to Resolution No. R2007-015. Adopted September 6, 2007. Effective October 29, 2008.

LARWQCB. 2010. *Proposed Amendments to the Water Quality Control Plan – Los Angeles Region for the Santa Monica Bay Nearshore and Offshore Debris TMDL*. Attachment A to Resolution No. R10-010. Adopted November 4, 2010. Effective March 20, 2012.

USEPA. 2012a. *Ballona Creek Wetlands Total Maximum Daily Loads for Sediment and Invasive Exotic Vegetation*. USEPA Region 9. March 26, 2012.

USEPA. 2012b. *Santa Monica Bay Total Maximum Daily Loads for DDTs and PCBs*. USEPA Region 9. March 26, 2012.

# Attachment B. Monitoring Location Fact Sheets

**Attachment B** presents the monitoring locations fact sheets for the receiving water and stormwater outfall monitoring sites identified in the CIMP. For each site, the monitoring location fact sheets consist of relevant information (e.g., coordinates), a general description, aerial satellite imagery, a photograph, and land use information. Additionally, an analysis evaluating stormwater variability and the appropriateness of the number of outfall sites selected is presented.

# 6 Receiving Water Sites

The receiving water monitoring sites in the BCWMG EWMP area and the type of monitoring (e.g., LTA or TMDL) that will be conducted at each site are summarized in **Table 12**. The locations of the monitoring sites are shown in **Figure 3**. Each constituent required for monitoring by the MRP is addressed by at least one of the two types of receiving water monitoring. The following subsections present details for the receiving water monitoring sites. Note that the specific constituents that will be monitored at each site are presented in the CIMP. Factsheets for each site are presented in the following subsections.

Given that the BC Metals and Toxics CMP states the following with respect to the BC-1 site: "Prior to the start of conformance monitoring, this location will be re-evaluated by the monitoring committee. Depending on the results from ambient monitoring, there may be no additional benefit to monitoring this location since there are no additional contributions downstream of BC-2." Within the current CMP conformance monitoring is synonymous with effectiveness monitoring, as indicated by the following excerpt: "specified by the effectiveness monitoring program to measure conformance". Thus, based upon the results from ambient monitoring presented in **Figure 4** which indicate that the metals data collected at BC-1 are almost indistinguishable from the data collected at the other BC Metals and Toxics CMP site located in Ballona Creek Reach 2 (BC-2), there is not additional benefit to monitoring this location and, consistent with the BC Metals and Toxics CMP, metals effectiveness monitoring at BC_02_ING will be moved to the Ballona Creek Estuary (BCE_PAC).

As discussed in the CIMP, given that the bacteria data collected at BCB-2 are almost indistinguishable from the bacteria data collected at the other BC Bacteria CMP site located in Ballona Creek Reach 2 (BCB-5), monitoring at the BCB-2 monitoring site will be suspended until the end of the Time Schedule Order (TSO) related to the Bacteria TMDL, which is December 15, 2019. The BCWMG will propose to reinitiate monitoring at the BCB-2 location or an alternate site (e.g., below the proposed Low Flow Treatment Facility #1) in the December 15, 2019 annual report and begin monitoring after receiving approval of the approach from the Regional Board Executive Officer. **Figure 5** presents the data collected at each site during dry weather and wet weather with summary statistics. The summary statistics show that these data are almost indistinguishable throughout the year.

As discussed in the CIMP, two of the six sediment quality monitoring sites will be utilized to eliminate redundancy. When comparing the results of the sediment toxicity tests, the similarity

of the granulomentry, and the close proximity of monitoring stations BCE-2 and BCE-3, it appears that there is no justification to monitor both stations. Toxicity measurements at sites provided similar results (both stations BCE-2 and BCE-3 had six samples expressing toxicity). Also, when comparing the granulometry of the stations, BCE-2 and BCE-3 have a similar distribution of clay, silt, sand, and gravel. BCE-2, located near the Pacific Bridge, was chosen due the high level of water-contact recreation occurring there; swimming, fishing (taking of fish, crabs, and mussels), and kayaking are commonly observed at this station. BCE-3 was a randomly chosen monitoring station. Due to the similarity in sediment toxicity results, granulometry, and the close proximity between BCE-2 and BCE-3, eliminating BCE-3 results in a cost effective and appropriate modification.

BCE-4 is a randomly selected monitoring site located between the Ballona Wetlands tide-gate and Culver Blvd. BCE-4 had increased variability in sediment toxicity results compared to BCE-2 and BCE-3, including low toxicity (one test), moderate toxicity (two tests), and high toxicity (three tests). BCE-4 also appears to be located at a transition zone between the Ballona Estuary and Ballona Creek. Although BCE-4 has similar sediment to BCE-3 and BCE-2, it has less sand and much more gravel. Due to the spatial differences between BCE-4 and BCE-2, the differences in toxicity test results, and the differences in granulometry, BCE-4 was retained as part of the CIMP.

Upper estuary sample sites (BCE-5 and BCE-6) are granulometrically quite disparate from that observed from BCE-1 through BCE-4. The cement-lined environment of this area results in a sediment often dominated by gravel. In fact, the percent gravel from BCE-5 and BCE-6 in 2014 was 65.68 % and 73.06 %, respectively, resulting in much lower levels of measured constituents. It is known that there is a relationship between species diversity and sediment diversity. Thus, it is difficult to identify the cause of an acute effect as it is very likely that there is a proportion of toxicity that is due to non-contaminant factors, especially with the lowest concentrations being recorded at BCE-5 and BCE-6. Because of this, these two gravel-dominated sites do not appear to provide relevant information regarding impacts to the environment due to contaminants (i.e., non-pollutant factors effect responses observed at the site). As a result BCE-5 and BCE-6 are eliminated as sediment quality monitoring sites.

**Table 12. Summary of Receiving Water Monitoring Sites**

| Site ID | Waterbody/Location | Previous Site Name Used in TMDL Coordinated Monitoring Programs | Coordinates | | Monitoring Type | |
|---|---|---|---|---|---|---|
| | | | Latitude | Longitude | LTA | TMDL |
| BC_02_SAW | Ballona Creek Reach 2 at Sawtelle Blvd | BC-2 | 33.998293 | -118.402035 | X | X |
| BC_02_DUQ | Ballona Creek Reach 2 at Duquesne Ave | BCB-2 | 34.017342(1) | -118.389191(1) | | X |
| BC_02_ING | Ballona Creek Reach 2 at Inglewood Blvd | BC-1; BCB-5 | 33.989385(2) | -118.412169(2) | | X |
| BC_01_WAS | Ballona Creek Reach 1 at W Washington Blvd | BCB-1 | 34.032252 | -118.375328 | | X |
| BC_01_NAT | Ballona Creek Reach 1 at National Blvd | BC-3 | 34.027953 | -118.376366 | | X |
| BCC_DUQ | Benedict Canyon Channel upstream of confluence with Ballona Creek | BCB-3 | 34.015141 | -118.390655 | | X |
| SC_CUL | Sepulveda Channel at Culver Blvd | BC-4; BCB-4 | 33.998319 | -118.415671 | | X |
| CC_ING | Centinela Creek at Inglewood Blvd | BCB-7 | 33.987368 | -118.409549 | | X |
| CC_CEN | Centinela Creek at Centinela Ave | BC-5 | 33.985321 | -118.413104 | | X |
| DRL_BCE | Del Rey Lagoon at outlet to the Ballona Creek Estuary | BCB-9 | 33.962820 | -118.451837 | | X |
| BCE_MCC | Ballona Creek Estuary at McConnell Ave | BCB-6 | 33.981657 | -118.422380 | | X |
| BCE_CUL(3) | Ballona Creek Estuary downstream of Culver Blvd | BCE-4 | 33.971000(4) | -118.439000(4) | | X |
| BCE_PAC(3) | Ballona Creek Estuary at Pacific Ave | BCE-2; BCB-8 | 33.963035 | -118.453415 | | X |

1. Monitoring at this site will be suspended until the end of the BC Bacteria TMDL Time Schedule Order (TSO), which is December 15, 2019. A future annual report may propose to move the location of this site to an alternate site (e.g., below the proposed Low Flow Treatment Facility #1).
2. Bacteria monitoring will occur at 33.989891, -118.411571.
3. Bed sediment and fish tissue monitoring site.
4. General vicinity of monitoring site. Actual location where bed sediment and tissue samples are collected may vary slightly.

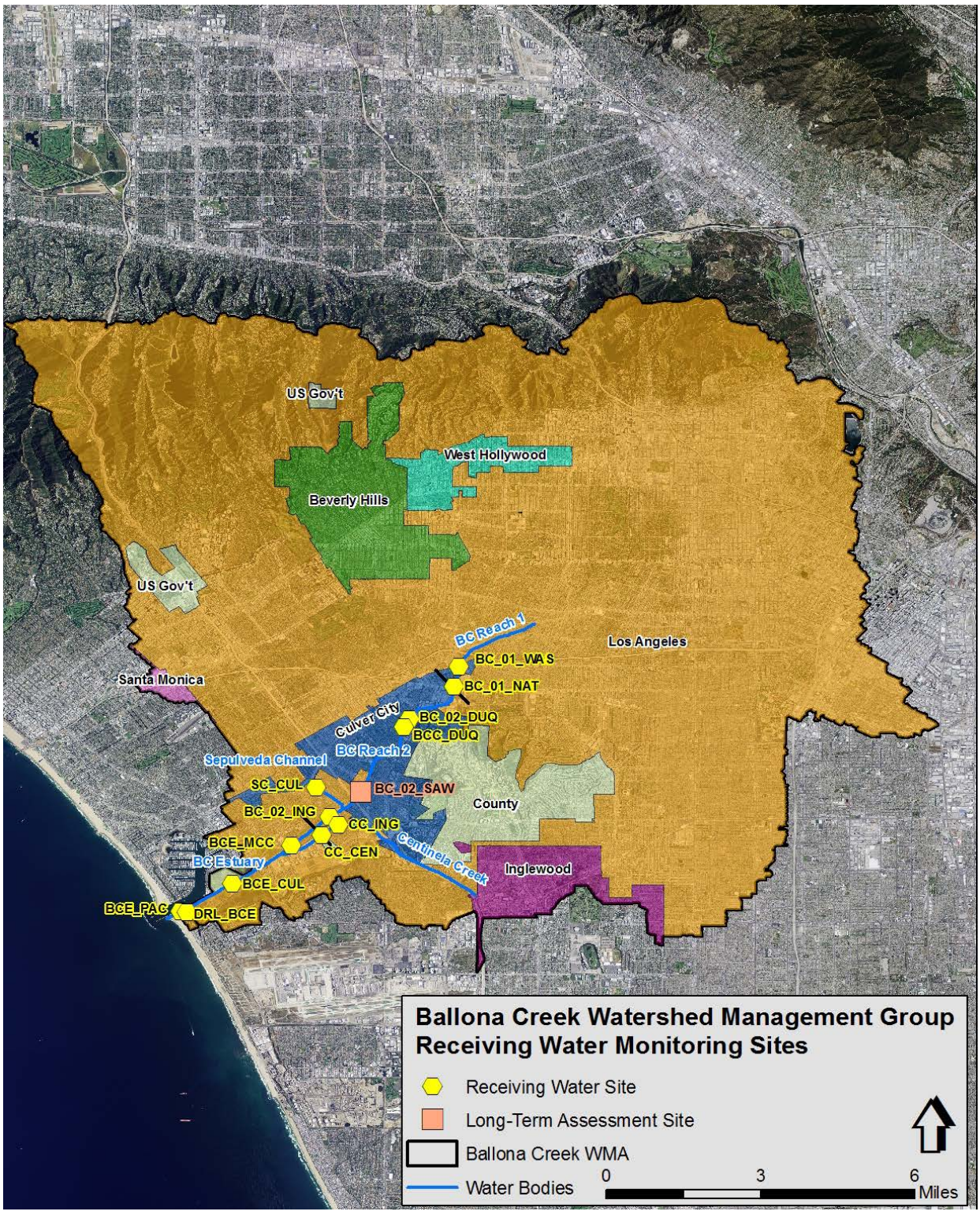



**Figure 3. Overview of Receiving Water Monitoring Sites**

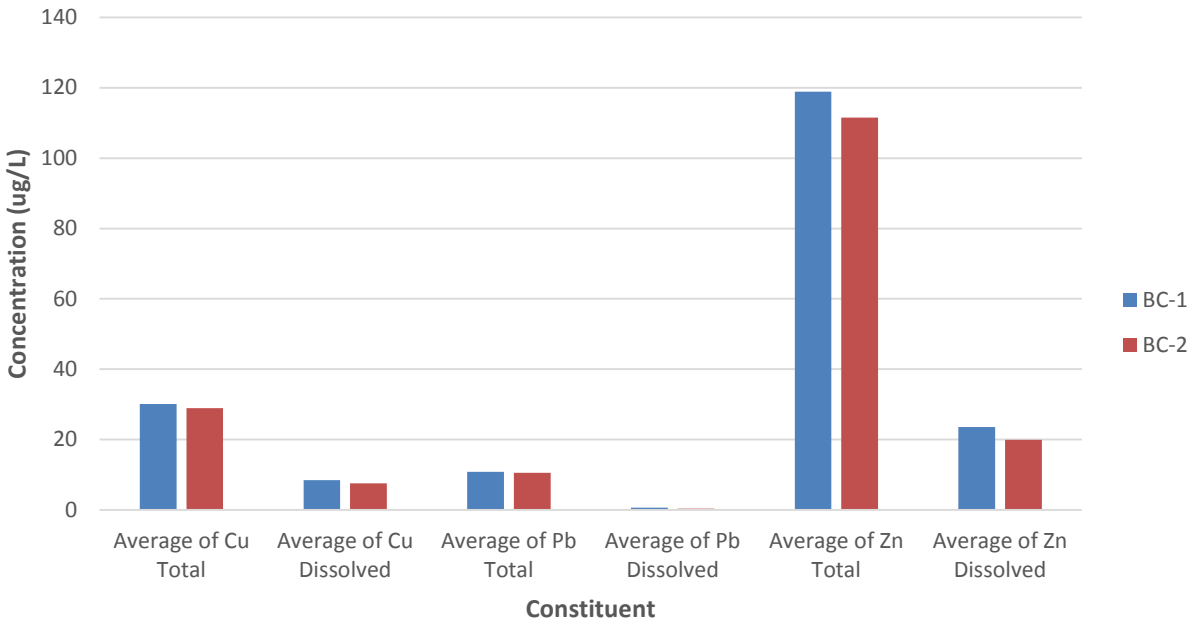
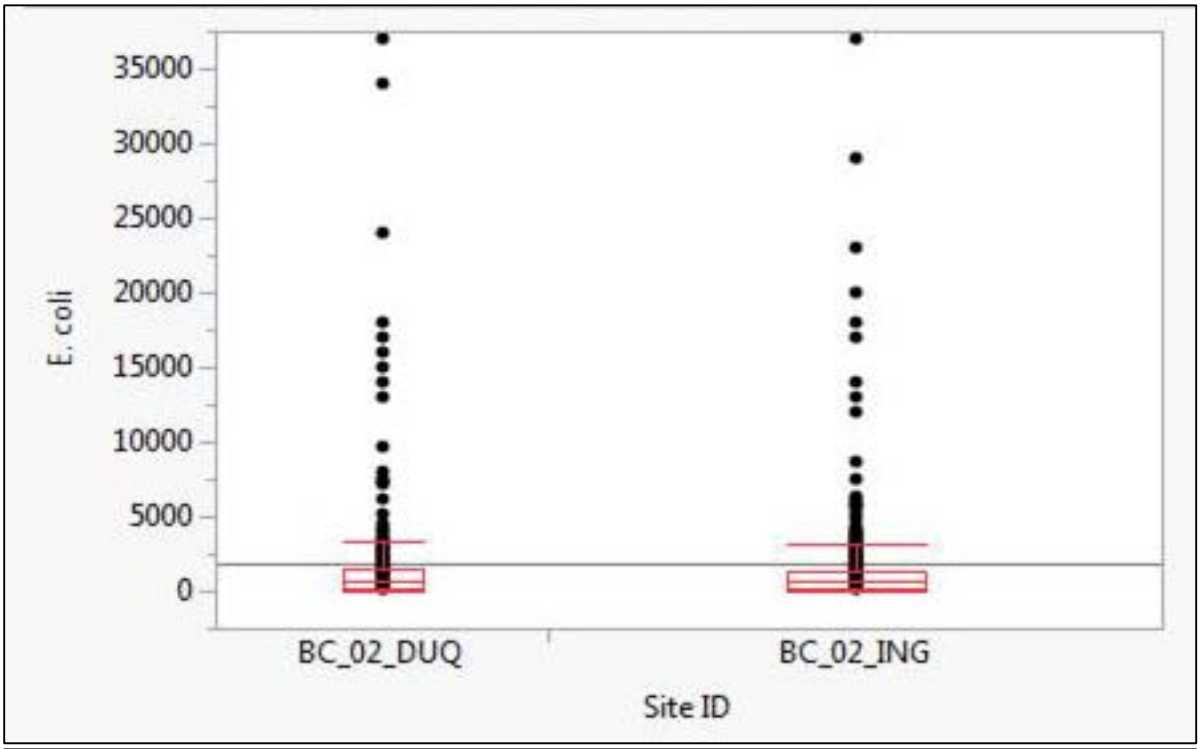



**Figure 4. Comparison of Metals CMP Data Collected at BC-1 and BC-2 (2004-2012; n = 38).**



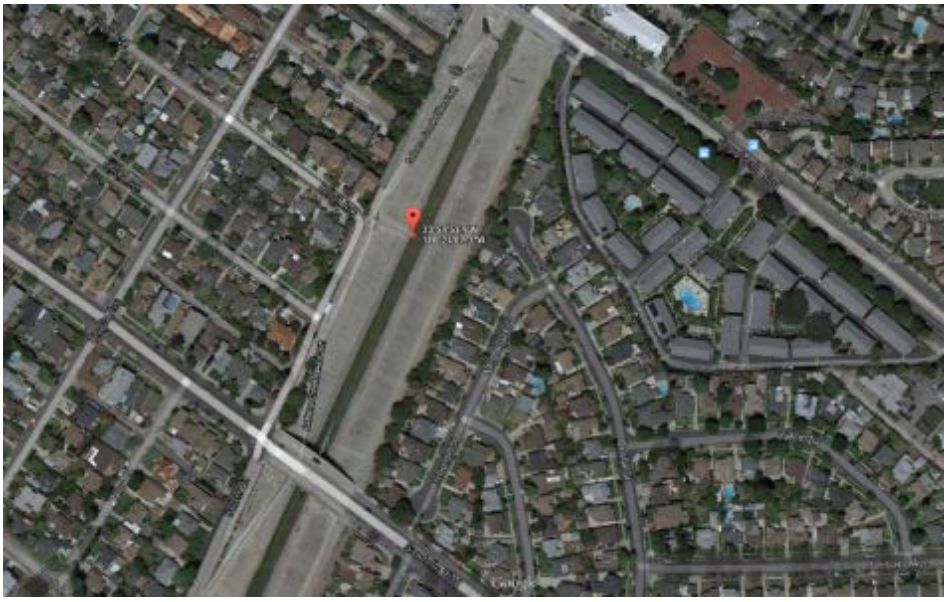

| Level | Minimum | 10% | 25% | Median | 75% | 90% | Maximum |
|---|---|---|---|---|---|---|---|
| BC_02_DUQ | 67 | 100 | 210 | 660 | 1500 | 3500 | 37000 |
| BC_02_ING | 67 | 100 | 200 | 630 | 1400 | 3100 | 37000 |

**Figure 5. Comparison of Bacteriological Data Collected at BCB-2 and BCB-5 (2004-2013; n = 595).**

## *6.1 Long Term Assessment Monitoring Site Fact Sheet*

| Waterbody Name | Waterbody Type | Site ID | Historical Site IDs | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| BC Reach 2 | Main Stem | BC_02_SAW | ME S01; BC-2 | LTA, TMDL | 33.998293 | -118.402035 |

**General Description:** Dry weather and wet weather LTA and TMDL monitoring site located in Reach 2 near Sawtelle Blvd. Coincides with the S01 Mass Emission Station and a TMDL Coordinated Monitoring Program site. The samples from this monitoring location would characterize the water quality of Reach 2 and identify additional constituents for monitoring at other locations within the watershed.



**BC_02_SAW Aerial View**

**BC_02_SAW Ground-Level View**

## *6.2 TMDL Monitoring Site Fact Sheets*

### 6.2.1 Ballona Creek Reach 2 TMDL Site at Duquesne

| Waterbody Name | Waterbody Type | Site ID | Historical Site ID | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| BC Reach 2 | Main Stem | BC_02_DUQ | BCB-2 | TMDL | 34.017342 | -118.389191 |

**General Description:** TMDL monitoring site located in Reach 2 near Duquesne Ave. Initially, this monitoring site is only intended to be monitored to satisfy the requirements of the Bacteria TMDL.

**BC_02_DUQ Aerial View**

**BC_02_DUQ Ground-Level View**

### 6.2.2 Ballona Creek Reach 2 TMDL Site at Inglewood

| Waterbody Name | Waterbody Type | Site ID | Historical Site ID | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| BC Reach 2 | Main Stem | BC_02_ING | BC-1; BCB-5 | TMDL | 33.989385 | -118.412169 |

**General Description:** Dry weather and wet weather TMDL monitoring site located in Reach 2 just downstream of Inglewood Blvd. Bacteria monitoring will occur at the Inglewood Blvd bridge (33.989891, -118.411571).

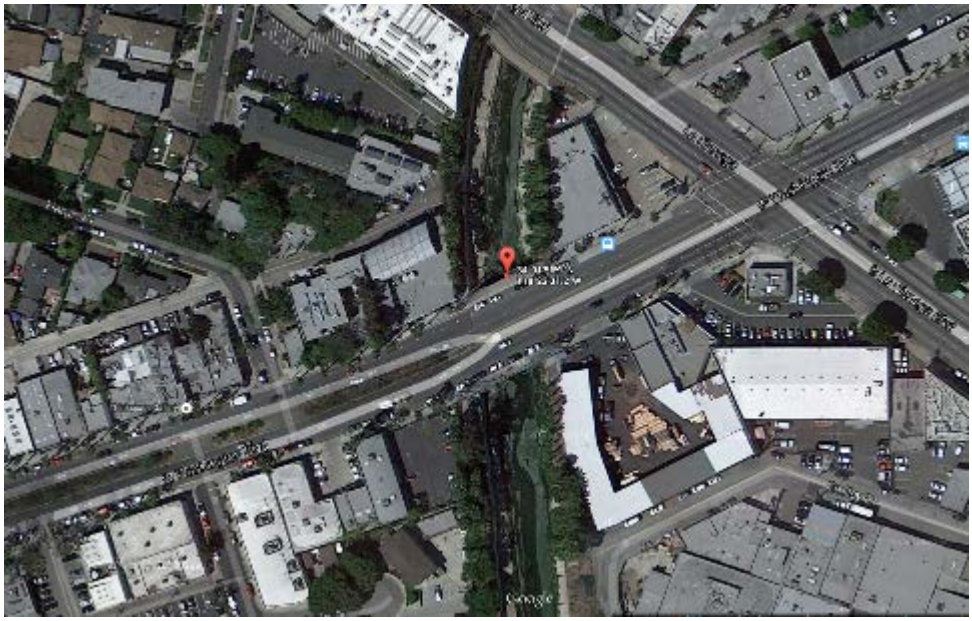
**BC_02_ING Aerial View**

**BC_02_ING Ground-Level View**

### 6.2.3 Ballona Creek Reach 1 TMDL Site at Washington

| Waterbody Name | Waterbody Type | Site ID | Historical Site ID | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| BC Reach 1 | Main Stem | BC_01_WAS | BCB-1 | TMDL | 34.032252 | -118.375328 |

**General Description:** TMDL monitoring site located in Reach 1 at W Washington Blvd. Initially, this monitoring site is only intended to be monitored to satisfy the requirements of the Bacteria TMDL.



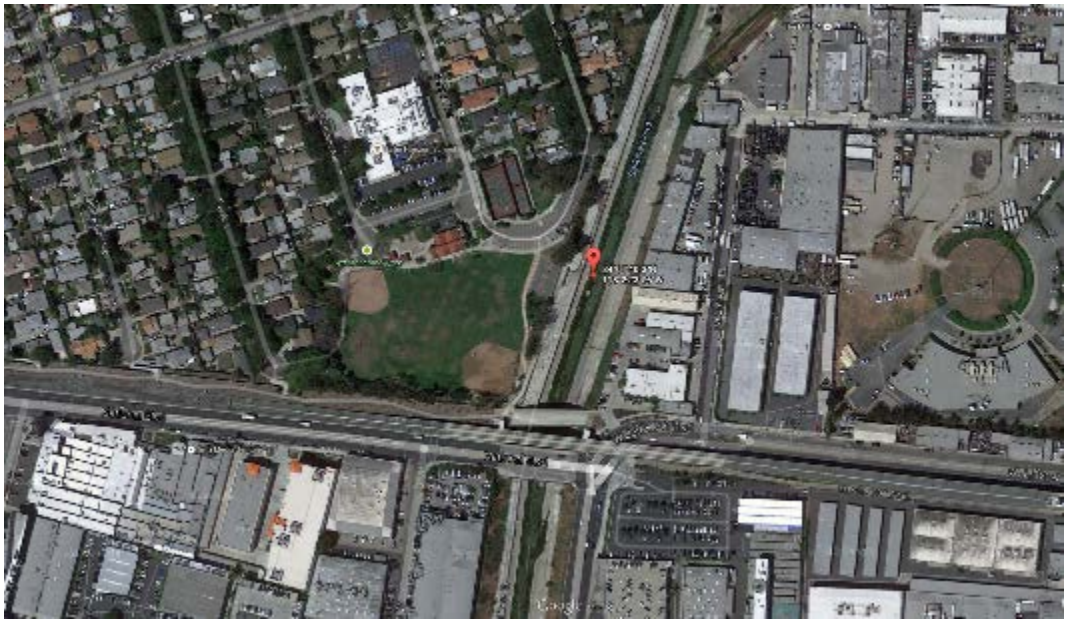
**BC_01_WAS Aerial View**

**BC_01_WAS Ground-Level View**

### 6.2.4 Ballona Creek Reach 1 TMDL Site at National

| Waterbody Name | Waterbody Type | Site ID | Historical Site ID | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| BC Reach 1 | Main Stem | BC_01_NAT | BC-3 | TMDL | 34.027953 | -118.376366 |

**General Description:** Dry weather and wet weather TMDL monitoring site located in Reach 1 near National Blvd. The samples from this monitoring site would characterize the water quality of Reach 1.



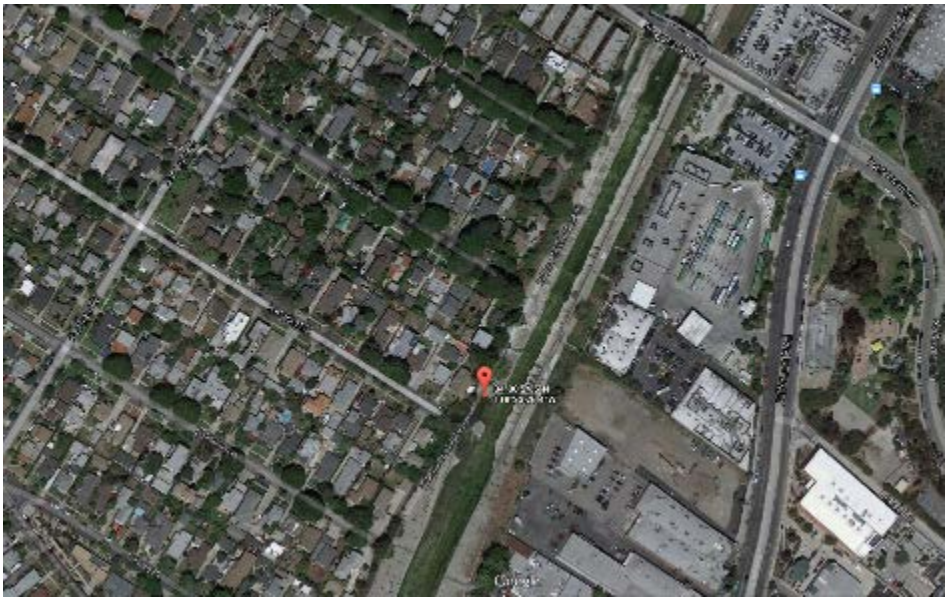
**BC_01_NAT Aerial View**

**BC_01_NAT Ground-Level View**

### 6.2.5 Benedict Canyon Channel TMDL Site

| Waterbody Name | Waterbody Type | Site ID | Historical Site ID | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Benedict Canyon Channel | Tributary | BCC_DUQ | BCB-3 | TMDL | 34.015141 | -118.390655 |

**General Description:** TMDL monitoring site located in Benedict Canyon Channel at the location where the channel daylights just upstream of the confluence with Ballona Creek. Initially, this monitoring site is only intended to be monitored to satisfy the requirements of the Bacteria TMDL.



**BCC_DUQ Aerial View**

**BCC_DUQ Ground-Level View**

### 6.2.6 Sepulveda Channel TMDL Site

| Waterbody Name | Waterbody Type | Site ID | Historical Site ID | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Sepulveda Channel | Tributary | SC_CUL | BC-4; BCB-4 | TMDL | 33.998319 | -118.415671 |

**General Description:** Dry weather and wet weather TMDL monitoring site located in Sepulveda Channel near Culver Blvd. The samples from this monitoring site would characterize the water quality of Sepulveda Channel.

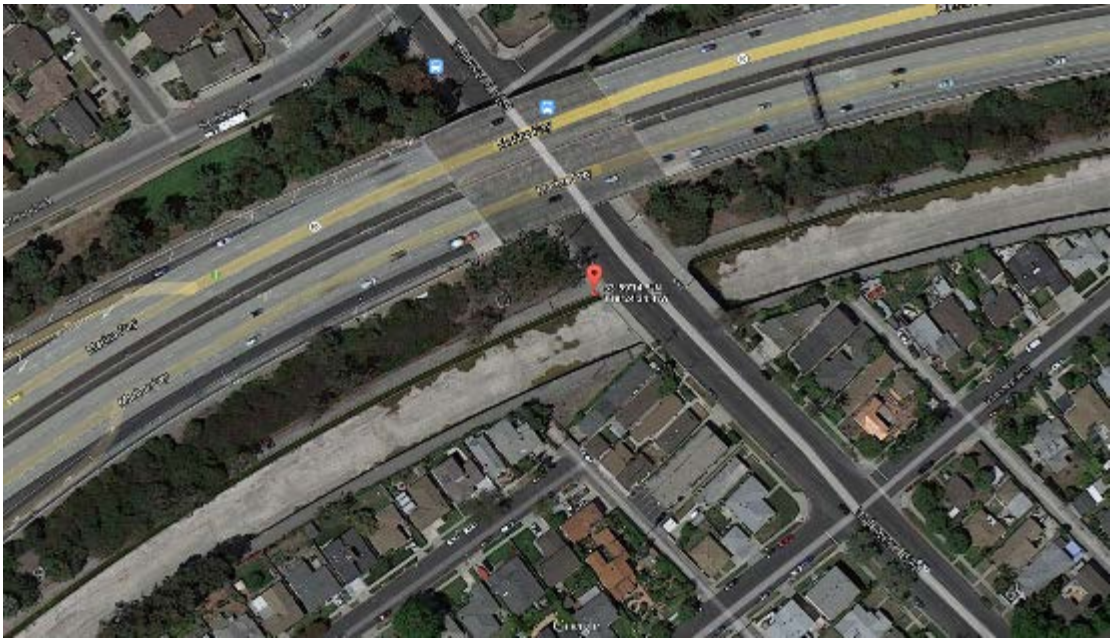
**SC_CUL Aerial View**

**SC_CUL Ground-Level View**

### 6.2.7 Centinela Creek TMDL Site at Inglewood

| Waterbody Name | Waterbody Type | Site ID | Historical Site ID | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Centinela Creek | Tributary | CC_ING | BCB-7 | TMDL | 33.987368 | -118.409549 |

**General Description:** TMDL monitoring site located in Centinela Creek at Inglewood Blvd. Initially, this monitoring site is only intended to be monitored to satisfy the requirements of the Bacteria TMDL.



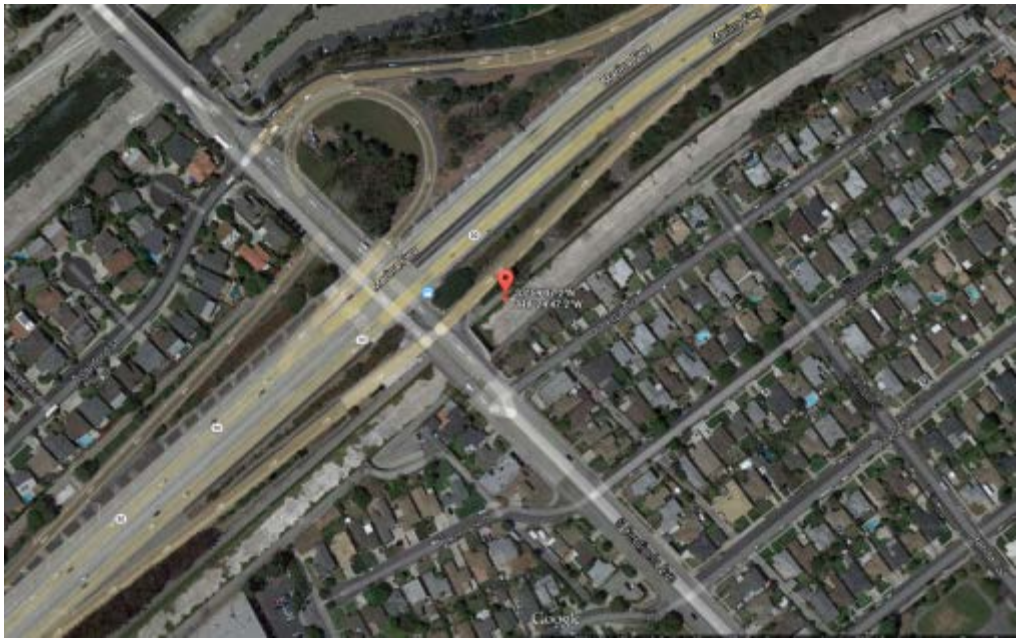
**CC_ING Aerial View**

**CC_ING Ground-Level View**

### 6.2.8 Centinela Creek TMDL Site at Centinela

| Waterbody Name | Waterbody Type | Site ID | Historical Site ID | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Centinela Creek | Tributary | CC_CEN | BC-5 | TMDL | 33.985321 | -118.413104 |

**General Description:** Dry weather and wet weather TMDL monitoring site located in Centinela Creek near S Centinela Ave. The samples from this monitoring site would characterize the water quality of Centinela Creek.



**CC_CEN Aerial View**

**CC_CEN Ground-Level View**

### 6.2.9 Del Rey Lagoon TMDL Site

| Waterbody Name | Waterbody Type | Site ID | Historical Site ID | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Del Rey Lagoon | Lagoon | DRL_BCE | BCB-9 | TMDL | 33.962820 | -118.451837 |

**General Description:** TMDL monitoring site located in Del Rey Lagoon at the tide gate connecting Del Rey Lagoon and Ballona Estuary. The nearest street is Pacific Avenue. This monitoring site is only intended to be monitored to satisfy the requirements of the Bacteria TMDL.

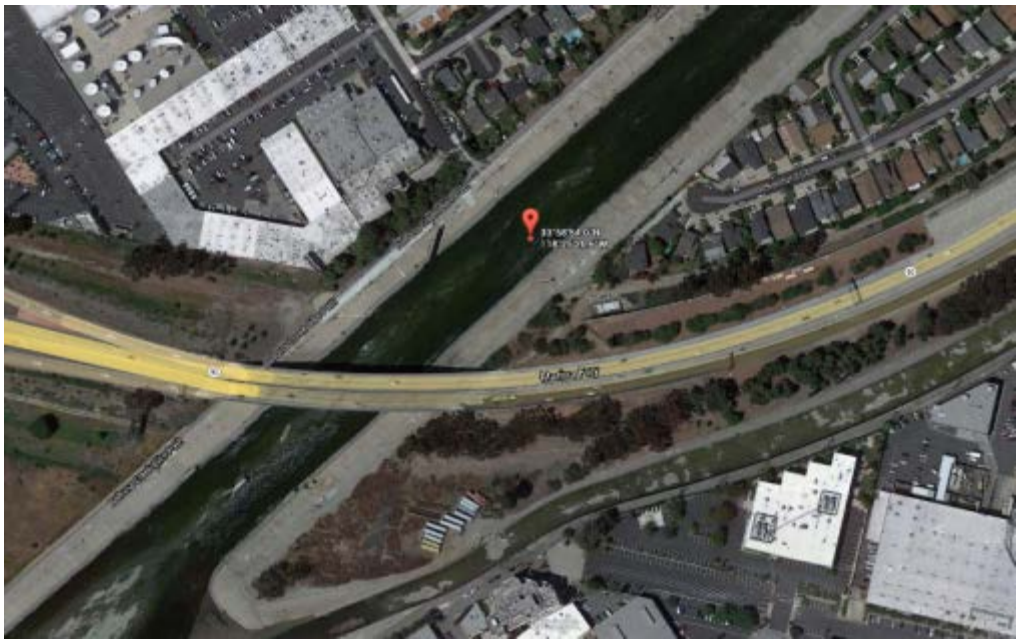
**DRL_BCE Aerial View**

**DRL_BCE Ground-Level View**

## 6.2.10 Ballona Creek Estuary TMDL Site at McConnell

| Waterbody Name | Waterbody Type | Site ID | Historical Site ID | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| BC Estuary | Estuary | BCE_MCC | BCB-6 | TMDL | 33.981657 | -118.422380 |

**General Description:** TMDL monitoring site located in the Ballona Creek Estuary upstream of the Centinela Creek confluence at McConnell Ave. Initially, this monitoring site is only intended to be monitored to satisfy the requirements of the Bacteria TMDL.



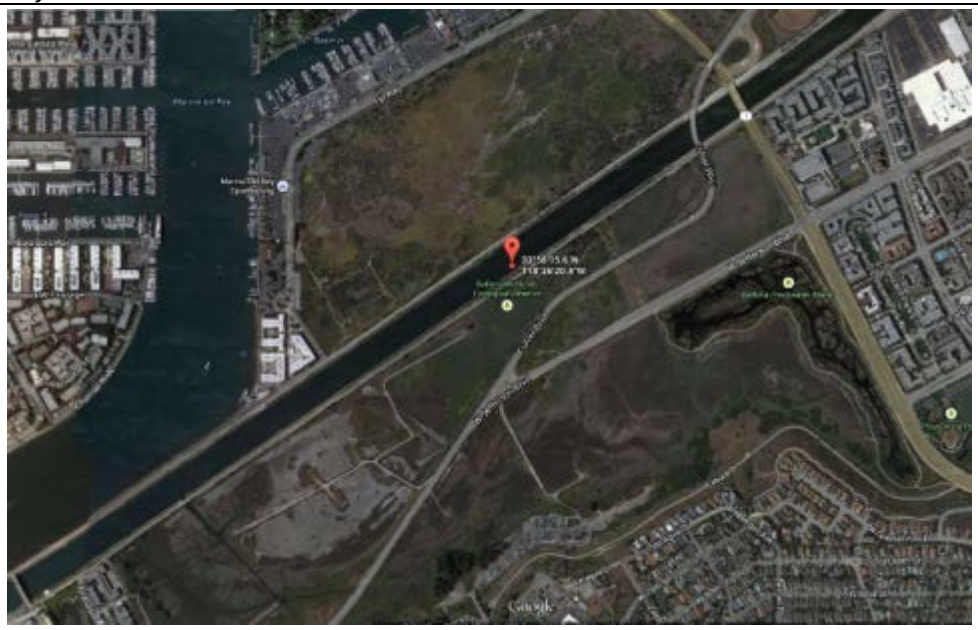
**BCE_MCC Aerial View**

**BCE_MCC Ground-Level View**

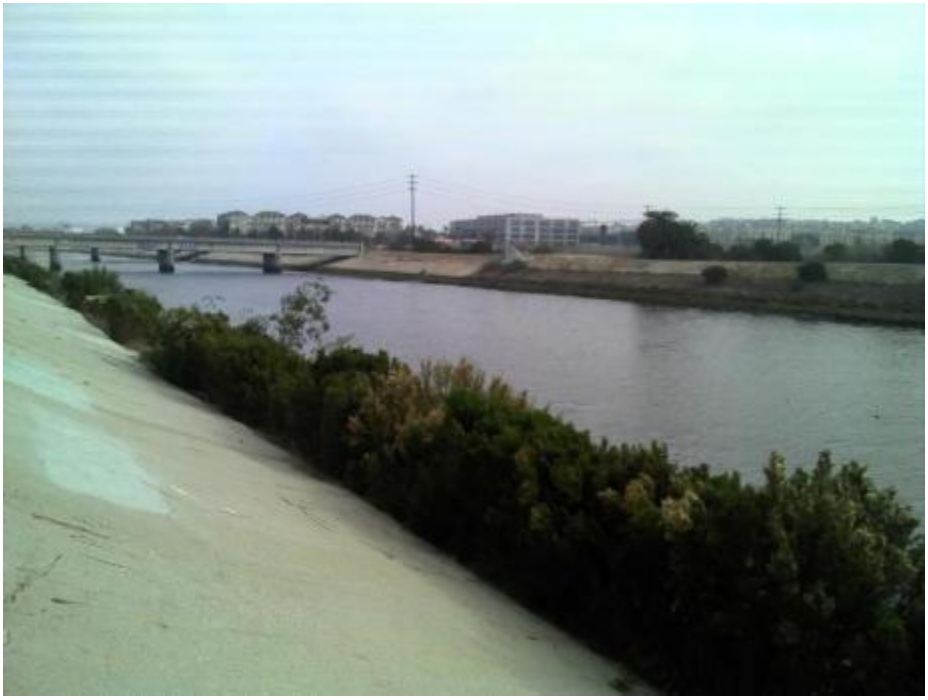
### 6.2.11 Ballona Creek Estuary TMDL Site at Culver

| Waterbody Name | Waterbody Type | Site ID | Historical Site ID | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| BC Estuary | Estuary | BCE_CUL | BCE-4 | TMDL | 33.971000 | -118.439000 |

**General Description:** TMDL monitoring site located in the Ballona Creek Estuary between the Ballona wetlands tide-gate and Culver Blvd. The exact location of sampling conducted at this monitoring site may vary, depending on the type of monitoring being conducted (i.e., sediment or bioaccumulation). Initially, this monitoring site is only intended to be monitored to satisfy the requirements of the Ballona Creek Estuary Toxic Pollutants TMDL.



**BCE_CUL Aerial View**

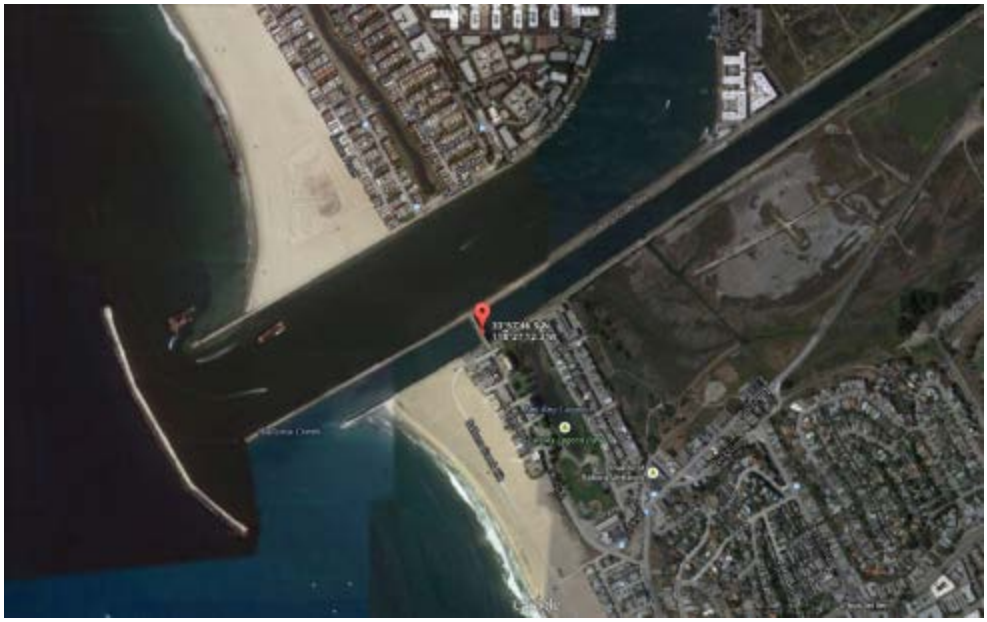


**BCE_CUL Ground-Level View**

### 6.2.12 Ballona Creek Estuary TMDL Site at Pacific

| Waterbody Name | Waterbody Type | Site ID | Historical Site ID | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| BC Estuary | Estuary | BCE_PAC | BCE-2; BCB-8 | TMDL | 33.963035 | -118.453415 |

**General Description:** Dry weather and wet weather TMDL monitoring site located in the Ballona Creek Estuary at Pacific Ave. The exact location of this monitoring site may vary, depending on the type of monitoring being conducted (i.e., water column, sediment, or bioaccumulation).



**BCE_PAC Aerial View**

**BCE_PAC Ground-Level View**

# 7 Stormwater Outfall Sites

The following provides details on the stormwater outfall site selection process, analysis evaluating the approach, as well as factsheets for each site. There are three receiving waters to which the MS4 serving the jurisdictions of the BCWMG predominately drain to: Ballona Creek, Sepulveda Channel, and Centinela Creek. As a result, the stormwater outfall site selection process focused on stormwater outfalls that discharged to these waterbodies. However, as the identification of sites was intended to be representative of the land uses and the characteristics of the entire BCWMG area these sites can be used to assess discharges to other waterbodies within the watershed. A "representative" approach to characterizing stormwater discharges is used rather than selecting individual sites for each jurisdiction because it provides the level of information necessary to support management decisions, it allows for a coordinated approach, and inter-event variability (e.g., for different storm events) in stormwater discharge quality is much greater than between individual outfall drainages or major land uses. **Section 7.2** of this Attachment presents an analysis evaluating whether the number of stormwater outfall sites will provide sufficient information to determine the quality stormwater discharges, determine if the discharge is in compliance with applicable WQBELs, and determine whether discharges are causing or contributing to exceedances of RWLs.

Six potential stormwater outfall monitoring sites (two per receiving water) were identified during an initial desktop geographic information system (GIS) analysis for further evaluation. In addition to the sites identified during the initial desktop GIS analysis, the County of Los Angeles identified and provided information for an additional site discharging to Centinela Creek. Note that an additional 11 potential jurisdiction-specific sites were also identified during the desktop GIS analysis. The desktop GIS analysis consisted of the following analyses listed in sequential order: (1) identifying the locations of major outfalls (defined as greater than 36 inches), (2) calculating the percentage of each land use associated with the entire BCWMG area and identifying the major outfalls with estimated catchment areas that most closely match the land use breakdown of the entire BCWMG area, (3) identifying outfalls that appeared to be viable options given what could be seen using Google Maps© and Google Street View©, and (4) identifying outfalls that receive drainage from multiple jurisdictions. Primary land use types for the BCWMG EWMP area include: 71 percent residential; 25 percent commercial/industrial; and 4 percent open space. This land use breakdown includes MS4-related open space only (golf courses, local parks, regional parks).

After the potential sites were visited, primary and alternate stormwater outfall monitoring sites were identified. The sites were selected based on an evaluation of the land uses draining to the outfall location, the jurisdictions draining to the outfall location (with an emphasis placed on receiving drainage from as many jurisdictions as possible), the safety and accessibility of the location, and the potential ability to use automatic sample compositors (autosampler) equipment at the location. The primary criterion for selecting the sites was the representativeness of the land uses within the estimated outfall catchment area as compared to the BCWMG EWMP area as a whole. To best compare the land uses within the MS4 areas, the BCWMG area and outfall

drainage land uses were estimated only using open space characterized as golf courses, local parks, and regional parks for site selection.[2]

## *7.1 Summary of Stormwater Outfall Monitoring Sites*

Summary information for the three stormwater outfall monitoring sites is presented in **Table 13** and the locations are shown on **Figure 6**. As stated previously, the principal criterion for the site selection for stormwater outfall monitoring is that sites are representative of the land uses in the BCWMG EWMP area. The drainages within the BCWMG EWMP area are comprised primarily of residential, commercial, and industrial land uses, and open space with minimal percentages of agriculture/nursery. The three sites were selected specifically to characterize runoff from drainages that are representative of the mix of these primary land uses in the BCWMG EWMP area, and to minimize contributions from other land uses. Land use summaries for the BCWMG EWMP area and each of the sites are listed in **Table 14**. Additionally, the land use summaries for each of the Ballona Creek mainstem, Sepulveda Channel, and Centinela Creek stormwater outfall monitoring sites are shown on **Figure 7**, **Figure 8**, and **Figure 9**, respectively. The monitored outfalls and drainages are geographically distributed to capture representative runoff to the three major waterbodies in the watershed.

**Table 15** identifies the outfalls which would be considered representative of each of the BCWMG members. Additionally, **Table 15** identifies the receiving waters to which the outfall sites may be considered applicable. That is, if an exceedance was observed in a given receiving water, the outfall data would be reviewed to determine if an individual BCWMG member caused or contributed to the exceedance. Specific constituents that will be monitored at each site are presented in the CIMP. **Section 7.2** of this Attachment presents an analysis evaluating whether the number of stormwater outfall sites will provide sufficient information to determine the quality of stormwater discharges, determine if the discharge is in compliance with applicable WQBELs, and determine whether discharges are causing or contributing to exceedances of RWLs.

Fact sheets are presented below to provide additional details of the sites as well as the alternate sites. Alternate sites provide additional sites that are approved for use should the selected sites pose unforeseen challenges for sampling that may require the use of a different site. For the stormwater outfall monitoring sites, sampling may occur at a manhole located upstream of the current location where the outfall discharges to a receiving water if determined to be preferable.

[2] All land uses were calculated using the 2005 SCAG land use layer.

**Table 13. Stormwater Outfall Monitoring Sites**

| Site Characteristic | Waterbody The Outfall Directly Discharges To | | |
|---|---|---|---|
| | **Ballona Creek** | **Sepulveda Channel** | **Centinela Creek** |
| Site Name | BC_SW_FAI | SC_SW_WAS | CC_SW_LAC |
| Jurisdiction Where Site is Located | City of Los Angeles | Culver City | Inglewood |
| Jurisdictions Discharging to Site | City of Los Angeles, West Hollywood | City of Los Angeles, Culver City | City of Los Angeles, County of Los Angeles, Inglewood |
| Drain Name | BI 0054 –Pico Blvd | BI 0425 Line G - S Culver City | BI 0273 – BI 0443 U1 |
| Size | 136 inches | 66 inches | 186 inches |
| Shape | Rectangular | Round | Rectangular |
| Material | Reinforced Concrete Box | Reinforced Concrete Pipe | Reinforced Concrete Box |
| Latitude | 34.03825 | 33.99986 | 33.96777 |
| Longitude | -118.36910 | -118.41757 | -118.37057 |

**Table 14. Land Use Summary for Drainage Areas of Major Waterbodies and Corresponding Stormwater Outfall Monitoring Sites (Percent of Drainage Area)**

| Drainage | Percent of Land Use[(1)] | | | | |
|---|---|---|---|---|---|
| | **Res** | **Com** | **Ind** | **Ag/Nur** | **Open** |
| EWMP Area | 71% | 20% | 5% | <1% | 4% |
| Ballona Creek (u/s of LTA site) | 71% | 22% | 4% | <1% | 3% |
| BC_SW_FAI | 76% | 19% | 3% | <1% | 2% |
| BI 0053 (Alternate) | 60% | 33% | 6% | <1% | 1% |
| Sepulveda Channel | 65% | 24% | 2% | <1% | 9% |
| SC_SW_WAS | 86% | 14% | <1% | <1% | <1% |
| BI 0089 (Alternate) | 82% | 18% | <1% | <1% | <1% |
| Centinela Creek | 62% | 21% | 12% | <1% | 6% |
| CC_SW_LAC | 68% | 14% | 14% | <1% | 5% |
| LA City Drain (Alternate) | 41% | 15% | 41% | <1% | 4% |

1. Land use classifications include: residential (Res), commercial and industrial (Com/Ind), agriculture and nursery (Ag/Nur), and open space (Open). Totals correspond to the percent of the total area considered in the EWMP.

**Table 15. BCWMG Member Represented by Each Stormwater Outfall Monitoring Site[1],[2]**

| Jurisdiction | Site | Ballona Creek | | | Tributaries | |
|---|---|---|---|---|---|---|
| | | Estuary | Reach 2 | Reach 1 | Sepulveda Channel | Centinela Creek |
| Beverly Hills | BC_SW_FAI | X | X | X(D) | | |
| City of Los Angeles | BC_SW_FAI | X | X | X(D) | | |
| | CC_SW_LAC | X | | | | X(D) |
| | SC_SW_WAS | X | X | | X(D) | |
| County of Los Angeles | CC_SW_LAC | X | | | | X(D) |
| Culver City | SC_SW_WAS | X | X | X | X(D) | X |
| Inglewood | CC_SW_LAC | X | | | | X(D) |
| Santa Monica | SC_SW_WAS [3] | X | X | | X(D) | |
| West Hollywood | BC_SW_FAI | X | X | X(D) | | |

1. Jurisdiction either discharges directly or indirectly to waterbody. A direct discharge indicates that an outfall that receives drainage from a jurisdiction discharges directly into the waterbody. An indirect discharge indicates that flow from a jurisdiction is discharged upstream of the waterbody. An X(D) represents the waterbody the outfall directly discharges to.
2. If an exceedance is observed in a waterbody, the paired data collected from the drains discharging directly and/or indirectly to the waterbody will be used to assess whether the BCWMG member caused or contributed to the exceedance.
3. Could be replaced by a more representative site from the Santa Monica Bay CIMP which has identified a monitoring site that likely provides a more representative characterization of the City of Santa Monica's stormwater discharges.

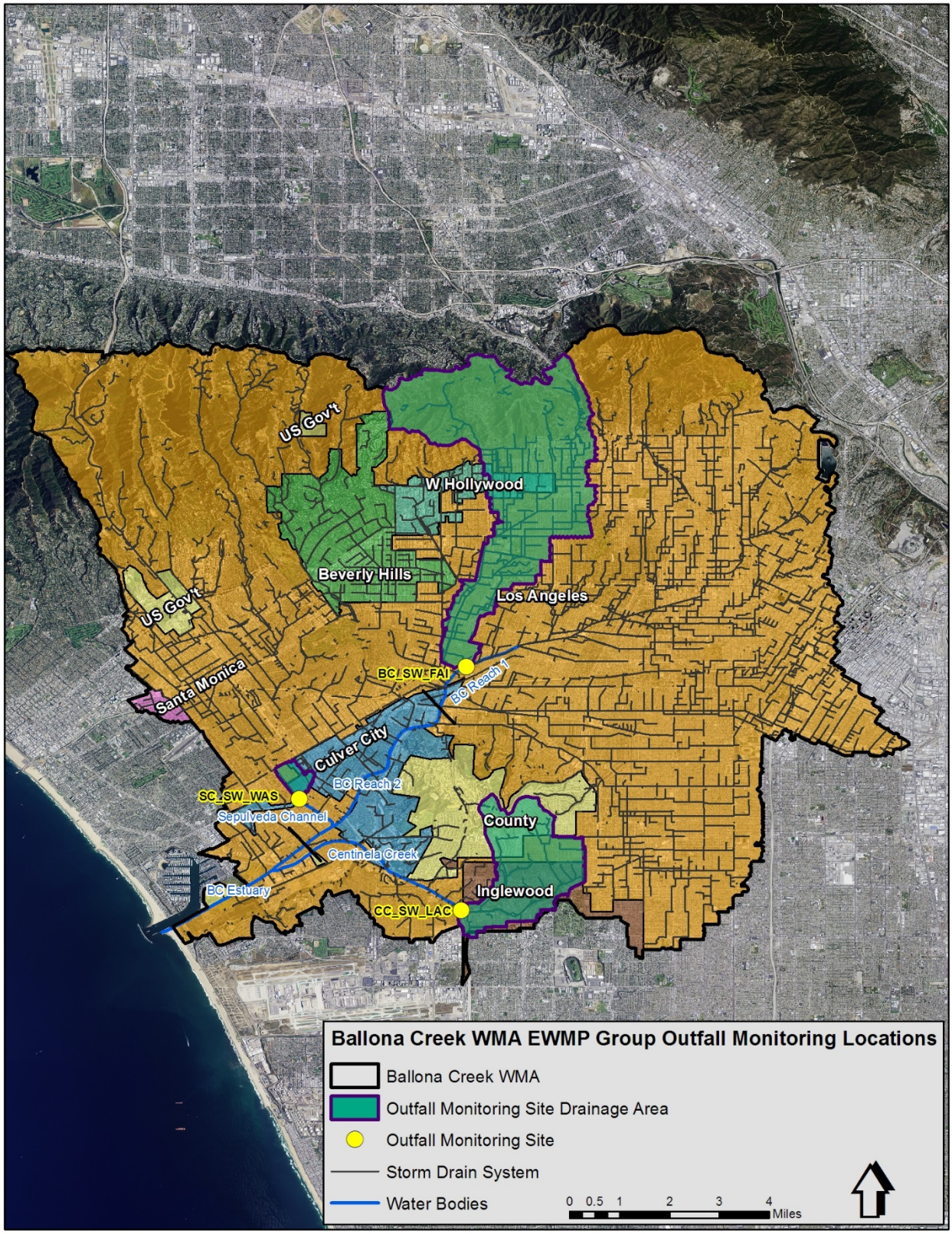



**Figure 6. Overview of Stormwater Outfall Monitoring Sites**

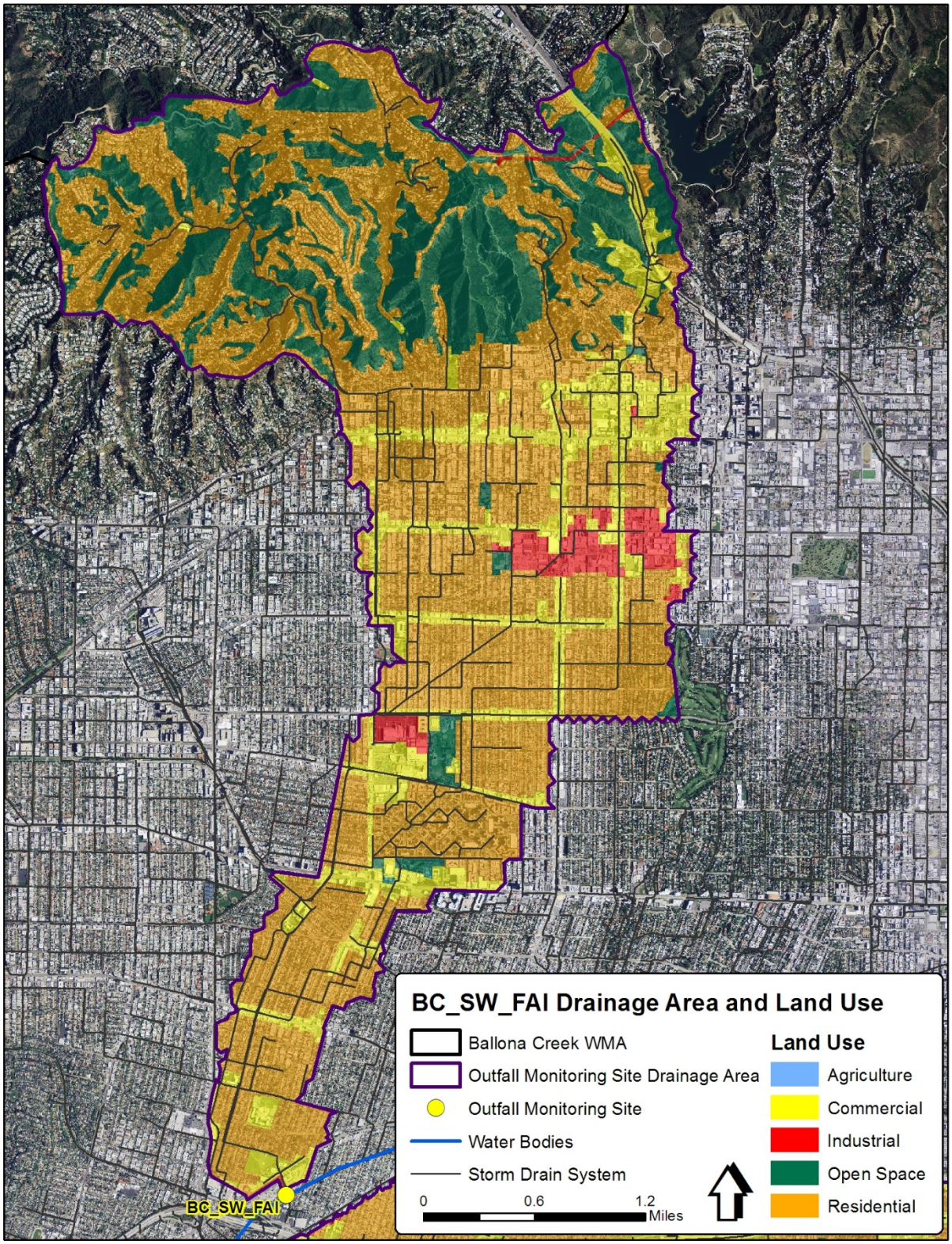



**Figure 7. BC_SW_FAI Drainage Area and Land Use**

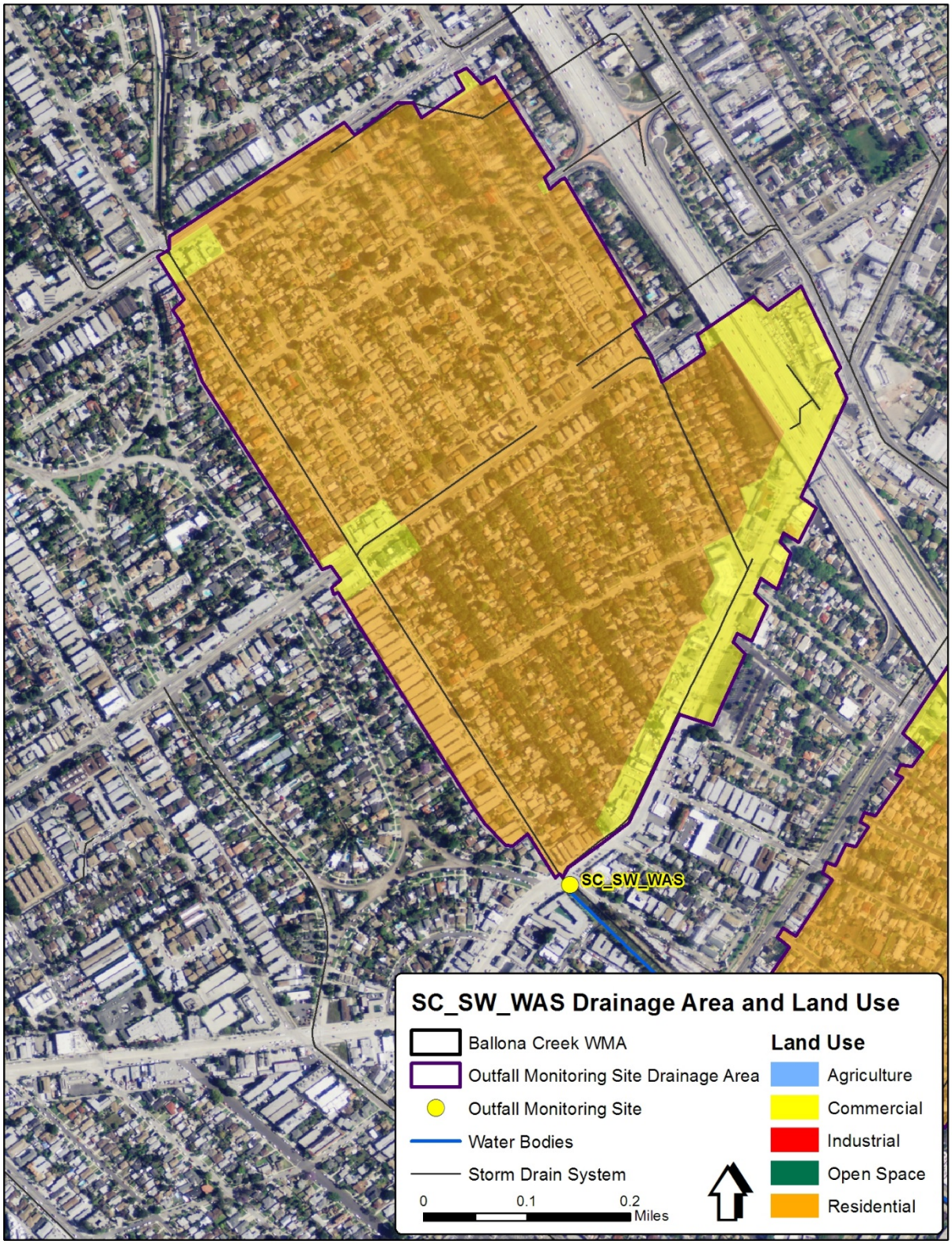



**Figure 8. SC_SW_WAS Drainage Area and Land Use**

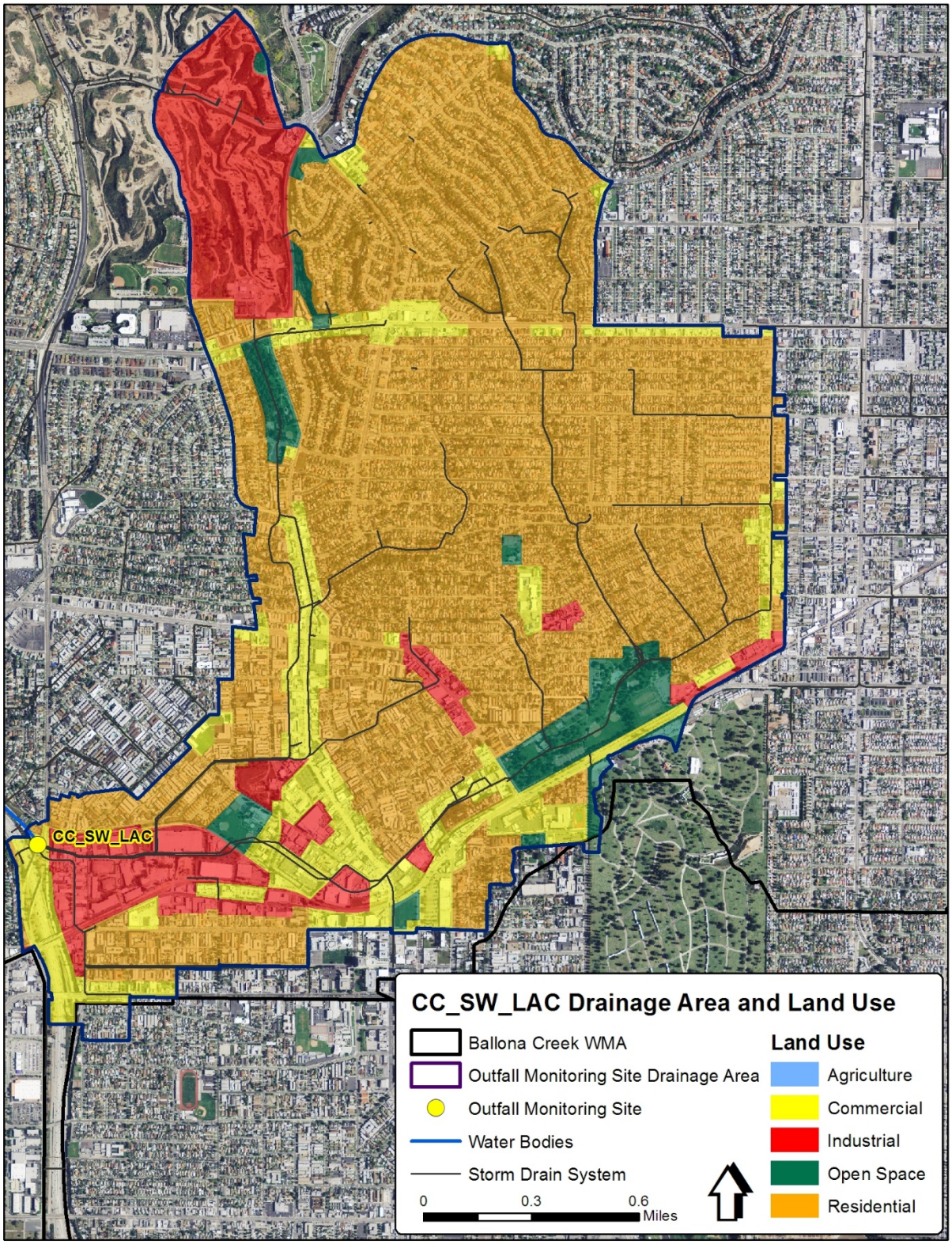



**Figure 9. CC_SW_LAC Drainage Area and Land Use**

## 7.2 Analysis of Representative Outfall Approach

The following presents an analysis evaluating whether a representative outfall approach will provide sufficient information to implement this CIMP consistent with the MRP. Specifically, the analysis evaluates variability of stormwater outfall data in the context of the ability to distinguish between sites and whether more sites are necessary to adequately characterize wet weather urban runoff for the purposes of determining the quality of discharges, compliance with applicable WQBELs, and whether discharges are causing or contributing to exceedances of RWLs.

The inter-event variability (e.g., for different storm events) in stormwater discharge quality is much greater than between individual outfall drainages or major land uses. Based on stormwater monitoring results from other programs in California, discharge quality from drainages with similar mixed land uses is not substantially different, and it will be impossible to distinguish statistically between drainages with a reasonable amount of monitoring because of the high variability in discharge water quality for each site. The statistical power analysis based on the range of typical stormwater discharge water quality distributions and the number of samples collected over the time frame of the Permit, 15 samples per site, is enumerated in **Table 16**. For example, the results of the analysis indicate that an average difference between sites would need to be greater than 62% to be detected with 95% confidence and 80% power for a pollutant with a fairly "typical" coefficient of variance (COV) of 0.66. COVs for stormwater discharge quality are generally greater than 0.2 and commonly exceed 1.0. Programmatically meaningful differences (i.e., differences between sites as small as 20%) would not be expected to be detected for most constituents over the time frame of the Permit.

Given the high variability typical of stormwater pollutant levels, and with only a few storm events that can be collected per year given climatic conditions, it will not be possible to make meaningful distinctions between drainages, either within land use types, across land use types, or between jurisdictions. Management implementation by the Permittees is also expected to be relatively consistent throughout the BCWMG, so additional focus on geographic differences is not necessary. This means that only a handful of sites are needed to adequately characterize land use discharge water quality within the BCWMG EWMP area. Consequently, sampling more than a few representative sites is unlikely to significantly improve characterization of runoff quality, or to better inform the BCWMG's management decisions.

Realistically achievable changes in stormwater runoff quality or loads (e.g., 20–50% reductions) are statistically demonstrable only over relatively long periods of time (≥10 years). This is also due to the high variability between events and the relatively few number of events that can be sampled each season. Additional monitoring sites will do little to improve the statistical power of such trend analysis within the permit time frame compared to longer periods of evaluation. This also supports the need to assess management effectiveness and compliance based primarily on successful implementation actions rather than explicit demonstration of improvements in runoff quality.

Based on the evaluations above, the BCWMG's CIMP approach to monitor one outfall for each major waterbody in the BCWMG EWMP area will provide the representative data needed to meet the specific Permit objectives for stormwater outfall monitoring and support management

decisions of the BCWMG. Additional monitoring sites will not provide significant improvements in representation or characterization of discharge quality, or additional information for discharge quality management.

**Table 16. Detectible Significant Percent Differences between Sites**

| Sample Size = 15, alpha = 0.05 | | |
|---|---|---|
| **COV** | **power=0.8** | **power 0.9** |
| 0.20 | 21% | 24% |
| 0.31 | 32% | 36% |
| 0.42 | 42% | 48% |
| 0.53 | 52% | 59% |
| 0.66 | 62% | 70% |
| 0.80 | 71% | 81% |
| 0.95 | 80% | 91% |
| 1.12 | 89% | 100% |
| 1.31 | 97% | 109% |

## *7.3 Stormwater Outfall Site Fact Sheets*

Fact sheets for the three storm water outfall monitoring sites are presented. Additionally, alternate sites are identified for each of the proposed sites.

### 7.3.1 Ballona Creek Stormwater Outfall Site - BC_SW_FAI

| Water Body | Group Members | Drain Name | Size | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Ballona Creek | Beverly Hills, City of LA, West Hollywood | BI 0054 –Pico Blvd | 136 inches | SW Outfall | 34.03825 | -118.36910 |

**General Description:** Double box outfall discharging just downstream of Fairfax Ave.

**BC_SW_FAI Aerial View**

**BC_SW_FAI**

### 7.3.2 Ballona Creek Stormwater Outfall Alternate Site (BC_SW_BLA)

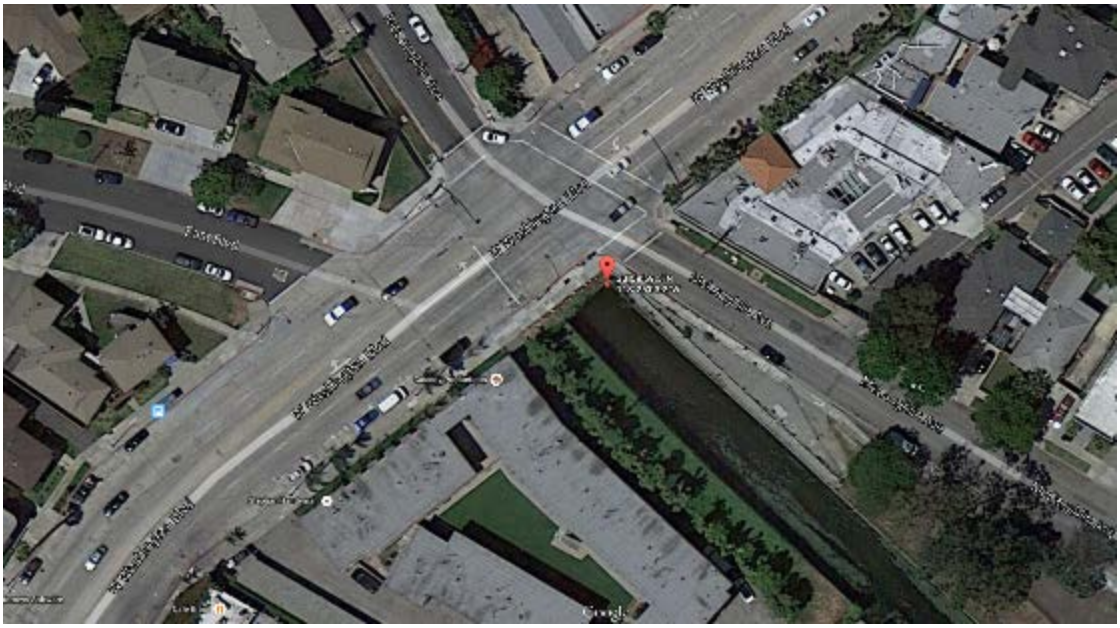
| Water Body | Jurisdiction | Drain Name | Size | Shape | Material | Latitude | Longitude |
|---|---|---|---|---|---|---|---|
| Ballona Creek | Culver City | BI 0053 LINE B - Jefferson Blvd[1] | 288” | Rectangle | Reinforced Cement Concrete | 34.030158 | -118.372552 |

1. This outfall is the same as the Tier II Site, BC-9, from the Metals CMP.

### 7.3.3 Sepulveda Stormwater Outfall Channel Site - SC_SW_WAS

| Water Body | Group Members | Drain Name | Size | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Sepulveda Channel | Culver City, City of LA | BI 0425 Line G - S Culver City | 66 inches | SW Outfall | 33.99986 | -118.41757 |

**General Description:** Outfall discharging just upstream of where Sepulveda Channel daylights near Washington Blvd.



**SC_SW_WAS Aerial View**

**SC_SW_WAS**

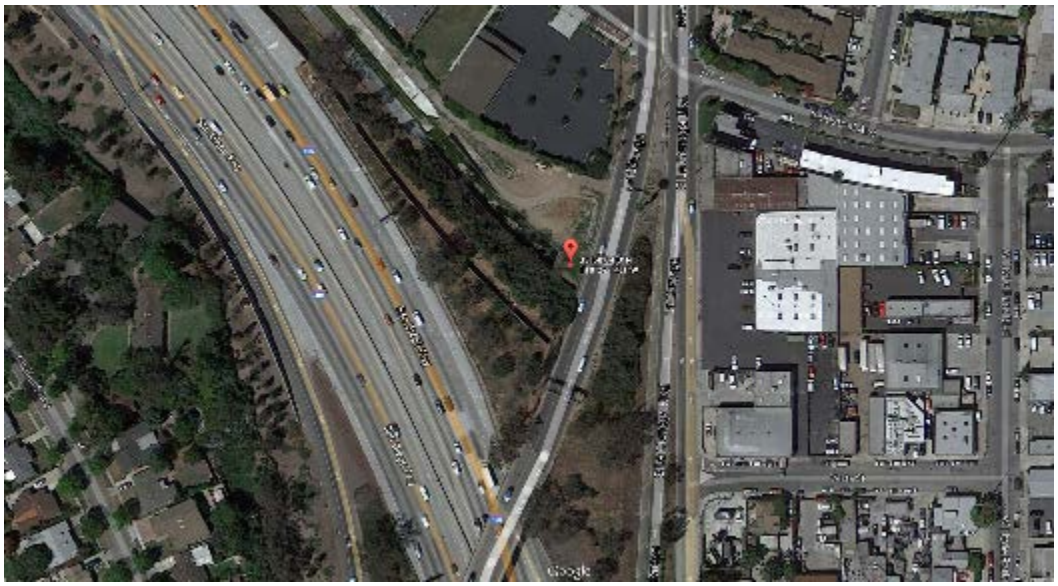
### 7.3.4 Sepulveda Channel Stormwater Outfall Alternate Site (SC_SW_BRA)

| Water Body | Jurisdiction | Drain Name | Size | Shape | Material | Latitude | Longitude |
|---|---|---|---|---|---|---|---|
| Sepulveda Channel | Los Angeles | BI 0089 Line A Berryman Ave - Braddock Dr | 63” | Round | Reinforced Concrete Pipe | 33.99608 | -118.41196 |

### 7.3.5 Centinela Creek Stormwater Outfall Site - CC_SW_LAC

| Water Body | Group Member | Drain Name | Size | Site Type | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Centinela Crk | County, City of LA, Inglewood | BI 0273 – BI 0443 U1 | 186 inches | SW Outfall | 33.96777 | -118.37057 |

**General Description:** Outfall discharging at the point where Centinela Creek daylights near S La Cienega Blvd.



**CC_SW_LAC Aerial View**

**CC_SW_LAC**

### 7.3.6 Centinela Creek Stormwater Outfall Alternate Site (CC_SW_LAT)

| Water Body | Jurisdiction | Drain Name | Size | Shape | Material | Latitude | Longitude |
|---|---|---|---|---|---|---|---|
| Centinela Creek | County of Los Angeles | LA City Drain | 90” | Round | Reinforced Concrete Pipe | 33.97428 | -118.38092 |

# 8 Monitoring Location References

Ballona Creek Monitoring Plan Subcommittee. 2007. *Ballona Creek Metals TMDL and Ballona Creek Estuary Toxic Pollutants TMDL Coordinated Monitoring Plan*. Chaired by the City of Los Angeles. January 10, 2007.

Ballona Creek Monitoring Plan Subcommittee. 2009. *Ballona Creek, Ballona Estuary, & Sepulveda Channel Bacteria TMDL Coordinated Monitoring Plan*. Chaired by the City of Los Angeles. January 29, 2009.

City of Los Angeles, Bureau of Sanitation. 2009. *Total Maximum Daily Load for Bacteria in Ballona Creek, Ballona Estuary, and Sepulveda Channel: Coordinated Monitoring Plan for Del Rey Lagoon*. January 29, 2009.

# Attachment C. Analytical and Monitoring Procedures

**Attachment C** details the monitoring procedures that will be utilized to collect and analyze samples to meet the goals and objectives of the CIMP and the Permit. The details contained herein serve as a guide for ensuring that consistent protocols and procedures are in place for successful sample collection and analysis. The attachment is divided into the following sections:

1. Analytical Procedures
2. Sampling Methods and Sample Handling
3. Quality Assurance/Quality Control
4. Instrument/Equipment Calibration and Frequency
5. Monitoring Procedures References

# 9 Analytical Procedures

The following subsections detail the analytical procedures for data generated in the field and in the laboratory.

## *9.1 Field Parameters*

Portable field meters will measure field parameters within specifications outlined in **Table 17**.

**Table 17. Analytical Methods and Project Reporting Limits for Field Parameters**

| Parameter | Method | Range | Project RL |
|---|---|---|---|
| Current velocity | Electromagnetic | -0.5 to +20 ft/s | 0.05 ft/s |
| pH | Electrometric | 0 – 14 pH units | NA |
| Temperature | High stability thermistor | -5 – 50 oC | NA |
| Dissolved oxygen | Membrane or Optical | 0 – 50 mg/L | 0.5 mg/L |
| Turbidity | Nephelometric | 0 – 3000 NTU | 0.2 NTU |
| Conductivity | Graphite electrodes | 0 – 10 mmhos/cm | 2.5 umhos/cm |

RL – Reporting Limit NA – Not applicable

## *9.2 Analytical Methods and Method Detection and Reporting Limits*

Method detection limits (MDL) and reporting limits (RLs) must be distinguished for proper understanding and data use. The MDL is the minimum analyte concentration that can be measured and reported with a 99% confidence that the concentration is greater than zero. The RL represents the concentration of an analyte that can be routinely measured in the sampled matrix within stated limits and with confidence in both identification and quantitation. For this CIMP, the term RL is equivalent to the term “Minimum Levels” presented in Table E-2 of the MRP (pages E-17 through E-20).

For this CIMP, RLs must be verifiable by having the lowest non-zero calibration standard or calibration check sample concentration at or less than the RL. RLs have been established in this

CIMP based on the verifiable levels and general measurement capabilities demonstrated for each method. These RLs should be considered as maximum allowable RLs to be used for laboratory data reporting. Note that samples diluted for analysis may have sample-specific RLs that exceed these RLs. This will be unavoidable on occasion. However, if samples are consistently diluted to overcome matrix interferences, the analytical laboratory will be required to notify the BCWMG regarding how the sample preparation or test procedure in question will be modified to reduce matrix interferences so that project RLs can be met consistently.

Analytical methods and RLs required for samples analyzed in the laboratory are summarized in **Table 18**, **Table 19**, and **Table 20** for analysis in water, sediment, and tissue, respectively. For organic constituents, environmentally relevant detection limits will be used to the extent practicable. The RLs listed in **Table 18** are consistent with the requirements of the available minimum levels provided in the MRP, except for total dissolved solids, which was set equal to the minimum level identified in the California State Water Resources Control Board's Surface Water Ambient Monitoring Program's (SWAMP) Quality Assurance Project Plan. Alternative methods with RLs that are at or below those presented in **Table 18**, **Table 19**, and **Table 20** are considered equivalent and can be used in place of the methods presented in **Table 18**, **Table 19**, and **Table 20**.

Prior to the analysis of any environmental samples, the laboratory must have demonstrated the ability to meet the minimum performance requirements for each analytical method presented in **Table 18**. The initial demonstration of capability includes the ability to meet the project RLs, the ability to generate acceptable precision and accuracy, and other analytical and quality control parameters documented in this CIMP. Data quality objectives for precision and accuracy are summarized in **Table 21**.

**Table 18. Analytical Methods, Project Reporting Limits (RLs), and MRP Table E-2 Minimum Levels (MLs) for Laboratory Analysis of Water Samples**

| Parameter/Constituent | Method[(1)] | Units | Project RL | MRP Table E-2 ML |
|---|---|---|---|---|
| ***Toxicity*** | | | | |
| *Pimephales promelas* | EPA-821-R-02-013 (1000.0) and EPA-821-R-02-012 (2000.0) | NA | NA | NA |
| *Ceriodaphnia dubia* | EPA-821-R-02-013 (1002.0) and EPA-821-R-02-012 (2002.0) | NA | NA | NA |
| *Selenastrum capricornutum* | EPA-821-R-02-013 (1003.0) | NA | NA | NA |
| *Strongylocentrotus purpuratus* | EPA-600-R-95-136 (1002.0) | NA | NA | NA |
| *Haliotis rufescens* | EPA-600-R-95-136 | NA | NA | NA |
| ***Bacteria*** | | | | |
| Total coliform (marine waters) | SM 9221/SM 9223 B | MPN/100mL | 10 | 10,000 |
| Enterococcus (marine waters) | SM 9230/SM 9223 B | MPN/100mL | 10 | 104 |

| Parameter/Constituent | Method[(1)] | Units | Project RL | MRP Table E-2 ML |
|---|---|---|---|---|
| Fecal coliform/*E. coli* (marine waters) | SM 9221/SM 9223 B | MPN/100mL | 10 | 400/NA |
| *E. coli* (fresh) | SM 9221/SM 9223 B | MPN/100mL | 10 | 235 |
| Fecal coliform (fresh waters) | SM 9222 | CFU/100mL | 10 | 400 |
| ***Conventionals*** | | | | |
| Oil and Grease | EPA 1664A | mg/L | 5 | 5 |
| Cyanide | EPA 335.4/SM 4500-CN E | mg/L | 0.005 | 0.005 |
| pH | SM 4500 H+B/ EPA 9040/ EPA 9045D | NA | NA | 0-14 |
| Dissolved Oxygen | NA | mg/L | 0.5 | Sensitivity to 5 mg/L |
| Specific Conductance | EPA 120.1 | µs/cm | 1 | 1 |
| Turbidity | SM 2130B/EPA 180.1 | NTU | 0.1 | 0.1 |
| Total Hardness | SM 2340C | mg/L | 2 | 2 |
| Dissolved Organic Carbon | SM 5310B | mg/L | 0.6 | NA |
| Total Organic Carbon | SM 5310B | mg/L | 1 | 1 |
| Total Petroleum Hydrocarbon | EPA 1664 | mg/L | 5 | 5 |
| Biochemical Oxygen Demand | SM-5210B | mg/L | 5 | 2 |
| Chemical Oxygen Demand | SM 5220D | mg/L | 20 | 20-900 |
| MBAS | SM 5540C | mg/L | 0.5 | 0.5 |
| Chloride | EPA 300.0 | mg/L | 1 | 2 |
| Fluoride | EPA 300.0 | mg/L | 0.1 | 0.1 |
| Sulfate | EPA 300.0/EPA 375.4 | mg/L | 1 | NA |
| Perchlorate | EPA 314.0 | µg/L | 4 | 4 |
| Dissolved Phosphorus (as P) | SM 4500-P E | mg/L | 0.05 | 0.05 |
| Total Phosphorus (as P) | SM 4500-P E | mg/L | 0.05 | 0.05 |
| Orthophosphate (as P) | SM 4500-PE/EPA 300.0 | mg/L | 0.2 | NA |
| Ammonia (as N) | SM 4500-NH3 C | mg/L | 0.1 | 0.1 |
| Nitrate + Nitrite (as N) | EPA 300.0 | mg/L | 0.1 | 0.1 |
| Nitrate (as N) | EPA 300.0 | mg/L | 0.1 | 0.1 |
| Nitrite (as N) | EPA 300.0 | mg/L | 0.1 | 0.1 |
| Total Kjeldahl Nitrogen (TKN) | SM 4500-NH3 C | mg/L | 0.1 | 0.1 |
| Total Alkalinity | SM 2320B | mg/L | 2 | 2 |
| ***Solids*** | | | | |
| Suspended Sediment Concentration (SSC) | ASTMD 3977-97 | mg/L | 3 | NA |
| Total Suspended Solids (TSS) | SM 2540D | mg/L | 2 | 2 |
| Total Dissolved Solids (TDS) | SM 2540C | mg/L | 10 | 2 |

| Parameter/Constituent | Method[(1)] | Units | Project RL | MRP Table E-2 ML |
|---|---|---|---|---|
| Volatile Suspended Solids | EPA 1684 | mg/L | 1 | 2 |
| ***Metals in Freshwater (dissolved and total)*** | | | | |
| Aluminum | EPA 200.8 | µg/L | 100 | 100 |
| Antimony | EPA 200.8 | µg/L | 0.5 | 0.5 |
| Arsenic | EPA 200.8 | µg/L | 1 | 1 |
| Beryllium | EPA 200.8 | µg/L | 0.5 | 0.5 |
| Cadmium | EPA 200.8 | µg/L | 0.25 | 0.25 |
| Chromium (total) | EPA 200.8 | µg/L | 0.5 | 0.5 |
| Chromium (Hexavalent) | EPA 218.6 | µg/L | 5 | 5 |
| Copper | EPA 200.8 | µg/L | 0.5 | 0.5 |
| Iron | EPA 200.8 | µg/L | 100 | 100 |
| Lead | EPA 200.8 | µg/L | 0.5 | 0.5 |
| Mercury | EPA 1631 | µg/L | 0.5 | 0.5 |
| Nickel | EPA 200.8 | µg/L | 1 | 1 |
| Selenium | EPA 200.8 | µg/L | 1 | 1 |
| Silver | EPA 200.8 | µg/L | 0.25 | 0.25 |
| Thallium | EPA 200.8 | µg/L | 1 | 1 |
| Zinc | EPA 200.8 | µg/L | 1 | 1 |
| ***Metals in Seawater (dissolved and total)*** | | | | |
| Copper | EPA 1640 | µg/L | 1 | NA |
| Lead | EPA 1640 | µg/L | 1 | NA |
| Mercury | EPA 1631 | µg/L | 1 | NA |
| Nickel | EPA 1640 | µg/L | 1 | NA |
| Selenium | EPA 1640 | µg/L | 1 | NA |
| Silver | EPA 1640 | µg/L | 1 | NA |
| Zinc | EPA 1640 | µg/L | 1 | NA |
| ***Organochlorine Pesticides*** | | | | |
| Aldrin | EPA 608 | ng/L | 5 | 5 |
| alpha-BHC | EPA 608 | ng/L | 10 | 10 |
| beta-BHC | EPA 608 | ng/L | 5 | 5 |
| delta-BHC | EPA 608 | ng/L | 5 | 5 |
| gamma-BHC (Lindane) | EPA 608 | ng/L | 20 | 20 |
| Chlordane-alpha | EPA 608 | ng/L | 100 | 100 |
| Chlordane-gamma | EPA 608 | ng/L | 100 | 100 |
| Oxychlordane | EPA 608 | ng/L | 200 | NA |

| Parameter/Constituent | Method[1] | Units | Project RL | MRP Table E-2 ML |
|---|---|---|---|---|
| Cis-nonachlor | EPA 608 | ng/L | 200 | NA |
| Trans-nonachlor | EPA 608 | ng/L | 200 | NA |
| 2,4'-DDD | EPA 8270C/EPA 625 | ng/L | 2 | NA |
| 2,4'-DDE | EPA 8270C/EPA 625 | ng/L | 2 | NA |
| 2,4'-DDT | EPA 8270C/EPA 625 | ng/L | 2 | NA |
| 4,4'-DDD | EPA 8270C/EPA 625 | ng/L | 50 | 50 |
| 4,4'-DDE | EPA 8270C/EPA 625 | ng/L | 50 | 50 |
| 4,4'-DDT | EPA 8270C/EPA 625 | ng/L | 10 | 10 |
| Dieldrin | EPA 608 | ng/L | 10 | 10 |
| Endosulfan I | EPA 608 | ng/L | 20 | 20 |
| Endosulfan II | EPA 608 | ng/L | 10 | 10 |
| Endosulfan Sulfate | EPA 608 | ng/L | 50 | 50 |
| Endrin | EPA 608 | ng/L | 10 | 10 |
| Endrin Aldehyde | EPA 608 | ng/L | 10 | 10 |
| Heptachlor | EPA 608 | ng/L | 10 | 10 |
| Heptachlor Epoxide | EPA 608 | ng/L | 10 | 10 |
| Toxaphene | EPA 608 | ng/L | 500 | 500 |
| ***PCBs*** | | | | |
| Congeners[2] | EPA 8270C/EPA 625 | ng/L | 2 | NA |
| Aroclors (1016, 1221, 1232, 1242, 1248, 1254, 1260) | EPA 8270C/EPA 625/EPA 608 | ng/L | 500 | 500 |
| ***Organophosphorus Pesticides*** | | | | |
| Chlorpyrifos | EPA 614 | ng/L | 50 | 50 |
| Diazinon | EPA 614 | ng/L | 10 | 10 |
| Malathion | EPA 614 | ng/L | 1000 | 1000 |
| ***Triazine*** | | | | |
| Atrazine | EPA 530 | µg/L | 2 | 2 |
| Cyanazine | EPA 530 | µg/L | 2 | 2 |
| Prometryn | EPA 530 | µg/L | 2 | 2 |
| Simazine | EPA 530 | µg/L | 2 | 2 |
| ***Herbicides*** | | | | |
| 2,4-D | EPA 8151A | µg/L | 10 | 10 |
| Glyphosate | EPA 547 | µg/L | 5 | 5 |
| 2,4,5-TP-SILVEX | EPA 8151A | µg/L | 0.5 | 0.5 |
| ***Semivolatile Organic Compounds (SVOCs)*** | | | | |
| 1,2-Diphenylhydrazine | EPA 625 | µg/L | 1 | 1 |

| Parameter/Constituent | Method[(1)] | Units | Project RL | MRP Table E-2 ML |
|---|---|---|---|---|
| 2,4,6-Trichlorophenol | EPA 625 | µg/L | 10 | 10 |
| 2,4-Dichlorophenol | EPA 625 | µg/L | 1 | 1 |
| 2,4-Dimethylphenol | EPA 625 | µg/L | 2 | 2 |
| 2,4-Dinitrophenol | EPA 625 | µg/L | 5 | 5 |
| 2,4-Dinitrotoluene | EPA 625 | µg/L | 5 | 5 |
| 2,6-Dinitrotoluene | EPA 625 | µg/L | 5 | 5 |
| 2-Chloronaphthalene | EPA 625 | µg/L | 10 | 10 |
| 2-Chlorophenol | EPA 625 | µg/L | 2 | 2 |
| 2-Methyl-4,6-dinitrophenol | EPA 625 | µg/L | 5 | 5 |
| 2-Nitrophenol | EPA 625 | µg/L | 10 | 10 |
| 3,3'-Dichlorobenzidine | EPA 625 | µg/L | 5 | 5 |
| 4-Bromophenyl phenyl ether | EPA 625 | µg/L | 5 | 5 |
| 4-Chloro-3-methylphenol | EPA 625 | µg/L | 1 | 1 |
| 4-Chlorophenyl phenyl ether | EPA 625 | µg/L | 5 | 5 |
| 4-Nitrophenol | EPA 625 | µg/L | 5 | 5 |
| Acenaphthene | EPA 625 | µg/L | 1 | 1 |
| Acenaphthylene | EPA 625 | µg/L | 2 | 2 |
| Anthracene | EPA 625 | µg/L | 2 | 2 |
| Benzidine | EPA 625 | µg/L | 5 | 5 |
| Benzo(a)anthracene | EPA 625 | µg/L | 5 | 5 |
| Benzo(a)pyrene | EPA 625 | µg/L | 2 | 2 |
| Benzo(b)fluoranthene | EPA 625 | µg/L | 10 | 10 |
| Benzo(g,h,i)perylene | EPA 625 | µg/L | 5 | 5 |
| Benzo(k)fluoranthene | EPA 625 | µg/L | 2 | 2 |
| Benzyl butyl phthalate | EPA 625 | µg/L | 10 | 10 |
| bis(2-Chloroethoxy) methane | EPA 625 | µg/L | 5 | 5 |
| bis(2-Chloroisopropyl) ether | EPA 625 | µg/L | 2 | 2 |
| bis(2-Chloroethyl) ether | EPA 625 | µg/L | 1 | 1 |
| bis(2-Ethylhexyl) phthalate | EPA 625 | µg/L | 5 | 5 |
| Chrysene | EPA 625 | µg/L | 5 | 5 |
| Dibenzo(a,h)anthracene | EPA 625 | µg/L | 0.1 | 0.1 |
| Diethyl phthalate | EPA 625 | µg/L | 2 | 2 |
| Dimethyl phthalate | EPA 625 | µg/L | 2 | 2 |
| Di-n-butylphthalate | EPA 625 | µg/L | 10 | 10 |
| Di-n-octylphthalate | EPA 625 | µg/L | 10 | 10 |
| Fluoranthene | EPA 625 | µg/L | 0.05 | 0.05 |
| Fluorene | EPA 625 | µg/L | 0.1 | 0.1 |

| Parameter/Constituent | Method[(1)] | Units | Project RL | MRP Table E-2 ML |
|---|---|---|---|---|
| Hexachlorobenzene | EPA 625 | µg/L | 1 | 1 |
| Hexachlorobutadiene | EPA 625 | µg/L | 1 | 1 |
| Hexachloro-cyclo pentadiene | EPA 625 | µg/L | 5 | 5 |
| Hexachloroethane | EPA 625 | µg/L | 1 | 1 |
| Indeno(1,2,3-cd)pyrene | EPA 625 | µg/L | 0.05 | 0.05 |
| Isophorone | EPA 625 | µg/L | 1 | 1 |
| Naphthalene | EPA 625 | µg/L | 0.2 | 0.2 |
| Nitrobenzene | EPA 625 | µg/L | 1 | 1 |
| N-Nitroso-dimethyl amine | EPA 625 | µg/L | 5 | 5 |
| N-Nitrosodiphenylamine | EPA 625 | µg/L | 1 | 1 |
| N-Nitroso-di-n-propyl amine | EPA 625 | µg/L | 5 | 5 |
| Pentachlorophenol | EPA 625 | µg/L | 2 | 2 |
| Phenanthrene | EPA 625 | µg/L | 0.05 | 0.05 |
| Total Phenols | EPA 625 | mg/L | 0.2 | 0.1 |
| Phenol | EPA 625 | µg/L | 1 | 1 |
| Pyrene | EPA 625 | µg/L | 0.05 | 0.05 |
| ***Volatile Organic Compounds*** | | | | |
| 1,2,4-Trichlorobenzene | EPA 624 | µg/L | 1 | 1 |
| 1,2-Dichlorobenzene | EPA 624 | µg/L | 1 | 1 |
| 1,3-Dichlorobenzene | EPA 624 | µg/L | 1 | 1 |
| 1,4-Dichlorobenzene | EPA 624 | µg/L | 1 | 1 |
| 2-Chloroethyl vinyl ether | EPA 624 | µg/L | 1 | 1 |
| Methyl tert-butyl ether (MTBE) | EPA 624 | µg/L | 1 | 1 |

RL – Reporting Limit NA – Not applicable

1. RLs are equal to those specified in the MRP of the Permit. Methods may be substituted by an equivalent method that is lower than or meets the project RL.
2. Analysis for PCB congeners includes the following constituents: PCB-8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209.

**Table 19. Analytical Methods and Reporting Limits (RL) for Laboratory Analysis of Sediment**

| Parameter/Constituent | Method[(1)] | Units | Project RL |
|---|---|---|---|
| ***General Parameters*** | | | |
| % Solids | EPA 1684 | % | NA |
| Total Organic Carbon (TOC) | SM5310B | % Dry Weight | 0.05 |
| ***Chlordane Compounds*** | | | |
| alpha-Chlordane | USEPA 8081A/8270C | ng/dry g | 0.5 |
| gamma-Chlordane | USEPA 8081A/8270C | ng/dry g | 0.5 |
| Oxychlordane | USEPA 8081A/8270C | ng/dry g | 0.5 |
| trans-Nonachlor | USEPA 8081A/8270C | ng/dry g | 0.5 |
| cis-Nonachlor | USEPA 8081A/8270C | ng/dry g | 0.5 |
| ***Other OC Pesticides*** | | | |
| 2,4'-DDD | USEPA 8081A/8270C | ng/dry g | 0.5 |
| 2,4'-DDE | USEPA 8081A/8270C | ng/dry g | 0.5 |
| 2,4'-DDT | USEPA 8081A/8270C | ng/dry g | 0.5 |
| 4,4'-DDD | USEPA 8081A/8270C | ng/dry g | 0.5 |
| 4,4'-DDE | USEPA 8081A/8270C | ng/dry g | 0.5 |
| 4,4'-DDT | USEPA 8081A/8270C | ng/dry g | 0.5 |
| Total DDT | USEPA 8081A/8270C | ng/dry g | NA |
| Dieldrin | USEPA 8081A/8270C | ng/dry g | 0.02 |
| ***PAHs*** | | | |
| 1-Methylnaphthalene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| 1-Methylphenanthrene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| 2-Methylnaphthalene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| 2,6-Dimethylnaphthalene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Acenaphthene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Anthracene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Benzo(a)anthracene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Benzo(a)pyrene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Benzo(e)pyrene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Biphenyl | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Chrysene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Dibenz(a,h)anthracene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Fluoranthene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Fluorene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Naphthalene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Perylene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Phenanthrene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |
| Pyrene | USEPA 8270C/8270D - SIM | ng/dry g | 20 |

| Parameter/Constituent | Method[1] | Units | Project RL |
|---|---|---|---|
| ***Total PCBs[2]*** | USEPA 8270C/8270D-SIM | ng/dry g | 0.2 |
| ***Metals*** | | | |
| Cadmium | EPA 6010B/6020 | µg/dry g | 0.01 |
| Copper | EPA 6010B/6020 | µg/dry g | 0.01 |
| Lead | EPA 6010B/6020 | µg/dry g | 0.01 |
| Silver | EPA 6010B/6020 | µg/dry g | 0.01 |
| Zinc | EPA 6010B/6020 | µg/dry g | 0.1 |

RL – Reporting Limit NA – Not applicable

1. Methods may be substituted by an equivalent method that is lower than or meets the project RL.
2. Analysis for PCBs includes the following constituents: PCB-8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209.

**Table 20. Analytical Methods and Reporting Limits (RL) for Laboratory Analysis of Tissue**

| Parameter/Constituent | Method[1] | Units | Project RL |
|---|---|---|---|
| Chlordane[2] | EPA 8270C | ng/dry g | 5 |
| DDT[3] | EPA 8270C | ng/dry g | 5 |
| PCBs[4] | EPA 8270C | ng/dry g | 5 |

RL – Reporting Limit NA – Not applicable

1. Methods may be substituted by an equivalent method that is lower than or meets the project RL.
2. Analysis for chlordane includes the following constituents: alpha-chlordane, gamma-chlordane, oxychlordane, cis-Nonachlor, and trans-Nonachlor.
3. Analysis for DDTs includes the following constituents: 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT
4. Analysis for PCBs includes the following constituents: PCB-8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209.

**Table 21. Data Quality Objectives**

| Parameter | Accuracy | Precision | Recovery | Completeness |
|---|---|---|---|---|
| **Field Measurements** | | | | |
| Water Velocity (for Flow calc.) | 2% | NA | NA | 90% |
| pH | ± 0.2 pH units | ± 0.5 pH units | NA | 90% |
| Temperature | ± 0.5 °C | ± 5% | NA | 90% |
| Dissolved Oxygen | ± 0.5 mg/L | ± 10% | NA | 90% |
| Turbidity | 10% | 10% | NA | 90% |
| Conductivity | 5% | 5% | NA | 90% |
| **Laboratory Analyses – Water** | | | | |
| Conventionals and Solids | 80 – 120% | 0 – 25% | 80 – 120% | 90% |
| Aquatic Toxicity | (1) | (2) | NA | 90% |
| Nutrients(3) | 80 – 120% | 0 – 25% | 90 – 110% | 90% |
| Metals(3) | 75 – 125% | 0 – 25% | 75 – 125% | 90% |
| Semi-Volatile Organics(3) | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| Volatile Organics(3) | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| Triazines(3) | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| Herbicides(3) | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| OC Pesticides(3) | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| PCB Congeners(3) | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| PCB Aroclors(3) | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| OP Pesticides(3) | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| **Laboratory Analyses – Sediment** | | | | |
| Sediment Toxicity | (1) | (2) | NA | 90% |
| % Solids | NA | NA | NA | 90% |
| Total Organic Carbon (TOC) | 80 – 120% | 0 – 25% | 80 – 120% | 90% |
| OC Pesticides(3) | 25 – 140% | 0 – 30% | 25 – 140% | 90% |
| PCB Congeners(3) | 60 – 125% | 0 – 30% | 60 – 125% | 90% |
| PAHs(3) | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| Metals(3) | 60 – 130% | 0 – 30% | 60 – 130% | 90% |
| **Laboratory Analyses – Tissue** | | | | |
| Chlordane(3) | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| DDTs(3) | 35 – 140% | 0 – 30% | 35 – 140% | 90% |
| Metals(3) | 80 – 120% | 0 – 25% | 80 – 120% | 90% |

1. Must meet all method performance criteria relative to the reference toxicant test.
2. Must meet all method performance criteria relative to sample replicates.
3. See **Table 18**, **Table 19**, and **Table 20** for a list of individual constituents in each suite for water, sediment, and tissue, respectively.

### 9.2.1 Method Detection Limit Studies

Any laboratory performing analyses under this program must routinely conduct MDL studies to document that the MDLs are less than or equal to the project-specified RLs. If any analytes have MDLs that do not meet the project RLs, the following steps must be taken:

- Perform a new MDL study using concentrations sufficient to prove analyte quantitation at concentrations less than or equal to the project-specified RLs per the procedure for the Determination of the Method Detection Limit presented in Revision 1.1, 40 Code of Federal Regulations (CFR) 136, 1984.
- No samples may be analyzed until the issue has been resolved. MDL study results must be available for review during audits, data review, or as requested. Current MDL study results must be reported for review and inclusion in project files.

An MDL is developed from seven aliquots of a standard containing all analytes of interest spiked at five times the expected MDL. These aliquots are processed and analyzed in the same manner as environmental samples. The results are then used to calculate the MDL. If the calculated MDL is less than 0.33 times the spiked concentration, another MDL study should be performed using lower spiked concentrations.

### 9.2.2 Project Reporting Limits

Laboratories generally establish RLs that are reported with the analytical results—these may be called reporting limits, detection limits, reporting detection limits, or several other terms by the reporting laboratory. These laboratory limits must be less than or equal to the project RLs listed in **Table 18**. Wherever possible, project RLs are lower than the relevant numeric criteria or toxicity thresholds. Laboratories performing analyses for this project must have documentation to support quantitation at the required levels.

### 9.2.3 Laboratory Standards and Reagents

All stock standards and reagents used for standard solutions and extractions must be tracked through the laboratory. The preparation and use of all working standards must be documented according to procedures outlined in each laboratory's Quality Assurance (QA) Manual; standards must be traceable according to USEPA, A2LA or National Institute for Standards and Technology (NIST) criteria. Records must have sufficient detail to allow determination of the identity, concentration, and viability of the standards, including any dilutions performed to obtain the working standard. Date of preparation, analyte or mixture, concentration, name of preparer, lot or cylinder number, and expiration date, if applicable, must be recorded on each working standard.

### 9.2.4 Sample Containers, Storage, Preservation, and Holding Times

Sample containers must be pre-cleaned and certified free of contamination according to the USEPA specification for the appropriate methods. Sample container, storage and preservation, and holding time requirements are provided in **Table 22**. The analytical laboratories will supply sample containers that already contain preservative (**Table 22**), including ultra-pure hydrochloric and nitric acid, where applicable. After collection, samples will be stored at 4°C until arrival at the contract laboratory. Note that sample containers, volumes, storage, processing, and holding

requirements may vary according to analytical method and laboratory. Typical requirements based on the methods listed in **Table 18**, **Table 19**, and **Table 20** are provided in **Table 22**, but are subject to change upon selection and consultation with the analytical laboratory.

**Table 22. Sample Container, Sample Volume, Initial Preservation, and Holding Time Requirements for Parameters Analyzed at a Laboratory**

| Parameter | Sample Container | Sample Volume[1] | Immediate Processing and Storage | Holding Time |
|---|---|---|---|---|
| ***Water*** | | | | |
| Toxicity | | | | |
| Initial Screening | Glass or FLPE-lined jerrican | 20 L | Store at 4°C | 36 hours[2] |
| Phase I TIE | | | | |
| Total coliform, fecal coliform, and Enterococcus (marine waters) | PE or PP | 120 mL | $Na_2S_2O_3$ and Store at 4ºC | 8 hours |
| *E. coli* (fresh) | PE | 120 mL | | |
| Fecal coliform (fresh) | PE | 120 mL | | |
| Oil and Grease | Glass | 1 L | HCl or $H_2SO_4$ to pH<2 and Store at 4°C | 28 days |
| Cyanide | PE | 500 mL | NaOH to pH>10, Add reducing agent if oxidizer present, and Store at 4°C | 14 days |
| Dissolved Organic Carbon (DOC) | PE | 250 mL | Store at 4°C | Filter/28 days |
| Total Organic Carbon (TOC) | PE | 250 mL | $H_2SO_4$ to pH<2 and Store at 4°C | 28 days |
| Total Petroleum Hydrocarbon | Glass | 1 L | HCl or $H_2SO_4$ and Store at 4°C | 7/40 days[3] |
| Biochemical Oxygen Demand | PE | 1 L | Store at 4°C | 48 hours |
| Chemical Oxygen Demand | PE | 500 mL | $H_2SO_4$ to pH<2 and Store at 4°C | 28 days |
| MBAS | PE | 1 L | Store at 4°C | 48 hours |
| Fluoride | PE | 500 mL | None required | 28 days |
| Chloride | PE | 250 mL | Store at 4°C | 28 days |
| Perchlorate | PE | 500 mL | Store at 4°C | 28 days |
| Nitrate Nitrogen | PE | 250 mL | Store at 4°C | 48 hours |
| Nitrite Nitrogen | | | | |
| Orthophosphate-P or Dissolved Phosphorus | | | | |
| Ammonia Nitrogen | PE or Glass | 250-mL | $H_2SO_4$ to pH<2 and Store at 4°C | 28 days |
| Total Phosphorus | | | | |
| Organic Nitrogen | | | | |
| Nitrate + Nitrite (as N) | | | | |

| Parameter | Sample Container | Sample Volume[1] | Immediate Processing and Storage | Holding Time |
|---|---|---|---|---|
| Total Kjeldahl Nitrogen (TKN) | PE | 250 mL | $H_2SO_4$ to pH<2 and Store at 4°C | 28 days |
| Total Alkalinity | PE | 500 mL | Store at 4°C | 14 days |
| Suspended Sediment Concentration (SSC) | PE | 250 mL | Store at 4°C | 120 days |
| Total Suspended Solids (TSS) | PE | 250 mL | Store at 4°C | 7 days |
| Total Dissolved Solids (TDS) | PE | 250 mL | Store at 4°C | 7 days |
| Volatile Suspended Solids | PE | 250 mL | Store at 4°C | 7 days |
| Hardness | PE | 1 L | $HNO_3$ to pH<2 (or $H_2SO_4$ to pH<2 for Hardness) and Store at 4°C | 180 days |
| Metals | | | | 6 months[4] |
| Mercury | Glass | 500 mL | $HNO_3$ to pH<2 and Store at 4°C | 28 days |
| PCBs, OC Pesticides, OP Pesticides, Triazine Pesticides | Amber glass | 4 x 1 L | Store at 4°C | 7/40 days[3] |
| Suspended Solids Analysis for Organics | Amber glass | 20 x 1 L | Store at 4°C | 7/40 days[3] |
| Herbicides | Glass | 2 x 40 mL | Thiosulfate and Store at 4°C | 14 days |
| Semivolatile Organic Compounds | Glass | 2 x 1 L | Store at 4°C | 7 days |
| Volatile Organic Compounds | VOA | 3 x 40 mL | HCl and Store at 4°C | 14 days |
| ***Sediment*** | | | | |
| Toxicity | | | | |
| Initial Screening | 4–mil poly bag | 10 L[6] | Store at 4°C | 14 days |
| Follow-Up Testing | | | | |
| % Solids | Glass | 2 x 8 oz jar | Store at 4°C | 7 days |
| Total Organic Carbon (TOC) | | | | 1 year[7] |
| OC Pesticides, PCBs, PAHs | | | | 1 year[5] |
| Metals | | | | |
| ***Tissue*** | | | | |
| % Lipids | teflon sheet | 200 g | Store on dry ice | 1 year[5] |
| Chlordane | | | | |
| DDTs | | | | |
| Metals | | | | |

PE – Polyethylene; PP - Polypropylene

1. Additional volume may be required for QC analyses and/or equivalent substitute method or for multiple species toxicity testing.
2. Tests should be initiated within 36 hours of collection. The 36-hour hold time does not apply to subsequent analyses for TIEs. For interpretation of toxicity results, samples may be split from toxicity samples in the laboratory and analyzed for specific chemical parameters. All other sampling requirements for these samples are as specified in this document for the specific analytical method. Results of these analyses are not for any other use (e.g., characterization of ambient conditions) because of potential holding time exceedances and variance from sampling requirements.
3. 7/40 = 7 days to extract and 40 days from extraction to analysis.
4. 6 months after preservation.
5. One year if frozen, otherwise 14 days to extract and 40 days from extraction to analysis.
6. Sample volumes for follow-up testing and Phase I TIEs for sediments may change based on percent solids in previous samples. In addition, collection of sediment for follow-up testing and Phase I TIEs may change based on observations of toxicity in previous sampling events.
7. One year if frozen, otherwise 28 days.

## *9.3 Aquatic Toxicity Testing and Toxicity Identification Evaluations*

Aquatic toxicity testing supports the identification of best management practices (BMPs) to address sources of toxicity in urban runoff. The following outlines the approach for conducting aquatic toxicity monitoring and evaluating results. Monitoring begins in the receiving water and the information gained is used to identify constituents for monitoring at outfalls to support the identification of pollutants that need to be addressed in the EWMP. The sub-sections below describe the detailed process and its technical and logistical rationale. The subsections below describe the detailed process for conducting aquatic toxicity monitoring, evaluating results, and the technical and logistical rationale. Control measures and management actions to address confirmed toxicity caused by urban runoff are addressed by the EWMP, either via currently identified management actions or those that are identified via adaptive management of the EWMP.

Although not specified for testing at this time, the saltwater toxicity testing approach is also provided if such testing is initiated in the Ballona Creek Estuary.

### 9.3.1 Sensitive Species Selection

The MRP (page E-32) states that a sensitivity screening to select the most sensitive test species should be conducted unless "a sensitive test species has already been determined, or if there is prior knowledge of potential toxicant(s) and a test species is sensitive to such toxicant(s), then monitoring shall be conducted using only that test species." Previous relevant studies conducted in the watershed should be considered. Such studies may have been completed via previous MS4 sampling, wastewater NPDES sampling, or special studies conducted within the watershed. The following sub-sections discuss the species section process for assessing aquatic toxicity in receiving waters.

#### *9.3.1.1 Freshwater Sensitive Species Selection*

As described in the MRP (page E-31), if samples are collected in receiving waters with salinity less than 1 part per thousand (ppt), or from outfalls discharging to receiving waters with salinity less than 1 ppt, toxicity tests should be conducted on the most sensitive test species in

accordance with species and short-term test methods in Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (EPA/821/R-02/013, 2002; Table IA, 40 CFR Part 136). The freshwater test species identified in the MRP are:

- A static renewal toxicity test with the fathead minnow, *Pimephales promelas* (Larval Survival and Growth Test EPA Method 1000.0).
- A static renewal toxicity test with the daphnid, *Ceriodaphnia dubia* (Survival and Reproduction Test EPA Method 1002.0).
- A static non-renewal toxicity test with the green alga, *Selenastrum capricornutum* (also named Raphidocelis subcapitata) (Growth Test EPA Method 1003.0).

The three test species were evaluated to determine if either a sensitive test species had already been determined, or if there is prior knowledge of potential toxicant(s) and a test species is sensitive to such toxicant(s). In reviewing the available data in the Ballona Creek watershed, metals, historical organics, and pyrethroids have been identified as problematic and are generally considered the primary aquatic life toxicants of concern found in urban runoff. Given the knowledge of the presence of these potential toxicants in the watershed, the sensitivities of each of the three species were considered to evaluate which is the most sensitive to the potential toxicants in the watershed.

*Ceriodaphnia dubia* (*C. dubia*) has been reported as a sensitive test species for historical and current use pesticides and metals, and studies indicate that it is more sensitive to the toxicants of concern than *Pimephales promelas* (*P. promelas*) or *Selenastrum capricornutum* (*S. capricornutum*). In *Aquatic Life Ambient Freshwater Quality Criteria - Copper*, the USEPA reports greater sensitivity of *C. dubia* to copper (species mean acute value of 5.93 µg/l) compared to *P. promelas* (species mean acute value of 69.93 µg/l; EPA, 2007). *C. dubia*'s relatively higher sensitivity to metals is common across multiple metals. Additionally, researchers at the University of California (UC), Davis reviewed available reported species sensitivity values in developing pesticide criteria for the Central Valley Regional Water Quality Control Board (CVRWQCB). The UC Davis researchers reported higher sensitivity of *C. dubia* to diazinon and bifenthrin (species mean acute value of 0.34 µg/l and 0.105 µg/l) compared to *P. promelas* (species mean acute value of 7804 µg/l and 0.405 µg/l; Palumbo et al., 2010a,b). Additionally, a study of the City of Stockton urban stormwater runoff found acute and chronic toxicity response to *C. dubia*, with no toxicity response to *S. capricornutum* or *P. promelas* (Lee and Lee, 2001). The toxicity was attributed to organophosphate pesticides, indicating a higher sensitivity of *C. dubia* compared to *S. capricornutum* or *P. promelas*. While *P. promelas* is generally less sensitive to metals and pesticides, this species can be more sensitive to ammonia than *C. dubia*. However, as ammonia is not typically a constituent of concern for urban runoff and ammonia is not consistently observed above the toxic thresholds in the watershed, *P. promelas* is not considered a particularly sensitive species for evaluating the impacts of urban runoff in receiving waters in this watershed.

*S. capricornutum* is a species sensitive to herbicides. However, while sometimes present in urban runoff, herbicides are not identified as a potential toxicant in the watershed. Additionally, *S. capricornutum* is not considered the most sensitive species as it is not sensitive to pyrethroids or organophosphate pesticides and is not as sensitive to metals as *C. dubia*. Additionally, the *S.*

*capricornutum* growth test can be affected by high concentrations of suspended and dissolved solids, color, and pH extremes, which can interfere with the determination of sample toxicity. As a result, it is common to manipulate the sample by centrifugation and filtration to remove solids to conduct the test; however, this process may affect the toxicity of the sample. In a study of urban highway stormwater runoff (Kayhanian et. al, 2008), *S. capricornutum's* response to the stormwater samples was more variable than the *C. dubia* and the *P. promelas* and in some cases the algal growth was possibly enhanced due to the presence of stimulatory nutrients. Also, in a study on the City of Stockton urban stormwater runoff (Lee and Lee, 2001) the *S. capricornutum* tests rarely detected toxicity where the *C. dubia* and the *P. promelas* regularly detected toxicity.

As *C. dubia* is identified as the most sensitive to known potential toxicant(s) typically found in receiving waters and urban runoff in the freshwater potions of this watershed, *C. dubia* is selected as the most sensitive species. The species also has the advantage of being easily maintained by means of in-house mass cultures. The relative ease of test preparation, the ease of interpreting results, and the smaller volume necessary to run the test, make the test a valuable screening tool. The ease of sample collection and higher sensitivity will support assessing the presence of ambient receiving water toxicity or long term effects of toxic stormwater over time. As such, toxicity testing in the freshwater portions of the watershed will be conducted using *C. dubia*. However, *C. dubia* test organisms are typically cultured in moderately hard waters (80-100 mg/L CaCO3) and can have increased sensitivity to elevated water hardness greater than 400 mg/L CaCO3), which is beyond their typical habitat range. Because of this, in instances where hardness in site waters exceeds 400 mg/L (CaCO3), an alternative test species may be used. Daphnia magna is more tolerant to high hardness levels and is a suitable substitution for *C. dubia* in these instances (Cowgill and Milazzo, 1990).

#### *9.3.1.2 Saltwater Sensitive Species Selection*

Although not specified for testing at this time, the following details the species selection process if saltwater toxicity testing is initiated in the Ballona Creek Estuary. As described in the MRP (page E-31), if samples are collected in receiving waters with salinity equal to or greater than 1 ppt or from outfalls discharging to receiving waters with salinity that is equal to or greater than 1 ppt, then toxicity tests should be conducted on the most sensitive test species in accordance with species and short-term test methods in Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136, 1995). The marine and estuarine test species identified in the MRP are:

- A static renewal toxicity test with the topsmelt, *Atherinops affinis* (Larval Survival and Growth Test EPA Method 1006.01).
- A static non-renewal toxicity test with the purple sea urchin, *Strongylocentrotus purpuratus* (Fertilization Test EPA Method 1008.0).
- A static non-renewal toxicity test with the giant kelp, *Macrocystis pyrifera* (Germination and Growth Test EPA Method 1009.0).

In addition to considering the three species identified in the MRP, the red abalone, *Haliotis rufescens (H. rufescens*), larval development test was also considered given the extensive use in region.

Although all the species mentioned have been demonstrated as sensitive to a wide variety of toxicants and have been subject to numerous inter- and intra-laboratory testing using standardized toxicants, two species-- *Macrocystis pyrifera* (*M. pyrifera*) and *Atherinops affinis* (*A. affinis*)--have limitations when used to assess the toxicity of stormwater compared to the sea urchin fertilization test and the red abalone larval development test.

The method for *M. pyrifera* is a 48-hour chronic toxicity test that measures the percent zoospore germination and the length of the gametophyte germ tube. Although the test may be sensitive to herbicides, fungicides, and treatment plant effluent, the use of *M. pyrifera* as a test species for stormwater monitoring may not be ideal. Obtaining sporophylls for stormwater testing could also be a limiting factor for selecting this test. Collection of *M. pyrifera* sporophylls from the field is necessary prior to initiating the test and the target holding time for any receiving water or stormwater sample is 36 hrs; however, 72 hrs is the maximum time a sample may be held prior to test initiation. During the dry season, meeting the 36-72 hr holding time will be achievable; however, field collection during wet weather may be delayed beyond the maximum holding time due to heavy seas and inaccessible collection sites. In addition, collection of *M. pyrifera* sporophylls during the storm season may include increased safety risks that can be avoided by selection of a different species.

The *A. affinis* test measures the survival and growth test of a larval fish over seven days. At the end of seven days of exposure to a suspected toxicant, the number of surviving fish are recorded, along with their weights, and compared to those exposed to non-contaminated seawater. Positive characteristics of the *A. affinis*s chronic test include the ability to purchase test organisms from commercial suppliers as well as being one of the few indigenous test species that may be used to test undiluted stormwater by the addition of artificial sea salts to within the range of marine receiving waters. Unfortunately, the tolerance of *A. affinis* to chemicals in artificial sea salts may also explain their lack of sensitivity to changes in water quality compared to other test organisms such as the sea urchin or red abalone. There are concerns with the comparability of conducting a seven-day exposure test when most rain events do not occur over a seven-day period.

The *Strongylocentrotus purpuratus* (*S. purpuratus*) fertilization test measures the ability of *S. purpuratus* sperm to fertilize an egg when exposed to a suspected toxicant. The *S. purpuratus* fertilization has been selected as a chronic toxicity test organism in previous MS4 permits and has been used to assess ambient receiving water toxicity, sediment pore water toxicity, as well as stormwater toxicity. The *S. purpuratus* fertilization test is also among the most sensitive test species to metals. The adult test organisms may be purchased and held in the lab prior to fertilization, and the sample volume necessary to conduct the test is small with respect to the other suggested tests. The minimal exposure period (20 min) allows for a large number of tests to be conducted over a short period of time and permits the testing of toxicants that may lose their potency over long periods of time.

The *Haliotis rufescens* larval development test measures the percent of abnormal shell development in larvae exposed to toxic samples for 48 hrs. *H. rufescens* is commonly used to test treatment plant effluent, but has had limited use in stormwater compared to the *S. purpuratus* fertilization test. The advantages of *H. rufescens* include a sensitive endpoint, the ability to purchase abalone from commercial suppliers and hold test organisms prior to spawning, and low

variability in results compared to other species (e.g., *S. purpuratus* fertilization test). Thus, though not listed as a potential test species for use in stormwater monitoring in the MS4 permit, it was considered as a potentially sensitive species for the purposes of selecting the most sensitive species.

Due to the limitations of the giant kelp germination and growth test and the topsmelt survival and growth test, in addition to not being particularly sensitive to the constituents identified as problematic in stormwater water runoff from the watershed, these tests are not considered particularly helpful in supporting the identification of pollutants of concern. Based on the sensitivity, smaller test volume requirements, their ability to be housed in the lab prior to testing, and shorter exposure times, the *S. purpuratus* fertilization test and the *H. rufescens* development test will be considered during sensitive species selection to measure toxicity in marine and estuarine environments. Based on historical data of the sensitivity of the *S. purpuratus* and *H. rufescens* tests, and the limiting factors associated with the *A. affinis* and *M. pyrifera*tests, the sensitive species test for marine and estuarine species will be conducted with the *S. purpuratus* and *H. rufescens* tests. Species screening was determined to be appropriate for these two species (as opposed to selecting just one) as testing conducted within the region with both species have shown varying sensitivity. Thus, it is appropriate to test both to determine sensitivity at a given site. After the screening testing is completed, monitoring will be conducted with the most-sensitive species.

### 9.3.2 Testing Period

The following describes the testing periods to assess toxicity in samples collected in the BCWMG EWMP area during dry and wet weather conditions.

#### *9.3.2.1 Freshwater Testing Periods*

Although wet weather conditions in the region generally persist for less than the chronic testing periods (typically 7 days), the *C. dubia* chronic test method will be used for wet weather toxicity testing in accordance with Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (EPA, 2002b). Utilization of chronic tests on wet weather samples are not expected to generate results representative of the typical conditions found in the receiving water intended to be simulated by toxicity testing.

Chronic toxicity tests will be used to assess both survival and reproductive/growth endpoints for *C. dubia* in dry weather samples. Chronic testing will be conducted on undiluted grab samples in accordance with Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (USEPA, 2002a).

#### *9.3.2.2 Saltwater Testing Period*

While not specified for testing at this time, the following details the testing period if saltwater toxicity testing is initiated in the BCE. Although the two marine and estuarine toxicity species tests utilize methods that have short durations (20 minutes for the *S. purpuratus* fertilization test and 48 hours for the *H. rufescens* development test), the end points are sub-lethal and can be considered representative of acute and chronic effects. Both test species and test methods are suitable for wet weather and dry weather monitoring.

### 9.3.3 Toxicity Endpoint Assessment and Toxicity Identification Evaluation Triggers

Per the MRP, toxicity test endpoints will be analyzed using the Test of Significant Toxicity (TST) t-test approach specified by the USEPA (USEPA, 2010). The Permit specifies that the chronic in-stream waste concentration (IWC) is set at 100% receiving water for receiving water samples and 100% effluent for outfall samples. Using the TST approach, a t-value is calculated for a test result and compared with a critical t-value from USEPA's TST Implementation Document (USEPA, 2010). Follow-up triggers are generally based on the Permit specified statistical assessment as described below.

For acute *C. dubia* toxicity testing, if a ≥50% reduction in survival or reproduction is observed between the sample and laboratory control that is statistically significant, a toxicity identification evaluation (TIE) will be performed.

For the chronic marine and estuarine tests, the percent effect will be calculated. The percent effect is defined as the difference between the mean control response and the mean IWC response divided by the control response, multiplied by 100. A TIE will be performed if the percent effect value is equal to or greater than 50 percent.

TIE procedures will be initiated as soon as possible after the toxicity trigger threshold is observed to reduce the potential for loss of toxicity due to extended sample storage. If the cause of toxicity is readily apparent or is caused by pathogen related mortality (PRM) or epibiont interference with the test, the result will be rejected. If necessary, a modified testing procedure will be developed for future testing.

In cases where significant endpoint toxicity effects greater than 50% are observed in the original sample, but the follow-up TIE baseline "signal" is not statistically significant, the cause of toxicity will be considered non-persistent. No immediate follow-up testing is required on the sample. However, future test results should be evaluated to determine if parallel TIE treatments are necessary to provide an opportunity to identify the cause of toxicity.

### 9.3.4 Toxicity Identification Evaluation Approach

The results of toxicity testing will be used to trigger further investigations to determine the cause of observed laboratory toxicity. The primary purpose of conducting TIEs is to support the identification of management actions that will result in the removal of pollutants causing toxicity in receiving waters. Successful TIEs will direct monitoring at outfall sampling sites to inform management actions. As such, the goal of conducting TIEs is to identify pollutant(s) that should be sampled during outfall monitoring so that management actions can be identified to address the pollutant(s).

The TIE approach is divided into three phases as described in USEPA's 1991 Methods for Aquatic Toxicity Identification Evaluations – Phase I Toxicity Characterization Procedures – Second Edition (EPA/600/6-9/003) and briefly summarized as follows:

- Phase I utilizes methods to characterize the physical/chemical nature of the constituents which cause toxicity. Such characteristics as solubility, volatility and filterability are

determined without specifically identifying the toxicants. Phase I results are intended as a first step in specifically identifying the toxicants but the data generated can also be used to develop treatment methods to remove toxicity without specific identification of the toxicants.

- Phase II utilizes methods to specifically identify toxicants.
- Phase III utilizes methods to confirm the suspected toxicants.

A Phase I TIE will be conducted on samples that exceed a TIE trigger described above. Water quality data will be reviewed to further support evaluation of potential toxicants. A range of sample manipulations may be conducted as part of the TIE process. The most common manipulations are described in **Table 23**. Information from previous chemical testing and/or TIE efforts will be used to determine which of these (or other) sample manipulations are most likely to provide useful information for identification of primary toxicants. TIE methods will generally adhere to USEPA procedures documented in conducting TIEs (USEPA, 1991, 1992, 1993a-b).

**Table 23. Aquatic Toxicity Identification Evaluation Sample Manipulations**

| TIE Sample Manipulation | Expected Response |
|---|---|
| pH Adjustment (pH 7 and 8.5) | Alters toxicity in pH sensitive compounds (i.e., ammonia and some trace metals) |
| Filtration or centrifugation(1) | Removes particulates and associated toxicants |
| Ethylenediamine-Tetraacetic Acid (EDTA) or Cation Exchange Column(1) | Chelates trace metals, particularly divalent cationic metals |
| Sodium thiosulfate (STS) addition | Reduces toxicants attributable to oxidants (i.e., chlorine) and some trace metals |
| Piperonyl Butoxide (PBO) (1) | Reduces toxicity from organophosphate pesticides such as diazinon, chlorpyrifos and malathion, and enhances pyrethroid toxicity |
| Carboxylesterase addition(2) | Hydrolyzes pyrethroids |
| Temperature adjustments(3) | Pyrethroids become more toxic when test temperatures are decreased |
| Solid Phase Extraction (SPE) with C18 column | Removes non-polar organics (including pesticides) and some relatively non-polar metal chelates |
| Sequential Solvent Extraction of C18 column(1) | Further resolution of SPE-extracted compounds for chemical analyses |
| No Manipulation(1) | Baseline test for comparing the relative effectiveness of other manipulations |

1. Denotes treatments that will be conducted during the initiation of toxicity monitoring, but may be revised as the program is implemented. These treatments were recommended for initial stormwater testing in Appendix E (Toxicity Testing Tool for Storm Water Discharges) of the State Water Resources Control Board's June 2012 Public Review Draft "Policy for Toxicity Assessment and Control".
2. Carboxylesterase addition has been used in recent studies to help identify pyrethroid-associated toxicity (Wheelock et al., 2004; Weston and Amweg, 2007). However, this treatment is experimental in nature and should be used along with other pyrethroid-targeted TIE treatments (e.g., PBO addition).
3. Temperature adjustments are another recent manipulation used to evaluate pyrethroid-associated toxicity. Lower temperatures increase the lethality of pyrethroid pesticides. (Harwood, You and Lydy, 2009)

The BCWMG will identify the cause(s) of toxicity using a selection of treatments in **Table 23** and, if possible, using the results of water column chemistry analyses. After any initial determinations of the cause of toxicity, the information may be used during future events to modify the targeted treatments to more closely target the expected toxicant or to provide additional treatments to narrow the toxicant cause(s). Moreover, if the toxicant or toxicant class is not initially identified, toxicity monitoring during subsequent events will confirm if the toxicant is persistent or a short-term episodic occurrence.

As the primary goal of conducting TIEs is to identify pollutants for incorporation into outfall monitoring, narrowing the list of toxicants following Phase I TIEs via Phase II or III TIEs is not necessary if the toxicant class determined during the Phase I TIE is sufficient for: (1) identifying additional pollutants for outfall monitoring; and/or (2) identifying control measures. Thus, if the specific pollutant(s) or the analytical class of pollutant(s) (e.g., metals that are analyzed via

USEPA Method 200.8) are identified then sufficient information is available to inform the addition of pollutants to outfall monitoring.

Phase II TIEs may be utilized to identify specific constituents causing toxicity in a given sample if the results of Phase I TIE testing and a review of available chemistry data fails to provide information necessary to identify constituents that warrant additional monitoring activities or management actions to identify likely sources of the toxicants and lead to elimination of the sources of these contaminants. Phase III TIEs will be conducted following any Phase II TIEs.

For the purposes of determining whether a TIE is inconclusive, TIEs will be considered inconclusive if:

- The toxicity is persistent (i.e., observed in the baseline), and
- The cause of toxicity cannot be attributed to a class of constituents (e.g., insecticides, metals, etc.) that can be targeted for monitoring.

If (1) a combination of causes that act in a synergistic or additive manner are identified; (2) the toxicity can be removed with a treatment or via a combination of the TIE treatments; or (3) the analysis of water quality data collected during the same event identify the pollutant or analytical class of pollutants, the result of a TIE is considered conclusive.

In cases where significant endpoint toxicity effects ≥50% are observed in the original sample, but the follow-up TIE baseline "signal" is not statistically significant, the cause of toxicity will be considered non-persistent. No immediate follow-up testing is required on the sample. However, future test results should be evaluated to determine if parallel TIE treatments are necessary to provide an opportunity to identify the cause of toxicity.

Note that the MRP (page E-33) allows a TIE Prioritization Metric (as described in Appendix E of the Southern California Stormwater Monitoring Coalition's (SMC) Model Monitoring Program) for use in ranking sites for TIEs. However, as the extent to which TIEs will be conducted is unknown, prioritization cannot be conducted at this time. However, prioritization may be utilized in the future based on the results of toxicity monitoring and an approach to prioritization will be developed through the CIMP adaptive management process and will be described in future versions of the CIMP.

### 9.3.5 Follow Up on Toxicity Testing Results

Per Parts VIII.B.c.vi and XI.G.1.d of the MRP, if the results of a TIE on a receiving sample are inconclusive, a toxicity test conducted during the same condition (i.e., wet or dry weather), using the same test species, will be conducted at applicable upstream outfalls as soon as feasible (i.e., the next monitoring event that is at least 45 days following the toxicity laboratory's report transmitting the results of a inconclusive TIE). The same TIE approach presented in **Sections 9.3.4Error! Reference source not found.** and **9.3.5**, respectively will be followed based on the results of the outfall sample.

If a toxicant or class of toxicants is identified through a TIE, the MRP (page E-33) indicates the following actions should be taken when a toxicant or class of toxicants is identified through a TIE:

- BCWMG Members shall analyze for the toxicant(s) during the next scheduled sampling event in the discharge from the outfall(s) upstream of the receiving water location.
- If the toxicant is present in the discharge from the outfall at levels above the applicable receiving water limitation, a toxicity reduction evaluation (TRE) will be performed for that toxicant.

The list of constituents monitored at outfalls identified in the CIMP will be modified based on the results of the TIEs. Monitoring for constituents identified based on the results of a TIE will occur as soon as feasible following the completion of a successful TIE (i.e., the next monitoring event that is at least 45 days following the toxicity laboratory's report transmitting the results of a successful TIE).

The requirements of the TREs will be met as part of the adaptive management process in the BC EWMP rather than conducted via the CIMP. The identification and implementation of control measures to address the causes of toxicity are tied to management of the stormwater program, not the CIMP. It is expected that the requirements of TREs will only be conducted for toxicants that are not already addressed by an existing Permit requirement (i.e., TMDLs) or existing or planned management actions.

### 9.3.6 Summary of Aquatic Toxicity Monitoring

The approach to conducting aquatic toxicity monitoring as described in the previous sections is summarized in **Figure 10**. The intent of the approach is to identify the cause of toxicity observed in receiving water to the extent possible with the toxicity testing tools available, thereby directing outfall monitoring for the pollutants causing toxicity with the ultimate goal of supporting the development and implementation of management actions.

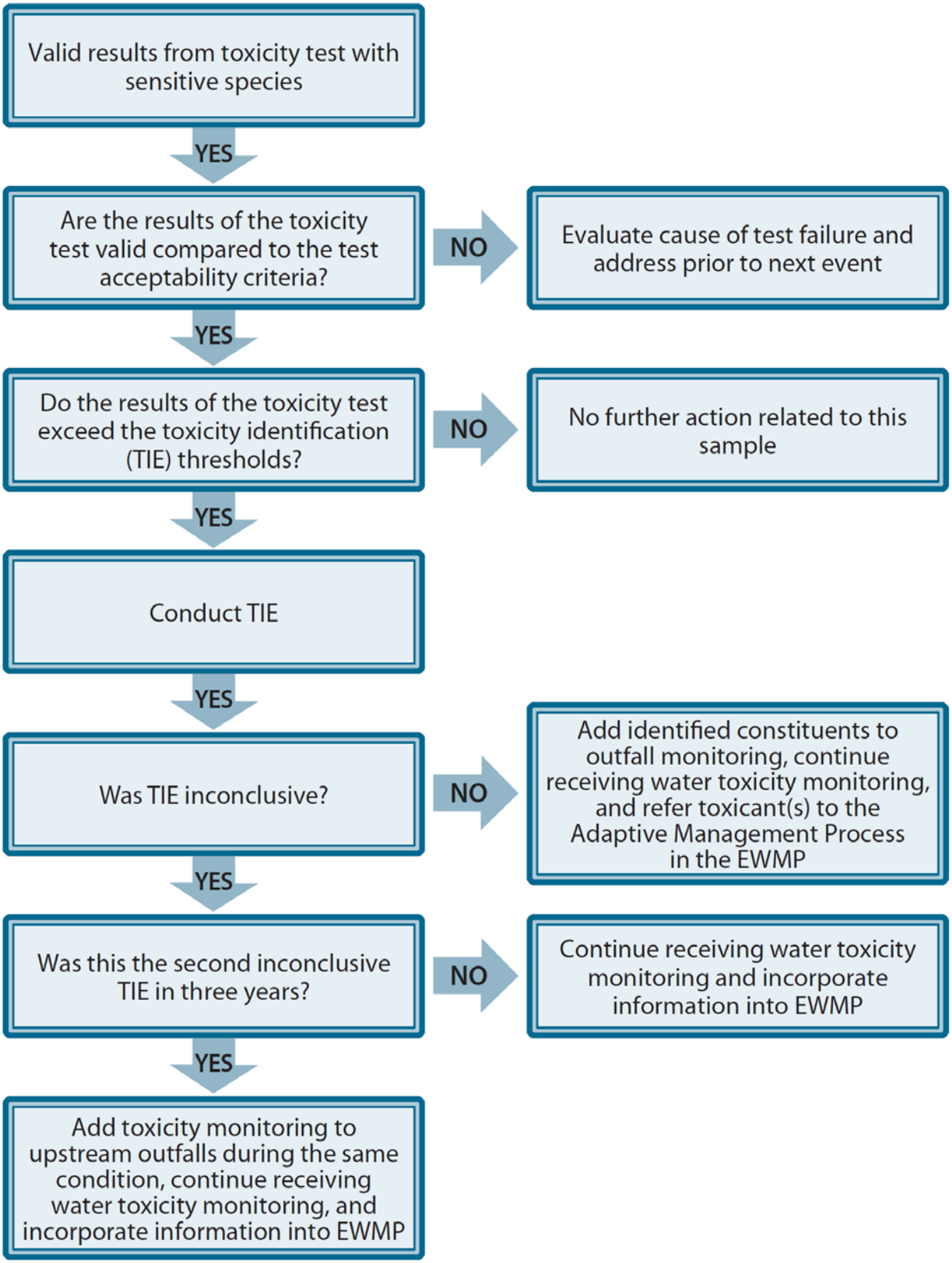



**Figure 10. Detailed Aquatic Toxicity Assessment Process**

## 9.4 Sediment Toxicity Testing and Toxicity Identification Evaluations

The California Sediment Quality Objectives[3] (Phase I SQOs) for direct effects describes acceptable toxicity tests. Annual sediment toxicity tests will be conducted using the 10-day *Eohaustorius estuarius* (*E. estuarius*) whole sediment toxicity test. Every five years, in conjunction with the full SQO testing (sediment triad sampling), sediment toxicity tests will be conducted using the 10-day *E. estuarius* whole sediment toxicity test and the 48-hour *Mytilus galloprovincialis* sediment-water interface toxicity test. Samples will be prepared and analyzed consistent with the methods presented in Chapter 4 of the Sediment Quality Assessment Draft Technical Support Manual (SCCWRP, 2009).

TIE methods recommended by the USEPA (1996 and 2007) and employed during the Sediment TIE Study reported in the Toxicity Identification Evaluation of Sediment (Sediment TIE) in Ballona Creek Estuary Final Report (SCCWRP, 2010) will be utilized. The various TIE treatments that may be employed are presented in **Table 24**. Sediment porewater will be extracted and tested for toxicity if a greater than 50 percent effect is observed in bulk sediment. If the subsequent sediment porewater toxicity testing results in a greater than 50 percent effect, a Phase 1 TIE will be initiated on the bulk sediment and porewater.

Additionally, the sediment toxicity data will be assessed in conjunction with sediment chemistry and benthic infuana data to evaluate attainment of the Phase I SQOs. As the benthic infauna data is collected every five years, the assessment will be conducted on the same timeframe. A stressor identification study, as required by the Phase I SQOs (Section VII.F), will be conducted if sediments fail to meet the narrative protective condition of Unimpacted or Likely Unimpacted. A separate Stressor Identification Work Plan will be developed and submitted to the Regional Board Executive Officer (EO) for review and approval prior to initiation of related sampling.

**Table 24. Sediment Toxicity Identification Evaluation Sample Manipulations**

| Treatment | Matrix | Purpose |
|---|---|---|
| Coconut carbon addition | Sediment | Binds organic contaminants |
| Cation exchange resin addition | Sediment | Binds of trace metals |
| Piperonyl Butoxide (PBO) addition | Sediment/ Pore water | Inhibits pesticide metabolism. Reduces toxicity of organophosphorus pesticides; increases toxicity of pyrethroid pesticides |
| C18 Extraction | Pore water | Removes non-polar organic compounds |
| EDTA | Pore water | Chelates cationic metals |

[3] Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality. Effective August 25, 2009.

## 9.5 Bio-Assessment/Macrobenthic Community Assessment

The Phase I SQOs for direct effects requires the analysis of benthic infauna. Benthic infauna assessment will be conducted as part of the sediment triad sampling once every five years. Samples will be processed and analyzed consistent with the methods presented in Chapter 5 of the Sediment Quality Assessment Draft Technical Support Manual (SCCWRP, 2009).

The benthic infuana data will be assessed in conjunction with sediment chemistry and sediment toxicity data to evaluate attainment of the Phase I SQOs every five years. A stressor identification study, as required by the Phase I SQOs (Section VII.F), will be conducted if sediments fail to meet the narrative protective condition of Unimpacted or Likely Unimpacted. A separate Stressor Identification Work Plan will be developed and submitted to the Regional Board EO for review and approval prior to initiation of related sampling.

## 9.6 List of Laboratories Conducting Analysis

The chosen laboratories will be able to meet the measurement quality objectives set forth in **Table 18** through **Table 21**. Laboratories will meet California Environmental Laboratory Accreditation Program (ELAP) and/or National Environmental Laboratory Accreditation Program (NELAP) certifications and any data quality requirements specified in this document. Due to contracting procedures and solicitation requirements, qualified laboratories have not yet been selected to carry out the analytical responsibilities described in this CIMP. Selected laboratories will be listed along with lab certification information in **Table 25**. Following the completion of the first monitoring year, the CIMP will be updated to include the pertinent laboratory specific information. At the end of all future monitoring years the BCWMG will assess the laboratories performance and at that time a new laboratory may be chosen.

**Table 25. Summary of Laboratories Conducting Analysis for the BCWMG CIMP**

| Laboratory[1] | General Category of Analysis | Lab Certification No. & Expiration Date[2] |
|---|---|---|
| | | |
| | | |

1. Information for all laboratories will be added to this table following their selection and upon CIMP update.
2. Lab certifications are renewed on an annual basis.

### 9.6.1 Alternate Laboratories

In the event that the laboratories selected to perform analyses for the CIMP are unable to fulfill data quality requirements outlined herein (e.g., due to instrument malfunction), alternate laboratories need to meet the same requirements that the primary labs have met. The original laboratory selected may recommend a qualified laboratory to act as a substitute. However, the final decision regarding alternate laboratory selection rests with the BCWMG.

# 10 Sampling Methods and Sample Handling

The following sections describe the steps to be taken to properly prepare for and initiate water quality sampling for the CIMP.

## *10.1 Monitoring Event Preparation*

Monitoring event preparation includes preparation of field equipment, placing bottle orders, and contacting the necessary personnel regarding site access and schedule. The following steps will be completed two weeks prior to each sampling event (a condensed timeline may be appropriate in storm events, which may need to be completed on short notice):

1. Contact laboratories to order sample containers and to coordinate sample transportation details.
2. Confirm scheduled monitoring date with field crew(s), and set-up sampling day itinerary including sample drop-off.
3. Prepare equipment.
4. Prepare sample container labels and apply to bottles.
5. Prepare the monitoring event summary and field log sheets to indicate the type of field measurements, field observations and samples to be collected at each of the monitoring sites.
6. Verify that field measurement equipment is operating properly (i.e., check batteries, calibrate, etc.)

**Table 26** provides a checklist of field equipment to prepare prior to each monitoring event.

**Table 26. Field Equipment Checklist**

| | |
|---|---|
| ☐ | Monitoring Plan |
| ☐ | Sample Containers plus Extras with Extra Lids |
| ☐ | Pre-Printed, Waterproof Labels (extra blank sheets) |
| ☐ | Event Summary Sheets |
| ☐ | Field Log Sheets or Electronic Device (e.g., laptop or tablet computer) |
| ☐ | Chain of Custody Forms |
| ☐ | Bubble Wrap |
| ☐ | Coolers with Ice |
| ☐ | Tape Measure |
| ☐ | Paper Towels or “Rags in a Box” |
| ☐ | Safety Equipment |
| ☐ | First Aid Kit |
| ☐ | Cellular Telephone |
| ☐ | Gate Keys |
| ☐ | Hip Waders |
| ☐ | Plastic Trash Bags |
| ☐ | Sealable Plastic Bags |
| ☐ | Grab Pole and/or Fishing Pole |
| ☐ | Clean Secondary Container(s) |
| ☐ | Field Measurement Equipment |
| ☐ | New Powder-Free Nitrile Gloves |
| ☐ | Writing Utensils |
| ☐ | Stop Watch |
| ☐ | Camera |
| ☐ | Blank Water |

### 10.1.1 Bottle Order/Preparation

Sample container orders will be placed with the appropriate analytical laboratory at least two weeks prior to each sampling event. Containers will be ordered for all water samples, including quality control samples, as well as extra containers in case the need arises for intermediate containers or a replacement. The containers must be the proper type and size and contain preservative as appropriate for the specified laboratory analytical methods. **Table 22** presents the proper container type, volume, and immediate processing and storage needs. The field crew must inventory sample containers upon receipt from the laboratory to ensure that adequate containers have been provided to meet analytical requirements for each monitoring event. After each event, any bottles used to collect water samples will be cleaned by the laboratory and either picked up by or shipped to the field crew.

### 10.1.2 Container Labeling and Sample Identification Scheme

All samples will be identified with a unique identification code to ensure that results are properly reported and interpreted. Samples will be identified such that the site, sampling location, matrix, sampling equipment and sample type (i.e., environmental sample or QC sample) can be distinguished by a data reviewer or user. The following provides a container and sample identification scheme that could be used. However, alternative sample and data management schemes can be used if they provide the essential information listed here. Sample identification codes may consist of a site identification code, a matrix code, and a unique sample identification code. An example format for sample identification codes is BC- ###.# - AAAA - XXX, where:

- BC indicates that the sample was collected as part of the BCWMG CIMP.
- ###- identifies the sequentially numbered monitoring event, and the decimal (.#) is an optional indicator for re-samples collected for the same event. Sample events are numbered from 001 to 999 and will not be repeated.
- AAAA indicates the unique site ID for each site.
- XXX identifies the sample number unique to a sample bottle collected for a single event. Sample bottles are numbered sequentially from 001 to 999 and will not be repeated within a single event.

Custom bottle labels should be produced using blank waterproof labels and labeling software. This approach will allow the site and analytical constituent information to be entered in advance and printed as needed prior to each monitoring event. Labels will be placed on the appropriate bottles in a dry environment; applying labels to wet sample bottles should be avoided. Labels should be placed on sides of bottles rather than on bottle caps. All sample containers will be pre-labeled before each sampling event to the extent practicable. Pre-labeling sample containers simplifies field activities, leaving only sample collection time and date and field crew initials to be filled out in the field. Labels should include the following information:

| | | |
|---|---|---|
| Program Name | Date | Analytical Requirements |
| Station ID | Collection Time | Preservative Requirements |
| Sample ID | Sampling Personnel and Agency/Firm | Analytical Laboratory |

### 10.1.3 Field Meter Calibration

Calibration of field measurement equipment is performed as described in the owner's manuals for each individual instrument. Each individual field crew will be responsible for calibrating their field measurement equipment. Field monitoring equipment must meet the requirements outlined in **Table 17** and be calibrated before field events based on manufacturer guidance, but at a minimum prior to each event. **Table 27** outlines the typical field instrument calibration procedures for each piece of equipment requiring calibration. Each calibration will be documented on each event's calibration log sheet (presented in **Appendix 1**).

If calibration results do not meet manufacturer specifications, the field crew should first try to recalibrate using fresh aliquots of calibration solution. If recalibration is unsuccessful, new calibration solution should be used and/or maintenance should be performed. Each attempt

should be recorded on the equipment calibration log. If the calibration results cannot meet manufacturer's specifications, the field crew should use a spare field measuring device that can be successfully calibrated. If a spare field measuring device that can be successfully calibrated is unavailable, field crews shall note the use of unsuccessfully calibrated equipment on each appropriate field log sheet. Additionally, the BCWMG should be notified.

Calibration should be verified using at least one calibration fluid within the expected range of field measurements, both immediately following calibration and at the end of each monitoring day. Individual parameters should be recalibrated if the field meters do not measure a calibration fluid within the range of accuracy presented in **Table 17**. Calibration verification documentation will be retained in the event's calibration verification log (presented in **Appendix 1**).

**Table 27. Calibration of Field Measurement Equipment**

| Equipment / Instrument | Calibration and Verification Description | Frequency of Calibration | Frequency of Calibration Verification | Responsible Party |
|---|---|---|---|---|
| pH Probe | Calibration for pH measurement is accomplished using standard buffer solutions. Analysis of a mid-range buffer will be performed to verify successful calibration. | Day prior to 1st day or 1st day of sampling event | After calibration and at the end of each sampling day | Individual Sampling Crews |
| Temperature | Temperature calibration is factory-set and requires no subsequent calibration. | | | |
| Dissolved Oxygen Probe | Calibration for dissolved oxygen measurements is accomplished using a water saturated air environment. Dissolved oxygen (DO) measurement of water-saturated air will be performed and compared to a standard table of DO concentrations in water as a function of temperature and barometric pressure to verify successful calibration. | | | |
| Conductivity | Conductivity calibration will follow manufacturer's specifications. A mid-range conductivity standard will be analyzed to verify successful calibration. | | | |
| Turbidity | Turbidity calibration will follow manufacturer's specifications. A mid-range turbidity standard will be analyzed to verify successful calibration. | | | |

### 10.1.4 Weather Conditions

Monitoring will occur during dry and wet conditions. Dry weather is defined in the MRP as when the flow of the receiving water body is less than 20 percent greater than the base flow, or as defined by effective TMDLs within the watershed, or, in the case of an estuary, on days with

less than 0.1 inch of rain and those days not less than three days after a rain event of 0.1 inch or greater within the watershed, as measured from at least 50 percent of LACDPW controlled rain gauges within the watershed. Wet weather conditions are defined in the MRP as when the receiving water body has flow that is at least 20 percent greater than its base flow or, as defined by effective TMDLs within the watershed or, in the case of an estuary, during a storm event of greater than or equal to 0.1 inch of precipitation. TMDLs within the Ballona Creek watershed have defined wet weather as when the maximum daily flow rate is equal to or greater than 64 cubic feet per second (cfs) and dry weather as below 64 cfs. As such, for the purposes of the BCWMG CIMP, weather conditions will be defined as follows:

- **Dry Weather:** When the flow of the receiving water body is less than 64 cfs and when there is less than 0.1 inch of rain in the previous three days.
- **Wet Weather:** When the flow of the receiving water body is equal to or greater than 64 cfs and when there is at least 0.1 inch of rain during the targeted storm event.

Note that if rainfall begins after dry weather monitoring has been initiated, then dry weather monitoring will be suspended and continued on a subsequent day when weather conditions meet the dry weather conditions. Generally, grab samples will be collected during dry weather and composite samples will be collected during wet weather depending on the sample collection requirements of the constituent of interest. Grab samples will be used for dry weather sampling events because the composition of the receiving water will change less over time; and thus, the grab sample can sufficiently characterize the receiving water. Grab samples during dry weather are consistent with similar programs within the region. However, to sufficiently characterize the receiving water during wet weather, composite samples will generally be used for wet weather sampling events. Grab samples may be utilized to collect wet weather sampling in certain situations, which may include, but are not limited to, when the constituent of interest requires the use of grab samples (e.g., *E. coli* and oil and grease), situations where it is unsafe to collect composite samples, or to perform investigative monitoring where composite sampling or installation of an automatic sample compositor (autosampler) may not be warranted. For safety purposes, when wet weather grab sampling is conducted, samples may be taken from slightly upstream or downstream of the designated monitoring location.

The MRP includes specific criteria for the time of monitoring events. With the exception of bacteria and metals monitoring, most constituents will be monitored during two dry weather monitoring events. For dry weather toxicity monitoring, sampling must take place during the historically driest month. As a result, the dry weather monitoring event that includes toxicity monitoring will be conducted in July. The second dry weather monitoring event will take place during January unless sampling during another month is deemed to be necessary or preferable.

All reasonable efforts will be made to monitor the first significant rain event of the storm year (first flush). The targeted storm events for wet weather sampling will be selected based on a reasonable probability that the events will result in substantially increased flows in Ballona Creek over at least 12 hours; however, it may be necessary to target smaller storms in some instances. Sufficient precipitation is needed to produce runoff and increase flow. The decision to sample a storm event will be made in consultation with weather forecasting information services after a quantitative precipitation forecast (QPF) has been determined. All efforts will be made to

collect wet weather samples from all sites during a single targeted storm event. However, safety or other factors may make it infeasible to collect samples from a given storm event. For example, storm events that will require field crews to collect wet weather samples during holidays and/or weekends may not be sampled due to sample collection or laboratory staffing constraints.

During a typical water year, for a storm to be tracked, the first flush event will have a predicted rainfall of at least 0.25 inches with at least a 70 percent probability of rainfall 24 hours prior to the forecasted time of initial rainfall. Since a significant storm event is based on predicted rainfall, it is recognized that this monitoring may be triggered without 0.25 inches of rainfall actually occurring. In this case, the monitoring event will still qualify as meeting this requirement provided that sufficient sample volume is collected to do all required laboratory analysis. Documentation will be provided showing the predicted rainfall amount. Subsequent storm events must meet the tracking requirements, flow objectives, as well as be separated by a minimum of three days of dry weather (less than 0.1 inch of rain). Antecedent conditions will be based on the LA County Department of Public Works (LACDPW) rain gage (or alternate rain gauge located within the watershed) listed in **Table 28**. The rain gauge has been used to define wet and dry weather during TMDL monitoring in the watershed since 2009. Data can be obtained at http://dpw.lacounty.gov/wrd/Precip/index.cfm by clicking the 'See Data' link in the "Near Real-Time Precipitation Map" section. The web page displays a map showing real-time rainfall totals (in inches) for different rain gages. Although the default precipitation period is 24 hours, the user can view rainfall totals over different durations. Data from the rain gages is updated every 10 minutes.

**Table 28. Real-Time Rain Gage Used to Define Weather Conditions for CIMP Monitoring[(1)]**

| Rainfall Gage | Operator | Gage Type | Latitude | Longitude |
|---|---|---|---|---|
| University of Southern California (USC) (375) | Los Angeles County Department of Public Works | Manually Observed Non-Mechanical Rain Gage | 34.0226 | -118.2908 |

1. Information for the gage can be found at http://dpw.lacounty.gov/wrd/Precip/alertlist.cfm.

For the purpose of triggering wet weather sampling preparation, a predicted rainfall of 0.1-0.5 inches in a 6- to 12-hour period would be sufficient to mobilize for wet weather sampling. The sampling crew should prepare to depart at the forecasted time of initial rainfall. The initiation of composite samples should be targeted for collection within 2 hours of local rainfall. The National Weather Service's weather forecast for the BCWMG EWMP area can be accessed on-line at http://www.wrh.noaa.gov/lox/ then click on the location of the BCWMG EWMP area on the area map. From the forecast page, the link to "Quantitative Precipitation Forecast" provides forecasted precipitation in inches for the next 24 hours, in 3-hour increments for the first 12 hours and in 6-hour increments for the last 12 hours.

Flow conditions will be based on the LACDPW flow gage listed in **Table 29** (or an alternate flow gage if real-time data at the stipulated flow gage cannot be accessed). The flow gage has been used to define flow conditions in TMDLs developed for the Ballona Creek watershed. In addition to the flow gage, field crews may monitor flow at each sampling site during dry weather.

**Table 29. Ballona Creek Watershed Flow Gage[1]**

| Flow Gage | Waterbody | Gage Location | Gage Type | Latitude | Longitude |
|---|---|---|---|---|---|
| F38C-R | Ballona Creek Reach 2 | Between Sawtelle Boulevard and Sepulveda Boulevard | Continuous Water Stage | 33.9983 | -118.4022 |

1. Information for the gage can be found at http://ladpw.org/wrd/runoff/design.cfm?facinit=F38C-R.

## *10.2 Sample Handling*

Proper sample handling ensures the samples will comply with the monitoring methods and analytical holding time and provides traceable documentation throughout the history of the sample.

### 10.2.1 Documentation Procedures

The BCWMG is responsible for ensuring that each field sampling team adheres to proper custody and documentation procedures. Field log sheets documenting sample collection and other monitoring activities for each site will be bound in a separate master logbook for each event or saved in an event specific electronic file. Field personnel have the following responsibilities:

1. Keep an accurate written record of sample collection activities on the field log sheets.
2. Ensure that all field log sheet entries are legible and contain accurate and inclusive documentation of all field activities.
3. Note errors or changes using a single line to cross out the entry and date and initial the change.
4. Ensure that a label is affixed to each sample collected and that the labels uniquely identify samples with a sample ID, site ID, date and time of sample collection and the sampling crew initials.
5. Complete the chain of custody forms accurately and legibly.

### 10.2.2 Field Documentation/Field Log

Field crews will keep a field log book or electronic file for each sampling event that contains calibration documentation, field documentation for each site, and appropriate contact information. The following items should be recorded for each sampling event:

- Monitoring station location (Station ID);
- Date and time(s) of sample collection;
- Name(s) of sampling personnel;
- Sample collection depth;
- Sample ID numbers and unique IDs for any replicate or blank samples;
- QC sample type (if appropriate);
- Requested analyses (specific parameters or method references);
- Sample type (e.g., grab or composite);
- The results of field measurements (e.g., flow, temperature, dissolved oxygen, pH, conductivity, turbidity) and the time that measurements were made;

- Qualitative descriptions of relevant water conditions (e.g., water color, flow level, clarity) or weather (e.g., wind, rain) at the time of sample collection;
- Trash observations (presence/absence);
- A description of any unusual occurrences associated with the sampling event, particularly those that may affect sample or data quality.

The field log will be scanned into a PDF within one week of the conclusion of each sampling event. Alternatively, all measurements could be collected on an electronic device such as laptop or tablet computer. **Appendix 1** contains an example of the field log sheet.

### 10.2.3 Sample Handling and Shipment

The field crews will have custody of samples during each monitoring event. Chain-of-custody (COC) forms will accompany all samples during shipment to contract laboratories to identify the shipment contents. All water quality samples will be transported to the analytical laboratory by the field crew or by courier. The original COC form will accompany the shipment, and a signed copy of the COC form will be sent, typically via fax, by the laboratory to the field crew to be retained in the project file.

While in the field, samples will be stored on ice in an insulated container. Samples that must be shipped to the laboratory must be examined to ensure that container lids are tight and placed on ice to maintain the appropriate temperature. The ice packed with samples must be approximately 2 inches deep at the top and bottom of the cooler, and must contact each sample to maintain temperature. The original COC form(s) will be double-bagged in re-sealable plastic bags and either taped to the outside of the cooler or to the inside lid. Samples must be shipped to the contract laboratory according to transportation standards. The method(s) of shipment, courier name, and other pertinent information should be entered in the "Received By" or "Remarks" section of the COC form.

Coolers must be sealed with packing tape before shipping, unless transported by field or lab personnel, and must not leak. It is assumed that samples in tape-sealed ice chests are secure whether being transported by common carrier or by commercial package delivery. The laboratory's sample receiving department will examine the shipment of samples for correct documentation, proper preservation and compliance with holding times.

The following procedures are used to prevent bottle breakage and cross-contamination:

- Bubble wrap or foam pouches are used to keep glass bottles from contacting one another to prevent breakage, re-sealable bags will be used if available.
- All samples are transported inside hard plastic coolers or other contamination-free shipping containers.
- If arrangements are not made in advance, the laboratory's sample receiving personnel must be notified prior to sample shipment.

All samples remaining after successful completion of analyses will be disposed of properly. It is the responsibility of the personnel of each analytical laboratory to ensure that all applicable regulations are followed in the disposal of samples or related chemicals. Samples will be stored

and transported as noted in **Table 22**. Samples not analyzed locally will be sent on the same day that the sample collection process is completed, if possible. Samples will be delivered to the appropriate laboratory as will be indicated in **Table 30**. Note that due to procurement procedures, the analytical laboratories have not been identified at this time. Information for all laboratories will be added to this table following their selection and upon CIMP update. Appropriate contacts will be listed along with lab certification information in **Table 30**.

**Table 30. Information on Laboratories Conducting Analysis for the BCWMG CIMP**

| Laboratory[1] | General Category of Analysis | Shipping Method | Contact | Phone | Address | Lab Certification No. & Expiration Date[2] |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

1. Information for all laboratories will be added to this table following their selection and upon CIMP update.
2. Lab certifications are renewed on an annual basis.

### 10.2.4 Chain-of Custody Forms

Sample custody procedures provide a mechanism for documenting information related to sample collection and handling. Sample custody must be traceable from the time of sample collection until results are reported. A sample is considered under custody if:

- It is in actual possession.
- It is in view after in physical possession.
- It is placed in a secure area (accessible by or under the scrutiny of authorized personnel only after in possession).

A COC form must be completed after sample collection and prior to sample shipment or release. The COC form, sample labels, and field documentation will be cross-checked to verify sample identification, type of analyses, number of containers, sample volume, preservatives, and type of containers. A complete COC form is to accompany the transfer of samples to the analyzing laboratory. A typical COC form is presented in **Appendix 1**.

### 10.2.5 Laboratory Custody Procedures

Laboratories will follow sample custody procedures as outlined in the laboratory's Quality Assurance (QA) Manual. A copy of each contract laboratory's QA Manual should be available at the laboratory upon request. Laboratories shall maintain custody logs sufficient to track each sample received and to analyze or preserve each sample within specified holding times. The following sample control activities must be conducted at the laboratory:

- Initial sample login and verification of samples received with the COC form;
- Document any discrepancies noted during login on the COC;
- Initiate internal laboratory custody procedures;
- Verify sample preservation (e.g., temperature);

- Notify the BCWMG if any problems or discrepancies are identified; and,
- Perform proper sample storage protocols, including daily refrigerator temperature monitoring and sample security.

Laboratories shall maintain records to document that the above procedures are followed. With the exception of microbiological samples, once samples have been analyzed, samples will be stored at the laboratory for at least 30 days. After this period, samples may be disposed of properly.

## *10.3 Field Protocols*

Briefly, the key aspects of quality control associated with field protocols for sample collection for eventual chemical, microbiological, and toxicological analyses are as follows:

1. Field personnel will be thoroughly trained in the proper use of sample collection gear and will be able to distinguish acceptable versus unacceptable water samples in accordance with pre-established criteria.
2. Field personnel will be thoroughly trained to recognize and avoid potential sources of sample contamination (e.g., engine exhaust, ice used for cooling, touching the inner surfaces the sample bottle or cap).
3. Sampling gear and utensils which come in direct contact with the sample will be made of non-contaminating materials (e.g., borosilicate glass, high-quality stainless steel and/or Teflon™, according to protocol) and will be thoroughly cleaned between sampling stations according to appropriate cleaning protocol.
4. Sample containers will be of the recommended type and will be free of contaminants (i.e., pre-cleaned and/or sterile).
5. Conditions for sample collection, preservation, and holding times will be followed.

Field crews will be comprised of two persons per crew, minimum. For safety reasons, sampling will occur during daylight hours, when possible. Sampling on weekends and holidays will also be avoided. Other constraints on sampling events include, but are not limited to, lab closures and toxicity testing organism availability. Sampling events should proceed in the following manner:

1. Before leaving the sampling crew base of operations, confirm number and type of sample containers as well as the complete equipment list.
2. Proceed to the first sampling site.
3. Fill-out the general information on the field log sheet.
4. Collect the environmental and quality assurance/quality control (QA/QC) samples indicated on the event summary sheet and store samples appropriately. Using the field log sheet, confirm that all appropriate containers were filled.
5. Collect field measurements and observations, and record these on the field log sheet.
6. Repeat the procedures in steps 3, 4, and 5 for each of the remaining sampling sites.
7. Complete the COC forms using the information on the field log sheets.
8. After sample collection is completed, deliver and/or ship samples to appropriate laboratory.

## *10.4 Sample Collection*

All samples will be collected in a manner appropriate for the specific analytical methods to be used. The proper sampling techniques, outlined in this section, will ensure that the collected samples are representative of the waterbodies sampled. Should field crews feel that it is unsafe to collect samples for any reason, the field crews **SHOULD NOT COLLECT** a sample and note on the field log that the sample was not collected, why the sample was not collected, and provide photo documentation, if feasible.

### 10.4.1 Overview of Sampling Techniques

As described below, the method used to collect water samples is dependent on the depth, flow, and sampling location (receiving water, outfall). Nonetheless, in all cases:

1. Throughout each sample collection event, the sampler should exercise aseptic techniques to avoid any contamination (i.e., do not touch the inner surfaces or lip edges of the sample bottle or cap).
2. The sampler should use clean, powder-free, nitrile gloves for each site to prevent contamination.
3. When collecting the sample, the sampler should not breathe, sneeze, or cough in the direction of the container.
4. Gloves should be changed if they are soiled, or if the potential for cross-contamination exists from handling sampling materials or samples.
5. While the sample is collected, the bottle lid shall not be placed on the ground.
6. The sampler should not eat or drink during sample collection.
7. The sampler should not smoke during sample collection.
8. Each person on the field crew should wear clean clothing that is free of dirt, grease, or other substances that could contaminate the sampling apparatus or sample bottles.
9. To the extent practical, sampling should not occur near a running vehicle. Vehicles should not be parked within the immediate sample collection area, even non-running vehicles.
10. When the sample is collected, ample air space should be left in the bottle to facilitate mixing by shaking for lab analysis, unless otherwise required by the method.
11. After the sample is collected and the cap is tightly screwed back on the bottle, the time of sampling should be recorded on the field log sheet.
12. Any QA/QC samples that are collected should be also be noted on the field log sheet and labeled according the convention described in **Section 10.1** of this Attachment.
13. Samples should be stored as previously described.
14. COC forms should be filled out as described in **Section 10.2** of this Attachment and delivered to the appropriate laboratory as soon as feasible to ensure hold times are met.

To prevent contamination of samples, clean metal sampling techniques using USEPA protocols outlined in USEPA Method 1669[4] will be used throughout all phases of the water sample

4 USEPA. April 1995. *Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels.* EPA 821-R-95-034.

collection. The protocol for clean metal sampling, based on USEPA Method 1669, is summarized below:

1. Samples are collected in rigorously pre-cleaned sample bottles with any tubing specially processed to clean sampling standards.
2. At least two persons, wearing clean, powder-free nitrile or latex gloves at all times, are required on a sampling crew.
3. One person, referred to as "dirty hands", opens only the outer bag of all double-bagged sample bottles.
4. The other person, referred to as "clean hands", reaches into the outer bag, opens the inner bag and removes the clean sample bottle.
5. Clean hands rinses the bottle at least two times by submerging the bottle, removing the bottle lid, filling the bottle approximately one-third full, replacing the bottle lid, gently shaking and then emptying the bottle. Clean hands then collects the sample by submerging the bottle, removing the lid, filling the bottle and replacing the bottle cap while the bottle is still submerged.
6. After the sample is collected, the sample bottle is double-bagged in the opposite order from which it was removed from the same double-bagging.
7. Clean, powder-free gloves are changed whenever something not known to be clean has been touched.

### 10.4.2 Field Measurements and Observations

Except as identified in the CIMP, field measurements will be recorded and observations made at each sampling site after a sample is collected. Given that some samples will be collected via automated composite samplers it may not be feasible to collect measurements and observations at the same time as sample collection. In these instances in-situ measurement equipment may be utilized or, if necessary, field measurements will be collected from composited samples and noted as such on the field log forms. Field measurements will include the parameters identified in the CIMP for which laboratory analysis is not required. Field monitoring equipment must meet the requirements outlined in **Table 21**. Field measurements for sediment samples shall be collected from within one meter of the sediment. All field measurement results and field observations will be recorded on a field log sheet (or electronic device) similar to the one presented in **Appendix 1** and as described in **Section 10.2** of this Attachment.

Measurements (except for flow) will be attained at approximately mid-stream, mid-depth at the location of greatest flow (if feasible) with a Hydrolab DS4 multi-probe meter, or comparable instrument(s). If at any time the collection of field measurements by wading appears to be unsafe, field crews will not attempt to collect mid-stream, mid-depth measurements. Rather, field measurements will be made either directly from a stable, unobstructed area at the channel edge, or by using a telescoping pole and intermediate container to obtain a sample for field measurements and for filling sample containers. For situations where flows are not sufficiently deep to submerge the probes, an intermediate container will be utilized. The location of field measurements will be documented on the field log sheet.

Flow measurements will be collected as outlined in the following subsections or from automated flow equipment, if available, at freshwater receiving water and non-stormwater outfall

monitoring sites. Regardless of measurement technique used, if a staff gage is present the gage height will be noted. Field crews may not be able to measure flow at several sites during wet weather because of inaccessibility of the site. If this is the case, site inaccessibility will be documented on the field log sheet.

The field sampling crew has the primary responsibility for responding to failures in the sampling or measurement systems. Deviations from established monitoring protocols will be documented in the comment section of the field log sheet and noted in the post event summaries. If monitoring equipment fails, monitoring personnel will report the problem in the notes section of the field log sheet and will not record data values for the variables in question. Broken equipment will be replaced or repaired prior to the next field use. Data collected using faulty equipment will not be used.

#### *10.4.2.1 Velocity Meter Flow Measurements*

For sampling sites where water is deep enough (>0.1-foot) a velocity meter will be utilized. For these cases, velocity will be measured at approximately equal increments across the width of the flowing water using a Marsh-McBirney Flo-Mate® velocity meter[5] or equivalent, which uses an electromagnetic velocity sensor. A "flow pole" will be used to measure the water depth at each measurement point and to properly align the sensor so that the depth of each velocity measurement is approximately equal to 0.6 * total depth, which is representative of the average velocity. The distance between velocity measurements taken across the stream is dependent on the total width. No more than 10% of the flow will pass through any one cross section.

#### *10.4.2.2 Shallow Sheet Flow Measurements*

If the depth of flow does not allow for the measurement of flow with a velocity meter (<0.1-foot) a "float" will be used to measure the velocity of the flowing water. The width, depth, velocity, cross section, and corresponding flow rate will be estimated as follows:

- **Sheet flow width:** The width (W) of the flowing water (not the entire part of the channel that is damp) is measured at the "top", "middle", and "bottom" of a marked-off distance – generally 10 feet (e.g., for a 10-foot marked-off section, $W_{Top}$ is measured at 0-feet, $W_{Mid}$ is measured at 5 feet, and $W_{Bottom}$ is measured at 10 feet).
- **Sheet flow depth:** The depth of the sheet flow is measured at the top, middle, and bottom of the marked-off distance. Specifically, the depth (D) of the sheet flow is measured at 0%, 25%, 50%, 75%, and 100% of the flowing width (e.g., $D_{50\%}^{Mid}$ is the depth of the water at middle of the section in the middle of the sheet flow) at each of the width measurement locations.
- **Representative cross-section:** Based on the collected depth and width measurements, the representative cross-sectional area across the marked-off sheet flow is approximated as follows:

5 For more information, see http://marsh-mcbirney.com/Products/2000.htm

$$\text{Representative Cross Section} = \text{Average}\ \{[\frac{W_{Top}}{4}\times(\frac{\left(D_{25\%}^{Top}+D_{0\%}^{Top}\right)}{2}+\frac{\left(D_{50\%}^{Top}+D_{25\%}^{Top}\right)}{2}+\frac{\left(D_{75\%}^{Top}+D_{50\%}^{Top}\right)}{2}+\frac{\left(D_{100\%}^{Top}+D_{75\%}^{Top}\right)}{2})],$$
$$[\frac{W_{Mid}}{4}\times(\frac{\left(D_{25\%}^{Mid}+D_{0\%}^{Mid}\right)}{2}+\frac{\left(D_{50\%}^{Mid}+D_{25\%}^{Mid}\right)}{2}+\frac{\left(D_{75\%}^{Mid}+D_{50\%}^{Mid}\right)}{2}+\frac{\left(D_{100\%}^{Mid}+D_{75\%}^{Mid}\right)}{2})],$$
$$[\frac{W_{Bottom}}{4}\times(\frac{\left(D_{25\%}^{Bottom}+D_{0\%}^{Bottom}\right)}{2}+\frac{\left(D_{50\%}^{Bottom}+D_{25\%}^{Bottom}\right)}{2}+\frac{\left(D_{75\%}^{Bottom}+D_{50\%}^{Bottom}\right)}{2}+\frac{\left(D_{100\%}^{Bottom}+D_{75\%}^{Bottom}\right)}{2})]\}$$

- **Sheet flow velocity:** Velocity is calculated based on the amount of time it took a float to travel the marked-off distance (typically 10-feet or more). Floats are normally pieces of leaves, litter, or floatables (suds, etc.). The time it takes the float to travel the marked-off distance is measured at least three times. Then average velocity is calculated as follows:

$$\text{Average Surface Velocity} = \frac{\text{Distance Marked off for Float Measurement}}{\text{Average Time for Float to Travel Marked off Distance}}$$

- **Flow Rate calculation:** For sheet flows, based on the above measurements/estimates, the estimated flow rate, Q, is calculated by:

$$Q = f \times (\text{Representative Cross Section}) \times (\text{Average Surface Velocity})$$

The coefficient f is used to account for friction effects of the channel bottom. That is, the float travels on the water surface, which is the most rapidly-traveling portion of the water column. The average velocity, not the surface velocity, determines the flow rate, and thus f is used to "convert" surface velocity to average velocity. In general, the value of f typically ranges from 0.60 – 0.90 (USGS 1982). Based on flow rate measurements taken during the LA River Bacteria Source Identification Study (CREST 2008) a value of 0.75 will be used for f.

#### *10.4.2.3 Free-flowing outfalls*

Some storm drain outfalls are free-flowing, meaning the runoff falls from an elevated outfall into the channel, which allows for collection of the entire flowing stream of water into a container of known volume (e.g., graduated bucket or graduated Ziploc bag). The time it takes to fill the known volume is measured using a stopwatch, and recorded on the field log. The time it takes to fill the container will be measured three times and averaged to ensure that the calculated discharge is representative. In some cases, a small portion of the runoff may flow around or under the container. For each measurement, "percent capture", or the proportion of flow estimated to enter the bucket, will be recorded. For free-flowing outfalls, the estimated flow rate, Q, is calculated by:

$$Q = \text{Average}\,[\frac{\text{Filled container Volume}}{(\text{Time to Fill Container})\times(\text{Estimated Capture})}]$$

Based on measurements of free-flowing outfalls during the LA River Bacteria Source Identification Study (CREST, 2008), estimated capture typically ranges from 0.75 – 1.0.

### 10.4.3 Sampling Techniques for the Collection of Water

The following subsections provide details on the various techniques that can be utilized to collect water quality samples. Should field crews feel that it is unsafe to collect samples for any reason, the field crews **SHOULD NOT COLLECT** a sample and note on the field log that the sample was not collected, why the sample was not collected, and provide photo documentation, if feasible.

#### *10.4.3.1 Direct Submersion*

Where practical, all grab samples will be collected by direct submersion at mid-stream, mid-depth using the following procedures:

1. Follow the standard sampling procedures described in **Section 10.4.1** of this Attachment.
2. Remove the lid, submerge the container to mid-stream/mid-depth, let the container fill and secure the lid. In the case of mercury samples, remove the lid underwater to reduce the potential for contamination from the air.
3. Place the sample on ice.
4. Collect the remaining samples including quality control samples, if required, using the same protocols described above.
5. Follow the sample handling procedures described in **Section 10.2** of this Attachment.

#### *10.4.3.2 Intermediate Container Technique*

Samples may be collected with the use of a clean intermediate container, if necessary, following the steps listed below. An intermediate container may include a container that is similar in composition to the sample container, a pre-cleaned pitcher made of the same material as the sample container, or a Ziploc bag. An intermediate container should not be reused at a different site without appropriate cleaning.

1. Follow the standard sampling procedures described in **Section 10.4.1** of this Attachment.
2. Submerge the intermediate container to mid-stream/mid-depth (if possible), let the container fill, and quickly transfer the sample into the individual sample container(s) and secure the lid(s).
3. Place the sample(s) on ice.
4. Collect remaining samples including quality control samples, if required, using the same protocols described above.
5. Follow the sample handling procedures described in **Section 10.2** of this Attachment.

Some flows may be too shallow to fill a container without using an intermediate container. When collecting samples from shallow sheet flows it is very important to not scoop up algae, sediment, or other particulate matter on the bottom because such debris is not representative of flowing water. To prevent scooping up such debris either: (1) find a spot where the bottom is relatively clean and allow the sterile intermediate container to fill without scooping; or (2) lay a clean sterile Ziploc® bag on the bottom and collect the water sample from on top of the bag. A fresh Ziploc® bag must be used at each site.

#### *10.4.3.3 Pumping*

Samples may be collected with the use of a peristaltic pump and specially cleaned tubing following the steps listed below. Sample tubing should not be reused at a different site without appropriate cleaning.

1. Follow the standard sampling procedures described in **Section 10.4.1** of this Attachment.
2. Attach pre-cleaned tubing into the pump, exercising caution to avoid allowing tubing ends to touch any surface known not to be clean. A separate length of clean tubing must be used at each sample location for which the pump is used.
3. Place one end of the tubing below the surface of the water. To the extent possible, avoid placing the tubing near the bottom so that settled solids are not pumped into the sample container.
4. Hold the other end of the tubing over the opening of the sample container, exercising care not to touch the tubing to the sample container.
5. Pump the necessary sample volume into the sample container and secure the lid.
6. Place the sample on ice.
7. Collect remaining samples including quality control samples, if required, using the same protocols described above.
8. Follow the sample handling procedures described in **Section 10.2** of this Attachment.

#### *10.4.3.4 Autosamplers*

Automatic sample compositors (autosamplers) are used to characterize the entire flow of a storm in one analysis. They can be programmed to take aliquots at either time- or flow-based specified intervals. As specified in Attachment E of the MRP Part VIII.C, samples shall be collected for the entire storm water discharge if it is less than 24 hours. Before beginning setup in the field, it is recommended to read the manufacturer's instructions. The general steps to set up the autosampler are described below:

1. Connect power source to autosampler computer. This can be in the form of a battery or a power cable.
2. Install pre-cleaned tubing into the pump. To the extent practicable, clean tubing will be used at each site and for each event, in order to minimize contamination. For some stations, it may be more practicable to replace tubing on an annual or every other year basis. In those instances, it would be appropriate to collect equipment blanks prior to sampling events. Tubing that is not newly installed should be flushed with clean water prior to each sampling event.
3. Attach strainer to intake end of the tubing and install in sampling channel.
4. If running flow based composite samples; install flow sensor in sampling channel and connect it to the automatic compositor.
5. Label and install composite bottle(s). If sampler is not refrigerated, then add enough ice to the composite bottle chamber to keep sample cold for the duration of sampling or until such time as ice can be refreshed. Make sure not to contaminate the inside of the composite bottle with any of the ice.
6. Program the autosampler as per the manufacturer's instructions and make sure the autosampler is powered and running before leaving the site.

After the sample collection is completed the following steps must be taken to ensure proper sample handling:

1. Upon returning to the site, check the status of the autosampler and record any errors or missed samples. Note on the field log the time of the last sample, as this will be used for filling out the COCs.
2. Remove the composite bottle and store on ice. If dissolved metals are required, then begin the sample filtration process outlined in the following subsection, within 15 minutes of the last composite sample, unless compositing must occur at another location, in which case the filtration process should occur as soon as possible upon sample compositing.
3. Power down autosampler, unless continuous flow measurements are being collected, and leave sampling site.
4. The composite sample will need to be split into the separate analysis bottles either before being shipped to the laboratory or at the laboratory. This is best done in a clean and weatherproof environment, using clean sampling technique.

#### *10.4.3.5 Dissolved Metals Field Filtration*

When feasible, samples for dissolved metals will be filtered in the field.[6] The following describes an appropriate field filtration method. An alternative or equivalent method may be utilized, if necessary.[7] A 50mL plastic syringe with a 0.45µm filter attached will be used to collect and filter the dissolved metals sample in the field. The apparatus will either come certified pre-cleaned from the manufacturer and confirmed by the analytical laboratory or be pre-cleaned by and confirmed by the analytical laboratory at least once per year. The apparatus will be double bagged in Ziploc plastic bags.

To collect the sample for dissolved metals, first collect the total metals sample using clean sampling techniques. The dissolved sample will be taken from this container. Immediately prior to collecting the dissolved sample, shake the total metals sample. To collect the dissolved metals sample using clean sampling techniques, remove the syringe from the bag and place the tip of the syringe into the bottle containing the total metals sample and draw up 50 mL of sample into the syringe. Next, remove the filter from the zip-lock bag and screw it tightly into the tip of the syringe. Then put the tip of the syringe with the filter into the clean dissolved metals container and push the sample through the filter taking care not to touch the inside surface of the sample container with the apparatus. The sample volume needs to be a minimum of 20 mL. If the filter becomes clogged prior to generating 20 mL of sample, remove and dispose of the used filter and replace it with a new clean filter (using the clean sampling techniques). Continue to filter the sample. When 20 mL has been collected, cap the sample bottle tightly and store on ice for delivery to the laboratory.

[6] If the field filtration for dissolved metals is not practical or feasible the filtration and preservation of the sample in accordance with the applicable method should be done as soon as practical upon delivery to the laboratory.
[7] Alternative methods should be considered (especially when more volume is required for lab analysis); for example, such as filtering 1 or 2 Liters by passing sample through 0.45 um filter using peristaltic pump equipped with clean tubing.

### 10.4.4 Receiving Water Sample Collection

A grab sample is a discrete individual sample. A composite sample is a mixture of samples collected over a period of time either as time or flow weighted. A time-weighted composite is created by mixing multiple aliquots collected at specified time intervals. A flow-weighted composite is created by mixing multiple aliquots collected at equal intervals but where the volume of the aliquot is based on flow rate. Generally, grab samples will be collected during dry weather and composite samples will be collected during wet weather. Should field crews feel that it is unsafe to collect samples for any reason, the field crews **SHOULD NOT COLLECT** a sample and note on the field log that the sample was not collected, why the sample was not collected, and provide photo documentation, if feasible.

Grab samples will be used for dry weather sampling events, because the composition of the receiving water will change less over time; and thus, the grab sample can sufficiently characterize the receiving water. Grab samples will be collected as described in **Section 10.4.3** of this Attachment. Monitoring site configuration and consideration of safety will dictate grab sample collection technique. The potential exists for monitoring sites to lack discernible flow. The lack of discernible flow may generate unrepresentative data. To address the potential confounding interference that can occur under such conditions, sites sampled should be assessed for the following conditions and sampled or not sampled accordingly:

- Pools of water with no flow or no visible connection to another surface water body should not be sampled. The field log should be completed for non-water quality data (including date and time of visit) and the site condition should be photo-documented.
- Flowing water (i.e., based on visual observations, flow measurements, and a photo-documented assessment of conditions immediately upstream and downstream of the sampling site) site should be sampled.

Wet weather samples will generally be collected as either time- or flow-weighted composites. Grab samples may be utilized to collect wet weather sampling in certain situations, which may include, but are not limited to, situations where it is unsafe to collect composite samples or to perform investigative monitoring where composite sampling or installation of an autosampler may not be warranted. For safety purposes, when wet weather grab sampling is conducted, samples may be taken from slightly upstream or downstream of the designated monitoring location.

It is the combined responsibility of all members of the sampling crew to determine if the performance requirements of the specific sampling method have been met, and to collect additional samples if required. If the performance requirements outlined above or documented in sampling protocols are not met, the sample will be re-collected. If contamination of the sample container is suspected, a fresh sample container will be used. The BCWMG will be contacted if at any time the sampling crew has questions about procedures or issues based on site-specific conditions.

### 10.4.5 Stormwater Outfall Sample Collection

Stormwater outfalls will be monitored with similar methods as discussed in **Section 10.4.4** of this Attachment. Sampling will not be undertaken if the outfalls are not flowing or if conditions

exist where the receiving water is back-flowing into the outfall. It is the combined responsibility of all members of the sampling crew to determine if the performance requirements of the specific sampling method have been met, and to collect additional samples if required. If the performance requirements outlined above or documented in sampling protocols are not met, the sample will be re-collected. If contamination of the sample container is suspected, a fresh sample container will be used. The BCWMG will be contacted if at any time the sampling crew has questions about procedures or issues based on site-specific conditions.

### 10.4.6 Non-Stormwater Outfall Screening Surveys and Sample Collection

The outfall screening process is designed to identify outfalls that have significant non-stormwater (NSW) discharges. The collection of water quality data will support the determination of significant NSW discharges as well as to characterize dry weather loading.

#### *10.4.6.1 Preparation for Outfall Surveys*

Preparation for outfall surveys includes preparation of field equipment, placing bottle orders, and contacting the necessary personnel regarding site access and schedule. The following steps should be completed two weeks prior to each outfall survey:

1. Check weather reports and LACDPW rain gage to ensure that antecedent dry weather conditions are suitable.
2. Contact appropriate Flood Maintenance Division personnel from LACDPW to notify them of dates and times of any activities in flood control channels.
3. Contact laboratories to order bottles and to coordinate sample pick-ups.
4. Confirm scheduled sampling date with field crews.
5. Set-up sampling day itinerary including sample drop-offs and pick-ups.
6. Compile field equipment.
7. Prepare sample labels.
8. Prepare event summaries to indicate the type of field measurements, field observations, and samples to be taken at each of the outfalls.
9. Prepare COCs.
10. Charge the batteries of field tablets (if used).

#### *10.4.6.2 Non-Stormwater Sample Collection*

Water quality samples will be collected consistent with the dry weather requirements outlined in the receiving water monitoring section using the direct submersion, intermediate container, shallow sheet flow, or pumping methods described in **Section 10.4.3** of this Attachment.

### 10.4.7 Stormborne Sediment Sampling and Analysis

The Ballona Creek Estuary Toxics TMDLs include requirements for the analysis of water quality samples to assess the contribution of cadmium, copper, lead, silver, zinc, chlordanes, PCBs, DDTs, and PAHs. Note that the TMDL also indicates that dieldrin and total organic carbon (TOC) associated with stormborne/suspended sediments should also be measured. However, the requirement to monitor dieldrin in the bed sediment was removed from the Revised Ballona Creek Estuary Toxics TMDL as the TMDL does not contain numeric targets or allocations for dieldrin. As such, the purpose for analyzing for dieldrin in the stormborne/suspended sediments

was unclear and was not included in the CIMP. Nevertheless, to provide the ability to assess trends in the location where aquatic life may be affected, the CIMP has been revised to include monitoring for dieldrin in the bed sediment. In addition, TOC is not a pollutant identified in the TMDL and will not be targeted for management actions. Rather, TOC in bed sediments, which can affect the toxicity of certain pollutants in bed sediment, will be measured. Measuring TOC only in bed sediments is consistent with other TMDLs in the region (e.g., Machado Lake Pesticides and PCBs TMDL, and the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL). Also, TOC will be measured in the water column during wet weather.

Most of the organochlorine (OC) pesticides and PCBs and many of the PAHs tend to strongly associate with sediment and organic material. These constituents commonly have octanol/water partition coefficients (log Kow) that are greater than six, elevated soil/water partition coefficients (log Kd) and elevated soil adsorption coefficients (log Koc). The lighter weight PAHs such as naphthalene, acenaphthene and acenaphthylene tend to be more soluble in water and volatile. Concentrations of OC pesticides, PCBs, and PAHs are often below or are very close to the limits of detection for conventional analytical methods used for analyzing water samples. Although collection and filtration of high volumes of stormwater will allow improved quantification of these constituents, it also introduces substantial potential for introduction of errors.

A number of studies have been performed to directly measure the concentration of contaminants associated with suspended solids but there are no standardized procedures established for this type of testing. Use of filtration methods in combination with conventional analytical methods requires collection of extremely large volumes of stormwater and challenging filtration processes. Use of conventional analytical methods for analysis of the filtered sediment is then expected to require at least 5 grams (dry weight) of sediment (typically 10 grams dry weight is preferred by laboratories) for each of the groups of analytes (metals, OC pesticides, PCBs and PAHs) in order to achieve detection limits necessary to quantify loads. In addition, the direct impacts of filtering samples with high sediment content are not well understood. Efforts by the City of Los Angeles and Los Angeles County in the Ballona Creek and Marina del Rey watersheds, respectively, have demonstrated the challenges associated with collecting and analyzing suspended sediments. Assuming samples contain sediment at an average TSS concentration of 100 mg/L and that all sediment could be recovered, analyses might require as much as 50 liters for each test method (total of 200 liters). An ongoing special study is underway in Marina del Rey to evaluate various methods for capturing sufficient sediment to conduct analysis. In Ballona Creek, the City of Los Angeles has been successful in collecting sufficient volumes of sediment over the course of a year to conduct the analysis. This allows for the quantification of annual loading; however, it does not allow for an evaluation of concentrations and loads under various storm conditions. Although use of lower sediment volumes may be possible, both detection limits and quality control measures might be impacted. In Ballona Creek, duplicate and quality control analysis have been limited to the available sediment, resulting in situations where either certain target constituents or quality control analysis are not completed during the pilot study.

An alternative approach for assessing the loads of the constituents of interest will be utilized in this CIMP to substantially reduce the amount of sample needing to be handled and potential for

introduction of error. This approach will utilize High Resolution Mass Spectrometry (HRMS) to analyze for OC pesticides (USEPA 1699), PCBs (USEPA 1668) and PAHs (CARB). HRMS analyses are quantified by isotope dilution techniques. Conventional methods utilized to analyze water samples for most metals of interest are sufficiently sensitive to allow for the assessment of concentrations on suspended sediments. During the first three years, analyses will be conducted on whole water samples. These test methods provide detection limits that are roughly 100 times more sensitive than conventional analytical methods. In addition, these extremely low detection limits can be achieved with as little as 3-6 liters of stormwater. Similar approaches have been used by the San Francisco Estuary Institute (SFEI) staff (Gilbreath, Pearce and McKee, 2012) to measure the performance of a rain garden. Autosamplers were used to collect stormwater influent and treated effluent to assess removal efficiency for pesticides, PCBs, mercury, and copper subject to TMDLs. HRMS was used to quantify PCB removal. HRMS methods are also being used in Virginia to assist in identification of sources of PCBs in MS4 and industrial stormwater discharges (Gilinsky, 2009).

Use of this approach is expected to greatly enhance the ability to consistently obtain appropriate samples for measuring and comparing loads of constituents of interest associated with each sampling event. This will assure that all key toxics can be quantified at levels suitable for estimation of mass loads. Due to relatively low levels of sediment in stormwater, efforts in Los Angeles County related to TMDL monitoring of suspended sediments have often led to the need to composite sediments collected over multiple storm events. The approach contained herein provides the opportunity to quantify concentrations, and therefore loads, for each stormwater sampling event.

For purposes of load calculations, it would be assumed that 100% of OC pesticides, PCBs and PAHs were associated with suspended solids. Separate analyses of TSS/SSC would be used to normalize the data. After three years (approximately four to six storm events) the data will be reevaluated to assess whether direct analysis of the filtered suspended sediments are necessary to improve load assessments. If deemed necessary, a modified approach will be evaluated for analysis of suspended sediments. It is currently not clear whether direct measurement of the target toxics in suspended sediments will result in any significant improvements in our ability to assess loads. In fact, collecting, transporting and processing the high volumes of stormwater necessary for this approach may result in a decrease in our ability to obtain useful data and will likely result in a decrease in our ability to assess pollutant loads.

Analysis of trace metals will be conducted based upon measured concentrations of dissolved and trace metals in routine monitoring at the downstream receiving water site. Existing detection limits for trace metals are considered suitable for calculation of concentrations in suspended solids. The concentration of trace metals associated with the particulate fraction will be calculated as:

$$C_P = C_T - C_D$$

where $C_T$ =Concentration of total recoverable metals
$C_D$ =Concentration of dissolved fraction
$C_P$ =Concentration of the particulate fraction

USEPA's guidance document for development of metals translators (EPA, 1996) uses the same approach for calculation of the trace metals in the particulate fraction.

#### *10.4.7.1 Sampling and Analytical Procedures*

Stormwater samples will be collected using autosamplers as described in **Section 10.4.3.4**. Based on TSS measurements at three mass emission sites in LA County (**Table 31**), use of a TSS concentration of 100 mg/L is expected to provide a conservative basis for estimating reporting limits for OC pesticides, PCBs, and PAHs in suspended sediments based upon 2-liter samples. However, three liters of storm water will be provided for each organic analytical suite for a total of nine liters. An accurate measure of suspended sediments is critical to this sampling approach. TSS will be analyzed; however, SSC will be used as the standard for calculating the concentrations of target constituents in suspended sediments and total loads.

**Table 31. Summary of Median TSS Measurements (mg/L) at Three Mass Emission Monitoring Sites in Los Angeles County**

| Waterbody | LA County Monitoring Site ID | Median |
|---|---|---|
| Los Angeles River | S10 | 143 |
| San Gabriel River | S14 | 113 |
| Ballona Creek | S01 | 158 |

Since detection limits will depend upon the concentration of suspended sediment in the sample, the laboratory analyzing the suspended sediment concentrations will be asked to provide a rush analysis to provide information that can be used to direct processing of the samples for the organic compounds. Processing of sample waters provided to the laboratory will depend upon the results of the SSC analysis.

- If TSS/SSC are less than 150 mg/L, an additional liter of water will be extracted for each subsequent HRMS analysis. If TSS concentrations are between 150 and 200 mg/L, one of the additional liter samples may be used to increase the volume of sample water for just PAHs or the two additional liters may be used as a field duplicate for one of the analyses.
- If TSS concentrations are greater than 200 mg/L, two of the three additional liters may be used as a field duplicate for one analysis. If available, the additional water provided in 2.5 L containers will also be considered for use as field replicates.
- If the initial TSS sample indicates that sediment content is less than 50 mg/L, additional measures will be taken to improve PAH reporting limits with respect to suspended sediment loads. This would include use of extra sample water to bring up the total sample volume (up to a maximum of 4 liters) or reduction the final extract volume.
- Given adequate sample volumes and normal levels of suspended sediment, a field duplicate will be analyzed for each analysis.

Target reporting limits (**Table 32** and **Table 33**) were established based upon bed sediment reporting limits listed in the *Coordinated Compliance and Reporting Plan for the Greater Los Angeles and Long Beach Harbor Waters* (Anchor QEA, 2013). **Table 32** and **Table 33** provide a

summary of the detection limits attainable in water samples using HRMS analytical methods. Estimated detection limits are provided for concentrations of the target constituents in suspended sediments given the assumption that 2-liter sample volumes will be used for each test, suspended sediment content of the water sample is 100 mg/L, and that 100 percent of the target constituents are associated with the suspended sediment. This provides a conservative assumption with respect to evaluating the potential impacts of concentrations of OC pesticides, PCBs, and PAHs in suspended sediment on concentrations in bed sediment. Additionally, **Table 32** and **Table 33** present relevant TMDL targets and reporting limits suggested in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009). **Table 34** examines the possible limitations of this approach if trace metal concentrations are extremely low, approaching detection limits. The following summarizes a comparison between the estimated detection limits for OC pesticides, PCBs, and PAHs in the suspended sediments to target reporting limits:

- For OC pesticides (**Table 32**), estimated detection limits in the suspended sediment are at or below TMDL targets limits for bed sediments. Additionally, estimated detection limits in the suspended sediment are below target bed sediment reporting limits for this CIMP and target reporting limits presented in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009).
- For PCBs (**Table 32**), estimated detection limits in the suspended sediment are below TMDL targets limits for bed sediments. Additionally, estimated detection limits in the suspended sediment are at or below target bed sediment reporting limits for this CIMP and below target reporting limits presented in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009).
- For PAHs (**Table 33**), estimated detection limits in the suspended sediment are below TMDL targets limits for bed sediments. Most individual PAH compounds would be expected to be detectable in the suspended sediment at concentrations about 2.5 times greater that the target bed sediment reporting limits for this CIMP and the target reporting limits presented in the SWAMP QAPP (SWRCB, 2008). Approximately half of the individual PAH compounds are above the target reporting limits presented in the SQO Technical Support Manual (SCCWRP, 2009), while the other half are below. Two compounds, naphthalene and phenanthrene, would have detection limits roughly 6 times the target bed sediment reporting limits for this CIMP. Naphthalene is an extremely light weight PAH that is not considered a major analyte of concern in storm water.
- **Table 34** summarizes the reporting limits applicable to total recoverable metals. Estimated equivalent concentrations in suspended solids are very conservatively estimated based upon 100 percent of the metals being associated with suspended particulates as measured values approach project detection limits. In reality, this is not a likely condition. When concentrations of total recoverable metals approach the very low detection limits used in this program, sediment loads will also be extremely low and the concentrations of metals in the dissolved phase will become a more significant fraction of the total metals concentrations. If concentrations of total cadmium are extremely low, comparison with TMDL targets in bed sediments could be limited.

### *10.4.7.2 Quality Control Measures*

In addition to the quality control measures described in **Section 11**, quality control measures for all HRMS analyses will include field equipment blanks to assess background contamination due to the field equipment and sample handling. One field equipment blank will be analyzed from one set of field equipment during each sampling site during the first year. Data will be evaluated at the end of the year to determine if field equipment blanks should be reduced to one per season. For the field blank, two liters of HPLC grade water provided by the laboratory will be pumped through the entire autosampler and intake hose for each analytical test (OC pesticides, PCBs and PAHs). The blank water will be pumped into precleaned sample containers and refrigerated until the stormwater sampling is completed. If the storm does not occur immediately after blanking, the equipment blank will be transmitted under COC to the laboratory in order the meet the requirement for extraction of aqueous samples within 7 days of collection. Extracts will be held until stormwater samples are received unless storm does not develop within a period of 30 days after extraction (samples are required to be analyzed within 40 days of extraction). If a successful storm event is monitored immediately after the equipment blank is taken, the equipment blank and stormwater samples will be submitted to the laboratory together. Given adequate sample volumes, field duplicates will also be analyzed to assess variability associated with the sampling and subsampling processes.

Laboratory quality control measures will include analysis of method blanks, initial calibrations, analysis of Ongoing Precision and Recovery (OPR) samples and use of labeled compounds to assess recoveries and matrix interferences. Method blanks will be based upon processing of laboratory water volumes identical to those used for the field samples. Initial calibrations are run periodically but daily calibration checks are conducted to verify stability of the calibration. OPR tests will be conducted with each batch of samples. OPR samples are blanks spiked with labeled isotopes that are used to monitoring continued performance of the test. Labelled isotopes are added to each field sample and analyzed to measure recovery in the sample matrix. Estimated Detection Limits (EDLs) will be calculated for each analyte associated with each field sample. For each analyte 'x', the EDL is calculated by the following formula:

$$EDL_x = 2.5 * \frac{(Na)*(Qis)*(Rah)}{(Ais)*(RRF)*(wv)}$$

Where:
- Na = Analyte peak to peak noise height.
- Qis = Concentration of internal standard.
- Rah = Area of Height Ratio
- Ais = Area of internal standard
- RRF = initial calibration average relative response factor for the congener of interest.
- wv = sample weight/volume.
- 2.5 = Minimum signal to noise ratio.

### *10.4.7.3 Summary*

In summary, all target reporting limits for the targeted organic compounds are below relevant TMDL targets and the overwhelming majority are below bed sediment reporting limits identified in this CIMP and the SWAMP QAPP (SWRCB, 2008) and SQO Technical Support Manual

(SCCWRP, 2009). In the case of metals, some limitations may exist for cadmium, in extreme conditions. Overall, the proposed approach based upon analyzing whole water samples to estimate concentrations of target pollutants meets the overall objectives of the program while also enhancing the chances of successfully monitoring multiple storm events and provide data necessary to evaluate relative loads from multiple storms each year. The proposed methods are also expected to allow incorporation of quality control measures necessary to evaluate potential source of contamination and variability that might be attributable to both the sampling and analytical processes.

**Table 32. Recommended Methods, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for Organochlorine Pesticides and Total PCBs**

| Constituent and Analytical Method | Detection Limits Associated with Suspended Sediments | | Reporting Limits Associated with Bed Sediment Monitoring | | | Relevant TMDL Targets |
|---|---|---|---|---|---|---|
| | Water Detection Limit [1] | Equivalent Suspended Sediment Detection Limit [2] | BC CIMP Target Bed Sediment Reporting Limits | SWAMP QAPP (2008) Reporting Limit | SQO Technical Support Manual (2009) Reporting Limit | Ballona Creek Estuary Toxics TMDL Sediment Target (Indirect Effects) |
| | pg/L | ng/g – dry wt | ng/g – dry wt | | | ng/g – dry wt |
| ***Chlordane Compounds (EPA 1699)*** | | | | | | |
| alpha-Chlordane | 40 | 0.4 | 0.5 | 1 | 0.5 | 1.3 (Total Chlordane) |
| gamma-Chlordane | 40 | 0.4 | 0.5 | 1 | 0.54 | |
| Oxychlordane | 40 | 0.4 | 0.5 | 1 | NA | |
| trans-Nonachlor | 40 | 0.4 | 0.5 | 1 | 4.6 | |
| cis-Nonachlor | 40 | 0.4 | 0.5 | 2 | NA | |
| ***Other OC Pesticides (EPA 1699)*** | | | | | | |
| 2,4'-DDD | 40 | 0.4 | 0.5 | 2 | 0.5 | 1.9 (Total DDT) |
| 2,4'-DDE | 80 | 0.8 | 0.5 | 2 | 0.5 | |
| 2,4'-DDT | 80 | 0.8 | 0.5 | 3 | 0.5 | |
| 4,4'-DDD | 40 | 0.4 | 0.5 | 2 | 0.5 | |
| 4,4'-DDE | 80 | 0.8 | 0.5 | 2 | 0.5 | |
| 4,4'-DDT | 80 | 0.8 | 0.5 | 5 | 0.5 | |
| Total DDT | 80 | 0.8 | --- | --- | 0.5 | |
| ***Total PCBs (EPA 1668)*** | 5-20 | 0.05-0.2 | 0.2 | 0.2 | 3.0 | 3.2 |

1. Water EDLs based upon 2 liters of water.
2. Suspended Sediment detection limits based upon estimate of 100 mg/L suspended solids.

**Table 33. Recommended Method, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for PAHs**

| Constituent | Detection Limits Associated with Suspended Sediments | | Reporting Limits Associated with Bed Sediment Monitoring | | | Relevant TMDL Targets |
|---|---|---|---|---|---|---|
| | Water Detection Limit [1] | Equivalent Suspended Sediment Detection Limit [2] | BC CIMP Target Bed Sediment Reporting Limits | SWAMP QAPP (2008) Reporting Limit | SQO Technical Support Manual (2009) Reporting Limit | Ballona Creek Estuary Toxics TMDL Sediment Targets |
| | pg/L | ng/g – dry wt | ng/g – dry wt | | | ng/g – dry wt |
| 1-Methylnaphthalene | 5 | 50 | 20 | 20 | 20 | NA |
| 1-Methylphenanthrene | 5 | 50 | 20 | 20 | 20 | |
| 2-Methylnaphthalene | 5 | 50 | 20 | 20 | 20 | |
| 2,6-Dimethylnaphthalene | 5 | 50 | 20 | 20 | 20 | |
| Acenaphthene | 5 | 50 | 20 | 20 | 20 | |
| Anthracene | 5 | 50 | 20 | 20 | 20 | |
| Benzo(a)anthracene | 5 | 50 | 20 | 20 | 80 | |
| Benzo(a)pyrene | 5 | 50 | 20 | 20 | 80 | |
| Benzo(e)pyrene | 5 | 50 | 20 | 20 | 80 | |
| Biphenyl | 5 | 50 | 20 | 20 | 20 | |
| Chrysene | 5 | 50 | 20 | 20 | 80 | |
| Dibenz(a,h)anthracene | 5 | 50 | 20 | 20 | 80 | |
| Fluoranthene | 5 | 50 | 20 | 20 | 80 | |
| Fluorene | 5 | 50 | 20 | 20 | 20 | |
| Naphthalene | 12.5 | 125 | 20 | 20 | 20 | |
| Perylene | 5 | 50 | 20 | 20 | 80 | |
| Phenanthrene | 12.5 | 125 | 20 | 20 | 20 | |
| Pyrene | 5 | 50 | 20 | 20 | 80 | |

1. Water EDLs based upon 2 liters of water and CARB 429m. Detection limits are based upon a final extract of 500 µL. If the SSC is low, either an additional liter of water can be extracted to decrease the detection limit by 1/3 or the final extract volume can be reduced. Depending on sample characteristics, the extract volume can be reduced to as little as 50-100 µL which would drop EDLs by a factor of 0.1 to 0.2 times the listed EDLs.
2. Suspended Sediment detection limits based upon estimate of 100 mg/L suspended solids.
3. *Low Molecular Weight PAHs* Low weight PAHs include Acenaphthene, Anthracene, Phenanthrene, Biphenyl, Naphthalene, 2,6-dimethylnaphthalene, Fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, *High Molecular Weight PAHs:* Benzo(a)anthracene, Benzo(a)pyrene, Benzo(e)pyrene, Chrysene, Dibenz(a,h)anthracene, Fluoranthene, Perylene, Pyrene.

**Table 34. Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for Metals**

| Constituent | Detection Limits Associated with Suspended Sediments | | Reporting Limits Associated with Bed Sediment Monitoring | | | Relevant TMDL Targets |
|---|---|---|---|---|---|---|
| | Water Detection Limit | Equivalent Suspended Sediment Detection Limit (1) | BC CIMP Target Bed Sediment Reporting Limits | SWAMP QAPP (2008) Reporting Limit | SQO Technical Support Manual (2009) Reporting Limit | Ballona Creek Estuary Toxics TMDL Sediment Targets |
| | ug/L | ng/g – dry wt | ng/g – dry wt | | | ng/g – dry wt |
| Cadmium | 0.25 | 2.5 | 0.01 | 0.01 | 0.09 | 1.2 |
| Copper | 0.50 | 5.0 | 0.01 | 0.01 | 52.8 | 34 |
| Lead | 0.50 | 5.0 | 0.01 | 0.01 | 25 | 46.7 |
| Silver | 0.25 | 2.5 | 0.01 | 0.02 | (2) | 1.0 |
| Zinc | 1 | 10 | 0.1 | 0.01 | 60 | 150 |

1. Suspended Sediment EDLs based upon estimate of 100 mg/L suspended solids.
2. Silver is not included as part of the Sediment Quality Objectives.

### 10.4.8 Estuary Bed Sediment Sample Collection

Sediment samples from the BCE will be collected in subtidal areas to allow the data to be compared to the SQOs and TMDL targets. Sediment samples will be collected by use of a Van Veen grab, diver, or by wading and use of a trowel or intermediate container. Samples will be collected and processed consistent with the methods presented in Chapter 2 of the *Sediment Quality Assessment Draft Technical Support Manual* (SCCWRP, 2009). The following generally outlines the field procedures:

1. All samples shall be collected using a grab sampler.
2. Benthic samples shall be screened through a 1.0 mm-mesh screen.
3. Surface sediment from within the upper 5 cm shall be collected for chemistry and toxicity analyses.
4. The entire contents of the grab sample, with a minimum penetration depth of 5 cm, shall be collected for benthic community analysis.

Subsamples of sediment shall be collected directly into a clean polyethylene bag, mixed, and then placed into the appropriate jars. Sediments for toxicity and chemistry analysis should be composited in a separate bag than sediments for benthic community analysis as the depth of sample collection may be different for the different analysis.

### 10.4.9 Bioaccumulation Sample Collection

Bioaccumulation sampling will be used to monitor trends in the concentration of contaminants in the tissues of aquatic organisms. This will be conducted in order to assess both ecological and human health concerns and to see if the trends or patterns of contaminant concentrations mirror those observed from the sediment analyses. Human health concerns will be assessed by sampling the tissues from fish species that are commonly taken for consumption by sport fisherman. Fish swim throughout the Ballona Creek Estuary and it is difficult to collect fish at any single monitoring station on a consistent basis. Therefore, for the purposes of monitoring, bioaccumulation sampling that takes place at any monitoring site in the Estuary is considered to be representative of the entire Estuary. The following subsections describe fish and mussel sample collection.

#### *10.4.9.1 Fish Sampling*

Fish sampling protocols shall be conducted in accordance with the California Office of Environmental Health Hazard Assessment's (OEHHA) *General Protocol for Sport Fish Sampling and Analysis*.[8] Fish may be analyzed, as individuals (preferred) or as composites (secondary). During each survey, the goal will be to collect at least nine fish per targeted species that are of legal size.[9] If fish are analyzed as composite samples, each composite sample shall include a minimum of three fish, with up to five fish per sample preferred, especially if smaller

[8] Although OEHHA protocols are established for freshwater fish, they may be translated to fish within small and medium sized marine and/or estuarine waterbodies such as the Ballona Creek Estuary.
[9] The Department of Fish and Wildlife (DFW) Sport Fishing Regulations define legal size requirements using total length. All size measurements are in terms of total length.

fish are caught (OEHHA, 2005). All fish composite samples must follow OEHHA's "75 percent rule," where the length of the smallest fish should be at least 75% of the length of the largest fish of a species in a composite sample.

Fish sampling techniques may vary due to season, weather, flow rate, target species, etc. Sport fish may be taken by any means permissible (e.g., hook and line, seine, trawling). If trawling is utilized, fish may be collected using different gear types, if necessary, due to the variation in gear capture efficiency and strata of the various target species. Examples include otter trawl, lampara net, and gill net. Trawling will be conducted at a speed-over-ground of approximately 2 knots, ranging between 1.5 and 2.5 knots. For collecting targeted species, the time and length of the trawl may vary, depending on site conditions. In general, the objective will be to limit trawl time to a five minute period. Using a standard otter trawl, this will result in linear trawl coverage of 450 m to 600 m. Lampara and purse seine are both deployed in a circle (or oval if space-limited) and "pursed" or drawn closed toward the center as they are retrieved onto the deck. Once on deck, the contents of the net will be transferred to tubs and processed. Sample processing for fish tissue samples includes evaluation of the length, weight, and sex of each fish.

Reasonable attempts will be made to collect two to three species of sport fish; but, if sport fish cannot be obtained, whatever species of fish, if any, that can be obtained will be collected and analyzed. However, data collected from species that are not typically consumed will be for informational purposes only and not considered representative of human health exposures. The more likely a species is to be consumed by anglers, the greater the importance of information. Based the available information regarding species present, the species targeted are placed in three groups as presented in **Table 35**:

- **Group 1** consists of highly sought after sport fish which makes them most appropriate in terms of how the information is intended to be used. With the exception of barred sand bass, all of the species in Group 1 have been observed in Ballona Creek in recent surveys so there is a high opportunity of collection.
- **Group 2** consists of a second tier of sought after game fish which makes them appropriate in terms of how the information is intended to be used (but not as appropriate as the Group 1 species). Some of these species have been observed in the Ballona Creek Estuary in recent surveys. Others have not been observed in the Ballona Creek Estuary. However, based on their ecology, the occurrence of these species is a distinct possibility.
- **Group 3** consists of species that could possibly be occurring in the Ballona Creek Estuary and could possibly be eaten by an angler. However, they are not typically considered sport fish making them less appropriate in terms of how the information is intended to be used. Speckled Sanddabs and Shiner Perch have been observed recently in Ballona Creek Estuary surveys.

**Table 35. Targeted Fish Species for the Ballona Creek Estuary(1)**

| Group 1 | Group 2 | Group 3 |
|---|---|---|
| *California Halibut* | *Topsmelt* | Speckled Sanddab |
| Fantail Sole | *Jacksmelt* | *Shiner Perch* |
| *Yellowfin Croaker* | *Diamond Turbot* | Zebra Perch |
| Striped Mullet | *Spotted Turbot* | *Bay Ray* |
| Opaleye | Queenfish | |
| Barred Sand Bass | *White Croaker* | |
| Kelp Bass | White Seaperch | |
| Spotted Sand Bass | Walleye Surfperch | |
| | Pile Perch | |
| | Blacksmith | |
| | *Black Perch* | |
| | Sargo | |

1. Note that species that are in *italics* may be found in the Ballona Creek Estuary; however, these species are known to be transient and are not considered "resident" for the purposes of assessing how pollutants in bed sediments in the Estuary are solely contributing to tissue concentrations. As these species may travel to other waterbodies nearby with elevated levels of pollutants of concern, concentrations within the tissue may be representative of the effects of non-Ballona Creek Estuary sediments.

#### *10.4.9.2 Mussel Sampling*

Mussels are filter feeders that rely on collecting organic particles from a large volume of water as food. Mussel sampling will be conducted within the intertidal zone at the sampling site. Mussel sampling may be of resident mussels or transplanted mussels. It is expected that initially, tissue from mussels resident to the Estuary will be collected and composited into two replicate samples of five individuals (55 to 65 mm in length, if available). As studies have found that the use of resident and transplant mussels yield nearly identical results[10], transplanted mussels sampling maybe used in place of resident mussel sampling in order to better control for mussel age and, therefore, assessment of mussel tissue bioaccumulation. Cages, containing approximately 50 California mussels per cage, would be installed at monitoring sites in the Estuary. Cages would remain on-site for one month before mussels were retrieved for tissue analysis.

### 10.4.10 Trash Monitoring

The following BCWMG members are implementing the Ballona Creek Trash and Santa Monica Marine Debris TMDLs through the installation of full capture devices: County of Los Angeles and the cities of Beverly Hills, Inglewood, Los Angeles, and Santa Monica. As such, no specific monitoring is required or will be conducted for the Trash TMDLs for these jurisdictions. The following BCWMG members are utilizing a combination of full capture, partial capture systems, and/or institutional controls: cities of Culver City, and West Hollywood. These jurisdictions are required to measure the effectiveness of partial capture systems and institutional controls through a mass balance approach based on the trash daily generation rate (DGR) for a specific area.

[10] California State Water Resources Control Board. State Water Mussel Watch Monitoring in California: Long-term Trends in Coastal Contaminants and Recommendations for Future Monitoring. January 10, 2013.

However, the Regional Board Executive Officer may approve alternate compliance monitoring programs, upon finding the program will provide an accurate estimate of trash discharged from the MS4.

The most common method for measuring effectiveness and determining compliance is through the use of a DGR. The DGR is the average amount of trash accumulated in a specific land area over a 24-hour period. The DGR is used to estimate the amount of trash discharged after a storm event. The sum of all storm event discharges equals the calculated annual trash discharge for each BCWMG member. DGR monitoring will consist of collecting trash on the ground via street sweeping, manual pickup, or other comparable means during thirty consecutive dry weather days.[11] To allow for a sufficient amount of consecutive dry weather days to occur, DGR monitoring will occur during the summer months of June, July, August, and/or September each year.[12] As DGR monitoring is occurring, the catch basins within the land area where DGR monitoring is taking place will be closed in a manner that prevents trash from being swept into the catch basins. The DGR and storm event discharge will be calculated using the following equations:

DGR = Amount of trash collected during DGR event / 30 days
Storm Event Discharge = [days since last street sweeping * DGR] - Volume of trash from catch basins

The following information provides the DGR methodology or similar monitoring activities for each agency subject to monitoring requirements:

- **City of Culver City:** To calculate an annual discharge of trash, the Culver City sums the amount of trash discharged during each storm event occurring the monitoring timeframe. To calculate the amount of trash discharged per storm event, the DGR is multiplied by the number of days since the last street sweeping event prior to a storm event. The DGR is calculated by dividing the amount of trash collected during street sweeping over the selected 30-day monitoring period by 30 days. For consistency, it is assumed that all street sweeping is performed on Monday, even though street sweeping frequency varies depending on the area of the City. For areas that are swept daily, the storm event reduced is reduced by 11.3% (103 catch basins out of 915 are in areas that are swept daily).
- **City of West Hollywood:** The City of West Hollywood is complying through a mixture of full capture and partial capture devices as well as institutional controls. City of West Hollywood will determine the amount of trash discharged annually by utilizing the performance standards of the various BMPs employed by the City.

### 10.4.11 Plastic Pellet Monitoring

See **Appendix 2** for details on plastic pellet monitoring and reporting requirements.

[11] For the purposes of DGR monitoring only, dry weather days are defined as days where no measurable precipitation occurs.
[12] Provided no special events are scheduled that may affect the representative nature of this period.

### 10.4.12 Quality Control Sample Collection

Quality control samples will be collected in conjunction with environmental samples to verify data quality. Quality control samples collected in the field will generally be collected in the same manner as environmental samples. Detailed descriptions of quality control samples are presented in **Section 11** of this Attachment.

# 11 Quality Assurance/Quality Control

This section describes the quality assurance and quality control requirements and processes. Quality control samples will be collected in conjunction with environmental samples to verify data quality. Quality control samples collected in the field will generally be collected in the same manner as environmental samples. There are no requirements for quality control for field analysis of general parameters (e.g., temperature, pH, conductivity, dissolved oxygen, and pH) outlined in the SWAMP. However, field crews will be required to calibrate equipment as outlined in **Section 10** of this Attachment. **Table 36** presents the quality assurance parameter addressed by each quality assurance requirement as well as the appropriate corrective action if the acceptance limit is exceeded.

**Table 36. Quality Control Requirements**

| Quality Control Sample Type | QA Parameter | Frequency[1] | Acceptance Limits | Corrective Action |
|---|---|---|---|---|
| **Quality Control Requirements – Field** | | | | |
| Equipment Blanks | Contamination | 5% of all samples[2] | < MDL | Identify equipment contamination source. Qualify data as needed. |
| Field Blank | Contamination | 5% of all samples | < MDL | Examine field log. Identify contamination source. Qualify data as needed. |
| Field Duplicate | Precision | 5% of all samples | RPD < 25% if \|Difference\| > RL | Reanalyze both samples if possible. Identify variability source. Qualify data as needed. |
| **Quality Control Requirements – Laboratory** | | | | |
| Method Blank | Contamination | 1 per analytical batch | < MDL | Identify contamination source. Reanalyze method blank and all samples in batch. Qualify data as needed. |
| Lab Duplicate | Precision | 1 per analytical batch | RPD < 25% if \|Difference\| > RL | Recalibrate and reanalyze. |
| Matrix Spike | Accuracy | 1 per analytical batch | 80-120% Recovery for GWQC | Check LCS/CRM recovery. Attempt to correct matrix problem and reanalyze samples. Qualify data as needed. |
| | | | 75-125% for Metals | |
| | | | 50-150% Recovery for Pesticides [3] | |
| Matrix Spike Duplicate | Precision | 1 per analytical batch | RPD < 30% if \|Difference\| > RL | Check lab duplicate RPD. Attempt to correct matrix problem and reanalyze samples. Qualify data as needed. |
| Laboratory Control Sample (or CRM or Blank Spike) | Accuracy | 1 per analytical batch | 80-120% Recovery for GWQC | Recalibrate and reanalyze LCS/ CRM and samples. |
| | | | 75-125% for Metals | |
| | | | 50-150% Recovery for Pesticides [3] | |
| Blank Spike Duplicate | Precision | 1 per analytical batch | RPD < 25% if \|Difference\| > RL | Check lab duplicate RPD. Attempt to correct matrix problem and reanalyze samples. Qualify data as needed. |
| Surrogate Spike (Organics Only) | Accuracy | Each environmental and lab QC sample | 30-150% Recovery[3] | Check surrogate recovery in LCS. Attempt to correct matrix problem and reanalyze sample. Qualify data as needed. |

MDL = Method Detection Limit RL = Reporting Limit RPD = Relative Percent Difference
LCS = Laboratory Control Sample/Standard CRM = Certified/ Standard Reference Material
GWQC = General Water Quality Constituents

1. "Analytical batch" refers to a number of samples (not to exceed 20 environmental samples plus the associated quality control samples) that are similar in matrix type and processed/prepared together under the same conditions and same reagents (equivalent to preparation batch).
2. Equipment blanks will be collected by the field crew before using the equipment to collect sample.
3. Or control limits set at + 3 standard deviations based on actual laboratory data.

## *11.1 QA/QC Requirements and Objectives*

### 11.1.1 Comparability

Comparability of the data can be defined as the similarity of data generated by different monitoring programs. For this monitoring program, this objective will be ensured mainly through use of standardized procedures for field measurements, sample collection, sample preparation, laboratory analysis, and site selection; adherence to quality assurance protocols and holding times; and reporting in standard units. Additionally, comparability of analytical data will be addressed through the use of standard operating procedures and extensive analyst training at the analyzing laboratory.

### 11.1.2 Representativeness

Representativeness can be defined as the degree to which the environmental data generated by the monitoring program accurately and precisely represent actual environmental conditions. For the CIMP, this objective will be addressed by the overall design of the program. Representativeness is attained through the selection of sampling locations, methods, and frequencies for each parameter of interest, and by maintaining the integrity of each sample after collection. Sampling locations were chosen that are representative of various areas within the watershed and discharges from the MS4, which will allow for the characterization of the watershed and impacts MS4 discharges may have on water quality.

### 11.1.3 Completeness

Data completeness is a measure of the amount of successfully collected and validated data relative to the amount of data planned to be collected for the project. It is usually expressed as a percentage value. A project objective for percent completeness is typically based on the percentage of the data needed for the program or study to reach valid conclusions.

Because the CIMP is intended to be a long term monitoring program, data that are not successfully collected during a specific sample event may not be recollected at a later date if the goals for data completeness shown in **Table 21** are met. Rather, subsequent events conducted over the course of the monitoring will provide robust data sets to appropriately characterize conditions at individual sampling sites and the watershed in general. For bacteria, this approach presents a modification from the Bacteria CMP which required revisiting and sampling for missed samples due to inaccessibility, when sample integrity is compromised, or the scheduled sampling day falls on a holiday.

However, some reasonable objectives for data are desirable, if only to measure the effectiveness of the program when conditions allow for the collection of samples (i.e., flow is present). The program goals for data completeness, shown in **Table 21**, are based on the planned sampling frequency and SWAMP's Measurement Quality Objective for completeness of 90% (SWRCB 2008). If, however, sampling sites do not allow for the collection of enough samples to provide representative data due to conditions (i.e., no flow) alternate sites will be considered. Data completeness will be evaluated on a yearly basis.

## *11.2 QA/QC Field Procedures*

Quality control samples to be prepared in the field will consist of equipment blanks, field blanks, and field duplicates as described below.

### 11.2.1 Equipment Blanks

The purpose of analyzing equipment blanks is to demonstrate that sampling equipment is free from contamination. Equipment blanks will be prepared by the analytical laboratory responsible for cleaning equipment and analyzed for relevant pollutants before sending the equipment to the field crew. Equipment blanks will consist of laboratory-prepared blank water (certified to be contaminant-free by the laboratory) processed through the sampling equipment that will be used to collect environmental samples.

The equipment blanks will be analyzed using the same analytical methods specified for environmental samples. If any analytes of interest are detected at levels greater than the MDL, the source(s) of contamination will be identified and eliminated (if possible), the affected batch of equipment will be re-cleaned, and new equipment blanks will be prepared and analyzed before the equipment is returned to the field crew for use.

### 11.2.2 Field Blanks

The purpose of analyzing field blanks is to demonstrate that sampling procedures do not result in contamination of the environmental samples. Per the Quality Assurance Management Plan for SWAMP (SWRCB, 2008), field blanks are to be collected as follows:

- At a frequency of 5% of samples collected for the following constituents: trace metals in water (including mercury), VOC samples in water and sediment, DOC samples in water, and bacteria samples.
- Field blanks for other media and analytes should be conducted upon initiation of sampling, and if field blank performance is acceptable (as described in **Table 36**), further collection and analysis of field blanks for these other media and analytes need only be performed on an as-needed basis, or during field performance audits. An as-needed basis for the BCWMG CIMP will be annually.

Field blanks will consist of laboratory-prepared blank water (certified to be contaminant-free by the laboratory) processed through the sampling equipment using the same procedures used for environmental samples.

If any analytes of interest are detected at levels greater than the MDL, the source(s) of contamination should be identified and eliminated, if possible. The sampling crew should be notified so that the source of contamination can be identified (if possible) and corrective measures taken prior to the next sampling event.

### 11.2.3 Field Duplicates

The purpose of analyzing field duplicates is to demonstrate the precision of sampling and analytical processes. Field duplicates will be prepared at the rate of 5% of all samples, and analyzed along with the associated environmental samples. Field duplicates will consist of two

grab samples collected simultaneously, to the extent practicable. If the Relative Percent Difference (RPD) of field duplicate results is greater than the percentage stated in **Table 36** *and* the absolute difference is greater than the RL, both samples should be reanalyzed, if possible. The sampling crew should be notified so that the source of sampling variability can be identified (if possible) and corrective measures taken prior to the next sampling event.

## *11.3 QA/QC Laboratory Analyses*

Quality control samples prepared in the laboratory will consist of method blanks, laboratory duplicates, matrix spikes/duplicates, laboratory control samples (standard reference materials), and toxicity quality controls.

### 11.3.1 Method Blanks

The purpose of analyzing method blanks is to demonstrate that sample preparation and analytical procedures do not result in sample contamination. Method blanks will be prepared and analyzed by the contract laboratory at a rate of at least one for each analytical batch. Method blanks will consist of laboratory-prepared blank water processed along with the batch of environmental samples. If the result for a single method blank is greater than the MDL, or if the average blank concentration plus two standard deviations of three or more blanks is greater than the RL, the source(s) of contamination should be corrected, and the associated samples should be reanalyzed.

### 11.3.2 Laboratory Duplicates

The purpose of analyzing laboratory duplicates is to demonstrate the precision of the sample preparation and analytical methods. Laboratory duplicates will be analyzed at the rate of one pair per sample batch. Laboratory duplicates will consist of duplicate laboratory fortified method blanks. If the RPD for any analyte is greater than the percentage stated in **Table 36** *and* the absolute difference between duplicates is greater than the RL, the analytical process is not being performed adequately for that analyte. In this case, the sample batch should be prepared again, and laboratory duplicates should be reanalyzed.

### 11.3.3 Matrix Spikes and Matrix Spike Duplicates

The purpose of analyzing matrix spikes and matrix spike duplicates is to demonstrate the performance of the sample preparation and analytical methods in a particular sample matrix. Matrix spikes and matrix spike duplicates will be analyzed at the rate of one pair per sample batch. Each matrix spike and matrix spike duplicate will consist of an aliquot of laboratory-fortified environmental sample. Spike concentrations should be added at five to ten times the reporting limit for the analyte of interest.

If the matrix spike recovery of any analyte is outside the acceptable range, the results for that analyte have failed to meet acceptance criteria. If recovery of laboratory control samples is acceptable, the analytical process is being performed adequately for that analyte, and the problem is attributable to the sample matrix. An attempt will be made to correct the problem (e.g., by dilution, concentration, etc.), and the samples and matrix spikes will be re-analyzed.

If the matrix spike duplicate RPD for any analyte is outside the acceptable range, the results for that analyte have failed to meet acceptance criteria. If the RPD for laboratory duplicates is

acceptable, the analytical process is being performed adequately for that analyte, and the problem is attributable to the sample matrix. An attempt will be made to correct the problem (e.g., by dilution, concentration, etc.), and the samples and matrix spikes will be re-analyzed.

### 11.3.4 Laboratory Control Samples

The purpose of analyzing laboratory control samples (or a standard reference material) is to demonstrate the accuracy of the sample preparation and analytical methods. Laboratory control samples will be analyzed at the rate of one per sample batch. Laboratory control samples will consist of laboratory fortified method blanks or a standard reference material. If recovery of any analyte is outside the acceptable range, the analytical process is not being performed adequately for that analyte. In this case, the sample batch should be prepared again, and the laboratory control sample should be reanalyzed.

### 11.3.5 Surrogate Spikes

Surrogate recovery results are used to evaluate the accuracy of analytical measurements for organics analyses on a sample-specific basis. A surrogate is a compound (or compounds) added by the laboratory to method blanks, samples, matrix spikes, and matrix spike duplicates prior to sample preparation, as specified in the analytical methodology. Surrogates are generally brominated, fluorinated or isotopically labeled compounds that are not usually present in environmental media. Results are expressed as percent recovery of the surrogate spike. Surrogate spikes are applicable for analysis of PCBs and pesticides.

### 11.3.6 Toxicity Quality Control

For aquatic toxicity tests, the acceptability of test results is determined primarily by performance-based criteria for test organisms, culture and test conditions, and the results of control bioassays. Control bioassays include monthly reference toxicant testing. Test acceptability requirements are documented in the method documents for each bioassay method.

# 12 Instrument/Equipment Calibration and Frequency

Frequencies and procedures for calibration of analytical equipment used by each contract laboratory are documented in the QA Manual for each laboratory. Any deficiencies in analytical equipment calibration should be managed in accordance with the QA Manual for each contract laboratory. Any deficiencies that affect analysis of samples submitted through this program must be reported to the BCWMG. Laboratory QA Manuals are available for review at the analyzing laboratory.

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# Attachment D. Data Management and Reporting

**Attachment D** details the procedures for managing and reporting data to meet the goals and objectives of the CIMP and in turn the Permit. The details contained herein serve as a guide for ensuring that consistent protocols and procedures are in place for successful data management and reporting. **Attachment D** is divided into the following sections:

1. Data Management, Validation, and Usability
2. Reporting

# 14 Data Management, Validation, and Usability

The BCWMG will maintain an inventory of data and its forms. After each sampling event, data collected in the BCWMG CIMP will be verified and validated before it is deemed ready for reporting. This section describes the process that the BCWMG will take to verify and validate the collected data.

## *14.1 Data Review, Verification, and Validation Requirements*

The acceptability of data is determined through data verification and data validation. Both processes are discussed in detail below. In addition to the data quality objectives presented in **Table 21**, the standard data validation procedures documented in the contract laboratory's QA Manual will be used to accept, reject, or qualify the data generated by the laboratory. Each laboratory's QA Officer will be responsible for validating data generated by the laboratory.

Once analytical results are received from the analyzing laboratory, the BCWMG will perform an independent review and validation of analytical results. **Appendix 3** provides equations that are used to calculate precision, accuracy, and completeness of the data. Decisions to reject or qualify data will be made by the BCWMG, based on the evaluation of field and laboratory quality control data, according to procedures outlined in Section 13 of Caltrans document No. CTSW-RT-00-005, *Guidance Manual: Stormwater Monitoring Protocols, 2nd Edition* (LWA, 2000). Section 13 of the Caltrans Guidance Manual is included as **Appendix 4**.

## *14.2 Data Verification*

Data verification involves verifying that required methods and procedures have been followed at all stages of the data collection process, including sample collection, sample receipt, sample preparation, sample analysis, and documentation review for completeness. Verified data have been checked for a variety of factors, including transcription errors, correct application of dilution factors, appropriate reporting of dry weight versus wet weight results, and correct application of conversion factors. Verification of data may also include laboratory qualifiers, if assigned.

Data verification should occur in the field and the laboratory at each level (i.e., all personnel should verify their own work) and as information is passed from one level to the next (i.e., supervisors should verify the information produced by their staff). Records commonly examined

during the verification process include field and sample collection logs, COC forms, sample preparation logs, instrument logs, raw data, and calculation worksheets.

In addition, laboratory personnel will verify that the measurement process was "in control" (i.e., all specified data quality objectives were met or acceptable deviations explained) for each batch of samples before proceeding with the analysis of a subsequent batch. Each laboratory will also establish a system for detecting and reducing transcription and/or calculation errors prior to reporting data.

## *14.3 Data Validation*

In general, data validation involves identifying project requirements, obtaining the documents and records produced during data verification, evaluating the quality of the data generated, and determining whether project requirements were met. The main focus of data validation is determining data quality in terms of accomplishment of measurement quality objectives (i.e., meeting QC acceptance criteria). Data quality indicators, such as precision, accuracy, sensitivity, representativeness, and completeness, are typically used as expressions of data quality. The BCWMG, will review verified sample results for the data set as a whole, including laboratory qualifiers, summarize data and QC deficiencies and evaluate the impact on overall data quality, assign data validation qualifiers as necessary, and prepare an analytical data validation report. The validation process applies to both field and laboratory data.

In addition to the data quality objectives presented in **Table 21**, the standard data validation procedures documented in the analyzing laboratory's QA Manual will be used to accept, reject, or qualify the data generated. The laboratory will only submit data that have met data quality objectives, or data that have acceptable deviations explained. When QC requirements have not been met, the samples will be reanalyzed when possible, and only the results of the reanalysis will be submitted, provided that they are acceptable. Each laboratory's QA Officer is responsible for validating the data it generates.

## *14.4 Data Management*

Analytical Data Reports will be sent to and kept by the BCWMG. Each type of report will be stored separately and ordered chronologically. The field crew shall retain the original field logs. The contract laboratory shall retain original COC forms. The contract laboratory will retain copies of the preliminary and final data reports. Concentrations of all parameters will be calculated as described in the laboratory Standard Operating Procedures (SOPs) or referenced method document for each analyte or parameter.

The field log and analytical data generated will be converted to a standard database format maintained on personal computers. After data entry or data transfer procedures are completed for each sample event, data will be validated as described in **Appendix 4**. After the final quality assurance checks for errors are completed, the data will be added to the final database.

# 15 Reporting

The MRP includes a number of reporting requirements to summarize CIMP implementation efforts, the data collected as part of the CIMP, as well as to report on implementation of the Permit requirements as a whole. The following sections detail monitoring and reporting requirements outlined in the MRP and provides information on how the water, sediment, and tissue data collected as part of this CIMP are to be used.

## *15.1 Semi-Annual Analytical Data Reports*

As required by Part XIV.L of the MRP, results from each of the receiving water or outfall based monitoring stations conducted in accordance with the SOP shall be sent electronically to the Regional Board's Stormwater site at MS4stormwaterRB4@waterboards.ca.gov. The monitoring results will be submitted on a semi-annual basis and will highlight exceedances applicable to WQBELs, RWLs, action levels, or aquatic toxicity thresholds. Corresponding sample dates and monitoring locations will be included. Data will be transmitted in the most recent Southern California SMC's Standardized Data Transfer Formats. Reports of monitoring activities will include, at a minimum, the following information (records of which are required by Part XIV.A.1.c of the MRP):

1. The date, time of sampling or measurements, exact place, weather conditions, and rain fall amount.
2. The individual(s) who performed the sampling or measurements.
3. The date(s) analyses were performed.
4. The individual(s) who performed the analyses.
5. The analytical techniques or methods used.
6. The results of such analyses.
7. The data sheets showing toxicity test results.

## *15.2 Annual Monitoring Reports*

As outlined in Part XVI.A of the MRP, the annual reporting process is intended to provide the Regional Board with summary information to allow for the assessment of the Permittee's:

1. Participation in one or more Watershed Management Programs.
2. Impact of each Permittee(s) stormwater and NSW discharges on the receiving water.
3. Each permittee's compliance with RWLs, numeric WQBELs, and action levels (including both Municipal Action Levels [for stormwater discharges] and non-stormwater action levels).
4. The effectiveness of each Permittee(s) control measures in reducing discharges of pollutants from the MS4 to receiving waters.
5. Whether the quality of MS4 discharges and the health of receiving waters is improving, staying the same, or declining as a result of watershed management program efforts, and/or TMDL implementation measures, or other MCMs.
6. Whether changes in water quality can be attributed to pollutant controls imposed on new development, re-development, or retrofit projects.

The annual report process also seeks to provide a forum for Permittee(s) to discuss the effectiveness of its past and ongoing control measure efforts and to convey its plans for future control measures. Detailed data and information will also be provided in a clear and transparent fashion to allow the Regional Board and the general public to review and verify conclusions presented by the Permittee. Annual reports shall be organized to include the information as described in the following subsections.

## *15.3 Watershed Summary Information*

According to Section XVII.B of the MRP, Permittees shall include the information requested in MRP Section XVII.B parts A.1 through A.3 in its odd year Annual Report (e.g., Year 1, 3, 5). The requested information shall be provided for each watershed within the Permittee's jurisdiction. Alternatively, Permittees participating in a EWMP may provide the requested information through the development and submission of a EWMP plan and any updates. As the BCWMG is submitting an EWMP the information is not required as a separate submittal. However, updates to information requested in Section XVII.B parts A.1 through A.3 (presented in **Sections 15.3.1** through **15.3.3** below) will be noted in EWMP plan updates.

### 15.3.1 Watershed Management Area

When a Permittee has collaboratively developed an EWMP, reference to the EWMP and any revisions to the EWMP may suffice for baseline information regarding the following watershed management area details:

1. The effective TMDLs, applicable WQBELs and RWLs, and implementation and reporting requirements, and compliance dates.
2. CWA section 303(d) listings of impaired waters not addressed by TMDLs.
3. Results of regional bioassessment monitoring.
4. A description of known hydromodificaitons to receiving waters and a description, including locations, of natural drainage systems.
5. Description of groundwater recharge areas including number and acres.
6. Maps and/or aerial photographs identifying the location of Environmentally Sensitive Areas (ESAs), Areas of Special Biological Significance (ASBS), natural drainage systems, and groundwater recharge areas.

### 15.3.2 Subwatershed (HUC-12) Descriptions

When a Permittee has collaboratively developed an EWMP, reference to the EWMP and any revisions to the EWMP may suffice for baseline information regarding the following Subwatershed (twelve digit Hydrologic Unit Code or HUC-12) descriptions:

1. Description including HUC-12 number, name and a list of all tributaries named in the Basin Plan.
2. Land use map of the HUC-12 watershed.
3. 85$^{th}$ percentile, 24-hour rainfall isohyetal map for the subwatershed.
4. One-year, one-hour storm intensity isohyetal map for the subwatershed.
5. MS4 map for the subwatershed, including major MS4 outfalls and all low-flow diversions.

### 15.3.3 Description of Permittee(s) Drainage Area within the Subwatershed

When a Permittee has collaboratively developed an EWMP, reference to the EWMP and any revisions to the EWMP may suffice for information regarding the Drainage Area within the subwatershed:

1. A subwatershed map depicting the Permittee(s) jurisdictional area and the MS4, including major outfalls (with identification numbers), and low flow diversions located within the Permittee(s) jurisdictional area.
2. Provide the estimated baseline percent of effective impervious area (EIA) within the Permittee(s) jurisdictional area.

### 15.3.4 Annual Assessment and Reporting

The following sections will be included in the BCWMG Annual Report to meet the MRP requirements. The BCWMG Annual Report will clearly identify all data collected and strategies, control measures, and assessments implemented by each Permittee within the BCWMG, as well as those implemented by multiple Permittees on a watershed scale.

#### *15.3.4.1 Stormwater Control Measures*

All reasonable efforts will be made to determine, compile, analyze, and summarize the following information for each Permittee:

1. Estimated cumulative change in percent EIA since the effective date of the Order, and if possible, the estimated change in the stormwater runoff volume during the 85th percentile storm event.
2. Summary of New Development/Re-Development Projects constructed within the Permittee(s) jurisdictional area during the reporting year.
3. Summary of Retrofit Projects that reduced or disconnected impervious area from MS4 during the reporting year.
4. Summary of other projects designed to intercept stormwater runoff prior to discharge to the MS4 during the reporting year.
5. Estimate the total runoff volume retained on site by the implementation of such projects during the reporting year.
6. Summary of actions taken in compliance with TMDL implementation plans or approved EWMP to implement TMDL provisions.
7. Summary of riparian buffer/wetland restoration projects completed during the reporting year. For riparian buffers include width, length and vegetation type; for wetland include acres restored, enhanced, or created.
8. Summary of other MCMs implemented during the reporting year, as the Permittee deems relevant.
9. Status of all multi-year efforts that were not completed in the current year and will therefore continue into the subsequent year(s). Additionally, if any of the requested information cannot be obtained, the Permittee(s) will provide a discussion of the factor(s) limiting its acquisition and steps that will be taken to improve future data collection efforts.

#### 15.3.4.2 Effectiveness Assessment of Stormwater Control Measures

The following information will be included to detail Stormwater Control Measures during the reporting year:

1. Rainfall summary for the reporting year, including the number of storm events, highest volume event (inches/24 hours), highest number of consecutive days with measurable rainfall, total rainfall during the reporting year compared to average annual rainfall for the BCWMG EWMP area.
2. A summary table describing rainfall during stormwater outfall and wet-weather receiving water monitoring events. The summary description will include the date, time that the storm commenced and the storm duration in hours, the highest 15-minute recorded storm intensity (converted to inches/hour), the total storm volume (inches), and the time between the storm event sampled and the end of the previous storm event.
3. Where control measures were designed to reduce impervious cover or stormwater peak flow and flow duration, hydrographs or flow data of pre- and post-control activity for the 85th percentile, 24-hour rain event, if available.
4. For natural drainage systems, a reference watershed flow duration curve and comparison to a flow duration curve for the BCWMG EWMP area under current conditions.
5. An assessment as to whether the quality of stormwater discharges as measured at designed outfalls is improving, staying the same, or declining. Water quality data may be compared from the reporting year to previous years with similar rainfall patterns, a trends analysis may be conducted, or other means may be used to develop and support the assessment's conclusions.
6. An assessment as to whether wet-weather receiving water quality is improving, staying the same or declining, when normalized for variations in rainfall patterns. Water quality data may be compared from the reporting year to previous years with similar rainfall patterns, a trends analysis may be conducted, regional bioassessment studies may be drawn from, or other means may be used to develop and support the assessment's conclusions.
7. Status of all multi-year efforts, including TMDL implementation, which were not completed in the current year and will continue into the subsequent year(s). Additionally, if any of the requested information cannot be obtained, a discussion of the factors(s) limiting its acquisition and steps that will be taken to improve future data collection efforts will be provided.

#### 15.3.4.3 Non-stormwater Water Control Measures

The following information will be included to detail non-stormwater (NSW) control measures:

1. An estimation of the number of major outfalls within the BCWMG EWMP area.
2. The number of outfalls that were screened for significant NSW discharges during the reporting year.
3. The cumulative number of outfalls that have been screened for significant NSW discharges since the date the Permit was adopted through the reporting year.
4. The number of outfalls with confirmed significant NSW discharge.
5. The number of outfalls where significant NSW discharge was attributed to other NPDES permitted discharges; other authorized NSW discharges; or conditionally exempt

discharges.

6. The number of outfalls where significant NSW discharges were abated as a result of the BCWMG's actions.
7. The number of outfalls where NSW discharges was monitored.
8. The status of all multi-year efforts, including TMDL implementation, which were not completed in the current year and will continue into the subsequent year(s). Additionally, if any of the requested information cannot be obtained, a discussion of the factor(s) limiting its acquisition and steps that will be taken to improve future data collection efforts will be provided.

#### *15.3.4.4 Effectiveness Assessment of Non-Stormwater Control Measures*

The following information will be included to assess NSW control measures effectiveness:

1. An assessment as to whether receiving water quality within the BCWMG EMWP area is impaired, improving, staying the same or declining during the dry-weather conditions. Water quality data from the reporting year to previous years with similar dry-weather flows may be compared, a trends analysis may be conducted, regional bioassessment studies may be drawn from, or other means may be used to develop and support the assessment's conclusions.
2. An assessment of the effectiveness of the control measures in effectively prohibiting NSW discharges through the MS4 to the receiving water.
3. The status of all multi-year efforts that were not completed in the current year and will continue into the subsequent year(s).

#### *15.3.4.5 Integrated Monitoring Compliance Report*

The following information will be included to assess the Permittee(s) compliance with applicable TMDLs, WQBELs, RWLs, and action levels:

1. An Integrated Monitoring Report that summarizes all identified exceedances of the following against applicable RWLs, WQBELs, action levels, and aquatic toxicity thresholds:
    a. Outfall-based stormwater monitoring data
    b. Wet weather receiving water monitoring data
    c. Dry weather receiving water data
    d. NSW outfall monitoring data
    e. All sample results that exceeded one more applicable thresholds shall be readily identified.
2. If aquatic toxicity was confirmed and a TIE was conducted, the toxic chemicals, as determined by the TIE, will be identified. All relevant data to allow the Regional Board to review the adequacy and findings of the TIE will be included. This shall include, but not be limited to:
    a. The sample(s) date
    b. Sample(s) start and end time
    c. Sample type(s)
    d. Sample location(s) as depicted on a map
    e. The parameters, analytical results, and applicable limitation.

3. A description of efforts that were taken to mitigate and/or eliminate all NSW discharges that exceeded one or more applicable WQBELs, or caused or contributed to Aquatic Toxicity.
4. A description of efforts that were taken to address stormwater discharges that exceeded one or more applicable WQBELs, or caused or contributed to Aquatic Toxicity.
5. Where RWLs were exceeded, provide a description of efforts that were taken to determine whether discharges from the MS4 caused or contributed to the exceedances and all efforts that were taken to control the discharge of pollutants from the MS4 to those receiving waters in response to the exceedances.

#### *15.3.4.6 Adaptive Management Strategies*

The following information will be included to outline Adaptive Management Strategies:

1. The most effective control measures, why the measures were effective, and how other measures will be optimized based on past experiences.
2. The least effective control measures, why the measures were deemed ineffective, and how the controls measures will be modified or terminated.
3. Significant changes to control measures during the prior year and the rationale for the changes.
4. All significant changes to control measures anticipated to be made next year and rationale for the changes. Those changes requiring approval of the Regional Board or its Executive Officer will be clearly identified at the beginning of the Annual Report.
5. A detailed description of control measures to be applied to New Development or Re-development projects disturbing more than 50 acres.
6. The status of all multi-year efforts that were not completed in the current year and will continue into the subsequent year(s).

#### *15.3.4.7 Supporting Data and Information*

All monitoring data and associated meta-data used to prepare the Annual Report will be summarized in an MS Excel© spreadsheet and sorted by monitoring station/outfall identifier linked to the BCWMG EWMP area map. The data summary will include the date, sample type (flow-weighted composite, grab, field measurement), sample start and stop times, parameter, analytical method, value, and units. The date field will be linked to a database summarizing the weather data for the sampling date including 24-hour rainfall, rainfall intensity, and days since the previous rain event.

### *15.4 Signatory and Certification Requirements*

All applications, reports, or information submitted to the Regional Board, State Board, and/or USEPA will be signed and certified as follows:

1. All applications submitted to the Regional Board shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer includes: (i) the chief executive officer of the agency (e.g., Mayor), or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., City Manager, Director of Public Works, City Engineer, etc.).

2. All reports required by the Permit and other information requested by the Regional Board, State Board, or USEPA shall be signed by either a principal executive officer or ranking elected official or by a duly authorized representative of a principal executive officer or ranking elected official. A person is a duly authorized representative only if:
    a. The authorization is made in writing by a principal executive officer or ranking elected official.
    b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)
    c. The written authorization is submitted to the Regional Board.
3. If an authorization of a duly authorized representative is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization will be submitted to the Regional Board prior to or together with any reports, information, or applications, to be signed by an authorized representative.
4. The following certification will be made by any person signing an application or report:
   *"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."*

## *15.5 Use of Submitted Data*

As stated in Part II.A.2 of the MRP, a Primary Objective of the Monitoring Program is to assess compliance with RWLs and WQBELs established to implement TMDL wet weather and dry weather wasteload allocations WLAs. As such, a discussion of how the compliance evaluation will be conducted is warranted and is presented below.

### 15.5.1 Compliance Evaluation

The compliance evaluation will take into consideration the relationship between the types of monitoring and the pathways for determining compliance outlined in the Permit. For example, the receiving water monitoring sites meet the MRP objectives and support an understanding of potential impacts associated with MS4 discharges. However, as described in the MRP (Part II.E.1), receiving water sites are intended to assess receiving water conditions. An exceedance of a RWL at a receiving water site does not on its own indicate MS4 discharges caused or contributed to the RWL exceedance. As the receiving water sites also receive runoff from non-MS4 sources, including open space and other permitted discharges, the exceedance of a RWL may have been caused or contributed to by a non-MS4 source. Additionally, an exceedance at an outfall location when the corresponding downstream receiving water location is

in compliance with the water quality objectives and RWLs does not constitute an exceedance of a WQBEL.

Finally, reporting of compliance will be accomplished by evaluating the data, in addition to the status of EWMP implementation consistent with the Permit (Parts VI.C.2, VI.C.3 and VI.E.2). Generally, reporting of compliance will consider whether the following conditions, as applicable, are met:

1. There are no violations of the effective WQBEL (i.e., interim or final) for the specific pollutant at the Permittee's applicable MS4 outfall(s).
2. There are no exceedances of an applicable RWLs for the specific pollutant in the receiving water(s) at, or downstream of, the Permittee's outfall(s).
3. There is no direct or indirect discharge from the Permittee's MS4 to the receiving water during the time period subject to the WQBEL and/or RWL for the pollutant(s) associated with a specific TMDL.
4. In drainage areas where Permittees are implementing an EWMP, (i) all non-stormwater and (ii) all stormwater runoff up to and including the volume equivalent to the 85th percentile, 24-hour event is retained for the drainage area tributary to the applicable receiving water.
5. The approved BCWMG EWMP is being implemented pursuant to Part VI.C of the Permit.
6. Conditions of effective Time Schedule Orders (TSOs) are met.
7. Exceedances of RWLs not otherwise addressed by a TMDL are addressed pursuant to Part VI.C.2 of the Permit.

In addition, evaluation of compliance for pollutants subject to TMDLs will consider the requirements specified in the applicable TMDLs described in the following subsections.

#### *15.5.1.1 BC Metals and BCE Toxics TMDLs Interim Milestones Compliance Determination*

Per the BC Metals and BCE Toxics TMDLs, the BCWMG is required to show an increase in the percent of the total watershed meeting WLAs. **Table 37** lists the compliance milestone dates for the BC Metals TMDL, as well as the required percent compliance for the total watershed or total percent reduction. **Table 38** lists the compliance milestone dates for the BCE Toxics TMDL, as well as the required percent compliance for the total watershed or total percent reduction.

**Table 37. BC Metals TMDL Compliance Milestone Dates and Required Percent Compliance**

| Compliance Milestone Date | Dry Weather Percent of Total Drainage Area Served by MS4 Meeting WLA or Total Percent Reduction | Wet Weather Percent of Total Drainage Area Served by MS4 Meeting WLA or Total Percent Reduction |
|---|---|---|
| January 11, 2012 | 50% | 25% |
| January 11, 2014 | 75% | Not Applicable |
| January 11, 2016 | 100% | 50% |
| January 11, 2021 | 100% | 100% |

**Table 38. BCE Toxics TMDL Compliance Milestone Dates and Required Percent Compliance**

| Compliance Milestone Date | Percent of Total Drainage Area Served by MS4 Meeting WLA or Total Percent Reduction for Chlordane and DDTs | Percent of Total Drainage Area Served by MS4 Meeting WLA or Total Percent Reduction for PCBs |
|---|---|---|
| January 11, 2016 | 50% | 25%(1) |
| January 11, 2017 | 75% | 25% |
| January 11, 2021 | 100% | 50% |
| January 11, 2025 | 100% | 100% |

1. 25% of the WLA required by the TMDL in effect in 2013.

If the percent area approach is taken for the BC Metals TMDL, the area meeting the WLAs will be calculated using an annual average. The annual average will be determined by averaging the total percentage for all of the sampling events occurring during an individual year to adequately characterize the dry or wet weather conditions for the reporting period. If the percent reduction approach is taken, the estimated annual loadings presented in the BC Metals TMDL Staff Report (page 28) will be used to establish the baseline upon which the percent reductions will be based.

If the percent area approach is taken for the BCE Toxics TMDL, the area meeting the WLAs will be calculated using an annual average. The annual average will be determined by averaging the total percentage for all of the sampling events occurring during an individual year to adequately characterize the reporting period. If the percent reduction approach is taken, it is necessary to first estimate a "baseline" loading as a baseline estimate of loading was not computed as part of the BCE Toxics TMDL. However, a conservative estimate of loading at the time of TMDL development can be calculated using data presented in the BCE Toxics TMDL Staff Report. As this data was used to determine the impairment of the BCE, it is appropriate to establish the baseline estimate of loading on the same data. The sediment data for the BCE presented in the Toxics TMDL Staff Report were collected at Station 440240 by the State's Bay Protection and Toxic Cleanup Program (BPTCP). These data were collected in the portion of the BCE where samples are currently collected to evaluate whether the TMDL targets are being met. The range of concentrations from the BPTCP study is presented in Table 2-5 of the Toxics TMDL Staff Report. The maximum concentration for each constituent in Table 2-5 will be utilized as a conservative estimate of baseline sediment concentrations in the BCE. To estimate the baseline loadings, the annual total sediment load discharged from Ballona Creek presented in the TMDL Staff Report will be multiplied by baseline sediment concentrations for each constituent. Baseline MS4 loading will be calculated based on the percent MS4 area. Annual calculation of mass discharged based on samples collected during the reporting year will be compared to the baseline to calculate the percent reduction. Annual calculation of mass discharged will be based on sediment loading and chemistry measured during the three storm events conducted over the course of the year. Sediment loading will be estimated using the average concentration of SSC extrapolated over the course of the storms that occurred during the year. Sediment concentration will be estimated using the average concentration of each constituent extrapolated over the course of the storms that occurred during the year.

#### *15.5.1.2 SMB Toxics TMDL Compliance Determination*

The methodology that will be used to monitor and assess sediment for DDT and PCBs is described in **Section 2** and **Section 3** of the main body of this CIMP. The annual calculation of mass discharged based on samples collected during the reporting year identified in **Section 15.5.1.1** will also serve as the assessment framework which is designed to provide credible estimates of the total mass loadings to the Santa Monica Bay.

#### *15.5.1.3 BC Trash TMDL Compliance Determination*

As described in **Section 10.4.10** of **Attachment C**, a group of BCWMG members are complying with the BC Trash TMDL WQBELs through a combination of full capture, partial capture, and/or institutional controls. Each year, details regarding how each BCWMG member is either implementing full capture in a manner consistent with the implementation schedule or how those using a combination of full capture, partial capture, and/or institutional controls calculated its DGR will be presented in the Annual Report. When reporting on the number of catchbasins retrofitted with either full capture systems or partial capture devices with a predetermined performance, the BCWMG will report on all catchbasins within their jurisdiction – both those that are Permittee-owned and those that are LACFCD-owned. Monitoring and reporting for the Ballona Creek Trash TMDL will be reported by the BCWMG using the Trash TMDL Compliance Reporting Forms (revised to reflect compliance deadlines per the Ballona Creek Trash TMDL) found at:

http://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/los_angeles_ms4/TrashTMDLComplianceReportingForms/trash_tmdl_reportingforms_corrected_2010_1019.xls.

As the City West Hollywood will determine the amount of trash discharged annually by utilizing the performance standards of the various BMPs employed by the City, the City of West Hollywood will review applicable trash capture efficiencies of partial capture devices and institutional controls, including the studies conducted by the City of Los Angeles and an evaluation of the City of West Hollywood's land uses. This information will be factored into the annual Trash TMDL Compliance Reporting forms. The City of West Hollywood will institute a combination of approaches which can include:

- DGR study, and/or
- Augment its institutional controls, and/or
- Augment the number and placement of trash capture systems.

This will be accomplished prior to and along with the adaptive management process.

### 15.5.2 Use of Specie-Specific Data for Chlordanes, PCBs, and PAHs

Chlordanes, PCBs, and PAHs are unique in that they are pollutant categories which may be analyzed for the species that make up the pollutant category and the species of interest varies depending on the purpose of data collection. The individual constituents are summed to determine "total" concentrations. The following describes how individual chlordane, PCB, and

PAH species will be summed for comparison to applicable WQBELs, RWLs, TMDL targets, WLAs, and/or State adopted objectives.

Analysis included in this CIMP for chlordane includes the following species: alpha-chlordane, gamma-chlordane, oxychlordane, cis-Nonachlor, and trans-Nonachlor. The calculation of total chlordane will be conducted as follows:

- When evaluating sediment concentrations and loads associated with the direct effects California Sediment Quality Objectives, quantified concentrations of alpha-chlordane, gamma-chlordane, trans-Nonachlor will be summed.
- When evaluating sediment concentrations and loads and tissue concentrations associated with indirect effects, quantified concentrations of alpha-chlordane, gamma-chlordane, oxychlordane, cis-Nonachlor, and trans-Nonachlor will be summed.
- Upon approval by the State Board, for the purposes of conducting analyses associated with the Decision Support Tool (DST) for determining impairment due to indirect effects associated with sediment concentrations, data for each species will be utilized in a manner consistent with the supporting documentation.

Analysis included in this CIMP for PCBs includes the following species: Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260 and Congeners 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209. The calculation of total PCBs will be conducted as follows:

- When evaluating water concentrations for the purposes of comparing to the California Toxics Rule (CTR) aquatic life criteria, quantified concentrations of aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260 will be summed.
- When evaluating water concentrations for the purposes of comparing to the CTR human health criteria, quantified concentrations of aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260 or congeners 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209 will be summed.
- When evaluating sediment concentrations and loads associated with the direct effects California Sediment Quality Objectives, quantified concentrations of congeners 8,18, 28, 44, 52, 66, 101, 105, 118, 128, 138, 153, 170, 180, 187, 189, 195, 206, and 209 will be summed.
- When evaluating sediment and tissue samples associated with indirect effects, quantified concentrations of congeners 18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206 will be summed.
- Upon approval by the State Board, for the purposes of conducting analyses associated with the DST for determining impairment due to indirect effects associated with sediment concentrations, data for each species will be utilized in a manner consistent with the supporting documentation.

Analysis included in this CIMP for PAHs includes the following constituents: acenaphthene, anthracene, biphenyl, naphthalene, 2,6-dimethylnaphthalene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, perylene, and pyrene. The calculation of total PAHs will be conducted as follows:

- When evaluating sediment and tissue samples associated with direct and indirect effects, quantified concentrations of acenaphthene, anthracene, biphenyl, naphthalene, 2,6-dimethylnaphthalene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, perylene, and pyrene will be summed.
- Upon approval by the State Board, for the purposes of conducting analyses associated with the DST for determining impairment due to indirect effects associated with sediment concentrations, data for each species will be utilized in a manner consistent with the supporting documentation.

### 15.5.3 Sediment Monitoring and Reporting Plan

The MRP requires the Permittees to develop a Sediment Monitoring and Reporting Plan to quantify the annual loading of sediment from the Ballona Creek watershed and the impact from the sediment loading to the Ballona Creek Wetlands. Consistent with a methodology described in the Wetlands TMDL for estimating the Ballona Creek watershed sediment loading to Ballona Creek Wetlands, sediment loading from the Ballona Creek watershed will be "based on flow and total suspended sediment data". This monitoring is proposed in **Section 2.2** of the CIMP and will be reported consistent with the requirements previously described in this Attachment. As such, the requirement to submit a Sediment Monitoring and Reporting Plan is met by submittal of the CIMP.

As described in USEPA's Ballona Creek Wetlands TMDL (pg. 74), as the current existing discharge of sediment load is not contributing to the listed impairments or otherwise causing a negative impact to Ballona Creek Wetlands, this TMDL establishes a WLA for sediment based on existing conditions, which are based on the amount of sediment discharged to the watershed, rather than the sediment that enters the wetlands. If it is determined in the future that annual loads are exceeding the 10-year average presented in the TMDL, and the connectivity between the wetlands and Ballona Creek is increased such that loadings from the watershed may have the potential to impact the wetlands, additional monitoring/evaluation of loadings between the channel and the wetlands may be warranted. However, at this time, it is consistent with the TMDL to estimate the annual loading of sediment from the watershed and no separate analysis is needed to quantify the impact from the sediment loading to the wetlands.

The TMDL determined the amount of sediment discharged from the watershed using historical dredging records that were based on the total sediment load accumulated at the channel mouth. Because dredging is not conducted annually and annual information on loading is desired, a two part approach will be utilized to evaluate sediment loading from the watershed. Firstly, the annual calculation of sediment discharged based on samples collected during the reporting year identified in **Section 15.5.1.1** will also serve as the assessment framework which is designed to

provide credible estimates of the total sediment loadings from the watershed. Secondly, dredging records will be reviewed as they become available.

# Appendix 1

Example Field, Calibration and Chain-of-Custody Forms

**EXAMPLE Field Log** 

**GENERAL INFORMATION** Date: _____

Site ID: _____ Sampling Personnel: _____

GPS Coordinates: (lat) _____ (lon) _____ Picture/Video #: _____

**OBSERVATIONS**

Weather:_____

Water Color:_____ In stream Activity:_____

Water Characteristics (flow type, odor, turbidity, floatables):_____

Other comments (trash, wildlife, recreational uses, homeless activity, etc. – Use notes section if more room is needed):

_____

***In situ* WATER QUALITY MEASUREMENTS**

| Time | Temp ($^0$C) | pH | D.O. (mg/L) | D.O. % Sat | Elec Cond. (uS/cm) | Turbidity (NTU) |
|---|---|---|---|---|---|---|
| | | | | | | |

**COLLECTED WATER QUALITY SAMPLES**

| Sample ID | Analysis | Time | Volume | Notes |
|---|---|---|---|---|
| | | | | |
| | | | | Field blank |
| | | | | Field duplicate |

**ADDITIONAL WATER QUALITY SAMPLING NOTES:**

**FLOW MEASUREMENTS WITH VELOCITY METER**

Estimated Total Width of Flowing Water (ft): _____ Distance measured from (circle): RIGHT or LEFT

| **Measurement Number** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Distance from Bank (ft) | | | | | | | | | | | | | | |
| Depth (ft) | | | | | | | | | | | | | | |
| Velocity (ft/s) | | | | | | | | | | | | | | |

**FLOW MEASUREMENTS WITH FLOAT AND STOPWATCH** Number of Flow Paths:_____

| **Fill out Path # ➔** | Path# | Path# | Path# | Path# | Path# |
|---|---|---|---|---|---|
| Width of Flow at **Top** of Marked Section: | | | | | |
| Width of Flow at **Middle** of Marked Section: | | | | | |
| Width of Flow at **Bottom** of Marked Section: | | | | | |
| Depth of Flow at 0% of **Top** Marked Section: | | | | | |
| Depth of Flow at 25% of **Top** Marked Section: | | | | | |
| Depth of Flow at 50% of **Top** Marked Section: | | | | | |
| Depth of Flow at 75% of **Top** Marked Section: | | | | | |
| Depth of Flow at 100% of **Top** Marked Section: | | | | | |
| Depth of Flow at 0% of **Middle** Marked Section: | | | | | |
| Depth of Flow at 25% of **Middle** Marked Section: | | | | | |
| Depth of Flow at 50% of **Middle** Marked Section: | | | | | |
| Depth of Flow at 75% of **Middle** Marked Section: | | | | | |
| Depth of Flow at 100% of **Middle** Marked Section: | | | | | |
| Depth of Flow at 0% of **Bottom** Marked Section | | | | | |
| Depth of Flow at 25% of **Bottom** Marked Section: | | | | | |
| Depth of Flow at 50% of **Bottom** Marked Section: | | | | | |
| Depth of Flow at 75% of **Bottom** Marked Section: | | | | | |
| Depth of Flow at 100% of **Bottom** Marked Section | | | | | |
| Distance Marked-off for Velocity: | | | | | |
| Time 1: | | | | | |
| Time 2: | | | | | |
| Time 3: | | | | | |

**Specify if measurements are in inches or feet using "in" or "ft"**

**FLOW MEASUREMENT WITH GRADUATED CONTAINER**

Container Volume:_____ Percent Capture:_____

Time to fill container:

| | Minutes | Seconds |
|---|---|---|
| Time1 | | |
| Time2 | | |
| Time3 | | |

**ADDITIONAL FLOW MEASUREMENT NOTES:**

# EXAMPLE Field Meter Calibration Logsheet

## Field Measurement Equipment Calibration Log & Initial Calibration Verification

Date:

| Parameter | Meter ID | Calibration Standard | Post-Cal Measurement | Calibration Valid if: | Time | Initials |
|---|---|---|---|---|---|---|
| Dissolved Oxygen | | _____ mmHG<br>_____ $^{o}$C<br>_____mg/L [1] | _____ mg/L (water-sat'd air) | D.O. reads within 10% of value from D.O. tables [1] | | |
| Conductivity | | 0 uS/cm (air) | | | | |
| | | 10,000 uS/cm | _____uS/cm (1,000 uS/cm) | 900 – 1,100 uS/cm | | |
| pH | | 7.0 Units | | | | |
| | | 10.0 Units | _____Units (pH = 8.0) | pH 8 = 7.8 - 8.2 (or w/in manuf's specs) | | |
| Turbidity | | 0 NTU | | | | |
| | | 3000 NTU | _____NTU (1000 NTU) | NTU = 900 - 110 | | |

Notes:

## Field Measurement Equipment Post Event Calibration Verification Log

Date:

| Parameter | Meter ID | Verification Standard | Measurement | Calibration Valid if: | Time | Initials |
|---|---|---|---|---|---|---|
| Dissolved Oxygen | | _____ mmHG<br>_____ $^{o}$C<br>_____mg/L [1] | _____ mg/L (water-sat'd air) | D.O. reads within 10% of value from D.O. tables | | |
| Conductivity | | _____ uS/cm | _____uS/cm (1,000 uS/cm) | EC of 1,000 std = 900 – 1,100 uS/cm | | |
| pH | | _____Units | _____Units (pH = 8.0) | pH 8.0 = 7.8 - 8.2 (or w/in manuf's specs) | | |
| Turbidity | | _____ NTU | _____NTU (1,000 NTU) | NTU = 900 – 1,100 | | |

Notes:

[1] "D.O. tables" refers to tables of dissolved oxygen in water as a function of temperature and barometric pressure, typically found in wastewater engineering text books.

**CHAIN-OF-CUSTODY RECORD**

Date:

Lab ID:

Destination Lab:

Address:

Phone:

Fax:

Sampled By:

Contact:

Project:

| Client Sample Id | Sample Date | Sample Time | Sample Matrix | Container # | Container Type | Container Pres. | | | | | | | | | | | **Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| Sender Comments: | Relinquished By (1): | Relinquished By (2): |
|---|---|---|
| | Signature: | |
| | Print: | |
| | Organization: | |
| | Date: Time: | Date: Time: |
| Laboratory Comments: | Received By (1): | Received By (2): |
| | Signature: | |
| | Print: | |
| | Organization: | |
| | Date: Time: | Date: Time: |

Crew:

# Appendix 2

Plastic Pellet Monitoring and Reporting Program

# 1 Introduction

The purpose of this Appendix is to detail a Plastic Pellet Monitoring and Reporting Plan (PMRP) and Spill Response Plan to meet the requirements of the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load (Debris TMDL), effective March 20, 2012. The Basin Plan Amendment[1] (BPA) implementing the Debris TMDL lists the requirements for the PMRP. The following describes the PMRP developed for the jurisdictions of the Ballona Creek Watershed Management Area (WMA) Enhanced Watershed Management Plan (EWMP) Group (BCWMG Group) including: County of Los Angeles, Los Angeles County Flood Control District (LACFCD), and the cities of Beverly Hills, Culver City, Inglewood, Los Angeles, Santa Monica, and West Hollywood.

The Appendix includes the following sections:

- **PMRP Requirements** summarizing the requirements of Debris TMDL related to plastic pellets as well as identifying the requirements for each BCWMG member based on facilities within their jurisdiction.
- **PMRP Approach** detailing the inspection and monitoring that will be conducted by those agencies with facilities within their jurisdictions that necessitates PMRP implementation to meet the requirements of the Debris TMDL.
- **Spill Response Plan** presenting the response plans that will be utilized by all the BCWMG members to meet the requirements of the Debris TMDL.



[1] Attachment A to Resolution No. R10-010, Proposed Amendments to the Water Quality Control Plan – Los Angeles Region for the Santa Monica Bay Nearshore and Offshore Debris TMDL (http://63.199.216.6/larwqcb_new/bpa/docs/R10-010/R10-010_RB_BPA.pdf)

# 2 PMRP Requirements

Under the Debris TMDL, jurisdictions identified as responsible parties for point sources of trash in the existing Ballona Creek Trash TMDL shall either prepare a PMRP or demonstrate that a PMRP is not required under certain circumstances, as follows:

1. Responsible jurisdictions that have industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets within their jurisdiction shall prepare a PMRP to (i) monitor the amount of plastic pellets being discharged from the MS4; (ii) establish triggers for increased industrial facility inspections and enforcement of SWPPP requirements for industrial facilities identified as responsible for the plastic pellet waste load allocation (WLA) herein; and (iii) address possible plastic pellet spills.
2. Responsible jurisdictions that have no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets, may not be required to conduct monitoring at MS4 outfalls, but shall be required to include a response plan in the PMRP. In order to be absolved of the requirement to conduct monitoring at MS4 outfalls, documentation of the absence of industrial facilities and activities within the jurisdiction that are related to the manufacturing, handling and transportation of plastic pellets must be provided in the proposed PMRP.
3. A MS4 Permittee may demonstrate to the Los Angeles Regional Water Quality Control Board (Regional Board) that it has only residential areas within its jurisdiction, and that it has limited commercial or industrial transportation corridors (rail and roadway), such that it is not considered a potential source of plastic pellets to Santa Monica Bay. Such demonstration may be submitted in lieu of a PMRP and must include the municipal zoning plan and other appropriate documentation. The Executive Officer may approve an exemption from the requirement to prepare a PMRP for the MS4 Permittee on the basis of this demonstration, if appropriate.

The PMRP requirements apply to areas within the EWMP Group's jurisdictions that contain industrial facilities that are related to the manufacturing, handling, or transportation of plastic pellets. As defined in the Debris TMDL, the WLA for plastic pellets is zero. Facilities associated with plastic pellets include but are not limited to Standard Industry Classification (SIC) codes 282X, 305X, 308X, 39XX, 25XX, 3261, 3357, 373X, and 2893. Additionally, industrial facilities with the term "plastic" in the facility or operator name may be subject to the WLA for plastic pellets. For the EWMP Group, meeting the WLA will be achieved through implementing the PMRP. For plastic pellet-related facilities within the jurisdictions of the agencies, meeting the WLA will be achieved through applicable permits and orders[2].

The County of Los Angeles, LACFCD, and the cities of Beverly Hills, Culver City, Inglewood, Los Angeles, West Hollywood and Santa Monica performed analyses to determine if any plastic pellet-related facilities are located within their jurisdictions and found the following:

1. The County of Los Angeles researched the land use code and business names for the term "plastic" in the facility or operator name within their jurisdiction to determine if any plastic

[2] The Industrial General Permit, other general permits, individual industrial stormwater permits, or other Regional Board orders, consistent with California Water Code § 13367 and 40 CFR 122.26(b) (12).

pellet-related facilities are located within their boundaries. The land use codes were obtained from the Enterprise GIS Repository data, which is found on the Los Angeles County GIS Data Portal website (http://egis3.lacounty.gov/dataportal/2014/02/04/business-locations/). There were 1,163 businesses within their jurisdiction. No businesses had any of the nine SIC codes identified in the Debris TMDL. No businesses had the term "plastic" in the facility or operator name. It is unclear if there is any handling or transportation of plastic pellets within the County of Los Angeles' jurisdiction. However, the County of Los Angeles prepared a spill response plan for the Marine Debris TMDL in case there are any plastic pellet handling or transportation activities within their jurisdiction.

2. LACFCD does not have any industrial facilities utilizing plastic pellets and has no activities related to the manufacturing, handling, or transportation of plastic pellets within its MS4 right-of-way.

3. The City of Beverly Hills reviewed its industrial facilities inventory and did not find any facilities that use plastic pellets or have "plastic" in its name or in operations. To complete this assessment, City of Beverly Hills staff reviewed the Industrial Waste Source Control Program Annual Reports, which list all of the industrial facilities within the City of Beverly Hills' jurisdiction. Staff also conducted a SIC code search of their industrial facilities in their business license database and did not find any that have the SIC codes identified in the Debris TMDL. In addition, there are no industries that handle or transport plastic pellets within their jurisdiction.

4. The City of Culver City researched the land use codes and business names with the term "plastic" in the facility or operator name within our jurisdiction to determine if any plastic pellet-related facilities are located within the City of Culver City's boundaries. The land use codes were obtained by utilizing the business license database. There were 13,120 businesses within the City of Culver City's jurisdiction. No facilities had any of the nine SIC codes identified in the Debris TMDL. Four facilities had the term "plastic" in the facility or operator name. Staff reached out to each facility and verified that they did not handle or transport plastic pellets.

5. The City of Inglewood researched the land use codes and business names with the term "plastic" in the facility or operator name within their jurisdiction to determine if any plastic pellet-related facilities are located within the City of Inglewood's boundaries. The land use codes were obtained by searching for the term "plastic" in all businesses within the City of Inglewood's business listing database. The City of Inglewood identified two facilities with the term "plastic" in their titles. After inspecting the premises, the City of Inglewood determined there were no plastic pellets present and no manufacturing of plastic products at the facilities. The two businesses are involved with the import/export and distribution of already manufactured plastic products. In addition, the City of Inglewood determined there is no handling or transportation of plastic pellets within the City of Inglewood's jurisdiction.

6. The City of Los Angeles researched the land use codes and business names with the term "plastic" in the facility or operator name within the City of Los Angeles' jurisdiction to determine if any plastic pellet-related facilities are located within City of Los Angeles boundaries. The land use codes were obtained by acquiring a list of all facilities (permittees) within the City of Los Angeles, which have any of the SIC codes identified by the Debris TMDL associated with their permit that could have a potential to use, store, or transport

plastic pellets. There were over 1,000 businesses within the City of Los Angeles' jurisdiction. 171 businesses had one of the nine identified SIC codes, and all of these had the term "plastic" in the facility or operator name or description. The City of Los Angeles then geo-coded the list of 171 businesses to identify and extract a list of facilities in the Santa Monica Bay watershed (including Ballona Creek and Marina del Rey). This narrowed down the candidates to a list of 23 facilities that could potentially be involved in an operation that utilizes plastic pellets. The geo-coded map showed facilities in the Ballona Creek watershed and in the Marina Del Rey watershed. The City of Los Angeles then created a survey form and had inspectors visit the 23 facilities and interview the facilities manager/Owner. The result of the inspections/surveys showed only one facility in the Ballona Creek watershed that uses plastic pellets. City of Los Angeles staff conducted a second inspection to investigate the operation, assess possibility of spills, and determine the potential discharge location into the catch basin in the event of an accidental spill. From this evidence, the City of Los Angeles determined there was handling or transportation of plastic pellets within their jurisdiction.

7. The City of West Hollywood sorted and queried its business license database (containing over 3,700 facilities) by name and SIC code and found no businesses with the SIC codes identified in the Debris TMDL, nor any facilities with "plastic" in their name.
8. The City of Santa Monica reviewed its business license database and wastewater permits and concluded there are no businesses within its jurisdiction that have any of the SIC codes identified in the Debris TMDL, but there are five business with the word "plastic" in their name. However, based on follow up with these facilities, it was determined that none of the businesses use, store, manufacture, process, recycle, or transport plastic pellets. The City of Santa Monica is unaware of any handling or transportation of plastic pellets within its jurisdiction. No facilities north or south of the City of Santa Monica use the Pacific Coast Highway to transport plastic pellets.

More information related to each jurisdiction's businesses/facilities databases are available upon request.

The plastic pellet use category that each BCWMG Group member is subject to and the associated requirement are detailed in **Table 1**. The City of Los Angeles is the only agency within the BCWMG Group member that is subject to the Debris TMDL's requirement to develop a PMRP. The PMRP monitoring approach is described in **Section 3**. All BCWMG Group members must have a spill response plan, which is described in **Section 4**.

**Table 1. Plastic Pellet Use Category and Associated Requirement**

| BCWMG Member | Plastic Pellet Category[1] | Requirement |
|---|---|---|
| County of Los Angeles | 2 | Spill Response Plan |
| LACFCD | 2 | Spill Response Plan |
| City of Beverly Hills | 2 | Spill Response Plan |
| City of Culver City | 2 | Spill Response Plan |
| City of Inglewood | 2 | Spill Response Plan |
| City of Los Angeles | 1 | PMRP |
| City of Santa Monica | 2 | Spill Response Plan |
| City of West Hollywood | 2 | Spill Response Plan |

1. Category 1 denotes jurisdictions that have industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets. Category 2 represents jurisdictions that have no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets.

# 3 PMRP

The City of Los Angeles is the only agency within the BCWMG Group member that is subject to the Debris TMDL's requirement to develop a PMRP. As such, the information presented in **Section 3** is only relevant for the City of Los Angeles. However, if in the future, another BCWMG Group member becomes subject to the Debris TMDL's PRMP requirement, **Section 3** will be utilized to meet the requirements. Notification of any changes in PMRP requirement status and any related information will be provided in the Annual Report.

The BCWMG Group members do not use or transport plastic pellets. Entities within the watershed that use plastic pellets are presumed to be subject to the IGP and required to conduct BMPs to prevent the discharge of plastic pellets per their storm water pollution prevention plans (SWPPPs) developed specific to the pellet use by the entity. Discharge of plastic pellets to the MS4 would occur through entities violating their IGPs or through spill during transport. The procedures for meeting the Debris TMDL requirements to identify entities discharging plastic pellets include the following:

1. Conduct inspections of any identified plastic pellet-related facilities and if plastic pellets are observed to be discharging from the facility, conduct plastic pellet monitoring. The flow path from the facility to the nearest catch basin will be visually assessed during each annual inspection;
2. In the event of a spill, implement applicable Spill Response Plan and notify the Regional Board within 24 hours of the responsible entity or agency becoming aware of the spill;
3. Submit an annual monitoring report, to be included in the CIMP Annual Report, that provides the following information:
    a. Summary of all industrial facility inspection and monitoring efforts;
    b. Results of any plastic pellet monitoring, and whether additional inspections were triggered;
    c. Results, including enforcement actions, from additional inspections triggered through monitoring; and
    d. If necessary, proposed revisions to the PMRP, including:
        i. Inspection triggers;
        ii. Monitoring frequency, procedures, or site revisions;
        iii. Spill response protocol revisions; and
        iv. Description of additional industrial facilities to be addressed the following year.

The above proposed procedures comprise a tentative list that may be modified after monitoring efforts begin. Any major deviations will warrant Regional Board notification. The annual reports will incorporate results from activities outlined in the PMRP and a description of components and/or elements added or modified.

For industrial facilities, the Debris TMDL WLA is implemented primarily through the requirements of the IGP, other general permits, individual industrial stormwater permits, or other

Regional Board orders. The discharge of plastic pellets from industrial facilities is prohibited. However, if industrial facilities release plastic pellets into the MS4, facility inspections and enforcement of IGP SWPPP requirements will be used to further control and prevent the release of plastic pellets into the natural environment.

## 3.1 TRIGGERS FOR INSPECTION AND SWPPP ENFORCEMENT

All current plastic pellet-related facilities, and new facilities that may emerge, will undergo at least one routine annual inspection. Additional facilities using plastic pellets identified through routine inspections, hotline reporting, or other means will be added into the annual inspection and monitoring will be performed as warranted.

Following a routine facility inspection where plastic pellets are found to be discharging from the facility, plastic pellet monitoring will be conducted on a semi-annual basis. The data collected from monitoring may be used to trigger enforcement of plastic pellet-related SWPPP requirements. For example, if the volume of plastic pellets captured from facility discharge to the MS4 exceeds 50 mL, the responsible agency will conduct a follow-up inspection within four weeks from the completion of the monitoring event. Similarly, in the event that the responsible agency determines, based on a routine annual inspection or illicit discharge/spill investigation conducted, that a facility has failed to adequately implement all necessary plastic pellet BMPs, the responsible agency will include a follow-up inspection within four weeks from the date of the initial inspection and/or investigation.

From a follow-up inspection, the BCWMG Group member will determine if the facility has made progress in implementing required BMPs identified in the initial site inspection and/or monitoring. If the potential problem is not resolved, the agency will decide whether there is enough progress to warrant a second follow-up inspection to allow the facility owner/operator more time to meet the requirements, to initiate enforcement actions, or to refer the facility to Regional Board for further actions. The BCWMG Group member will follow the legal authority established in the municipal code and ordinances.

## 3.2 ENFORCEMENT OF SWPPP REQUIREMENTS

If during facility inspections, the plastic pellet-related BMPs specified in the SWPPP, and any applicable source control BMPs and any additional BMPs required for compliance with municipal ordinances, are not adequately protective of water quality standards (e.g., at preventing illicit discharges into the MS4 and receiving waters), the BCWMG Group member may require additional site-specific controls.

In the event that the BCWMG Group member determines that a facility has failed to adequately implement BMPs after a follow-up inspection and has demonstrated a good faith effort to bring the facility into compliance, the responsible agency may take enforcement action as established through authority in its municipal code and ordinances or through the judicial system. For those facilities subject to the IGP and in violation of municipal storm water ordinances, the responsible agency may escalate referral of a violation of its municipal storm water ordinances and/or California Water Code §13260 to the Regional Board (promptly via telephone or electronically) after conducting a minimum of one follow-up inspection and submitting a minimum of one written notice of violation (copied to the Regional Board) to the facility or site operator regarding the violation. For facilities not subject to the IGP that are in violation of municipal

storm water ordinances, the BCWMG Group member may refer such a violation to the Regional Board after conducting a minimum of two follow-up inspections and submitting a minimum of two warning letters or notices of violation to the facility or site operator regarding the violation.

## 3.3 MONITORING APPROACH

The Debris TMDL presents a WLA of zero plastic pellets. Zero is defined as no discharge of plastic pellets from the premises of industrial facilities that import, manufacture, process, transport, store, recycle, or otherwise handle plastic pellets. For the purposes of the PMRP, a plastic pellet is a piece of pre-production plastic that is typically formed into a spherical or cylindrical shape measuring less than five millimeters in diameter or length. Varying widely in composition, plastic pellets often incorporate different types of plastic as well as colorants and other additives. Plastic pellets are the feedstock used in manufacturing plastic products.

To ensure compliance with the WLA of zero plastic pellets, MS4 catch basins receiving discharges from industrial facilities with confirmed plastic pellet usage, transfer, or other handling within the Ballona Creek watershed will be monitored for plastic pellets. In the event that plastic pellets are found to be discharging from the facility during facility inspections, plastic pellet monitoring will be conducted semi-annually once during the wet season and once during the dry season.

Any new or repurposed facilities to be located within any of the BCWMG Group member's jurisdiction will be responsible for assisting the relevant agency in identifying nearest MS4 catch basins and determining monitoring procedures appropriate for the catch basin locations. New facilities will also be expected to implement industrial BMPs for plastic pellets (e.g., install storm drain screens with mesh smaller than the smallest pellet handled at the facility, equip loading areas with vacuums or brooms and dust pans, and provide catch trays for use at all vehicle unloading valves).[3]

## 3.4 MONITORING EVENT PREPARATION

Monitoring events should only be conducted during safe weather conditions. As such, the weather forecast should be checked immediately prior to heading out for monitoring field work. Precipitation events within the watershed can cause elevated water levels and unsafe conditions. If at any time during a monitoring event, field personnel feel that site conditions are unsafe for any reason, the event should be abandoned and the project manager notified of the situation.

Prior to mobilization for each monitoring event, field personnel should prepare the equipment necessary to conduct the monitoring event. Required equipment is listed in **Table 2**. Additionally, any necessary permits required for access to restricted areas and/or plastic pellet removal will be obtained prior to the monitoring event.

[3] These example BMPs and additional examples can be found in the Operation Clean Sweep Manual

**Table 2. Equipment Checklist**

| Required Plastic Pellet Monitoring Items | |
|---|---|
| ☐ First Aid Kit | ☐ Copy of PMRP document |
| ☐ Cellular Telephone | ☐ Digital Camera |
| ☐ Life Jackets | ☐ Timepiece |
| ☐ Work Gloves/Laboratory Gloves | ☐ Notebook and Pen |
| ☐ Trash Bags | |

## 3.5 MONITORING PROCEDURE

Where necessary, the monitoring for plastic pellets generally will be conducted using a two stage mesh. The first stage mesh will be of 5 mm opening to collect trash. The second stage will be a fine screen or cloth 1 mm or finer. The mesh system may be temporarily affixed to the outlet, or within the drop-inlet or catch basin. The volume of the collected plastic pellets will be recorded.

Where there is no flow at the time of sampling, a visual assessment of the outfall will be conducted. Plastic pellets found in the vicinity of the outfall will be collected. Where accessible, the sampling crew will open and visually assess the drop-inlet/catch basin closest to the identified facility. Plastic pellets found in the drop-inlet or catch basin will be collected if accessible. If found in the drop-inlet or catch basin, the facility will be subject to increased inspection.

## 3.6 MONITORING SITE LOCATIONS

Currently, the City of Los Angeles is the only agency within the EWMP Group that has a plastic pellet-related facility within its jurisdiction. Teksun, Inc., located at 11368 Olympic Boulevard, Los Angeles, CA 90064, utilizes approximately 500 pounds per month of plastic pellets. The facility has adequate storage with no drains leading to the MS4. In addition, the facility has proper equipment in the operation area for containing and cleaning any potential spills. The facility receives the plastic pellets in plastic bags and does not ship out plastic pellets. If necessary, monitoring will be performed at the nearest catch basin downstream from Teksun, Inc. Photos of Teksun, Inc. and the nearest downstream catch basin as well as facility information is presented in **Figure 1**.

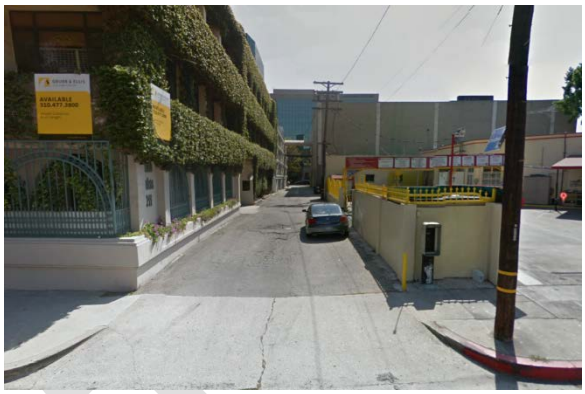
| Front View of Teksun, Inc | Rear View of Teksun, Inc. |
|---|---|
|  |  |
| **View of Nearest Catch Basin (Purdue Avenue)** | **Facility Information** |
|  | • No possible discharge from front of facility.<br>• Operation area is at rear of facility.<br>• Discharge of plastic pellets to MS4 is unlikely:<br>1. Runoff would have to travel down alley.<br>2. Runoff would have to travel south down Purdue Avenue for more than one block to enter nearest catch basin.<br>• Monitoring will be conducted at the Purdue Avenue catch basin (34.035686, -118.441906). |

**Figure 1. Teksun, Inc. Facility Details**

# 4 Spill Response Plan

The County of Los Angeles, LACFCD, and the cities of Culver City, Santa Monica, and West Hollywood have developed their own agency-specific Spill Response Plans (SRPs) to address plastic pellet spills. These SRPs are provided in **Attachment A** to this Appendix. The following SRP provides how the cities of Beverly Hills, Inglewood, and Los Angeles, will address plastic pellet spills.

Three important phases of a SRP are: *contain*, *control*, and *cleanup*. The first personnel on scene are to *contain* the spill or, in other words, to keep it from entering the MS4 or other receiving waters. This may be done in any number of ways, including the use of berms, sand bags, or by blocking the outlet pipe of a catch basin. Once the spill is contained, it needs to be brought under *control*. That is, upright any fallen containers/ vehicles and close all lids and doors. The third and final step of the response is *cleanup*. Removing any plastic pellets that may have spilled is paramount and may be done through any effective manner including sweeping or vacuuming. Specific spill response procedures are provided below:

1. Immediately notify the agency-specific SRP lead, who shall immediately notify the appropriate agency-specific contacts;
2. Contain the spillage immediately by using berms, sandbags, or any other applicable measure. If plastic pellets have entered a catch basin, if appropriate, block the outlet pipe of the catch basin;
3. Take photographs of the spill and confine pictures to only the areas affected by the spill;
4. Investigate the incident and develop a written chronology that describes:
    a. Time, date, and cause of the overflow/spill;
    b. Events and actions that led up to the spill;
    c. The approximate volume of the spill and route, if any, storm drains that were compromised;
    d. Names and titles of personnel present on scene of spill/overflow; and
    e. Actions taken to correct the situation, including containing the spill as well as remediation;
5. Clean up the spill area and remove containment:
    a. Remove all plastic pellets through most effective manner;
    b. Appropriately dispose of materials used during spill containment and cleanup;
    c. Leave the area as clean as practicable;
6. Complete any applicable SRP forms and notify the Regional Board within 24 hours of becoming aware of the spill:
    a. Regional Board:
        i. 213-576-6657 (Business hours);
        ii. 231-350-2253 (Non-business hours); and

iii. 213-620-6140 (Fax for written notification).

The general communication procedures and responsibilities for plastic pellet spill response are shown in **Figure 2**.

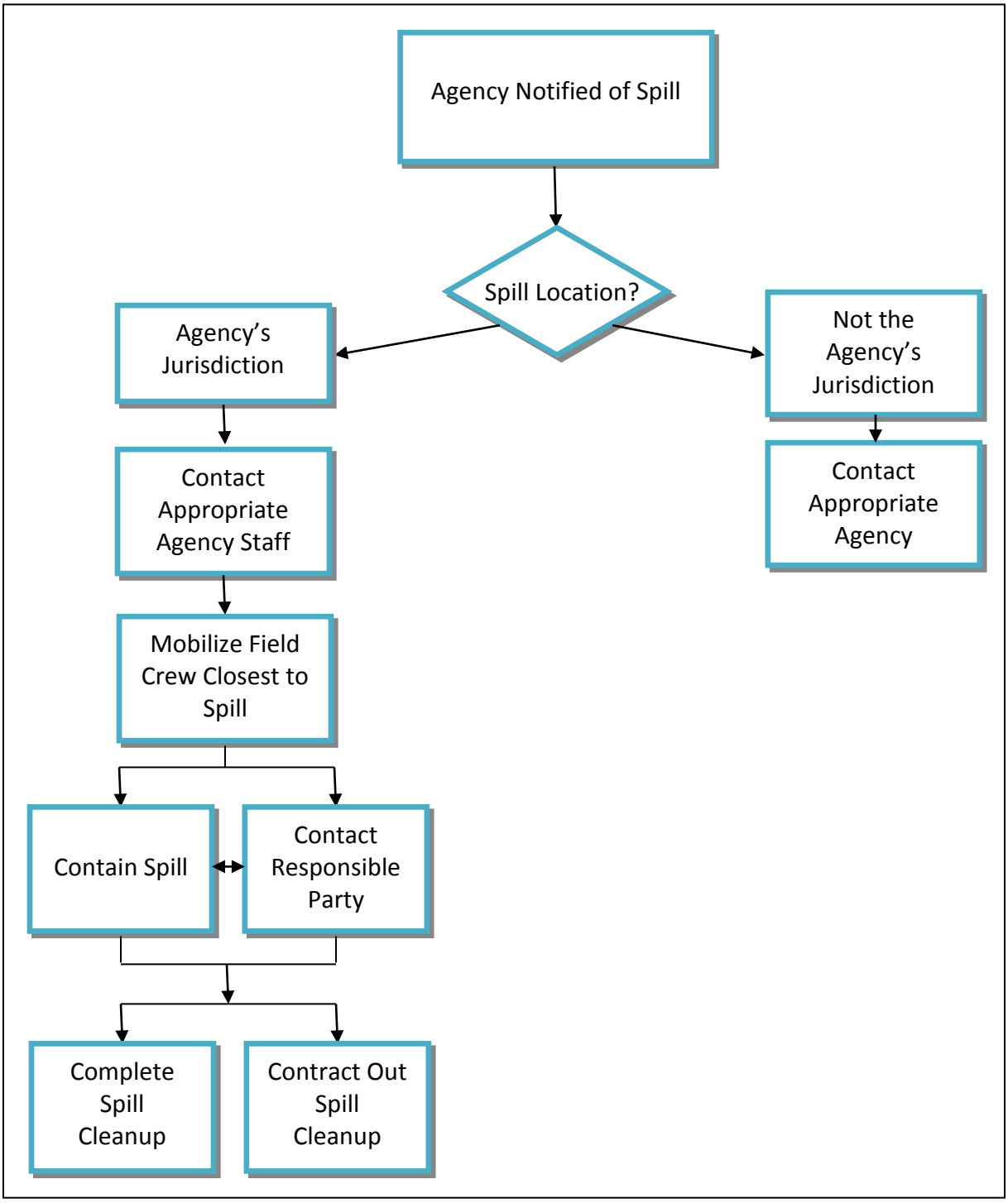



**Figure 2. General Communication Procedures and Responsibility for Plastic Pellet Spill Response**

# Attachment A: Ballona Creek Watershed Jurisdiction Specific Plastic Pellet Spill Response Plans for the Los Angeles County Flood Control District, the County of Los Angeles, and the cities of Culver City, Santa Monica, and West Hollywood

# City of Santa Monica Plastic Pellet Spill Response Plan

## Element 6 EMERGENCY RESPONSE PROCEDURES

This section of the PMRP provides an overview and summary of emergency response procedures for accidental releases of plastic pellets in the public right-of-way. As noted in previous Elements of this PMRP, the City does not currently have any facilities that handle plastic pellets. If in the future, individual facilities that use, manage or produce plastic pellets will be required by the City to have a site specific emergency response plan in place and to install facility BMPs such as covered handling areas, perimeter windscreen, berms, filters or other debris capture devices to prevent the release of plastic pellet debris off property or into storm or sanitary sewer collection system connections.

### 6.1 Emergency Response Plan Elements

The City has developed the following procedures to protect public health and the environment in the event of an accidental release of plastic pellets in the public right-of-way. The key emergency response elements include:

- Procedures for proper notification so that the primary responders are informed of all accidental releases of plastic pellets in a timely manner;
- Procedures to address emergency operations, such as, traffic and crowd control and other necessary response activities;
- Procedures to ensure that all reasonable steps are taken to contain and collect an accidental release of plastic pellets and prevent the release from reaching waters of the State; and
- Procedures to ensure prompt notification of appropriate regulatory agencies and other potentially affected entities (e.g. health agencies, regional water boards, treatment plants etc.) of all accidental releases of plastic pellets in the public-right-of way that have a potential to affect public health or reach the waters of the State.

### 6.3 Emergency Response Plan

In order to minimize the potential for health and environmental impacts caused by plastic pellet debris, the City has developed the following plan and standard operation procedure (SOP) for responding to accidental releases of plastic pellets.

**Plastic Pellet Accidental Release Emergency Response Plan:**

City Fire, Police and Water Resources and Inspection staff have been trained to respond promptly upon receiving notification of emergencies that could affect the City's water distribution and separate storm and sanitary sewer collection systems. To respond to the accidental release of plastic pellet debris in the public-right-of way, the PMRP Emergency Response Plan (ERP) will rely on this expertise.

The PMRP ERP involves two basic scenarios (steps):

**Step 1**-Upon notification by first responders, such as, the City Fire or Police Departments, of a release in the public right-of-way, City Wastewater Staff (both Operations and Waste Resources Protection Program Inspector) mobilizes to the location and immediately identifies the extent and character of the release. Factors that will be documented include; apparent source, estimated time of release, approximate volume of pellets released, whether other utilities or conditions are involved, i.e. broken hydrants, fuel spill, fire etc., location of the nearest stormwater catch basins, whether or not a portion of the release is on private property, and determination of the potentially responsible party. This information is recorded on an incident response form and becomes the basis of future reporting and/or enforcement.

To ensure containment, City Wastewater staff will locate the nearest down gradient (down slope) storm drain and determine if the release has, or will, reach this drain. Based on site conditions, the onsite Wastewater incident manager shall decide if immediate action, additional staff and equipment are required to prevent the release from reaching this drain. If the release includes active fire suppression activities, the onsite incident manager will direct City Wastewater staff to immediately contain the discharge by completely surrounding the storm drain inlet with straw wattle booms or other filtering berm materials to minimize the potential for the discharge of pellets or other debris to the stormwater collection system. In the event firefighting foam is used, the Wastewater staff will, in addition to applying filter berms, direct that the SMURRF be shut down to prevent equipment damage.

If the release takes place on a major roadway (Interstate 10, PCH, or Wilshire Blvd., Lincoln Blvd) or rail right-of-way, the City will act as a first responder until such time as the agency or entity with primary authority and or jurisdiction arrives on scene to take command (e.g. CAL TRANS, Metro-link etc.).

Once the nature and extent of the discharge are known, and the work area has been secured and is safe for workers (e.g. crowd and or traffic control in place), staff will begin immediate

cleanup of pellet debris in the public right-of way; typically by vacuuming or street sweeping the spilled pellets for lawful disposal.

The information collected on the incident response form, along with any other relevant information, is reported by Wastewater staff to all required outside agencies, such as, the Office of Emergency Services, LA County Dept. of Health Services, LA Regional Water Quality Control Board, and if applicable, LA Co. Flood Control and City of Los Angeles (see below for more detail).

As part of any emergency response, Staff will also ensure the release area (all public areas) are cleaned and disinfected, as necessary. If the release has reached the storm drain system, staff will routinely check a couple of storm drain catch basins downstream from the contaminated catch basin to verify how far the release has traveled down the storm drain line. Depending on the volume and extent of the release, additional response activities may be implemented in these additional catch basins. If there is a question about the necessity for further response activities, onsite staff will confer with the WRPP supervisor on duty. If a pellet release in the public right-of-way has visibly impacted private property, onsite staff will photo document all such impacts identified at the time of the release response. Staff shall also document the contact information of the property owner and any notes regarding the potential impact in their field notebook. Questions regarding repair or cleanup costs shall be directed to the CSM Office of Risk Management. The City retains an emergency response contractor that may be activated to assist the City or a private property owner with critical immediate needs that arise as a result of the emergency response caused by a release in the public right-of-way. Costs associated with such aide will be tracked and invoiced back to the responsible party.

**Step 2-** In the future, if the City ever gets pellet-related facilities, and if a release occurred because of an accident within a privately owned facility, including any future rail line right-of way or major roadway not under City jurisdiction, and such release resulted in a discharge into the public right-of-way, such as, City streets, sanitary sewer, storm drain, alleys or side-walks, CSM Wastewater staff will contain and prevent further discharges into the public right-of-way as described in Step 1, above. This will typically be done by using a City vacuum truck or street sweeper, unless other specialty equipment is required, in which case the City may mobilize its emergency response contractor. CSM staff will contact the subject property owner/manager and direct them to immediately clean up the spill. Any facility that uses, manages, stores or produces plastic pellets in the City shall have a site specific emergency response plan in place. In instances where there is no effective response from the property owner or manager to abate the release within a reasonable time frame (less than an hour), or at the discretion of the onsite Wastewater incident manger or the WRPP Inspector, the City will contact the RWQCB and request assistance, and assuming there are no other safety considerations, may direct that the

facility water service be temporarily turned off at the subject property in order to ensure pellet debris is not being carried or washed into the City's collection systems.

Before directing the interruption of water services, CSM Wastewater staff will notify the property owner or manager. Wastewater Operations staff will notify if a WRPP Inspector is unavailable (i.e. after hours, weekends). Notification is made verbally and by posting a large placard in a common area such as a facility entrance or gate. Each placard and door hanger has contact information for the CSM.

Other agency contact/reporting contacts include:

-**Office of Emergency Services (OES) at (800) 852-7550** to obtain an OES Control#. After business hours including weekends, CSM Wastewater staff makes the notification to OES and provides WRPP Inspection Staff with the OES Control #.

- **LA County Dept. of Health Services at (213) 974-1234** and obtain a ticket#. After business hours including weekends, CSM Wastewater staff contact the agency and provide WRPP Inspection Staff with the incident ticket#.

- **Los Angeles County Department of Health Services (DHS) "Public Health" at (310) 665-8484** (8:00am-5:00pm). After business hours including weekends Wastewater Staff call the Los Angeles County Department of Health Services at (213) 974-1234. -**LA Regional Water Quality Control Board at (213) 576-6657**. After hours including weekends, Wastewater Staff will notify the agency.

-For discharges into the **County of Los Angles Flood Control** storm drain system, call 24/7 dispatch **– 1-800-675-4357**. For discharges into the **City of Los Angeles storm drain system, call 1-800-974-9794**. WRPP inspection staff calls in incidents during regular work hours. Wastewater staff makes this call during after hours, including weekends.

-For a significant spill (i.e. a spill that would bypass treatment and/or enter Santa Monica Bay) the **Recreational Waters Program at (626) 430-5360** is also contacted.

-For a significant spill into Ashland or Rose Diversions the contact is:

- Jared Deck: (562) 861-0316
- Mike Stephenson: (323) 776-7610

During weekends and after hours: Dispatch: (800) 675-4357. Wastewater staff will monitor the release site continuously to make sure the problem is corrected and pellet debris at the site has been cleaned up and the release area is disinfected, if necessary (i.e. sanitary sewer). Large discharges from private property requiring cleanup will be billed to the property owner for cost

recovery of labor and equipment use. If water service is interrupted due to site conditions or otherwise at the direction of CSM Water/Wastewater staff, service will be restored upon cleanup of the pellet debris to the satisfaction of the City, unless other conditions persist.

It is important to remember that discharges into the City storm drain system are typically captured by one of the City low-flow diversion and trash treatment BMP projects, such as, SMURFF, Wilshire Blvd., Montana Ave., Rose Ave., Ashland Ave., Sunset-Canyon and Centinela-Pearl projects and therefore normally do not reach Santa Monica Bay, as long as those diversion projects are operational at the time of the incident. Staff will confirm the operational status of the subject BMP project as part of the ERP response procedures. Potentially affected diversion structures may be checked for the presence of pellet debris after any large volume release. Further response at any impacted diversion structure shall be considered in consultation with City Engineers and the RWQCB.

Once the pellet response incident is concluded, CSM OSE Staff shall forward any requested reports or data to the RWQCB within 24 hours.

**Sanitary Sewer Overflow (SSO) Equipment and Training**

Typical equipment required for response to an accidental release of plastic pellets, depending on location and size of the release, includes, but is not limited to, personal protective gear, reporting forms, traffic control devices such as cones or barricades, absorbent materials (i.e. berms or plastic sheeting), sampling equipment, disinfectant solutions, vacuum trucks, and street sweepers.

The City conducts regular training to familiarize staff with various health and safety issues, standard response procedures, and regulatory and technological developments. The City also encourages staff to recommend more efficient ways of completing work tasks based on staff field experience.

## 6.2 Appendix F

Supporting documents for Element 6 are included here.

1. Contacts for Emergency Response Plan

# Culver City Plastic Pellet Spill Response Plan

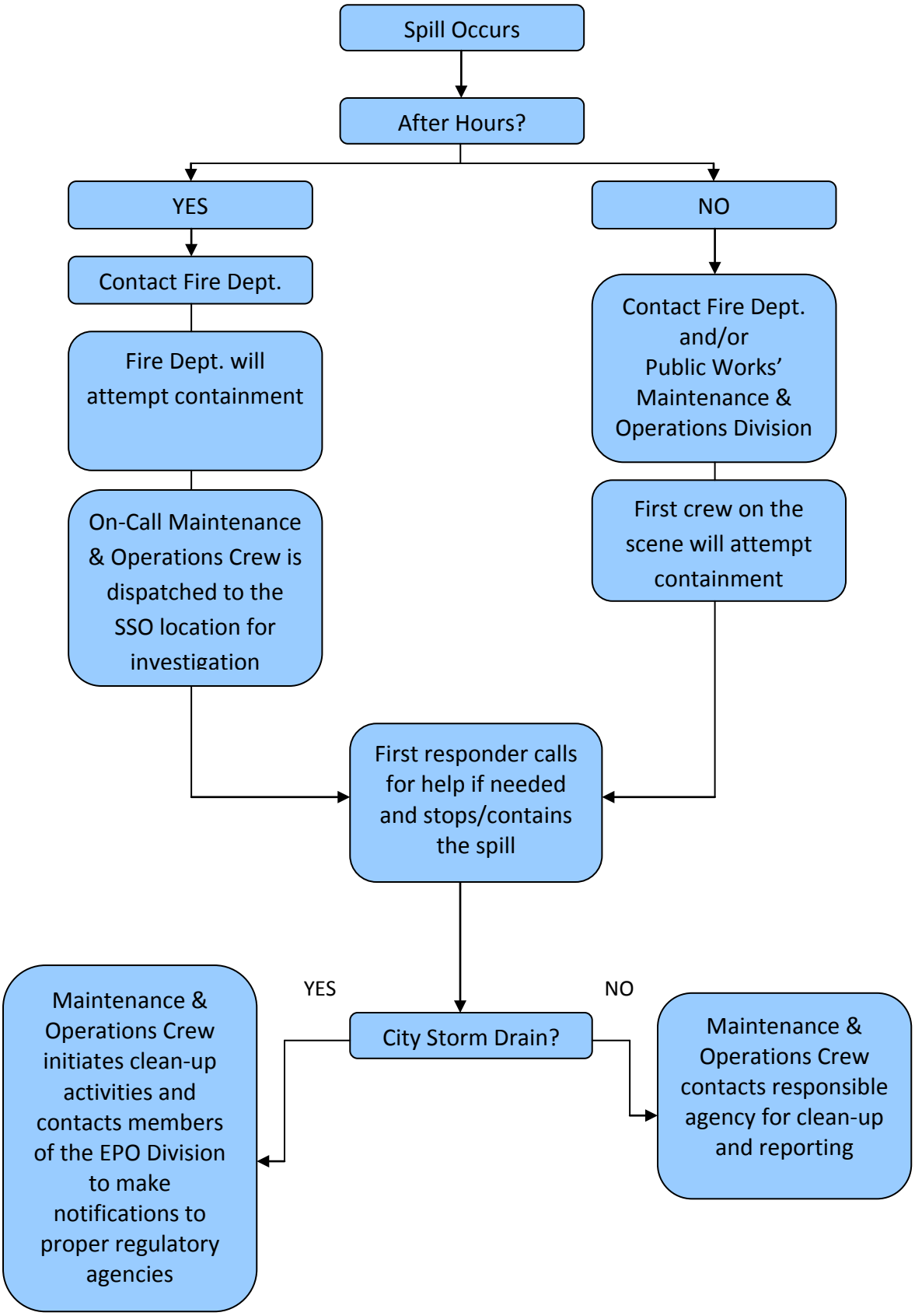
## 9.0 PLASTIC PELLET MONITORING AND REPORTING PLAN

The City of Culver City (City) has no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets. Therefore, the City is not required and will not conduct monitoring at MS4 outfalls.

The City has reviewed its business license and there for no businesses with SIC codes that are regulated for plastic pellets. In addition, there are no businesses with the word “plastic” in its name that must comply with this TMDL. City staff also verified with the Industrial General NPDES Permit and did not find any businesses in the City on that list either.

As required by the TMDL, below is the City’s response plan:

**PLASTIC PELLETS SPILL RESPONSE PLAN**



**Proper notification procedures so that the primary responders and regulatory agencies are informed of plastic pellet spill in a timely manner;**

| SPILL NOTIFICATION CONTACT NUMBERS | | |
|---|---|---|
| **AGENCY** | **INFO** | **NOTIFICATION TIME FRAME** |
| **CULVER CITY PUBLIC WORKS:**<br>**Charles D. Herbertson**, Director of PW/City Engineer<br>**Damian Skinner**, EPO Div. Manager<br>**May Ng**, WDR (Sewers) Engineer<br>**Kaden Young**, NPDES (Stormwater) Engineer<br>**Steve Orozco**, Maintenance Op. Div. Manager<br>**Eric Mirzaian**, Senior Management Analyst<br>**Benny Tenorio**, Sewer Crew Lead<br>**Mate Gaspar**, Engineering Services Div. Manager<br>**Culver City Fire HazMat** | (310) 253-5630<br>(310) 253-6421<br>(310) 253-6406<br>(310) 253-6445; (562) 308-8269<br>(310) 253-6444<br>(310) 253-6410<br>(310) 849-8937; (310) 236-1345<br>(310) 253-5602<br>(310) 253-5930 | Immediately |
| State Water Resources Control Board (SWRCB) | Submit info on this page at<br>http://ciwqs.waterboards.ca.gov/ | ASAP |
| California Office of Emergency Services (Cal OES) | (800) 852-7550; 24-hour reporting | Immediately |
| Los Angeles Regional Water Quality Control Board (LARWQCB) | (213) 576-6657; business hours<br>(213) 305-2253; non-business hours<br>(213) 620-6140; fax written notification | Immediately |
| Los Angeles County Department of Health Services (DHS) | (213) 974-1234; 24-hour reporting<br>(626) 430-5420 | Immediately |
| Los Angeles County Flood Control District | (818) 896-0594<br>(818) 248-3842; business hours only | Immediately |

The Fire Chief or Director of Public Works/City Engineer will be the official who will receive immediate notification. The Chief or Director or his designee shall be immediately dispatched to the site to take control of the scene as the Incident Commander. Unless otherwise noted, the Incident Commander is responsible to ensure all listed procedures are carried out. Field crews are prepared to respond immediately with all available equipment including drinking materials, pumps, vacuum truck and traffic control equipment.

The Incident Commander shall assess the magnitude of the spill by estimating the volume by the accumulation of spillage. If any plastic pellet enters the storm drain system, immediately notify the appropriate agencies according to the chart above. If the situation does not permit the Incident Commander to contact the agencies immediately, contact the Environmental Programs and Operations (EPO) Division staff to report the spill to the appropriate agencies. If EPO staff cannot be reached, contact Culver City Fire HazMat to report the spill.

The City's Fire Department and Public Work's Maintenance & Operations Crew are trained and prepared to respond to spills and overflows of all sorts. They are ready to respond at a moment's notice and secure the perimeter for necessary activities such as traffic and crowd control.

**General Response Procedures**

The three fundamental phases of all responses to a plastic pellet spill are: contain, control, and cleanup.

The first personnel on scene are to contain the spill or, in other words, to keep it from entering the storm drainage system or other receiving waters. This may be done in any number of ways, including the use of sand or soil dikes, sand bags, or by plugging the outlet pipe of a catch basin.

Once the spill is contained, it needs to be brought under control. That is, upright any fallen containers/vehicles and closing all lids and doors.

The third and final step of the response is cleanup. All surfaces touched by the spill must be swept and vacuumed for proper disposal. The spill should never be blown/swept down into a storm drain, it must be vacuumed.

## SPILL RESPONSE PROCEDURES

1. Immediately notify the Maintenance & Operations Division Manager, who in this case should act as the Incident Commander. Incident Commander shall immediately notify the appropriate departments/division managers.
2. Contain the spillage immediately by building berms around the spills using sandbags and vacuum truck. Block openings of nearby storm drain catch basins using sandbags. If any plastic pellets enter the storm drain, build a temporary dam (using sandbags) in downstream storm drain system, to avoid plastic pellets entering the receiving waters.
3. Take photographs of the spill and include them for review by the WDR Engineer and Department Head. If the spill was not generated from a private property but entered private property, a copy of the report and photos must be forwarded to Risk Management. Staff will request permission of the occupant of the private property before taking any pictures on private property. Confine pictures to only the areas affected by the spill.
4. Investigate the incident and develop a written chronology that describes:
    a. time, date, and cause of the overflow/spill;
    b. events and actions that led up to the spill;
    c. the approximate volume of the spill and route, if any, storm drains that were compromised;
    d. names and titles of personnel present on scene of spill/overflow; and
    e. Actions taken to correct the situation, including containing the spill as well as remediation.

This information is required for Department records. If the spill occurs in a business area, or if it is suspected to have been the result of a commercial or business activity, contact the NPDES Engineer to assist with the investigation.

5. Clean up the spill area and remove containment.
    a. Appropriately dispose of contaminated sandbags.
    b. Leave the area as clean as practicable.
    c. When washing down contaminated areas or streets, block all nearby storm drain catch basin openings with sandbags to prevent wash water from entering the storm drain system.
    d. Place temporary dikes using sandbags to capture runoff and vacuum up all run off from surfaces that were in contact with the spill.
    e. If storm drain system was compromised with plastic pellets, a temporary dam will be erected downstream to capture spillage until it is vacuum extracted.
        - Water quality samples should be taken at the time of spill to be analyzed. Another sample should be done the next day for follow up.
6. The Incident Commander must verify that a Plastic Pellet Report form has been completed. This task is completed by the NPDES Engineer and filed to the State's online reporting system.

**OUTSIDE RESOURCES CONTACT LIST**

Spill Response Companies

**Allwaste**
2222 E. Sepulveda Boulevard
Carson, CA 90810
(310) 595-1000

**National Plant Services**
1461 Harbor Avenue
Long Beach, CA 90813
(562) 436-7600

**Ocean Blue (Environmental Services, Inc.)**
925 W. Esther Street
Long Beach, CA 90813
(562) 624-4120

**Cleanstreet**
1937 W. 169th Street
Gardena, CA 90247
(800) 225-7316 x1111

Spill Sampling Laboratory

**Weck Laboratories, Inc.**
14859 East Clark Avenue
City of Industry, CA 91745
(626) 336-2139

For after hours, weekends, holidays, and emergencies:

| | |
|---|---|
| Alfredo Pierri | (626) 926-4256; (626) 330-9569 |
| Marilyn Romero | (626) 926-4105 |
| Joe Chau | (626) 290-0546 |
| Hai-Van Nguyen | (909) 802-3764 |

OUTSIDE AGENCY NOTIFICATION NUMBERS

**A. City of Los Angeles**

a. If spill is originating from a City of Los Angeles
City of Los Angeles – Bureau of Sanitation
Phone: (213) 485-7575 (Sewage Spill Hotline Main #)
Phone: (213) 485-5391 (Sewage Spill Hotline Weekdays, 6:30AM – 1:00AM)
Phone: (310) 823-5507; (310) 822-0777 (Night Emergencies, 1:00AM – 6:30AM)

**B. County of Los Angeles**

a. When spill enters storm drain system
L.A. County Department of Public Works
Floor Maintenance Division
Phone: (800) 675-4357, ext. #1

b. Call ONLY if storm drain is compromised or if spills enter receiving water(s)
L.A. County Department of Health Services
Phone: (626) 430-5420, After hours: (213) 974-1234

**C. California Office of Emergency Services**

a. If spill exceeds 1,000 gallons or presents hazard to human health or environment
Hazardous Spills Notification
Phone: (800) 852-7550

**D. Other Agencies (to request assistance)**

a. City of Los Angeles: (213) 485-7575
b. County of Los Angeles: (800) 675-HELP (4357)
c. City of Hawthorne: (213) 216-2356 (Richard Carver)
d. City of El Segundo: (310) 524-2760
e. City of Manhattan Beach: (310) 802-5320; (310) 345-2442 (Justin Gervais)
MB Police Station: (310) 802-5100

**E. Regional Water Quality Control Board**

a. When spill enters the storm drain system
Technical Support Unit – Spills Report Duty Officer
(213) 576-6720, if no answer, (213) 576-6600
After hours: (213) 774-4238
Fax: (213) 576-6640

**F. California Coastal Commission**

a. When spill enters coastal waters or have the potential to enter coastal waters
(805) 585-1816; (562) 590-5071

**G. California Department of Fish and Game**

a. When spill enters coastal waters or have the potential to enter coastal waters
(562) 708-7757

# County of Los Angeles Santa Monica Bay Watershed Management Area Plastic Pellet Spill Response Plan

# Emergency Spills

Accidental spills during transfer and transportation contribute to plastic pellets entering storm drains and, ultimately, the Santa Monica Bay. Included below, are protocols for a timely and appropriate response to possible plastic pellet spills within County jurisdiction to address containment of spilled plastic pellets (see **Figure 15**). Railroads do not cross the areas of County jurisdiction within the Santa Monica Bay WMA.

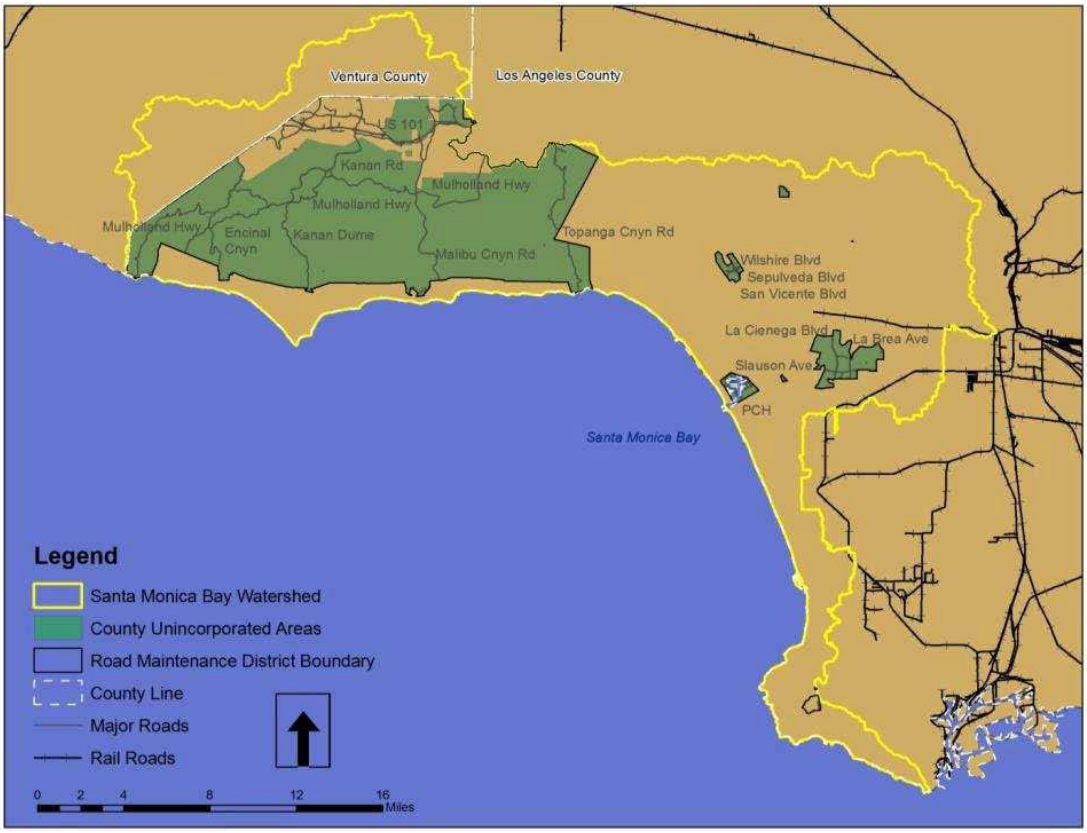



**Figure 15. Major Thoroughfares Crossing Areas of County Jurisdiction**

## SPILL RESPONSE PLAN

The general procedures for the spill response plan are outlined below:

1. Calls come in to our Dispatch Center (e.g., through 24-hour illegal dumping/discharge hotlines) from the general public or responding crew to report spills and other illegal dumping/discharge incidents. Calls or faxes regarding spills, discharges, or dumping information affecting the County can also come in from the California Office of Emergency Services.

2. The dispatcher will obtain as much information as possible about the location (e.g., on street, in gutter, or entered waterway such as catch basin or storm drain) and take the following steps:

a. If the spill, discharge, or dumping is on County jurisdiction, the dispatcher will contact the Los Angeles County Department of Public Works' (Public Works) Road Maintenance Division (RMD) and provide them the information.

b. If the spill, discharge, or dumping has entered an Los Angeles County Flood Control District (LACFCD) waterway, storm drain, or catch basin, the dispatcher will contact them and provide them the information

c. If the dumping, discharge, or spill is on a City street or property not contracted with the County, Dispatcher will provide the reporting party (RP) with the telephone number for the appropriate City and/or handling agency. Dispatcher will also transfer RP to the correct agency.

Under the County Spill Response Plan, Public Works' RMD will respond by mobilizing the field crew closest to the spill to investigate and identify the source of the spill. The County and/or the responsible party will either perform the spill cleanup or appoint a third-party emergency response service to perform the spill clean-up. The responding field crew will ask Dispatch Center to contact the local authorities to handle traffic control, if needed.

1. The Regional Board will be notified within 24 hours of the County, other responsible agency, or jurisdiction becoming aware of the spill.

    a. The County staff will call the Regional Board's front desk at (213) 576-6600.

    The County staff handling the spill report will notify the Regional Board's front desk staff that he/she is calling regarding the Santa Monica Bay Debris TMDL and ask to be transferred to the correct staff. If it is on a weekend, the County staff will leave a message including: a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact info.

    b. The County staff will send a notification e-mail to the Regional Board at losangeles@waterboards.ca.gov.

    The e-mail subject line will be "Santa Monica Bay Debris TMDL". The body of the e-mail will include a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact info.

The general flow of communication and responsibility that will occur during spill response is illustrated in **Figure 16**. Additionally, a listing of relevant contact information is included in Attachment B. In identifying the responsible party for the spill, the origin and destination of the plastic pellet shipment will be ascertained to determine if a new plastic pellet industry should be included in the program.

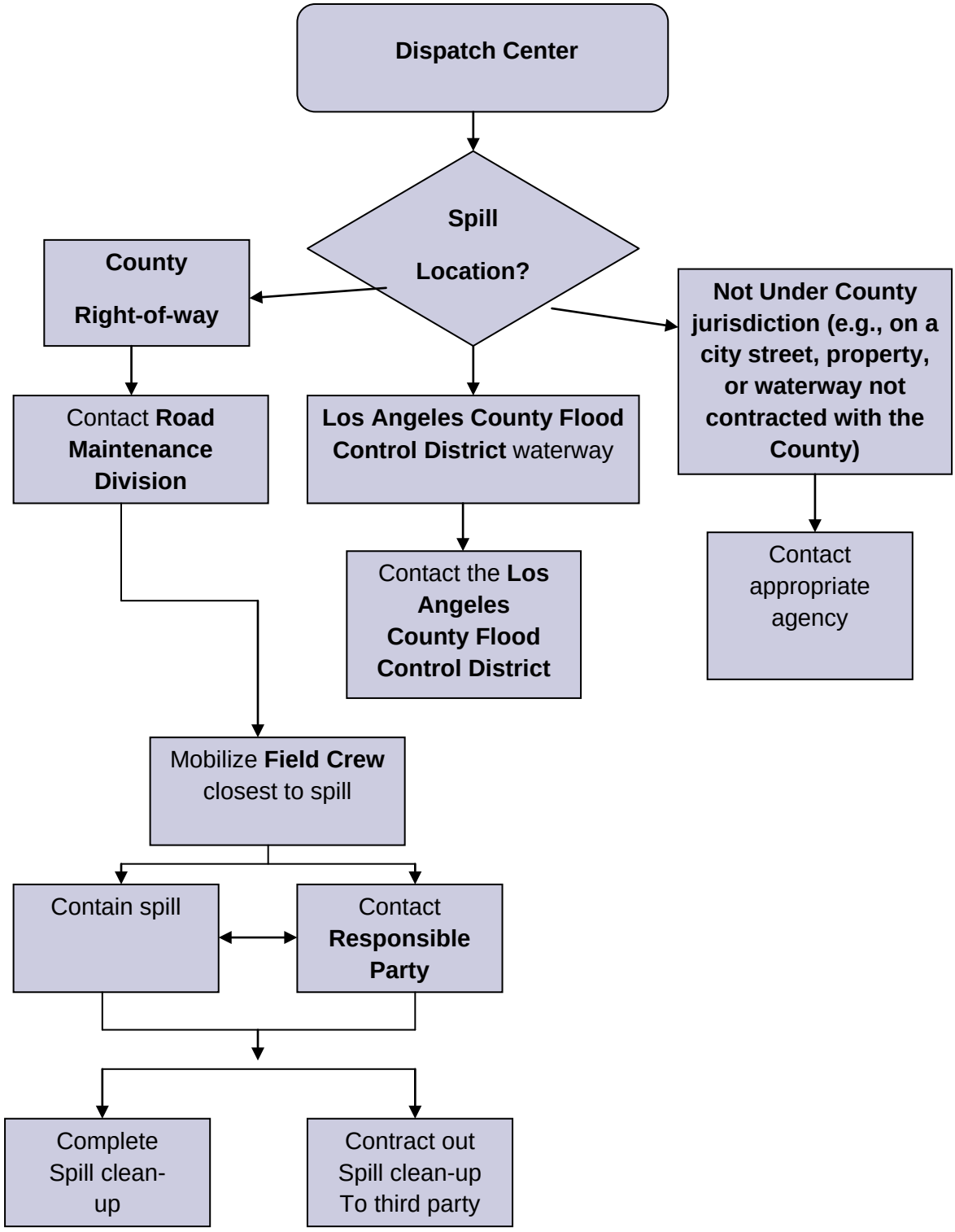



**Figure 16. General Flow of Communication and Responsibility for Plastic Pellet Spill Response**

## COMPREHENSIVE PLAN

To ensure containment of plastic pellets released within County jurisdiction, the County will implement the given Spill Response Plan and uphold the facility inspection, monitoring, and SWPPP enforcement protocols proposed in the PMRP.

For any spill or illicit discharge, Public Works' Environmental Programs Division will provide support by mobilizing personnel to investigate the details of the occurrence. Such investigations will include visual inspections, interviews, sampling, and documentation of findings (e.g., violations of industrial permits and/or city codes). If applicable, documented findings will be used by the County to trigger enforcement activities and/or facility inspections (detailed in the Industrial Facility Inspections Section).

The County has standby field and in-office staff available at all times for spill response, and will coordinate with spill response teams throughout all appropriate divisions, programs, and agencies so that maximum water quality protection is provided. Additionally, the County will respond to spills that occur on the boundaries of County jurisdiction and take steps to contain the spill. The County will then coordinate with the responsible party to make sure that all captured plastic pellets are disposed of properly at a landfill.

# Los Angeles County Flood Control District Santa Monica Bay Watershed Management Area Plastic Pellet Spill Response Plan

# Emergency Spills

Accidental spills during transfer and transportation contribute to plastic pellets entering storm drains and, ultimately, the Santa Monica Bay. Included below are protocols for a timely and appropriate response to possible plastic pellet spills to address containment of spilled plastic pellets in areas within or adjacent to LACFCD's right of way within the Santa Monica Bay WMA (see **Figure 1**), including the MS4 physical infrastructures that are under its authority.

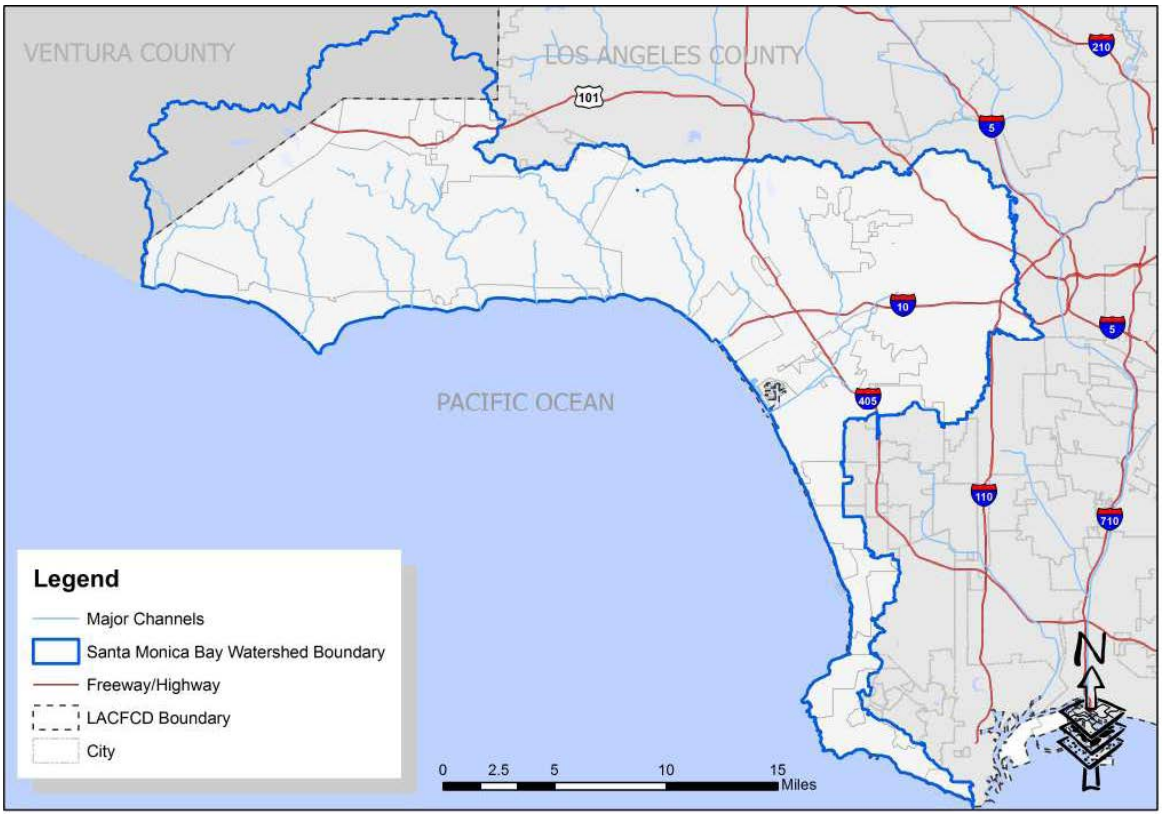



**Figure 1. Santa Monica Bay Watershed Management Area**

## SPILL RESPONSE PLAN

The general procedures for the spill response plan are outlined below:

1. Calls come in to the Dispatch Center (e.g., through 24-hour illegal dumping/discharge hotlines) from the general public or responding crew to report spills and other illegal dumping/discharge incidents. Calls or faxes regarding spills, discharges, or dumping information affecting the LACFCD can also come in from the California Office of Emergency Services.

The dispatcher will obtain as much information as possible about the location and facilities impacted (e.g., on street, in gutter, or entered waterway such as catch basin or storm drain).
If LACFCD waterways, catch basins, and storm drains are not impacted, the dispatcher would contact the other responsible entities for the first response and provide the reporting

party with the telephone number for the appropriate city and/or handling agency. The dispatcher will also transfer the reporting party to the correct agency.

If the incident occurred in an area within the LACFCD's jurisdiction, the dispatcher will contact the County of Los Angeles Department of Public Works' (Public Works) Flood Maintenance Division, and provide them the information.

The responding field crew may ask Dispatch Center to contact the local authorities to handle traffic control.

2. The Regional Board will be notified within 24 hours of the LACFCD's becoming aware of the spill.
    a. The LACFCD staff will call the Regional Board's front desk at (213) 576-6600.

        The person reporting the spill will notify the front desk staff that he/she is calling regarding the Santa Monica Bay Debris TMDL and ask to be transferred to the correct staff. If it is on a weekend, the LACFCD staff will leave a message including a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact information.

    b. The LACFCD staff will send a notification e-mail to the Regional Board at losangeles@waterboards.ca.gov

        The e-mail subject line will be "Santa Monica Bay Debris TMDL." The body of the e-mail will include a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact information.

3. The LACFCD will assist with spill response throughout the Santa Monica Bay WMA when LACFCD facilities are involved.

Under the Spill Response Plan, Public Works' FMD, will respond immediately by mobilizing the field crew closest to the spill to investigate and identify the source of the spill. If a responsible party is identified, the identified responsible party will be given an emergency permit to go into the LACFCD system to clean up the pellets. The LACFCD and/or the responsible party will either perform the spill cleanup or appoint a third-party response service to perform containment and cleanup. All plastic pellets captured will be securely contained and disposed of at a landfill.
The general flow of communication and responsibility that will occur during spill response is illustrated in Figure 2.

Public Works has stand-by field and in-office staff available at all times for a spill response and will coordinate with spill response teams throughout all appropriate divisions, programs, and agencies so that maximum water quality protection is provided. A list of relevant contact information is included as Attachment A.

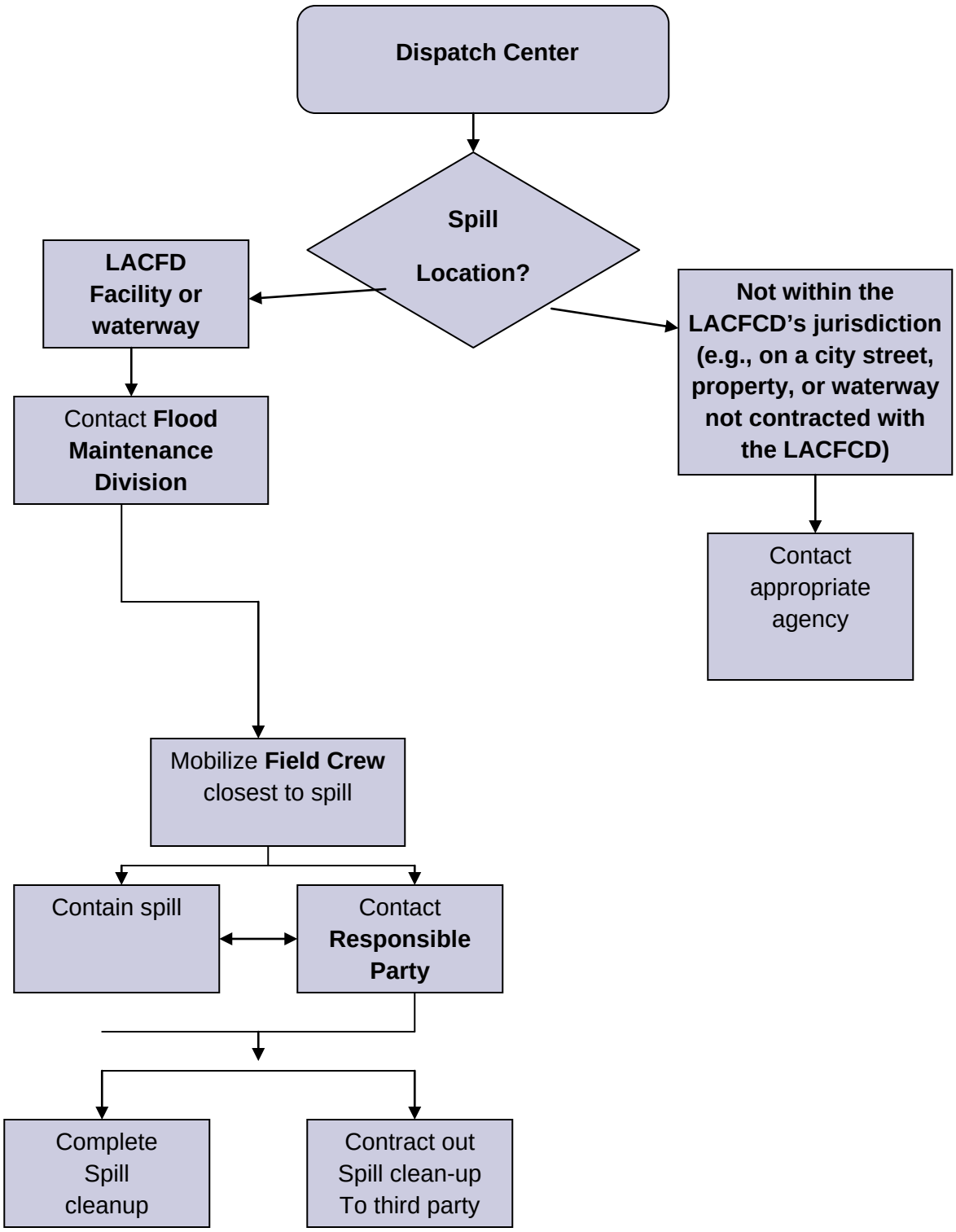



**Figure 2. General Flow of Communication and Responsibility for Plastic Pellet Spill Response**

# Attachment A – LACFCD Plastic Pellet TMDL Contact Sheet

## PLASTIC PELLET SPILLS AND ILLEGAL DUMPING/DISCHARGES

Public Works, Dispatch Center (24-hour hotline)
Phone: (626) 458-4357

Public Works, Dispatch Center (24-hour public hotline)
Call to report illegal dumping/discharges into the storm drain system anywhere in Los Angeles County
Phone: 1(888) 253-2652, or 1(888) CLEAN LA

Public Works, Flood Maintenance Division Headquarter
Phone: (626) 458-4146

## LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PMRP CONTACT

Bruce Hamamoto, Public Works, Watershed Management Division
Phone: (626) 458-5918 or (626) 458-4301
E-mail: BHAMAMO@dpw.lacounty.gov
Address: 900 South Fremont Avenue, Alhambra, CA 91803

# City of West Hollywood Plastic Pellet Spill Response Plan

## EMERGENCY SPILL RESPONSE PLAN

The general procedures for the spill response plan are outlined below:

1. Calls come in to City Hall (e.g., During regular working hours: Through the City's Department of Public Works mainline at (323)848-6375 or the 24-hour illegal dumping/discharge hotlines)(323)848-6404 and (323)848-6516, from the general public or responding crew to report spills and other illegal dumping/discharge incidents. Calls or faxes regarding spills, discharges, or dumping information affecting the City can also come in from the California Office of Emergency Services.

The receptionist taking the call will obtain as much information as possible about the location (e.g., on the street, in gutter, or entered waterway such as catch basin or storm drain) and take the following steps:

A. If the spill, discharge, or dumping is within City jurisdiction, the dispatcher will contact the West Hollywood Department of Public Works' (Public Works) Street Maintenance Division (SMD) and provide them the information.

B. If the spill, discharge, or dumping has entered an adjacent city's or county waterway, storm drain, or catch basin, the dispatcher will contact them and provide them the information.

Depending on the location of the spill and the type of material, and volume of materials spilled the appropriate department/agency should be notified. This may include:

- West Hollywood Street Maintenance, if the spill is in the public right-of-way
- Los Angeles County Flood Control District and or, Ecology Control, Inc.(City contractor), if the spill reaches the storm drain system
- Los Angeles County Sewer Maintenance, if the material is from the sewage system
- Los Angeles County Industrial Waste Inspection, if the material is from industrial facilities
- Los Angeles County Fire Department, if the material may be hazardous
- Contractors for hazardous materials, if the material is hazardous

These departments/agencies should determine the nature of the material and the extent of the spill. If any agency determines there is a chance that the spill involves hazardous materials, the Los Angeles County Fire Department will be notified.

Under the City's Spill Response Plan, the Public Works' Street Maintenance Supervisor will respond by mobilizing the field crew closest to the spill to investigate and identify the source of the spill. The City and/or the responsible party will either perform the spill cleanup or appoint a third-party emergency response service to perform the spill clean-up. The responding field crew will ask the Dispatch Center to contact the Los Angeles County Sheriff's Department to handle traffic control, if needed.

2. The Regional Water Quality Control Board will be notified within 24 hours of the City, other responsible agency, or jurisdiction becoming aware of the spill.

A. The City staff will call the Regional Water Quality Control Board's front desk at: (213) 576-6600.

The City staff handling the spill report will notify the Regional Board's front desk staff that he/she is calling regarding the Santa Monica Bay Debris TMDL and ask to be transferred to the correct staff. If it is on a weekend, the City staff will leave a message including: a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact information.

B. The City staff will send a notification e-mail to the Regional Water Quality Control Board at: losangeles@waterboards.ca.gov

The e-mail subject line will be **"Santa Monica Bay Debris TMDL"**. The body of the e-mail will include a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact information.

The general flow of communication and responsibility that will occur during spill response is illustrated in **Figure 2** on the next page. Additionally, a listing of relevant contact information is included on this page. In identifying the responsible party for the spill, the origin and destination of the plastic pellet shipment will be ascertained to determine if a new plastic pellet industry should be included in the program.

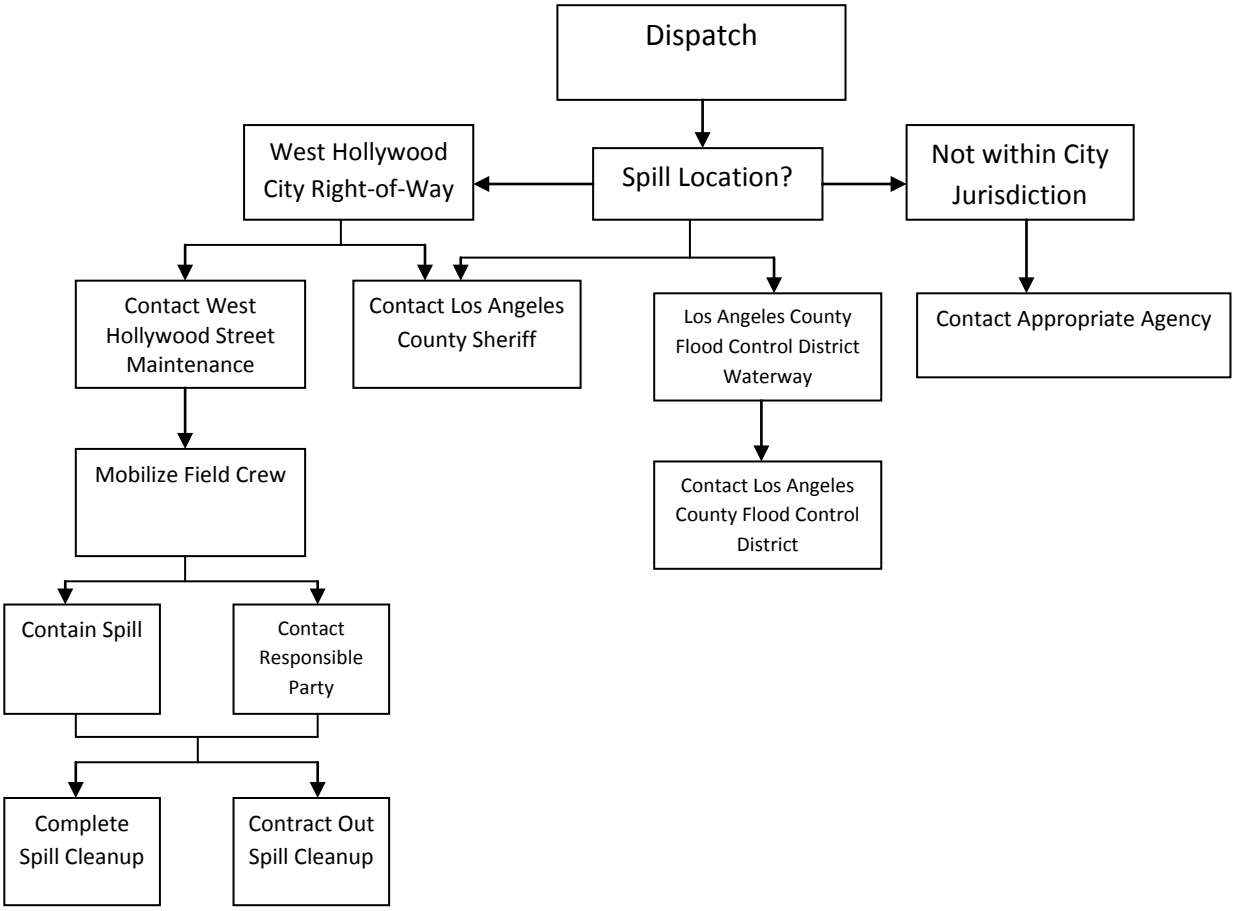



**Figure 2. West Hollywood Emergency Spill Flow Chart**

# West Hollywood Emergency Spill Response Contact Sheet

## EMERGENCY SPILLS AND ILLEGAL DUMPING/DISCHARGES

West Hollywood Department of Public Works (Public Works)
Regular City Hall Working Hours - (323) 848-6375
Dispatch Center (24-hour hotline) - (310) 854-5000

Public Works, Code Compliance (24-hour public hotline)
Call to report illegal dumping/discharges into the storm drain system anywhere in West Hollywood
Phone: (323) 848-6516

Los Angeles County Department of Public Works (Storm Drain, Sewer, Flood Control, Traffic Signals)
Phone: (626) 458-4357

Los Angeles County Fire Department – 911 or (310) 358-2380

Los Angeles County Sheriff's Department – 911 or (310) 855-8850

# Appendix 3

Calculations for Data Quality Assessment

This appendix documents the calculations used to assess precision, accuracy, and completeness of the data.

### Precision

Precision is a measure of the degree to which replicate measurements differ from one another. Precision assessed through calculation of field and laboratory duplicates, and matrix spike duplicates is expressed as the Relative Percent Difference (RPD).
RPD for laboratory and field duplicates is calculated as follows:

$$\text{RPD} = 100 \text{ x} \left( \frac{\left|\text{replicate 1 - replicate 2}\right|}{(\text{replicate 1} + \text{replicate 2}) \div 2} \right)$$

RPD for matrix spike duplicates is calculated as follows:

$$\text{RPD} = 100 \text{ x} \left( \frac{\left|\text{recovery 1 - recovery 2}\right|}{(\text{recovery 1} + \text{recovery 2}) \div 2} \right)$$

where *Recovery* is calculated as described for matrix spikes, below.

If assessed with three or more replicate measurements, precision should be expressed as Relative Standard Deviation (RSD). RSD is calculated as:

$$\text{RSD} = 100 \text{ x} \left( \frac{\text{standard deviation of replicated measurements}}{\text{average of replicate measurements}} \right)$$

### Accuracy

Accuracy is the degree to which a measured value agrees with a true or expected value for a parameter. Accuracy is typically assessed using standard reference materials, laboratory control samples, and matrix spikes. Recovery of laboratory control samples and standard reference materials is calculated as:

$$\%\ \text{Recovery} = 100 \text{ x} \left( \frac{\text{recovered concentration}}{\text{true spike concentration}} \right)$$

Recovery of matrix spikes is calculated as:

$$\%\ \text{Recovery} = 100 \text{ x} \left( \frac{\text{total recovered concentration - sample concentration}}{\text{true spike concentration}} \right)$$

When sample concentrations are less than the method detection limit, a value of "0" (zero) will be used as the sample result concentration for purposes of calculating spike recoveries.

### Completeness

Completeness may be defined as the number of valid measurements compared to the total number of measurements collected. Completeness is calculated as:

$$\%\,\text{Completeness} = 100\ \text{x}\left(\frac{\text{number of valid measurements}}{\text{total number of measurements}}\right)$$

# Appendix 4

Chapter 13 QA/QC Data Evaluation from Caltrans Guidance Manual: Stormwater Monitoring Protocols, 2nd Edition

# SECTION 13
*QA/QC DATA EVALUATION*

All data reported by the analytical laboratory must be carefully reviewed to determine whether the project's data quality acceptability limits or objectives (DQOs) have been met. This section describes a process for evaluation of all laboratory data, including the results of all QA/QC sample analysis.

Before any results are reported by the laboratory, the deliverable requirements should be clearly communicated to the laboratory, as described in the "Laboratory Data Package Deliverables" discussion in ***Section 12***.

The current section discusses QA/QC data evaluation in the following two parts:

**KEY TOPICS**

- ➢ **Initial Data Quality Screening**
- ➢ **Data Quality Evaluation**

The initial data quality screening identifies problems with laboratory reporting while they may still be corrected. When the data reports are received, they should be immediately checked for conformity to chain of custody requests to ensure that all requested analyses have been reported. The data are then evaluated for conformity to holding time requirements, conformity to reporting limit requests, analytical precision, analytical accuracy, and possible contamination during sampling and analysis. The data evaluation results in rejection, qualification, and narrative discussion of data points or the data as a whole. Qualification of data, other than rejection, does not necessary exclude use of the data for all applications. It is the decision of the data user, based on specifics of the data application, whether or not to include qualified data points.

## ➢ INITIAL DATA QUALITY SCREENING

The initial screening process identifies and corrects, when possible, inadvertent documentation or process errors introduced by the field crew or the laboratory. The initial data quality control screening should be applied using the following three-step process:

1. *Verification check between sampling and analysis plan (SAP), chain of custody forms, and laboratory data reports*: Chain of custody records should be compared with field logbooks and laboratory data reports to verify the accuracy of all sample identification and to ensure that all samples submitted for analysis have a value reported for each parameter requested. Any deviation from the SAP that has not yet

been documented in the field notes or project records should be recorded and corrected if possible.

Sample representativeness should also be assessed in this step. The minimum acceptable storm capture parameters (number of aliquots and percent storm capture) per amount of rainfall are specified in ***Section 10***. Samples not meeting these criteria are generally not analyzed; however, selected analyses can be run at the Caltrans task manager's discretion. If samples not meeting the minimum sample representativeness criteria are analyzed, the resulting data should be rejected ("R") or qualified as estimated ("J"), depending upon whether the analyses were approved by Caltrans. Grab samples should be taken according to the timing protocols specified in the SAP. Deviations from the protocols will result in the rejection of the data for these samples or qualification of the data as estimated. The decision to reject a sample based on sample representativeness should be made prior to the submission of the sample to the laboratory, to avoid unnecessary analytical costs.

2. *Check of laboratory data report completeness*: As discussed in ***Section 12***, the end product of the laboratory analysis is a data report that should include a number of QA/QC results along with the environmental results. QA/QC sample results reported by the lab should include both analyses requested by the field crew (field blanks, field duplicates, lab duplicates and MS/MSD analysis), as well as internal laboratory QA/QC results (method blanks and laboratory control samples).

There are often differences among laboratories in terms of style and format of reporting. Therefore, it is prudent to request in advance that the laboratory conform to the style and format approved by Caltrans as shown in ***Section 14***. The Caltrans data reviewer should verify that the laboratory data package includes the following items:

- ✓ A narrative which outlines any problems, corrections, anomalies, and conclusions.
- ✓ Sample identification numbers.
- ✓ Sample extraction and analysis dates.
- ✓ Reporting limits for all analyses reported.
- ✓ Results of method blanks.
- ✓ Results of matrix spike and matrix spike duplicate analyses, including calculation of percent recovered and relative percent differences.
- ✓ Results of laboratory control sample analyses.
- ✓ Results of external reference standard analyses.
- ✓ Surrogate spike and blank spike analysis results for organic constituents.

- ✓ A summary of acceptable QA/QC criteria (RPD, spike recovery) used by the laboratory.

Items missing from this list should be requested from the laboratory.

3. *Check for typographical errors and apparent incongruities*: The laboratory reports should be reviewed to identify results that are outside the range of normally observed values. Any type of suspect result or apparent typographical error should be verified with the laboratory. An example of a unique value would be if a dissolved iron concentration has been reported lower than 500 µg/L for every storm event monitored at one location and then a value of 2500 µg/L is reported in a later event. This reported concentration of 2500 µg/L should be verified with the laboratory for correctness.

   Besides apparent out-of-range values, the indicators of potential laboratory reporting problems include:

   - Significant lack of agreement between analytical results reported for laboratory duplicates or field duplicates.
   - Consistent reporting of dissolved metals results higher than total or total recoverable metals.
   - Unusual numbers of detected values reported for blank sample analyses.
   - Inconsistency in sample identification/labeling.

   If the laboratory confirms a problem with the reported concentration, the corrected or recalculated result should be issued in an amended report, or if necessary the sample should be re-analyzed. If laboratory results are changed or other corrections are made by the laboratory, an amended laboratory report should be issued to update the project records.

## ➢ DATA QUALITY EVALUATION

The data quality evaluation process is structured to provide systematic checks to ensure that the reported data accurately represent the concentrations of constituents actually present in stormwater. Data evaluation can often identify sources of contamination in the sampling and analytical processes, as well as detect deficiencies in the laboratory analyses or errors in data reporting. Data quality evaluation allows monitoring data to be used in the proper context with the appropriate level of confidence.

QA/QC parameters that should be reviewed are classified into the following categories:

- ✔ Reporting limits

- ✔ Holding times
- ✔ Contamination check results (method, field, trip, and equipment blanks)
- ✔ Precision analysis results (laboratory, field, and matrix spike duplicates)
- ✔ Accuracy analysis results (matrix spikes, surrogate spikes, laboratory control samples, and external reference standards)

Each of these QA/QC parameters should be compared to data quality acceptability criteria, inalso known as the project's data quality objectives (DQOs). The key steps that should be adhered to in the analysis of each of these QA/QC parameters are:

1. Compile a complete set of the QA/QC results for the parameter being analyzed.
2. Compare the laboratory QA/QC results to accepted criteria (DQOs).
3. Compile any out-of-range values and report them to the laboratory for verification.
4. Prepare a report that tabulates the success rate for each QA/QC parameter analyzed.

This process should be applied to each of the QA/QC parameters as discussed below.

**Reporting Limits**

Stormwater quality monitoring program DQOs should contain a list of acceptable reporting limits that the lab is contractually obligated to adhere to, except in special cases of insufficient sample volume or matrix interference problems. The reporting limits used should ensure a high probability of detection. , Table 12-1 provides recommended reporting limits for selected parameters.

**Holding Times**

Holding time represents the elapsed time between sample collection time and sample analysis time. Calculate the elapsed time between the sampling time and start of analysis, and compare this to the required holding time. For composite samples that are collected within 24-hours or less, the time of the final sample aliquot is considered the "sample collection time" for determining sample holding time. For analytes with critical holding times (≤48 hours), composite samples lasting longer than 24-hours require multiple bottle composite samples. Each of these composite samples should represent less than 24 hours of monitored flow, and subsamples from the composites should have been poured off and analyzed by the laboratory for those constituents with critical holding times (***see Section 12***). It is important to review sample holding times to ensure that analyses occurred within the time period that is generally accepted to maintain stable parameter concentrations. Table 12-1 contains the holding times for selected parameters. If holding times are exceeded, inaccurate concentrations or false negative results may be reported.

Samples that exceed their holding time prior to analysis are qualified as "estimated", or may be rejected depending on the circumstances.

## Contamination

Blank samples are used to identify the presence and potential source of sample contamination and are typically one of four types:

1. ***Method blanks*** are prepared and analyzed by the laboratory to identify laboratory contamination.
2. ***Field blanks*** are prepared by the field crew during sampling events and submitted to the laboratory to identify contamination occurring during the collection or the transport of environmental samples.
3. ***Equipment blanks*** are prepared by the field crew or laboratory prior to the monitoring season and used to identify contamination coming from sampling equipment (tubing, pumps, bailers, etc.).
4. ***Trip blanks*** are prepared by the laboratory, carried in the field, and then submitted to the laboratory to identify contamination in the transport and handling of volatile organics samples.
5. ***Filter blanks*** are prepared by field crew or lab technicians performing the sample filtration. Blank water is filtered in the same manner and at the same time as other environmental samples. Filter blanks are used to identify contamination from the filter or filtering process.

If no contamination is present, all blanks should be reported as "not detected" or "non-detect" (e.g., constituent concentrations should not be detected above the reporting limit). Blanks reporting detected concentrations ("hits") should be noted in the written QA/QC data summary prepared by the data reviewer. In the case that the laboratory reports hits on method blanks, a detailed review of raw laboratory data and procedures should be requested from the laboratory to identify any data reporting errors or contamination sources. When other types of blanks are reported above the reporting limit, a similar review should be requested along with a complete review of field procedures and sample handling. Often times it will also be necessary to refer to historical equipment blank results, corresponding method blank results, and field notes to identify contamination sources. This is a corrective and documentative step that should be done as soon as the hits are reported.

If the blank concentration exceeds the laboratory reporting limit, values reported for each associated environmental sample must be evaluated according to USEPA guidelines for data evaluations of organics and metals (USEPA, 1991; USEPA, 1995) as indicated in Table 13-1.

**Table 13-1. USEPA Guidelines for Data Evaluation**

| *Step* | *Environmental Sample* | *Phthalates and other common contaminants* | *Other Organics* | *Metals* |
|---|---|---|---|---|
| 1. | Sample > 10X blank concentration | No action | No action | No action |
| 2. | Sample < 10X blank concentration | Report associated environmental results as "non-detect" at the reported environmental concentration. | No action | Results considered an "upper limit" of the true concentration (note contamination in data quality evaluation narrative). |
| 3. | Sample < 5X blank concentration | Report associated environmental results as "non-detect" at the reported environmental concentration. | Report associated environmental results as "non-detect" at the reported environmental concentration. | Report associated environmental results as "non-detect" at the reported environmental concentration. |

Specifically, if the concentration in the environmental sample is less than five times the concentration in the associated blank, the environmental sample result is considered, for reporting purposes, "not-detected" *at the environmental sample result concentration* (phthalate and other common contaminant results are considered non-detect if the environmental sample result is less than ten times the blank concentration). The laboratory reports are not altered in any way. The qualifications resulting from the data evaluation are made to the evaluator's data set for reporting and analysis purposes to account for the apparent contamination problem. For example, if dissolved copper is reported by the laboratory at 4 µg/L and an associated blank concentration for dissolved copper is reported at 1 µg/L, data qualification would be necessary. In the data reporting field of the database (see ***Section 14***), the dissolved copper result would be reported as 4 µg/L***)***, the numerical qualifier would be reported as "<", the reporting limit would be left as reported by the laboratory, and the value qualifier would be reported as "U" ("not detected above the reported environmental concentration").

When reported environmental concentrations are greater than five times (ten times for phthalates) the reported blank "hit" concentration, the environmental result is reported unqualified at the laboratory-reported concentration. For example, if dissolved copper is reported at 11 µg/L and an associated blank concentration for dissolved copper is reported at 1 µg/L, the dissolved copper result would still be reported as 11 µg/L.

## Precision

Duplicate samples provide a measure of the data precision (reproducibility) attributable to sampling and analytical procedures. Precision can be calculated as the relative percent difference (RPD) in the following manner:

$$RPD_i = \frac{2 * |O_i - D_i|}{(O_i + D_i)} * 100\%$$

where:

$RPD_i$ = Relative percent difference for compound i

$O_i$ = Value of compound i in original sample

$D_i$ = Value of compound i in duplicate sample

The resultant RPDs should be compared to the criteria specified in the project's DQOs. The DQO criteria shown in Table 13-2 below are based on the analytical method specifications and laboratory-supplied values. Project-specific DQOs should be developed with consideration to the analytical laboratory, the analytical method specifications, and the project objective. Table 13-2 should be used as a reference point as the least stringent set of DQO criteria for Caltrans monitoring projects.

Laboratory and Field Duplicates

Laboratory duplicates are samples that are split by the laboratory. Each half of the split sample is then analyzed and reported by the laboratory. A pair of field duplicates is two samples taken at the same time, in the same manner into two unique containers. Subsampling duplicates are two unique, ostensibly identical, samples taken from one composite bottle (see ***Section 10***). Laboratory duplicate results provide information regarding the variability inherent in the analytical process, and the reproducibility of analytical results. Field duplicate analysis measures both field and laboratory precision, therefore, it is expected that field duplicate results would exhibit greater variability than lab duplicate results. Subsampling duplicates are used as a substitute for field duplicates in some situations and are also an indicator of the variability introduced by the splitting process.

The RPDs resulting from analysis of both laboratory and field duplicates should be reviewed during data evaluation. Deviations from the specified limits, and the effect on reported data, should be noted and commented upon by the data reviewer. Laboratories typically have their own set of maximum allowable RPDs for laboratory duplicates based on their analytical history. In most cases these values are more stringent than those listed in Table 13-2. Note that the laboratory will only apply these maximum allowable RPDs to laboratory duplicates. In most cases field duplicates are submitted "blind" (with pseudonyms) to the laboratory.

Environmental samples associated with laboratory duplicate results greater than the maximum allowable RPD (when the numerical difference is greater than the reporting limit) are qualified as "J" (estimated). When the numerical difference is less than the RL, no qualification is necessary. Field duplicate RPDs are compared against the maximum allowable RPDs used for laboratory duplicates to identify any pattern of problems with reproducibility of results. Any significant pattern of RPD exceedances for field duplicates should be noted in the data report narrative.

Corrective action should be taken to address field or laboratory procedures that are introducing the imprecision of results. The data reviewer can apply "J" (estimated) qualifiers to any data points if there is clear evidence of a field or laboratory bias issue that is not related to contamination. (Qualification based on contamination is assessed with blank samples.)

Laboratories should provide justification for any laboratory duplicate samples with RPDs greater than the maximum allowable value. In some cases, the laboratory will track and document such exceedances, however; in most cases it is the job of the data reviewer to locate these out-of-range RPDs. When asked to justify excessive RPD values for field duplicates, laboratories most often will cite sample splitting problems in the field. Irregularities should be included in the data reviewer's summary, and the laboratory's response should be retained to document laboratory performance, and to track potential chronic problems with laboratory analysis and reporting.

**Accuracy**

Accuracy is defined as the degree of agreement of a measurement to an accepted reference or true value. Accuracy is measured as the percent recovery (%R) of spike compound(s). Percent recovery of spikes is calculated in the following manner:

$$\%R = 100\% * [(C_s - C) / S]$$

where:

- %R = percent recovery
- $C_s$ = spiked sample concentration
- C = sample concentration for spiked matrices
- S = concentration equivalent of spike added

Accuracy (%R) criteria for spike recoveries should be compared with the limits specified in the project DQOs. A list of typical acceptable recoveries is shown in Table 13-2. As in the case of maximum allowable RPDs, laboratories develop acceptable criteria for an allowable range of recovery percentages that may differ from the values listed in Table 13-2.

Percent recoveries should be reviewed during data evaluation, and deviations from the specified limits should be noted in the data reviewer's summary. Justification for out of range recoveries should be provided by the laboratory along with the laboratory reports, or in response to the data reviewer's summary.

Laboratory Matrix Spike and Matrix Spike Duplicate Samples

Evaluation of analytical accuracy and precision in environmental sample matrices is obtained through the analysis of laboratory matrix spike (MS) and matrix spike duplicate (MSD) samples. A matrix spike is an environmental sample that is spiked with a known amount of the constituent being analyzed. A percent recovery can be calculated from the results of the spike analysis. A MSD is a duplicate of this analysis that is performed as a check on matrix recovery precision. MS and MSD results are used together to calculate RPD as with the duplicate samples. When MS/MSD results (%R and RPD) are outside the project specifications, as listed in Table 13-2, the associated environmental samples are qualified as "estimates due to matrix interference". Surrogate standards are added to all environmental and QC samples tested by gas chromatography (GC) or gas chromatography-mass spectroscopy (GC-MS). Surrogates are non-target compounds that are analytically similar to the analytes of interest. The surrogate compounds are spiked into the sample prior to the extraction or analysis. Surrogate recoveries are evaluated with respect to the laboratory acceptance criteria to provide information on the extraction efficiency of every sample.

External Reference Standards

External reference standards (ERS) are artificial certified standards prepared by an external agency and added to a batch of samples. ERS's are not required for every batch of samples, and are often only run quarterly by laboratories. Some laboratories use ERS's in place of laboratory control spikes with every batch of samples. ERS results are assessed the same as laboratory control spikes for qualification purposes (see below). The external reference standards are evaluated in terms of accuracy, expressed as the percent recovery (comparison of the laboratory results with the certified concentrations). The laboratory should report all out-of-range values along with the environmental sample results. ERS values are qualified as biased high" when the ERS recovery exceeds the acceptable recovery range and "biased low" when the ERS recovery is smaller than the recovery range.

Laboratory Control Samples

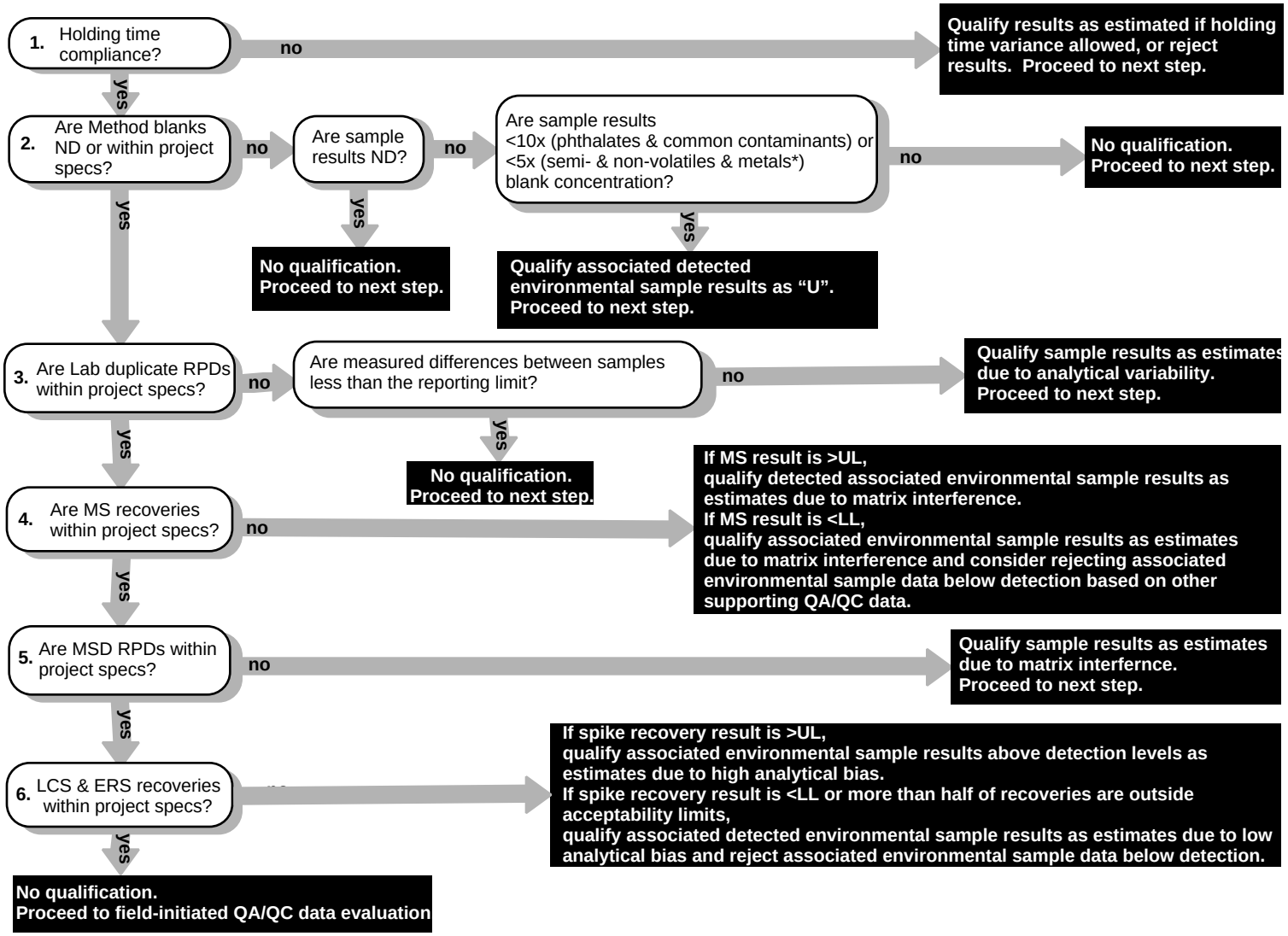
LCS analysis is another batch check of recovery of a known standard solution that is used to assess the accuracy of the entire recovery process. LCSs are much like ERS's except that a certified standard is not necessarily used with LCSs, and the sample is prepared internally by the laboratory so the cost associated with preparing a LCS sample is much lower than the cost of ERS preparation. LCSs are reviewed for percent recovery within

control limits provided by the laboratory. LCS out-of-range values are treated in the same manner as ERS out-of-range values. Because LCS and ERS analysis both check the entire recovery process, any irregularity in these results supersedes other accuracy-related qualification. Data are rejected due to low LCS recoveries when the associated environmental result is below the reporting limit.

A flow chart of the data evaluation process, presented on the following pages as Figures 13-1 (lab-initiated QA/QC samples) and 13-2 (field-initiated QA/QC), can be used as a general guideline for data evaluation. Boxes shaded black in Figures 13-1 and 13-2 designate final results of the QA/QC evaluation.

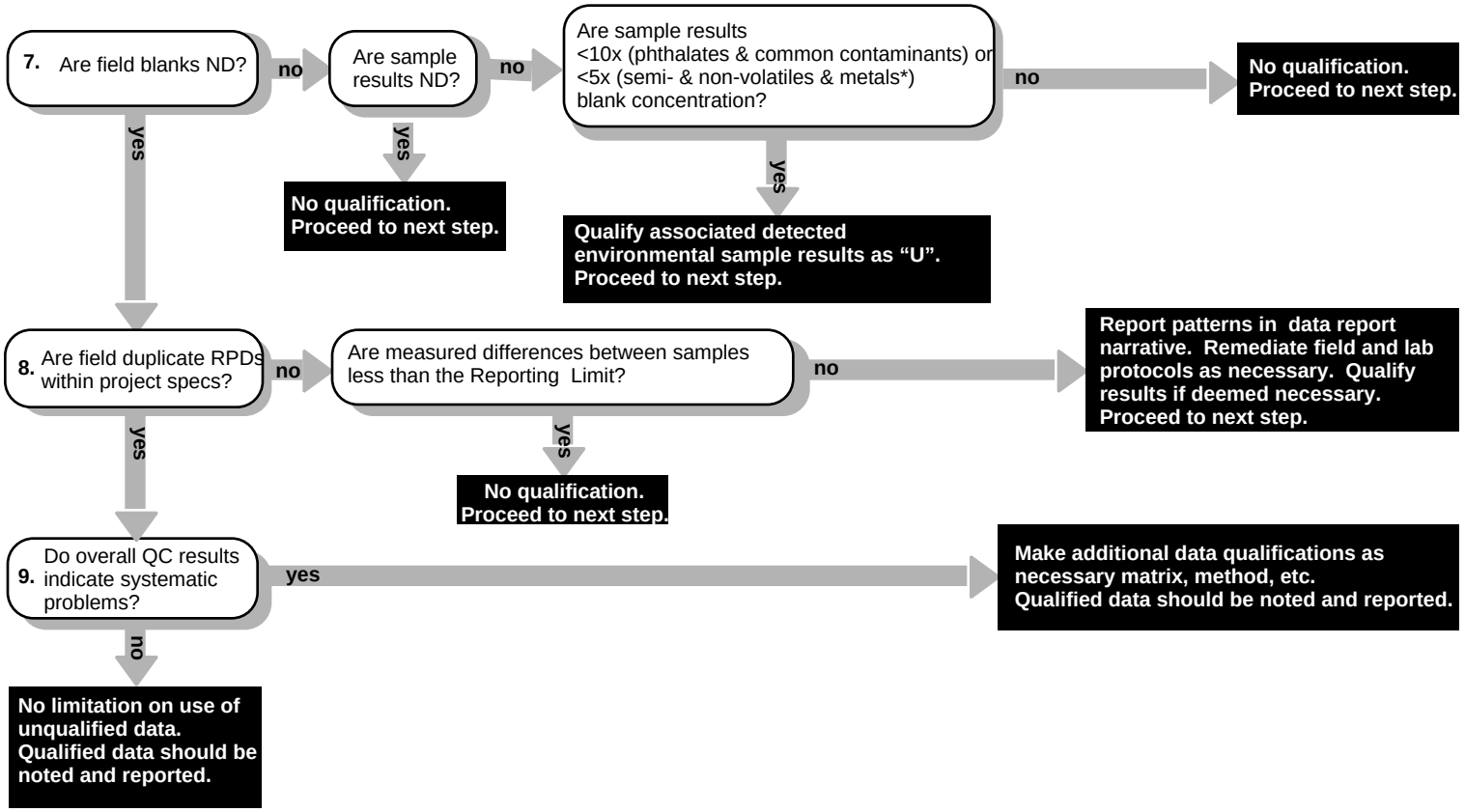
## Table 13-2. Typical Control Limits for Precision and Accuracy for Analytical Constituents

| *Analyte* | *EPA Method Number or Standard Method* | *Maximum Allowable RPD* | *Recovery Upper Limit* | *Recovery Lower Limit* |
|---|---|---|---|---|
| **Conventionals** | | | | |
| BOD | 405.1; SM 5210B | 20% | 80% | 120% |
| COD | 410.1; 410.4; SM 5220C; SM 5220D | 20% | 80% | 120% |
| Hardness | 130.2; 130.1; SM 2340B | 20% | 80% | 120% |
| pH | 150.1 | 20% | NA | NA |
| TOC/DOC | 415.1 | 15% | 85% | 115% |
| TDS | 160.1 | 20% | 80% | 120% |
| TSS | 160.2 | 20% | 80% | 120% |
| Turbidity | 180.1 | 20% | NA | NA |
| **Nutrients** | | | | |
| NH3-N | 350.2; 350.3 | 20% | 80% | 120% |
| NO3-N | 300.0 | 20% | 80% | 120% |
| NO2-N | 300.0 | 20% | 80% | 120% |
| NO3/NO2-N | 353.2 | 20% | 80% | 120% |
| P | 365.2 | 20% | 80% | 120% |
| Ortho-P | 365.2; 365.3 | 20% | 80% | 120% |
| TKN | 351.3 | 20% | 80% | 120% |
| **Metals** | | | | |
| Ag | 272.2; 200.8 | 20% | 75% | 125% |
| Al | 200.9; 200.8 | 20% | 75% | 125% |
| Cd | 213.2; 200.8 | 20% | 75% | 125% |
| Cr | 218.2; 200.8 | 20% | 75% | 125% |
| Cu | 220.2; 200.8 | 20% | 75% | 125% |
| Ni | 249.2; 200.8 | 20% | 75% | 125% |
| Pb | 239.2; 200.8 | 20% | 75% | 125% |
| Zn | 289.2; 200.8 | 20% | 75% | 125% |
| As | 206.3; 200.8 | 20% | 75% | 125% |
| Fe | 200.9; SM 3500-Fe B | 20% | 75% | 125% |
| Se | 200.9; 270.3; 200.8 | 20% | 75% | 125% |
| Hg | 1631 | 21% | 79% | 121% |
| **Total Petroleum Hydrocarbons** | | | | |
| TPH (gasoline) | 8015b | 21% | 45% | 129% |
| TPH (diesel) | | 21% | 45% | 129% |
| TPH (motor oil) | | 21% | 45% | 129% |
| Oil & Grease | 1664 | 18% | 79% | 114% |
| **Pesticides and Herbicides** | | | | |
| Glyphosate | 547 | 30% | 70% | 130% |
| OP Pesticides (esp. diazinon and chlorpyrifos) | 8141; ELISA | 25% | see method for constituent specific | |
| OC Pesticides | 8081 | 25% | | |
| Chlorinated Herbicides | 8150; 8151 | 25% | | |
| Carbamate Pesticides | 8321 | 25% | | |
| **Miscellaneous Organic Constituents** | | | | |
| Base/Neutrals and Acids | 625; 8270 | 30% to 50% (analyte dependent) | see method for constituent specific | |
| PAHs | 8310 | | | |
| Purgeables | 624; 8260 | 20% | | |
| Purgeable Halocarbons | 601 | 30% | see method, Table 2 | |
| Purgeable Aromatics | 602 | 20% | see method for constituent specific | |
| **Miscellaneous Constituents** | | | | |
| Cyanide | 335.2 | 20% | 75 | 125 |
| **Bacteriological** | | | | |
| Fecal Coliform | SM 9221E | - | - | - |
| Total Coliform | SM 9221B | - | - | - |




*Environmental results between 5x and 10x the blank concentration are qualified as "an upper limit on the true concentration" and the data user should be cautioned.

**Figure 13-1. Technical Data Evaluation for Lab-Initiated QA/QC Samples**




*Environmental results between 5x and 10x the blank concentration are qualified as "an upper limit on the true concentration" and the data user should be cautioned.

**Figure 13-2. Technical Data Evaluation for Field-Initiated QA/QC Samples**