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July 30, 2015

VIA Regional Website

Regional Water Quality Control Board
Los Angeles Region
Attention: Ivar K. Ridgeway, Senior Environmental Scientist
320 West 4th Street, Suite 200
Los Angeles, CA 90013

Dear Mr. Ridgeway,

The East San Gabriel Valley Watershed Management Group (ESGVWMG) comprises the Cities of Claremont, La Verne, Pomona, and San Dimas. Pursuant to the Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit (NPDES Permit No. CAS004001; Order No. R4-2012-0175), ESGVWMG hereby submits the revised final Coordinated Integrated Monitoring Program (CIMP).

The CIMP has been updated to reflect a correction to Table 4-6 (pg.42) of the revised CIMP. Table 4-6 has been revised to reflect the removal of E. coli monitoring at the Upper Chino Creek HUC-12 monitoring site. As noted in the Regional Board CIMP approval letter dated June 25, 2015, the Upper Chino Creek HUC-12 site is located within the Middle Santa Ana River watershed. As such, E. coli monitoring is being conducted through the implementation of the Bacterial Indicator TMDL for the Middle Santa Ana River. The Upper Chino Creek site will be monitored for the following constituents:

- Dissolved Oxygen
- pH
- Temperature
- Specific Conductivity
- Hardness
- Total Suspended Solids
- Copper
- Lead
- Zinc

The ESGVWMG looks forward to working with Regional Board staff during the CIMP and WMP implementation and adaptive management process. If there are any questions, please contact the respective City Staff as listed below:

- Loretta Mustafa – City of Claremont, (909) 399-5474
- Lisa O'Brien – City of La Verne, (909) 596-8741
- Julie Carver – City of Pomona, (909) 620-3628
- Latoya Cyrus – City of San Dimas, (909) 394-6240

Sincerely,

Loretta Mustafa
City Engineer

Cc: Lisa O'Brien, City of La Verne
Julie Carver, City of Pomona
Latoya Cyrus, City of San Dimas

Attachment: Revised Final ESGVWMG Coordinated Integrated Monitoring Program (CIMP)

July 2015

LOS ANGELES REGIONAL WATER QUALITY CONTROL BOARD

Coordinated Integrated Monitoring Program (CIMP)

Prepared by

East San Gabriel Valley Watershed Management Group

(Cities of Claremont, La Verne, Pomona, and San Dimas)

MWH

Executive Summary

The East San Gabriel Valley Watershed Management Group (ESGV Group) is comprised of the Cities of Claremont, La Verne, Pomona, and San Dimas (Group Members). Group Members started meeting in early 2013 to collaboratively develop a Watershed Management Program (WMP) and Coordinated Integrated Monitoring Program (CIMP) for the East San Gabriel Valley Watershed.

The WMP and CIMP fulfill requirements of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Order No. R4-2012-0175 (Permit). The Permit was adopted by the Los Angeles Regional Water Quality Control Board (Regional Board) November 8, 2012, and became effective December 28, 2012. The CIMP is the Group Members approach to meeting the Monitoring and Reporting Program (MRP) requirements of the Permit.

The CIMP is designed to provide the information necessary to guide management decisions in addition to providing a means to measure compliance with the Permit. The CIMP is composed of five elements:

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

Semi-annual analytical data reports and annual monitoring reports will be submitted as outlined in the MRP. The annual monitoring reports will cover the monitoring period of July 1 through June 30.

The WMP, containing customized strategies, control measures, and best management practices (BMPs) for the ESGV Group will be presented in a separate document according to the Permit schedule.

RECEIVING WATER MONITORING

Receiving water monitoring is designed to assess whether water quality objectives are being met in water bodies and if beneficial uses are being supported. The Group Members propose two types of receiving water monitoring:

- **Long-Term Assessment** – Long-Term Assessment (LTA) monitoring is intended to determine if receiving water limitations (RWLs) are achieved, assess trends in pollutant concentrations over time, and to determine whether designated uses are supported. LTA sites include:

- Live Oak Wash at the confluence of Puddingstone Channel, Marshall Creek, and Live Oak Wash.

- **TMDL** – TMDL monitoring is conducted to evaluate attainment of or progress in attaining the WLAs. TMDL sites include:
  - San Jose Creek Reach 1 at the downstream intersection with the WMP Boundary.
  - San Dimas Wash at the intersection with the WMP Boundary.
  - Walnut Creek Wash at the intersection with the WMP Boundary (optional site, triggered by ESGV Group if determining WMP area contribution is necessary.)

In addition, the Group Members will be coordinating receiving water monitoring with other watershed management program groups in the San Gabriel River Watershed and the Los Angeles County Sanitation Districts to share monitoring data in the San Gabriel River Watershed Management Area. The Group Members may use the data in evaluating its progress in meeting the goals and requirements of the Permit.

STORMWATER OUTFALL MONITORING

Stormwater outfall monitoring is intended for determining if a Group Member's MS4 system is causing or contributing to water quality issues observed in the receiving water. The Group Members proposes three stormwater outfall monitoring sites, one for each subwatersheds defined by the hydrologic unit code-12 (HUC-12s) for the ESGV Group. The monitoring sites were selected to be representative of the land uses for each HUC-12. Monitoring will be conducted during three events at each stormwater outfall monitoring site for the monitoring requirements of the waterbody to which they discharge, as well as downstream water bodies. Monitoring at these outfall sites will be used to assess compliance with water quality based effluent limitations (WQBELs), TMDL WLAs, and whether the MS4 may be causing or contributing to observed exceedances of RWLs. Monitoring of Puddingstone Reservoir will be conducted by the County of Los Angeles (County) under a separate program.

NON-STORMWATER OUTFALL SCREENING AND MONITORING

The non-stormwater outfall screening and monitoring program is focused on dry weather discharges from major outfalls to receiving waters. The program serves to provide an assessment on whether non-stormwater discharges are potentially impacting the receiving water and whether significant non-stormwater discharges are allowable. The screening process will begin summer 2014. Visual observations gathered from the screening events, such as size, estimated flow, flow characteristics, and receiving water conditions, will be used to determine and prioritize significant non-stormwater discharges. In the order of prioritization, sources will be investigated, and monitoring sites will be determined. Monitored parameters will depend upon the receiving water on which the non-stormwater outfall site it is located.

NEW DEVELOPMENT/RE-DEVELOPMENT EFFECTIVENESS TRACKING

Group Members maintain databases tracking information related to new and redevelopment projects subject to the minimum control measures (MCMs). The collected information will be used to assess the effectiveness of the low impact development (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. The CIMP provides general details on the requirements and approaches related to the new and redevelopment tracking requirements. Group Members will each modify the general requirements as appropriate to reflect their own jurisdictional specific practices.

REGIONAL STUDIES

Only one regional study is identified in the MRP: Southern California Stormwater Monitoring Coalition (SMC). The MRP states that each Group Members shall be responsible for supporting the monitoring described at the sites falling within their jurisdictional boundaries. The Los Angeles County Flood Control District (LACFCD) will continue its participation in the SMC regional bioassessment monitoring program providing the Permit required funding on behalf of the Group Members.

ADAPTIVE MANAGEMENT

Historically, monitoring was not performed in the WMP area receiving waters prior to the implementation of the CIMP. Therefore, the monitoring specified in the CIMP will be dynamic. Defined triggers are included in the CIMP for adding constituents to the monitoring program or removing them if they no longer pose water quality issues. The adaptive management process will be utilized on an annual basis to evaluate this CIMP and update the monitoring requirements as necessary. Monitoring data from the CIMP will tie into the WMP by providing feedback on water quality changes resulting from control measures implemented by the Group Members.

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LIST OF ACRONYMS AND ABBREVIATIONS

BMP	Best Management Practice
BPA	Basin Plan Amendment
CCW	Calleguas Creek Watershed
CEDEN	California Environmental Data Exchange Network
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CIMP	Coordinated Integrated Monitoring Program
COC	Chain of Custody
COV	Coefficient of Variance
CRAM	California Rapid Assessment Method
CTR	California Toxics Rule
CWA	Clean Water Act
CWH	Council for Watershed Health
DAP	Discharge Assessment Plan
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
EIA	Effective Impervious Area
ESGV Group	East San Gabriel Valley Watershed Management Group
GIS	Geographic Information System
GWQC	General Water Quality Constituents
HRMS	High Resolution Mass Spectrometry
HUC	Hydrologic Unit Code
IC/ID	Illicit Connection/Illicit Discharge
IMP	Integrated Monitoring Program
IWC	In-Stream Waste Concentration
LA	Los Angeles
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District
LACSD	Los Angeles County Sanitation Districts
LCS	Laboratory Control Sample/Standard
LSGR	Lower San Gabriel River
LTA	Long-Term Assessment
MAL	Municipal Action Level
MDL	Minimum Detection Limit
mg/L	Milligram per Liter
µg/L	Microgram per Liter

MRP	Monitoring and Reporting Program
MS4	Municipal Separate Storm Sewer System
NAL	Non-stormwater Action Levels
NELAP	National Environmental Laboratory Accreditation Program
NPDES	National Pollutant Discharge Elimination System
NSW	Non-Stormwater
NTU	Nephelometric Turbidity Unit
OC	Organochlorine
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAA	Reasonable Assurance Analysis
Regional Board	Los Angeles Regional Water Quality Control Board
RPD	Relative Percent Difference
RW	Receiving Water
RWL	Receiving Water Limitation
SCCWRP	Southern California Coastal Water Research Project
SGRRMP	San Gabriel River Regional Monitoring Program
SMC	Stormwater Monitoring Coalition
SQO	Sediment Quality Objectives
SSA	Special Study Assessment
SSC	Suspended Sediment Concentration
SW	Stormwater
SWAMP	Surface Water Ambient Monitoring Program
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TSS	Total Suspended Solids
TST	Test of Significant Toxicity
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile Organic Compound
WBPC	Water Body-Pollutant Combination
WLA	Waste Load Allocation
WMA	Watershed Management Area

WMP	Watershed Management Program
WQBEL	Water Quality Based Effluent Limitation
WQS	Water Quality Standard

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 the County of 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, 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 (RWL) 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.

Group Members have the option to develop a Coordinated Integrated Monitoring Program (CIMP) to specify alternative approaches for meeting the primary objectives of the MRP. Additionally, the CIMP is the vehicle to modify TMDL monitoring requirements and other historical monitoring program requirements, to unify efforts on a watershed scale, and provide consistent and comparable water quality observations throughout the watershed. Modifications to the MRP or TMDL monitoring requirements must satisfy the primary objectives and require sufficient justification to allow the changes. The Regional Board Executive Officer (EO) will provide final approval of the CIMP. 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 CIMP meets the requirements of the MS4 Permit, including TMDL monitoring requirements.

1.1 EAST SAN GABRIEL VALLEY WATERSHED MANAGEMENT PLAN AREA

The San Gabriel River receives drainage from a 682-square mile area of eastern Los Angeles County and has a main channel length of approximately 58 miles. Its headwaters originate in the San Gabriel Mountains with the East, West, and North Forks. The river flows through residential, commercial and industrial areas before reaching the Pacific Ocean in Long Beach. The main tributaries of the river are Walnut Creek Wash, San Jose Creek, and Coyote Creek.

The WMP area is located in the upper east portion of the San Gabriel River Valley. Water bodies within the WMP area include:

- San Dimas Wash;
- Puddingstone Channel;
- Marshall Creek;
- Live Oak Wash;
- Thompson Wash;
- San Jose Creek;
- Chino Creek;
- San Antonio Creek;
- Walnut Creek Wash; and
- Puddingstone Reservoir.

Receiving waters downstream of the WMP area include:

- Santa Ana River;
- Big Dalton Wash;
- San Gabriel River Reach 1, 2, and 3; and
- San Gabriel Estuary.

The geology of the San Gabriel River Valley provides rapid infiltration of water. During dry weather, the upper watershed is likely to be hydraulically disconnected from the lower watershed. A goal of the monitoring in the CIMP will be to establish when the WMP area is hydraulically connected to the downstream water bodies. If there is no flow to the downstream areas, the discharges in the WMP area cannot possibly be causing or contributing to the downstream water quality impairments. Water quality data for the receiving waters in the WMP area are sparse. Future monitoring results will allow the evaluation of whether MS4 discharges are causing or contributing to water quality objective exceedances in receiving waters in the WMP area.

The ESGV Group WMP area is displayed on **Figure 1-1** along with the named water bodies. Size and land uses for the Group Members are listed in **Table 1-1**. Because a portion of the Angeles National Forest and other open spaces overlap the Group Member jurisdictions, not all areas in each jurisdiction are serviced by the MS4 system. For purposes of the CIMP, the areas of or similar to the national forest are excluded from consideration. The areas serviced by the MS4 system for the Group Members and the land use break downs are presented as **Table 1-2**.

The Cities of Claremont and Pomona are addressing the monitoring requirements established in the Middle Santa Ana River Watershed Bacteria Indicator TMDL (Bacteria TMDL) under a separate program, as they are the only members of the group subject to those requirements. Links to the Santa Ana River Bacteria TMDL Comprehensive Bacteria Reduction Plans for the cities of Claremont and Pomona are included as **Attachment A**.

Figure 1-1.
Water Bodies and Geographic Boundary of the ESGV Group

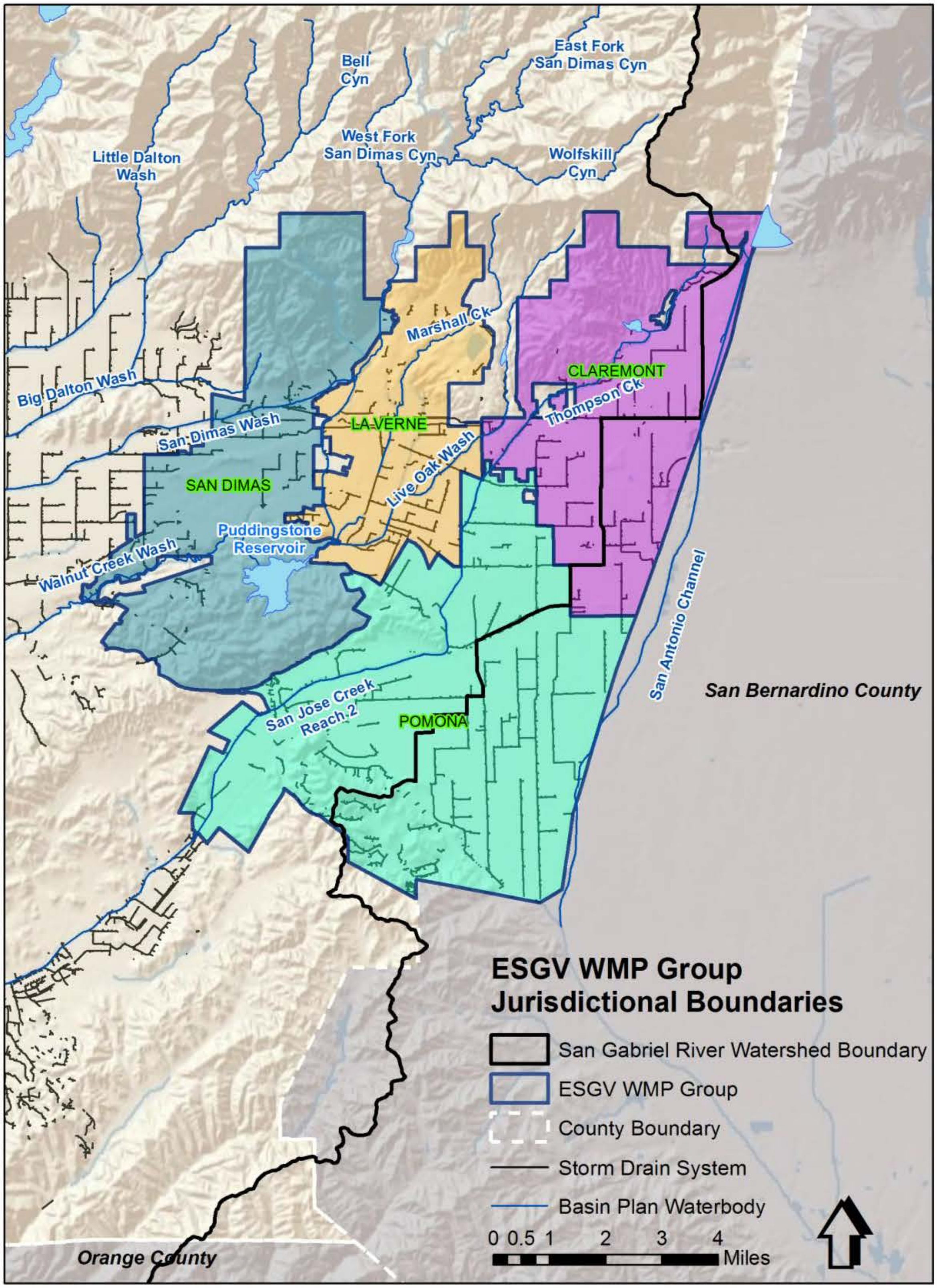


Table 1-1.
List of Group Members with Land Use Summaries within Jurisdictional Boundaries

Group Members	Area (square miles)	Percent of Land Area(1)			
		Res	Com/Ind	Ag/Nur	Open
Claremont	13.0	40	15	<1	45
La Verne	6.3	65	25	2	8
Pomona	21.9	51	34	2	13
San Dimas	14.3	32	9	1	58
All Cities	55.5	45	22	1	32

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 WMP and not just the area covered by the MS4 system.

Table 1-2.
List of Group Members with Land Use Summaries Draining to the MS4 System

Group Members	Area (square miles)	Percent of Land Area(1)			
		Res	Com/Ind	Ag/Nur	Open
Claremont	8	69	25	1	6
La Verne	6	72	20	3	6
Pomona	18	61	32	3	4
San Dimas	7	69	21	3	8
All Cities	38	65	27	2	6

1 Land use classifications include: residential (Res), commercial and industrial (Com/Ind), agriculture and nursery (ag/nur), and open space (open). Totals correspond to area covered by the MS4 system.

1.2 WATER QUALITY PRIORITIES

As part of the WMP development, the available data were analyzed to determine water quality priorities for the watershed. Water quality priorities are based on TMDLs, State Water Resources Control Board (SWRCB) 2010 303(d) List of Impaired Water Bodies (303(d) List), and monitoring data. Based on available information and data analysis, water body-pollutant combinations (WBPCs) were classified in one of the three Permit-defined categories, as described in **Table 1-3**.

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.

Table 1-3.
Water Body Pollutant Combination Categories

Category	Water Body-Pollutant Combinations (WBPCs) Included
1	WBPCs for which TMDL effluent or receiving water limitations are established in Part VI.E and Attachments P of the MS4 Permit.
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.
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.

1.2.1 Category 1 Constituents

Three TMDLs are applicable to the ESGV Group and include the Dominguez channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (Harbor Toxics TMDL), the San Gabriel River Metals TMDL (Metals TMDL), and the Los Angeles Area Lakes TMDLs for Puddingstone Reservoir (Puddingstone Reservoir TMDLs). The applicable TMDLs are also listed in **Table 1-4.**

Because the San Gabriel River Metals and the Puddingstone Reservoir TMDLs have both wet and dry weather WLAs allocations applied as grouped allocations, the combined loading from all upstream tributaries must meet the allocations at the listed reaches. Monitoring will be necessary to identify the contribution to the loads from the WMP area. The Regional Board adopted a Basin Plan Amendment (BPA) for the San Gabriel River Metals and Selenium TMDL incorporating an implementation plan and schedule on June 6, 2013 and became effective October 13, 2014. The adopted BPA contains general requirements for ambient monitoring and TMDL effectiveness monitoring. However, very specific requirements were incorporated into the MRP.

While the Harbors Toxics TMDL was developed to address impairments in (among other water bodies) San Pedro Bay, the Permit links the Harbors Toxics TMDL to the San Gabriel River watershed, requiring monitoring for all responsible parties subject to the Metals TMDL. Monitoring is necessary to identify the contribution to the loads from the San Gabriel River Watershed Management Area (WMA). The ESGV Group is coordinating with downstream groups to provide support for performing the required sampling.

Similar to the Metals TMDL, the Puddingstone Reservoir TMDLs were promulgated by United States Environmental Protection Agency (USEPA), and implementation provisions, including monitoring, were not explicitly required in the TMDLs. Rather, the TMDLs proposed monitoring recommendations. However, very specific requirements were incorporated into the MRP. The County and LACFCD are monitoring the reservoir water column, benthic sediment, and fish tissue. The ESGV Group will monitor the MS4 discharge to the reservoir. Therefore, monitoring to address the Puddingstone Reservoir TMDL will be performed through the coordination of both groups.

Table 1-4.
TMDLs Applicable to the WMP Area

TMDL	Effective Date or EPA Approval Date	Regional Board Resolution Number
Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (Harbors Toxics TMDL)	03/23/2012	2011-008
Los Angeles Area Lakes Toxics and Nutrients TMDL for Puddingstone Reservoir (Lakes TMDL)	3/26/2012	None (USEPA TMDL)
San Gabriel River Metals and Selenium TMDL (Metals TMDL)	03/26/2007	R13-004 (1) (USEPA TMDL)

1 Regional Board adopted the San Gabriel River Metals TMDL Implementation Plan as BPA through resolution R13-004 on June 6, 2013 and became effective October 13, 2014.

1.2.2 Category 2 Constituents

WBPCs on the State Water Resources Control Board's (SWRCB) 2010 Clean Water Act Section 303(d) List that are not already addressed by a TMDL or other action are included as Category 2. All listings within or downstream of the WMP area were identified and included to acknowledge that discharges from upstream reaches could impact the listed area, particularly during wet weather. However, a constituent included in the table does not infer MS4 discharges from the WMP area contribute to the downstream impairment. The 303(d) listed water bodies are presented in **Table 1-5**.

Table 1-5.
Category 2 Water Body-Pollutants for Tributaries in the WMP Area

Constituent	San Gabriel River Reach 1	San Gabriel River Reach 2	San Gabriel River Reach 3	San Jose Creek Reach 1	San Jose Creek Reach 2	Walnut Creek Wash	San Gabriel Estuary
Ammonia				O			
Coliform or other Indicator Bacteria	L	L	L	L	L	L	
Cyanide		L					
TDS				L			
Benthic-Macroinvertebrates						L	
Dioxin							L
Low Dissolved Oxygen							L
Nickel							L
pH	L			L		L	
Toxicity				L			

L - Listed on 2010 303(d) list.
O - Listed on the 2010 303(d) list as being addressed through a single regulatory action (NPDES permit for wastewater discharges)

1.2.3 Category 3 Constituents

Monitoring data for sites within the San Gabriel River WMA was received from the following sources:

- Los Angeles County Department of Public Works (LACDPW) provided long-term monitoring data from the San Gabriel River Mass Emission Station (S14.)
- LACDPW provided temporary monitoring data from the Walnut Creek Wash Tributary Site (TS13.)
- LACDPW provided temporary monitoring data from the San Jose Creek Tributary Site (TS15.)
- The Council for Watershed Health provided monitoring data from their monitoring activities throughout the San Gabriel River watershed.
- The California Environmental Data Exchange Network (CEDEN.)
- Los Angeles County Sanitation Districts (LACSD) provided long-term receiving water monitoring data.

Available data were compared to the applicable water quality objectives to determine the additional Category 2 and Category 3 constituents, depending on the frequency of exceedances.

Data received from the Council for Watershed Health (CWH) and CEDEN largely consisted of short term monitoring activities and many sites from these programs were only used for a single sampling event or had a limited number of constituents tested at the sites. All data were screened to identify potential water quality objective exceedances. The vast majority of the available sites are for receiving waters downstream from the ESGV Group area. Monitoring data specific to the WMP area is lacking. To estimate the potential constituents of concern in the area, data reflective of receiving waters downstream from the WMP area are considered. Implementation of the CIMP and the adaptive management process will allow the assessment of prioritized constituents, removing those from the prioritization where WMP area monitoring reveals they are not water quality issues. Additionally, new constituents found to be water quality issues will be added to the prioritization. The CIMP revision process is detailed in **Section 10**.

1.3 WATER BODY POLLUTANT COMBINATIONS

Where available, the most recent 10 years of data were analyzed to identify WBPCs. Additionally, the last 5 years of data were analyzed to determine if historical issues were abated and to refine the categorization of WBPCs. Subcategories were identified and created to refine the prioritization process. Those pollutants with measurements exceeding water quality objectives are further evaluated and categorized based on the frequency, timing, and magnitude of exceedances. The WBPCs are placed in the respective subcategories in **Table 1-6**. The ESGV Group is monitoring the outfall to Puddingstone Reservoir, while the County and the LACFCD are performing the in-lake monitoring.

Constituents may change subcategories with new information as the monitoring progresses, source investigations occur, and BMP implementation begins. Where exceedances decrease over time, constituents will be reprioritized or removed from the priority list as watershed actions bring prioritized constituents into compliance. For a constituent that is currently not a priority, if the frequency of water quality exceedances increases, then the constituent would be reevaluated using the prioritization procedure, likely increasing the priority. Due to the natural rate of infiltration, the San Gabriel River and some of the tributaries are dry with the exception of storm flows. Future monitoring will be assessed to establish the disconnect between the upper and lower watershed during dry weather and minor storm events. On establishing the disconnection, the corresponding WBPCs flagged due to downstream water quality issues will be adjusted or removed from the categorization.

1.4 PHASED IMPLEMENTATION OF MONITORING

As there are currently no established monitoring sites within the WMP area, it may not be possible to begin monitoring all aspects of the CIMP within 90 days of Regional Board approval. Receiving water and stormwater outfall sites require site planning, equipment purchase, and installation prior to commencing monitoring. Receiving water and outfall monitoring will begin

July 1, 2015, or 90 days after CIMP approval, whichever is later. The Group Members will begin the non-stormwater outfall screening process summer 2014.

Table 1-6.
Summary of San Gabriel River Watershed Water Body-Pollutant Combinations

Class(1)	Constituent	Walnut Creek Wash	San Gabriel River Reach		San Jose Creek Reach		Pudding-stone Reservoir	San Gabriel River Reach 1	San Gabriel Estuary	Santa Ana River
			2	3	1	2				
Category 1A: WBPCs with past due or current term TMDL deadlines with exceedances in the past 5 years.										
Metals	Copper (Dry)							I	I	
	Selenium (Dry)				I	I				
Bacteria	Fecal Coliform and E. coli (Dry)									F
Category 1B: WBPCs with TMDL deadlines beyond the current Permit term and with exceedances in the past 5 years.										
Metals	Copper (Dry)							F	F	
	Selenium (Dry)				F	F				
Bacteria	Fecal Coliform and E. coli (Wet)									F
Category 1C: WBPCs addressed in USEPA TMDL without an Implementation Plan.										
Nutrients	Total Nitrogen						X			
	Total Phosphorus						X			
Metals	Total Mercury						X			
Legacy	PCB (Sediment)						X			
	PCB (Water)						X			
	Chlordane (Sediment)						X			
	Chlordane (Water)						X			
	Dieldrin (Sediment)						X			
	Dieldrin (Water)						X			
	DDT (Sediment)						X			
	DDT (Water)						X			

Continued

Table 1-6 Continued

Class[(1)]	Constituent	Walnut Creek Wash	San Gabriel River Reach 2	San Gabriel River Reach 3	San Jose Creek Reach 1	San Jose Creek Reach 2	Pudding-stone Reservoir	San Gabriel River Reach 1	San Gabriel Estuary	Santa Ana River
Category 1D: WBPCs with past due or current term deadlines without exceedances in the past 5 years.										
Metals	Lead (Wet)[(2)]	I	I	I	I	I				
Category 1E: WBPCs with TMDL deadlines beyond the current Permit term without exceedances in the past 5 years.										
Metals	Lead (Wet)[(2)]	F	F	F	F	F				
Category 2A: 303(d) Listed WBPCs with exceedances in the past 5 years.										
Bacteria	Indicator Organisms	303(d)	303(d)	303(d)	303(d)	303(d)		303(d)		
Metals	Lead (Dry)					X				
	Zinc			X						
	Copper	X		X						
Legacy	Polycyclic Aromatic Hydrocarbon (PAH)		X	X	X	X				
Other	Cyanide		303(d)	X						
Category 2B: 303(d) Listed WBPCs that are not a "pollutant"[(3)] (i.e., toxicity).										
Other	Benthic-Macroinvertebrates	303(d)								
Other	Dissolved Oxygen								303(d)	
Other	pH	303(d)			303(d)			303(d)		
Other	Toxicity				303(d)					
Category 2C: 303(d) Listed WBPCs without exceedances in past 5 years.										
Nutrients	Ammonia				303(d)					
Other	2,3,7,8-TCDD (Dioxin)								303(d)	
Metal	Nickel								303(d)	
	Copper				X					
	Lead (Dry)	X								
	Zinc	X			X					

Continued

Table 1-6 Continued

Class[1]	Constituent	Walnut Creek Wash	San Gabriel River Reach		San Jose Creek Reach		Pudding-stone Reservoir	San Gabriel River Reach 1	San Gabriel Estuary	Santa Ana River
			2	3	1	2				
Salts	Total Dissolved Solids (Dry)				303(d)					
Category 3A: WBPCs with exceedances in the past 5 years.										
Other	MBAS			X						
Salts	Sulfate (Dry)			X	X	X				
	Chloride (Dry)			X	X	X				
	Total Dissolved Solids (Dry)			X						
Category 3B: WBPCs that are not a "pollutant"[3] (i.e., toxicity).										
Other	Dissolved Oxygen			X	X	X		X(Dry)		
Category 3C: WBPCs without exceedances in past 5 years.										
Other	Cyanide				X					
Metals	Selenium	X						X	X	
	Lead								X	
	Zinc								X	
	Mercury	X								
Other	Lindane			X						

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 WMP for the TMDL. (Permit pg. 49).

2 Grouped wet weather waste load allocation, expressed as total recoverable metals discharged to all upstream reaches and tributaries of the San Gabriel River Reach 2.

3 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.

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

2 Receiving Water Monitoring Program

Receiving water monitoring is designed to provide data to determine whether the RWLs and water quality objectives are being achieved and if beneficial uses are being supported. Over time, the monitoring will allow the assessment of trends in pollutant concentrations. The following subsections describe how the MRP requirements for receiving water monitoring will be met within the WMP area.

2.1 RECEIVING WATER MONITORING OBJECTIVES

The objectives of the receiving water monitoring include the following:

- Determine whether the RWL 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 following presents the receiving water monitoring sites, monitoring parameters and frequency, and a discussion on monitoring coordination. A summary of how the receiving water monitoring program meets the objectives of the MRP is discussed further below. The approach builds off the MRP requirements, the TMDL monitoring requirements, as well as existing monitoring programs in the watershed. Implementation of the CIMP will replace existing TMDL monitoring programs and meet the monitoring requirements for TMDLs that had not yet developed monitoring programs (e.g., Harbors Toxics TMDL, San Gabriel River Metals TMDL, etc.). Note that the Harbors Toxics TMDL required the development of a monitoring program and quality assurance project plan (QAPP). This CIMP addresses those requirements. While not all aspects of a QAPP are explicitly addressed herein the primary requirements that are not included relate to the implementation of the CIMP (e.g., definition of project manager, lines of communication, and standard operating procedures). These requirements can be addressed once an agency is selected to lead the implementation of the CIMP.

2.2 DESCRIPTION OF RECEIVING WATER MONITORING

Receiving water monitoring is designed to achieve the objectives listed in the permit based on the category of WBPCs applicable to the site. WBPCs prioritizations were utilized to support the development of the monitoring approach. WBPCs were prioritized, as described in **Section 1**. To address the different monitoring objectives and priorities, two types of monitoring are proposed:

- **Long Term Assessment** (LTA) – monitoring is intended to determine if RWLs are achieved, to assess trends in pollutant concentrations over time, and to determine whether designated uses are supported.
- **TMDL** Receiving Water (TMDL) – monitoring is conducted to evaluate attainment of or progress in attaining the TMDL.

While not explicitly established in the MRP, the monitoring types proposed distinguish between the different end goals of monitoring for specific constituents within specific water bodies in the WMP area. LTA monitoring provides a long term record to understand conditions within the WMP area, for a robust suite of parameters. TMDL monitoring addresses TMDL related constituents. WBPCs on the 303(d) list, or those meeting the listing requirements and have exceeded receiving water objectives, will be monitored at the LTA and appropriate TMDL sites.

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, 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. A determination regarding whether MS4 discharges caused or contributed to a RWL exceedance should be made using data collected through outfall monitoring.

2.3 RECEIVING WATER MONITORING SITES

The MRP requirements include receiving water monitoring sites at previously designated mass emission stations, TMDL receiving water compliance points, and additional receiving water locations representative of the impacts from MS4 discharges. As there are no existing mass emission stations in the WMP area, the ESGV Group will establish a new LTA site representative of the WMP area. The number of required receiving water monitoring sites is not specified in the MRP, however, the tributaries leaving the WMP area are sited for monitoring. Approximate locations of the proposed monitoring sites for the ESGV Group are shown in **Figure 2-1.** A field assessment was conducted and locations were identified based on the field assessments on December 26, 2013, and January 17, 2014. Summaries of the site selection assessments and proposed location photographs are presented in **Attachment B**.

2.3.1 Long Term Assessment Site

The LTA site is located to fulfill one of the primary objectives of receiving water monitoring; to assess trends in pollutant concentrations over time or during specified conditions. As a result, the primary characteristic of an ideal 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. A new LTA site was identified to support understanding of potential impacts associated with MS4 discharges from the ESGV Group. The site receives drainage predominantly from La Verne. However, the land use for all four cities for the ESGV Group are similar and therefore will be reflective of the water quality in receiving waters leaving the WMP area.

The proposed LTA site meets the receiving water objectives and supports an understanding of potential impacts associated with MS4 discharges. However, receiving water sites are intended to assess receiving water conditions. An exceedance of a receiving water limitation at a receiving water site does not, on its own, represent an exceedance of a receiving water limitation that was caused by or contributed to by MS4 discharges as these sites also receive runoff from non-MS4 sources, including open space and other permitted discharges.

The LTA monitoring site will be located on Live Oak Wash between the confluence of Puddingstone Channel, Marshall Creek, and Live Oak Wash; and the discharge into Puddingstone Reservoir. The proposed site is located on **Figure 2-1**. The LTA monitoring site will also be utilized to support TMDL monitoring. Since Live Oak Wash is a soft-bottomed channel and irregularly shaped, flow may be measured within each of Puddingstone Channel, Marshall Creek, and Live Oak Wash and totaled. However, flow will be measured at the located LTA site if a suitable stage-flow rating curve can be developed to determine storm flows without having to enter the channel. Photographs of the LTA site can be found in **Figures 2-2** through **2-4**. Additional photographs and flow monitoring locations evaluated for the LTA site are included in **Attachment A**. Exact placement of the site will be dependent on site engineering constraints.

Figure 2-1.
Overview of Receiving Water Monitoring Sites

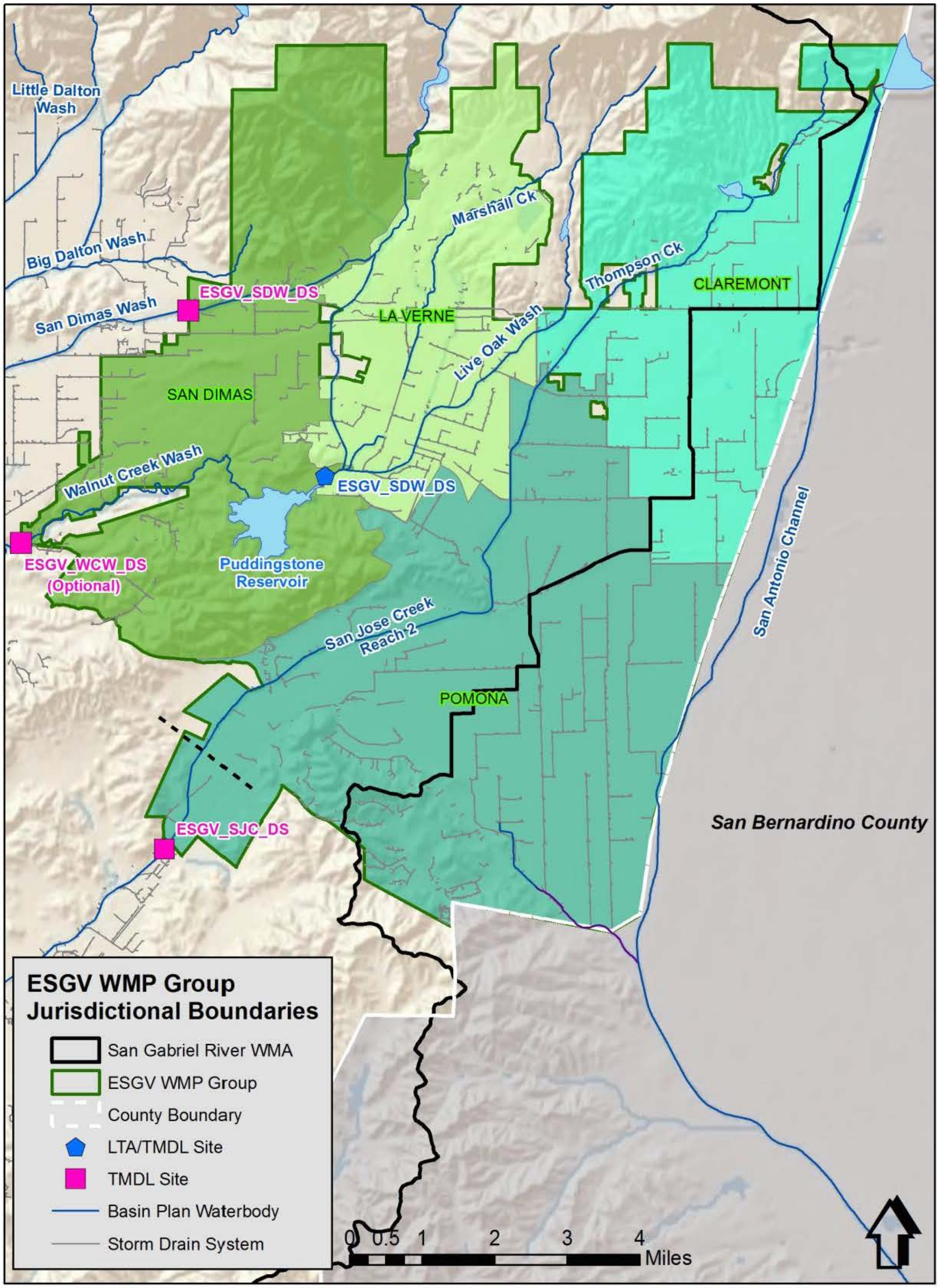


Figure 2-2.
ESGV_LOW_DS Site Looking Upstream in the Soft Bottom Portion of the Channel

Figure 2-3.
ESGV_LOW_DS Site Looking Downstream

Figure 2-4.
Confluence of Channels Discharging to Puddingstone Reservoir at Transition Between Hard and Soft Bottom Channel.

TMDL Sites

Within the WMP area, Metals TMDL monitoring sites are required in San Jose Creek Reaches 1 and 2 and Walnut Creek Wash. Given that San Jose Creek Reach 1 extends for greater than 13 miles and only approximately 1 mile is located within the WMP area, a combined TMDL site will be utilized for San Jose Creek Reaches 1 and 2. The San Jose Creek TMDL site will be located at the downstream intersection of San Jose Creek and the ESGV Group boundary. The proposed sites for the ESGV Group are located on **Figure 2-1**, and are as follows:

- San Jose Creek at the crossing of the Pomona city line (ESGV_SJC_DS.)
- San Dimas Wash at the crossing of the San Dimas city line (ESGV_SDW_DS.)
- Walnut Creek Wash between Puddingstone dam and the jurisdictional boundary of San Dimas (ESGV_WCW_DS.)

Given that Puddingstone Reservoir discharges to Walnut Creek Wash, that Puddingstone Reservoir is under the jurisdiction of Los Angeles County, and that lake processes can affect the concentration of constituents in the downstream receiving waters, the ESGV Group is concerned that conducting receiving water monitoring within Walnut Creek Wash would not be representative of the ESGV Group's MS4 discharge. Walnut Creek Wash is proposed as an optional site to be evaluated by the ESGV Group if downstream exceedances are measured and the decision is made to further determine the contribution from the WMP area. As Puddingstone Reservoir is in a County park and operated by the LACFCD, the ESGV Group Members will not monitor within the Lake. The LTA site on Live Oak Wash will also serve to monitor discharges to Puddingstone Reservoir.

The ESGV Group is participating with other groups in the San Gabriel River WMA and is coordinating required sampling downstream of the WMP area with the respective MS4 groups and LACSD.

All responsible parties to the Metals TMDL are equally responsible for performing the specified monitoring throughout the watershed. Monitoring for the Metals TMDL and the Harbors Toxics TMDL is required in San Gabriel River Reaches 1, 2, and 3; and the San Gabriel River Estuary. Given that these water bodies are downstream of the WMP area, TMDL monitoring sites within the WMP area will be utilized to assess the ESGV Group contribution to downstream water bodies. The LTA monitoring site also will be utilized to assess the potential level of contribution to downstream water bodies. The Metals TMDL sites outside the WMP will be located and monitored as follows:

- San Gabriel River Reach 4 TMDL site will be located at Ramona Blvd and monitored by the USGR EWMP Group.
- San Gabriel River Reach 5 TMDL site will be assessed by two outfall sites by the Rio Hondo/San Gabriel River EWMP Group.
- San Jose Creek Reach 1 TMDL site will be at the LACSD R-10 monitoring site located upstream of the Discharge Serial No. 002 discharge point for LACSDs' San Jose Creek Water Reclamation Plant (WRP). Monitoring in dry weather will be by the LACSD and by the USGR EWMP Group in wet weather.
- Walnut Creek Wash TMDL site will be located in the unlined portion of Walnut Creek Wash, just upstream of the confluence with the San Gabriel River. Monitoring will be conducted by the USGR EWMP Group.

Photographs of the San Jose Creek TMDL site, ESGV_SJC_DS, are included in **Figure 2-5** and **Attachment B**.

Figure 2-5.
San Jose Creek TMDL site ESGV_SJC_DS Looking Upstream

A TMDL monitoring site is located at the intersection of San Dimas Wash and the ESGV Group boundary, indicated as site ESGV_SDW_DS on **Figure 2-1**. Photograph of the San Dimas Wash site are included in **Figure 2-6** and **Attachment B**.

Figure 2-6.
San Dimas Wash TMDL Site, ESGV_SDW_DS, Looking Downstream

An optional TMDL monitoring site is located on Walnut Creek Wash. If the ESGV Group decides to determine the contribution from the WMP area, the site will be triggered. The TMDL monitoring site will be located between the Puddingstone dam and the ESGV Group boundary downstream of N Reeder Street, indicated as site ESGV_WCW_DS on **Figure 2-1**. A photograph of a potential location for ESGV_WCW_DS is presented as **Figure 2-7**.

Figure 2-7.
Walnut Creek Wash TMDL Potential Site Looking Upstream.

2.4 MONITORED PARAMETERS AND FREQUENCY OF MONITORING

The MRP clearly defines the default required parameters and frequency for receiving water monitoring. A general summary of the frequency of monitoring and of parameters identified in the MRP for receiving water monitoring are presented in **Table 2-1**. The program will generally operate three wet weather events per year, including the first significant rain event of the storm year. For the San Jose Creek receiving water site a fourth storm will be targeted for monitoring metals and associated constituents. After the first year of monitoring at the San Jose Creek site, the data will be evaluated to determine if three storms provide sufficient information. If three storms are found to provide sufficient information, a reduction in monitoring to three storms per year will be requested from the Regional Board. Additionally, the program will operate two dry

MWH

weather events per year, conducted in January and July. However, not all parameters will be monitored each event. The frequency of monitoring for wet and dry events is specified by site in **Table 2-1**. For toxicity, monitoring will be conducted during two wet weather events per year and during the one dry weather event that takes place coincident with the summer dry weather sampling event. The ESGV Group does not have historical flow data to determine base flow conditions within the Group's receiving waters. Therefore, during the first year of monitoring, wet weather conditions will be defined as when greater than 0.25 inches of precipitation has fallen within the previous 24-hour period. Additionally, parameters in Table E-2 of the MRP, listed in **Attachment C**, will be assessed with applicable water quality objectives after the first year of LTA monitoring. Analytical methods, detection limits, sampling methods, and sample handling procedures are detailed in **Attachment D**. In addition, details regarding the collection of quality assurance/quality control (QA/QC) samples are outlined in **Attachment D**.

Initially, at the San Jose Creek site, Metals TMDL ambient monitoring will be conducted at a frequency of four wet and two dry events. The Metals TMDL specifies four wet weather events annually for effectiveness monitoring. However, after the first year of monitoring at the San Jose Creek site the data will be evaluated to determine if reducing monitoring frequency to three events per year will provide sufficient data. If three events of wet-weather data can provide sufficient data, the ESGV Group will request a reduction in sampling frequency. If a reduction in sampling is appropriate, the frequency of supporting parameters will likewise be reduced. The supporting parameters include: flow and field parameters, TSS, and hardness.

Table 2-1.
Annual Frequency and Duration of Receiving Water Monitoring
During Wet and Dry Weather Conditions

Constituent	Annual Frequency (number wet events/number dry events)			
	Live Oak Wash	San Jose Creek	San Dimas Wash	Walnut Creek Wash
Flow and field parameters(1)	3/2	4/2	3/2	3/2
Table E-2 Pollutants(2)	1(3)/1(3)	(4)	(4)	(4)
Toxicity	2/1	(5)/0		
TIE Identified Pollutants	(6)	(6)	(6)	(6)
TSS and Hardness	3/2	4/2	3/2	3/2
Alkalinity	3/2	3/2		
Ammonia	3/2	3/2		
TKN or Organic N, Nitrate, Nitrite,	3/0			

Constituent	Annual Frequency (number wet events/number dry events)			
	Live Oak Wash	San Jose Creek	San Dimas Wash	Walnut Creek Wash
Orthophosphate, and Total Phosphorus				
TDS, Chloride, and Sulfate	2/2	0/2	0/2	0/2
Mercury	2/2			3/2
Methylmercury	2/0			
TOC	2/0			
Total PCBs(7), Total Chlordane, Dieldrin, and Total DDTs(8)	1(9)/0			
Copper(10)	3/2	4/2	3/2	3/2
Lead(10)	3/2	4/2	3/2	3/2
Zinc(10)	3/2	4/2	3/2	3/2
Selenium		4/2		3/2
E. coli	3/2	3/2	3/2	3/2
Cyanide		3/2		
PAHs(11)		3/2		

1 Field parameters are defined as dissolved oxygen, pH, temperature, and specific conductivity.

2 All pollutants identified in Table E-2 of the MRP that are not otherwise addressed by monitoring at the LTA.

3 Monitoring frequency only applies during the first year of monitoring. For pollutants identified in Table E-2 of the MRP that are not detected at the Method Detection Limit (MDL) for its respective test method 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 pollutants identified in Table E-2 of the MRP that are detected above the lowest applicable water quality objective, additional monitoring will be conducted under condition with observed exceedance (i.e., the monitoring frequency will become 3/2 if exceedances are observed during dry and wet weather, the monitoring frequency will become 3/0 if exceedances are observed during wet weather only, and the monitoring frequency will become 0/2 if exceedances are observed during dry weather only).

4 Pollutants identified for additional monitoring from Table E-2 under condition with observed exceedance in first year. For constituents with no measured exceedances and not otherwise addressed by monitoring at the LTA station, monitoring will discontinue.

5 Where wet weather monitoring of the San Gabriel River at the mass emission site S14 or the LTA site observes toxicity and a subsequent TIE is inconclusive, wet weather toxicity will be initiated. Where dry weather monitoring by either LACSD of San Jose Creek or the ESGV at the LTA site observes toxicity and a subsequent TIE is inconclusive, dry weather toxicity will be initiated. Toxicity monitoring will commence at the scheduled event following notification of TIE results.

6 Where wet weather monitoring of the San Gabriel River at the mass emission site S14 or the LTA site observes toxicity and a subsequent TIE identifies a pollutant(s), the pollutant(s) will be added to the wet weather monitoring list. Where dry weather monitoring by either LACSD of San Jose Creek or at the LTA site observes toxicity and a subsequent TIE identifies a pollutant(s), the pollutant(s) will be added to the dry weather monitoring list. The monitoring for the additional pollutant(s) will commence at the scheduled event following notification of TIE results.

7 PCBs includes analyses for all aroclor species when analyzed in water and the following 54 PCB congeners when analyzed in water 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

8 DDT is defined as the sum of 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.

9 Suspended sediment samples will be collected and analyzed for listed parameters, in addition to water column concentrations.

10 Total and dissolved.

11 PAHs include: Benzo(a)pyrene, 3,4 Benzofluoranthene, Benzo(k)flouranthene, Chrysene, Dibenzo(a,h)anthracene, and Indeno(1,2,3-cd)pyrene.

Data collected through monitoring will be reviewed and changes to the constituents and frequencies listed in **Table 2-1** will be discussed in the annual report and implemented starting no later than the first scheduled CIMP event of the next monitoring year, which corresponds to the first applicable event after July 1 following the annual report submittal. The processes for determining appropriate changes to monitoring are listed in **Section 10**.

2.5 MONITORING COORDINATION

The ESGV Group is participating with other groups in the San Gabriel River WMA and is coordinating required sampling downstream of the WMP area with the respective MS4 groups and LACSD. All responsible parties to the Metals TMDL are equally responsible for performing the specified monitoring throughout the watershed. Monitoring for the Metals TMDL and the Harbors Toxics TMDL is required in San Gabriel River Reaches 1, 2, and 3; and the San Gabriel River Estuary. Given that these water bodies are downstream of the WMP area, TMDL monitoring sites within the WMP area will be utilized to assess the ESGV Group contribution to downstream water bodies. The LTA monitoring site also will be utilized to assess the potential level of contribution to downstream water bodies. The Metals TMDL sites outside the WMP will be located and monitored as follows:

- San Gabriel River Reach 4 TMDL site will be located at Ramona Blvd and monitored by the USGR EWMP Group.
- San Gabriel River Reach 5 TMDL site will be assessed through two outfall sites by the Rio Hondo/San Gabriel River EWMP Group.
- San Jose Creek Reach 1 TMDL site will be at the LACSD R-10 monitoring site located upstream of the Discharge Serial No. 002 discharge point for LACSDs' San Jose Creek Water Reclamation Plant (WRP). Monitoring in dry weather will be by the LACSD and by the USGR EWMP Group in wet weather.
- Walnut Creek Wash TMDL site will be located in the unlined portion of Walnut Creek Wash, just upstream of the confluence with the San Gabriel River. Monitoring will be conducted by the USGR EWMP Group.

Opportunities potentially exist to coordinate with other watershed management groups for receiving water monitoring. The planned coordination to achieve the required Metals TMDL monitoring is an example of the coordination opportunities. The CIMP is written to outline the monitoring requirements to assess the ESGV Group MS4. Coordination with other watershed management groups may occur in the future, where data from other programs may be used to fulfill ESGV Group requirements.

2.6 RECEIVING WATER MONITORING SUMMARY

Three sites are selected in the WMP area to address the receiving water monitoring program objectives. An additional optional site will be triggered by the ESGV Group in the event it becomes necessary to evaluate the potential contribution of constituents from the WMP area to downstream areas. The optional site will be triggered if downstream exceedances are observed for constituents not already being addressed by the WMP area. The receiving water sites are summarized in **Table 2-2**. None of the identified sites have been monitored as part of historical or existing monitoring programs. The County and LACFCD will perform monitoring in Puddingstone Reservoir. Estuary monitoring will be fulfilled by LACSD during dry weather and the Lower San Gabriel River EWMP group during wet weather per the Harbor Toxics TMDL to assess the potential of metals contribution to toxicity.

Table 2-2.
Summary of ESGV Group Receiving Water Monitoring Sites

Site ID	Water Body	Coordinates		Monitoring Type	
		Latitude	Longitude	LTA	TMDL
ESGV_LOW_DS	Live Oak Wash	34.094064	-117.792934	X	X
ESGV_SJC_DS	San Jose Creek	34.032233	-117.824894		X
ESGV_SDW_DS	San Dimas Wash	34.121341	-117.820088		X
ESGV_WCW_DS[(1)]	Walnut Creek Wash	34.086672	-117.845592		X

1 Optional site to be triggered by the ESGV Group to evaluate contribution of constituents from the WMP area in the event downstream exceedances are observed

A summary of how the ESGV 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 2-3**.

**Table 2-3.
Summary of Receiving Water Monitoring Program Objectives**

MRP Objective	CIMP Component Meeting Objective
Determine whether the RWLs are being achieved.	○ Four total receiving water monitoring sites. Three planned sites and one optional site. ○ Receiving water monitoring sites located as required by TMDLs. ○ 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.	○ LTA station will be established within the WMP area. ○ Monitoring during dry weather and wet weather ○ 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 the majority of water bodies specified in the Basin Plan. ○ Aquatic toxicity monitoring to be conducted during dry and wet weather. ○ Constituents added for monitoring based on the water quality priorities.

3 MS4 Database

The objective of the MS4 database is to geographically link the characteristics of the outfalls within the WMP area with watershed characteristics including: subwatershed, water body, land use, and effective impervious area. The information will be compiled into geographic information systems (GIS) layers.

3.1 PROGRAM OBJECTIVES

A GIS-based database of the MS4 storm drains and outfalls is required as part of the CIMP. The database structure must accommodate the following data fields:

1. Surface water bodies within the ESGV Group
2. Sub-watershed (HUC-12) boundaries
3. Land use overlay
4. Effective Impervious Area overlay
5. Jurisdictional boundaries
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)
7. The location of all dry weather diversions
8. The location of all major MS4 outfalls within the ESGV Group. Each major outfall shall be assigned an alphanumeric identifier, which must be noted on the map
9. Notation of outfalls with significant non-stormwater discharges (to be updated annually)
10. Storm drain outfall catchment areas for each major outfall within the ESGV Group
11. Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include:
    a) Ownership
    b) Coordinates
    c) Physical description
    d) Photographs of the outfall, where possible, to provide baseline information to track operation and maintenance needs over time
    e) Determination of whether the outfall conveys significant non-stormwater discharges.
    f) Stormwater and non-stormwater monitoring data

Available GIS data was reviewed to determine which components were available to populate the database for submittal with the CIMP. Available information includes components 1, 2, 3, 5, 6, 7, and 11.b. For the remaining components (4, 8, 9, 10, 11.a, 11.c, 11.d, 11.e, and 11.f) the ESGV Group will gather the information upon implementation of the non-stormwater outfall screening program in the summer of 2014. All outstanding data will be collected upon completion of the non-stormwater outfall screening. Based on the review of the GIS data, the components were divided into two categories: (1) available information being submitted with the CIMP, and (2) pending information that will be submitted after completion of the non-stormwater outfall and screening and monitoring program.

3.2 AVAILABLE INFORMATION

The following data are being submitted as a map and/or in a database concurrently with the CIMP (note, the numbering corresponds to the item number in the Permit list):

1 Surface water bodies within the ESGV Group.
2. Sub-watershed (HUC-12) boundaries.
3. Land use overlay.
5. Jurisdictional boundaries.
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).
7. The location of all dry weather diversions.
11. Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include:
    b. Coordinates

3.3 PENDING INFORMATION

Collecting the following data is an ongoing effort. The data are not currently available for submittal with the CIMP. The MS4 database will be populated as the data are collected. As the data are collected the database will be updated. The annual reports will include the updated database. The fields that will be updated through implementation of the CIMP include:

4. Effective impervious area overlay.
8. The location of all major MS4 outfalls within the Group Members' jurisdictional boundary.
9. Notation of outfalls with significant non-stormwater discharges (to be updated annually).
10. Storm drain outfall catchment areas for each major outfall within the Group Member's jurisdiction.
11. Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include:
    a. Ownership
    c. Physical description
    d. Photographs of the outfall, where possible, to provide baseline information to track operation and maintenance needs over time

e. Determination of whether the outfall conveys significant non-stormwater discharges.

f. Stormwater and non-stormwater monitoring data.

The information necessary to determine pending elements will be generated as an outcome of implementing the non-stormwater outfall program as noted in the **Table 3-1.** footnotes. 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 non-stormwater discharge. Updates will be included as part of the annual reporting to the Regional Board.

Table 3-1.
MS4 Database Elements to Be Developed

Database Element	To Be Developed	Date of Submission
Effective Impervious Area (EIA) overlay.	---	As Available
Notation of outfalls with significant non-stormwater discharges (to be updated annually).	X(1)	December 2015
Detailed analysis of storm drain outfall catchment areas for any new outfall monitoring locations, outfalls identified as having significant non-stormwater discharges, and outfalls addressed by structural best management practices (BMPs).	X(2)	Ongoing
Photographs of the outfall, where possible, to provide baseline information to track operation and maintenance needs over time	X(3)	December 2015
Determination of whether the outfall conveys significant non-stormwater discharges.	X(1)	December 2015
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.
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 nonstormwater 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

Stormwater outfall selection and monitoring requirements are discussed below.

4.1 PROGRAM OBJECTIVES

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 receiving water limitations.

4.2 STORMWATER OUTFALL MONITORING SITES

The primary criteria for the stormwater outfall monitoring program is selecting monitoring sites that are representative of the range of land uses in the WMA and provide accurate data for measuring flows and characterizing pollutant loads. The Permit provides default requirements for one outfall site per jurisdiction per HUC-12. The HUC-12 equivalent drainage areas are used in the analysis and represent the United States Geological Survey (USGS) HUC-12s modified to account for the MS4 system. The Regional Board approved the HUC-12 equivalent drainages for use in the WMP and CIMP process. The default procedure in the Permit was modified to select one outfall per HUC-12. The Permit allows an alternative approach to increase the cost efficiency and effectiveness of the monitoring program. To facilitate the approval of the outfall selection process, the proposed process is demonstrated to achieve equivalent monitoring in **Attachment E**. The following subsections outline the approach to meet the MS4 Permit requirements related to stormwater outfall monitoring.

There are four HUC-12s within the WMP area that include MS4 serving the Group Members. The San Dimas Wash HUC-12 covers a minor portion of the WMP area and is similar in land use to the neighboring Big Dalton Wash HUC-12. As a result, no stormwater outfall monitoring site will be located in the San Dimas Wash HUC-12. A representation of the WMP area with highlighted HUC-12 areas is presented in **Figure 4-1**. The selected monitoring sites are shown on the Figure. Field verification of the sites was performed on December 26, 2013 and January 17, 2014.

One monitoring site for each of the remaining HUC-12s that include MS4 will be monitored. The three stormwater outfall monitoring sites are presented in **Figure 4-1**. The selected sites are representative of the land uses within each respective HUC-12. The catchment areas for each selected drain are displayed with land use in **Figure 4-2**. The data collected at the monitored outfalls will be considered representative of all MS4 discharge within the respective HUC-12. The resulting data will be applied to all Group Members represented by the site, regardless of whether a site is located within a particular jurisdiction or received flow from that land area. Compliance for Group Members with WQBELs and RWLs may be based on comingled discharges or data not collected within an individual jurisdiction.

Figure 4-1.
HUC-12 Drainage Areas Corresponding to the WMP Area.

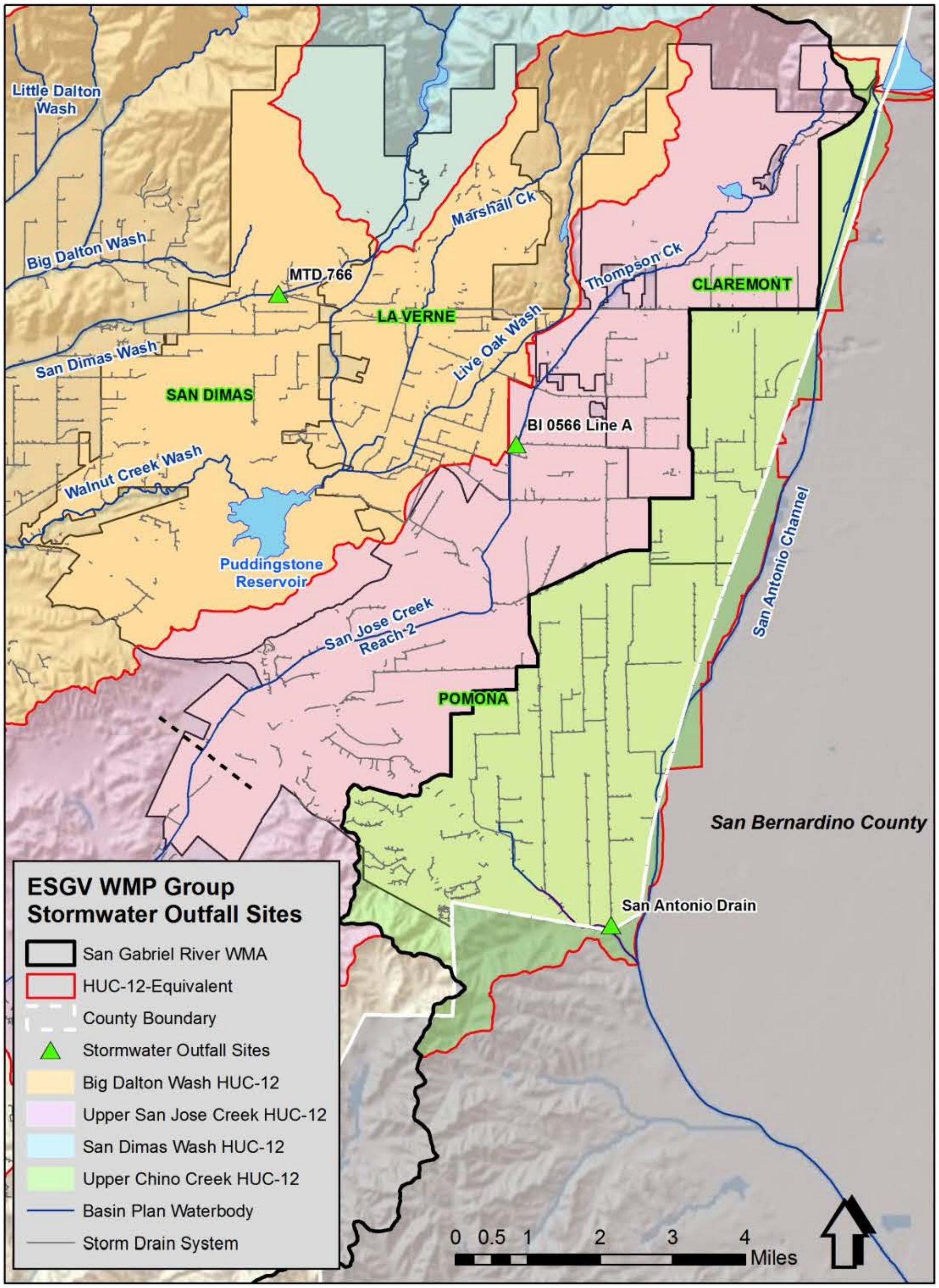
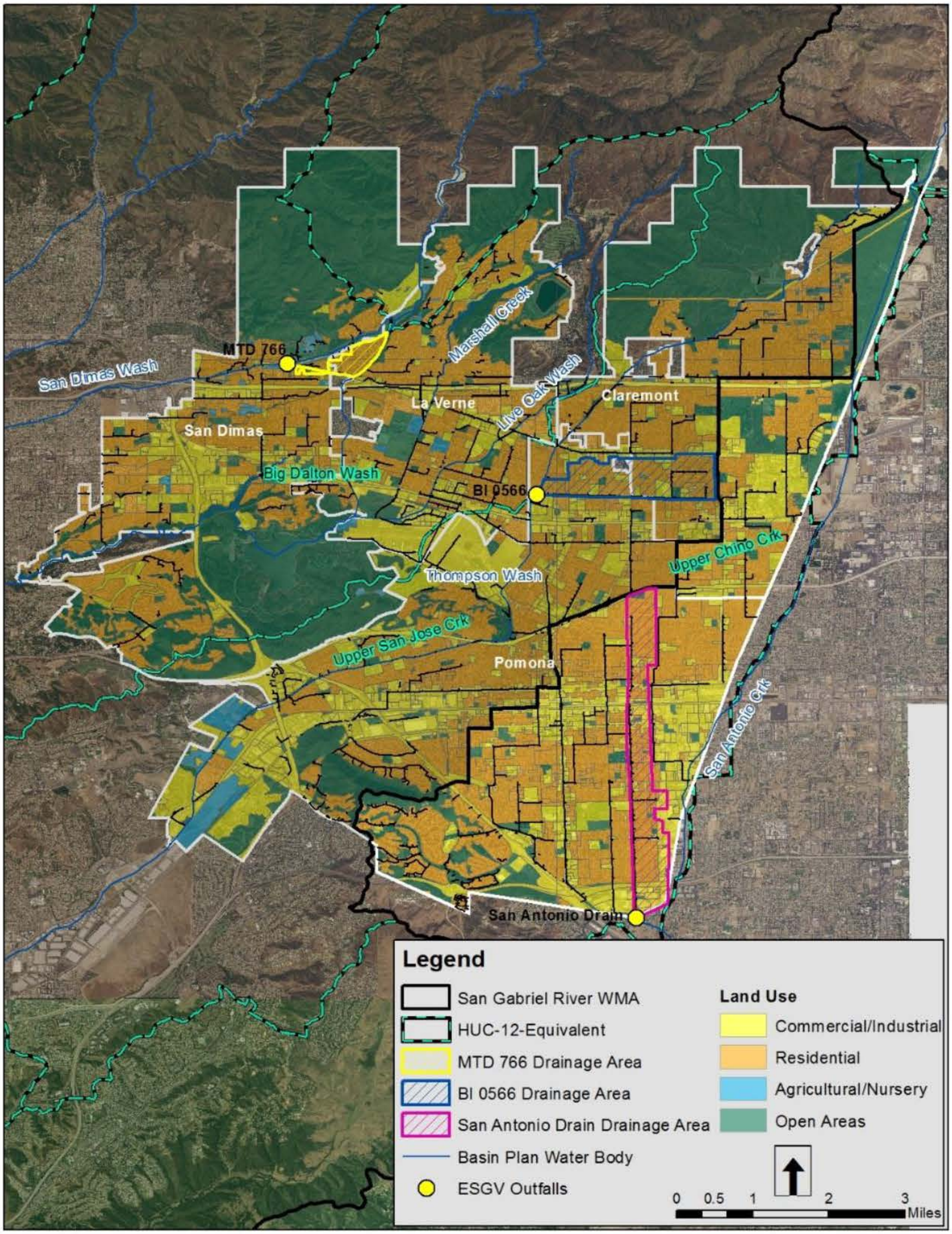


Figure 4-2.
Stormwater Outfall Monitoring Sites



The stormwater outfall monitoring sites in the ESGV WMP area are summarized in **Table 4-1**. The land uses within the outfall catchment area for the selected drains are incorporated in **Table 4-2**.

Table 4-1.
Summary of Stormwater Outfall Monitoring Sites in the ESGV WMP Area

HUC-12	Drain Name	Size	Shape	Material	Latitude	Longitude
Big Dalton Wash	MTD 766	42 inches	Round	Reinforced Conc. Pipe	34.12417	-117.80215
Upper San Jose Creek	BI 0566 Line A	84 inches	Square or Rectangle	Reinforced Conc. Box	34.09926	-117.75468
Upper Chino Creek	San Antonio Drain Unit 1	120 inches	Square or Rectangle	Reinforced Concrete Box	34.01976	-117.73575

1 Drain eventually discharges to water body.
2 Manhole location.

Table 4-2.
Relative Land Use Area within Drain Area to Stormwater Outfall Sites

HUC-12	Area	Percent of Land Area(1)			
		Res	Com/Ind	Ag/Nur	Open
Big Dalton Wash	HUC-12(2)	68	23	2	6
	MTD 766	87	12	1	<1
Upper San Jose Creek	HUC-12(3)	66	29	1	4
	BI 0566 Line A	76	22	<1	2
Upper Chino Creek	HUC-12	71	33	<1	5
	San Antonio Drain Unit 1	71	27	<1	2

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 MS4 area considered in the WMP.
2 Big Dalton Wash HUC-12 includes Puddingstone Reservoir and County Park, downstream of the selected outfall. The catchment area is similar to the HUC-12 land use upstream of Puddingstone.
3 Includes portion of the Angeles National Forest. Land use of HUC-12 over MS4 area similar to selected drain catchment.

The stormwater outfall monitoring sites for the three major HUC-12s that cover the ESGV Group are presented in the following subsections. Photographs of each of the stormwater outfall monitoring sites are included in **Attachment B**.

While the selected sites were visited, they were not assessed under storm conditions. There is potential for receiving water to back up into an outfall or the site may have unforeseen safety issues under storm conditions. If for a reason other than water quality it is determined a selected outfall site is unsuitable, alternate sites would need to be selected. To facilitate switching outfall locations, alternate sites for each HUC-12 are listed in **Attachment F**. The alternate sites would only become active if the original selection was deemed unrepresentative of the MS4 discharge in the HUC-12.

4.2.1 Big Dalton Wash HUC-12

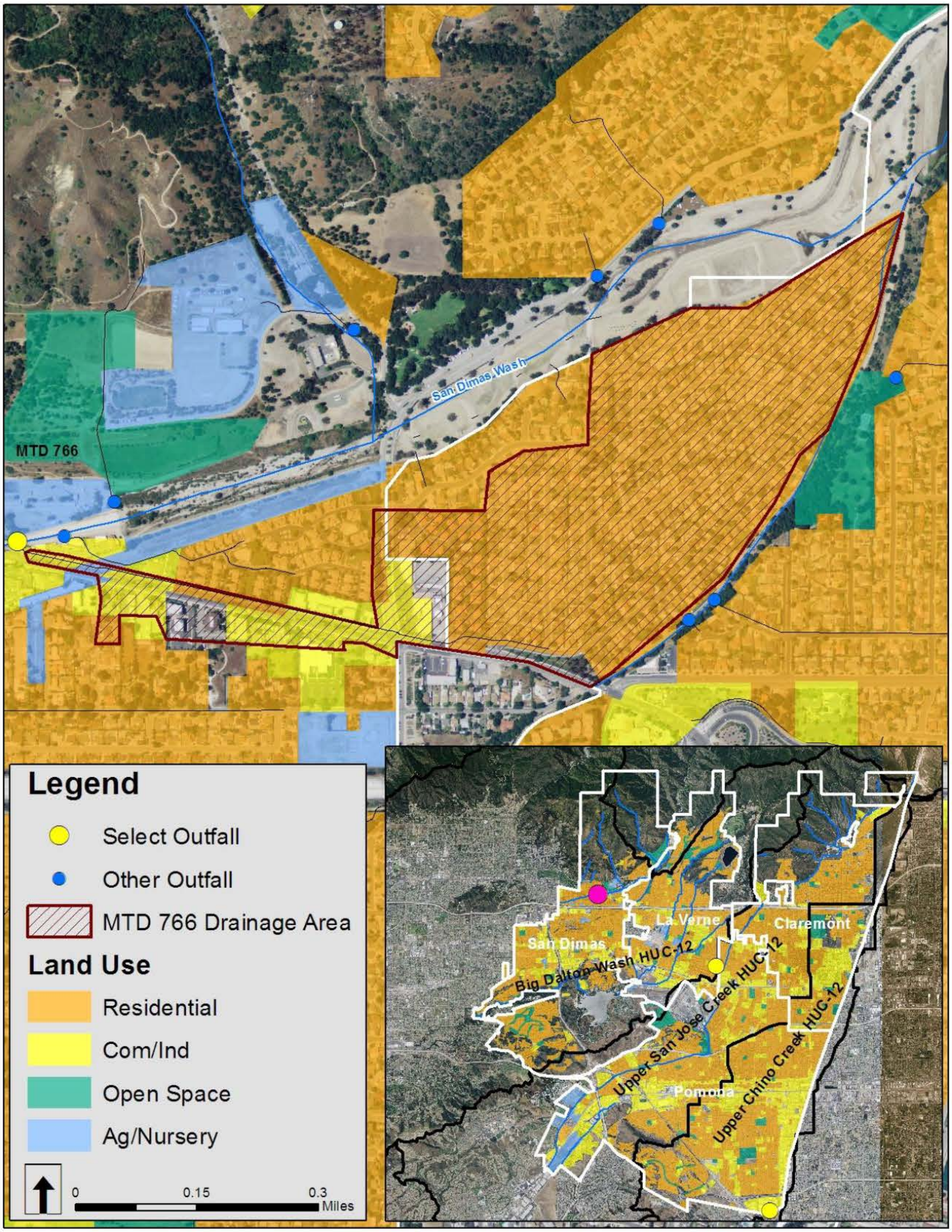
Big Dalton Wash is the largest of the three main HUC-12s for the ESGV Group, and it primarily covers the cities of San Dimas and La Verne. Primary land use types include: 87% residential; 8% open space; and 12% commercial/industrial. The large area of open space in the Big Dalton Wash HUC-12 is primarily due to land associated with the Puddingstone Reservoir which is under the jurisdiction of the County and LACFCD, and not a part of the ESGV Group. Relevant details for the stormwater outfall monitoring site in the Big Dalton Wash HUC-12 are presented in **Table 4-3**.

Table 4-3.
Stormwater Outfall Monitoring Site – Big Dalton Wash HUC-12

HUC-12	City	Drain Name	Size	Shape	Material	Latitude	Longitude
Big Dalton Wash	San Dimas	MTD 766	42 inches	Round	Reinforced Conc. Pipe	34.12417	-117.80215

The primary factor contributing to the selection of the MTD 766 site is its representativeness of primary land uses within its estimated drainage area with respect to the HUC-12. The outfall, estimated drainage area, and land uses are shown on **Figure 4-3**. Other factors that contributed to the selection of the MTD 766 site include space for the placement of a permanent sampling station (if desired), safe and easy access, and all public property to access sampling equipment.

Figure 4-3.
Stormwater Outfall Monitoring Site – Big Dalton Wash HUC-12



4.2.2 Upper San Jose Creek HUC-12

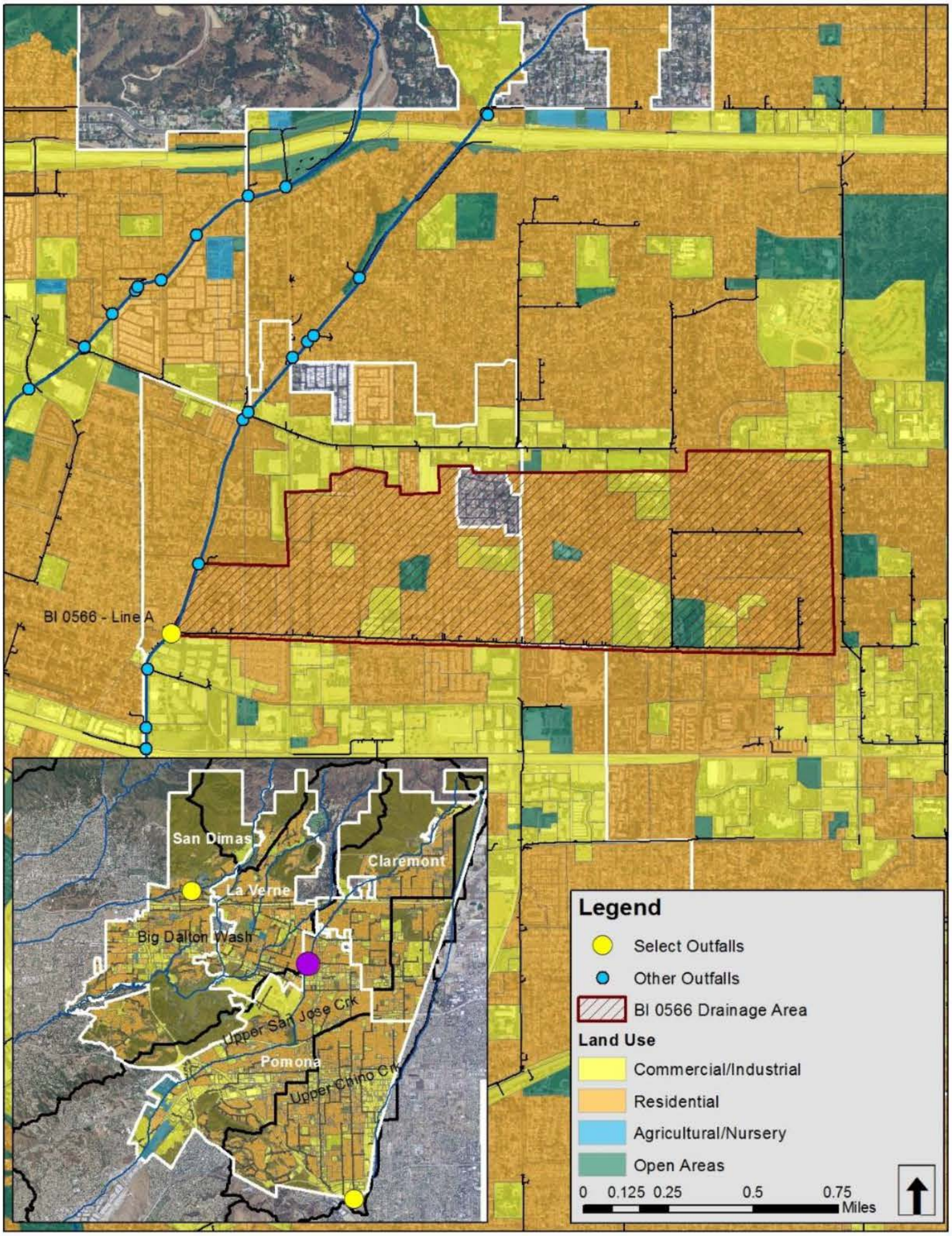
Upper San Jose Creek is the second largest of the three main HUC-12 for the ESGV Group. It primarily covers the cities of Pomona and Claremont. Primary land use types include: 66% residential; 29% commercial/industrial; and 4% open space. Relevant information for the stormwater outfall monitoring site in the Upper San Jose Creek HUC-12 are detailed in **Table 4-4**.

Table 4-4
Outfall monitoring Site – Upper San Jose Creek HUC-12

HUC-12	City	Drain Name	Size	Shape	Material	Latitude	Longitude
Upper San Jose Creek	Pomona	BI 0566 Line A	84 inches	Square or Rectangle	Reinforced Conc. Box	34.09926	-117.75468

The primary factor contributing to the selection of the BI 0566 Line A site is the representativeness within its estimated drainage area of the surrounding HUC-12 with respect to the primary land uses. The outfall location, estimated drainage area, and land uses are displayed on **Figure 4-4**. Other factors that contributed to the selection of the BI 0566 Line A site include available space for a permanent sampling station, if determined necessary, safe and easy access, all public property, availability of a safe and accessible upstream manhole that could serve as an alternate sampling location if the outfall could not be directly sampled, and receipt of drainage from both the Cities of Claremont and Pomona. Bacteria monitoring data collected at BI 0566 Line A will also be used to evaluate compliance with the Santa Ana River Bacteria TMDL per the Bacteria TMDL monitoring outlined in **Attachment A**.

Figure 4-4.
Stormwater Outfall Monitoring Site – Upper San Jose Creek HUC-12



4.2.3 Upper Chino Creek HUC-12

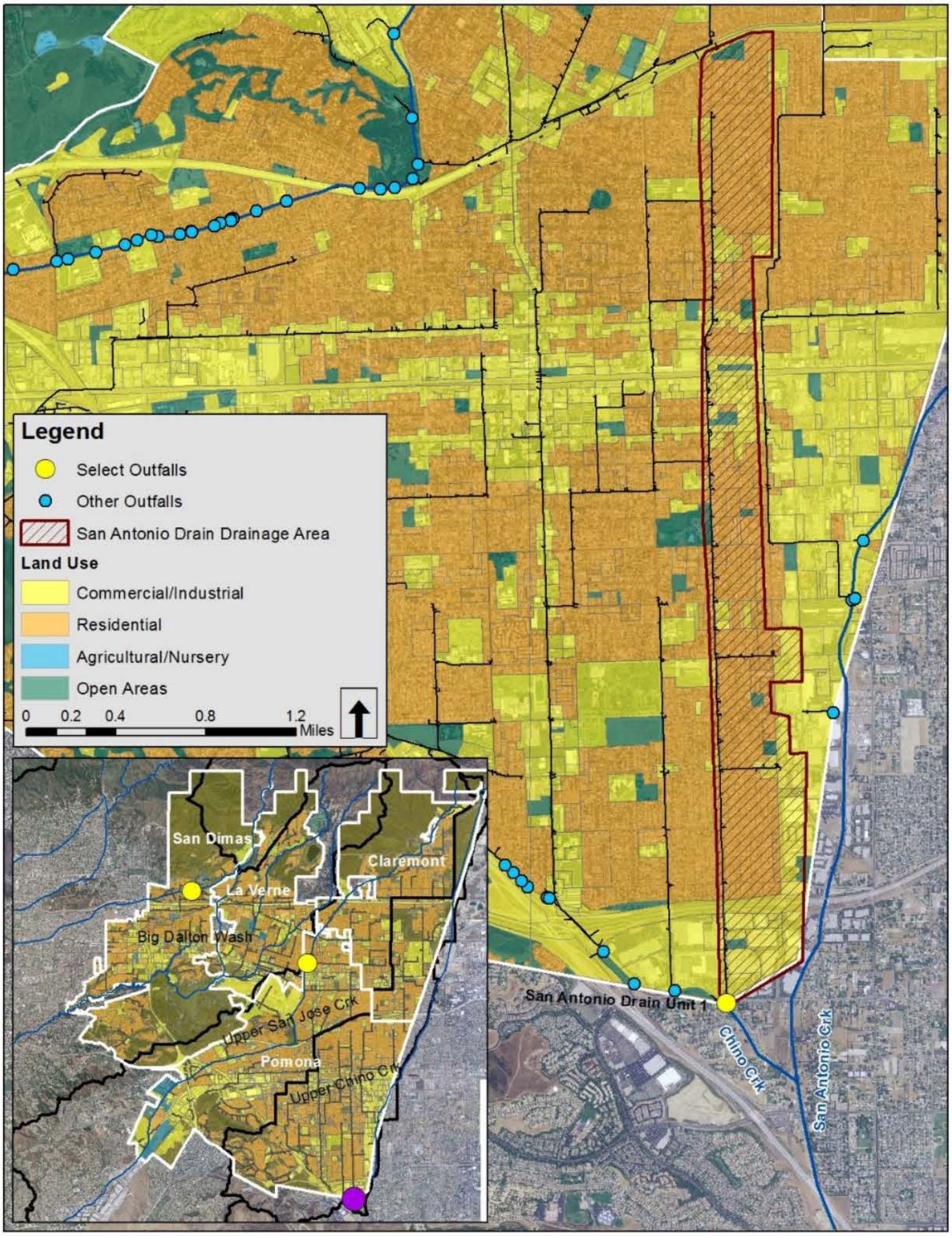
Upper Chino Creek is the smallest of the three main HUC-12 for the ESGV Group. It primarily covers the cities of Pomona and Claremont, but also covers minor portions of jurisdictions outside of the ESGV Group. Primary land use types include: 71% residential; 33% commercial/industrial; and 5% open space. **Table 4-5** details relevant information for the stormwater outfall monitoring site in the Upper Chino Creek HUC-12.

Table 4-5
Stormwater Outfall monitoring Site – Upper Chino Creek HUC-12

HUC-12	City	Name	Size	Shape	Material	Latitude	Longitude
Upper Chino Creek	Pomona	San Antonio Drain Unit 1	120 inches	Square or Rectangle	Reinforced Concrete Box	34.01976	-117.73575

The primary factor contributing to the selection of the San Antonio Drain Unit 1 site is its representativeness within its estimated drainage area with respect to the primary land uses of the HUC-12. The outfall, drainage area, and respective land uses are shown on **Figure 4-5**. Because the outfall is located outside of the WMP area, sampling will occur at the nearest upstream manhole. Other factors that contributed to the selection of the San Antonio Drain Unit 1 site include being located on a street with a low volume of traffic, being located on a street large enough to where traffic can easily be diverted around the sampling location without lane closure, safe and easy access for set-up and tear-down of autosampling equipment, and all public property.

Figure 4-5
Stormwater Outfall Monitoring Site – Upper Chino Creek HUC-12



4.3 MONITORED PARAMETERS AND FREQUENCY

Outfalls discharging to flowing water bodies will be monitored for all required constituents during three storm events per year concurrently with receiving water monitoring, with the exception of toxicity. Toxicity monitoring is only required when triggered by recent receiving water toxicity monitoring where a toxicity identification evaluation (TIE) on the observed receiving water toxicity test was inconclusive. The requirements for monitored constituents at each outfall are outlined in the MRP (Part VIII.B.1.c). Additionally, parameters in Table E-2 of the MRP, listed in **Attachment C**, will not be identified as exceeding applicable water quality objectives until after the first year of LTA monitoring. Parameters and frequency of stormwater monitoring are presented in **Table 4-6**.

Table 4-6.
Summary of MS4 Permit Required Stormwater Outfall Monitoring Parameters

Constituent	Annual Frequency (number of wet events per year)		
	Big Dalton Wash HUC-12 Site	Upper San Jose Creek HUC-12 Site	Upper Chino Creek HUC-12 Site
	San Dimas Wash	Thompson Creek	Chino Creek
Flow and field parameters(1)	3	3	3
Pollutants identified in Table E-2 of the MRP	(2)	(2)	
TSS and Hardness	3	3	3
Alkalinity	3	3	
Ammonia	3	3	
TKN or Organic N	3		
Nitrate+Nitrite	3		
Orthophosphate	3		
Total Phosphorus	3		
Total Mercury	3		
Methylmercury	3		
TOC	3		
Total and Dissolved Copper	3	3	3
Total and Dissolved Lead	3	3	3
Total and Dissolved Zinc	3	3	3
Selenium		3	
E. coli	3	3	
Cyanide		3	
PAH(3)		3	

1 Field parameters are defined as dissolved oxygen, pH, temperature, specific conductivity, and TSS. The Permit lists Hardness as a field parameter, however, it is included as a laboratory measurement for consistency with receiving water.

2 For pollutants identified in Table E-2 of the MRP (**Attachment C)** that are not detected at the MDL for its respective test method or the result is below the lowest applicable water quality objective during the first year of LTA monitoring, stormwater outfall monitoring will not be conducted (i.e., monitoring frequency will become 0). For pollutants identified in Table E-2 of the MRP that are detected above the lowest applicable water quality objective during the first year of LTA monitoring, stormwater outfall monitoring will be conducted at the frequency specified in the MRP (i.e., monitoring frequency will become 3).

3 PAHs are defined as benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

4.4 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 4-7**.

Table 4-7.
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 for HUC-12s. ○ 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 water bodies with applicable WQBELs. ○ Stormwater outfall monitoring sites chosen using a representative land use approach. ○ List of constituents based on the water quality priorities which includes constituents with WQBELs derived from TMDL WLAs and considers current and historical exceedances in receiving waters.
Determine whether a Permittee's discharge causes or contributes to an exceedance of RWLs.	○ Stormwater outfall monitoring sites chosen to be representative of each HUC-12. ○ 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. ○ Stormwater outfall monitoring sites chosen using a representative land use approach. ○ List of constituents based on the monitoring requirements of the water body to which they discharge, as well as downstream water bodies.

5 Non-Stormwater Outfall Screening and Monitoring Program

Objectives of the non-stormwater outfall monitoring include:

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

Additionally, the outfall screening and monitoring process is intended to prioritize outfalls for assessment and, where appropriate, scheduling of BMPs to address the non-stormwater flows.

The non-stormwater outfall screening and monitoring program is focused on dry weather discharges to receiving waters from major outfalls. The Permit defines a "major outfall" to be a MS4 outfall that discharges from a single pipe with an inside diameter of at least 36 inches, or a MS4 outfall greater than 12 inches in diameter that receives water from 2 acres of land zoned for industrial activity. The program fills two roles; the first is to provide monitoring of whether the non-stormwater constituent load is adversely impacting the receiving water and the second is to assess whether the non-stormwater discharge is allowable. The non-stormwater outfall program is designed to be complimentary to the Illicit Connection/Illicit Discharge (IC/ID) MCM.

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 non-stormwater discharges are identified and assessed during the term of the Permit.
2. For outfalls determined to have significant non-stormwater flow, determine whether flows are the result of IC/IDs, authorized or conditionally exempt non-stormwater 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 non-stormwater 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 non-stormwater discharges on the receiving water.
7. Conduct monitoring or other investigations to identify the source of pollutants in non-stormwater discharges.
8. Use results of the screening process to evaluate the conditionally exempt non-stormwater 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 resources by integrating the screening and monitoring process into existing or planned IMP and/or CIMP efforts.

In summary, the intent of the non-stormwater outfall program is to demonstrate that the Group Members are effectively prohibiting non-exempt or conditionally non-exempt discharges to receiving waters and to assess whether non-stormwater discharges are causing or contributing to exceedances of RWLs. By detecting, identifying, and eliminating illicit discharges, the program will demonstrate efforts by the ESGV Group to effectively prohibit non-stormwater discharges to and from the MS4. Where the discharges are deemed "significant", the program will discern whether they are illicit, exempt, or conditionally exempt. Following the program procedures will allow determination of whether the discharges may be causing or contributing to exceedances of RWLs.

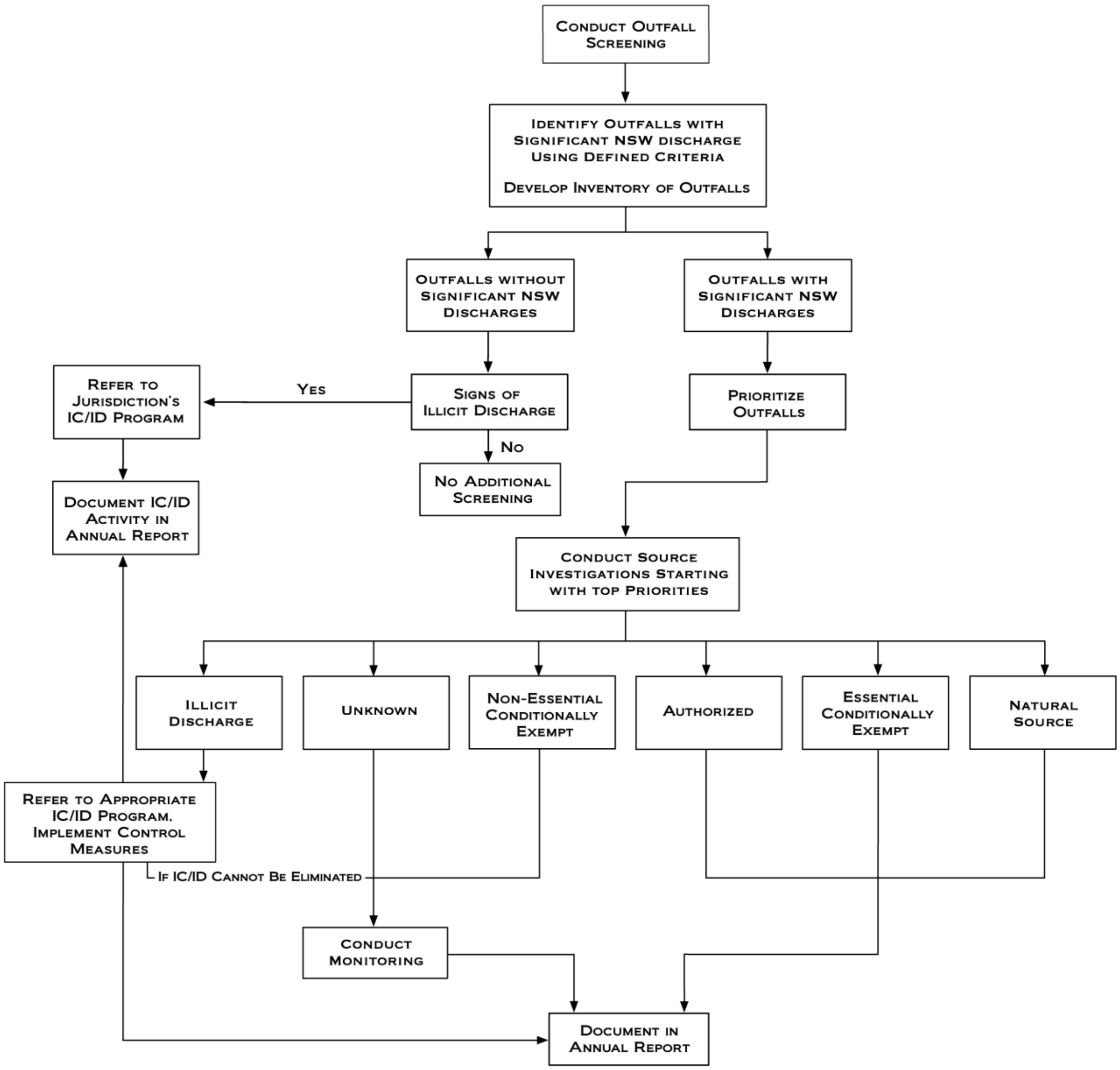
5.1 NON-STORMWATER OUTFALL SCREENING AND MONITORING PROGRAM

The Permit specifies a process for screening, investigating, and ultimately monitoring of outfalls with non-stormwater discharges. For the receiving water and stormwater 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 non-stormwater outfall program, the MRP specifies a process for screening, investigating, and ultimately monitoring. The outfall screening and investigations must be completed prior to initiating monitoring at an individual outfall. A summary of the approach to address the required elements of the non-stormwater outfall program is presented in **Table 5-1**. A flowchart of the program is presented as **Figure 5-1**. Detailed discussion of each element is provided in the following subsections.

Table 5-1.
Non-Stormwater Outfall Screening and Monitoring Program Summary

Element	Description	Implementation Dates
Outfall screening	Implement a screening process to determine which outfalls exhibit significant discharges and those that do not require further investigation.	The screening process will begin summer 2014.
Identify outfalls with significant discharge	Based on data collected during the Outfall Screening process, identify MS4 outfalls with significant discharges.	
Inventory outfalls with discharge	Develop an inventory of major MS4 outfalls with known significant discharges and those requiring no further assessment.	
Prioritize source investigation	Use the data collected during the screening process to prioritize outfalls for source investigations.	
Identify sources of significant discharges	For outfalls exhibiting significant discharges, perform source investigations per the prioritization completed in the previous element.	Source investigations will be conducted for at least 25% of the outfalls with significant discharges by the end of December 28, 2015 and 100% by December 28, 2017.
Monitor discharges exceeding criteria	Using the information collected during screening and source investigation efforts, monitor outfalls that have been determined to convey significant discharges comprised of either unknown or non-essential conditionally exempt discharges, or continuing discharges attributed to illicit discharges are monitored.	First regularly scheduled dry weather monitoring event after the source investigation or after the CIMP has been approved by the Executive Officer, whichever is later.

Figure 5-1.
Non-Stormwater Outfall Screen and Monitoring Program Flow Diagram



5.2 IDENTIFICATION OF OUTFALLS WITH SIGNIFICANT NON-STORMWATER DISCHARGES

Based on a review of the information provided by the ESGV Group, the data necessary to identify significant non-stormwater discharges was not available. Thus, outfall screening will be initiated summer 2014 to collect the information to identify major outfalls exhibiting significant non-stormwater discharges and to develop the information needed for the inventory of outfalls with significant non-stormwater discharges. To help assess seasonality, additional screening will occur in late winter/early spring 2015, and late spring/early summer 2015. Screenings must be completed by early summer 2015 to allow sufficient time to determine which outfalls are significant and perform the assessments by the permit schedule. There are only three screening events planed. The MRP (Part IX.C.1) states that one or more of the following characteristics may determine significant non-stormwater discharges:

- Discharges from major outfalls subject to dry weather TMDLs.
- Discharges for which monitoring data exceeds non-stormwater action levels (NALs).
- Discharges that have caused or have the potential to cause may cause overtopping of downstream diversions.
- Discharges exceeding a proposed threshold discharge rate as determined by the Group Members.
- Persistence of flow.
- Discharges with higher flow rates.
- Larger outfall diameters.
- Discharges with odor, color, or cloudiness.
- Discharges into receiving waters with flows at the point of discharge.

To collect data for determining the significant non-stormwater outfalls, the ESGV Group will perform three dry-weather screenings. The initial screening provides the dual purpose of data collection for completing the outfall database and initial evaluation of outfalls. Each outfall in the EMWP area will be visited during the first screening. If no flow is observed for a particular outfall on both the first and second screenings, it would not be visited on the third event. A standard form will be used to collect characteristic data, consisting of:

- Receiving water channel bottom.
- Presence of water in channel.
- Visual estimate of discharge flow rate as follows:
    a. No flow,
    b. Trickle,
    c. Low flow (like from a garden hose), or
    d. High flow (like from a fire hose)
- Whether discharge ponds in the channel or reaches a flowing receiving water.
- Clarity.
- Presence of odors or foam.

Data collected through the screening process are the characteristics that will be utilized to determine which outfalls should be targeted for the next steps in the non-stormwater outfall program. The characteristics utilized will support a focus on discharges that have, or the potential to have, an impact on receiving waters. The receiving waters within the ESGV WMP area discharge to various downstream water bodies. The components of the outfall screening process are presented in **Table 5-2**.

The determination of significance will be made after the three screenings have been completed and the characteristics have been reviewed. Significant outfalls are persistent, so outfalls found to be flowing on only one event will be removed from consideration. Additionally, outfalls where the estimated flow was high on two or more screenings will be considered significant. Outfalls where turbid waters, or odors or foam were observed on two or more screenings will be referred to the jurisdiction's ICID program.

Table 5-2.
Approach for Establishing a Non-Stormwater Outfall Screening Process

Component	Description
Data Collection	Data include qualitative flow size, channel bottom, ponding of discharge, clarity, color, and odor. Any additional information needed to complete the inventory will be collected. Land use and permitted dischargers will be considered in the evaluation with field data to determine significant non-stormwater discharge.
Frequency	Three field screening events per outfall will be conducted. Visual information will be collected on all flowing drains greater than 12 inches in diameter.
Defining Significant Discharges	Will be determined after screening events are completed. Visual information from the screening, such as flow size persistent flow, flow condition in receiving water, may be considered to determine significant discharges. Land use information or SIC codes may also be considered to include only drains 12 to 36 inches in diameter from areas with industrial drainage.
Timeline	The non-stormwater outfall screening process will begin in the summer of 2014. Additional screenings will occur in winter 2014-2015 and late-Spring/early Summer 2015.

5.3 INVENTORY OF MS4 OUTFALLS WITH NON-STORMWATER DISCHARGES

An inventory of MS4 outfalls must be developed to identify those outfalls with dry weather discharge. The inventory is split into two major categories, those with known significant non-stormwater discharges, and those requiring no further assessment (Part IX.D of the MRP). If the MS4 outfall requires no further assessment, the inventory must include the rationale for the determination of no further action required. Rationale for a determination of no future action would be expected to include 1) the outfall does not have persistent flow; 2) the outfall does not have a significant non-stormwater discharge; or 3) discharges observed were determined to be exempt. The inventory would be included in a database generated by the ESGV Group as required by the MRP. Each year, the inventory must be updated to incorporate the most recent characterization data for outfalls with significant non-stormwater discharges.

The following physical attributes of outfalls with significant non-stormwater discharges must be included in the inventory and is being collected as part of the screening process:

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

5.4 PRIORITIZED SOURCE IDENTIFICATION

Once the major outfalls exhibiting significant non-stormwater discharges have been identified through the screening process and incorporated in the inventory, Part IX.E of the MRP requires that the ESGV Group prioritize the outfalls for further source investigations. The MRP identifies the following prioritization criteria for outfalls with significant non-stormwater discharges:

- Outfalls discharging directly to receiving waters with WQBELs or RWLs in the TMDL provisions for which final compliance deadlines have passed.
- All major outfalls and other outfalls that discharge to a receiving water subject to a TMDL shall be prioritized according to TMDL compliance schedules.
- Outfalls for which monitoring data exist and indicate recurring exceedances of one or more of the non-stormwater action levels (NALs) identified in Attachment G of the Permit.
- All other major outfalls identified to have significant non-stormwater discharges.

Data collected during the three screenings may be used to refine the determination of significance. Once the prioritization is complete, a source identification schedule will be developed. The scheduling will focus on the outfalls with the highest pollutant of concern loading rates first. Unless the results of the field screening justify a modification to the schedule in the MRP, the schedule will ensure that source investigations are completed on no less than 25% of the outfalls with significant non-stormwater discharges by December 28, 2015 and 100% by December 28, 2017.

5.5 SIGNIFICANT NON-STORMWATER DISCHARGE SOURCE IDENTIFICATION

The screening and source identification component of the program is used to identify the source(s) and point(s) of origin of the non-stormwater discharge. Based on the prioritized list of major outfalls with significant non-stormwater discharges, investigations will be conducted to identify the source(s) or potential source(s) of non-stormwater flows.

Source investigations will be conducted using site-specific procedures based on the characteristics of the non-stormwater discharge. 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.

Part IX.A.2 of the MRP requires the source investigation results be classified into one of four endpoints outlined as follows and summarized in **Table 5-3**:

A. <u>IC/IDs</u>: If the source is determined to be an illicit discharge, the procedures to eliminate the discharge consistent with IC/ID requirements must be implemented and document actions.
B. <u>Authorized or conditionally exempt non-stormwater discharges</u>: If the source is determined to be an NPDES permitted discharge, a discharge subject to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or a conditionally exempt essential discharge, the Group Members must document the source. For non-essential conditionally exempt discharges, the Group Members must conduct monitoring consistent with Part IX.G of the MRP to determine whether the discharge should remain conditionally exempt or be prohibited.
C. <u>Natural flows</u>: If the source is determined to be natural flows, the Group Members must document the source.
D. <u>Unknown sources</u>: The Group Members must conduct monitoring consistent with the MRP if a source is unknown.

Table 5-3.
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 non-stormwater discharge addressed by other requirements. Conditionally exempt non-stormwater discharge addressed by other requirements are described in detail in Part III.A. Prohibitions – Non-Stormwater Discharges of the Permit.

Where investigations determine the non-stormwater source to be authorized, natural, or essential conditionally exempt flows, the ESGV Group will conclude the investigation and move to the next highest priority outfall for investigation. Where investigations determine that the source of the discharge is non-essential conditionally exempt, an illicit discharge, or is unknown – further investigation may be conducted to eliminate the discharge or demonstrate that it is not causing or contributing to receiving water problems. In some cases, source investigations may ultimately lead to prioritized programmatic or structural BMPs. Where Group Members determine that they will address the non-stormwater discharge through modifications to programs or by structural BMP implementation, the ESGV Group will incorporate the approach into the implementation schedule developed for the WMP and the outfall can be lowered in priority for investigation, such that the next highest priority outfall may be addressed.

5.6 NON-STORMWATER DISCHARGE MONITORING

As outlined in the MRP, outfalls with significant non-stormwater discharges that remain unaddressed after source investigation shall be monitored to meet the following objectives:

A. Determine whether a discharge is in compliance with applicable non-stormwater WQBELs derived from TMDL WLAs;
B. Determine the quality of a discharge exceeds non-stormwater action levels, as described in Attachment G of the Permit; and
C. Determine whether a discharge causes or contributes to an exceedance of receiving water limitations.

As identified in **Table 5-3**, outfalls that have been determined to convey significant non-stormwater discharges where the source investigations concluded that the source is attributable to a continued illicit discharge (Endpoint A), non-essential conditionally exempt (Endpoint B), or unknown (Endpoint D) must be monitored. Monitoring will begin at the first regularly scheduled dry weather event after completing a source investigation.

5.6.1 Non-Stormwater Outfall-Based Monitoring Sites

The outfall screening and prioritization approach will result in an inventory of outfalls. Where required, the non-stormwater discharge will be monitored per the Permit requirements. The monitoring is described in the following section.

5.6.2 Monitored Parameters and Frequency of Monitoring

The requirements for constituents to be monitored are outlined in the Part VIII.G.1.a-e of the MRP. Outfalls will be monitored for all required constituents except toxicity. Toxicity monitoring is only required when triggered by recent receiving water toxicity monitoring where a Toxicity Identification Evaluation (TIE) on the observed receiving water toxicity test was inconclusive. Additionally, parameters in **Attachment C** will not be able to be identified as exceeding applicable water quality objectives until after the first year of LTA monitoring. A list of parameters applicable to non-stormwater outfall monitoring, based on which receiving water the discharge is to, is presented in **Table 5-4**. Also, constituents associated with suspended sediments transported during wet weather (i.e., PCBs, DDTs, dieldrin, and chlordane) will not be monitored during non-stormwater outfall monitoring.

Table 5-4.
Summary of Non-Stormwater Outfall Monitoring Parameters

Constituent	Subwatershed Annual Frequency (Dry events per year)							
	San Dimas Wash	Walnut Creek Wash	Puddingstone Channel	Marshall Creek	Live Oak Wash	San Jose Creek	Chino Creek	San Antonio Creek
Flow and field parameters(1)	2	2	2	2	2	2	2	2
Pollutants identified in Table E-2 of the MRP	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Hardness and TSS	2	2	2	2	2	2	2	2
Alkalinity		2	2	2	2	2		
Ammonia		2	2	2	2	2		
Total Mercury		2	2	2	2			
Total and Dissolved Copper	2	2	2	2	2	2	2	2
Total and Dissolved Lead	2	2	2	2	2	2	2	2
Total and Dissolved Zinc	2	2	2	2	2	2	2	2
Selenium						2		
E. coli	2	2	2	2	2	2	2	2
Cyanide						2		
PAHs(3)						2		
TDS	2	2	2	2	2	2		
Sulfate	2	2	2	2	2	2		
Chloride	2	2	2	2	2	2		

1 Field parameters are defined as dissolved oxygen, pH, temperature, specific conductivity. Hardness is specified as a field measurement in the Permit, however to be consistent with the receiving water, it will be measured in the laboratory.

2 For pollutants identified in Table E-2 of the MRP (**Attachment C)** that are not detected at the MDL for its respective test method or the result is below the lowest applicable water quality objective during the first year of LTA monitoring, non-stormwater outfall monitoring will not be conducted (i.e., the monitoring frequency will become 0). For pollutants identified in Table E-2 of the MRP that are detected above the lowest applicable water quality objective during the first year of LTA monitoring, Non-stormwater outfall monitoring will become 2.

3 PAHs include: Benzo(a)pyrene, 3,4 Benzofluoranthene, Benzo(k)flouranthene, Chrysene, Dibenzo(a,h)anthracene, and Indeno(1,2,3-cd)pyrene.

The MRP specifies the monitoring frequency for non-stormwater outfall monitoring as the following:

- 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, 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, NALs or water quality standards for pollutants identified on the 303(d) List.

The non-stormwater outfall monitoring events will be coordinated with the dry weather receiving water monitoring events to allow for an evaluation of whether the non-stormwater discharges are causing or contributing to an observed exceedance of water quality objectives in the receiving water. While a monitoring frequency of four times per year is specified in the Permit, it is inconsistent with the dry weather receiving water monitoring requirements. The receiving water monitoring requires two dry weather monitoring events per year. Therefore, non-stormwater outfall monitoring events will be conducted twice per year.

A summary of how the non-stormwater outfall monitoring program meets the intended objectives of the non-stormwater outfall monitoring program outlined in Part II.E.3 of the MRP is presented in **Table 5-5**.

5.6.3 Adaptive Monitoring

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-NALs, or water quality standards for pollutants identified on the 303(d) list, monitoring will cease at an outfall after the first year. The process of updating the CIMP per the monitoring results is presented in **Section 10**. Thus, the number and location of outfalls monitored has the potential to change on an annual basis.

TablJe 5-5.
Summary of Non-Stormwater Outfall Monitoring Program Objectives

MRP Objective	CIMP Component Meeting Objective
Determine whether a Permittee's discharge is in compliance with applicable non-stormwater WQBELs derived from TMDL WLAs	○ List of constituents based on the water quality priorities which incorporate constituents with WQBELs derived from TMDL WLAs and considers current and historical exceedances in receiving waters.
Determine whether a Permittee's discharge exceeds non-stormwater action levels, as described in Attachment G of the MS4 Permit.	○ Extensive list of constituents being collectively monitored at non-stormwater outfall monitoring sites.
Determine whether a Permittee's discharge causes or contributes to an exceedance of RWLs.	○ List of constituents based on the monitoring requirements of the water body to which they discharge, as well as downstream water bodies.
Assist a Permittee in identifying illicit discharges as described in Part VI.D.10 of the MS4 Permit.	○ Non-stormwater outfall program is designed to be complimentary to IC/ID program. ○ Non-stormwater outfall program provides a mechanism for the detection, identification, and elimination of illicit discharges. ○ Where non-stormwater discharges are deemed "significant", the non-stormwater outfall program will discern whether the discharges are illicit, exempt, or conditionally exempt. ○ If the source identification component of the non-stormwater outfall program determines a discharge to be an illicit discharge, the discharge will be referred to the IC/ID program.

6 New Development/Re-Development Effectiveness Tracking

6.1 PROGRAM OBJECTIVES

Group Members have developed mechanisms for tracking information related to new and redevelopment projects that are subject to post-construction BMP requirements in Part VI.D.7 of the Permit. The specific data to be tracked listed in Part X.A of the MRP are listed in **Table 6-1**. The data will be used to assess the effectiveness of the low-impact development (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.

Table 6-1.
Required Data to Track for New and Redevelopment Projects per Attachment E.X.A

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

6.2 EXISTING NEW DEVELOPMENT/RE-DEVELOPMENT TRACKING PROCEDURES

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 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 Group Members will build on the existing procedures for land development to ensure that all required project data is captured.

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 6-2**.

Table 6-2.
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	

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7 Regional Studies

One regional study is identified in the MRP: Southern California Stormwater Monitoring Coalition (SMC). The 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.

On behalf of Group Members, the LACFCD will continue to provide full financial and/or monitoring resources to the SMC regional watershed monitoring program, also known as the Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program (Bioassessment Program). The Bioassessment Program was initiated in 2009 and is 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.

8 Non-Direct Measurements

Water quality data collected through other monitoring programs (e.g., WRPs receiving water monitoring) in the watershed will be evaluated 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 the CIMP to compile and analyze all available data. Data reported by these entities will be evaluated for suitability for inclusion in the CIMP database. If the data are deemed to be suitable they will be included in the ESGV CIMP database. Data from other programs will be used to supplement land use data to evaluate loading to the receiving water as well as to evaluate receiving water quality. 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 consistent with the sampling procedures outlined in this CIMP.
- Sampling collection is performed and documented by a competent party consistent with applicable guidance and this CIMP.
- Sample analysis is conducted using approved analytical method by a certified analytical laboratory.

Receiving water monitoring sites were selected to allow coordination between this CIMP and LACSD receiving water monitoring programs. Currently, the San Gabriel River estuary site, R-8, will be used for dry weather Harbors Toxics TMDL monitoring requirements. If additional sites are moved to be coincident with the Water Reclamation Plant program, environmental data collected by the Water Reclamation Plants may be directly used in place of the monitoring described in this CIMP.

Due to the absence of previously collected monitoring results, an understanding has not been obtained of the extent to which pollutants associated with suspended sediment being discharged from the MS4 may be causing or contributing to the impairments identified in the Harbor Toxics TMDL. As such, to gain a clear understanding, environmental data representative of the entire San Gabriel River WMA will be collected downstream of the ESGV WMP area and directly used for suspended sediment monitoring associated with meeting the requirements of the Harbor Toxics TMDL. The downstream Lower San Gabriel River (LSGR) EWMP Group conducting monitoring in San Gabriel Reach 1 will conduct wet weather suspended sediment monitoring associated with meeting the requirements of the Harbor Toxics TMDL. After a better understanding has been obtained of the extent to which pollutants associated with suspended sediment being discharged from the MS4 are causing or contributing to the impairments identified in the Harbor Toxics TMDL, the Group Members may elect to also conduct suspended sediment monitoring associated with meeting the requirements of the Harbor Toxics TMDL at the receiving water LTA sites.

Non-direct measurements of flow and rainfall information will be obtained from the LACFCD as described in **Attachment D**.

9 Monitoring Procedures

A general outline of the monitoring procedures is presented in this section. Detailed discussion of the procedures is included in **Attachment D**.

9.1 MONITORING PROCEDURES

Monitoring will occur during dry and wet conditions. Wet weather conditions for triggering storm events will be defined as a 70 percent probable forecast of greater than 0.25 inches of precipitation of rain where the preceding 72 hours of dry weather has less than 0.1 inches of rain. The Metals TMDL operationally defines wet-weather where flow at the USGS gage station 11085000 is equal or greater than 260 cfs. Compliance with wet-weather metals allocations will be determined from loading estimates where flows at USGS gage 1108500 are measured greater than 260 cfs. 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. As noted in the Metals TMDL, the 90th percentile flow measured at S14 is 1 cfs, dry weather conditions are operationally defined as where flow measured at the S14 station is less than 1 cfs. In the case of an estuary, dry weather is defined as days with less than 0.1 inches of rain and days more than three days after a rain event of 0.1 inches or greater within the watershed, as measured from at least 50 percent of LACDPW controlled rain gauges within the watershed.

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 as the composition of the receiving water will change less over time; and thus, the grab samples sufficiently characterize the receiving water. Additionally, grab samples for dry weather are consistent with similar programs throughout the region.

Composite samples will be used for wet weather sampling events to sufficiently characterize the receiving water during wet weather. 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; oil and grease), conditions are considered unsafe to collect composite samples, or to perform investigative monitoring where composite sampling or installation of an automatic sample compositor (auto-sampler) may not be warranted. Additionally, if auto-samplers fail during a rain event, or if the rain event is such that composite samples cannot be collected (e.g., very short in duration or volume), grab samples will be collected and submitted for analysis for all analytes. For dry weather toxicity monitoring, the sampling event 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 the San Jose Creek and San Dimas Wash over at least 12 hours. 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 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.

Additional information to support evaluating weather conditions, collecting grab and composite samples, and targeting wet weather sampling events is provided in **Attachment D**.

9.2 ADAPTIVE MONITORING TRIGGER

Monitoring of a specific constituent will be eliminated if:

- For a water body pollutant combination (WBPC) covered in a TMDL, no exceedances are observed over a five-year period.
- For a WBPC on the 303(d) list, data collected are sufficient to support delisting per State policy.
- WBPC being monitored due to downstream 303(d) listings, two years of monitoring of no exceedances are observed for the same condition as the listing (i.e., wet or dry weather).
- Category 3C WBPCs having no exceedances over two years.

Category 3A WBPCs will be moved to Category 3C if there are two years of no observed exceedances. Additionally, monitoring for a constituent at the TMDL receiving water sites may be triggered in the future if two consecutive exceedances during the same condition (i.e., wet or dry weather) are observed at the LTA site. If a TMDL receiving water site has observed two consecutive exceedances during the same condition, the constituent will be added to the nearest upstream stormwater outfall or significant non-stormwater outfall site for wet or dry weather, respectively. Monitoring would be initiated at upstream receiving water monitoring sites during subsequent events until the elimination of the WBPC described above are triggered.

The monitoring data will be reviewed annually to determine if constituent lists for monitoring sites require updating. When additions or removals are triggered, the changes will become effective for the subsequent monitoring season and reported in the annual report.

9.3 AQUATIC TOXICITY TESTING

Aquatic toxicity testing supports the identification of BMPs to address sources of toxicity in urban runoff. The following outlines the approach for conducting aquatic toxicity monitoring and evaluating results. Control measures and management actions to address confirmed toxicity caused by urban runoff are addressed by the WMP, either via currently identified management actions or those that are identified via adaptive management of the WMP. 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 the watershed, *C. dubia* is selected as the most sensitive species. The species also has the advantage of being easily maintained in house mass cultures. The simplicity of the test, the ease of interpreting results, and the smaller volume necessary to run the test, make the test a valuable screening tool.

Per the MRP, acute and chronic 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 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).

For acute and chronic *C. dubia* toxicity testing, if a statistically significant 50% difference in mortality is observed between the sample and laboratory control, a TIE will be performed. If a statistically significant 50% difference in a sub-lethal endpoint is observed between the sample and laboratory control, a confirmatory sample will be collected from the receiving water within two weeks of obtaining the results of the initial sample. If a statistically significant 50% difference in mortality or sub-lethal endpoint is observed between the sample and laboratory control on the confirmatory sample, a TIE will be performed.

In cases where significant endpoint toxicity effects greater than 50% are observed in the original sample, but the follow-up TIE positive control "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.

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 Group Members will prepare a discharge assessment plan if TIEs conducted on consecutive sampling events are inconclusive. Discharge assessments will be conducted after consecutive inconclusive TIEs, rather than after one, because of the inherit variability associated with the toxicity and TIE testing methods.

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 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.

9.4 SUSPENDED SEDIMENT SAMPLING

Most of the organochlorine (OC) pesticides and PCBs tend to strongly associate with sediment and organic material. 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. Use of filtration methods in combination with conventional analytical methods requires collection of extremely large volumes of stormwater and challenging filtration processes. Although use of lower sediment volumes may be possible, both detection limits and quality control measures might be impacted.

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). HRMS analyses are quantified by isotope dilution techniques. Analytical performance is measured by analysis of Ongoing Precision and Recovery (OPR) analyses and labeled compound recovery. 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 the County related to TMDL monitoring of suspended sediments have often led to the need to composite sediments collected over multiple storm events.

Where analyses for storm borne sediment are required, the HRMS method will be used to quantify the constituents. Details of the method are presented in **Attachment D**.

10 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 that will require modifications to the monitoring sites, schedule, frequency or parameters. In particular, the non-stormwater 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.

10.1 INTEGRATED MONITORING AND ASSESSMENT PROGRAM

Monitoring is based on water quality issues identified in downstream water bodies. As data are collected and currently identified constituents prove to not be an issue in the ESGV WMP area water bodies, they will be removed from the monitoring program. Likewise, if new constituents are identified, they will be added to the ongoing monitoring program. 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.
- Inconclusive TIEs result in additional receiving water toxicity monitoring.
- Additional upstream receiving water monitoring is necessary to characterize the spatial extent of RWL exceedances.
- Additional outfall monitoring is needed in response to RWL exceedances.
- Non-stormwater 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 WMP as feedback for the water quality changes resulting from control measures implemented by the Group Members. As a result, additional changes may be considered during the evaluation based on the control measure implementation needs.

10.2 CIMP REVISION PROCESS

A range of sampling specified in the CIMP may result in data that will require changes to ensure monitoring meets the requirements and intent of the MRP and supports WMP 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. 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., October 1 of the year following the annual report submittal), consisting of:

1. Adding constituents 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, i.e. not previously monitored, and are not detected at levels above relevant water quality objectives in the first year of monitoring.
3. Discontinuing monitoring of any Category 3 constituent at a specified site if there are two consecutive years of monitoring for the same condition (i.e., wet or dry weather) with no exceedances observed.
4. Modifying methods for consistency with USEPA method requirements or to achieve lower detection limits.
5. Changing analytical laboratories.
6. Relocating an outfall monitoring location determined to be not representative of MS4 discharges in the WMP area, for reasons other than the observed water quality, or because monitoring at the site is not feasible.
7. Implementing the changes associated with conducting at least one re-assessment of the Non-stormwater Outfall Program during the Permit term.
8. Modifications to sampling protocols resulting from coordination with other watershed monitoring programs. In particular, suspended sediment monitoring associated with meeting the requirements of the Harbor Toxics TMDL will be conducted downstream of the WMP area. If consistent exceedances of interim WQBELs are observed and the MWP group determines that control measures will need to be implemented to meet the final WQBELs by March 23, 2032, the group will commence monitoring at the LTA site to assess the degree to which discharges from the WMP area are causing or contributing to those exceedances. After March 23, 2032, if there are two consecutive monitoring events with exceedances observed, the WMP Group will commence monitoring at the stormwater outfall monitoring sites to assess the degree to which discharges from each of the Group Members may be causing or contributing to those exceedances.

Should additional modifications be identified that are not specified in this section that would be major changes to the approach (e.g., moving or removing a stormwater outfall or receiving water location), the modifications will be proposed in the annual report and in a separate letter to the Regional Board Executive Officer for approval.

11 Reporting and Data Management

The following sections provide an overview of the monitoring and reporting the Group Members will follow. Details of the data management and reporting are included in **Attachment D**.

11.1 DOCUMENTS AND RECORDS

The ESGV Group shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the Permit, and records of all data used to completed the Report of Waste Discharge and application of the Permit, for a period of at least three years from the date of the sample, measurement, report, or application.

11.1.1 Event Summary Reports

Reports of monitoring activities will include, at a minimum, the following information:

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

11.1.2 Semi-Annual Analytical Data Reports

Results from each of the receiving water or outfall based monitoring station conducted in accordance with standard operating procedures shall be sent electronically to the Regional Board's stormwater site at MS4stormwaterRB4@waterboards.ca.gov. 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, or aquatic toxicity thresholds.
- Corresponding sample dates and monitoring locations.

Semi-annual data reports will be submitted June 15 and December 15 of each year. The mid-year data reports will cover the monitoring period of July 1 through December 31. The December data report will cover January 1 through June 30.

11.2 MONITORING REPORTS

Annual monitoring reports will be submitted by December 15 of each 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

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**.

11.3 DATA MANAGEMENT

The acceptability of data is determined through data verification and data validation. In addition to the programmatic data quality objectives, the standard data validation procedures documented in the subcontracted laboratory's quality assurance (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 ESGV Group will perform an independent review and validation of analytical results. Decisions to reject or qualify data will be made, based on the evaluation of field and laboratory quality control data. Data verification is the process of checking required methods and procedures have been followed at all stages of the data collection process, including: collection, receipt, preparation, and analysis of samples; and review of generated results for completeness. Data validation is the process to determine if project requirements are met, including: obtaining the documents and records produced during data verification and evaluating the quality of the data generated by the laboratory equipment to evaluate the acceptability of the analytical results as representative measures of the conditions in the original sample.

The field log and analytical data generated will be converted to a standard database format. After data entry or data transfer procedures are completed for each sample event, data will be validated. After the final quality assurance checks for errors are completed, the data will be added to the database. Details of the data management protocols are provided in **Attachment D**.

12 Schedule for CIMP Implementation

The CIMP will become effective July 1, 2015, or 90 days after approval by the Executive Officer of the Regional Board whichever is later. However, new and redevelopment effectiveness tracking will begin no later than the date of Draft WMP submittal (June 28, 2014).

During the CIMP approval process all existing monitoring will continue. Within 90 days of CIMP approval, sample collection for all constituents at all dry and 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) auto-sampler installation and (2) monitoring that is dependent upon prerequisite information (e.g., monitoring of significant non-stormwater discharges).

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

- Detailed auto-sampler 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, United States Fish and Wildlife Service, California Department of Fish and Game, California 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.

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 requiring an alternate or a new site.

Phase I of the CIMP Implementation:

- Fiscal Year 2014-2015.
- Non-stormwater screening.
- Dry weather monitoring at all locations (beginning July 1, 2015 or 90 days after CIMP approval; whichever is later.)

Phase II of the CIMP Implementation (assuming CIMP approved by July 1, 2015):

- Fiscal Year 2015-2016.
- Determination of significant non-stormwater outfalls.
- Installation of LTA receiving water site.
- Installation of 2 TMDL receiving water sites.
- Dry weather monitoring at all locations.
- Stormwater monitoring at existing and new sites.

Phase III of the CIMP Implementation (assuming CIMP approved by July 1, 2015):

- Fiscal Year 2016-2017.
- Installation of 3 stormwater outfall sites.
- Dry weather monitoring at all locations.
- Stormwater monitoring at existing and new sites.

Phase IV of the CIMP Implementation (assuming CIMP approved by July 1, 2015):

- Fiscal Year 2017-2018.
- Dry weather monitoring at all locations.
- Stormwater monitoring at existing sites.
- Installation of optional TMDL receiving water site as necessary.

13 References

Regional Board, 2013. Final Staff Report for the Implementation Plans and Schedules for the Los Cerritos Channel and San Gabriel River Metals TMDLs.

Regional Board, 2011. Amendment to the Water Quality Control Plan – Los Angeles Region to Incorporate the Total Maximum Daily Load for Toxic Pollutants in Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters. Attachment A to Resolution No. R11-008. Adopted May 5, 2011. Effective March 23, 2012.

Regional Board, 2012. Water Discharge Requirements for Municipal Separate Storm Sewer Systems (MS4s) Discharges within the Coastal Watersheds of Los Angeles County, Except Those Discharges Originating from the City of Long Beach MS4. Order No. R4-2012-0175. NPDES No. CAS004001. December 6

USEPA, 2007. Total Maximum Daily Loads for Metals and Selenium – San Gabriel River and Impaired Tributaries. USEPA Region 9. March 26, 2007.

USEPA, 2012. Los Angeles Area Lakes Total Maximum Daily Loads for Nitrogen, Phosphorus, Mercury, Trash, Organochlorine Pesticides and PCBs. USEPA Region 9. March 26, 2012.

Attachment A

Middle Santa Ana River Water Quality Monitoring Plan

City of Claremont:

http://www.swrcb.ca.gov/rwqcb8/water_issues/programs/tmdl/docs/msar/cbrp/scb/CBRP_City_of_Claremont.pdf

City of Pomona:

http://www.swrcb.ca.gov/rwqcb8/water_issues/programs/tmdl/docs/msar/cbrp/scb/CBRP_City_of_Pomona.pdf

Attachment B

Monitoring Location Fact Sheets

B-1 Receiving Water Sites

B-1.1 Live Oak Wash Long Term Assessment Site

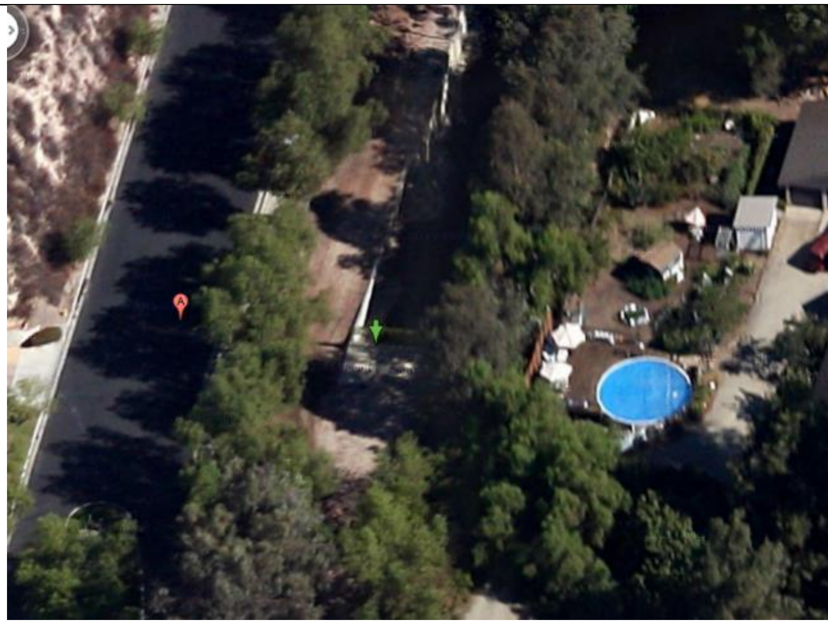
Waterbody Name	Waterbody Type	Site ID	Historical Site ID	Site Type	Latitude	Longitude
Live Oak Wash	Tributary	ESGV_LOW_DS	N/A	LTA, TMDL	34.094064	-117.792934

General Description: LTA monitoring site located upstream of where Live Oak Wash discharges into Puddingstone Reservoir and downstream of the confluence of all major tributaries with Live Oak Wash. Because Live Oak Wash is a soft-bottomed channel and irregularly shaped at the location of the LTA monitoring site, flow will be measured upstream of the LTA monitoring site within Puddingstone Channel, Marshal Creek, and at Live Oak Wash upstream of the confluence of these tributaries.

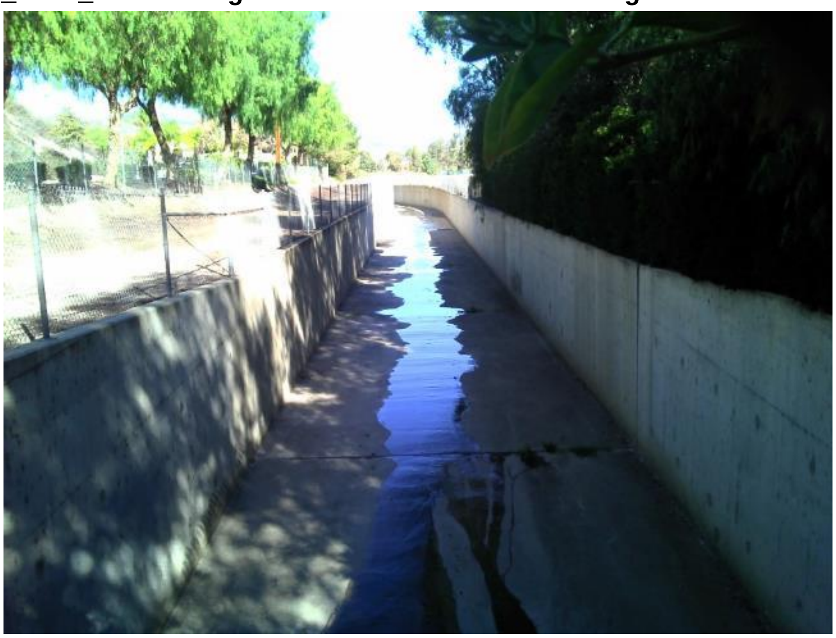
ESGV_LOW_DS Aerial View

ESGV_LOW_DS Looking Upstream

ESGV_LOW_DS Looking Downstream



ESGV_LOW_DS Puddingstone Channel Flow Monitoring Location Aerial View

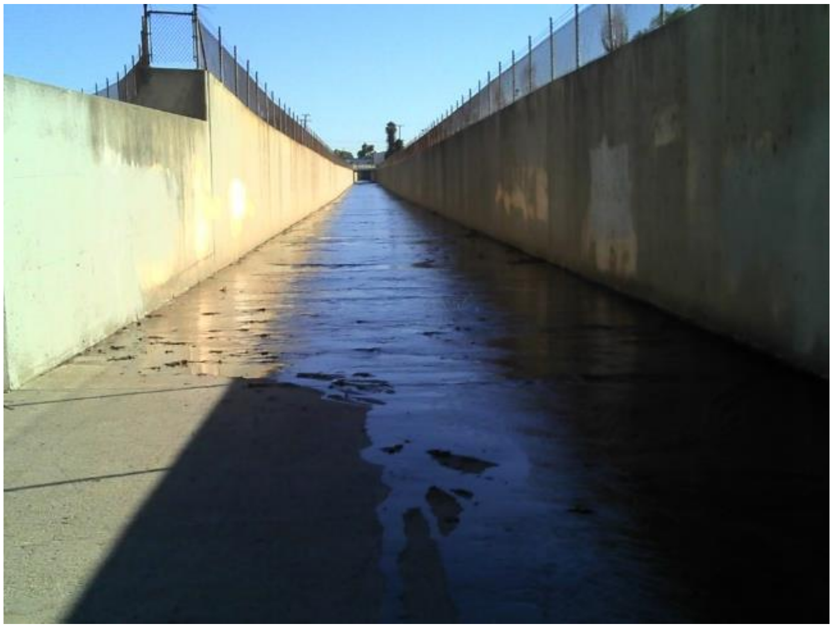


ESGV_LOW_DS Puddingstone Channel Flow Monitoring Location Looking Upstream

ESGV_LOW_DS Marshall Creek Flow Monitoring Location Aerial View

ESGV_LOW_DS Marshall Creek Flow Monitoring Location Looking Upstream

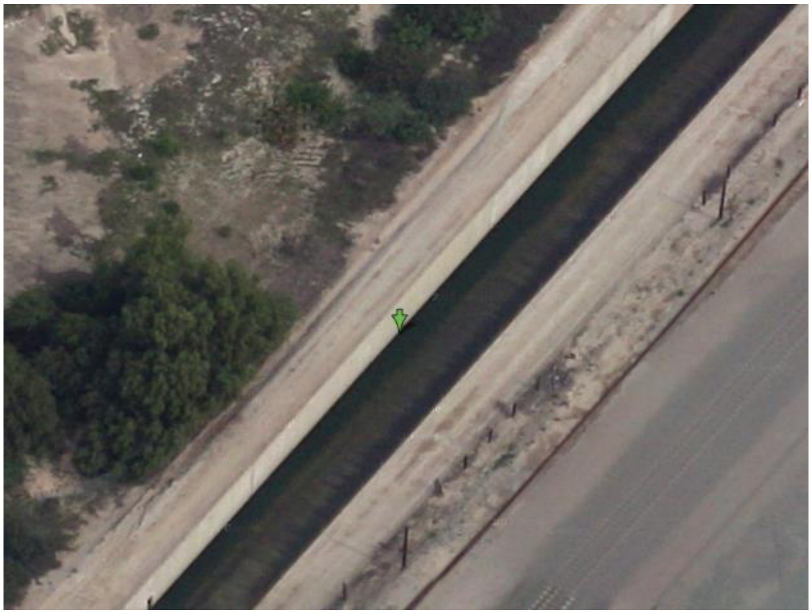
ESGV_LOW_DS Live Oak Wash Flow Monitoring Location Aerial View



ESGV_LOW_DS Live Oak Wash Flow Monitoring Location Looking Upstream

B-1.2 San Jose Creek TMDL site

Waterbody Name	Waterbody Type	Site ID	Historical Site ID	Site Type	Latitude	Longitude
San Jose Creek	Tributary	ESGV_SJC_DS	N/A	TMDL	34.032233	-117.824894
General Description: TMDL monitoring site located at the downstream intersection of San Jose Creek and the ESGV Group's jurisdictional boundary.						

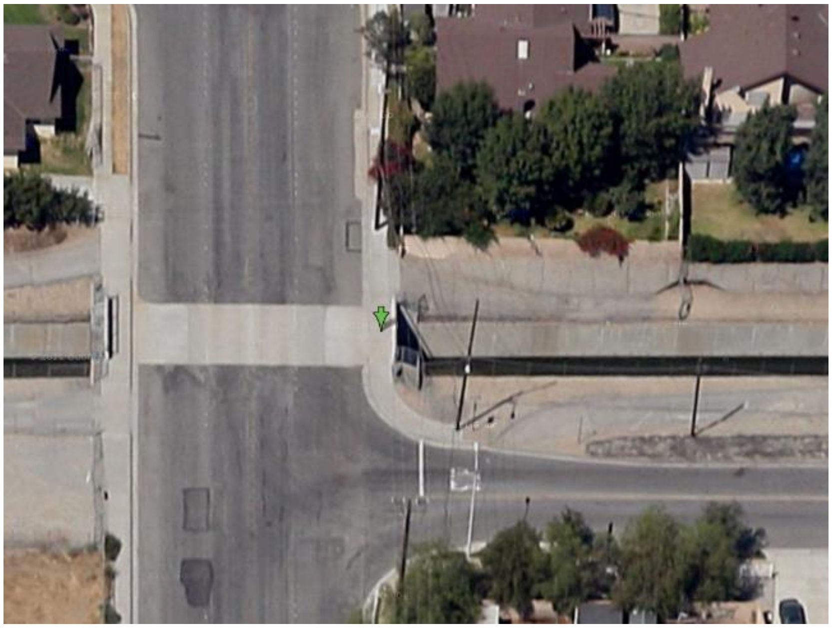


ESGV_SJC_DS Aerial View

ESGV_SJC_DS Looking Upstream

B-1.3 San Dimas Wash Special Study Assessment site

Waterbody Name	Waterbody Type	Site ID	Historical Site ID	Site Type	Latitude	Longitude
San Dimas Wash	Tributary	ESGR_SDW_DS	N/A	TMDL	34.121341	-117.820088
General Description: TMDL monitoring site located at the downstream intersection of San Dimas Wash and the ESGV Group's jurisdictional boundary.						



ESGV_SDW_DS Aerial View

ESGV_SDW_DS Looking Downstream

B-1.4 Walnut Creek Wash Optional TMDL Site

Waterbody Name	Waterbody Type	Site ID	Historical Site ID	Site Type	Latitude	Longitude
San Dimas Wash	Tributary	ESGR_WCW_DS	N/A	TMDL	34.086672	-117.845592
General Description: TMDL monitoring site located at the downstream of Puddingstone Dam and upstream of the ESGV Group's jurisdictional boundary.						

ESGV_SDW_DS Looking Downstream

B-2 Stormwater Outfall Sites

B-2.1 MTD 766

HUC-12	City	Drain Name	Size	Site Type	Latitude	Longitude
Big Dalton Wash	San Dimas	MTD 766	42 inches	SW Outfall	34.12417	-117.80215

General Description: New SW outfall monitoring site discharging to San Dimas Wash just upstream of Foothill Blvd. Receives drainage from San Dimas and La Verne. Primary land use types include: 89% residential; 10% commercial/industrial; and 1% agricultural.

MTD 766 Aerial View

MTD 766

B-2.2 BI 0566 Line A

HUC-12 Equivalent	City	Drain Name	Size	Site Type	Latitude	Longitude
Upper San Jose Creek	Pomona	BI 0566 Line A	84 inches	SW Outfall	34.09926	-117.75468

General Description: New SW outfall monitoring site discharging to Thompson Wash upstream of Bonita Ave. Receives drainage from Pomona and Claremont. Primary land use types include: 83% residential; 15% commercial/industrial; and 2% open space.

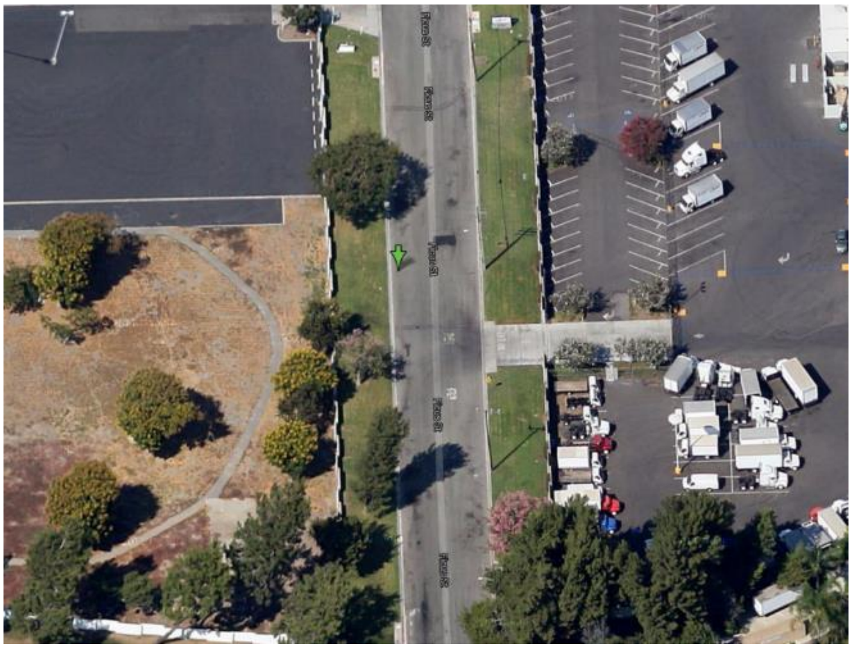
BI 0566 Line A Aerial View

BI 0566 Line A

B-2.3 San Antonio Drain Unit 1

HUC-12	City	Drain Name	Size	Site Type	Latitude	Longitude
Upper Chino Creek	Pomona	San Antonio Drain Unit 1	120 inches	SW Outfall	34.01976	-117.73575

General Description: New SW outfall monitoring site discharging to Chino Creek. Located on Ficus St north of Riverside Dr at nearest manhole upstream of outfall. Receives drainage from Pomona. Primary land use types include: 67% residential; 31% commercial/industrial; and 2% open space.



San Antonio Drain Unit 1 Aerial View

San Antonio Drain Unit 1 Looking South Towards Outfall

Attachment C

Table E-2 of the Monitoring and Reporting Program

Table E-2 of the Monitoring and Reporting Program

CONSTITUENTS
CONVENTIONAL POLLUTANTS
Oil and Grease
Total Phenols
Cyanide
pH
Temperature
Dissolved Oxygen
BACTERIA
Fecal Coliform
E. coli
GENERAL
Dissolved Phosphorus
Total Phosphorus
Turbidity
Total Suspended Solids
Total Dissolved Solids
Volatile Suspended Solids
Total Organic Carbon
Total Petroleum Hydrocarbon
Biochemical Oxygen Demand
Chemical Oxygen Demand
Total Ammonia-Nitrogen
Total Kjeldahl Nitrogen
Nitrate-Nitrogen
Alkalinity
Specific Conductance
Total Hardness
MBAS
Chloride
Fluoride
Methyl tertiary butyl ether (MTBE)

CONSTITUENTS
Perchlorate
METALS
Aluminum
Antimony
Arsenic
Beryllium
Cadmium
Chromium (total)
Chromium (Hexavalent)
Iron
Lead
Mercury
Nickel
Selenium
Silver
Thallium
Zinc
SEMIVOLATILE ORGANIC COMPOUNDS
Acids
2-Chlorophenol
4-Chloro-3-methylphenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2-Nitrophenol
4-Nitrophenol
Pentachlorophenol
Phenol
2,4,6-Trichlorophenol
Base/Neutral
Acenaphthene
Acenaphthylene

CONSTITUENTS
Anthracene
Benzidine
1,2 Benzanthracene
Benzo(a)pyrene
Benzo(g,h,i)perylene
3,4 Benzofluoranthene
Benzo(k)fluoranthene
Bis(2-Chloroethoxy) methane
Bis(2-Chloroisopropyl) ether
Bis(2-Chloroethyl) ether
Bis(2-Ethylhexl) phthalate
4-Bromophenyl phenyl ether
Butyl benzyl phthalate
2-Chloroethyl vinyl ether
2-Chloronaphthalene
4-Chlorophenyl phenyl ether
Chrysene
Dibenzo(a,h)anthracene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
1,2-Dichlorobenzene
3,3-Dichlorobenzidine
Diethyl phthalate
Dimethyl phthalate
di-n-Butyl phthalate
2,4-Dinitrotoluene
2,6-Dinitrotoluene
4,6 Dinitro-2-methylphenol
1,2-Diphenylhydrazine
di-n-Octyl phthalate
Fluoranthene
Fluorene
Hexachlorobenzene

CONSTITUENTS
Hexachlorobutadiene
Hexachloro-cyclopentadiene
Hexachloroethane
Isophorone
Naphthalene
Nitrobenzene
N-Nitroso-dimethyl amine
N-Nitroso-diphenyl amine
N-Nitroso-di-n-propyl amine
Phenanthrene
Pyrene
1,2,4-Trichlorobenzene
CHLORINATED PESTICIDES
Aldrin
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC (lindane)

CONSTITUENTS
alpha-chlordane
gamma-chlordane
4,4'-DDD
4,4'-DDE
4,4'-DDT
Dieldrin
alpha-Endosulfan
beta-Endosulfan
Endosulfan sulfate
Endrin
Endrin aldehyde
Heptachlor
Heptachlor Epoxide
Toxaphene
POLYCHLORINATED BIPHENYELS
Aroclor-1016
Aroclor-1221
Aroclor-1232

CONSTITUENTS
Aroclor-1242
Aroclor-1248
Aroclor-1254
Aroclor-1260
ORGANOPHOSPHATE PESTICIDES
Atrazine
Chlorpyrifos
Cyanazine
Diazinon
Malathion
Prometryn
Simazine
HERBICIDES
2,4-D
Glyphosate
2,4,5-TP-SILVEX

Attachment D

Analytical and Monitoring Procedures

Attachment D 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

D-1 Analytical Procedures

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

D-1.1 Field Parameters

Portable field meters will measure field parameters within specifications outlined in **Table D-1**.

Table D-1.
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	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

D-1.2 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, 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 ESGV Group 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 D-2** and **Table D-3** 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 D-2** 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 D-2** and **Table D-3** are considered equivalent and can be used in place of the methods presented in **Table D-2** and **Table D-3**.

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 D-2** and **Table D-3**. 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 D-4**.

Table D-2.
Analytical Methods and Reporting Limits (RLs) 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
Bacteria				
Escherichia coli	SM 9221	MPN/100mL	10	235
Conventionals				

Parameter/Constituent	Method[1]	Units	Project RL	MRP Table E-2 ML
Oil and Grease	EPA 1664A	mg/L	5	5
Cyanide	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	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	SMOL-5210	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 375.4	mg/L	1	NA
Perchlorate	EPA 314.0	µg/L	4	4
Chlorophyll a	SM 10200 H	mg/L	0.01	NA
Dissolved Phosphorus	SM 4500-P E	mg/L	0.05	0.05
Total Phosphorus	SM 4500-P E	mg/L	0.05	0.05
Orthophosphate-P	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 Kjehdahl 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 200.8	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
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
Cis-nonachlor	EPA 608	ng/L	200	NA
Trans-nonachlor	EPA 608	ng/L	200	NA
2,4'-DDD	EPA 625/ 8270C	ng/L	2	NA
2,4'-DDE	EPA 625/ 8270C	ng/L	2	NA
2,4'-DDT	EPA 625/ 8270C	ng/L	2	NA

Parameter/Constituent	Method[(1)]	Units	Project RL	MRP Table E-2 ML
4,4'-DDD	EPA 625/ 8270C	ng/L	50	50
4,4'-DDE	EPA 625/ 8270C	ng/L	50	50
4,4'-DDT	EPA 625/ 8270C	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 625/ 8270C	ng/L	2	NA
Aroclors (1016, 1221, 1232, 1242, 1248, 1254, 1260)	EPA 608/ 625/ 8270C	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
Dioxins				
2,3,7,8-TCDD	EPA 1613	ng/L	0.005	NA
1,2,3,7,8-PeCDD	EPA 1613	ng/L	0.025	NA
1,2,3,7,8-PeCDF	EPA 1613	ng/L	0.025	NA
2,3,4,7,8-PeCDF	EPA 1613	ng/L	0.025	NA
1,2,3,4,7,8-HxCDD	EPA 1613	ng/L	0.025	NA
1,2,3,6,7,8-HxCDD	EPA 1613	ng/L	0.025	NA

Parameter/Constituent	Method[1]	Units	Project RL	MRP Table E-2 ML
1,2,3,7,8,9-HxCDD	EPA 1613	ng/L	0.025	NA
1,2,3,4,7,8-HxCDF	EPA 1613	ng/L	0.025	NA
1,2,3,6,7,8-HxCDF	EPA 1613	ng/L	0.025	NA
1,2,3,7,8,9-HxCDF	EPA 1613	ng/L	0.025	NA
2,3,4,6,7,8-HxCDF	EPA 1613	ng/L	0.025	NA
1,2,3,4,6,7,8-HpCDD	EPA 1613	ng/L	0.025	NA
1,2,3,4,6,7,8-HpCDF	EPA 1613	ng/L	0.025	NA
1,2,3,4,7,8,9-HpCDF	EPA 1613	ng/L	0.025	NA
OCDD	EPA 1613	ng/L	0.025	NA
OCDF	EPA 1613	ng/L	0.050	NA
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
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

Parameter/Constituent	Method[1]	Units	Project RL	MRP Table E-2 ML
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
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

Parameter/Constituent	Method[(1)]	Units	Project RL	MRP Table E-2 ML
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 625	µg/L	1	1
1,2-Dichlorobenzene	EPA 625	µg/L	1	1
1,3-Dichlorobenzene	EPA 625	µg/L	1	1
1,4-Dichlorobenzene	EPA 625	µg/L	1	1
2-Chloroethyl vinyl ether	EPA 625	µg/L	1	1
Methyl tert-butyl ether (MTBE)	EPA 625	µg/L	1	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 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 D-3.
Analytical Methods and Reporting Limits (RLs) 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

Parameter/Constituent	Method[1]	Units	Project RL
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
Total PCBs[2]	USEPA 8270C/8270D-SIM	ng/dry g	0.2
Metals			
Cadmium	EPA 6020	µg/dry g	0.05
Copper	EPA 6020	µg/dry g	0.05
Lead	EPA 6020	µg/dry g	0.05
Silver	EPA 6020	µg/dry g	0.05
Zinc	EPA 6020	µg/dry g	0.05

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 D-4.
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 oC	+ 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%
Dioxin(3)	50 – 150%	0 – 25%	50 – 150%	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				
% 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%

Dieldrin[3]	50 – 150%	0 – 25%	50 – 150%	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 D-2** and **Table D-3**for a list of individual constituents in each suite for water, sediment, and tissue, respectively.

D-1.3 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.

D-1.4 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 D-2**. 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.

D-1.5 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.

D-1.6 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 D-5**. The analytical laboratories will supply sample containers that already contain preservative (**Table D-5**), including ultra-pure hydrochloric and nitric acid, where applicable. After collection, samples will be stored at 4°C until arrival at the contract laboratory.

Table D-5.
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	40 L	Store at 4°C	36 hours[2]
Follow-Up Testing				
Phase I TIE				
E. coli (fresh)	PE	120 mL	Na2S2O3 and Store at 4°C	8 hours
Oil and Grease	PE	250 mL	HCl and Store at 4°C	28 days
Chlorophyll a	Amber PE	1 L	Store at 4°C	Filter w/in 48 hours, 28 days
Cyanide	PE	1 L	NaOH 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	H2SO4 and Store at 4°C	28 days
Total Petroleum Hydrocarbon	Glass	1 L	HCl or H2SO4 and Store at 4°C	7/40 days[3]
Biochemical Oxygen Demand	PE	1L	Store at 4°C	48 hours
Chemical Oxygen Demand	PE	500 mL	H2SO4 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

Parameter	Sample Container	Sample Volume(1)	Immediate Processing and Storage	Holding Time
Chloride	PE	250 mL	Store at 4°C	28 days
Sulfate				28 days
Boron	PE	250-mL	Store at 4°C	180 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				
Ammonia Nitrogen	Glass	250-mL	H2SO4 and Store at 4°C	28 days
Total and Dissolved Phosphorus				
Organic Nitrogen				
Nitrate + Nitrite (as N)				
Total Kjehdahl Nitrogen (TKN)	PE	250 mL	H2SO4 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	500 mL	Store at 4°C	180 days
Metals				6 months(4)
Mercury	Glass	500 mL	Store at 4°C	48 Hours
Dioxin	Amber glass	2 x 1 L	Store at 4°C	1 year
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 and Metals	Amber glass	20 x 1 L	Store at 4°C	1 year(5)
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				

Parameter	Sample Container	Sample Volume(1)	Immediate Processing and Storage	Holding Time
% Solids	Glass	2 x 8 oz jar	Store at 4°C	7 days
Total Organic Carbon (TOC)				1 year(6)
OC Pesticides, PCBs, PAHs				1 year(5)
Metals				
Tissue				
% Lipids	teflon sheet	200 g	Store on dry ice	1 year(5)
Chlordane				
DDTs				
Dieldrin				

PE – Polyethylene

4. Additional volume may be required for QC analyses.
5. 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.
6. 7/40 = 7 days to extract and 40 days from extraction to analysis.
7. 6 months after preservation.
8. One year if frozen, otherwise 14 days to extract and 40 days from extraction to analysis.
9. One year if frozen, otherwise 28 days.

D-1.7 Aquatic Toxicity Testing and Toxicity Identification Evaluations

Aquatic toxicity testing supports the identification of BMPs to address sources of toxicity in urban runoff. 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 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 WMP, either via currently identified management actions or those that are identified via adaptive management of the WMP.

D-1.7.1 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 discuss the species selection process for assessing aquatic toxicity in receiving waters.

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 Method 1000.04).
- A static renewal toxicity test with the daphnid, Ceriodaphnia dubia (Survival and Reproduction Test Method 1002.05).
- A static renewal toxicity test with the green alga, Selenastrum capricornutum (also named Raphidocelis subcapitata) (Growth Test 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 watershed, metals, historical organics, and currently used pesticides 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. 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 to C. dubia, with no toxicity 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. C. dubia is also the test organism selected to assess the ambient toxicity of the Los Angeles River by the Los Angeles River Watershed Monitoring Program and has been the most-sensitive species to the Donald C. Tillman and the Los Angeles-Glendale Water Reclamation Plant effluent as well as the Los Angeles River receiving water in the vicinity of the water treatment plants. 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 the 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 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 the watershed, C. dubia is selected as the most sensitive species. The species also has the advantage of being easily maintained in house mass cultures. The simplicity of the test, 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 $CaCO_3$) and can have increased sensitivity to elevated water hardness greater than 400 mg/L $CaCO_3$), which is beyond their typical habitat range. Because of this, in instances where hardness in site waters exceeds 400 mg/L ($CaCO_3$), 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).

D-1.7.2 Testing Period

The following describes the testing periods to assess toxicity in samples collected in the WMP area during dry and wet weather conditions. Although wet weather conditions in the region generally persist for less than the chronic testing periods (typically 7 days), the *C. dubia* chronic testing, 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 samples in accordance with *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (USEPA, 2002a).

D-1.7.3 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.

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

D-1.7.4 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 future support evaluation of potential toxicants. TIEs will perform the manipulations described in **Table D-6**. TIE methods will generally adhere to USEPA procedures documented in conducting TIEs (USEPA, 1991, 1992, 1993a-b).

Table D-6.
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*	Removes particulates and associated toxicants
Ethylenedinrilo-Tetraacetic Acid (EDTA) or Cation Exchange Column*	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) *	Reduces toxicity from organophosphate pesticides such as diazinon, chlorpyrifos and malathion, and enhances pyrethroid toxicity
Carboxylesterase addition(1)	Hydrolyzes pyrethroids
Temperature adjustments(2)	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	Further resolution of SPE-extracted compounds for chemical analyses
No Manipulation*	Baseline test for comparing the relative effectiveness of other manipulations

* 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".

1. 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).
2. 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 ESGV Group will identify the cause(s) of toxicity using the treatments in **Table D-6** 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 goals 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 (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 ntify the pollutant or analytical class of pollutants, the result of a TIE is considered conclusive. utilized to identify specific constituents causing toxicity in a given sample if information beyond what is gained via the Phase I TIE and review of chemistry data is needed to identify constituents to monitor or management actions. 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 ide

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.

13.1.1 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 D-1.7.3 and D-1.7.4, 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:

- ULARWMAG 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.

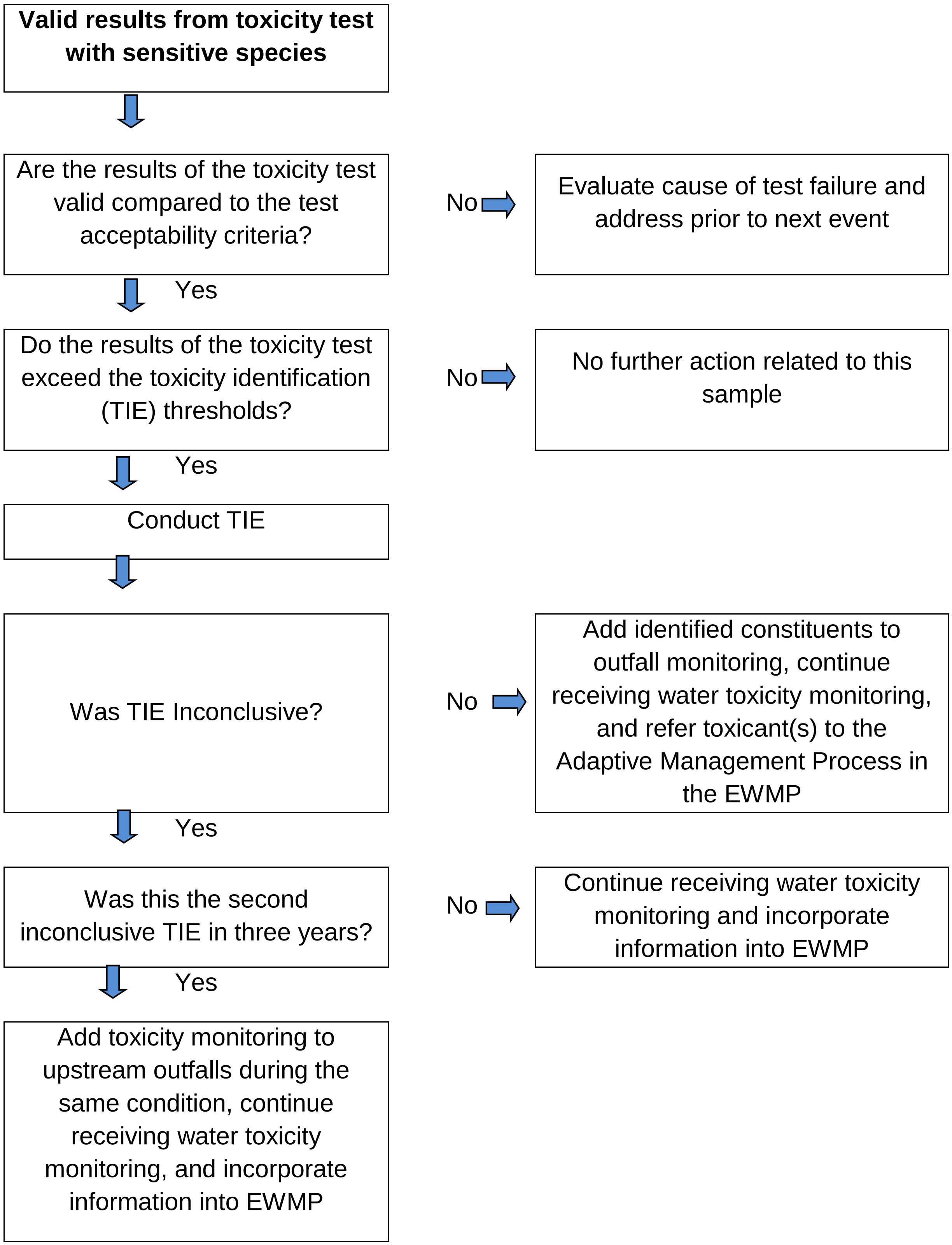
The list of constituents monitored at outfalls identified in the CIMP will be modified based on the results of the TIEs. Monitoring for constituents identified based on the results of a TIE will occur as soon as feasible following the completion of a successful TIE (i.e., the next monitoring event that 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 ULAR 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.

D-1.7.5 Summary of Aquatic Toxicity Monitoring

The approach to conducting aquatic toxicity monitoring as described in the previous sections of this Attachment is summarized in detail in **Figure D-2**. 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 D-2.
Detailed Aquatic Toxicity Assessment Process



D-1.8 Bio-Assessment/Macrobenthic Community Assessment

The LACFCD has indicated that it will continue its participation in the SMC Regional Bioassessment Monitoring Program on behalf of the ESGV Group. Thus no specific monitoring and analytical procedures are included in the CIMP at this time. If in the future, such monitoring is necessary under this program, the CIMP will be revised to include appropriate procedures.

D-1.8.1 List of Laboratories Conducting Analysis

The chosen laboratories will be able to meet the measurement quality objectives set forth in **Table D-2** through **Table D-4**. 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 D-7**. 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 ESGV Group will assess the laboratories performance and at that time a new laboratory may be chosen.

Table D-7.
Summary of Laboratories Conducting Analysis for the ESVG 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.

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 ESGV Group.

D-2 Sampling Method and Sample Handling

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

D-2.1 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 D-8 provides a checklist of field equipment to prepare prior to each monitoring event.

Table D-8.
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
☐	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
☐	Clean Secondary Container(s)
☐	Field Measurement Equipment
☐	New Powder-Free Nitrile Gloves
☐	Writing Utensils
☐	Stop Watch
☐	Camera
☐	Blank Water

D-2.1.1 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 D-5** 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.

D-2.1.2 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. Sample identification codes will consist of a site identification code, a matrix code, and a unique sample identification code. The format for sample identification codes is ESGV- ###.# - AAAA - XXX, where:

- ESGV indicates that the sample was collected as part of the ESGV CIMP.
- ###- identifies the sequentially numbered monitoring event, and the # 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	Analytical Laboratory

D-2.1.3 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 D-1**and be calibrated before field events based on manufacturer guidance, but at a minimum prior to each event. **Table D-9** 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 ESGV Group 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 D-1**. Calibration verification documentation will be retained in the event's calibration verification log (presented in Appendix 1).

Table D-9.
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.			

D-2.1.4 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. As noted in the Metals TMDL, the 90th percentile flow measured at S14 is 1 cfs, dry weather conditions are operationally defined as where flow measured at the S14 station is less than 1 cfs. 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. Wet weather conditions for triggering storm events will be defined as a 70 percent probable forecast of greater than 0.25 inches of precipitation of rain where the preceding 72 hours of dry weather has less than 0.1 inches of rain. The Metals TMDL operationally defines wet-weather where flow at the USGS gage station 11085000 is equal or greater than 260 cfs. Compliance with wet-weather metals allocations will be determined from loading estimates where flows at USGS gage 1108500 are measured greater than 260 cfs.

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.

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 preferable.

The first significant rain event of the storm year (first flush) will be monitored. 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 the San Gabriel River over at least 12 hours. 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.

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. Subsequent storm events must meet the tracking requirements, flow objectives, as well as be separated by a minimum of three days of dry weather. Antecedent conditions will be based on the LA County Department of Public Works (LACDPW) rain gage listed in **Table D-10**. The rain gage 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 D-10.
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.

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 the San Gabriel River for at least 12 hours. 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 the same storm event.

For the purpose of triggering wet weather sampling preparation, field staff can estimate that any rainfall prediction for downtown Los Angeles of 0.1-0.5 inches in a 6- to 12-hour period would be sufficient to mobilize for wet weather sampling, or by utilizing the analyses of the CMP staff. The sampling crew should prepare to depart at the forecasted time of initial rainfall. The first of the four manual composite samples should be targeted for collection within 2 hours of local rainfall.

Publicly available meteorological forecasting systems are suggested for identifying and anticipating storm event sampling for the Study. The sampling decision protocol begins when the sampling crew recognizes an approaching storm, through weekly monitoring of forecasts. The National Weather Service’s weather forecast for downtown Los Angeles can be accessed on-line at:

http://www.wrh.noaa.gov/lox/ then click on “Los Angeles” 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.

D-2.1.5 Flow Gage Measurements

USGS flow gages along the San Gabriel River will be used to determine whether the receiving water flow has exceeded the 20 percent threshold. Flows above the 20 percent threshold will classify the receiving water body as being in "wet" conditions and flows that are less than the 20 percent threshold will be "dry" conditions. In addition to the USGS rain gages, field crews will monitor flow at each of the sampling sties. **Table D-11** presents the location of flow gages located on the San Gabriel River.

Table D-11.
SGR and Tributary Flow Gages

Water Body	Water Body Type	Gage Location	Gage ID
San Gabriel River	Main Stem	San Gabriel River Below Santa Fe Dam	SGRS

D-2.2 Sample Handling

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

D-2.2.1 Documentation Procedures

The ESGV Group 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. 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.

D-2.2.2 Field Documentation/ Field Log

Field crews will keep a field log book for each sampling event that contains a calibration log sheet, a field log sheet for each site, and appropriate contact information. The following items should be recorded on the field log sheet 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);
- Observations of recreational activities;
- 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. Attachment 1 contains an example of the field log sheet

D-2.2.3 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 D-5**. 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 D-12**. 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 D-12**.

Table D-12.
Information on Laboratories Conducting Analysis for the ESGV 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.

D-2.2.4 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 Attachment 1.

D-2.2.5 Laboratory Custody Procedures

Laboratories will follow sample custody procedures as outlined in the laboratory's 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 submitted 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 ESGV Group 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. 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.

D-2.3 Field Protocols

Briefly, the key aspects of quality control associated with field protocols for sample collection for eventual chemical 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)

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 (rinsing thoroughly at minimum)
4. Sample containers will be of the recommended type and will be free of contaminants (i.e., pre-cleaned)
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

D-2.4 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 water bodies 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.

D-2.4.1 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. 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 D-1**
13. Samples should be stored as previously described
14. COC forms should be filled out as described in **Section D-2.2.4** 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[1] will be used throughout all phases of the water sample 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

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

D-2.4.2 Field Measurements and Observations

Field measurements will be collected and observations made at each sampling site after a sample is collected. Field measurements will include the parameters identified in the CIMP for which a laboratory analysis is not being conducted. Field monitoring equipment must meet the requirements outlined in **Table D-4**. 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 similar to the one presented in Appendix 1 and as described in **Section D-2.2.4** of this Attachment.

Measurements (except for flow) will be collected 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 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.

A-1.1.1.1 *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 25%, 50%, and 75% 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. It is assumed that the depth at the edge of the sheet flow (i.e., at 0% and 100% of the flowing width) is zero.

- **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:

$$
\begin{aligned}
&\text{Re}\textit{presentative Cross Section} = \\
&\textit{Average}\ \{[\frac{W_{Top}}{4}\times(\frac{D_{25\%}^{Top}}{2}+\frac{\left(D_{50\%}^{Top}+D_{25\%}^{Top}\right)}{2}+\frac{\left(D_{75\%}^{Top}+D_{50\%}^{Top}\right)}{2}+\frac{D_{75\%}^{Top}}{2})], \\
&[\frac{W_{Mid}}{4}\times(\frac{D_{25\%}^{Mid}}{2}+\frac{\left(D_{50\%}^{Mid}+D_{25\%}^{Mid}\right)}{2}+\frac{\left(D_{75\%}^{Mid}+D_{50\%}^{Mid}\right)}{2}+\frac{D_{75\%}^{Mid}}{2})], \\
&[\frac{W_{Bottom}}{4}\times(\frac{D_{25\%}^{Bottom}}{2}+\frac{\left(D_{50\%}^{Bottom}+D_{25\%}^{Bottom}\right)}{2}+\frac{\left(D_{75\%}^{Bottom}+D_{50\%}^{Bottom}\right)}{2}+\frac{D_{75\%}^{Bottom}}{2})]\}
\end{aligned}
$$

- **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:

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

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

$$Q = f\ x\ (\textit{Representative Cross Section})\ x\ (\textit{Average Surface Velocity})$$

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.

A-1.1.1.2 ***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:

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

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.

A-1.1.1.3 ***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.

A-1.1.1.4 ***Direct Submersion: Hand Technique***

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 D-2.4.1** 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 D-2.2** of this Attachment.

A-1.1.1.5 *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 D-2.4.1** 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 D-2.2** 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.

A-1.1.1.6 *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 D-2.4.1** 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 D-2.2** of this Attachment.

A-1.1.1.7 ***Autosamplers***

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. 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. Clean tubing will be used at each site and for each event, in order to minimize contamination.
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 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.

A-1.1.1.8 ***Dissolved Metals Field Filtration***

When feasible, samples for dissolved metals will be filtered in the field. The following describes an appropriate dissolved field filtration method. An alternative an equivalent method may be utilized, if necessary. 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.

D-2.4.3 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 time 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 D-2.4.1** of this Attachment. Monitoring site configuration and consideration of safety will dictate grab sample collection technique. The potential exists for monitoring sites to lack discernable flow. Except in the case of lakes, the lack of discernable 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.

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 ESGV Group will be contacted if at any time the sampling crew has questions about procedures or issues based on site-specific conditions.

D-2.4.4 Stormwater Outfall Sample Collection

Stormwater outfalls will be monitored with similar methods as discussed in **Section D-2.4.3** 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 ESGV Group will be contacted if at any time the sampling crew has questions about procedures or issues based on site-specific conditions.

D-2.4.5 Non-Stormwater Outfall Screening Surveys and Sample Collection

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

A-1.1.1.9 *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).

A-1.1.1.10 ***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 A-1.1.1.3** of this Attachment.

D-2.4.6 Stormborne Sediment Sampling

The Puddingstone Reservoir TMDLs and the Harbors Toxics TMDLs include requirements for the analysis of water quality samples to assess the contribution of certain organic pollutants associated with bulk sediment (**Table D-13**).

Table D-13.
Categories of Constituents for Assessing Sediment Concentrations in Water for the Puddingstone Reservoir and the Harbors Toxics TMDLs

General Category of Constituent	Harbors Toxics TMDLs	Puddingstone Reservoir TMDLs
Metals(1)	X	
DDTs(2)	X	X
Chlordanes(2)		X
Dieldrin		X
PCBs(2)	X	X
PAHs(2)	X	

1 Metals include copper, lead, silver, and zinc.
2 See **Table D-3** for a list of individual constituents in each category.

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.

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 of sediment (typically 10 grams 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.

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. Analytical performance is measured by analysis of Ongoing Precision and Recovery (OPR) analyses and labeled compound recovery. Conventional methods for analyzing for metals of interest are sufficiently sensitive to assess 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.

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 continued use of the HRMS approach remains to be beneficial. If deemed necessary, a modified approach will be evaluated for analysis of filtered suspended sediments.

A-1.1.1.11 *Sampling and Analytical Procedures*

Stormwater samples for the Harbors Toxics TMDLs will be collected using autosamplers as described in **Section A-1.1.1.7**. Based on TSS measurements at one mass emission sites in LA County (**Table D-14**), 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 1-liter samples. However, two liters of storm water will be provided for each organic analytical suite for a total of six 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.

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. If TSS/SSC are less than 150 mg/L, two liters will be extracted for 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 additional liter may be used as a field duplicate for each analysis. If TSS concentrations are greater than 200 mg/L, the additional liter may be used as a field duplicate for each analysis. 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. A field duplicate from one site will be analyzed if adequate sample volumes are obtained.

Target reporting limits (**Table D-15** and **Table D-16**) 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 D-15** and **Table D-16** 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 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 D-15** and **Table D-16** present relevant TMDL targets and reporting limits suggested in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009). 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 D-15**), estimated detection limits in the suspended sediment are at or below TMDL targets limits for bed sediments, except for dieldrin. The dieldrin estimated detection limit is above the lowest TMDL target, but not the remaining TMDL targets, and is below observed concentrations reported in the TMDL staff reports. 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), except for dieldrin. Dieldrin is above the bed sediment reporting limit in this CIMP, but below target reporting limits presented in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009).

- For PCBs (**Table D-15**), 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 D-16**), 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.

As noted previously, metals of interest are quantifiable with standard analytical methods. Detection limits for trace metals (**Table D-2**) are suitable for calculation of concentrations in suspended solids and 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.

In summary, all but one of the target reporting limits 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). The approach to analyzing whole water samples to estimate concentrations of target pollutants on bed sediment provides an opportunity to improve the understanding of loads during multiple storms each year.

Table D-14.
Summary of Median TSS Measurements (mg/L)
at the San Gabriel River Mass Emission Site

Waterbody	LA County Monitoring Site ID	Median
San Gabriel River	S14	113

Table D-15.
Recommended Methods, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for Organochlorine Pesticides and Total PCBs

Constituent and Analytical Method	Water Detection Limit (1)	Suspended Sediment Detection Limit (2)	ESGV CIMP Target Bed Sediment Reporting Limits	SWAMP QAPP (2008) Reporting Limit	SQO Technical Support Manual (2009) Reporting Limit	Harbors Toxics TMDL Sediment Target (Indirect Effects)	Harbors Toxics TMDL Sediment Target (Direct Effects)	Puddingstone Reservoir Sediment Target (Indirect Effects)
	pg/L	ng/g – dry wt						
Chlordane Compounds (EPA 1699)								
alpha-Chlordane	40	0.4	0.5	1	0.5	1.3 (Total Chlordane)	0.5 (Total Chlordane)	0.75 (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)	1.58 (Total DDT)	3.94 (Total DDT)
2,4'-DDE	80	0.4	0.5	2	0.5			
2,4'-DDT	80	0.4	0.5	3	0.5			
4,4'-DDD	40	0.4	0.5	2	0.5			
4,4'-DDE	80	0.4	0.5	2	0.5			
4,4'-DDT	80	0.4	0.5	5	0.5			
Total DDT	80	0.4	---	---	0.5			
Dieldrin	40	0.4	0.02	2	2.7	NA	0.02	0.22
Total PCBs (EPA 1668)	5-20	0.05-0.2	0.2	0.2	3.0	3.2	22.7	0.59

1 Water MLs based upon 1 liter of water.

2 Suspended Sediment MLs based upon estimate of 100 mg/L suspended solids.

3 Target is for the summed value of the individual constituents and is not specific to each constituent species.

NA Not applicable

Table D-16.
Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for PAHs

Constituent	Water Detection Limit (1)	Suspended Sediment Detection Limit (2)	ESGV CIMP Target Bed Sediment Reporting Limits	SWAMP QAPP (2009) Reporting Limit	SQO Technical Support Manual Reporting Limit	Harbors Toxics TMDL Sediment Target (Direct Effects)
	pg/L	ng/g – dry wt				
1-Methylnaphthalene	5	50	20	20	20	552 (Low Weight) (3) 1700 (High Weight) (3) 4700 (Total PAHs)
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 MLs based upon 1 liter 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 halve the detection limit 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 MLs by a factor of 0.1 to 0.2 times the listed ML.

2 Suspended Sediment MLs based upon estimate of 100 mg/L suspended solids.

2 *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.

NA Not applicable

D-3 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 D-3.1** of this Attachment.

D-3.1 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 SWAMP guidance documents. However, field crews will be required to calibrate equipment as outlined in **Section D-2** of this Attachment. **Table D-17** 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 D-17.
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 75-125% for Metals 50-150% Recovery for Pesticides [3]	Check LCS/CRM recovery. Attempt to correct matrix problem and reanalyze samples. Qualify data as needed.
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 75-125% for Metals 50-150% Recovery for Pesticides [3]	Recalibrate and reanalyze LCS/ CRM and samples.
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% Recovery3	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).

3. Equipment blanks will be collected by the field crew before using the equipment to collect sample.
4. Or control limits set at + 3 standard deviations based on actual laboratory data.

D-3.2 QA/QC Requirements and Objectives

D-3.2.1 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.

D-3.2.2 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.

D-3.2.3 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 will not be recollected at a later date. 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 this reason, most of the data planned for collection cannot be considered absolutely critical, and it is difficult to set a meaningful objective for data completeness.

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 D-4**, are based on the planned sampling frequency, SWAMP recommendations, and a subjective determination of the relative importance of the monitoring element within the CIMP. 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.

D-3.3 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.

D-3.3.1 Equipment Blanks

The purpose of analyzing equipment blanks is to demonstrate that sampling equipment is free from contamination. Equipment blanks will be collected 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.

D-3.3.2 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 D-17**), 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 ESGV 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.

D-3.3.3 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 D-17** 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.

D-3.4 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.

D-3.4.1 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.

D-3.4.2 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 D-17** 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.

D-3.4.3 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.

D-3.4.4 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.

D-3.4.5 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.

D-3.4.6 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.

D-4 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 ESGV Group. Laboratory QA Manuals are available for review at the analyzing laboratory.

D-5 DATA MANAGEMENT

Section D-5 details the procedures for managing and reporting data 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.

D-5.1 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 D-4**, 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 ESGV Group will perform an independent review and validation of analytical results. Appendix 2 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 ESGV Group, 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 3.

D-5.1.1 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.

D-5.1.2 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 ESGV Group, 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 D-4**, 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.

D-5.1.3 Data Management

Analytical Data Reports will be sent to and kept by the ESGV Group. 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 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. After the final quality assurance checks for errors are completed, the data will be added to the final database.

D-6 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 data are to be used.

D-6.1 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.

D-6.2 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 non-stormwater discharges on the receiving water.
3. Each permittee's compliance with RWLs, numeric WQBELs, 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.

D-6.3 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 WMP may provide the requested information through the development and submission of a WMP plan and any updates. As the ULARWMG is submitting an WMP 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 D-6.3.1** through **D-6.3.3** below) will be noted in WMP plan updates.

D-6.3.1 Watershed Management Area

When a Permittee has collaboratively developed an WMP, reference to the WMP and any revisions to the WMP 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.

D-6.3.2 Subwatershed (HUC-12) Descriptions

When a Permittee has collaboratively developed an WMP, reference to the WMP and any revisions to the WMP may suffice for 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. 85th 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 ourfalls and all low-flow diversions.

D-6.3.3 Description of Permittee(s) Drainage Area within the Subwatershed

When a Permittee has collaboratively developed an WMP, reference to the WMP and any revisions to the WMP 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 Permitte(s) jurisdictional area.

D-6.3.4 Annual Assessment and Reporting

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

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 WMP 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.

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 WMP 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 WMP 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.

Non-stormwater Water Control Measures

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

1. An estimation of the number of major outfalls within the WMP area.
2. The number of outfalls that were screened for significant non-stormwater discharges during the reporting year.
3. The cumulative number of outfalls that have been screened for significant non-stormwater discharges since the date the Permit was adopted through the reporting year.
4. The number of outfalls with confirmed significant non-stormwater discharge.
5. The number of outfalls where significant non-stormwater discharge was attributed to other NPDES permitted discharges; other authorized non-stormwater discharges; or conditionally exempt discharges.
6. The number of outfalls where significant non-stormwater discharges were abated as a result of the WMP Group actions.
7. The number of outfalls where non-stormwater 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.

Effectiveness Assessment of Non-Stormwater Control Measures

The following information will be included to assess non-stormwater control measures effectiveness:

1. An assessment as to whether receiving water quality within the WMP 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 non-stormwater 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).

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, non-stormwater 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

    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 non-stormwater 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.

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).

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 WMP 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.

D-6.4 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."

D-6.5 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.

D-6.5.1 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 WMP 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 WMP, (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 ULARWMG WMP 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.

SGR Metals TMDL Interim Milestones Compliance Determination

Per the Metals TMDL, the WMP Group is required to show increasing percentages of the total watershed meeting dry and wet weather WLAs phased over a 12-year period. Table D-18 lists the compliance milestone dates as well as the required percent compliance for the total watershed. The percent compliance for the WMP Group 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.

Table D-18.
Compliance Milestone Dates and Required Percent Compliance

Compliance Milestone Date	Dry Weather Percent of Total Drainage Area Served by MS4 Meeting WLA	Wet Weather Percent of Total Drainage Area Served by MS4 Meeting WLA
September 30, 2017	30%	10%
September 30, 2020	70%	35%
September 30, 2023	100%	65%
September 30, 2026	100%	100%

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: Benzo(a)pyrene, 3,4 Benzofluoranthene, Benzo(k)flouranthene, Chrysene, Dibenzo(a,h)anthracene, and Indeno(1,2,3-cd)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 Benzo(a)pyrene, 3,4 Benzofluoranthene, Benzo(k)flouranthene, Chrysene, Dibenzo(a,h)anthracene, and Indeno(1,2,3-cd)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.

Attachment D

Appendix 1
Example Field and Chain-of-Custody Forms

EXAMPLE Field Log

Page 1 of 2

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)

COLLECTED WATER QUALITY SAMPLES

Sample ID	Analysis	Time	Volume	Notes
				Field blank
				Field duplicate

ADDITIONAL WATER QUALITY SAMPLING NOTES:

Example Field Log

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 Chain-of-Custody Form

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 #	Type	Pres.											Notes

Sender Comments:	Relinquished By (1): Signature: Print: Organization: Date: Time:	Relinquished By (2): Date: Time:
Laboratory Comments:	Received By (1): Signature: Print: Organization: Date: Time:	Received By (2): Date: Time:

Crew:

Attachment D

Appendix 2
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.

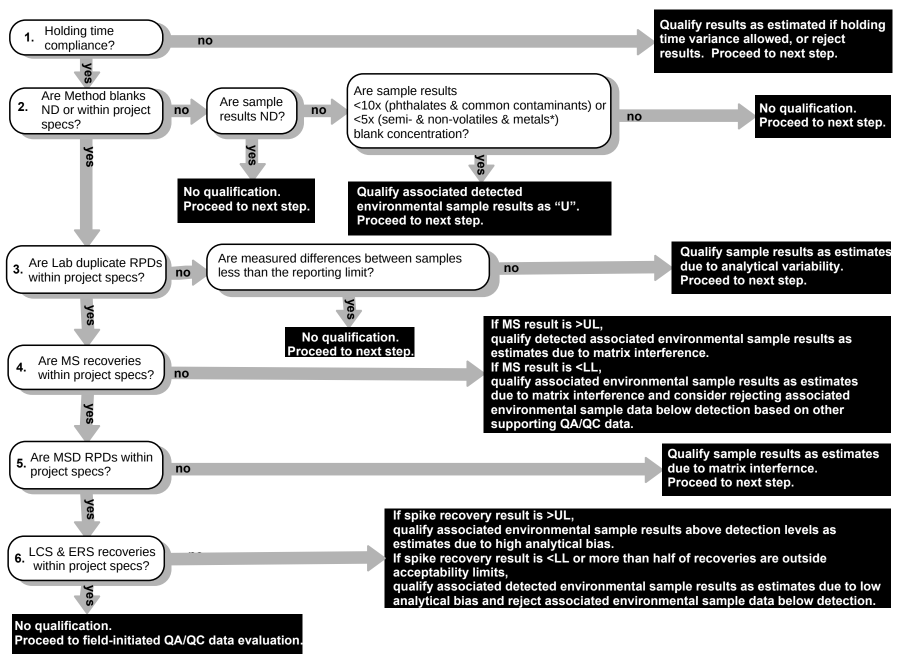
Laboratory Control Samples

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

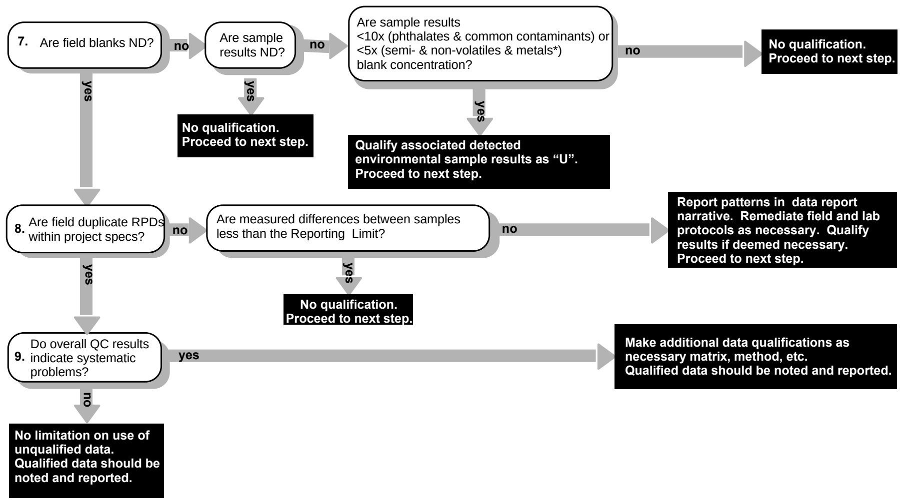
Analyte	EPA Method Number or Standard Method	Maximum Allowable RPD	Recovery Upper Limit	Recovery Lower Limit
Conventionals				
BOD	405.1; SM 5210B	20%	80%	120%
COD	410.1; 410.4; SM 5220C; SM 5220D	20%	80%	120%
Hardness	130.2; 130.1; SM 2340B	20%	80%	120%
pH	150.1	20%	NA	NA
TOC/DOC	415.1	15%	85%	115%
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

Implementing the Monitoring Plan 13-12 May 2000
QA/QC Data Evaluation



*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

Attachment E

Stormwater Outfall Selection

E-1 Stormwater Outfall Site Selection

The primary criterion cited in the MRP for selection of monitoring sites for the stormwater outfall monitoring program is that the sites are representative of the range of land uses in the area. An additional stated criterion for site selection is the ability to accurately measure flows for pollutant loads characterization. Flow measurement is easily addressed by physical assessment of the site conditions and consideration of access to the site. The primary criterion in the MRP implies an assessment of variation of land uses within the WMA, potential variation in water quality issues for different HUC-12 drainages, and geographic variation in factors influencing runoff quality.

In addition to the primary criteria for monitoring site selection, the Permit defined specific objectives depend on the representativeness of the stormwater outfall monitoring are as follows:.

- Determine the quality of discharge relative to municipal action levels
- Determine whether the discharge is in compliance with WQBELs derived from TMDL WLAs
- Determine whether a discharge causes or contributes to exceedances of receiving water limitations (RWL).

The default approach in the MRP to achieving adequate representation is to select one major outfall in each hydrological unit (HUC–12) within each individual Permittee's jurisdiction. Consequently, the minimum number of outfalls required for monitoring under the default approach is equal to the total number of unique combinations of HUC-12s and jurisdictions. The default approach is geared toward ensuring adequate accountability and representation if the Permittees monitor as individual entities, but results in monitoring more outfall discharges than needed for efforts coordinated among the ESGV Group. For the East San Gabriel Valley WMA, there would be 9 (or possibly 10) stormwater outfalls using the default approach.

The default approach would also result in several areas of relatively small and isolated HUC–12-Jurisdictional overlap for the Group Members. In some cases, these areas are predominately open space or undeveloped area. These areas are essentially an artifact of the default approach and would not provide significant additional characterization of runoff. Specific examples include:

- There is a very small overlap of the Pomona jurisdiction with the Dalton Wash HUC–12 (~78 acres).
- There is a small overlap of the La Verne jurisdiction with the Upper San Jose Creek HUC-12 (~145 acres).
- There is a small overlap of the north La Verne jurisdiction with an HUC–12 (~400 acres of mainly residential area plus substantially more open space).

- There is a small overlap of the south San Dimas jurisdiction with the Upper San Jose HUC-12 (~260 acres of mainly residential area plus substantially more open space).

As an alternative to the MRP's default monitoring approach, the Group Members is proposing to monitor one major outfall for each HUC12 in the WMA. The monitoring sites would consist of two outfalls with drains collecting runoff from two jurisdictions in the northern portion of the WMA, and one outfall in the southern portion of the WMA. The resulting data would be considered representative of all Group Members' discharge in the HUC–12s, would provide representative results needed to meet all three specific monitoring objectives, and would also provide the basis for stormwater management decisions for all Group Members. The rationale supporting the Group Members' alternative approach follows.

E-2 Representativeness of Selected Outfalls

The principal criterion for the site selection for stormwater outfall monitoring is that sites are representative of the range of land uses in the WMA. The drainages within the Group Members' WMA are comprised primarily of residential, commercial, and industrial land uses, with minimal percentages of agriculture and undeveloped open space. The three proposed outfalls were selected specifically to characterize runoff from drainages that are representative of the mix of these primary land uses in the WMA, and to minimize contributions from other land uses. Land use summaries for the ESGV Group are listed in **Table E-1**.

- Residential land use represents 64–84% of the monitored drainages.
- Commercial and Industrial land use represent 10–30% of the monitored drainages.
- Non-urban influences on runoff are minimized: Agriculture represents <1%, and open space represents <3% of the monitored drainages.

The monitored outfalls and drainages are geographically distributed in the WMA, and runoff from all 3 HUC–12s with significant urban drainage is characterized (Big Dalton Wash, Upper San Jose Creek, Upper Chino Creek), as well as runoff from each of the four jurisdictions (Claremont, Pomona, San Dimas, La Verne). The monitored drainages also represent a range of drainage sizes (0.19 – 1.3 square miles) and would directly characterize approximately 3.9% of the total WMP drainage area.

Table E-1.
Land Use Summary, areas in square miles and percent of drainage

Monitored Drainage	Units	Residential	Commercial / Industrial	Agriculture	Open Space	Other (not applicable)	TOTAL	Percent of Total WMP Area (61.3 sq.miles)
MTD 766	sq.miles	0.159	0.019	0.001	0.0	0.011	0.19	
	% drainage	84%	10%	0.6%	0.0%	5.7%	100%	*0.31%*
San Antonio Drain	sq.miles	0.834	0.386	0.0	0.021	0.058	1.30	
	% drainage	64%	30%	0.0%	1.6%	4.4%	100%	*2.1%*
BI 0566	sq.miles	0.722	0.129	0.0	0.022	0.004	0.877	
	% drainage	82%	15%	0.0%	2.5%	0.4%	100%	*1.4%*
								3.9%

E-3 STORMWATER MONITORING DATA VARIABILITY

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, 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 quality for each site. The statistical power analysis based on the range of typical stormwater discharge quality distributions and the number of sample collected for the permit term, 15 samples per site, is enumerated in **Table E-2**. For example, the analysis results in 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, 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 WMA, 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 WMA. Consequently, sampling more than a few representative sites is unlikely to significantly improve characterization of runoff quality, or to better inform the Group Memberss'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, and 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.

E-3.1 Recommendation for Stormwater Outfall Site Selection

Based on the evaluations above, the Group Members's proposed CIMP approach to monitor one outfall for each HUC–12 in the WMA will provide the representative data needed to meet the specific permit objectives for stormwater outfall monitoring and support management decisions of the Group Members. Additional monitoring sites within these three HUC–12s will not provide significant improvements in representation or characterization of discharge quality, or additional information for discharge quality management.

Table E-2.
Detectible Significant Percent Differences between Sites

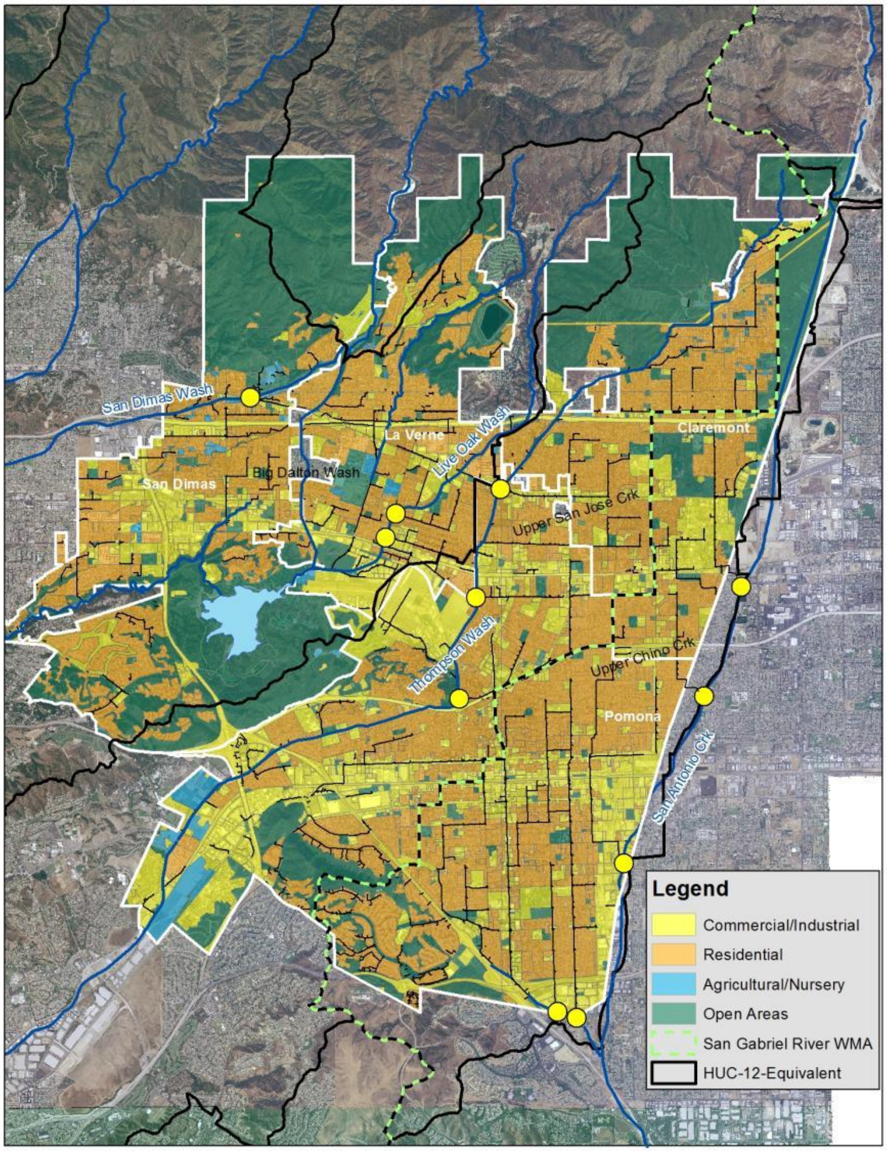
Sample Size = 15, alpha = 0.05		
COV	**power=0.8**	**power 0.9**
0.20	21%	24%
0.31	32%	36%
0.42	42%	48%
0.53	52%	59%
0.66	62%	70%
0.80	71%	81%
0.95	80%	91%
1.12	89%	100%
1.31	97%	109%

Attachment F

Alternate Stormwater Outfall Sites

There are three major HUC-12 Equivalents that cover the jurisdictions of the ESGV WMP Group. Presented below, are potential wet weather outfall monitoring sites by HUC-12 Equivalent as shown in the figure. If for a reason other than water quality it is determined a selected outfall site is unsuitable, alternate sites are provided in this section. While the selected sites were visited, they were not assessed under storm conditions. There is potential for receiving water to back up into an outfall or the site may have unforeseen safety issues under storm conditions. The potential stormwater outfalls are displayed in **Figure F-1**.

Figure F-1.
Potential Stormwater Outfalls



Three potential outfalls considered for wet weather monitoring in the Big Dalton Wash HUC-12 Equivalent are presented in **Table F-1**

Table F-1.
Potential Wet Weather Outfall Monitoring Sites – Big Dalton Wash HUC-12 Equivalent

HUC-12	City	Drain Name	Size	Shape	Material	Lat	Lon
Big Dalton Wash	La Verne	BI 9701 Line A	49”	Square or Rectangle	Reinforced Conc. Box	34.10429	-117.77243
Big Dalton Wash	San Dimas	MTD 766	42”	Round	Reinforced Conc. Pipe	34.12417	-117.80215
Big Dalton Wash	La Verne	BI 0449 La Verne	54”	Square or Rectangle	Reinforced Conc. Box	34.10020	-117.77453

Three potential outfalls considered for wet weather monitoring in the Upper San Jose Creek HUC-12 Equivalent are presented in **Table F-2**.

Table F-2.
Potential Wet Weather Outfall Monitoring Sites – Upper San Jose Creek HUC-12 Equivalent

HUC-12	City	Drain Name	Size	Shape	Material	Lat	Lon
Upper San Jose Crk	Pomona	BI 0266	93”	Round	Reinforced Conc. Pipe	34.07278	-117.75952
Upper San Jose Crk	Pomona	BI 0520 Line A	107”	Square or Rectangle	Reinforced Conc. Box	34.10831	-117.75105
Upper San Jose Crk	Pomona	RDD 0086 Thompson Crk	48”	Round	Reinforced Conc. Pipe	34.08998	-117.75595

Five potential outfalls considered for wet weather monitoring in the Upper Chino Creek HUC-12 Equivalent are presented in **Table F-3**.

Table F-3.
Potential Wet Weather Outfall Monitoring Sites – Upper Chino Creek HUC-12 Equivalent

HUC-12	City	Drain Name	Size	Shape	Material	Lat	Lon
Upper Chino Crk	Pomona	BI 0267	63”	Square or Rectangle	Reinforced Conc. Box	34.04466	-117.72593
Upper Chino Crk	Pomona	San Antonio Drain Unit 1	108”	Square or Rectangle	Reinforced Conc. Box	34.01836	-117.73567
Upper Chino Crk	Pomona	BI 6402 Unit 1 Line C	81”	Round	Reinforced Conc. Pipe	34.01948	-117.73962
Upper Chino Crk	Claremont	BI 1122	87”	Round	Reinforced Conc. Pipe	34.09178	-117.70173
Upper Chino Crk	Claremont	BI 0022 Line C	90”	Round	Reinforced Conc. Pipe	34.07312	-117.70945