Los Angeles River Upper Reach 2 Watershed Management Area

Coordinated Integrated Monitoring Program (CIMP) Plan DRAFT

Submittal Date: June 26, 2014

1561 E. Orangethorpe Avenue, Suite 240
Fullerton, California 92831
TEL (714) 526-7500 | FAX (714) 526-7004
www.cwecorp.com

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Coordinated Integrated Monitoring Program (CIMP)

Prepared for:

Los Angeles Gateway Region
Integrated Regional Water Management Authority
16401 Paramount Boulevard
Paramount, California 90641
TEL (626) 485-0338

On Behalf of the Cities of Bell (WDID 4B190153001), Bell Gardens (WDID 4B190139002), Commerce (WDID 4B190161001), Cudahy (WDID 4B190164001), Huntington Park (WDID 4B190177001), Maywood (WDID 4B190192001), Vernon (WDID 4B190216001), and the Los Angeles County Flood Control District (WDID4B190107101)

Prepared by:

1561 E. Orangethorpe Avenue, Suite 240
Fullerton, California 92831

TEL (714) 526-7500 | FAX (714) 526-7004 | www.cwecorp.com

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Acronyms

AL	Action Limit
AMP	Adaptive Management Process
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFU	Colony Forming (Microbial) Unit
CIMP	Coordinated Integrated Monitoring Program
CTR	California Toxics Rule
CWA	Clean Water Act
DO	Dissolved Oxygen
EO	Executive Officer
GIS	Geographic Information System
HUC	Hydrologic Unit Code
IC/ID	Illicit Connection/Illicit Discharge
LACFCD	Los Angeles County Flood Control District
LACSD	Los Angeles County Sanitation Districts
LAR	Los Angeles River
LARWQCB	Los Angeles Regional Water Quality Control Board
MAL	Municipal Action Limit
MES	Mass Emission Station
MRP	Monitoring and Reporting Program
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NSW	Non-Stormwater
NSWD	Non-Stormwater Discharge
QAPP	Quality Assurance Project Program
RAA	Reasonable Assurance Analysis
RWL	Receiving Water Limitation
SCCWRP	Southern California Coastal Water Research Project
SMC	Stormwater Monitoring Coalition
SSC	Suspended Sediment Concentration
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UR2	Upper Reach 2
USEPA	United States Environmental Protection Agency
WBPC	Water Body- Pollutant Combination
WDR	Waste Discharge Requirements
WLA	Waste Load Allocation
WMA	Watershed Management Area
WMP	Watershed Management Program
WQO	Water Quality Objectives
WQBEL	Water Quality-Based Effluent Limitation

Executive Summary

The California Regional Water Quality Control Board, Los Angeles Region, adopted the fourth term Coastal Los Angeles County Municipal Separate Storm Sewer System (MS4) NPDES Permit as Order No. R4-2012-0175, on November 8, 2012, which then became effective on December 28, 2012. This Permit encourages Permittees to join together into Watershed Management Groups and develop Watershed Management Program (WMP) or Enhanced WMP (EWMP) Plan. This plan is intended to guide the iterative adaptive management process for the individual group as they prioritize the implementation of watershed control measures to reduce the discharge of runoff, and the pollutants it may convey, to local receiving waters, thereby contributing to the attainment and protection of water body beneficial uses.

In a June 27, 2013, Notice of Intent (NOI) letter, which was acknowledged in a September 25, 2013, NOI Approval letter from the Regional Board Executive Officer, the Cities of Bell, Bell Gardens, Commerce, Cudahy, Huntington Park, Maywood, and Vernon, along with the Los Angeles County Flood Control District (LACFCD), announced the formation of the Los Angeles River Upper Reach 2 Watershed Management Area (LAR UR2 WMA). Furthermore these Permittees agreed to prepare a Reasonable Assurance Analysis (RAA), to guide development of the WMP Plan, and a Coordinated Integrated Monitoring Program (CIMP) Plan to track progress in attaining the Permit goals and objectives, through the iterative adaptive management process identified within MS4 Permit Part VI.C.8.a.

The LAR UR2 WMA Cities lie exclusively within the Los Angeles River Watershed and each Permittee discharges to Reach 2 of the Los Angeles River, which flows during dry-weather primarily with treated wastewater. The Cities of Bell Garden and Commerce also drain southeast to the normally dry concrete-lined Rio Hondo tributary channel. To the north and west, the LAR UR2 WMA is bordered by, and receives discharges from, the Upper Los Angeles River EWMP Group, while the Lower Los Angeles River WMP Group aligns with the east and south LAR UR2 WMA borders.

Based on discussions with Board staff and meetings with other watershed management groups, this document constitutes a Coordinated Integrated Monitoring Program (CIMP) Plan that will allow implementation of integrated approach to support the Adaptive Management Process (AMP) as intended in 2012 MS4 Permit Attachment E (MRP), Part II.C. The LAR UR2 WMA proposes to implement a dry and wet-weather receiving water monitoring location, along the Los Angeles River at Tweedy Avenue in the City of South Gate, just downstream of the largest storm drains from the area.

Seven stormwater outfall based monitoring sites are proposed, that would allow water quality to be collected annually, from over 70% of the LAR UR2 WMA, based on Los Angeles County subwatershed delineations. Since the Rio Hondo is normally dry, the Ford Park outfall site would be sampled during three storm events per year to develop WMA trend data and compliment data that might be needed to support regional wet-weather receiving water assessments. The remaining six outfall sites would be split into two groups, with similar land use characteristics, of three each and monitored annually. This strategy is proposed to facilitate annual characterization of most discharges from the LAR UR2 WMA.

The LAR UR2 WMA CIMP also proposes a non-stormwater outfall based monitoring approach that will complement the Illegal Discharge Illicit Connection (IC/ID) Elimination Minimum Control Measure (MCM) watershed control measure component of the WMP and Permit. Similarly, the New and Redevelopment Effectiveness Tracking MCM, should support the anticipated demonstration of steady progress in reducing pollutant loads and concentrations observed at the group outfalls and in adjacent receiving waters. Regional studies, through the (Southern California) Stormwater Monitoring Coalition (SMC), or more locally focused special studies, such as contemplated zinc Water Effects Ratio (WER) Site Specific Objective (SSO) study could also be coordinated through the AMP and implemented through modifications of the CIMP, to prioritize evolving water quality challenges and priorities that develop. Effective CIMP implementation will present difficult hurdles for all of the involved stakeholder groups.

1. Introduction

On November 8, 2012, the Regional Water Quality Control Board, Los Angeles Region (Regional Board or LARWQCB) adopted Order No. R4-2012-0175, *Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except those Discharges Originating from the City of Long Beach MS4*, herein the MS4 Permit or Permit which became effective on December 28, 2012. The Permit encourages Permittees to join together as Watershed Management Areas (WMAs) and propose individualized stormwater programs through the development and implementation of Watershed Management Program (WMP) and Coordinated Integrated Monitoring Program (CIMP) Plans to demonstrate attainment of certain numeric limits expressed as Receiving Water Limitations (RWLs) and Water Quality-Based Effluent Limits (WQBELs). This document is the proposed CIMP for the Los Angeles River Upper Reach 2 (LAR UR2) WMA.

Permit Attachment E sets forth the requirements for the Monitoring and Reporting Program (MRP). The primary objectives for the MRP are listed in Part II.A of the MRP and are summarized as follows:

- Assess the chemical, physical, and biological impacts of MS4 discharges on receiving waters;
- Assess compliance with Total Maximum Daily Load (TMDL) wet-weather and dry-weather numeric limit waste load allocations (WLAs);
- Characterize pollutant loads in MS4 discharges;
- Identify sources of pollutants in MS4 discharges; and
- Measure and improve the effectiveness of pollutant controls implemented under the Permit.

Extensive default monitoring requirements are specified in the MRP, however the MRP allows Permittees, such as the LAR UR2 WMA, the option of proposing a CIMP that utilizes alternative approaches to meet the primary objectives of the MS4 Permit MRP. The CIMP should also identify TMDL monitoring requirements which are designed to unify the Permittees' efforts and provide consistent and comparable assessments of watershed water quality conditions and source control priorities.

1.1 Los Angeles River Upper Reach 2 Watershed Management Area Overview

Located in the south central Los Angeles River watershed, as shown in **Figure 1-1**, the LAR UR2 WMA includes the Cities of Bell, Bell Gardens, Commerce, Cudahy, Huntington Park, Maywood, Vernon and the Los Angeles County Flood Control District (LACFCD), as shown in **Figure 1-2**. The most prevalent land uses are industrial, residential, commercial, and transportation as shown in **Table 1-1** and **Figure 1-3**.

Table 1-1 Land Use Summaries by UR2 City

City	Agr	Com	Edu	Ind	MF Res	SF Res	Trans	Vac	Total
Bell	0%	16.15%	2.34%	17.67%	30.60%	16.24%	7.80%	9.20%	100%
Bell Gardens	1.68%	14.55%	6.17%	10.40%	46.65%	11.10%	0.52%	8.93%	100%
Commerce	0.46%	9.13%	0.58%	60.15%	3.09%	6.97%	15.51%	4.11%	100%
Cudahy	0%	7.44%	4.82%	13.28%	55.18%	6.47%	3.10%	9.71%	100%
Huntington Park	0%	18.24%	4.64%	17.27%	24.89%	29.14%	2.76%	3.06%	100%
Maywood	0%	14.45%	2.69%	6.85%	16.01%	57.05%	1.16%	1.79%	100%
Vernon	0%	0.50%	0.08%	77.52%	0.01%	0.03%	14.98%	6.88%	100%
LACFCD	NA	NA	NA	NA	NA	NA	NA	NA	NA
LAR UR2 Total	0.32%	9.98%	2.19%	42.41%	16.98%	12.55%	9.64%	5.93%	100%

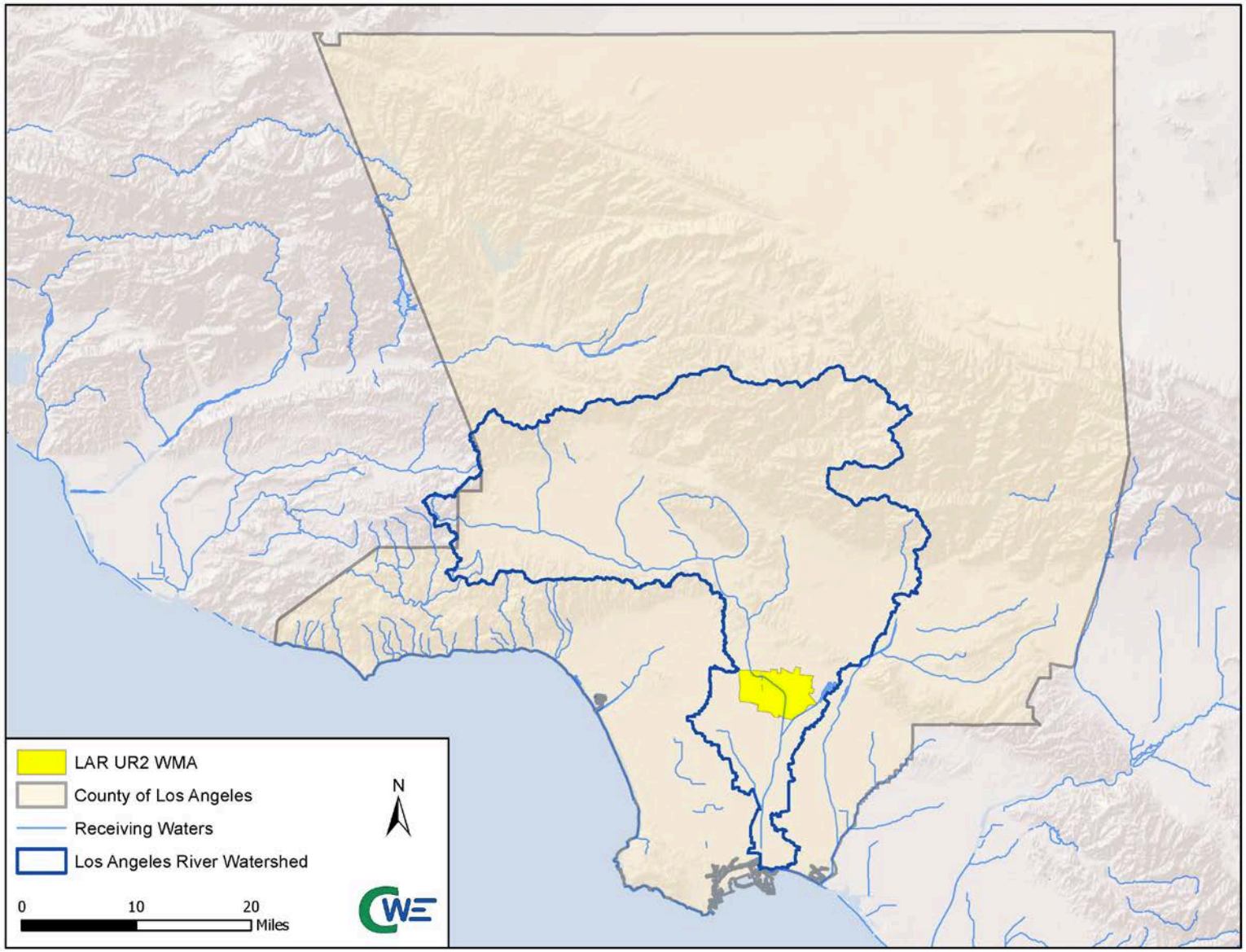


Figure 1-1 Los Angeles River Upper Reach 2 Watershed Management Area within Los Angeles Basin

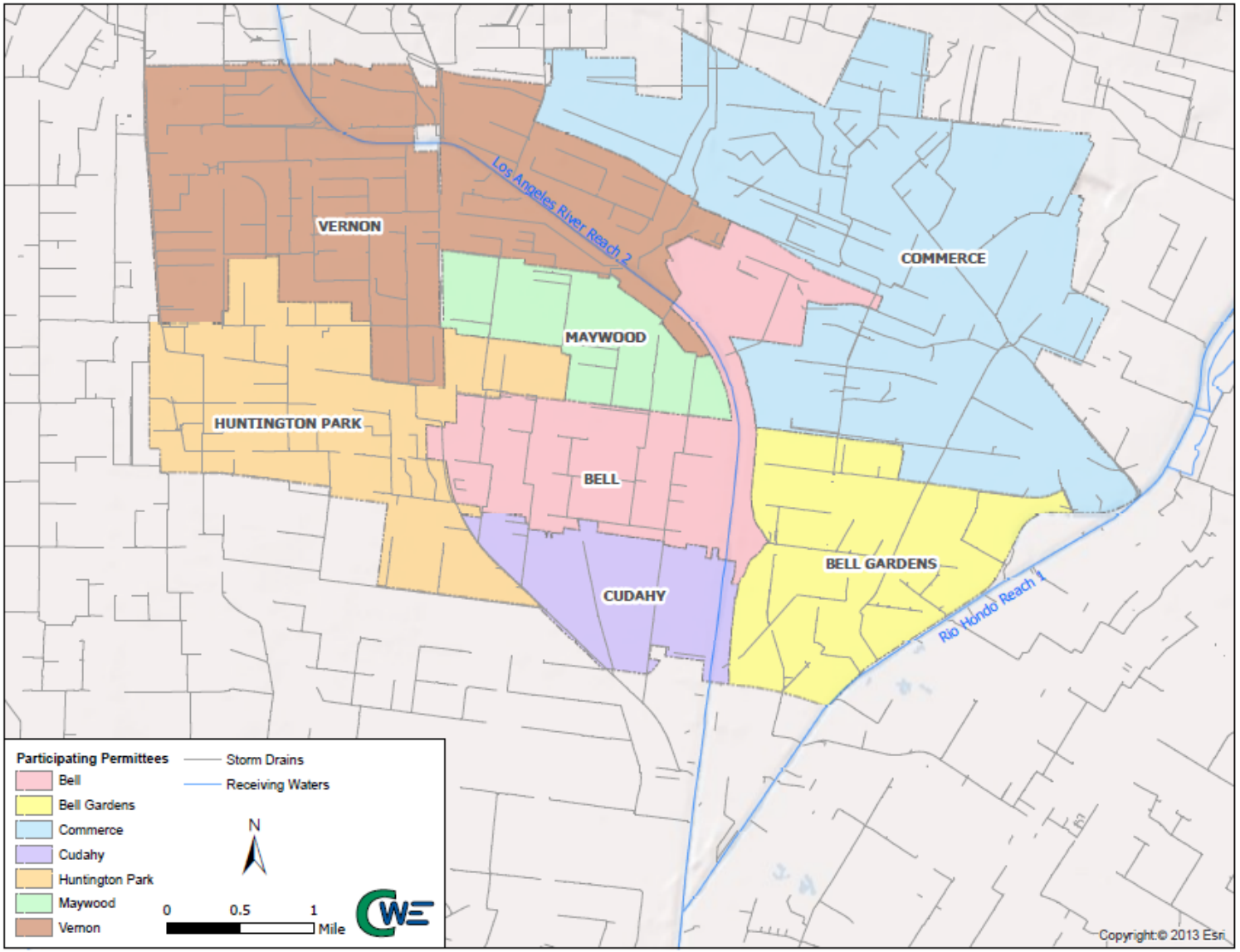


Figure 1-2 Participating Permittees

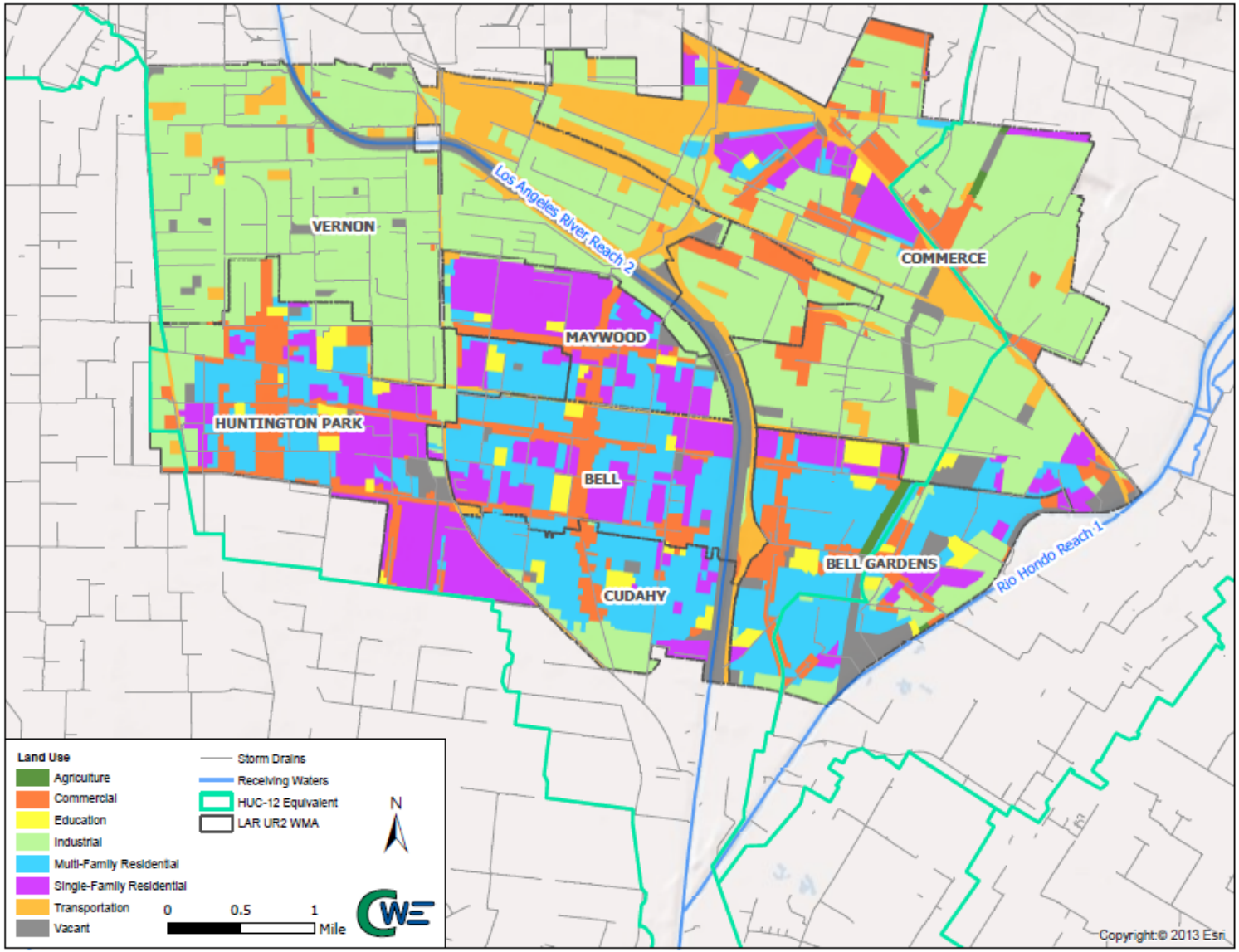


Figure 1-3 Land Use

The Los Angeles River flows 51 miles from the Santa Monica Mountains, in the west San Fernando Valley, to Long Beach Harbor, San Pedro Bay, and the Pacific Ocean. Including tributaries, the 824 square mile watershed has a total stream length of about 837 miles with about 4.6 square miles of lake area. The watershed includes steep, easily eroded, undeveloped mountainous areas in the Angeles National Forest and large urban areas in the midsection and south. Los Angeles River Reach 2 begins at the Arroyo Seco confluence and ends at the Compton Creek confluence. The primary Reach 2 tributary is the Rio Hondo.

The 120 square mile Rio Hondo subwatershed drains a large portion of the eastern Los Angeles River Watershed. Reach 2 of the Rio Hondo is located north of the Santa Ana Freeway, while Reach 1 stretches from the Freeway south to its confluence with the LAR. During storm events, flows in Rio Hondo Reach 2 are diverted to the adjacent Rio Hondo Spreading Grounds and used to recharge the central basin groundwater aquifer. When the Spreading Grounds are not operating, the Rio Hondo flows into Rio Hondo Reach 1 and the Los Angeles River.

The total area of the LAR UR2 WMA is approximately 14,215 acres, or 22.21 square miles and it is located the lower half of the Los Angeles River Watershed, beginning at about East 26th Street, in the City of Vernon, and ending at Patata Street, in the City of Cudahy. The Cities of Bell Gardens and Commerce are along the western bank of the Rio Hondo. As shown in **Figure 1-4**, a the receiving or surface waters defined by the Basin Plan within the LAR UR2 WMA include:

- Los Angeles River, Reach 2
- Rio Hondo, Reach 1

Watershed boundaries and other features, developed by the United States Geological Survey as Hydrologic Units Codes (HUC-12), are mapped in MS4 Permit Attachment B. In-lieu of these Permit specified boundaries, the March 26, 2014 Regional Board Reasonable Assurance Analysis (RAA) Guidelines allows WMP or EWMP groups to use equivalent HUC-12 boundaries, prepared by the LACFCD. Following the LACFCD equivalent HUC-12 boundaries and nomenclature conventions, **Figure 1-4** identifies the relevant LAR UR2 WMA receiving water tributary areas as follows:

- Compton Creek – Los Angeles River (180701050402)
- Chavez Ravine – Los Angeles River (180701050401)
- Alhambra Wash – Rio Hondo (180701050303)

The LAR UR2 WMA municipal and LACFCD equivalent HUC-12 boundaries, are shown in **Figure 1-5**, overlain on the Los Angeles County Geospatial Library layer of the LACFCD MS4 and City of Vernon drainage system elements, along with the LACFCD major outfalls, both within and adjacent to the WMA**.** The other LAR UR2 WMA Permittees did not identify any additional drainage infrastructure elements to supplement the available County GIS data.

The LAR UR2 WMA drainage element specific to each Permittee are also identified in **Appendix A**

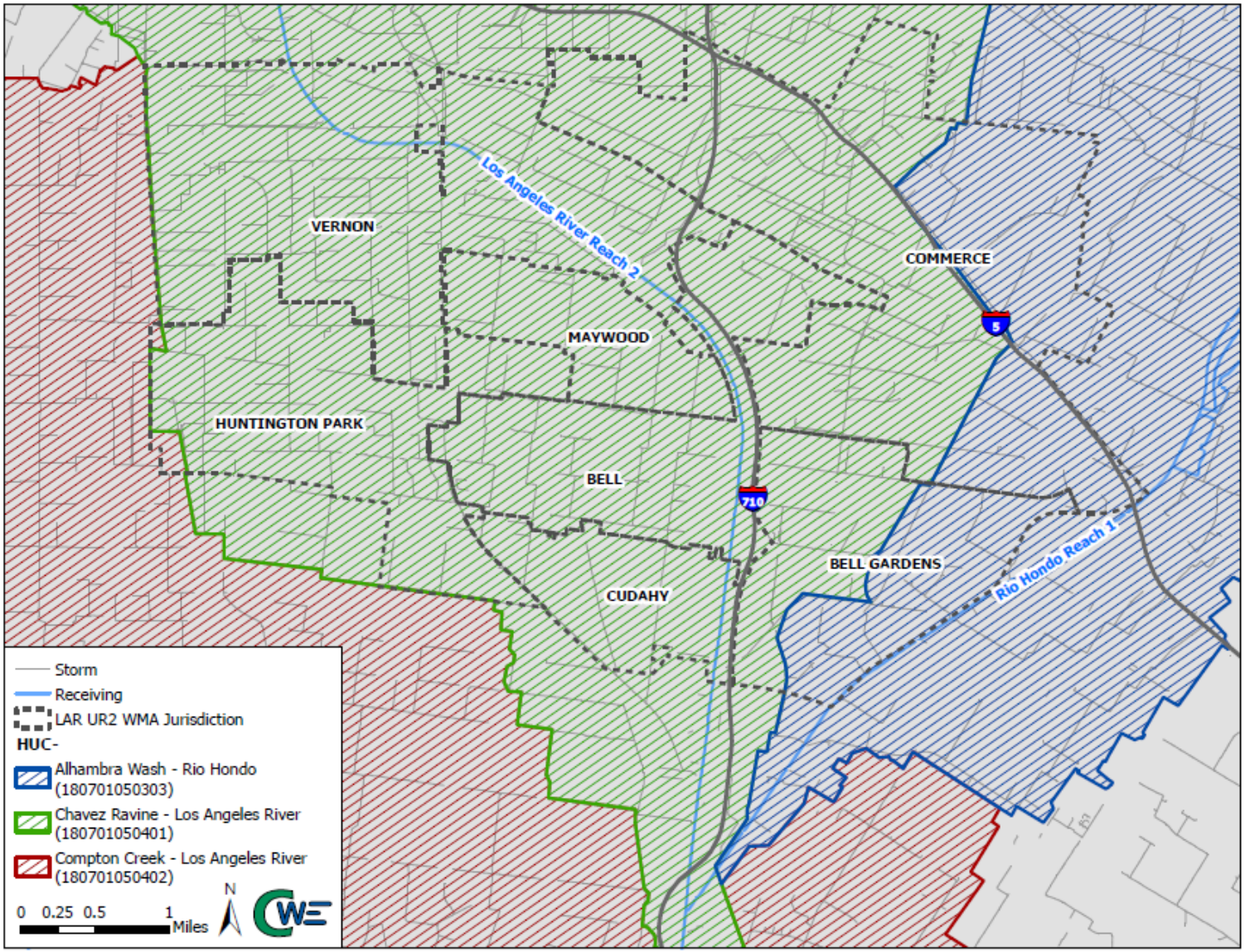


Figure 1-4 County Equivalent HUC-12 Subwatersheds

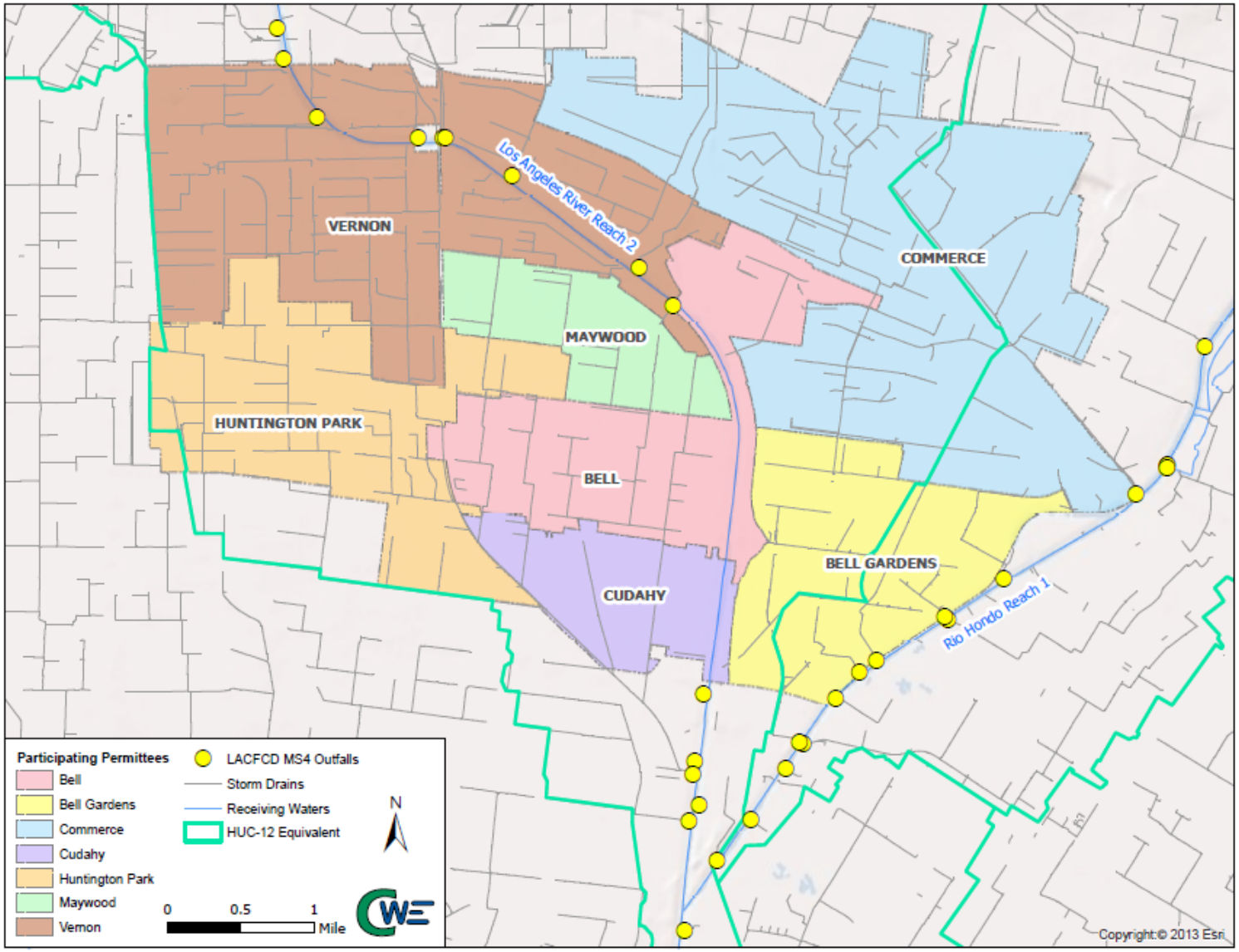


Figure 1-5 Participating Permittees with HUC-12, MS4 Drainage System and County Outfalls

1.2 Water Quality Priorities

In accordance with Permit Part IV.C.5(a)ii, water body–pollutant combinations (WBPCs) were classified into the following three categories:

- Category 1: WBPC subject to TMDL
- Category 2: WBPC on 2010 Clean Water Act (CWA) 303(d) List
- Category 3: WBPC with RWL exceedances

In accordance with Permit Part VI.C.5 water quality priorities were identified based on the WBPC compliance deadlines as follows:

- Priority 1(a) – TMDLs controlling pollutants for which there are numeric limits with interim or final compliance deadlines within the permit term or TMDL compliance deadlines that have already passed and the limitations have not been achieved.
- Priority 1(b) – TMDLs controlling pollutants for which the numeric limits with interim or final compliance deadlines between September 6, 2012 and October 25, 2017 have not been achieved.
- Priority 2 – All other controlling pollutants for which data indicate impairment or exceedances of RWLs in the receiving water and the findings from the source assessment implicates discharges from the MS4 shall be considered the second highest priority.

This process is intended to prioritize WBPCs to guide implementation of structural and institutional best management practices (BMPs) and monitoring activities in the CIMP. **Table 1-2** lists the identified water quality priorities, WBPCs categories, and compliance deadlines for the LAR UR2 WMA where nutrients and trash were identified as Priority 1 WBPCs. As part of the adaptive management process (AMP), categorization of WBPCs may be adjusted based on data obtained from monitoring, source evaluations, and BMP implementation. Approved CIMP derived data may result in future Category 3 designations in instances where MS4 discharges are identified as contributing to RWLs exceedances. Under these conditions, the appropriate LAR UR2 WMA Permittees will follow the guidance in Permit Part VI.C.2.a.iii.

1.3 Total Maximum Daily Load Monitoring Requirements

One of the regulatory mechanisms for addressing water quality impairments is the development and implementation of a TMDL, which may be established by the State Water Resources Control Board (State Board), or the United States Environmental Protection Agency (USEPA), or proposed by Permittees and approved by the regulatory agencies. MS4 Permit Attachment O identifies four TMDLs that impact Los Angeles River Reach 2 and the LAR UR2 WMA. These TMDLs, along with their Board resolution number and most recent amendment effective or significant revision dates, are as follows:

- Los Angeles River Bacteria TMDL – Resolution 2010-007 and became effective on March 23, 2012
- Los Angeles River and Tributary Metals TMDL – Resolution 2007-014 and became effective on October 29, 2008, and Resolution 2010-003 effective on November 3, 2011
- Los Angeles River Nitrogen Compounds and Related Effects TMDL – Resolution 2003-009 and became effective on March 23, 2004. Site Specific Objectives (SSOs) for Ammonia were approved by the State Water Resources Control Board (SWRCB) June 4, 2013
- Los Angeles River Trash TMDL – adopted Resolution 2007-012 and became effective on September 23, 2008.

The TMDL numeric limits are summarized in the following subsections and MS4 Permit Attachment O.

Table 1-2 Identified Water Quality Priorities

Priority	Category	Pollutant	Water Body		Compliance Deadline
			Los Angeles River Reach 2	Rio Hondo Reach 1	
1a	1	Ammonia (NH_3-N)	x	x	23-Mar-04
	1	Nitrate (NO_3-N)	x	x	23-Mar-04
	1	Nitrite (NO_2-N)	x	x	23-Mar-04
	1	NO_3-N+NO_2-N	x	x	23-Mar-04
1b	1	Trash	x	x	September 30, 2016 (effectively 10/1/15)
2	1	*E.coli* Dry-Weather	x	x	March 23, 2022 (Group Interim Single sample/Final WQBEL)
	1	Copper Dry-Weather	x	x	11-Jan-24
	1	Lead Dry-Weather	x	x	11-Jan-24
	1	Zinc Dry-Weather		x	11-Jan-24
	1	Copper Wet-Weather	x	x	11-Jan-28
	1	Lead Wet-Weather	x	x	11-Jan-28
	1	Zinc Wet-Weather	x	x	11-Jan-28
	1	Cadmium Wet-Weather	x	x	11-Jan-28
	1	*E.coli* Wet-Weather	x	x	23-Mar-37
	2	Oil	x		N/A
	2	Coliform Bacteria*		x	N/A
	2	Toxicity		x	N/A
	3	To Be Determined based on results of future CIMP monitoring			

* Addressed by a TMDL

1.3.1 Los Angeles River Bacteria TMDL

The Los Angeles River Bacteria TMDL was adopted by the LARWQCB as Resolution 2010-007 and became effective on March 23, 2012, after approval by the State Board and USEPA. Ambient monitoring, monitoring to assess attainment with WLAs, monitoring to support Load Reduction Strategies (LRS) or alternative compliance strategies, and monitoring to support wet-weather implementation plans are identified in the TMDL. A CMP was submitted to the Regional Board by the Los Angeles River Watershed Bacteria TMDL Technical Committee, on behalf of the LAR Watershed Permittees, however, monitoring was pre-empted in anticipation of CIMP development. The TMDL has multiple implementation phases, wet and dry compliance schedules, numeric WLAs, and allows Permittees to developing Load Reduction Strategies (LRS) to gain an extended compliance schedule. Permit Attachment O Part D.4, summarizes TMDL monitoring requirements, while **Table 1-3** summarizes applicable effluent limits for LAR UR2 WMA.

Table 1-3 Los Angeles River Bacteria TMDL Numeric Limits

Constituent	Effluent Limitation (MPN or cfu)		Final Compliance Date	
	Daily Maximum	Geometric Mean	Wet-Weather	Dry-Weather
E. coli	235/100 mL	126/100 mL	March 23, 2037	March 23, 2022

The interim dry-weather limits are group-based and shared among the Permittees within a drainage area. However, they may be distributed based on proportion of drainage area, upon approval of the Regional Board. **Table 1-4** presents the group interim dry-weather limits for the LAR UR2 WMA.

Table 1-4 Grouped Interim Dry-Weather Single Sample Bacteria Numeric Limits

River Segment of Tributary	Daily Maximum E. coli Load (10^9 MPN/day)	First Phase Compliance Date	Second Phase Compliance Date
Los Angeles River Segment B (Rosecrans to Figueroa)	518	March 23, 2022	September 23 2028
Rio Hondo	2	September 23, 2023	March 23, 2030

In addition to the numeric limits for MS4 discharges, the Los Angeles River Bacteria TMDL includes allowable exceedance limits, based on the number of days, or weeks, per year, where the allowable bacteria limits are not achieved. The final compliance dates, for the annually assessed grouped single sample bacteria limits are stated to be March 23, 2022 for dry- and March 23, 2037 for wet-weather. These requirements are on **Table 1-5**, while the numeric water quality objectives are on **Table 1-6**.

Table 1-5 Grouped Final Single Sample Bacteria Allowable Exceedances

Time Period	Annual Allowable Exceedance Days of the Single Sample Objective (days)	
	Daily Sampling	Weekly Sampling
Dry-Weather	5	1
Non-High Flow Suspension (HFS[1]) Waterbodies Wet-Weather	15	2
HFS[1] Waterbodies Wet-Weather	10 (not including HFS days)	2 (not including HFS days)

[1] HFS stands for high flow suspension as defined in Chapter 2 of the Basin Plan shall apply to water contact recreational activities associated with the swimmable goal as expressed in the federal Clean Water Act section 101(a)(2) and regulated under the REC-1 use, non-contact water recreation involving incidental water contact regulated under the REC-2 use, and the associated bacteriological objectives set to protect those activities. WQO set to protect (1) other recreational uses associated with the fishable goal as expressed in the federal Clean Water Act section 101(a)(2) and regulated under the REC-1 use and (2) other REC-2 uses (e.g., uses involving the aesthetic aspects of water) shall remain in effect at all times for waters where the (ad) footnote appears in Table 2-1a. The High Flow Suspension shall apply on days with rainfall greater than or equal to ½ inch and the 24 hours following the end of the ½-inch or greater rain event, as measured at the nearest local rain gauge, using local Doppler radar, or using widely accepted rainfall estimation methods. The High Flow Suspension only applies to engineered channels, defined as inland, flowing surface water bodies with a box, V-shaped or trapezoidal configuration that have been lined on the sides and/or bottom with concrete. The water bodies to which the High Flow Suspension applies are identified in Table 2-1a in the column labeled "High Flow Suspension".

Table 1-6 Los Angeles River Bacteria TMDL Geometric Mean Allowable Limit

Constituent	Geometric Mean (MPN or cfu)
E. coli	126/100 mL

1.3.2 Los Angeles River and Tributaries Metal TMDL

The Los Angeles River and Tributaries Metals TMDL was adopted by the Regional Board as Resolution 2007-014 and became effective on October 29, 2008, after approval by the State Board and USEPA. The TMDL assesses the load or concentration of several metals in comparison to California Toxic Rule values, during dry- and wet-weather conditions. Dry-weather is defined as days when the maximum daily flow in

the river is less than 500 cubic feet per second (cfs) as measured at the Wardlow Street gauge station. Since metal toxicity is correlated to bioavailability, as assessed by water hardness, the permit and TMDL WQBELs values were determined using total to dissolved "translator" values, prepared by the USEPA. Weather and water body specific hardness data result in a relatively significant variability in the limit among the various water body and weather combinations. Local water characteristics, such as organic content, may result in Water Effect Ratios (WERs) and Site Specific Objectives (SSOs) that alter the preliminary toxicity assessment used in developing a TMDL and may change the final numeric WQBELs.

Table 1-7 through **Table 1-10** lists the applicable LAR UR2 WMA final numeric limits, subject to any future basin plan amendments, established by the Los Angeles River and Tributaries Metals TMDL and identified in Attachment O, Section C.2 and C.3 of the MS4 Permit. **Table 1-7** lists the grouped (shared) dry-weather final numeric limits, expressed as total recoverable metals daily loads. Dry-weather flows in Rio Hondo Reach 1, have normally been much lower than the TMDL estimate of 0.5 cfs, however TMDL watershed compliance has generally been first assessed based on concentration, rather than load.

Table 1-7 Dry-Weather Final WQBELs Expressed as Total Recoverable Metals

Waterbody	Effluent Limitations Daily Maximum (kg/day)		
	Copper	Lead	Zinc
LA River Reach 2	WER[1] x 0.53	WER[1] x 0.33	--
Rio Hondo Reach 1	WER[1] x 0.01	WER[1] x 0.006	WER[1] x 0.16

[1] WER(s) have a default value of 1.0 unless site-specific WER(s) are approved through a Basin Plan Amendment

Concentration based dry-weather numeric limits applicable to the LAR UR2 WMA are summarized in **Table 1-8**. Ambient water quality monitoring is implemented through the Los Angeles River Metals TMDL Coordinated Monitoring Program (LAR MTMDL CMP).

Table 1-8 Concentration Based Dry-Weather Final WQBELs Expressed as Total Recoverable Metals

Waterbody	Effluent Limitations Daily Maximum (µg)		
	Copper	Lead	Zinc
LA River Reach 2	WER[1] x 22	WER[1] x 11	--
Rio Hondo Reach 1	WER[1] x 13	WER[1] x 5.0	WER[1] x 131

[1] WER(s) have a default value of 1.0 unless site-specific WER(s) are approved through a Basin Plan Amendment

Load and approximate concentration based wet-weather numeric limits applicable to the LAR UR2 WMA are summarized in **Table 1-9**. Since the TMDL includes both LAs and WLAs, and multiple discharge groups, the numeric limit concentration for MS4 Permittees varies with the volume of runoff measured at Wardlow Street, but the rightmost column is a serviceable first order estimate.

Table 1-9 Wet-Weather Final WQBEL Expressed as Total Recoverable Metals

Constituent	Effluent Limitations Daily Maximum (kg/day)	Approximate Effluent Limitation (µg/L)
Cadmium	WER[1] x 2.8 x 10^{-9} x daily volume (L) - 1.8	WER[1] x 2.8
Copper	WER[1] x 1.5 x 10^{-8} x daily volume (L) - 9.5	WER[1] x 15
Lead	WER[1] x 5.6 x 10^{-8} x daily volume (L) - 3.85	WER[1] x 56
Zinc	WER[1] x 1.4 x 10^{-7} x daily volume (L) - 83	WER[1] x 140

Table 1-10 outlines the interim and final Metals TMDL numeric limits schedule which Permittees may comply with through compliance with the WMP and RAA development process. Since the LAR UR2 WMA is located within Reach 2, it should be noted that the June 29, 2012 Implementation Study, funded by the Permittees, identifies Watershed Control Measures to achieve the interim and final WLAs. Among the more important measures was State Senate Bill 346, chaptered in September 2010, which called for phased elimination of copper from automotive brake pads. A similar effort to reduce the zinc content in automotive tires has also been initiated.

Table 1-10 Schedule of Interim and Final WQBELs for Los Angeles River Metals TMDL

Deadline	Total Drainage Area Served by the MS4 required to meet the water quality-based effluent limitations (%)	
	Dry-Weather	Wet-Weather
January 11, 2012	50	25
January 11, 2020	75	-
January 11, 2024	100	50
January 11, 2028	100	100

Along with most other Los Angeles River Watershed municipalities, the LAR UR2 WMA Permittees supported a study to develop Copper WER and Lead Recalculation SSOs that is currently pending before the Regional Board for approval as a Basin Plan Amendment. If the Basin Plan Amendment is approved, the study suggests for copper, in both dry- and wet-weather, a final WER of 3.971 and 9.691 should be adopted for LAR Reach 2 and the Rio Hondo, respectively. The lead recalculation study suggest an increase in the dry-weather WQBEL from 11 to 94 µg/L for LAR Reach 2, while the dry-weather WQBEL would rise from 5 to 37 µg/L for the Rio Hondo. In wet-weather, the allowable lead numeric limit should increase from 62 to 94 µg/L in both of these water bodies. Favorable translators between total and dissolved metal concentrations were also determined by these studies, but are not explicitly referenced in the MS4 Permit so their eventual impact is unclear at this time. As a result of these studies and legislative efforts, the LAR Metals TMDL appears to have moved from a regional to specific outfall priority.

1.3.3 Los Angeles River Nitrogen Compounds and Related Effects TMDL

The LAR Nutrients TMDL was adopted by the LARWQCB as Resolution 2003-009 and became effective on March 23, 2004, after State Board and USEPA approval. SSOs for Ammonia were approved by the State Board on June 4, 2013. This TMDL targets Publically Owned Treatment Works (POTW), or Water Recovery Plants (WRP); MS4 Permittee discharges do not appear to cause or contribute to the exceedance of the applicable loads. **Table 1-11** lists the currently effective TMDL numeric limit, as identified in Attachment O, Section B.2 of the MS4 Permit.

Table 1-11 LAR Nitrogen Compounds and Related Effects TMDL Final WLAs

Water Body	NH_3-N (mg/L)		NO_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N+NO_2-N (mg/L)
	One-hour Average	Thirty-day Average	Thirty-day Average	Thirty-day Average	Thirty-day Average
Los Angeles River below LAG	8.7	2.4	8.0	1.0	8.0
Rio Hondo Reach 1 and 2	10.1	2.3	8.0	1.0	8.0

1.3.4 Los Angeles River Watershed Trash TMDL

The Los Angeles River Trash TMDL was adopted by the Los Angeles Regional Water Quality Control Board as Resolution 2007-012, which became effective on September 23, 2008, after State Board and USEPA approval. Simplistically, TMDL compliance is assessed based on Daily Generation Rate (DGR) studies, the remainder of the catchment not protected by Full Capture Certified Devices (FCCDs), or a combination of both metrics. The LAR UR2 WMA Permittees have generally chosen to track the installation of FCCDs, such as Connector Pipe Screens (CPS). **Table 1-12** and **Table 1-13** lists (in gallons and pounds) interim and final DGR estimated residual limits from Permit Attachment O Part A.3, while the allowable remainder of the catchment unprotected by FCCDs is identified in parentheses within the table header.

Table 1-12 LAR Watershed Trash TMDL Effluent Limitations per Storm Year (gallons of uncompressed trash)

Permittees	Baseline	2012 (30%)	2013 (20%)	2014 (10%)	2015 (3.3%)	2016 (0%)
Bell	16026	4808	3205	1603	529	0
Bell Gardens	13500	4050	2700	1350	446	0
Commerce	58733	17620	11747	5873	1938	0
Cudahy	5935	1781	1187	594	196	0
Huntington Park	19159	5748	3832	1916	632	0
Maywood	6129	1839	1226	613	202	0
Vernon	47203	14161	9441	4720	1558	0

Table 1-13 LAR Watershed Trash TMDL Effluent Limitations per Storm Year (pounds of drip dry trash)

Permittees	Baseline	2012 (30%)	2013 (20%)	2014 (10%)	2015 (3.3%)	2016 (0%)
Bell	25337	7601	5067	2534	836	0
Bell Gardens	23371	7011	4674	2337	771	0
Commerce	85481	25644	17096	8548	2821	0
Cudahy	10061	3018	2012	1006	332	0
Huntington Park	30929	9279	6186	3093	1021	0
Maywood	10549	3165	2110	1055	348	0
Vernon	66814	20044	13363	6681	2205	0

The final WLA of zero trash discharged, or catchment area unprotected, is to be achieved for the 2016 storm year that begins on October 1, 2015 and ends on September 30, 2016. During the current period from, October 1, 2013 to September 30, 2014, 90% of the baseline study trash volume or weight must be captured based on DGR study analysis and only 10% estimated to have been discharged. Alternatively, 90% of a Permittee catchment may be protected by FCCDs, leaving 10% unprotected.

With the assistance of a grant to the Gateway Water Management Authority (GWMA), over 2,700 FCCDs were installed throughout the LAR UR2 WMA catchment area by December 31, 2011, as summarized in **Table 1-14**. Completion of the installation of FCCDS will be subject to significantly more difficult design, permitting, funding, and construction related challenges, but remains an LAR UR2 WMA priority.

Table 1-14 Installation of FCCDs Within the LAR UR2 WMA by December 31, 2011			
Permittees	**Number of LAR Catch Basins**	**Number of FCCDs Installed**	**Percent of Catch Basins Protected**
Bell	259	238	92%
Bell Gardens	271	248	92%
Commerce	659	545	83%
Cudahy	147	130	88%
Huntington Park	522	442	85%
Maywood	178	151	85%
Vernon	902	847	94%

1.4 Existing and Past Monitoring Programs

A review of existing monitoring programs within the LAR UR2 WMA was conducted to establish and assess the magnitude of water quality challenges. **Figure 1-6** presents the location of the existing or past monitoring locations near LAR UR2 WMA. The following summaries characterize specific water quality data, pollutant priorities and study findings relevant to the LAR UR2 WMA.

1.4.1 LA County Annual Stormwater Monitoring (2002-2012)

The Los Angeles County Department of Public Works Annual Stormwater Monitoring Report (LACDPW SMR) presents stormwater quality findings for each July to June storm season. The 2002–2003, 2003–2004, 2005–2006, 2006–2007, 2007–2008, 2008–2009, 2009–2010, 2010-2011, and 2011-2012 monitoring reports addressed the following programs and associated elements:

- Core Monitoring Program – mass emission, tributary, water column toxicity, and trash monitoring.
- Regional Monitoring Program – estuary sampling and bioassessment.
- Special studies – New Development Impacts Study in the Santa Clara Watershed, Peak Discharge Impact Study and BMP Effectiveness Study.

Figure 1-6 shows the Core Monitoring Program for the LA River mass emission station (S10) nearest the LAR UR2 WMA, and the Rio Hondo Channel tributary monitoring station (TS06) studied during the 2002-2003 and 2003-2004 storm seasons. The S10 station is located at the existing stream gauge station (i.e., Stream Gauge F319-R) between Willow Street and Wardlow Road in the City of Long Beach and was chosen to avoid tidal influences. The Rio Hondo Channel monitoring station TS06 is located on Beverly Boulevard, downstream of Whittier Narrows dam, at the USGS – U.S. Army Corps of Engineers (ACOE) Stream gage No. 1102300 or E327-R and upstream of the LAR UR2 WMA.

A minimum of three wet-weather and two dry-weather events were monitored for all sites during each annual storm season. Grab samples were collected and analyzed for conventional pollutants and bacteria during both dry and wet-weather events. Additionally, composite samples were collected for both dry- and wet-weather events and were analyzed for general minerals, metals, semi-volatiles, chlorinated pesticides, organophosphate pesticides, herbicides, PCBs and TSS.

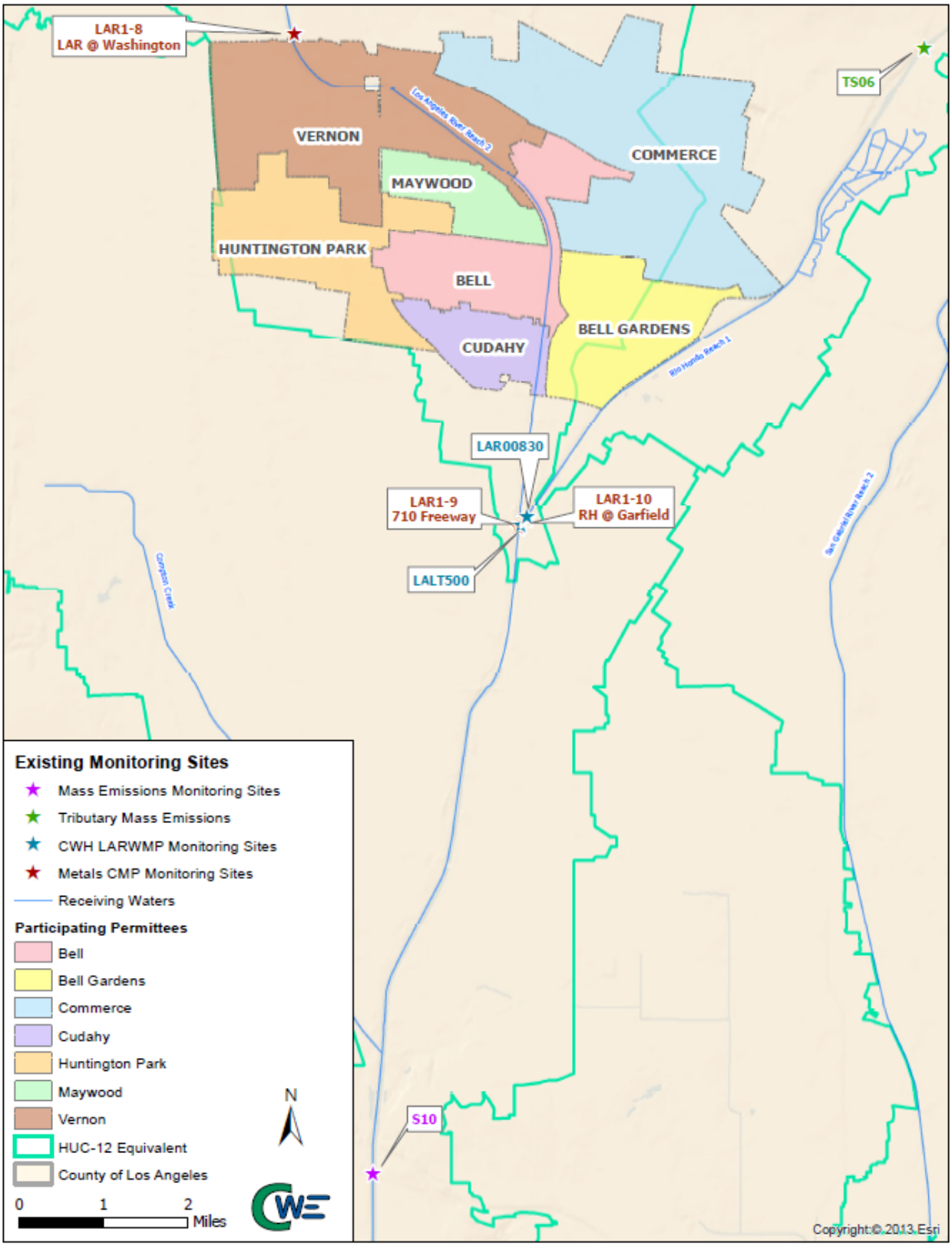


Figure 1-6 Existing Monitoring Sites

1.4.2 Council for Watershed Health: Los Angeles River Watershed Monitoring

The Council for Watershed Health (CWH) coordinates the Los Angeles River Watershed Monitoring Program (LARWMP) to assess Watershed health based on five broad objectives: 1) Are stream conditions improving; 2) Are specific critical site conditions improving; 3) Do discharges meet WQOs; 4) Is it safe to swim; and 5) Are locally caught fish safe to eat. The CWH LARWMP collects water samples and performs bioassessments following a stratified randomized sampling scheme that separates the watershed into natural, urban and mainstem portions to facilitate comparisons. Sampling occurs annually, during the late spring or early summer, and the water is analyzed for general chemistry (nutrients), metals (total and dissolved), organophosphorus, and pyrethroid pesticides. The CWH responded to our request for monitoring data from 2009 – 2012, which was reviewed. The nearest monitoring sites to the LAR UR2 WMA are LALT500, located at the LAR and Rio Hondo confluence, and LAR00830, which is located within Rio Hondo. As shown in **Figure 1-6**, both sites are located downstream of the LAR UR2 WMA.

1.4.3 LA River Metals TMDL Coordinated Monitoring Plan and Ambient Monitoring Submittal (2010-2011, 2011-2012)

At its July 17, 2006 meeting, the Los Angeles River Watershed Management Committee recommended formation of a Los Angeles River Metals TMDL Technical Committee (TC) and tasked the group with preparation of a Coordinated Monitoring Plan (CMP). The CMP includes both ambient (Tier I) and effectiveness monitoring (Tier II). The Tier I ambient monitoring program collects monthly samples at thirteen locations. Tier I monitoring site LAR1-8, LAR1-9, and LAR1-10, shown in **Figure 1-6**, are located adjacent to the LAR UR2 WMA and the data from these sites have given the LAR UR2 WMA a better understanding of the distribution of metals concentrations in the adjacent WMAs.

1.4.4 LA River Copper Water-Effect Ratio (WER) and Lead Recalculation Site Specific Objectives (SSO) Study

The California Toxic Rule (CTR) and MS4 Permit allows WER SSO, that reflect local water column conditions, to be developed so long as they provide equivalent aquatic life protection to that intended in the "Guidelines for deriving numerical national Water Quality Criteria" (USEPA 1985). If the WER value for a pollutant exceeds 1, site water reduces the toxic effect of that pollutant, while a WER of less than 1, signals that the toxic effect of site water is greater than laboratory water. Once a WER is approved, ambient acute and chronic CTR criteria are multiplied by the locally developed WER value. Similarly, CTR values may be recalculated based on new laboratory toxicity studies, as occurred for lead. The primary purpose of the subject study was to determine one or more copper WER value for the Los Angeles River and some tributaries, along with a recalculation of criteria for lead. The results suggest that appropriate wet- and dry-weather copper WERs, for the Rio Hondo and Los Angeles River, would be about 9.691 and 3.971 respectively, resulting in substantially higher, but equally protective, water quality objectives.

1.5 CIMP Overview

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

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

1.5.1 Receiving Water Monitoring

Receiving water monitoring is intended to assess whether water quality objectives are being achieved, whether beneficial uses are supported, and to track trends in constituent concentrations over time. **Section 2** discusses the proposed LAR UR2 WMA receiving water monitoring site and program.

1.5.2 Stormwater Outfall Monitoring

Stormwater outfall monitoring assesses compliance with municipal action limits (MALs), WQBELs derived from TMDL WLAs, as well as the potential of the LAR UR2 WMA to have caused or contributed to exceedances of RWLs derived from TMDL WLAs or receiving water quality objectives. The majority of storm drains within the LAR URS2 WMA initially drain south and seven potential stormwater outfall monitoring sites were found to comprise about 79% of the LAR UR2 WMA catchment area. The selected sites are representative of a combination of the HUC-12 equivalents, jurisdictions, and/or land uses within each catchment area which they have been chosen to represent. A synopsis of each potential outfall's catchment area, along with an analysis of its land use/zoning characteristics is summarized in **Section 4**.

1.5.3 Non-Stormwater Outfall Program

To further fulfill the Permit requirements, the MRP requires Permittees to implement a non-stormwater outfall based screening and monitoring program. The Non-Stormwater Outfall Screening and Monitoring Program (Non-Stormwater Program) is focused on non-stormwater discharges to receiving waters from MS4 outfalls. The Non-Stormwater Program will collect information necessary to identify significant non-stormwater discharges and conduct the screening and prioritization process to non-stormwater outfall monitoring. Additional details of the Non-Stormwater Program are presented in **Section 5**.

1.5.4 New Development and Redevelopment Effectiveness Tracking

The New Development/Re-Development Effectiveness Tracking is required to identify the information necessary for data management and annual compliance reporting. Each jurisdiction will be individually responsible for tracking Permit requirements, based on their specific operational procedures and internal processes. The LAR UR2 WMA permittees will maintain an informational database record for each new development/re-development project subject to the minimum control measure (MCM) and their adopted Low Impact Development (LID) Ordinance. In addition, LAR UR2 WMA permittees will implement a tracking system for new development/re-development projects that have been conditioned for post-construction BMPs. **Section 6** presents the new development and redevelopment effectiveness tracking system for the LAR UR2 WMA.

1.5.5 Regional Studies

One Regional Study is identified in the MRP: Southern California Stormwater Monitoring Coalition (SMC), which is overseen by the Southern California Coastal Water Research Project (SCCWRP). The LAR UR2 WMA will participate and support the most recent SMC study, the bioassessment monitoring program. The LAR UR2 WMA will coordinate with SCCWRP and participate in the Bioassessment Program. **Section 7** presents the regional studies approach for the LAR UR2 WMA.

1.5.6 Special Studies

The MRP requires each Permittee to be responsible for conducting special studies required in an effective TMDL or an approved TMDL Monitoring Plan. Special studies options are further discussed in **Section 8**.

1.6 2012 MS4 Permit Review Process and Planned Implementation

On December 10, 2012 the cities of Commerce, Huntington Park and Vernon (hereinafter "the Cities") submitted Administrative Petitions (Petitions) to the California State Water Resources Control Board (SWRCB) pursuant to section 13320(a) of the California Water Code requesting that the SWRCB review various terms and requirements set forth in the 2012 MS4 Permit, Order No. R4-2012-0175 (Permit) adopted by the California Regional Water Quality Control Board, Los Angeles Region (Regional Board). The Petitions were subsequently referred to as SWRCB/OCC File Nos. A-2236(a) through (kk). In particular, and among other terms/requirements contained in the Permit, the Cities have sought review of all numeric limits, both interim and final, and whether derived from a TMDL or provided from the application of an adopted water quality standard, or through a discharge prohibition set forth in the Permit. The challenges to the various numeric limits set forth in the Permit include a challenge to all such numeric limits that may be complied with through the implementation of an approved Watershed Management Plan (WMP) and/or an Enhanced Watershed Management Plan (EWMP). In essence, the Petitions are challenging the fundamental premise for the various WMPs and the EWMPs requirements in the Permit, on various grounds, including, but not limited to, on the grounds that such Permit terms exceed the maximum extent practicable (MEP) standard, and were not adopted in accordance with the requirements of California Water Code (CWC) sections 13000, 13263 and 13241 The Cities are reserving all of their rights to subsequently assert that the identified BMPs need not be implemented, on the grounds that they are not technically or economically feasible. In other words, that the BMPs are impracticable and contrary to the MEP standard, and that it is not possible to provide the reasonable assurances required under the Permit in a manner that is consistent with the MEP standard, if at all. The Cities agree that it is not possible to provide the reasonable assurances required under the Permit in a manner that is consistent with the MEP standard. On July 8, 2013 the SWRCB advised the Cities that the respective Petitions were complete and all such Petitions remain pending at this time.

In spite of the pending Petitions, the Cities are acting in good faith and moving forward to attempt to comply with all of the applicable terms of the Permit, and look forward to working with the Regional Board to assess and implement the strategies and requirements necessary for compliance, including the development of an acceptable WMP. Nevertheless, because, through their Petitions, the Cities believe that many of the terms of the Permit are invalid, including the terms involving compliance with numeric limits which the Cities are seeking to comply with through the development and implementation of this WMP. the Cities hereby expressly reserve and are not waiving, with this submission or otherwise, any of their rights to challenge the need for any WMP, including their rights to seek to void or otherwise compel modifications to the Permit terms involving the WMP, or to void or compel revisions to any other part or portion of the Permit. In addition, the Cities are not waving, and hereby expressly reserve, any and all rights they have or may have to seek to recover the costs from the State to develop and implement this WMP, on the grounds that the WMP is being developed and will be implemented in order to comply with various mandates involving TMDLs, water quality standards and other similar Permit requirements, which requirements in the Permit are not mandated by the Clean Water Act, and with the Cities being unable to impose fees in order to recover their costs for developing and implementing this WMP.

2. Receiving Water Monitoring Approach

As outlined in the MRP, receiving water monitoring is intended to assess whether water quality objectives are being achieved, whether beneficial uses are supported, and to track trends in constituent concentrations over time. The requirements in the MRP include receiving water monitoring sites at previously designated County of Los Angeles Department of Public Works (LACDPW) mass emission stations (MES), TMDL receiving water compliance points, and additional receiving water locations representative of the impacts from MS4 discharges.

Through the evaluation of previously-utilized and existing receiving water monitoring sites, as summarized in **Section 1**, no existing MES were located within the LAR UR2 WMA. Additionally, there are no other existing receiving water monitoring sites located in relation to the LAR UR2 WMA. The existing downstream MES and other surrounding monitoring sites were not considered because they would be ineffective for characterizing local discharges, as they are located further downstream of the LAR UR2 WMA and receive significant tributary flows that are unrepresentative of the group. New receiving water monitoring locations were selected and are summarized in the following sections.

2.1 Receiving Water Monitoring Objectives

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

- Determine whether the receiving water limitations 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.

2.2 Receiving Water Monitoring Sites

The primary objective of receiving water monitoring is to assess trends in pollutant concentrations over time, or during specified conditions. To address the receiving water monitoring objectives and WBPCs, one receiving water monitoring site was selected, LAR-UR2-RW, to represent the Los Angeles River, Reach 2. A receiving water monitoring site in the Rio Hondo, Reach 1 was not selected. In lieu of a receiving water monitoring site, for the Rio Hondo, an outfall site was selected. Additional information is summarized below. **Figure 2-1** presents the approximate location of the receiving water monitoring site for LAR UR2 WMA. A fact sheet summary for the receiving water monitoring site is presented in **Appendix D**.

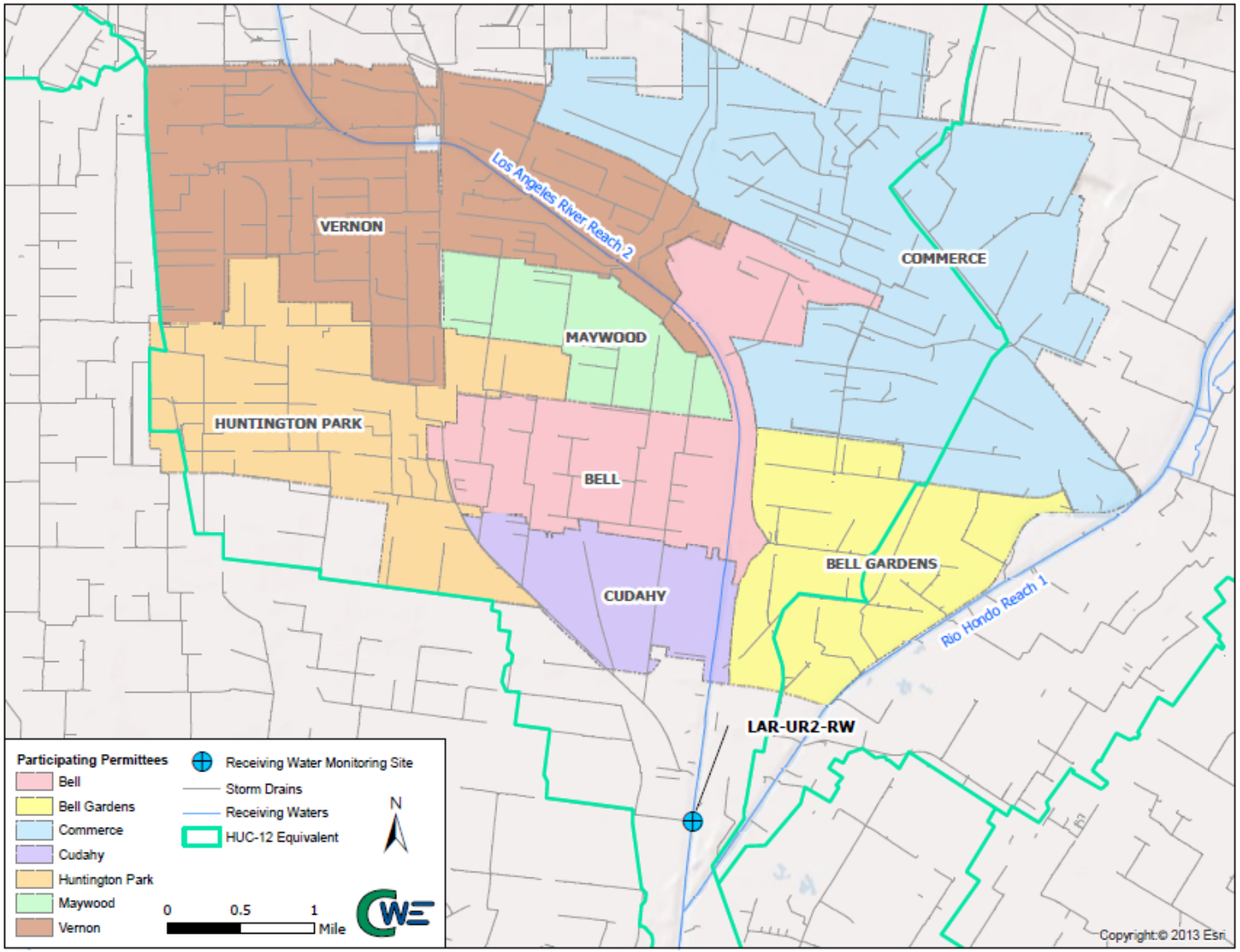


Figure 2-1 Receiving Water Monitoring Site Location

2.2.1 Los Angeles River (LAR-UR2-RW)

LAR-UR2-RW will be located in the City of South Gate, near the railroad trestle, or extension of Tweedy Boulevard. Sampling data from this location will assess the impact of LAR UR2 WMA MS4 discharges on the receiving water. The LAR-UR2-RW monitoring site is slightly downstream of the LAR UR2 WMA and receives discharges from the City of South Gate, which is not a LAR UR2 WMA member. The site is immediately downstream of major outfalls on both the east and west sides of the Los Angeles River that drain over 60% of the LAR UR2 WMA. Collection of samples will be done utilizing a fixed continuous autosampler.

Upstream receiving water monitoring will be coordinated with the Upper Los Angeles River Watershed Management Group (ULARWMG). The ULARWMG has identified a monitoring site that is located in the City of Los Angeles at Washington Boulevard, just upstream of LAR UR2 WMA. Water quality data at this location would be valuable for assessing the true impact of LAR UR2 WMA discharges on the receiving water. **Table 2-1** provides a summary of information for the LAR-UR2-RW site.

Table 2-1 LAR-UR2-RW Receiving Water Monitoring Site Summary

Site ID	Water Body/Location	Coordinates		Monitoring Type	
		Latitude	Longitude	RW	TMDL
LAR-UR2-RW	Los Angeles River/ near the railroad trestle, or extension of Tweedy Boulevard	33.940550	-118.174528	X	X

2.2.2 Rio Hondo

A receiving water monitoring site in the Rio Hondo in Reach 1 was not selected for the LAR UR2 WMA. Within the LAR UR2 WMA, the Rio Hondo is located on the entire eastern jurisdictional boundary. Adjacent to the LAR UR2 WMA, flows in the Rio Hondo are completely comingled with runoff from the Lower Los Angeles River (LLAR) group's cities of Pico Rivera and Downey. The discharge from these cities would confound the assessment of receiving water quality for the LAR UR2 WMA. The Los Angeles River Metals TMDL CMP has demonstrated that during dry-weather there is normally no dry-weather flow present in the Rio Hondo. During wet-weather, flows in this area are primarily derived from upstream areas which will be assessing their own receiving water quality. In lieu of selecting a receiving water monitoring site, the group has selected an outfall to monitor the discharges to the Rio Hondo. The stormwater outfall monitoring site, LAR-UR2-RHO, is representative of the LAR UR2 WMA Rio Hondo catchment, allowing direct water quality and pollutant load assessments. LAR-UR2-RHO encompasses about 74% of the total LAR UR2 WMA Rio Hondo catchment area. LAR-UR2-RHO is discussed further in **Section 4.2.1.**

2.3 TMDL Monitoring

TMDL monitoring requirements, as discussed in **Section 1**, within the LAR UR2 WMA are as follows:

- Los Angeles River Bacteria TMDL – Resolution 2010-007 and became effective on March 23, 2012
- Los Angeles River and Tributary Metals TMDL – Resolution 2007-014 and became effective on October 29, 2008, and Resolution 2010-003 effective on November 3, 2011
- Los Angeles River Nitrogen Compounds and Related Effects TMDL – Resolution 2003-009 and became effective on March 23, 2004. Site Specific Objectives (SSOs) for Ammonia were approved by the State Water Resources Control Board (SWRCB) June 4, 2013

- Los Angeles River Trash TMDL – adopted Resolution 2007-012 and became effective on September 23, 2008

To satisfy TMDL monitoring requirements, LAR UR2 WMA will monitor each specific TMDL constituent at all proposed receiving water, stormwater outfall-based and non-stormwater outfall-based monitoring sites. Additional monitoring requirements are summarized in the sections below.

2.3.1 Los Angeles River Bacteria TMDL

The LAR UR2 WMA is in the process of developing and submitting a Load Reduction Strategy (LRS) plan. Submittal of this plan will be separate from the CIMP. Until the LRS has been developed and approved by the Regional Board, LAR UR2 WMA will commence monitoring for *E. coli* at the proposed monitoring sites and frequency for each CIMP monitoring program (Receiving Water, Stormwater Outfall and Non-stormwater outfall). The LAR UR2 WMA is proposing this frequency schedule since monitoring for bacteria has not been conducted within the LAR UR2 WMA.

2.3.2 Los Angeles River and Tributary Metals TMDL

The existing Los Angeles River Metals TMDL Coordinated Monitoring Plan (CMP) is expected to be replaced by the incoming proposed CIMPs and IMPs, pending Regional Board Approval. Currently, the Metals CMP includes a three-tiered assessment of jurisdictional progress towards attainment of wet- and dry-weather water quality objectives. Three Tier I monitoring sites, near but not within the LAR UR2 WMA, are monitored monthly as grab samples. One site is located directly north of the City of Vernon. Two other Tier I monitoring sites are located immediately north of the confluence of the Rio Hondo and Los Angeles River. These sites receive runoff from, and are about one and a half miles downstream of, the LAR UR2 WMA.

The LAR UR2 WMA will continue to participate and cooperate in the CMP. Prior to the end of the CMP, LAR UR2 WMA will initiate Los Angeles River and Tributary Metals TMDL monitoring at the monitoring locations and frequency proposed in this CIMP. The LAR UR2 WMA is proposing this frequency schedule since monitoring for bacteria has not been conducted within the LAR UR2 WMA.

2.3.3 Los Angeles River Nitrogen Compounds and Related Effects TMDL

Outside of POTW or WRP, monitoring requirements for the Los Angeles River Nitrogen Compounds and Related Effects TMDL were not identified. To meet the TMDL monitoring requirements, the LAR UR2 WMA will monitor for these listed TMDL constituents at the CIMP monitoring sites and frequencies.

2.3.4 Los Angeles River Trash TMDL

Los Angeles River Trash TMDL does not require monitoring, and the LAR UR2 WMA is not required to conduct any type of monitoring if it is complying with the WLAs through the implementation of BMPs. Each of the individual LAR UR2 WMA permittees have submitted a compliance strategy through the development of BMP installation schedules, based on the DGR studies. To show compliance, a progress report based on installation of structural BMPs, such as full capture or partial capture systems, institutional controls, or any BMPs, is to be included in each individual LAR UR2 WMA permittees Annual Report.

2.4 Monitored Parameters and Frequency

Each constituent required for monitoring by the MRP is addressed by the receiving water monitoring site LAR-UR2-RW. Wet- and dry-weather monitoring frequency, parameters, and duration will be addressed in the following sections. Parameters for monitoring were based on the water quality priorities, as discussed in **Section 1.2**. Additional analytical and monitoring procedures are presented in the Quality Assurance Project Program (QAPP) Plan in **Appendix E**.

2.4.1 Wet-weather

For receiving water monitoring within LAR UR2 WMA, wet-weather will be defined as when the flow within the receiving water is at least 20 percent greater than the base flow. Wet-weather samples will be collected using a fixed continuous autosampler and sampled three times a year for all parameters except for aquatic toxicity which will be performed twice a year, per Part VI.C.1.a of the MRP. Wet-weather monitoring will target the first significant rain event of the wet season (October to April) of the storm year (July 1 to June 30) with a predicted rainfall of at least 0.25 inch at a seventy percent probability of rain fall at least 24 hours prior to the event start time. Because a significant storm event is based on predicted rainfall, it is recognized that monitoring may be triggered without 0.25 inches of rainfall actually occurring. If monitoring occurs, without the projected 0.25 inches of rainfall, but exceed the 20 percent or greater base flow of the receiving water, the event will still qualify as meeting the monitoring requirement provided that sufficient sample volume is collected to perform all required laboratory analysis. Documentation will be provided showing the predicted rainfall depth. LAR UR2 WMA will then target at least two subsequent wet-weather events that forecast sufficient rainfall and base flow. Sampling events will be separated by a minimum of three day of dry conditions (less than 0.1 inch of rain each day). Wet-weather receiving water monitoring will be performed in a close coordination with stormwater outfall monitoring to be reflective of potential impacts from MS4 discharges. Parameters to be collected and sampling frequency to meet to the receiving water monitoring requirements of the MPR are summarized in **Table 16**. Wet-weather receiving water monitoring will be conducted for the duration of the MS4 permit.

2.4.2 Dry-weather

Dry-weather, for LAR UR2 WMA receiving water monitoring, will be defined as when the flow is less than 20 percent greater than the base flow. Dry-weather receiving water monitoring will be conducted two times per year for all parameters except aquatic toxicity, which will be monitored once per year, as outlined in Part VI.D.1.a of the MRP. A summary of constituents and monitoring frequency for the receiving water monitoring sites is presented in **Table 2-2**. Dry-weather receiving water monitoring will be conducted for the duration of the MS4 permit.

Table 2-2 Schedule and Constituent Summary for Receiving Water Monitoring Sites and Annual Frequency (wet/dry)[1]

Constituents	Site ID
	LAR-UR2-RW
Flow and field parameters[2]	3/2
Pollutants identified in Table E-2 of the MRP[3]	1[4]/1[4]
Aquatic Toxicity and	2/1
Toxicity Identification Evaluation (TIE)	
E. coli	3/2[5]
Cadmium[6]	3/2
Copper[6]	
Lead[6]	
Zinc[6]	
Ammonia	
Nitrate - N	
Nitrite - N	
Nitrate-N + Nitrite-N	
Oil	

1. Annual frequency listed as number of wet-weather/dry-weather events per year, respectively (e.g., 3/2 signifies three wet-weather and two dry-weather events per year).
2. Field parameters are defined as DO, pH, temperature, and specific conductivity.
3. All pollutants identified in Table E-2 of the MRP not already explicitly addressed by monitoring at this site.
4. Monitoring frequency only applies during the first year of monitoring. For pollutants identified in Table E-2 of the MRP that are not detected at the Method Detection Limit (MDL) or the result is below the lowest applicable water quality objective, additional monitoring will not be conducted (i.e., the monitoring frequency will become 0/0). For pollutants detected above the lowest applicable water quality objective, future monitoring will be conducted at the frequency specified in the MRP (i.e., the monitoring frequency will become 3/2).
5. *E. coli* will be monitored at the receiving water site.
6. TSS and Hardness will be monitored when metals are monitored.

3. GIS Database

To meet the requirements of Part VII of the MRP, a map(s) and/or database of the MS4 storm drains, channels, and outfalls must be submitted with the CIMP and include the following information (Part VII.A of the MRP):

1. Surface water bodies within the Permittee(s) jurisdiction
2. Sub-watershed (HUC-12) boundaries
3. Land use overlay
4. Effective Impervious Area (EIA) overlay (if available)
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 Permittee's jurisdictional boundary. Each major outfall shall be assigned an alphanumeric identifier, which must be noted on the map
9. Notation of outfalls with significant NSW discharges (to be updated annually)
10. Storm drain outfall catchment areas for each major outfall within the Permittee(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
    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 NSW discharges
    f. Stormwater and NSW monitoring data

Attachment A of the MS4 Permit defines major MS4 outfall (or "major outfall") as a municipal separate storm sewer outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (discharge from a single conveyance other than circular pipe which is associated with a drainage area of more than 50 acres); or for municipal separate storm sewers that receive stormwater from lands zoned for industrial activity (based on comprehensive zoning plans or the equivalent), an outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (discharge from other than a circular pipe associated with a drainage area of 2 acres or more) (40 CFR § 122.26(b)(5)).

Available Geographic Information System (GIS) data were reviewed to determine whether components 1 through 11.f from the list specified in the MRP were available for submittal. Based on the review of the GIS data, components 1 through 11.f from the list specified in the MRP were divided into available information or pending information and schedule for completion, **Section 3.2** and **3.3**, respectively.

3.1 Program Objectives

Each year, storm drains, channels, outfalls map and associated database for the LAR UR2 WMA are required to be updated to incorporate the most recent characterization data for outfalls with significant non-stormwater discharge.

3.2 Available Information

The LAR UR2 WMA reviewed Part VII.A of the MRP and gathered the available information for the group. The following data are readily available for submittal as a map and/or in a database (note, the numbering corresponds to the item number in the Permit list):

1. Surface water bodies within the Permittee(s) jurisdiction
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
8. The location of all major MS4 outfalls within the Permittee's jurisdictional boundary
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
    c. Physical description
    d. Photographs of the outfall, where possible, to provide baseline information to track operation and maintenance needs over time
    f. Stormwater and NSW monitoring data

In addition, some of the following data are readily available but have data gaps that will be addressed through review of existing information or will be generated based on additional data processing (i.e., Non-Stormwater Outfall Screening and Inventory) by the LAR UR2 WMA Permittees:

10. Storm drain outfall catchment areas for each major outfall within the Permittee(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

Figure 1-2 through **Figure 1-5** contain available information, listed above, for the LAR UR2 WMA, while **Appendix B** contains an map of the approximately 100 outfalls observed adjacent to the Permittees, some of which may be associated with individual or general Permittee, other than the LAR UR2 WMA members. **Appendix C** contains an initial database for tracking Stormwater Outfall based monitoring, but no analytical data has yet been collected so that portion of the work sheet was not inserted.

3.3 Pending Information and Schedule for Completion

From the review, the following data are not currently available for submittal as a map and/or in a database, but are scheduled for completion:

4. Effective Impervious Area (EIA) overlay
9. Notation of outfalls with significant NSW discharges (to be updated annually)
11. Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include:
    e. Determination of whether the outfall conveys significant NSW discharges

Completion of the data, listed above, is in progress and will be collected through the implementation of the CIMP, specifically the Non-Stormwater Outfall Monitoring Program.

4. Stormwater Outfall Monitoring Approach

Stormwater outfall monitoring assesses compliance with municipal action limits (MALs), WQBELs derived from TMDL WLAs, as well as the potential to have caused or contributed exceedances of RWLs derived from TMDL WLAs or receiving water quality objectives. The majority of LAR UR2 WMA storm drains generally drain south through multiple jurisdictions. An analysis of land use per HUC-12, drainage area and LAR UR2 WMA was conducted for each monitoring site.

4.1 Program Objectives

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

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

Each stormwater outfall monitoring site was evaluated and assessed on how representative they are of the surrounding land use of the LAR UR2 WMA, jurisdictions, and the HUC-12. Each zoning category provided by the RAA guidance manual was fit into one of the following eight land use categories:

- Agricultural;
- Industrial;
- Single Family Residential;
- Open Space
- Commercial;
- Education;
- Multi-Family Residential; and
- Transportation

4.2 Stormwater Outfall Monitoring Sites

The Permit provides monitoring site "default" requirements, one site per HUC-12 per jurisdiction, for achieving stormwater outfall monitoring objectives. The MS4 Permit also allows for an alternative approach to increase the cost efficiency and effectiveness of the monitoring program. The LAR UR2 WMA has chosen an alternative to the default Permit approach. Seven stormwater outfall monitoring sites, as shown in **Figure 4-1**, were selected as part of the alternative approach. The seven monitoring sites comprise about 79% of the catchment area of the LAR UR2 WMA. The selected sites are representative of a combination of the HUC-12 equivalents, jurisdictions, and/or land uses within each drainage area which they have been chosen to represent. LAR UR2 WMA Stormwater outfall samples will be collected upstream of the outfalls at manholes, utilizing a portable autosampler. One stormwater outfall monitoring site (LAR-UR2-RHO) will be monitored at every wet-weather event and the remaining six stormwater outfall monitoring sites will be monitored on a rotation basis, where one site to the north and one site to the south will be monitored per storm event. A synopsis of each potential outfall catchment area, along with an analysis of its land use/zoning characteristics are summarized below. **Table 4-1** provides a summary for the seven stormwater outfall monitoring sites and **Appendix D** provides a summary of fact sheet summary for the stormwater outfall monitoring sites.

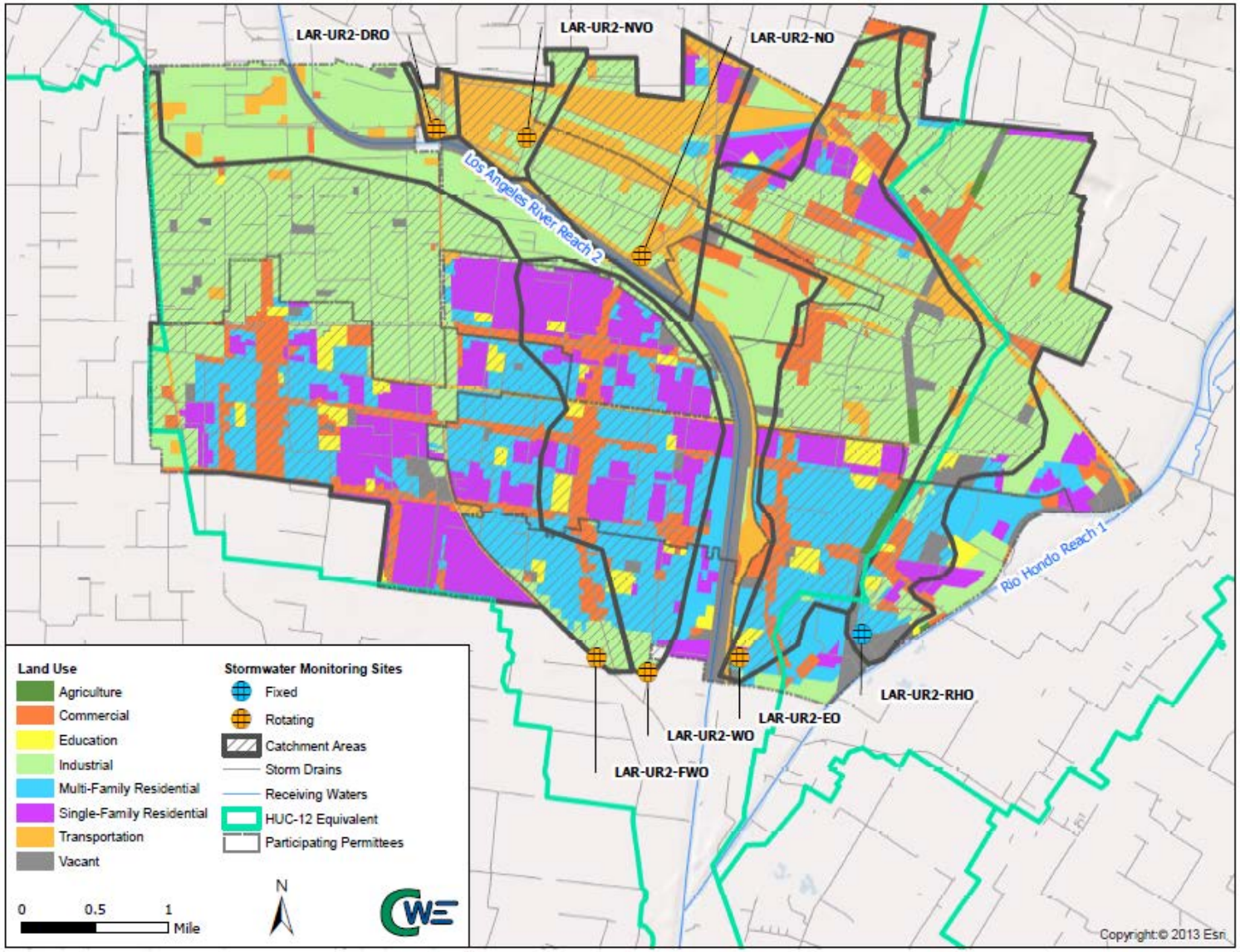


Figure 4-1 Stormwater Outfall Monitoring Sites Location

Table 4-1 Stormwater Outfall Monitoring Site Summary						
Outfall ID	**Tributary HUC-12 Area**	**Jurisdiction Where Site is Located**	**Jurisdictions Draining to the Site**	**Facility**	**Latitude**	**Longitude**
Fixed Site						
LAR-UR2-RHO	Alhambra Wash - Rio Hondo	Bell Gardens	Bell Gardens, Commerce	Manhole	33.959003	-118.154614
Rotating Sites						
LAR-UR2-DRO	Chavez Ravine - Los Angeles River	Vernon	Vernon	Manhole	34.008539	-118.205166
LAR-UR2-EO	Chavez Ravine - Los Angeles River	Bell Gardens	Bell, Bell Gardens, Commerce, Vernon	Outfall	33.956663	-118.169102
LAR-UR2-NO	Chavez Ravine - Los Angeles River	Vernon	Bell, Commerce, Vernon	Manhole	33.996050	-118.180775
LAR-UR2-WO	Chavez Ravine - Los Angeles River	Cudahy	Bell, Cudahy, Huntington Park, Maywood, Vernon	Manhole	33.955146	-118.179975
LAR-UR2-NVO	Chavez Ravine - Los Angeles River	Vernon	Commerce, Vernon	Manhole	34.007733	-118.194464
LAR-UR2-FWO	Chavez Ravine - Los Angeles River	Cudahy	Bell, Cudahy, Huntington Park, Maywood, Vernon	Manhole	33.956591	-118.186050

4.2.1 LAR-UR2-RHO

As discussed in **Section 2.2.2**, Rio Hondo receiving water monitoring in not being proposed as the WMA makes up only about four percent of the subwatershed. Stormwater outfall site LAR-UR2-RHO, shown in **Figure 4-2**, receives runoff from about 71% of the total LAR UR2 WMA Rio Hondo tributary area. This location is proposed as a "fixed outfall site" meaning that it will be sampled for three wet-weather events annually and can contribute data towards other receiving water monitoring efforts. The LAR-UR2-RHO location is the BI0539 – Line A –storm drain manhole located in the John Anson Ford Park parking lot near the intersection of Park Lane and Gillard Avenue in the City of Bell Gardens. It receives runoff from the Cities of Bell Gardens and Commerce and is representative of MS4 discharge to the Rio Hondo, within the Alhambra Wash HUC-12 areas. A comparative analysis, presented in **Table 4-2**, demonstrates that the land use composition of the catchment tributary to site LAR-UR2-RHO should be representative of the total LAR UR2 WMA draining to the Rio Hondo.

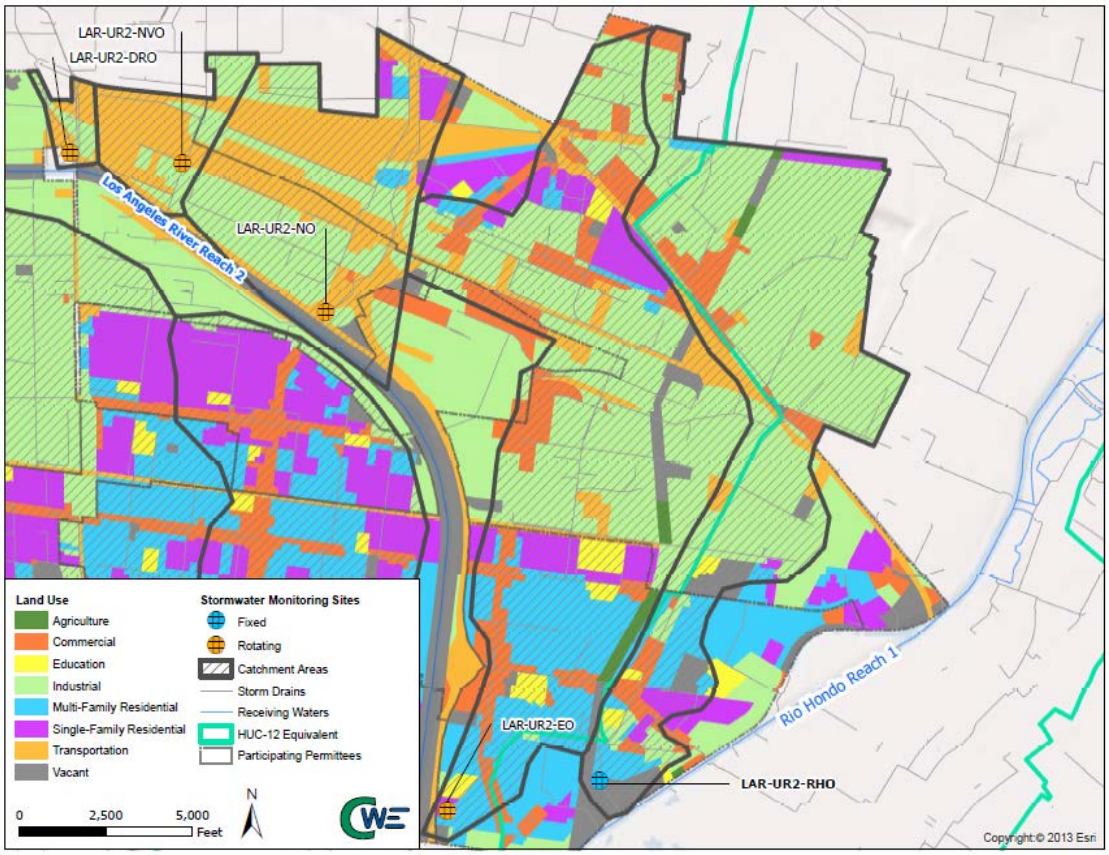


Figure 4-2 LAR-UR2-RHO Stormwater Outfall Monitoring Site

Table 4-2 LAR-UR2-RHO Tributary Area

Land Use Category	Catchment		LAR UR2 WMA Portion of Rio Hondo HUC-12 area		LAR UR2 WMA Total	
	Acres	Percentage	Acres	Percentage	Acres	Percentage
Agriculture	9.30	0.52%	11.02	0.48%	46.00	0.32%
Commercial	162.49	9.09%	179.17	7.88%	1418.94	9.98%
Education	23.31	1.30%	41.10	1.81%	311.42	2.19%
Industrial	1195.52	66.88%	1232.08	54.16%	6028.97	42.41%
MF Residential	123.20	6.89%	380.11	16.71%	2412.98	16.98%
SF Residential	65.85	3.68%	164.16	7.22%	1783.77	12.55%
Transportation	85.50	4.78%	66.34	2.92%	1369.82	9.64%
Vacant	122.38	6.85%	200.88	8.83%	843.43	5.93%
Total	1787.55	100%	2274.86	100%	14215.34	100%

Based on the findings from the comparative analysis of the watershed drainage to the Rio Hondo, there is no necessity or value in conducting receiving water monitoring in the Rio Hondo for the LAR UR2 WMA. Under these circumstances, the most definitive source of LAR UR2 WMA water quality data to the Rio Hondo receiving water would be the data provided by the LAR-UR2-RHO stormwater outfall monitoring site. A summary of the LAR-UR2-RHO stormwater monitoring site information is presented in **Table 4-3**.

Table 4-3 LAR-UR2-RHO Stormwater Outfall Monitoring Site Summary						
Outfall ID	**Tributary HUC-12 Area**	**Jurisdiction Where Site is Located**	**Jurisdictions Draining to the Site**	**Facility**	**Latitude**	**Longitude**
LAR-UR2-RHO	Alhambra Wash - Rio Hondo	Bell Gardens	Bell Gardens, Commerce	Manhole	33.959003	-118.154614

4.2.2 Rotating Stormwater Outfall Monitoring Sites

LAR UR2 WMA has decided to rotate monitoring between the six stormwater outfall sites that are representative of the entire watershed. The six rotating stormwater outfall sites will be sampled in conjunction with the receiving water site and the "fixed" LAR-UR2-RHO stormwater outfall monitoring site. Two stormwater outfall monitoring sites will be monitored during each storm event, where one site in the north and one site in the south will be monitored. Each group of monitoring sites will be monitored once per year and will rotate between the first, second and third storm event. **Table 4-4** presents the preliminary rotation schedule for the six stormwater outfall monitoring sites.

Table 4-4 Stormwater Outfall Monitoring Rotation Schedule						
Outfall ID	**Storm Year**					
	2014-2015	**2015-2016**	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**
Group 1						
LAR-UR2-DRO	1	2	3	1	2	3
LAR-UR2-EO						
Group 2						
LAR-UR2-NO	2	3	1	2	3	1
LAR-UR2-WO						
Group 3						
LAR-UR2-NVO	3	1	2	3	1	2
LAR-UR2-FWO						

1 First storm event
2 Second storm event
3 Third storm event

4.2.2.1 LAR-UR2-DRO (Downey Road)

The stormwater outfall monitoring site LAR-UR2-DRO receives runoff from the BI5206 – Los Angeles storm drain, which primarily receives runoff from the non WMA group member, City of Los Angeles, and a small portion of the City of Vernon. Samples for LAR-UR2-DRO will be collected, utilizing portable autosamplers, in a manhole located on the sidewalk on the southwest corner of Bandini Boulvard and South Downey Road. Stormwater outfall monitoring site LAR-UR2-DRO is located in the Chavez Ravine - Los Angeles River HUC-12 area.

An analysis comparing the land use composition within the LAR UR2 WMA portion of the LAR-UR2-DRO catchment area, to that of the greater LAR UR2 WMA, indicates the LAR-UR2-DRO area is not representative of the LAR UR2 WMA or the City of Vernon. However, from the comparative analysis, stormwater outfall monitoring site LAR-UR2-DRO is representative entirely of the industrial land use category. Based on these findings, water quality data from LAR-UR2-DRO will be used to represent the findings for the industrial land use category in the LAR UR2 WMA.

Table 4-5 presents the land use comparative analysis of the LAR-UR2-DRO tributary area. A summary of stormwater outfall monitoring site LAR-UR2-DRO is found in **Table 4-6**.

Table 4-5 LAR-UR2-DRO Tributary Area

Land Use Category	Catchment		Vernon		LAR UR2 WMA Portion of Los Angeles River HUC-12 area	
	Acres	Percentage	Acres	Percentage	Acres	Percentage
Agriculture	0	0%	0	0%	34.98	0.29%
Commercial	0	0%	16.37	0.50%	1239.48	10.38%
Education	0	0%	2.67	0.08%	270.08	2.26%
Industrial	25.57	35.91%	2556.40	77.52%	4796.90	40.18%
MF Residential	0	0%	0.23	0.01%	2032.77	17.03%
SF Residential	0	0%	0.93	0.03%	1618.17	13.55%
Transportation	37.75	53.00%	494.04	14.98%	1303.48	10.92%
Vacant	0.29	0.40%	226.95	6.88%	642.48	5.38%
Unincorporated	7.61	10.68%	0	0%	0	0%
Total	71.22	100%	3297.60	100%	11938.34	100%

Table 4-6 LAR-UR2-DRO Stormwater Outfall Monitoring Site Summary

Outfall ID	Tributary HUC-12 Area	Jurisdiction Where Site is Located	Jurisdictions Draining to the Site	Facility	Latitude	Longitude
LAR-UR2-DRO	Chavez Ravine - Los Angeles River	Vernon	Vernon	Manhole	34.008539	-118.205166

Figure 4-3 and **Figure 4-4** illustrate the catchment area of LAR-UR2-DRO as well as the monitoring site location in relation to the LAR UR2 WMA.

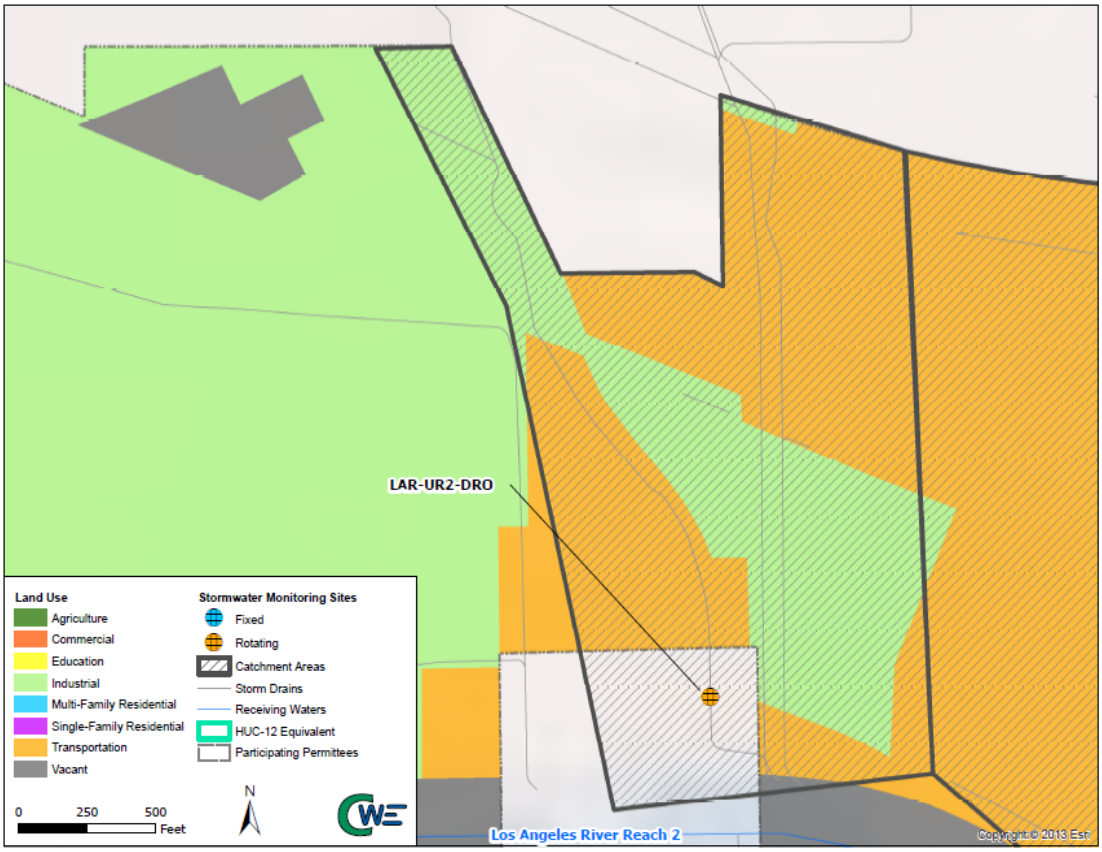


Figure 4-3 LAR-UR2-DRO Stormwater Outfall Monitoring Site

4.2.2.2 LAR-UR2-EO (East Los Angeles River)

Stormwater outfall monitoring site LAR-UR2-EO, presented in **Figure 4-4**, receives runoff from the DDI 23 storm drain, which receives drainage from the Cities of Bell, Bell Gardens, Commerce and a small portion of Vernon. Samples for LAR-UR2-EO will be collected over the outfall, which can be accessed in the channel near 8287 Jaboneria Road in the City of Bell Gardens. LAR UR2 WMA will install portable autosamples over the outfall prior to the storm event to collect the samples for LAR-UR2-EO. Monitoring site LAR-UR2-EO is located in the Chavez Ravine - Los Angeles River HUC-12 area.

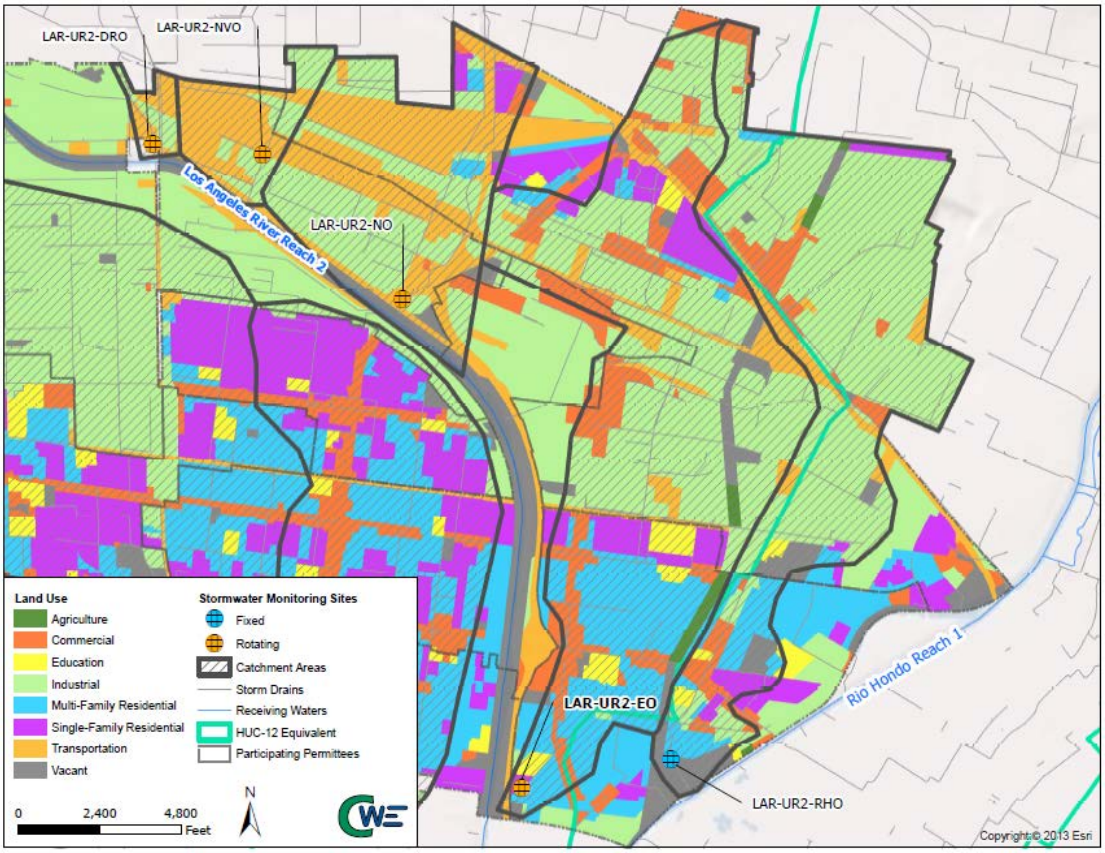


Figure 4-4 LAR-UR2-EO Stormwater Outfall Monitoring Site

Table 4-7 presents an analysis comparing the land use composition within the LAR-UR2-EO catchment area, to that of the whole LAR UR2 WMA. From the analysis, drainage from LAR-UR2-EO is representative of the LAR UR2 WMA as a whole. Land use categories commercial, industrial, high density single family residential as well as open space are well represented in the LAR-UR2-EO catchment area.

Table 4-7 LAR-UR2-EO Tributary Area

Land Use Category	Catchment		LAR UR2 WMA Portion of Los Angeles River HUC-12 area		LAR UR2 WMA Total	
	Acres	Percentage	Acres	Percentage	Acres	Percentage
Agriculture	34.96	1.44%	34.98	0.30%	46.00	0.32%
Commercial	364.37	15.07%	1239.48	10.38%	1418.94	9.98%
Education	75.08	3.11%	270.08	2.26%	311.42	2.19%
Industrial	1036.52	42.88%	4796.90	40.18%	6028.97	42.41%
MF Residential	443.02	18.33%	2032.77	17.03%	2412.98	16.98%
SF Residential	187.43	7.75%	1618.17	13.55%	1783.77	12.55%
Transportation	188.99	7.82%	1303.48	10.92%	1369.82	9.64%
Vacant	87.00	3.60%	642.48	5.38%	843.43	5.93%
Total	2417.35	100%	11938.34	100%	14215.34	100%

A summary of stormwater outfall monitoring site LAR-UR2-EO is found in **Table 4-8**.

Table 4-8 LAR-UR2-EO Stormwater Outfall Monitoring Site Summary

Outfall ID	Tributary HUC-12 Area	Jurisdiction Where Site is Located	Jurisdictions Draining to the Site	Facility	Latitude	Longitude
LAR-UR2-EO	Chavez Ravine - Los Angeles River	Bell Gardens	Bell, Bell Gardens, Commerce, Vernon	Outfall	33.956663	-118.169102

4.2.2.3 LAR-UR2-NO (North Los Angeles River)

Stormwater Outfall Monitoring Site LAR-UR2-NO, presented in **Figure 4-5**, is located in the Chavez Ravine - Los Angeles River HUC-12 area. LAR-UR2-NO receives runoff from the BI 0014 – U3 – DDI 22 storm drain line. The Cities of Commerce, Vernon and a small portion of Bell within LAR UR2 WMA as well as the non WMA group member, City of Los Angeles drains to LAR-UR2-NO. Samples for LAR-UR2-NO will be collected by a portable autosampler, installed in a manhole located in lane number 3 on South Atlantic Boulevard in the City of Vernon.

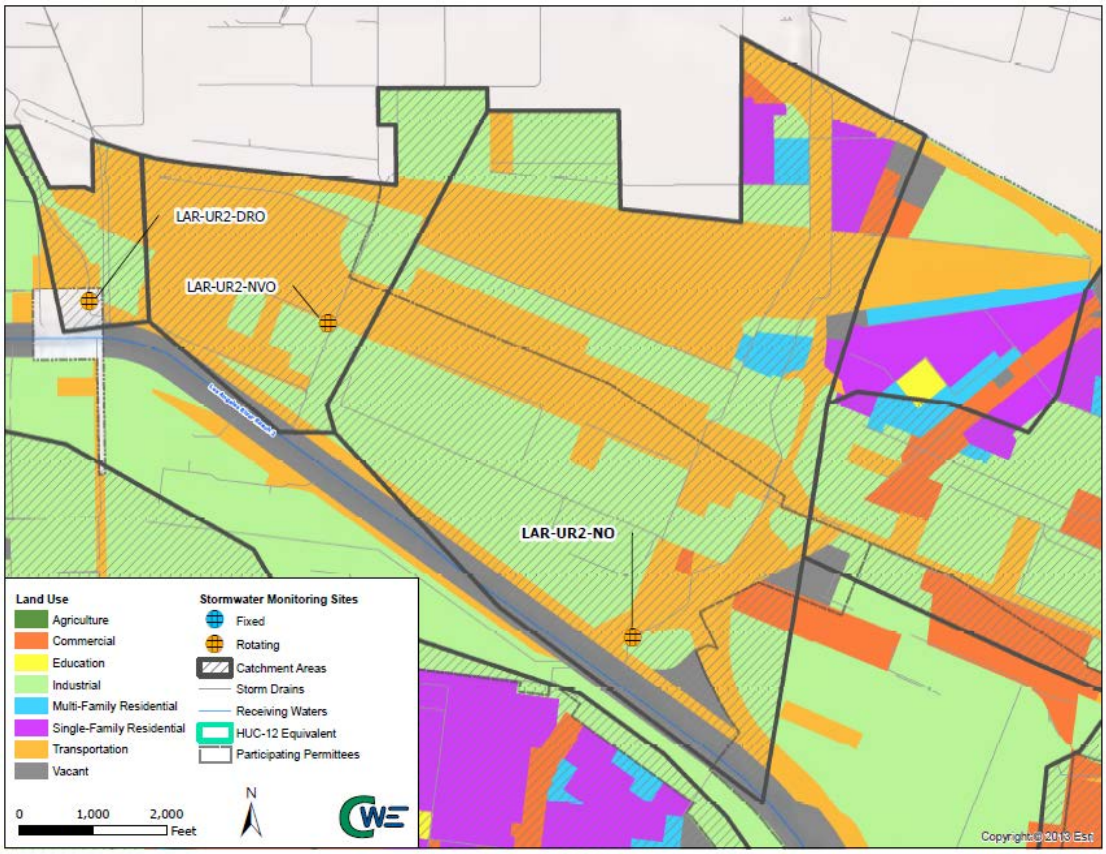


Figure 4-5 LAR-UR2-NO Stormwater Outfall Monitoring Site

Land use composition within the LAR-UR2-NO catchment area was compared to the total land use composition of all the LAR UR2 WMA. **Table 4-9** presents the findings from the land use analysis. From the analysis, LAR-UR2-NO area is not representative of the LAR UR2 WMA. However, LAR-UR2-NO is more comparable to the Cities of Commerce and Vernon, which is relatively dense in industrial land use and makes up approximately 86% of the catchment area. Based on these comparisons, samples collected at LAR-UR2-NO will be representative of the industrial land uses for the Cities of Commerce and Vernon.

Table 4-9 LAR-UR2-NO Tributary Area

Land Use Category	Catchment		Commerce		Vernon		LAR UR2 WMA Total	
	Acres	%	Acres	%	Acres	%	Acres	%
Agriculture	0	0%	19.46	0.46%	0	0%	46.00	0.32%
Commercial	19.83	1.95%	383.03	9.13%	16.37	0.50%	1418.94	9.98%
Education	0	0%	24.46	0.58%	2.67	0.08%	311.42	2.19%
Industrial	406.41	39.91%	2523.00	60.15%	2556.40	77.52%	6028.97	42.41%
MF Residential	18.94	1.86%	129.28	3.09%	0.23	0.01%	2412.98	16.98%
SF Residential	34.44	3.38%	292.25	6.97%	0.93	0.03%	1783.77	12.55%
Transportation	473.28	46.48%	650.51	15.51%	494.04	14.98%	1369.82	9.64%
Vacant	65.39	6.42%	172.50	4.11%	226.95	6.88%	843.43	5.93%
Total	1018.29	100%	4194.48	100%	3297.60	100%	14215.34	100%

A summary of stormwater outfall monitoring site LAR-UR2-NO is presented in **Table 4-10**.

Table 4-10 LAR-UR2-NO Stormwater Outfall Monitoring Site Summary

Outfall ID	Tributary HUC-12 Area	Jurisdiction Where Site is Located	Jurisdictions Draining to the Site	Facility	Latitude	Longitude
LAR-UR2-NO	Chavez Ravine - Los Angeles River	Vernon	Bell, Commerce, Vernon	Manhole	33.996050	-118.180775

4.2.2.4 LAR-UR2-WO (West Los Angeles River)

Stormwater outfall monitoring site LAR-UR2-WO, **Figure 4-6**, receives runoff from the BI 001 – U1 Line A – East Compton Creek, which primarily drains the Cities of Bell, Cudahy, Maywood and a small portion of Huntington Park. Stormwater outfall monitoring site LAR-UR2-WO is located in the Chavez Ravine - Los Angeles River HUC-12 area. Samples for LAR-UR2-WO will be collected in a manhole, via portable autosampler, at the T-intersection of Wilcox Avenue and Patata Street.

An analysis comparing land use composition within the LAR-UR2-WO catchment area, to that of the greater LAR UR2 WMA, **Table 4-11**, indicates the LAR-UR2-WO area is not representative of the LAR UR2 WMA as a whole, but has a high percentage of high density single family and multi-family/mixed residential land uses making up approximately 72% of the area. From these comparisons, LAR-UR2-WO will be used to represent the high density single family and multi-family/mixed residential land uses within LAR UR2 WMA.

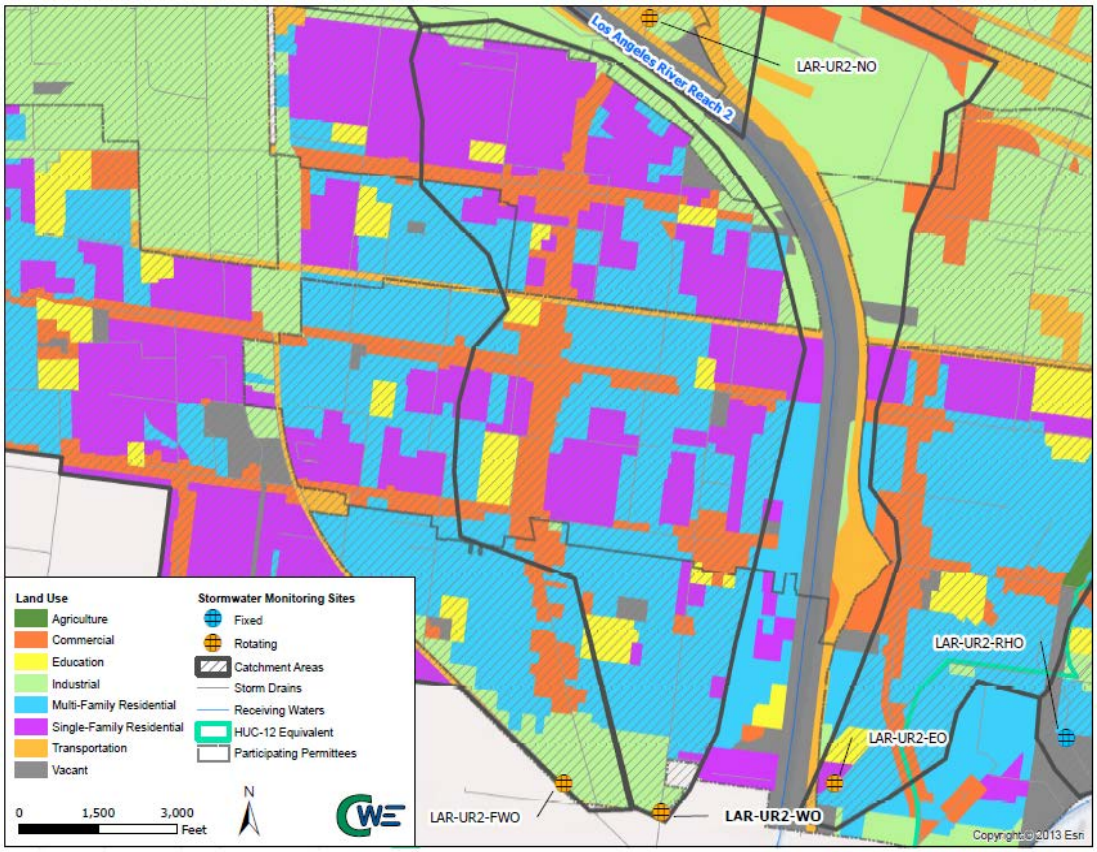


Figure 4-6 LAR-UR2-WO Stormwater Outfall Monitoring Site

Table 4-11 LAR-UR2-WO Tributary Area

Land Use Category	Catchment		LAR UR2 WMA Portion of Los Angeles River HUC-12 area		LAR UR2 WMA Total	
	Acres	Percentage	Acres	Percentage	Acres	Percentage
Agriculture	0	0%	34.98	0.30%	46.00	0.32%
Commercial	244.09	15.97%	1239.48	10.38%	1418.94	9.98%
Education	66.85	4.37%	270.08	2.26%	311.42	2.19%
Industrial	91.61	6.00%	4796.90	40.18%	6028.97	42.41%
MF Residential	565.52	37.01%	2032.77	17.03%	2412.98	16.98%
SF Residential	515.64	33.74%	1618.17	13.55%	1783.77	12.55%
Transportation	16.66	1.09%	1303.48	10.92%	1369.82	9.64%
Vacant	19.87	1.30%	642.48	5.38%	843.43	5.93%
South Gate	7.87	0.52%	0	0%	0	0%
Total	1528.12	100%	11938.34	100%	14215.34	100%

A summary of stormwater outfall monitoring site LAR-UR2-WO attributes are presented in **Table 4-12.**

Table 4-12 LAR-UR2-WO Stormwater Outfall Monitoring Site Summary

Outfall ID	Tributary HUC-12 Area	Jurisdiction Where Site is Located	Jurisdictions Draining to the Site	Facility	Latitude	Longitude
LAR-UR2-WO	Chavez Ravine - Los Angeles River	Cudahy	Bell, Cudahy, Huntington Park, Maywood, Vernon	Manhole	33.955146	-118.179975

4.2.2.5 LAR-UR2-NVO (North Vernon)

The LAR-UR2-NVO stormwater outfall monitoring site, **Figure 4-7**, receives runoff from the DDI 26 storm drain, which receives discharge from the Cities of Vernon and a small portion of Commerce as well as non WMA group member, City of Los Angeles. Stormwater outfall monitoring site LAR-UR2-NVO is located in the Chavez Ravine - Los Angeles River HUC-12 area. Samples for LAR-UR2-NVO will be collected, utilizing portable autosamplers, in a manhole located in the center median near 3890 East 26th Street in the City of Vernon.

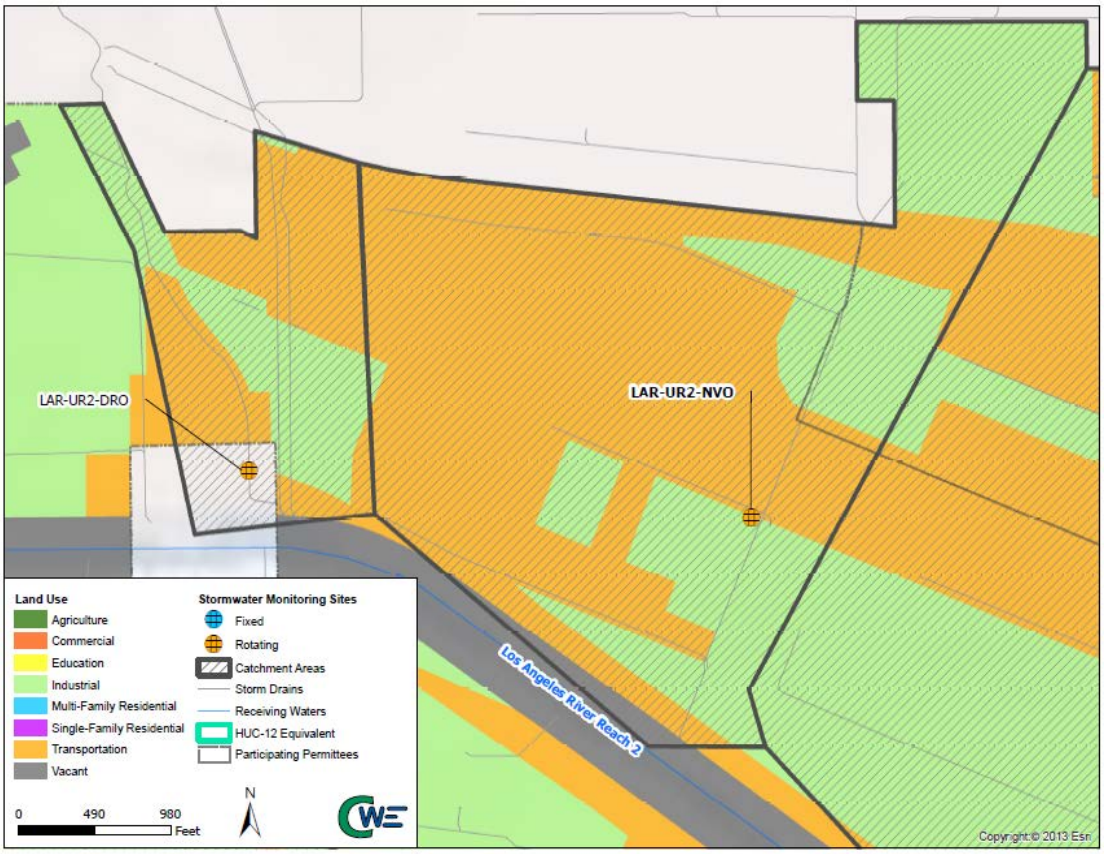


Figure 4-7 LAR-UR2-NVO Stormwater Outfall Monitoring Site

An analysis comparing the land use composition within the LAR-UR2-NVO catchment area within LAR UR2 WMA, **Table 4-13**, to that of the greater LAR UR2 WMA, indicates the LAR-UR2-NVO area is not representative of the LAR UR2 WMA. However, further analysis indicates the LAR-UR2-NVOarea is like the Cities of Commerce and Vernon, relatively dense in industrial land use categories which make up

approximately 98% of the area. Based on these findings, water quality data from LAR-UR2-NVO will be used to represent the industrial land use category in the LAR UR2 WMA.

Table 4-13 LAR-UR2-NVO Tributary Area

Land Use Category	Catchment		Commerce		Vernon		LAR UR2 WMA Total	
	Acres	%	Acres	%	Acres	%	Acres	%
Agriculture	0	0%	19.46	0.46%	0	0%	46.00	0.32%
Commercial	0	0%	383.03	9.13%	16.37	0.50%	1418.94	9.98%
Education	0	0%	24.46	0.58%	2.67	0.08%	311.42	2.19%
Industrial	91.70	35.09%	2523.00	60.15%	2556.40	77.52%	6028.97	42.41%
MF Residential	0	0%	129.28	3.09%	0.23	0.01%	2412.98	16.98%
SF Residential	0	0%	292.25	6.97%	0.93	0.03%	1783.77	12.55%
Transportation	165.58	63.36%	650.51	15.51%	494.04	14.98%	1369.82	9.64%
Vacant	4.07	1.56%	172.50	4.11%	226.95	6.88%	843.43	5.93%
Total	261.35	100%	4194.48	100%	3297.60	100%	14215.34	100%

A summary of attributes for stormwater outfall monitoring site LAR-UR2-NO is presented in **Table 4-14**.

Table 4-14 LAR-UR2-NVO Stormwater Outfall Monitoring Site Summary

Outfall ID	Tributary HUC-12 Area	Jurisdiction Where Site is Located	Jurisdictions Draining to the Site	Facility	Latitude	Longitude
LAR-UR2-NVO	Chavez Ravine - Los Angeles River	Vernon	Commerce, Vernon	Manhole	34.007733	-118.194464

4.2.2.6 LAR-UR2-FWO (Far West Los Angeles River)

LAR-UR2-FWO, **Figure 4-8**, stormwater outfall monitoring site receives runoff from the East Compton Creek No. 1 storm drain, which primarily receives discharge from the Cities of Cudahy, Huntington Park, Maywood, Vernon and a small portion of Bell. Samples for LAR-UR2-FWO will be collected using a portable autosampler in a manhole located on Salt Lake Avenue in the City of Cudahy, between Ardine Street and Atlantic Avenue. Stormwater outfall monitoring site LAR-UR2-FWO is located in the Chavez Ravine - Los Angeles River HUC-12 area.

Land use composition within the LAR-UR2-FWO catchment area was compared to the total land use composition of all the LAR UR2 WMA. **Table 4-15** presents the findings from the land use analysis. From the analysis, LAR-UR2-FWO catchment area to that of the greater LAR UR2 WMA, indicates the LAR-UR2-FWO area is representative of the area as a whole. Land use categories commercial, industrial, high density single family residential as well as open space are well represented in the LAR-UR2-FWO catchment area. A summary of attributes for stormwater outfall monitoring site LAR-UR2-FWO is presented in **Table 4-16**.

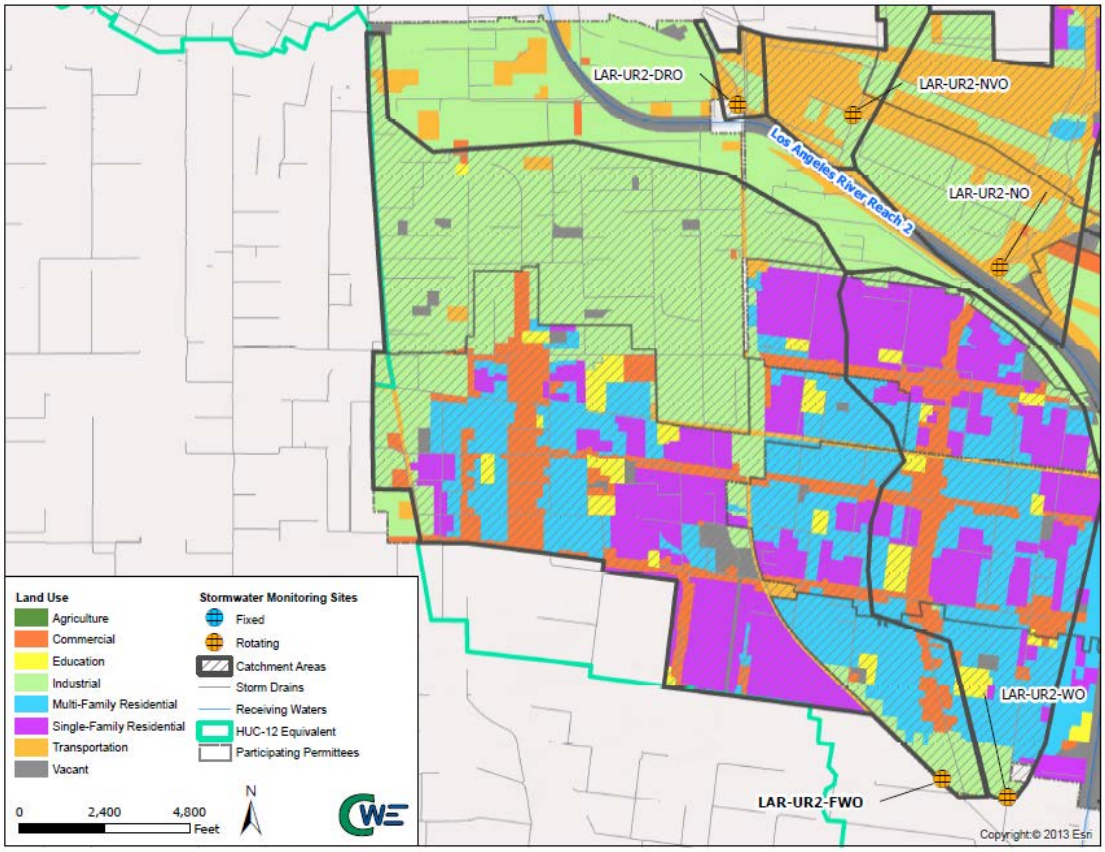


Figure 4-8 LAR-UR2-FWO Stormwater Outfall Monitoring Site

Table 4-15 LAR-UR2-FWO Tributary Area

Land Use Category	Catchment		LAR UR2 WMA Portion of Los Angeles River HUC-12 area		LAR UR2 WMA Total	
	Acres	Percentage	Acres	Percentage	Acres	Percentage
Agriculture	0	0%	34.98	0.29%	46.00	0.32%
Commercial	454.93	10.87%	1239.48	10.38%	1418.94	9.98%
Education	114.25	2.73%	270.08	2.26%	311.42	2.19%
Industrial	1763.25	42.14%	4796.90	40.18%	6028.97	42.41%
MF Residential	879.38	21.02%	2032.77	17.03%	2412.98	16.98%
SF Residential	749.79	17.92%	1618.17	13.55%	1783.77	12.55%
Transportation	111.22	2.66%	1303.48	10.92%	1369.82	9.64%
Vacant	100.63	2.40%	642.48	5.38%	843.43	5.93%
Unincorporated	10.86	0.26%	0	0%	0	0%
Total	4184.31	100%	11938.34	100%	14215.34	100%

Table 4-16 LAR-UR2-FWO Stormwater Outfall Monitoring Site Summary						
Outfall ID	**Tributary HUC-12 Area**	**Jurisdiction Where Site is Located**	**Jurisdictions Draining to the Site**	**Facility**	**Latitude**	**Longitude**
LAR-UR2-FWO	Chavez Ravine - Los Angeles River	Cudahy	Bell, Cudahy, Huntington Park, Maywood, Vernon	Manhole	33.956591	-118.186050

4.3 Monitored Frequency and Parameters

Stormwater outfall monitoring sites will be monitored for three storm events per year, prior to receiving water monitoring, for all required constituents except aquatic toxicity. Aquatic toxicity will be monitored 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 Section VIII.B.1.c and presented in **Table 4-17**. Parameters in Table E-2 of the MRP, will not be identified as exceeding applicable water quality objectives until after the first year of receiving water monitoring. Monitoring for the selected sites would occur for at least the duration of the Permit term, unless an alternative site is warranted, per the adaptive management process, as presented in **Section 10**. Additional analytical and monitoring procedures are discussed in **Appendix E**.

Table 4-17 List of Constituents for Stormwater Outfall Monitoring

Constituent	Site ID						
	LAR-UR2-RHO	LAR-UR2-EO	LAR-UR2-FWO	LAR-UR2-WO	LAR-UR2-NO	LAR-UR2-NVO	LAR-UR2-DRO
Flow, hardness, pH, dissolved oxygen, temperature, specific conductivity, and TSS	X	X1	X1	X	X	X	X
Table E-2 pollutants detected above relevant objectives	X	X	X	X	X	X	X
Aquatic Toxicity and Toxicity Identification Evaluation (TIE)[1]							
E. coli	X	X	X	X	X	X	X
Cadmium	X	X	X	X	X	X	X
Copper	X	X	X	X	X	X	X
Lead	X	X	X	X	X	X	X
Zinc	X	X	X	X	X	X	X
Ammonia		X	X	X	X	X	X
Nitrate - N		X	X	X	X	X	X
Nitrite - N		X	X	X	X	X	X
Nitrate-N + Nitrite-N		X	X	X	X	X	X
Oil		X	X	X	X	X	X

1. Toxicity is only monitored from outfalls when triggered by recent receiving water toxicity monitoring where a TIE on the observed receiving water toxicity test was inconclusive. If toxicity is observed at the outfall a TIE must be conducted.
2. E. coli will be monitored at each storm event.

5. Non-stormwater Outfall Monitoring Approach

The Non-Stormwater Outfall Screening and Monitoring Program is focused on dry-weather discharges to receiving waters from major outfalls. The program fills two roles: (1) to provide assessment of whether the non-stormwater discharges are potentially impacting the receiving water, and (2) to determine whether significant non-stormwater discharges are allowable. The non-stormwater outfall program is complimentary to the IC/ID program minimum control measure. Non-stormwater outfall monitoring sites will be determined after outfall screening, determination of discharge significance, and source identification. 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.

5.1 Program Objectives

The objectives of the non-stormwater outfall program include the following (Part II.E.3 of the MRP):

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

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

1. Develop criteria or other means to ensure that all outfalls with significant non-stormwater discharges are identified and assessed during the term of this MS4 Permit.
2. For outfalls determined to have significant non-stormwater flow, determine whether flows are the result of illicit connection/illicit discharge (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 MS4 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 MS4 Permit and take appropriate actions pursuant to Part III.A.4.d of the MS4 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 MS4 Permit.
9. Maximize the use of Permittee resources by integrating the screening and monitoring process into existing or planned Integrated Monitoring Program (IMP) and/or CIMP efforts.

The outfall screening and investigations must be completed prior to initiating monitoring at an individual outfall. A flowchart of the program is presented as **Figure 5-1**. Detailed discussion of each element is provided in the following subsections.

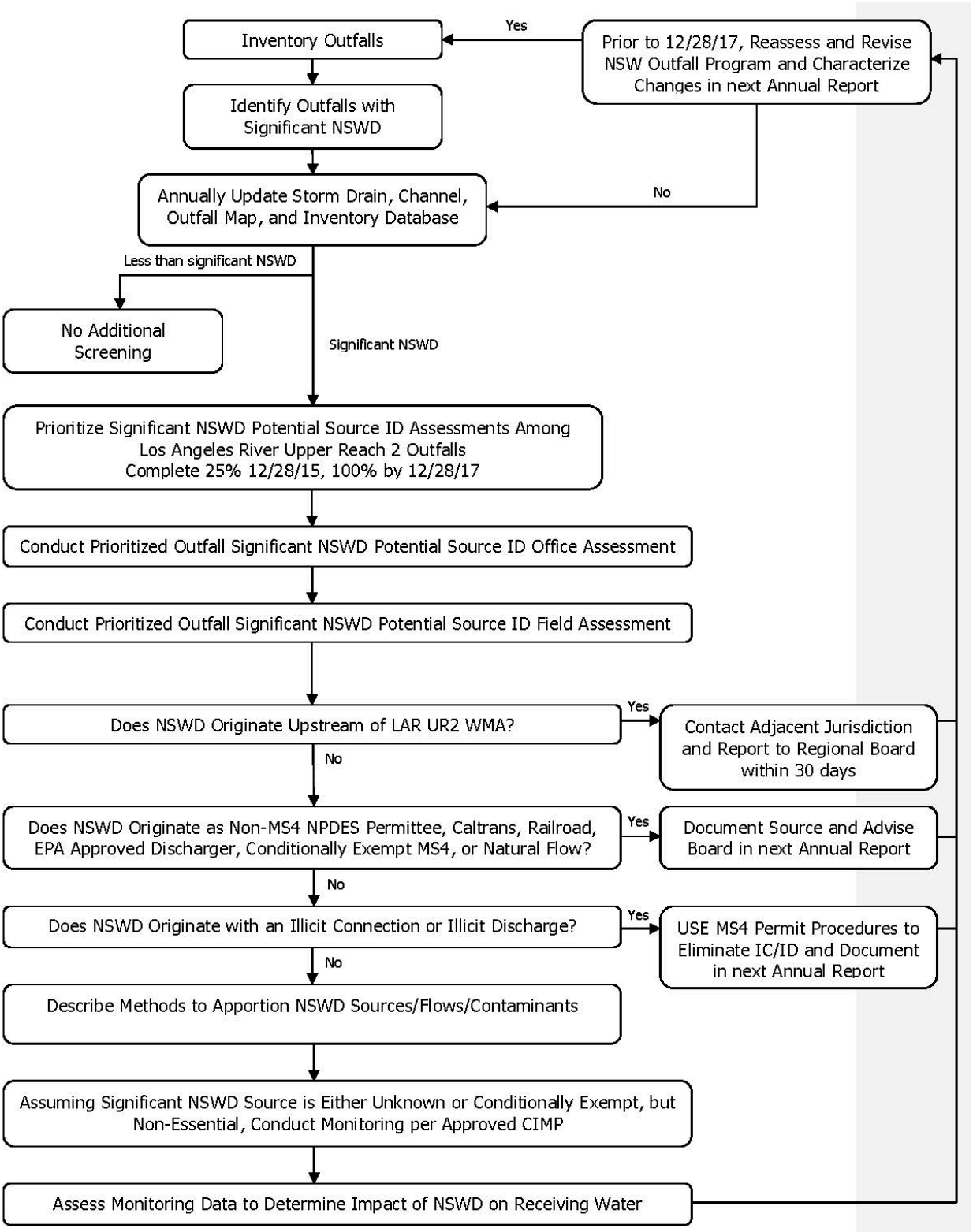


Figure 5-1 Non-stormwater Outfall Monitoring Program Flow Chart

5.2 Screen and Identify Outfalls with Significant Non-Stormwater Discharge

In December 2013, a field survey was conducted in the Los Angeles River and Rio Hondo within the LAR UR2 WMA to allow for the identification of outfalls. Based on a review of the available information, identification of significant non-stormwater discharges is not available at this time. Under this task, the LAR UR2 WMA will undertake one additional outfall screening to evaluate all major outfalls within its jurisdiction. The major outfalls for the LAR UR2 WMA are defined as follows:

- 36-inch or larger pipes with a drainage area of more than 50 acres, and
- 12-inch or larger pipes from industrial zoned areas with a drainage area of 2 acres or more.

In order to collect data to determine significant non-stormwater outfalls, the LAR UR2 WMA will perform one outfall screening during the first year after CIMP approval. The outfall screening is necessary to collect the information to identify outfalls exhibiting significant non-stormwater discharges and to develop the information needed for the inventory of outfalls with significant non-stormwater discharges. The LAR UR2 WMA will screen for flow and plans to collect a sample for analytical monitoring; however it has not determined what parameters will be analyzed. Analytes may include *E. coli*; metals; and nutrients.

During the outfall screening process, all outfalls within the LAR UR2 WMA area will be visited. A standard field data collection form will be used, consisting of:

- Channel bottom, visual estimate of flow rate
- Whether discharge ponds, or reaches the receiving water
- Clarity
- Presence of odors and foam
- Analytical sampling

Additionally needed information for the GIS database will be collected, including geographically referenced photographs, as discussed in **Section 3**. **Table 5-1** outlines the LAR UR2 WMA screening process. Based on the estimated flow rate and the preponderance of the analytical data, the outfalls will be ranked and the top 20% will be identified as outfalls with significant non-stormwater discharges.

Table 5-1 Non-Stormwater Outfall Screening Process Utilizing Flow and WQOs

Component	Description
Characteristics for Defining Significant Non-Stormwater Discharges	The top 20% ranked outfalls will be assessed as significant non-stormwater discharges. The ranking score is the sum of the following criteria:
	1. Does the non-stormwater discharge reach the receiving water during dry-weather? If yes, give a score of 1 and continue through the ranking criteria.
	2. WQO Exceedances: for each outfall monitored during the non-stormwater outfall screening process, a score will be given to the outfall depending on whether an exceedance of WQO was observed during monitoring. A score of 1 will be given for each exceedance of WQO, and 0 for meeting criteria.
Data Collection	Data that would need to be collected include accurate flow measurements AND Constituents (To be determined). Additionally, information needed to complete the inventory would be collected.
Timeline	The screening process will occur within 90 day of approval of the CIMP, to be scheduled during dry-weather.

5.3 Inventory MS4 Outfalls

An inventory of MS4 Outfalls will be developed and maintained by the LAR UR2 WMA after outfall screening. The LAR UR2 WMA inventory database, will include available existing data from past outfall screening efforts, monitoring, and initiated data collection efforts. The data within the database will include the physical attributes MS4 outfalls determined to have significant non-stormwater discharges as well as those requiring no further assessment. If the MS4 outfall requires no further assessment, the inventory will include the rationale for the determination of no further action required based on the following:

- The outfall does not have flow;
- The outfall does not have a known significant non-stormwater discharge; or
- Discharges observed were determined to be exempt during the source identification (**Section 5.5**).

The inventory will be recorded in the database as required in Part VII.A of the MRP. Each year, the inventory will be updated to incorporate the most recent characterization data for outfalls with significant non-stormwater discharges. The following physical attributes of outfalls with significant non-stormwater discharges will be included in the inventory and should be 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., 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 monitoring characteristics that could aid in pollutant source identification; and
- Monitoring data.

5.4 Prioritized Source Identification

Once the significant non-stormwater outfalls have been identified through the screening process and incorporated into the inventory, Part IX.E of the MRP requires Permittees to prioritize outfalls for further source investigations. The LAR UR2 WMA proposes the following alternative prioritization criteria to be utilized:

Outfalls in the top 20% with the highest ranking score based on **Table 5-2**, and

1. Outfalls for which monitoring data exist and indicate recurring exceedances of one or more of the Action Levels identified in Attachment G of the Permit.

Once the prioritization is completed, a source identification of designated significant non-stormwater outfall will be achieved. The LAR UR2 WMA proposes the following schedule:

- Complete 25% of significant outfalls – within 5 years of the effective date of the MS4 NPDES Permit (December 28, 2017); and
- Complete 100% of significant outfalls – within 7 years of the effective date of the MS4 NPDES Permit (December 28, 2019)

5.5 Source Identification of Significant Non-Stormwater Discharge

Based on the prioritized list of major outfalls with significant non-stormwater discharge, source identification will be conducted to identify the source(s) or potential source(s) of non-stormwater discharge.

Part IX.A.2 of the MRP requires Permittees to classify the source identification results into the following types and summarized in **Table 5-2**:

A. IC/IDs: If the source is determined to be an illicit discharge, the Permittee must implement procedures to eliminate the discharge consistent with IC/ID requirements (Permit Part VI.D.10) and document actions.
B. Authorized or conditionally exempt non-stormwater discharges: 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 member must document the source. For non-essential conditionally exempt discharges, the group member must conduct monitoring consistent with Part IX.G of the MRP.
C. Natural flows: If the source is determined to be natural flows, the Permittee must document the source.
D. Unknown sources: If the source is unknown, the Permittee must conduct monitoring consistent with Part IX.G of the MRP.

Table 5-2 Summary of Source Identification Types

Type	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 it 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
E. Upstream of LAR UR2 WMA	End investigation	Inform upstream WMA and the Regional Board in writing within 30 days of identifying discharge.

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

Source identification will be conducted using site-specific procedures based on the characteristics of the non-stormwater discharge. Investigations could include:

- Performing 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; and
- Compiling and reviewing available resources, including past monitoring and investigation data, land use/MS4 maps, aerial photography, and property ownership information.

Where the source identification has determined the non-stormwater source to be authorized, natural, or essential conditionally-exempt flows, the outfall will require no further assessment, and source identification will continue to the next highest priority outfall. However, if the source identification determines that the source of the discharge is non-essential conditionally exempt, an ID, or is unknown, then further investigation will be conducted to eliminate the discharge or to demonstrate that it is not causing or contributing to receiving water impairments, and will be added to the monitoring list until the non-stormwater discharge is eliminated.

In some cases, source investigations may ultimately lead to prioritized programmatic or structural BMPs. Where the LAR UR2 WMA has determined that they will address the non-stormwater discharge through modifications to programs or by structural BMP implementation, the LAR UR2 WMA will incorporate the approach into the implementation schedule developed in the WMP, and the outfall can be eliminated from the monitoring list.

5.6 Monitoring of Non-Stormwater Outfalls Exceeding Criteria

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

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

Thus, outfalls that have been determined to convey significant non-stormwater discharges where the source identification concluded that the source is attributable to an ongoingID (Type A from **Table 5-2**, non-essential conditionally exempt (Type B from **Table 5-2**), or unknown (Type D from **Table 5-2**) must be monitored. Monitoring will begin within 90 days of completing the source identification.

5.6.1 Non-Stormwater Outfall Monitoring Sites

The information to determine the number and location of outfalls requiring monitoring is not available at this time. After the outfall inventory, identification of outfalls with significant non-stormwater discharge, prioritization, and source identification, outfalls identified to require monitoring will be monitored as described in the following section.

5.6.2 Monitored Frequency and Parameters

After the outfall screening and source identification, non-stormwater monitoring sites will be sampled for two times per year to coincide with receiving water dry-weather monitoring. Coordination with receiving water monitoring will allow for an evaluation of whether the non-stormwater discharges are causing or contributing to any observed exceedances of water quality objectives in the receiving water. Significant non-stormwater outfalls will be monitored for all required constituents, per receiving water bodies, as outlined in Part IX.G.1.a-e of the MRP, except toxicity. Toxicity monitoring is only required when

triggered by recent receiving water toxicity monitoring where a TIE on the observed receiving water toxicity test was inconclusive. An overview of the constituents to be monitored and the corresponding frequency is listed in **Table 5-3**. Outfalls on the monitoring list will be monitored for at least the duration of the Permit term, or until the non-stormwater discharge is eliminated. Additional analytical and monitoring procedures are discussed in **Appendix D**.

Table 5-3 List of Constituents for Non-stormwater Outfall Monitoring

Constituent	Receiving Water Bodies of Outfalls	
	Los Angeles River	Rio Hondo
Flow, hardness, pH, dissolved oxygen, temperature, specific conductivity, and TSS	X	X
Table E-2 pollutants detected above relevant objectives	X	X
Aquatic Toxicity and Toxicity Identification Evaluation (TIE)[1]		
E. coli	X	X
Copper	X	X
Lead	X	X
Zinc	X	X
Ammonia	X	
Nitrate - N	X	
Nitrite - N	X	
Nitrate-N + Nitrite-N	X	
Oil	X	

1. Toxicity is only monitored from outfalls when triggered by recent receiving water toxicity monitoring where a TIE on the observed receiving water toxicity test was inconclusive. If toxicity is observed at the outfall a TIE must be conducted.
2. E. coli will be monitored at each non-stormwater outfall monitoring event.

6. New Development/Re-Development Effectiveness

New Development/Re-Development Effectiveness Tracking is used for tracking information data about new and re-development activities. To meet the MRP requirements of Permit Attachment E, Part X.A, the LAR UR2 WMA members will maintain an informational database record for each new development/re-development project subject to the minimum control measure (MCM) requirements in Part VI.D.7 of the Permit and their adopted Low Impact Development (LID) Ordinance. The database should track the following information:

1. Name of the Project and Developer,
2. Mapped project location (preferably linked to the Geographic Information System (GIS) storm drain map),
3. Issuance date of the project Certificate of Occupancy,
4. 85th percentile 24-hour storm event for project design (inches),
5. 95th percentile 24-hour storm event for projects draining to natural water bodies (inches),
6. Other design criteria required to meet hydromodification requirements for drainages to natural water bodies,
7. Project design storm (inches per 24 hours),
8. Project design storm volume (gallons or MGD),
9. Percent of design storm volume to be retained onsite,
10. Design volume for water quality mitigation treatment BMPs (if any),
11. If flow through, water quality treatment BMPs are approved, provide the one-year, one-hour storm intensity as depicted on the most recently issued isohyetal map published by the Los Angeles County Hydrologist,
12. Percent of design storm volume to be infiltrated at an off-site mitigation or groundwater replenishment project site,
13. Percent of design storm volume to be retained or treated with biofiltration at an off-site retrofit project,
14. Location and maps (preferably linked to the GIS storm drain map) of off-site mitigation, groundwater replenishment, or retrofit sites, and
15. Documentation of issuance of requirements to the developer.

Upon approval of the WMP by the Regional Board or the Executive Officer, the LAR UR2 WMA members will begin implementing the new development and re-development effectiveness tracking requirements. In addition to the requirements in Part X.A of the MRP, Part VI.D.7.d.iv of the Permit requires that the LAR UR2 WMA implement a tracking system for new development/re-development projects that have been conditioned for post-construction BMPs. The following information is to be tracked using GIS or another electronic system:

1. Municipal Project ID
2. State Waste Discharge Identification (WDID) Number
3. Project Acreage
4. BMP Type and Description
5. BMP Location (coordinates)
6. Date of Acceptance
7. Date of Maintenance Agreement
8. Maintenance Records
9. Inspection Date and Summary
10. Corrective Action
11. Date Certificate of Occupancy Issued
12. Replacement or Repair Date

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 LAR UR2 WMA members will develop a complete tracking system that works for their individual needs and internal processes.

6.1 Program Objectives

The objective of the New Development/Re-Development Effectiveness Tracking is to assess whether post-construction Best Management Practice (BMP), as outlined in permits issued by the Permittees, are implemented and to ensure the volume of stormwater associated with the design storm is retained onsite, as required by Part VI.D.7.c.i. of the Permit. The New Development/Re-Development Effectiveness Tracking will gather necessary data to assess whether construction MCM, LID ordinances', and BMPs are effective and being implemented.

6.2 Existing New Development/Re-Development Tracking Procedures

Within the LAR UR2 WMA, each jurisdiction has a unique approach to tracking some or the entire 27 required development program tracking elements (15 elements identified in Attachment E.X.A and 12 elements in Part VI.D.7.d.iv.). For private development projects, a Building Department, or a variation of, is typically the entity responsible for collecting and recording the program tracking elements. In contrast, public improvement projects are normally the responsibility of a Public Works Department.

Based on a review of the existing new development/re-development tracking procedure for the different jurisdictions within the LAR UR2 WMA, additional effort will be needed to track the 27 program tracking elements required by the Permit. Information has currently been recorded and stored differently across jurisdictions, with some using commonly available software packages, such as Microsoft Office products and GIS, and others using proprietary software programs, such as Plan Check and Inspection System (PCIS), or in some instances paper files. LAR UR2 WMA members will need to develop or modify their current tracking systems to setting up a centrally located spreadsheet template that includes the required information fields for each project that can be tracked separately by the individual jurisdiction's proprietary software system if integrated accordingly. Each jurisdiction will dedicate resources to develop a complete tracking system that works for their individual needs and internal processes.

6.3 Data Management

Each jurisdiction will conduct tracking that will meet the Permit requirements and facilitate reporting. The data management protocols will include:

- Designing and testing data entry sheets for the required information fields identified in **Section 6.1**;
- Describing the procedures and identifying the departments/divisions responsible for inputting data, assessing accuracy and consistency, and coordinating follow up actions when questions arise;
- Strategy for checking and validating data entry, including identifying departments/divisions responsible for managing and safeguarding data, performing data entry, supervising the data entry, and ensuring quality control of the data; and
- Specifying procedures for routinely and safely archiving data files.

Data collection for development review processes generally consist of the following similar steps:

- **Planning** – Project proponents submit an application to agency planning department to determine whether or not the project meets jurisdictional requirements. When required, the project may require a public hearing for conditions and entitlements. Project conditions may include water quality related requirements.
- **Building** – Projects may be conditioned subject to engineering, community services, or building department review and approval of plans or technical reports. During review, required water quality BMP designs are reviewed and accepted. When a building and/or grading permit is issued, project construction usually proceeds without further discretionary approvals.
- **Construction** – During construction, approved BMPs are implemented then verified by the jurisdiction's inspector prior to issuance of a Certificate of Occupancy.
- **Post-Construction Inspections** – Once constructed, inspection and verification of maintenance is transferred to the jurisdiction's water quality program manager.

Relevant project data is collected during each phase of the development review process described above.

6.3.1 Additional Data

To facilitate annual assessment and reporting and future Reasonable Assurance Analyses (RAA) input data compilation, the LAR UR2 WMA may also track the following information:

- Do any modified MCMs apply to this project?
- Assessor's Identification Number (AIN)
- Street address
- Revised land use (based on City/County Land Use Categories)
- BMP maintenance funding source
- Tributary area to each BMP

6.3.2 Reporting

Annual Assessment and Reporting requirements to be included in an Annual Report are outlined in Part XVIII.A.1 through A.7 of the MRP. Relevant to New Development/Re-Development Effectiveness Tracking, each permittee within LAR UR2 WMA is required to annually track, analyze, and report on the following stormwater control measures in Part XVIII.A.1:

- Estimate the cumulative change in percent effective impervious area (EIA) since the effective date of the Permit and, if possible, the estimated change in the stormwater runoff volume during the 85th percentile storm event.
- Summarize new development/re-development projects constructed within the Permittee's jurisdictional area during the reporting year.
- Summarize retrofit projects that reduced or disconnected impervious area from the MS4 during the reporting year.
- Summarize other projects designed to intercept stormwater runoff prior to discharge to the MS4 during the reporting year.
- For the projects summarized above, estimate the total runoff volume retained onsite by the implemented projects.
- Summarize actions taken in compliance with Total Maximum Daily Load (TMDL) implementation plans or approved Watershed Management Programs to implement TMDL provisions in Part VI.E and Attachments L-R of the Permit.

- Summarize 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.
- Summarize other MCMs implemented during the reporting year, as deemed relevant.
- Provide 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 shall provide a discussion of the factor(s) limiting its acquisition and steps that will be taken to improve future data collection efforts.

The LAR UR2 WMA is also required to track, evaluate, and provide an effectiveness assessment of stormwater control measures per Attachment E, Part XVIII.A.2:

- Summarize rainfall for the reporting year. Summarize the number of storm events, highest volume event (inches/24 hours), highest number of consecutive days with measureable rainfall, total rainfall during the reporting year compared to average annual rainfall for the subwatershed. Precipitation data may be obtained from the Los Angeles County Department of Public Works rain gauge stations available at http://www.ladpw.org/wrd/precip/.
- Provide a summary table describing rainfall during stormwater outfall and wet-weather receiving water monitoring events. The summary description shall 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.
- Where control measures were designed to reduce impervious cover or stormwater peak flow and flow duration, provide hydrographs or flow data of pre- and post-control activity for the 85th percentile, 24-hour rain event, if available.
- For natural drainage systems, develop a reference watershed flow duration curve and compare it to a flow duration curve for the subwatershed under current conditions.
- Provide an assessment as to whether the quality of stormwater discharges as measured at designed outfalls is improving, staying the same or declining. The Permittee may compare water quality data from the reporting year to previous years with similar rainfall patterns, conduct trends analysis, or use other means to develop and support its conclusions (e.g., use of non-stormwater action levels or municipal action levels as provided in Attachment G of the Permit).
- Provide an assessment as to whether wet-weather receiving water quality within the jurisdiction of the Permittee is improving, staying the same or declining, when normalized for variations in rainfall patterns. The Permittee may compare water quality data from the reporting year to previous years with similar rainfall patterns, conduct trends analysis, draw from regional bioassessment studies, or use other means to develop and support its conclusions.
- Provide status of all multi-year efforts, including TMDL implementation, that 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, the Permittee shall provide a discussion of the factor(s) limiting its acquisition and steps that will be taken to improve future data collection efforts.

Additional reporting elements required are identified in Part VI.D.7 of the Permit and include:

- A summary of total offsite project funds raised to date and a description (including location, general design concept, volume of water expected to be retained, and total estimated budget) of all pending public offsite projects.
- A list of mitigation project descriptions and estimated pollutant and flow reduction analyses.
- A comparison of the expected aggregate results of alternative compliance projects to the results that would otherwise have been achieved by retaining onsite the stormwater quality design volume.

Part XV.A of the MRP requires each Permittee or group to submit an Annual Report to the Regional Board by December 15th of each year. The annual reporting period is from July 1st through June 30th and information reported will cover approved and constructed projects that have been issued occupancy permits.

6.4 Summary of New Development/Re-development Effectiveness Tracking

New Development/Re-Development Effectiveness Tracking is used for tracking information data in regards to new and re-development activities and their associated post-construction BMPs. The information is stored and will be submitted in an annual compliance report. Each jurisdiction will be individually responsible for tracking Permit requirements, based on their specific operational procedures and internal processes.

7. Regional Studies

The MRP identifies one regional study: the SMC Regional Watershed Monitoring Program. The SMC is a collaborative effort between SCCWRP, State Water Board's Surface Water Ambient Monitoring Program (SWAMP), three Southern California Regional Water Quality Control Boards, and several county stormwater agencies. SCCWRP acts as a facilitator to organize the monitoring program, conducts the data analysis, and prepares monitoring results reports. The goal of the SMC is to develop a monitoring program on a regional level for Southern California's coastal streams and rivers.

7.1 Regional Study Participation

The MRP states that each Permittee shall be responsible for supporting the monitoring described at the sites within the watershed management area(s) that overlap with the Permittee's jurisdictional area. One program initiated under the SMC is the Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program (Bioassessment Program), which included six monitoring sites that were monitored annually within the WMP Group area.

The LAR UR2 WMA will continue to participate in the Biosassessment Program being managed by the SMC, through the LACFCD. The LACFCD will contribute necessary resources to implement the bioassement monitoring requrement of the MS4 permit on behalf of all permitees in Los Angeles County during the current permit cycle. Initiated in 2008, the SMC's Regional Bioassement Program is designed to run over a five-year cycle. Monitoring under the first cycle concluded in 2013, with reporting of findings and additional special studies planned to occur in 2014. SMC, including LACFCD, is currently working on designing the bioassessment monitoring program for the next five-year cycle, which is scheduled to run from 2015 to 2019.

8. Special Studies

LAR UR2 WMA is responsible for conducting special studies that are required in an effective TMDL or an approved TMDL Monitoring Plan applicable to a watershed that is within the LAR UR2 WMA's jurisdictional boundary. At this time there are no special studies required by any of the TMDLs within the LAR UR2 WMA. LAR UR2 WMA will take into consideration the optional special studies. One such study the LAR UR2 WMA is currently interested in pursuing, is the Site Specific Objective (SSO) for zinc in the Los Angeles River and Tributary waters.

9. Adaptive Management

An adaptive management approach provides a structured process that allows for taking action under uncertain conditions based on the best available science, closely monitoring and evaluating outcomes, and re-evaluating and adjusting decisions as more information is collected.

The CIMP, as with the WMP, is to be implemented as an adaptive process. As new program elements are implemented and data are gathered over time, the WMP and CIMP will undergo revision to reflect the most current understanding of the watershed and present a sound approach to addressing changing conditions. As such, the WMP and CIMP will employ an adaptive management process utilizing BMPs that meet the maximum extent practicable standard and that will allow the two programs to evolve over time.

9.1 Annual Assessment and Reporting

MRP Part XVIII.A details the annual assessment and reporting that is required as part of the annual report. The annual assessment and reporting is composed of seven parts, which are the following:

1. Stormwater Control Measures
2. Effectiveness Assessment of Stormwater Control Measures
3. Non-stormwater Control Measures (including the MAL Assessment Report per Attachment G, see page G-17)
4. Effectiveness Assessment of Non-stormwater Control Measures
5. Integrated Monitoring Compliance Report
6. Adaptive Management Strategies
7. Supporting Data and Information

Based on the findings of the annual assessment, revisions to the CIMP will be included as part of the Adaptive Management Strategies.

9.2 CIMP Revision Process

CIMP implementation used to develop data on receiving water conditions and stormwater/non-stormwater quality to assess the effectiveness of the WMP. As part of the adaptive management process, re-evaluation of the CIMP will need to be conducted to better inform the LAR UR2 WMA of ever changing conditions of the watershed. Each program of the CIMP will be re-evaluated for the following:

- **Monitored site locations:** as water quality priorities change and certain WBPCs are being addressed or identified, monitoring site locations may need to be added or modified. Outfall monitoring locations determined not to be representative of MS4 discharges may also be relocated.
- **Monitoring constituents**: eliminate or reduced monitoring of certain constituents. If constituents were initially detected during the initiation of CIMP monitoring and are eventually addressed through the implementation of a watershed control measure which results in non-detect in future monitoring results, elimination or reduction in monitoring will be submitted for approval to the Regional Board.
- **Monitoring frequency**: increased or decreased in monitoring frequency will be based on the evaluation of RWL, WQBELs, non-stormwater action levels.
- **Monitoring methods**: Analytical methods or analytical labs may need to be modified.

Based on the re-evaluation, CIMP revisions will be made and submitted to the Regional Board for approval in conjunction with the WMPs every two years.

10. Reporting

Analysis and reporting of data is an integral part of communicating to the Regional Board of whether the CIMP is meeting MRP objectives. The MRP, establishes NPDES permit monitoring, reporting, and recordkeeping requirements, including those for large MS4s, based on federal Clean Water Act (CWA) section 308(a) and Code of Federal Regulations (40 CFR) sections 122.26(d)(2)(i)(F), (iii)(D), 122.41(h)-(l), 122.42(c), and 122.48. In addition, California Water Code (CWC) section 13383 authorizes the Regional Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements. The sections below will outline the CIMP reporting process for the LAR UR2 WMA.

10.1 Documents and Records

Consistent with the Part XIV.A of the MRP requirements, LAR UR2 WMA will retain records of all monitoring information, including: all calibration, major maintenance records, all original lab and field data sheets, all original strip chart recordings for continuous monitoring instrumentations, copies of all reports required by the permit, and records of data used to complete the application for the permit for a period of at least 3 years from the date of the sample, measurement, report, or application. Monitoroing records will include:

1. The sampling date, time of 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; and
7. The data sheets showing toxicity test results.

10.1.1 Event Summary Reports

At the conclusion of each monitoring event for receiving water (wet- and dry-weather), stormwater outfall, and non-stormwater outfall monitoring, or all of the above, an event summary report for the LAR UR2 WMA will be produced and submitted annually as an attachment with the Integrated Monitoring Compliance Report. The event summary report will give an overview of what was conducted during the monitoring event, the result findings from the monitoring events, summary exceedances, and the monitoring records as mentioned above.

10.1.2 Semi-Annual Analytical Data Submittal

Monitoring results data will be submitted semi-annually, as stated in Part XIV.L of the MRP, with suggested reporting dates of April and October first. The transmitted data will be in the most recent update of the Southern California Municipal Storm Water Monitoring Coalition's (SMC) Standardized Data Transfer Formats (SDTFs) and sent electronically to the LARWQCB Stormwater site to MS4stormwaterRB4@waterboards.ca.gov. The SMC SDTFs can be found at the Southern California Coastal Water Research Project (SCCWRP) web page http://www.sccwrp.org/data/DataSubmission.aspx. The submitted monitoring data should highlight the following:

1. Exceedances of applicable WQBELs,
2. Receiving water limitations,
3. Action levels, and/or
4. Aquatic toxicity thresholds for all test results, with corresponding sampling dates per receiving water monitoring station.

10.2 Monitoring Reports

Part XVIII.A.5, of the MPR presents the requirements of the Integrated Monitoring Compliance Report (IMCR) that will be included and submitted on an annual basis as part of the Annual Report. As discussed in **Section 9**, the IMCR is one of seven parts of the Annual Assessment and Reporting.

The IMCR will include the following information as required by the MRP:

- Summary of exceedances against all applicable RWL, WQBELs, non-stormwater action levels, and aquatic toxicity thresholds for:
    1. Receiving water monitoring – wet- and dry-weather;
    2. Stormwater outfall monitoring; and
    3. Non-stormwater outfall monitoring.
- Summary of actions taken:
    1. To address exceedances for WQBELs, non-stormwater action levels, or aquatic toxicity for stormwater and non-stormwater outfall monitoring.
    2. To determine whether MS4 discharges contributed to RWL exceedances and efforts taken to control the discharge causing the exceedances to the receiving water.
- If aquatic toxicity was confirmed and a TIE was conducted, identify the toxic chemicals determined by the TIE, and include all relevant data to allow the Regional Board to review the adequacy and findings of the TIE.

The IMCR will be submitted as part of the Annual Assessment Report to the Regional Board by December 15th of each year, for at least the duration of the Permit term. As indicated above, event summary reports will be attached to the IMCR.

10.3 Signatory and Certification Requirements

Part V.B of Attachment D of the Permit presents the Signatory and Certification Requirements and states:

1. All applications, reports, or information submitted to the Regional Water Board, State Water Board, and/or USEPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below [40 CFR section 122.41(k)(1)].
2. All applications submitted to the Regional Water 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.).[40 CFR section 122.22(a)(3)].
3. All reports required by this Order and other information requested by the Regional Water Board, State Water Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:
    a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above [40 CFR section 122.22(b)(1)];
    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.) [40 CFR section 122.22(b)(2)]; and

c. The written authorization is submitted to the Regional Water Board [40 CFR section 122.22(b)(3)].

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above must be submitted to the Regional Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative [40 CFR section 122.22(c)].
5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification: "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." [40 CFR section 122.22(d)].

All required signatures and statements will be included as an attachment of the Annual Report, which will cover the MS4 Permit period from July 1 to June 30, of each year and be submitted to the Regional Board by December 15th of each year, for at least the duration of the Permit term.

11. Schedule for CIMP Implementation

As stated in Part IV.C.6 of the MRP, the LAR UR2 WMA's CIMP implementation will commence within 90 days after approval by the Executive Officer of the Regional Board. CIMP monitoring will start on July 1, 2015 to coincide with the Annual Report period of the Permit as well as to coordinate monitoring with other WMA groups' CIMP monitoring. For seven of the sites, portable equipment will be used allowing for the monitoring to begin, on a rotational basis as described in **Section 4**. Implementation of the CIMP for the one monitoring site in Los Angeles River is subject to the availability and approval of construction permits from LACFCD and Army Corps of Engineers. If the availability and approval of permits are not obtained before the 90 day deadline, the LAR UR2 WMA will inform the Regional Board on the progress of obtaining the permits. Monthly updates will be provided to the Regional Board until the permits are obtained. Monitoring at the one monitoring site in Los Angeles River will commence within 30 days after the approval of required permits. It is anticipated that the permitting and installation process may take a minimum of 18 months.

12. Quality Assurance Project Program Plan

A final Quality Assurance Project Program (QAPP) Plan will be prepared once a monitoring program contract is issued. This is necessary as the QAPP should identify specific individuals, contact points, Analytical Method Detection and Reporting Limits that are Sampling Consultant and Analytical Laboratory specific. A generic QAPP is attached to the CIMP as **Appendix E**, while a Summary of Laboratory Capabilities in Relation to Permit Minimum Levels can be found within **Appendix F**.

13. References

California Department of Fish and Wildlife. Ecosystem Restoration Program, Adaptive Management https://www.dfg.ca.gov/erp/adaptive_management.asp. April 2014.

California Regional Water Quality Control Board, Los Angeles Region. 2013. Water Quality Control Plan: Los Angeles Region, Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties, Section 3. April 19, 2013

California Regional Water Quality Control Board, Los Angeles Region. *Water Quality Control Plan, Los Angeles Region (Basin Plan)*. 1995, Updated 2013.

California Regional Water Quality Control Board, Los Angeles Region, *Order No. R4-2012-0175 NPDES Permit No. CAS004001, Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except Those Discharges Originating From The City of Long Beach MS4.* November 2012.

California Regional Water Quality Control Board, Los Angeles Region, *Order No. R4-2012-0175 NPDES Permit No. CAS004001, Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, Except Those Discharges Originating From The City of Long Beach MS4.* November 2012.

California Regional Water Quality Control Board, Los Angeles Region. *Revision of the Total Maximum Daily Load for Nitrogen Compounds and Related Effects in the Los Angeles River.* December 2012.

California Regional Water Quality Control Board, Los Angeles Region. *Los Angeles River Watershed Bacteria Total Maximum Daily Load*. July 2010.

California Regional Water Quality Control Board, Los Angeles Region. *Trash Total Maximum Daily Loads for the Los Angeles Watershed.* August 2007.

City of Los Angeles. *Los Angeles Metals TMDL Coordinated Monitoring Plan Ambient and Effectiveness Monitoring, 2008 to 2013 Submittals*. 2008 – 2013.

Council for Watershed Health (CWH). 2013. Draft Los Angeles River Watershed Monitoring Program, 2011 Annual Report. April 30, 2013.

Council for Watershed Health. *Los Angeles River Watershed Monitoring Program* 2009 – 2012.

CREST. 2008. Los Angeles River Bacteria Source Identification Study: Final Report. Cleaner Rivers through Effective Stakeholder-led TMDLs (CREST). November 2008.

Kayhanian, M., C. Stransky, S. Bay, S. Lau, M.K. Stenstrom. 2008. Toxicity of urban highway runoff with respect to sorm duration. Science of the Total Environment 389:109-128

Larry Walker Associates (LWA). 2008. Final Report Los Angeles Copper Water-Effect Ratio Study. June 3, 2008

LWA. 2010. Work Plan for Recalculation and Water-Effect Ratio to Support Implementation of the Los Angeles River and Tributaries Metals TMDL. 2010

Lee, G. F. and A. Jones-Lee. "Review of the City of Stockton Urban Stormwater Runoff Aquatic Life Toxicity Studies Conducted by the CVRWQCB, DeltaKeeper and the University of California, Davis, Aquatic Toxicology Laboratory between 1994 and 2000," Report to the Central Valley Regional Water Quality Control Board, G. Fred Lee & Associates, El Macero, CA, October (2001).

Los Angeles County Department of Public Works (LACDPW). 2002 – 2012. Annual Stormwater Monitoring Report. 2002 – 2012.

Los Angeles Regional Water Quality Control Board (RWQCB), *Attachment A to Resolution No. 2002-022 Final – 12/12/02 1 Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate Implementation Provisions for the Region's Bacteria Objectives and to incorporate the Santa Monica Bay Beaches Wet-Weather Bacteria TMDL*, 2002.

Los Angeles RWQCB. (2013). Full Capture Certification for Trash TMDLs. http://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/full_capture_certification.shtml.

Los Angeles River Metals TMDL Technical Committee, Chaired by the City and County of Los Angeles. 2008. Los Angeles River Metals TMDL Coordinated Monitoring Plan. March 25, 2008.

Los Angeles River Upper Reach 2 Watershed Management Area. (June 27, 2013). Notice of Intent for a Watershed Management Program for the Los Angeles River Upper Reach 2 Gateway Sub Watershed.

Palumbo, A., Fojut, T., TenBrook, P. and Tjerdeema, R. 2010a. Water Quality Criteria Report for Diazinon. Prepared for the Central Valley Regional Water Quality Control Board by the Department of Environmental Toxicology, University of California, Davis. March.

Palumbo, A., Fojut, T., Brander, S., and Tjerdeema, R. 2010b. Water Quality Criteria Report for Bifenthrin. Prepared for the Central Valley Regional Water Quality Control Board by the Department of Environmental Toxicology, University of California, Davis. March.

Schiff, K., Bax, B., Markle, P., Fleming, T. and Newman, J. 2007. Wet- and Dry-Weather Toxicity in the San Gabriel River. Bulletin of the Southern California Academy of Sciences: Vol. 106: 3. Available at: http://scholar.oxy.edu/scas/vol106/iss3/2

United States Environmental Protection Agency (USEPA). 1991. Methods for Aquatic Toxicity Identification Evaluations: Phase I. Toxicity Characterization Procedures. 2nd Edition. EPA-600-6-91-003. National Effluent Toxicity Assessment Center, Duluth, MN.

United States Environmental Protection Agency (USEPA). 1992. Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I. EPA/600/6-91/005F. May 1992. National Effluent Toxicity Assessment Center, Duluth, MN.

United States Environmental Protection Agency (USEPA). 1993a. Methods for Aquatic Toxicity Identification Evaluations- Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity. EPA-600-R-92-080. National Effluent Toxicity Assessment Center, Duluth, MN.

United States Environmental Protection Agency (USEPA). 1993b. Methods for Aquatic Toxicity Identification Evaluations- Phase III Toxicity Confirmation Procedures for Samples Exhibiting

Acute and Chronic Toxicity. EPA-600-R-92-081. National Effluent Toxicity Assessment Center, Duluth, MN.

United States Environmental Protection Agency (USEPA). 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms. EPA-600-R-95-136. August.

U.S. Environmental Protection Agency (USEPA). 1996. Marine toxicity identification evaluation (TIE): Phase I guidance document. EPA/600/R-96/054. National Health and Environmental Effects Research Laboratory. Narragansett, RI.

United States Environmental Protection Agency (USEPA). 2002a. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Fourth Edition. October. EPA-821-R-02-013.

United States Environmental Protection Agency (USEPA). 2002b. Methods for Measuring the Acute Toxicity of Effluent and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition. October. EPA-821-R-02-012.

United States Environmental Protection Agency (USEPA), Region 2, 2004, *Guidance for the Development of Quality Assurance Project Plans for Environmental Monitoring Projects*. April 12, 2004

United States Environmental Protection Agency (USEPA) 2009, New England, *Quality Assurance Project Plan Guidance for Environmental Projects Using Only Existing (Secondary) Data.* October 2009

United States Environmental Protection Agency (USEPA). 2010. National Pollutant Discharge Elimination System Test of Significant Toxicity Technical Document. EPA/833-R-10-004, U.S. Environmental Protection Agency, Office of Environmental Management, Washington, DC.

Wheelock, C., Miller, J., Miller, M., Gee, S., Shan, G. and Hammock, B. 2004. Development of Toxicity Identification Evaluation (TIE) procedures for pyrethroid detection using esterase activity. Environmental Toxicology and Chemistry 23:2699-2708

Appendix A

Drainage Facilities Maps by LAR UR2 WMA Permittee

BELL
2.6 sq. miles
14.8 miles of storm drain
263 catch basins

N
W E
S

0 1,300 2,600 5,200 Feet

Legend

- CatchBasin_Clip
- CulvertPoint_Clip
- Gate_Clip
- MaintenanceHole_Clip
- PumpStation_Clip
- GravityMain_Clip
- LateralLine_Clip
- OpenChannel_Clip

LAR UR2 WMA

GIS SPATIAL LIBRARY
DRAINAGE FACILITIES
CITY OF BELL

C.R.	08/28/2013
13039	**1**

BELL GARDENS
2.5 sq. miles
14.3 miles of storm drain
315 catch basins

N
W E
S

0 1,000 2,000 4,000 Feet

Legend

- CatchBasin_Clip
- CulvertPoint_Clip
- Gate_Clip
- MaintenanceHole_Clip
- PumpStation_Clip
- Culvert_Clip
- GravityMain_Clip
- LateralLine_Clip
- OpenChannel_Clip

LAR UR2 WMA		
GIS SPATIAL LIBRARY **DRAINAGE FACILITIES** **CITY OF BELL GARDENS**	C.R.	08/28/2013
	13039	**1**

COMMERCE
6.6 sq. miles
32.5 miles of storm drain
663 catch basins

N
W E
S

0 1,625 3,250 6,500 Feet

Legend

- CatchBasin_Clip
- CulvertPoint_Clip
- Gate_Clip
- MaintenanceHole_Clip
- PumpStation_Clip
- AbandonedLine_Clip
- GravityMain_Clip
- LateralLine_Clip
- OpenChannel_Clip

LAR UR2 WMA		
GIS SPATIAL LIBRARY **DRAINAGE FACILITIES** **CITY OF COMMERCE**	C.R.	08/28/2013
	13039	**1**

CUDAHY
1.2 sq. miles
8.8 miles of storm drain
146 catch basins

N
W E
S

0 650 1,300 2,600 Feet

Legend

- CatchBasin_Clip
- CulvertPoint_Clip
- Gate_Clip
- MaintenanceHole_Clip
- PumpStation_Clip
- GravityMain_Clip
- LateralLine_Clip
- OpenChannel_Clip

LAR UR2 WMA

GIS SPATIAL LIBRARY
DRAINAGE FACILITIES
CITY OF CUDAHY

C.R.	08/28/2013
13039	**1**

HUNTINGTON PARK
3.0 sq. miles
19.1 miles of storm drain
586 catch basins

N
W E
S

0 1,125 2,250 4,500 Feet

Legend

- CatchBasin_Clip
- CulvertPoint_Clip
- Gate_Clip
- MaintenanceHole_Clip
- PumpStation_Clip
- GravityMain_Clip
- LateralLine_Clip
- OpenChannel_Clip

LAR UR2 WMA

GIS SPATIAL LIBRARY
DRAINAGE FACILITIES
CITY OF HUNTINGTON PARK

C.R.	08/28/2013
13039	**1**

MAYWOOD
1.2 sq. miles
5.8 miles of storm drain
183 catch basins

N
W E
S

0 650 1,300 2,600 Feet

Legend

- CatchBasin_Clip
- CulvertPoint_Clip
- Gate_Clip
- MaintenanceHole_Clip
- PumpStation_Clip
- GravityMain_Clip
- LateralLine_Clip
- OpenChannel_Clip
- City Boundary

LAR UR2 WMA

GIS SPATIAL LIBRARY
DRAINAGE FACILITIES
CITY OF MAYWOOD

C.R.	08/28/2013
13039	**1**

VERNON
5.2 sq. miles
47.5 miles of storm drain
1,166 catch basins

N
W E
S

0 1,150 2,300 4,600 Feet

Legend

- CatchBasin_Clip
- CulvertPoint_Clip
- Gate_Clip
- PumpStation_Clip
- MaintenanceHole_Clip
- AbandonedLine_Clip
- GravityMain_Clip
- LateralLine_Clip
- OpenChannel_Clip

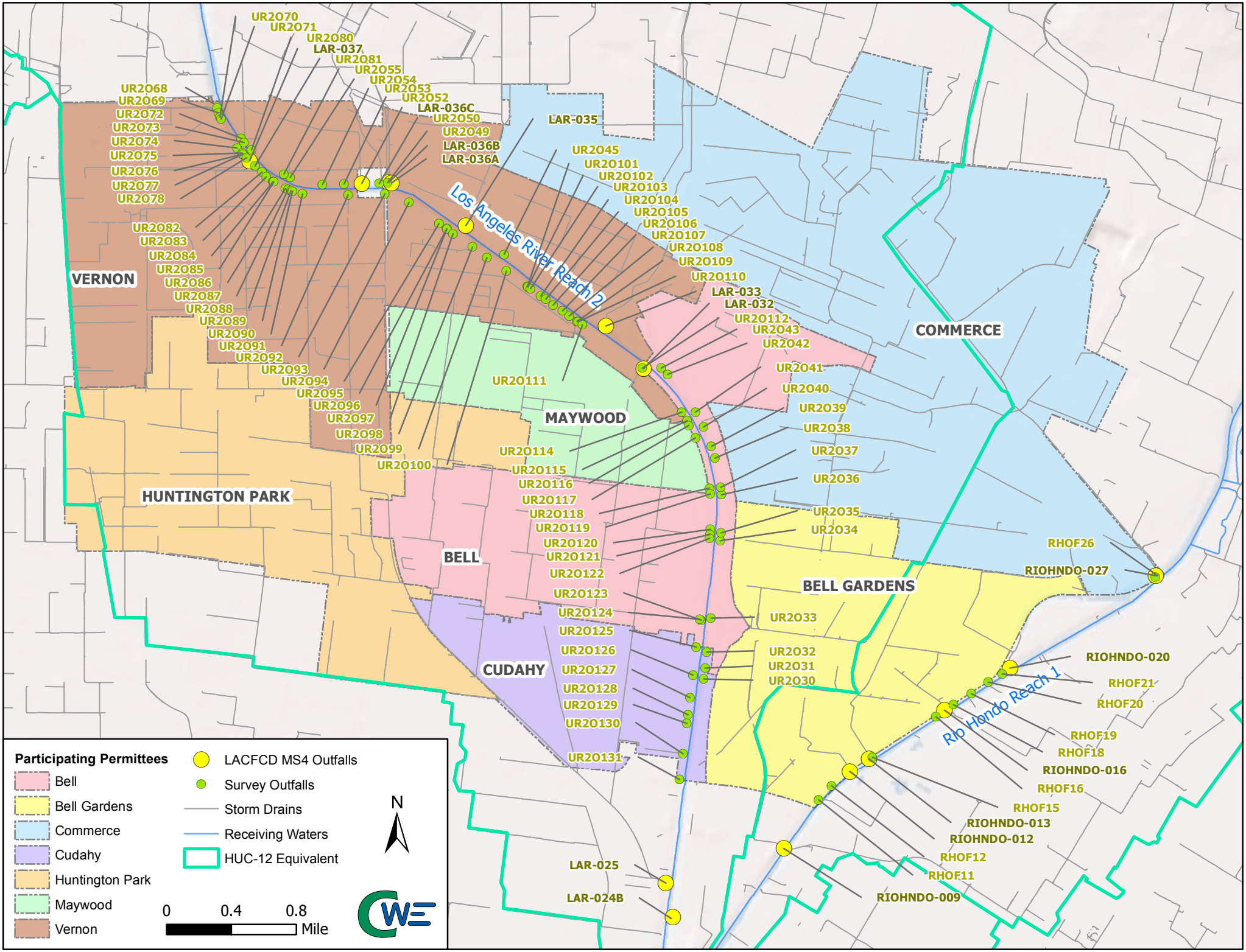
City Facilities

- Catch Basin
- Manhole
- Lateral
- Gravity Main

LAR UR2 WMA		
GIS SPATIAL LIBRARY **DRAINAGE FACILITIES** **CITY OF VERNON**	C.R.	08/28/2013
	13039	**1**

Appendix B

Outfall Locations Survey Map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UR2071
UR2080
LAR-037
UR2081
UR2055
UR2054
UR2053
UR2052
LAR-036C
UR2050
UR2049
LAR-036B
LAR-036A
LAR-035
UR2045
UR2101
UR2102
UR2103
UR2104
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UR2106
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UR2099
UR2100
UR2111
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UR2117
UR2118
UR2119
UR2120
UR2121
UR2122
UR2123
UR2124
UR2125
UR2126
UR2127
UR2128
UR2129
UR2130
UR2131
Los Angeles River Reach 2
VERNON
HUNTINGTON PARK
MAYWOOD
BELL
CUDAHY
COMMERCE
BELL GARDENS
RHOF26
RIOHNDO-027
RIOHNDO-020
RHOF21
RHOF20
RHOF19
RHOF18
RIOHNDO-016
RHOF16
RHOF15
RIOHNDO-013
RIOHNDO-012
RHOF12
RHOF11
RIOHNDO-009
Rio Hondo Reach 1
LAR-025
LAR-024B
Participating Permittees
Bell
Bell Gardens
Commerce
Cudahy
Huntington Park
Maywood
Vernon
LACFCD MS4 Outfalls
Survey Outfalls
Storm Drains
Receiving Waters
HUC-12 Equivalent
N
0
0.4
0.8
Mile

Appendix C

Preliminary Outfall Database

Outfall Inventory Values		
Column Header	**Permit Parts/Exemplar values**	**Definition**
Outfall ID	E.VII.A.8	Alphanumeric identifier
NSW/RW Outfalls	LAR-##X RIOHNDO-### UR2O### RHOF##	LACFCD ID for Los Angeles River, where # is a number and when present X is letter LACFCD ID for the Rio Hondo, where # is a number UR2 LAR Outfall, where ### is a number UR2 Rio Hondo Outfall, where ## is a number
Owner	E.VII.A.11.a LACFCD ACOE Private Unknown	Agency Name (e.g. Vernon, Bell) Los Angeles County Flood Control District Army Corps of Engineers Name of Company or Undocumented
Latitude	E.VII.A.11.b	Decimal degrees with up to 6 decimals
Longitude	E.VII.A.11.b	Decimal degrees with up to 6 decimals
City	E.VII.A.11.c BL, BG, CM, CU, HP, MW, SG, VR	Jurisdiction where outfall/facility is located (mostly UR2, but also South Gate, City/County of LA) Bell, Bell Gardens, Commerce, Cudahy, Huntington Park, Maywood, South Gate (not UR2), Vernon
Type	E.VII.A.11.c FG, FGP, G, LFD VCP, CMP, CMA, STLP RCP, 2RCP, 3RCP RCB, 2RCB, 3RCB Manhole	Outfall Type/Shape Flap Gate, Flap Gated (Unknown Material) Pipe, Grated, Low Flow Ditch to LFC (Vitrified) Clay Pipe, Corrugated Metal Pipe, Corrugated Metal Arch, Steel Pipe Reinforced Concrete Pipe (single, double, triple, etc.) Reinforced Concrete Box (single, double, triple, etc.) Utility Access Way
D/H"	E.VII.A.11.c	Diameter/Height (inches)
W"	E.VII.A.11.c	Width (inches)
Wall H"	E.VII.A.11.c	Estimated Wall Height from floor of main channel (inches)
Photo Link	E.VII.A.11.d	Hyperlink to Photo (Needs editing if spreadsheet or photos copied to other sources)
Date	E.VII.A.11.e	Date of Observation (also date of last observation)
Time	E.VII.A.11.e	Time of Observation (also time of last observation)
Q(GPM)	E.VII.A.11.e	Estimated Non-Stormwater Discharge Flow Rate in Gallons Per Minute
Flow Observations	E.VII.A.11.e T, S/G, Veg, HV, PW	Discharge Characteristics Trash, Sediment/Gravel, Vegetation, Heavy Vegetation, Ponded Water
Determination	Significant, Not Significant, None, Not Determined	Use characteristics to clarify why significant

LAR UR2 Outfall Inventory

Identification		Coordinates		Physical Description					Photos	Non-Stormwater Significance Screening				
Outfall Identifier	Owner	Latitude	Longitude	City	Type	D/H "	W "	Wall H"	Photo Link	Date	Time	Q (GPM)	Flow Observations	Significance
RIOHNDO-009	LACFCD	33.948215	-118.161866	SG	RCP	66"		0"	RIOHNDO-009	12/23/2013	10:02	Trickle	T, S/G, PW	ND
RHOF11	LACFCD	33.952646	-118.158152	BG	RCP	36	NA	60	RHOF11	12/23/2013	10:22	0		ND
RHOF12	LACFCD	33.953884	-118.156790	BG	RCP	24	NA	180	RHOF12	12/23/2013	10:26	0	T, S/G	ND
RIOHNDO-012	LACFCD	33.955080	-118.154845	LACFCD	RCB	45	72	60	RIOHNDO-012	12/23/2013	10:30	0	T, S/G	ND
RIOHNDO-013	LACFCD	33.956118	-118.152857	LACFCD	2RCB	132	114	0	RIOHNDO-013	12/23/2013	10:35	0	T, S/G, Veg, PW	ND
RHOF15	LACFCD	33.956420	-118.152374	LACFCD	RCP	24	NA	48	RHOF15	12/23/2013	10:40	0	T, S	ND
RHOF16	LACFCD	33.960056	-118.145573	LACFCD	RCP	24	NA	0	RHOF16	12/23/2013	10:45	0	S/G, Veg	ND
RIOHNDO-016	LACFCD	33.960492	-118.144764	LACFCD	RCP	84	NA	0	RIOHNDO-016	12/23/2013	10:50	0	T, S/G, PW	ND
RHOF18	LACFCD	33.961140	-118.143722	LACFCD	RCP	21	NA	120	RHOF18	12/23/2013	10:52	0	T	ND
RHOF19	LACFCD	33.962101	-118.141793	LACFCD	RCP	18	NA	120	RHOF19	12/23/2013	10:55	0	S/G	ND
RHOF20	Unknown	33.963161	-118.139996	LACFCD	RCP	18	NA	180	RHOF20	12/23/2013	10:58	0	T	ND
RHOF21	Unknown	33.963895	-118.138475	LACFCD	2RCP	54	NA	12	RHOF21	12/23/2013	11:02	0	T, S/G	ND
RIOHNDO-020	LACFCD	33.964332	-118.137716	LACFCD	RCP	96	NA	0	RIOHNDO-020	12/23/2013	11:06	0.5	T, S/G	ND
RHOF26	LACFCD	33.972528	-118.122099	CM	GRCP	66	NA	0	RHOF26	12/23/2013	11:22	0	Musty, T	ND
RIOHNDO-027	LACFCD	33.972690	-118.121862	LACFCD	RCP	72	NA	0	RIOHNDO-027	12/23/2013	11:25	0	S/G, oily	ND
LAR-024B	Unknown	33.942006	-118.173898	SG	3RCP	90	NA	24	LAR-024B	12/23/2013	12:50	1.7	S/G	ND
UR2O30	Unknown	33.963409	-118.170493	CU	RCP	24	NA	36	UR2O30	12/23/2013	13:10	0		ND
UR2O31	Unknown	33.964368	-118.170323	CU	RCP	24	NA	12	UR2O31	12/23/2013	13:16	0	T, S/G	ND
UR2O32	LACFCD	33.965817	-118.170164	CU	RCP	30	NA	36	UR2O32	12/23/2013	13:20	0	PW	ND
UR2O33	Unknown	33.968846	-118.169692	BL	RCP	24	NA	36	UR2O33	12/23/2013	13:24	0	T, S/G, Veg, PW, Black Water	ND
UR2O34	Unknown	33.975765	-118.168712	BL	RCP	24	NA	60	UR2O34	12/23/2013	13:32	0		ND
UR2O35	Unknown	33.976465	-118.168621	BL	RCP	24	NA	120	UR2O35	12/23/2013	13:37	0		ND
UR2O36	Unknown	33.979864	-118.168606	BL	2RCP	30	NA	60	UR2O36	12/23/2013	13:39	0	T	ND
UR2O37	LACFCD	33.980534	-118.168673	BL	RCP	30	NA	60	UR2O37	12/23/2013	13:43	0		ND
UR2O38	Unknown	33.983126	-118.169302	BL	RCP	42	NA	60	UR2O38	12/23/2013	13:46	0	Oily	ND
UR2O39	LACFCD	33.984193	-118.169673	BL	RCP	18	NA	60	UR2O39	12/23/2013	13:49	0	S/G	ND

LAR UR2 Outfall Inventory

Identification		Coordinates		Physical Description					Photos	Non-Stormwater Significance Screening				
Outfall Identifier	Owner	Latitude	Longitude	City	Type	D/H "	W "	Wall H"	Photo Link	Date	Time	Q (GPM)	Flow Observations	Significance
UR2O40	LACFCD	33.985911	-118.170513	BL	RCP	24	NA	96	UR2O40	12/23/2013	13:54	T	T, S/G, PW	ND
UR2O41	LACFCD	33.987231	-118.171399	BL	RCB	39	72	36	UR2O41	12/23/2013	13:59	0.05	S/G, Veg	ND
UR2O42	LACFCD	33.990594	-118.174405	BL	2RCB	78	144	144	UR2O42	12/23/2013	14:05	0.17	T, S/G	ND
UR2O43	LACFCD	33.991176	-118.175116	BL	FGP	24	NA	120	UR2O43	12/23/2013	14:10	0		ND
LAR-033	LACFCD	33.994726	-118.180943	VR	RCB	126	174	0	UR2O44	12/23/2013	14:14	0.8	Veg	ND
UR2O45	Unknown	34.001302	-118.191964	VR	STLP	6	NA	60	UR2O45	12/23/2013	14:20	0		ND
LAR-035	LACFCD	34.003732	-118.196125	VR	3RCB	102	168	72	LAR-035	12/23/2013	14:25	T	Veg	ND
LAR-036A	LACFCD	34.007580	-118.203954	LACFCD	RCB	48	96	36	LAR-036A	12/23/2013	14:30	0.08	S/G,	ND
LAR-036B	LACFCD	34.007590	-118.204154	LACFCD	RCB	120	144	0	LAR-036B	12/23/2013	14:35	0.3	S/G	ND
UR2O49	LACFCD	34.007691	-118.204464	VR	RCB	84	168	144	UR2O49	12/23/2013	14:38	0.3	S/G, oily, Veg	ND
UR2O50	LACFCD	34.007619	-118.205344	UNK	RCP	24	NA	96	UR2O50	12/23/2013	14:43	0	T, S/G	ND
LAR-036C	LACFCD	34.007500	-118.207139	LACFCD	GRCP	96	NA	48	LAR-036C	12/23/2013	14:46	T		ND
UR2O52	LACFCD	34.007532	-118.209129	VR	Pipe	18	NA	120	UR2O52	12/23/2013	14:50	0		ND
UR2O53	LACFCD	34.007483	-118.211436	VR	Pipe	18	NA	60	UR2O53	12/23/2013	14:55	0		ND
UR2O54	Unknown	34.008126	-118.214918	VR	VCP	18	NA	180	UR2O54	12/23/2013	14:58	0		ND
UR2O55	Unknown	34.008418	-118.215586	VR	CMP	16	NA	180	UR2O55	12/23/2013	15:02	0	T	ND
UR2O68	VR	34.014351	-118.222761	VR	RCP	45	NA	240	UR2O68	12/31/2013	9:31	0		ND
UR2O69	Unknown	34.013897	-118.222619	VR	4STLP	8	NA	360	UR2O69	12/31/2013	9:36	0		ND
UR2O70	Unknown	34.013494	-118.222444	VR	RCB	12	12	288	UR2O70	12/31/2013	9:37	0		ND
UR2O71	Unknown	34.013313	-118.222340	VR	RCP	18	NA	240	UR2O71	12/31/2013	9:39	0		ND
UR2O72	Unknown	34.011614	-118.220184	VR	RCP	18	NA	300	UR2O72	12/31/2013	9:44	0		ND
UR2O73	LACFCD	34.011255	-118.219835	VR	RCP	30	NA	240	UR2O73	12/31/2013	9:47	0		ND
UR2O74	Unknown	34.010755	-118.220614	VR	RCP	18	NA	168	UR2O74	12/31/2013	9:48	0		ND
UR2O75	Unknown	34.010295	-118.220051	VR	RCP	8	NA	168	UR2O75	12/31/2013	9:52	0		ND
UR2O76	Unknown	34.010202	-118.219975	VR	RCP	8	NA	240	UR2O76	12/31/2013	9:55	0		ND
UR2O77	Unknown	34.010202	-118.219975	VR	RCP	8	NA	168	UR2O77	12/31/2013	9:55	0		ND
UR2O78	Unknown	34.009890	-118.219581	VR	STLP	36	NA	192	UR2O78	12/31/2013	9:57	0		ND
LAR-037	Unknown	34.009506	-118.219101	VR	RCP	75	NA	12	UR2O79	12/31/2013	9:59	0	PW	ND

LAR UR2 Outfall Inventory

Identification		Coordinates		Physical Description					Photos	Non-Stormwater Significance Screening				
Outfall Identifier	Owner	Latitude	Longitude	City	Type	D/H "	W "	Wall H"	Photo Link	Date	Time	Q (GPM)	Flow Observations	Significance
UR2O80	Unknown	34.010577	-118.219058	VR	STLP	36	NA	192	UR2O80	12/31/2013	9:58	0		ND
UR2O81	VR	34.009167	-118.218674	VR	RCP	45	NA	72	UR2O81	12/31/2013	10:03	T	PW	ND
UR2O82	LACFCD	34.008589	-118.217931	VR	RCP	48	NA	72	UR2O82	12/31/2013	10:06	0		ND
UR2O83	Unknown	34.008184	-118.217457	VR	CMP	10	NA	120	UR2O83	12/31/2013	10:11	0		ND
UR2O84	LACFCD	34.007746	-118.216753	VR	STLP	14	NA	120	UR2O84	12/31/2013	10:16	T	Algae	ND
UR2O85	LACFCD	34.007741	-118.216661	VR	CMP	12	NA	120	UR2O85	12/31/2013	10:16	0		ND
UR2O86	Unknown	34.007139	-118.215420	VR	VCP	10	NA	120	UR2O86	12/31/2013	10:21	0		ND
UR2O87	LACFCD	34.007029	-118.215140	VR	VCP	10	NA	120	UR2O87	12/31/2013	10:24	0		ND
UR2O88	LACFCD	34.006954	-118.214845	VR	VCP	12	NA	120	UR2O88	12/31/2013	10:27	0		ND
UR2O89	LACFCD	34.006891	-118.214660	VR	VCP	12	NA	120	UR2O89	12/31/2013	10:28	0		ND
UR2O90	LACFCD	34.006660	-118.213570	VR	VCP	18	NA	120	UR2O90	12/31/2013	10:30	0		ND
UR2O91	LACFCD	34.006585	-118.208677	VR	RCP	36	NA	120	UR2O91	12/31/2013	10:33	0		ND
UR2O92	VR	34.006667	-118.204775	VR	RCB	45	45	0	UR2O92	12/31/2013	10:38	UNK	Invert below WL.	ND
UR2O93	LACFCD	34.005929	-118.202161	VR	VCP	12	NA	120	UR2O93	12/31/2013	10:42	0		ND
UR2O94	LACFCD	34.004057	-118.198962	VR	VCP	12	NA	120	UR2O94	12/31/2013	10:47	0		ND
UR2O95	LACFCD	34.003585	-118.198112	VR	VCP	16	NA	120	UR2O95	12/31/2013	10:50	22	Odor, cantaloupe seeds	ND
UR2O96	LACFCD	34.003563	-118.198095	VR	VCP	16	NA	240	UR2O96	12/31/2013	10:53	0		ND
UR2O97	LACFCD	34.003146	-118.197417	VR	VCP	12	NA	240	UR2O97	12/31/2013	10:54	0		ND
UR2O98	LACFCD	34.001946	-118.195324	VR	RCB	51	NA	72	UR2O98	12/31/2013	10:56	T	Odor	ND
UR2O99	LACFCD	34.001023	-118.193785	VR	FG RCP	24	NA	120	UR2O99	12/31/2013	11:00	0		ND
UR2O100	LACFCD	33.999795	-118.191687	VR	FG CMP	24	NA	120	UR2O100	12/31/2013	11:03	0		ND
UR2O101	LACFCD	33.998459	-118.189427	VR	FGP	48	NA	96	UR2O101	12/31/2013	11:08	0	Orange residue	ND
UR2O102	LACFCD	33.998398	-118.189390	VR	FGP	18	NA	120	UR2O102	12/31/2013	11:10	0	T	ND
UR2O103	LACFCD	33.998232	-118.189112	VR	FGP	12	NA	120	UR2O103	12/31/2013	11:11	0	T	ND
UR2O104	LACFCD	33.997592	-118.188034	VR	FGP	12	NA	240	UR2O104	12/31/2013	11:13	0		ND
UR2O105	LACFCD	33.997312	-118.187477	VR	FGP	24	NA	120	UR2O105	12/31/2013	11:14	0		ND
UR2O106	LACFCD	33.996795	-118.186691	VR	FGP	12	NA	240	UR2O106	12/31/2013	11:16	0		ND
UR2O107	LACFCD	33.996254	-118.185682	VR	FGP	24	NA	120	UR2O107	12/31/2013	11:18	0		ND
UR2O108	LACFCD	33.995822	-118.184960	VR	FGP	24	NA	120	UR2O108	12/31/2013	11:19	0		ND
UR2O109	LACFCD	33.995345	-118.184136	VR	RCP	51	NA	48	UR2O109	12/31/2013	11:21	T	Grey, turbid, T	ND

LAR UR2 Outfall Inventory

Identification		Coordinates		Physical Description					Photos	Non-Stormwater Significance Screening				
Outfall Identifier	Owner	Latitude	Longitude	City	Type	D/H "	W "	Wall H"	Photo Link	Date	Time	Q (GPM)	Flow Observations	Significance
UR2O110	LACFCD	33.995294	-118.184012	VR	FGP	24	NA	48	UR2O110	12/31/2013	11:23	0		ND
UR2O111	LACFCD	33.995020	-118.183544	VR	FGP	36	NA	48	UR2O111	12/31/2013	11:25	T	Algae	ND
UR2O112	LACFCD	33.991179	-118.177106	BL	FGP	24	NA	96	UR2O112	12/31/2013	11:29	0		ND
LAR-032	LACFCD	33.991148	-118.177012	LACFCD	FGP	36	NA	48	LAR-032	12/31/2013	11:31	T	T	ND
UR2O114	LACFCD	33.987248	-118.172871	BL	FGP	30	NA	48	UR2O114	12/31/2013	11:32	0	PW	ND
UR2O115	LACFCD	33.986462	-118.172274	BL	FGP	30	NA	48	UR2O115	12/31/2013	11:36	0	Veg	ND
UR2O116	LACFCD	33.986055	-118.172110	BL	FG CMP	18	NA	240	UR2O116	12/31/2013	11:37	0		ND
UR2O117	LACFCD	33.984939	-118.171397	BL	FGP	30	NA	96	UR2O117	12/31/2013	11:40	T	T	ND
UR2O118	LACFCD	33.980469	-118.169901	BL	FGP	30	NA	48	UR2O118	12/31/2013	11:43	20	HV, T	ND
UR2O119	Unknown	33.979930	-118.169824	BL	FGP	48	NA	72	UR2O119	12/31/2013	11:46	0		ND
UR2O120	BL	33.976753	-118.169809	BL	FGP	10	NA	120	UR2O120	12/31/2013	11:47	0		ND
UR2O121	Unknown	33.976325	-118.169845	BL	FGP	30	NA	96	UR2O121	12/31/2013	11:48	T	T	ND
UR2O122	Unknown	33.975975	-118.169901	BL	FGP	30	NA	120	UR2O122	12/31/2013	11:52	0		ND
UR2O123	BL	33.968669	-118.170764	BL	FGP	42	NA	24	UR2O123	12/31/2013	11:58	T	T, PW	ND
UR2O124	BL	33.968712	-118.170926	BL	FGP	42	NA	48	UR2O124	12/31/2013	12:01	0		ND
UR2O125	LACFCD	33.966243	-118.171266	CU	FG CMP	36	NA	72	UR2O125	12/31/2013	12:02	T		ND
UR2O126	Unknown	33.963755	-118.171621	CU	2FGP	30	NA	72	UR2O126	12/31/2013	12:05	0		ND
UR2O127	LACFCD	33.961713	-118.171947	CU	FGP	24	NA	48	UR2O127	12/31/2013	12:07	T	Veg	ND
UR2O128	LACFCD	33.960210	-118.172156	CU	FGP	16	NA	12	UR2O128	12/31/2013	12:10	0	Dead Hveg	ND
UR2O129	LACFCD	33.959439	-118.172286	CU	FGP	24	NA	24	UR2O129	12/31/2013	12:12	0		ND
UR2O130	LACFCD	33.956731	-118.172699	CU	FGP	24	NA	24	UR2O130	12/31/2013	12:13	T	Veg	ND
UR2O131	Unknown	33.954406	-118.173061	CU	FGP	24	NA	120	UR2O131	12/31/2013	12:15	0		ND
LAR-025	LACFCD	33.945129	-118.174509	SG	5RCB	96	96	0	UR2O135	12/31/2013	12:26	320	T	ND

Appendix D

Monitoring Site Fact Sheets

Summary Sheet for LAR-UR2-RW

Watershed: Los Angeles River	**Monitoring Type:** Receiving Water
Latitude: 33.940550	**Longitude:** -118.174528
Thomas Guide Grid: pg.705 F5	**Nearest Street Address:** 5437 Tweedy Boulevard, South Gate, CA 90280
Site Description: LAR-UR2-RW is a receiving water monitoring location in the City of South Gate, near the railroad trestle, or extension of Tweedy Boulevard. It is immediately downstream of major outfalls on both the east and west sides of the river that drains from over 60% of the LAR UR2 WMA.	
Site Location: Please see **Figure 7**	
Site View: 	

Summary Sheet for LAR-UR2-RHO

Watershed: Los Angeles River			**Monitoring Type:** Fixed Stormwater Outfall			
Latitude: 33.959003		**Longitude:** -118.154614				
Represented Area: Cities of Bell Gardens and Commerce						
Thomas Guide Grid: pg. 705 H2			**Drainage System:** BI0539 – Line A – Bell Gardens			
Outfall Shape: Round		**HUC-12:** Alhambra Wash – Rio Hondo				
Outfall Type: Manhole		**Nearest Street Address:** 7854 Gilliland Avenue, Bell Gardens, CA 90201				
	Catchment Area		**LAR UR2 WMA HUC-12 Portion**		**LAR UR2 WMA Total**	
Land Use Category	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
Agricultural	9.30	0.52%	11.02	0.48%	46.00	0.32%
Commercial	162.49	9.09%	179.17	7.88%	1418.94	9.98%
Education	23.31	1.30%	41.10	1.81%	311.42	2.19%
Industrial	1195.52	66.88%	1232.08	54.16%	6028.97	42.41%
Multi-Family Residential	123.20	6.89%	380.11	16.71%	2412.98	16.97%
Single Family Residential	65.85	3.68%	164.16	7.22%	1783.77	12.55%
Transportation	85.50	4.78%	66.34	2.92%	1369.82	9.64%
Vacant	122.38	6.85%	200.88	8.83%	843.43	5.93%
Total	1787.55	100%	2274.86	100%	14215.34	100%

Site Description: LAR-UR2-RHO encompasses about 70% of the total LAR UR2 WMA Rio Hondo tributary area. It is located in the parking lot of the John Anson Ford Park in the City of Bell Gardens, across from the intersection of Gilliland Avenue and Park Lane. Minimal traffic controls will be utilized to alert drivers of the samplers' location and prevent parking in a few parking spots.

Site Location: Please See **Figure 9**

Site View:

Summary Sheet for LAR-UR2-DRO

Watershed: Los Angeles River			**Monitoring Type:** Rotating Stormwater Outfall			
Latitude: 34.008539			**Longitude:** -118.205166			
Represented Area: Cities of Commerce, Vernon, and Bell						
Thomas Guide Grid: pg.675 B3			**Drainage System:** BI5206 – Los Angeles			
Outfall Shape: Round			**HUC-12:** Chavez Ravine – Los Angeles River			
Outfall Type: Manhole			**Nearest Street Address:** 3344 Bandini Boulevard, Vernon, CA 90058			
	Catchment		**Vernon**		**LAR UR2 WMA Total**	
Land Use	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
Agricultural	0	0%	0	0%	34.98	0.29%
Commercial	0	0%	16.37	0.50%	1239.48	10.38%
Education	0	0%	2.67	0.08%	270.08	2.26%
Industrial	25.57	35.91%	2556.40	77.52%	4796.90	40.18%
Multi-Family Residential	0	0%	0.23	0.01%	2032.77	17.03%
Single Family Residential	0	0%	0.93	0.03%	1618.17	13.55%
Transportation	37.75	53.00%	494.04	14.98%	1303.48	10.92%
Vacant	0.29	0.40%	226.95	6.88%	642.48	5.38%
Unincorporated	7.61	10.68%	0	0%	0	0%
Total	71.22	100%	3297.60	100%	11938.34	100%

Site Description: LAR-UR2-DRO is located on the sidewalk at the intersection of Bandini Boulevard and South Downey Road. Due to its location and access to parking, traffic controls would not be required to collect samples.

Site Location: Please See **Figure 10**

Site View:

Summary Sheet for LAR-UR2-EO

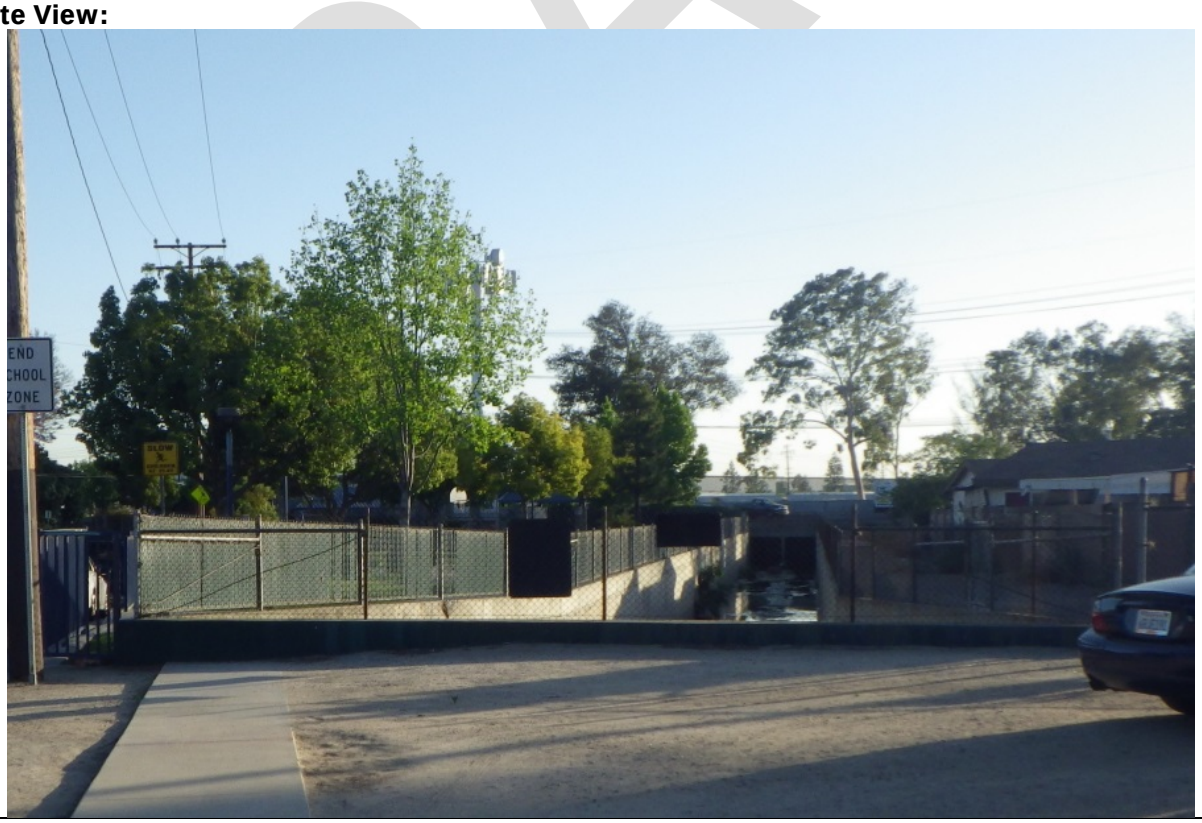
Watershed: Los Angeles River	**Monitoring Type:** Rotating Stormwater Outfall
Latitude: 33.956663	**Longitude:** -118.169102
Represented Area: Cities of Bell Gardens, Commerce, and Vernon	
Thomas Guide Grid: pg.705 F3	**Drainage System:** DD123
Outfall Shape: Rectangle	**HUC-12:** Chaves Ravine – Los Angeles River
Outfall Type: Concrete Channel	**Nearest Street Address:** 8287 Jaboneria Rd., Bell Gardens, CA 90201

Land Use	Catchment		LAR UR2 WMA HUC-12 Portion		LAR UR2 WMA Total	
	Acres	%	Acres	%	Acres	%
Agricultural	34.96	1.44%	34.98	0.30%	46.00	0.32%
Commercial	364.37	15.07%	1239.48	10.38%	1418.94	9.98%
Education	75.08	3.11%	270.08	2.26%	311.42	2.19%
Industrial	1036.52	42.88%	4796.90	40.18%	6028.97	42.41%
Multi-Family Residential	443.02	18.33%	2032.77	17.03%	2412.98	16.98%
Single Family Residential	187.43	7.75%	1618.17	13.55%	1783.77	12.55%
Transportation	188.99	7.82%	1303.48	10.92%	1369.82	9.64%
Vacant	87.00	3.60%	642.48	5.38%	843.43	5.93%
Total	2417.35	100%	11938.34	100%	14215.34	100%

Site Description: Stormwater outfall monitoring site LAR-UR2-EO is located in a residential area in Bell Gardens. Samples will be collected from the concrete channel that is located on Jaboneria Road just north of the Jaboneria Road and Fostoria Street intersection. Access to the channel may require a permit from the Los Angeles County Flood Control District (LACFCD).

Site Location: Please See **Figure 11**

Site View:



Summary Sheet for LAR-UR2-NO

Watershed: Los Angeles River	**Monitoring Type:** Rotating Stormwater Outfall
Latitude: 33.996050	**Longitude:** -118.180775
Represented Area: Cities of Commerce, Vernon, and Bell	
Thomas Guide Grid: pg.675 E4	**Drainage System:** BI0014 – U3 – DD122
Outfall Shape: Round	**HUC-12:** Chavez Ravine – Los Angeles River
Outfall Type: Manhole	**Nearest Street Address:** 3077 S. Atlantic Blvd, Vernon, CA 90058

	Catchment		Commerce		Vernon		LAR UR2 WMA Total	
Land Use	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
Agricultural	0	0%	19.46	0.46%	0	0%	46.00	0.32%
Commercial	19.83	1.95%	383.03	9.13%	16.37	0.50%	1418.94	9.98%
Education	0	0%	24.46	0.58%	2.67	0.08%	311.42	2.19%
Industrial	406.41	39.91%	2523.00	60.15%	2556.40	77.52%	6028.97	42.41%
Multi-Family Residential	18.94	1.86%	129.28	3.09%	0.23	0.01%	2412.98	16.98%
Single Family Residential	34.44	3.38%	292.25	6.97%	0.93	0.03%	1783.77	12.55%
Transportation	473.28	46.48%	650.51	15.51%	494.04	14.98%	1369.82	9.64%
Vacant	65.39	6.42%	172.50	4.11%	226.95	6.88%	843.43	5.93%
Total	1018.29	100%	4194.48	100%	3297.60	100%	14215.34	100%

Site Description: LAR-UR2-NO is located on South Atlantic Boulevard west of Highway 710, in the number 3 southbound lane. It is two feet above the crosswalk. Traffic controls would be needed to obtain the samples.

Site Location: Please See **Figure 12**

Site View:

Summary Sheet for LAR-UR2-WO

Watershed: Los Angeles River	**Monitoring Type:** Rotating Stormwater Outfall					
Latitude: 33.955146	**Longitude:** -118.179975					
Represented Area: Cities of Bell, Cudahy, and Maywood						
Thomas Guide Grid: pg.705 E3	**Drainage System:** BI001 – Line A – East Compton Creek					
Outfall Shape: Round	**HUC-12:** Chavez Ravine – Los Angeles River					
Outfall Type: Manhole	**Nearest Street Address:** 8497 Wilcox Ave, Cudahy, CA 90201					
	Catchment		**LAR UR2 WMA HUC-12 Portion**		**LAR UR2 WMA Total**	
Land Use	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
Agricultural	0	0%	34.98	0.30%	46.00	0.32%
Commercial	244.09	16.06%	1239.48	10.38%	1418.94	9.98%
Education	66.85	4.40%	270.08	2.26%	311.42	2.19%
Industrial	91.61	6.03%	4796.90	40.18%	6028.97	42.41%
Multi-Family Residential	565.52	37.20%	2032.77	17.03%	2412.98	16.98%
Single Family Residential	515.64	33.92%	1618.17	13.55%	1783.77	12.55%
Transportation	16.66	1.10%	1303.48	10.92%	1369.82	9.64%
Vacant	19.87	1.31%	642.48	5.38%	843.43	5.93%
Total	1520.24	100%	11938.34	100%	14215.34	100%

Site Description: LAR-UR2-WO is located at the intersection of Wilcox Avenue and Patata Street in the City of Cudahy. The manhole in the westbound lane of Patata Street and is just beyond the turn line in the intersection. There is semi-trailer truck traffic in the area that will require the use of traffic controls to collect the samples.

Site Location: Please See **Figure 13**

Site View:

Summary Sheet for LAR-UR2-NVO

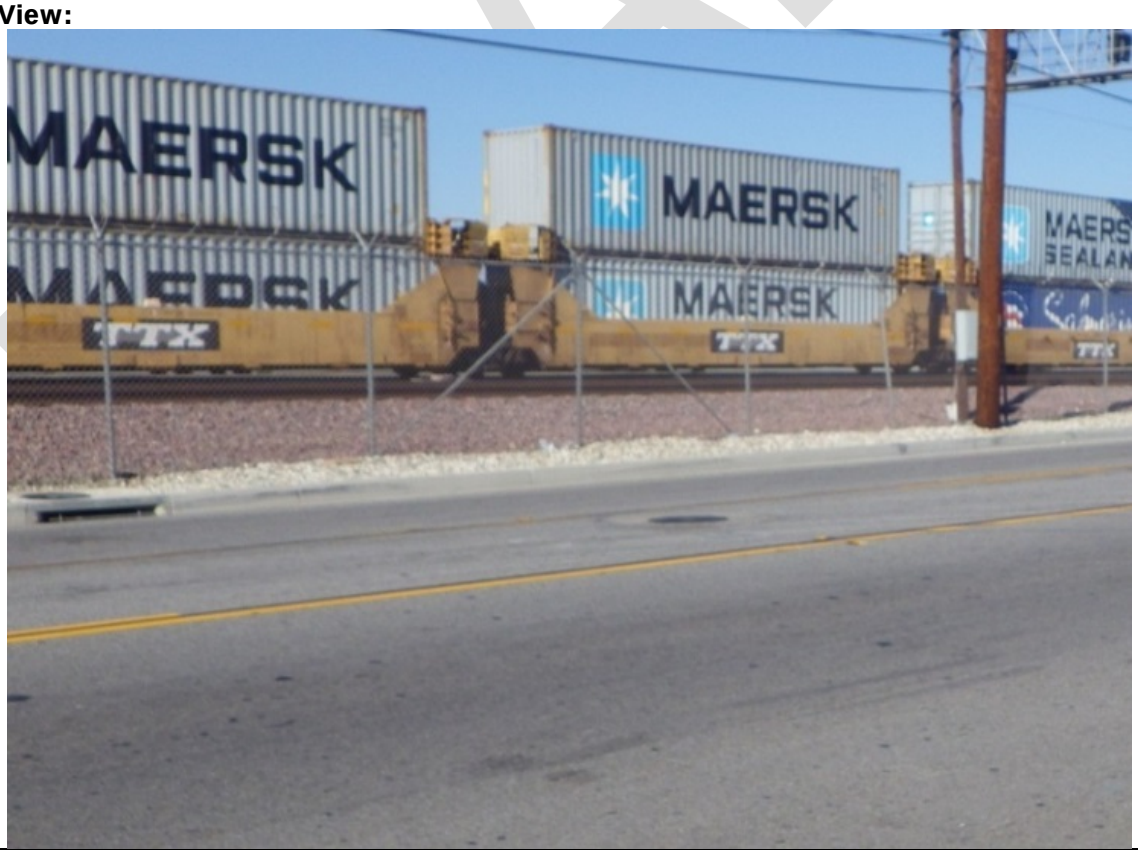
Watershed: Los Angeles River	**Monitoring Type:** Rotating Stormwater Outfall
Latitude: 34.007733	**Longitude:** -118.194464
Represented Area: Cities of Vernon and Commerce	
Thomas Guide Grid: pg.675 C3	**Drainage System:** DD126
Outfall Shape: Round	**HUC-12:** Chavez Ravine – Los Angeles River
Outfall Type: Manhole	**Nearest Street Address:** 3890 E. 26th Street, Vernon, CA 90058

	Catchment		Commerce		Vernon		LAR UR2 WMA Total	
Land Use	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
Agricultural	0	0%	19.46	0.46%	0	0%	46.00	0.32%
Commercial	0	0%	383.03	9.13%	16.37	0.50%	1418.94	9.98%
Education	0	0%	24.46	0.58%	2.67	0.08%	311.42	2.19%
Industrial	91.70	35.09%	2523.00	60.15%	2556.40	77.52%	6028.97	42.41%
Multi-Family Residential	0	0%	129.28	3.09%	0.23	0.01%	2412.98	16.98%
Single Family Residential	0	0%	292.25	6.97%	0.93	0.03%	1783.77	12.55%
Transportation	165.58	63.36%	650.51	15.51%	494.04	14.98%	1369.82	9.64%
Vacant	4.07	1.56%	172.50	4.11%	226.95	6.88%	843.43	5.93%
Total	261.35	100%	4194.48	100%	3297.60	100%	14215.34	100%

Site Description: LAR-UR2-NVO is located on East 26th Street, east of South Downey Road, in the median. The sampling team could park in the median and utilize minimal traffic controls to obtain samples.

Site Location: Please See **Figure 14**

Site View:



Summary Sheet for LAR-UR2-FWO

Watershed: Los Angeles River	**Monitoring Type:** Rotating Stormwater Outfall					
Latitude: 33.956591	**Longitude:** -118.186050					
Represented Area: Cities of Cudahy, Huntington Park, Maywood, Vernon, and Bell						
Thomas Guide Grid: pg.705 D3	**Drainage System:** East Compton Creek No. 1					
Outfall Shape: Round	**HUC-12:** Chavez Ravine – Los Angeles River					
Outfall Type: Manhole	**Nearest Street Address:** Salt Lake Avenue					
	Catchment		**LAR UR2 WMA HUC-12 Portion**		**LAR UR2 WMA Total**	
Land Use	**Acres**	**%**	**Acres**	**%**	**Acres**	**%**
Agricultural	0	0%	34.98	0.29%	46.00	0.32%
Commercial	454.93	10.90%	1239.48	10.38%	1418.94	9.98%
Education	114.25	2.74%	270.08	2.26%	311.42	2.19%
Industrial	1763.25	42.25%	4796.90	40.18%	6028.97	42.41%
Multi-Family Residential	879.38	21.07%	2032.77	17.03%	2412.98	16.98%
Single Family Residential	749.79	17.97%	1618.17	13.55%	1783.77	12.55%
Transportation	111.22	2.66%	1303.48	10.92%	1369.82	9.64%
Vacant	100.63	2.41%	642.48	5.38%	843.43	5.93%
Total	4173.45	100%	11938.34	100%	14215.34	100%

Site Description: Outfall monitoring location LAR-UR2-FWO is located in the City of Cudahy. The manhole is in the southbound, number 1 lane, south of the Ardine Street and Salt Lake Avenue intersection. Traffic controls will be required to partially block the lane to obtain samples.

Site Location: Please See **Figure 15**

Site View:

Appendix E

Quality Assurance Project Program (QAPP) Plan

Los Angeles River Upper Reach 2 Watershed Management Area

Generic

Quality Assurance Project Plan (QAPP)

Prepared for:

Los Angeles Gateway Region
Integrated Regional Water Management Authority
16401 Paramount Boulevard
Paramount California 90641
TEL (626) 485-0338

On Behalf of the Cities of Bell (WDID 4B190153001), Bell Gardens (WDID 4B190139002), Commerce (WDID 4B190161001), Cudahy (WDID 4B190164001), Huntington Park (WDID 4B190177001), Maywood (WDID 4B190192001), Vernon (WDID 4B190216001), and the Los Angeles County Flood Control District (WDID4B190107101)

Prepared by:

1561 E. Orangethorpe Avenue, Suite 240
Fullerton, California 92831
TEL (714) 526-7500 | FAX (714) 526-7004 | www.cwecorp.com

June 26, 2014

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Acronyms

AMP	Adaptive Management Process
CFU	Colony Forming (Microbial) Unit
CIMP	Coordinated Integrated Monitoring Program
DBM	Data Base Manager
DO	Dissolved Oxygen
DQO	Data Quality Objectives
GIS	Geographic Information System
LAR UR2 WMA	Los Angeles River Upper Reach 2 Watershed Management Area
LARWQCB	Los Angeles Regional Water Quality Control Board
MAL	Municipal Action Limit
MES	Mass Emission Station
MRP	Monitoring and Reporting Program
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
PM	Project Manager
QA	Quality Assurance
QAM	Quality Assurance Manual
QAPP	Quality Assurance Project Program
RWL	Receiving Water Limitation
QC	Quality Control
SCCWRP	Southern California Coastal Water Research Project
SMC	Stormwater Monitoring Coalition
SSC	Suspended Sediment Concentration
SSCs	Site Safety Coordinators
TIE	Toxicity Identification Evaluation
TSS	Total Suspended Solids
UR2	Upper Reach 2
USEPA	United States Environmental Protection Agency
WBPC	Water Body- Pollutant Combination
WDR	Waste Discharge Requirements
WLA	Waste Load Allocation
WMA	Watershed Management Area
WMP	Watershed Management Program
WQO	Water Quality Objectives
WQBEL	Water Quality-Based Effluent Limitation

1. Introduction

The California Regional Water Quality Control Board, Los Angeles Region (LARWQCB), adopted the fourth term Coastal Los Angeles County Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) Permit as Order No. R4-2012-0175, on November 8, 2012, which then became effective on December 28, 2012. The Permit encourages Permittees to join together into Watershed Management Groups and develop a Coordinated Integrated Monitoring Program (CIMP) Plan as further characterized in Attachment E to that Permit. This generic Quality Assurance Project Plan (QAPP) is intended to serve as a guide to Los Angeles River Upper Reach 2 Watershed Management Area (LAR UP2 WMA), its contractors, and analytical laboratories for sample analysis and laboratory performance evaluations for the Coordinated Integrated Monitoring Plan (CIMP).

2. Purpose

The intended purpose of this QAPP is to provide program Quality Assurance/Quality Control (QA/QC) consistency for all CIMP monitoring and reporting program activities. Additional information on the data quality review process is described in the USEPA document *Guidance for Data Quality Assessment: Practical Methods for Data Analysis* (USEPA 2000). This document provides the guidance to perform the scientific and statistical evaluation of the data to ensure the project data objectives of quality and quantity are met to support project needs and their intended use.

This QAPP presents the guidelines for monitoring the performance of the analytical laboratory and is not intended to supersede the laboratory's Quality Assurance Manual (QAM). All project personnel will be required to read the QAPP. A copy of the QAPP will be brought to the field during sampling events. Although this QAPP details specific QA/QC requirements applicable to the CIMP, it is a placeholder document for reference until a specific sampling consultants and/or analytical laboratory are contractually retained. These QA/QC requirements are designed to assist in achieving the project data quality objectives (DQOs) and analytical DQOs for all sampling activities that will be performed in the field.

3. Background

Pursuant to the requirements set forth in the Permit, LAR UR2 WMA has agreed to complete CIMP monitoring and reporting. This QAPP has been prepared to ensure that the appropriate levels of QA/QC are maintained throughout monitoring work. The QAPP serves as the controlling mechanism during monitoring and identifies the QA/QC techniques needed for sampling, sample handling, sample storage, Chain-of-Custody procedures, laboratory analytical protocols, data interpretation, reporting, and documentation requirements. The QAPP further provides a summary of the project, its organizational hierarchy, and objectives. QA/QC procedures will be in accordance with applicable professional technical standards, USEPA requirements, RWQCB requirements, specific project goals, and client requirements. This QAPP was prepared utilizing: the 2012 Coastal Los Angeles County MS4 Permit, *Guidance on Systematic Planning Using the Data Quality Objectives Process* (USEPA 2006), *Requirements for Quality Assurance Project Plans* (USEPA 2001), and *Guidance for Quality Assurance Project Plans* (USEPA 2002).

4. Document Organization

The guidelines for preparing this QAPP are presented in USEPA document *Requirements for Quality Assurance Project Plans* (USEPA 2001) and conforms to the following format:

Project Management This section of the QAPP covers the basic areas of project management, including project history, objectives, and the roles or responsibilities of the project participants. The

objectives of this QAPP section are to define and ensure that the participants understand the project goals and approaches to be used. This section also includes management of project documents and records.

Data Generation and Acquisition This section describes the technical design and implementation of the QAPP. Effective implementation of these elements ensures that appropriate methods for sampling, measurement, analysis, data collection, data handling, utilization of field and laboratory QA/QC samples are employed during sample collection and analysis. It also directs proper documentation of QC activities.

Assessment and Oversight This section describes the data quality activities for assessing that the QAPP is being implemented as prescribed and measures the effectiveness of project implementation and associated QA/QC activities.

Data Review, Verification, and Validation This section describes the data quality assessment methods to be used to evaluate field sample results against the established project and analytical DQOs.

5. Project Management

This section describes the overall project organization, schedule, quality objectives, and documentation.

5.1 Roles and Responsibilities

The LARWQCB will conduct oversight of the monitoring and reporting program as the regulatory lead and has external oversight responsibilities for all phases of monitoring, reporting, and should be informed of investigation findings and activities.

LAR UR2 WMA Project Manager The Project Manager (PM) will be the primary point of contact for the LAR UR2 WMA and will be responsible for the coordination of the activities described in the CIMP. All project-related activities will be addressed with the LAR UR2 WMA PM. In addition, any updates or revisions recommended for future versions of the QAPP should be presented to the LAR UR2 WMA PM. At this time, the LAR UR2 WMA has not designated a PM.

Consultant A consultant, or consultant team, will be contracted by LAR UR2 WMA to provide clear lines of authority and communication that will expedite and enhance the flow of information vital to effective technical controls, cost, and schedule performance. The functional roles of personnel within the organizational structure will also be clearly defined. Individuals are given the authority to accomplish their respective project assignments. Since the individuals listed below may change from time to time, this QAPP uses “designee” to include an alternate to the proposed or normal project organization. The following paragraphs define functional titles, positions, and responsibilities.

Consultant Program Manager The Consultant PM designee, will report directly to the LAR UR2 WMA PM. The Consultant PM is the direct line of communication between Consultant and LAR UR2 WMA, and is responsible for ensuring the availability of resources and overall quality of the activities completed under the Monitoring and Reporting Program (MRP). The Consultant PM will provide programmatic guidance to support staff and ensure that documents, procedures, and project activities meet the respective standards and quality requirements. The Consultant PM will also be responsible for resolving project concerns related to technical matters.

The Consultant PM is the focal point for control of project activities, continuity, quality, accountability, and leadership responsibility throughout all phases of the project. The Consultant PM will be supported

by QA personnel, who provide reviews, guidance, and technical advice on project execution and issues resolution. The project team, consisting of supervisory, health and safety, and technical personnel, will support the Consultant PM to ensure that the project meets professional standards, is safely executed, and in compliance with applicable laws, regulations, statutes, and industry codes. Individuals on the project team are responsible for fulfilling appropriate portions of the project QA program, in accordance with assignments made by the Consultant PM. The Consultant PM is responsible for satisfactory completion of the project QA program, may assign specific responsibilities to other members of the project staff, and will notify LAR UR2 WMA of any long-term changes in personnel.

Consultant Storm Water Event Manager The Consultant Storm Water Event Manager designee reports directly to the Consultant PM and will oversee all phases of technical work related to monitoring, reporting data and document generation. Additionally, he is responsible for field activity preparations and execution of sampling activities. This includes overseeing sampling in accordance with approved procedures and methodologies, collection of QA/QC samples, completion of sampling forms, labels, chain-of-custody forms, applying custody seals, and packaging or shipping samples to the approved laboratory.

Consultant Quality Assurance/Quality Control Manager The Consultant QA/QC Manager (QA/QCM), designee, will be available to ensure that management activities are consistent with project objectives. The Consultant QA/QCM will be responsible for monitoring the project analytical QA/QC program. Additional responsibilities include laboratory coordination, project tracking, data validation, data quality assessment, data reporting procedures, calculations, and QC. The Consultant QA/QCM or designee will assume primary responsibility for maintaining and reviewing the QAPP.

Consultant Health and Safety Officer The Consultant Program Health and Safety Manager or designee, reports to the Consultant PM and will be responsible for final approval of the Site Health and Safety Plan (HASP) to ensure that health and safety procedures for the project are conducted in accordance with the Occupational Safety and Health Association (OSHA) regulations and guidelines. The designee will also be responsible for updating the HASP as needed, ensuring that proper health and safety procedures are followed, directing periodic field audits, and assigning Site Safety Coordinators (SSCs).

Consultant Database Manager The designee, will act as the Data Base Manager (DBM) who will report to the Consultant PM and be responsible for maintenance of the LAR UR2 WMA GIS database and the Geographic Information Systems (GIS) component of the database. The DBM is responsible for providing routine data reporting deliverables as well as non-routine and special-circumstance data requests. All non-routine and special-circumstance data requests are routed through both the DBM and Consultant PM and will be prioritized by the latter if scheduling conflicts arise.

Consultant GIS Specialist The Consultant GIS Specialist designee will report to the Consultant PM and is responsible for creating, editing, and manipulating georeferenced spatial data to efficiently display the LAR UR2 WMA information in a visual form. The Consultant GIS Specialist is responsible for producing high quality maps using appropriate software.

Consultant Field Scientist, Geologists, Engineers, and Technicians Consultant field scientist, geologists, engineers, and technicians report to the Consultant PM, and are responsible for field activities, including sampling, and are responsible for following the QA/QC elements of the QAPP.

Consultant Project Administrators Project Administrators, designated by each Consultant business unit, report to the Consultant PM, other Consultant project personnel, and will be responsible for project subcontractor procurement, purchasing, and project file maintenance. In addition, the Consultant Contracting and Procurement Group will be involved in major subcontractor procurement and will be

responsible for enforcement on subcontracted terms, including imposing liquidated damages and other legal remedies.

Laboratory Project Manager The Laboratory Project Manager, designated by each primary laboratory, will be the laboratory's primary project contact and will coordinate with the Consultant QA/QCM. Analytical services may be subcontracted with the prior approval of the QA/QCM team; however, the Laboratory PM holds primary responsibility for delivery of all subcontracted services. The laboratory will be an USEPA and California or Oregon Department of Health Services (DHS) approved laboratory. The lab is designated as the primary analytical subcontractor and will perform the analyses for the standard analytical methods. Key positions and quality related responsibilities for laboratory personnel are discussed in the laboratory QAM.

Laboratory Quality Assurance Manager The Laboratory Quality Assurance Manager, designated by each primary laboratory, is the QA Manager for all laboratory services and deliverables. The QA Manager will be responsible for implementing the laboratory's QA/QC programs, as described in the laboratory QAM and implementing any additional and project-specific QA/QC procedures included in this QAPP.

5.2 Problem Statement

On November 8, 2012, the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) reissued the National Pollutant Discharge Elimination System (NPDES) Permit No. CAS004001, by adopting Order No. R4-2012-0175, *Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges Within the Coastal Watersheds of Los Angeles County, Except Those Discharges Originating From The City of Long Beach MS4* (MS4 Permit). The primary purpose of the Permit is to assess whether MS4 discharges are causing or contributing to the impairment of receiving water beneficial uses in Los Angeles County. The LAR UR2 WMG will assess progress towards these objectives through the CIMP. The CIMP is intended to contribute to the assessment of compliance with Order No. R4-2012-0175. The MRP, outlined in Permit Attachment E, establishes requirements for appropriate monitoring, reporting, and recordkeeping of MS4 discharge and receiving water quality data.

5.3 Project/Task Description

The monitoring of water constituents and pollutants will allow the LAR UR2 WMG to assess compliance with MS4 permit requirements within its watershed management area (WMA). Data collected will also be utilized to assess progress towards complying with Total Maximum Daily Load (TMDL) Waste Load Allocation (WLAs) numeric limits expressed as Water Quality Based Effluent Limits (WQBELs) and/or Receiving Water Limits (RWLs). Water quality monitoring data can be utilized to identify and characterize the effectiveness of instituted watershed control measures and refine their future implementation to reduce the discharge of pollutants into receiving waters. Ultimately, this will improve water quality and enhance beneficial use of the relevant receiving waters.

The CIMP is intended to guide the monitoring of receiving waters and MS4 outfalls to assess whether discharges from the LAR UR2 WMA Permittees are in compliance with the MS4 permit. These monitoring results will be used to assess proper control measures or best management practices (BMPs) to be implemented to maximize pollutant load reductions in the most effective manner.

Mobilization for wet-weather monitoring will occur when the National Weather Service predicted rainfall exceeds 0.25 inch with a 70% occurrence probability, at least 24 hours prior to the event start time, within the WMA. Local flows should also be at least 20% above base flow, or other value as defined by applicable TMDL Monitoring Plans; however, the Rio Hondo is often dry along with many of the MS4 outfalls. As indicated by the Permit, the LAR UR2 WMG will target the first storm event of the storm

year, and two subsequent storm events, that are forecast to generate sufficient rainfall and runoff to meet program objectives and allow the collection of the necessary water quality sample volume. Sampling events will be separated by a minimum of 72 hours of dry conditions (less than 0.1 inch of rain on each day). Monitoring samples collected as grab samples will first be collected at outfall monitoring sites, followed by the receiving water monitoring site, as directed by the Permit.

Dry-weather receiving water monitoring will occur when receiving water flows are less than 20% above base flow. Monitoring is expected to occur during the critical dry-weather event, which is defined as the month with the historically lowest flows or driest weather. It is proposed that July and August are essentially equally dry and that water quality monitoring should be coordinated among adjacent WMP groups to facilitate data comparability, compliance assessment, and runoff or pollutant source assessment.

5.3.1 Geographical Setting

The Los Angeles River begins in the Santa Monica Mountains at the western end of the San Fernando Valley. It flows 51 miles through the Los Angeles Basin, exiting into the Pacific Ocean at Long Beach Harbor and San Pedro Bay. Including tributaries, the 824 square mile watershed has a total stream length of about 837 miles and 4.6 square miles of lake area. The LAR UR2 WMA is located near central Los Angeles County and consists of the cities of Bell, Bell Gardens, Commerce, Cudahy, Huntington Park, Maywood, and Vernon, along with the Los Angeles County Flood Control District. Los Angeles River Reach 2 begins at the Arroyo Seco confluence flows through the LAR UR2 WMG cities of Vernon and Bell and adjacent to the Cities of Maywood, Cudahy, and Bell Gardens before terminating at the Compton Creek confluence. The boundaries for the LAR UR2 WMA specifically start at East 26th Street in the City of Vernon and ends at Patata Street in City of Cudahy. The LAR UR2 WMG Cities of Bell Gardens and Commerce line the western bank of Rio Hondo Reach 1, a 120 square mile Los Angeles River tributary from the eastern side of the LAR watershed. **Figure 1** illustrates the LAR UR2 WMA municipal and jurisdictional boundaries in relation to Los Angeles River Reach 2 and Rio Hondo Reach 1.

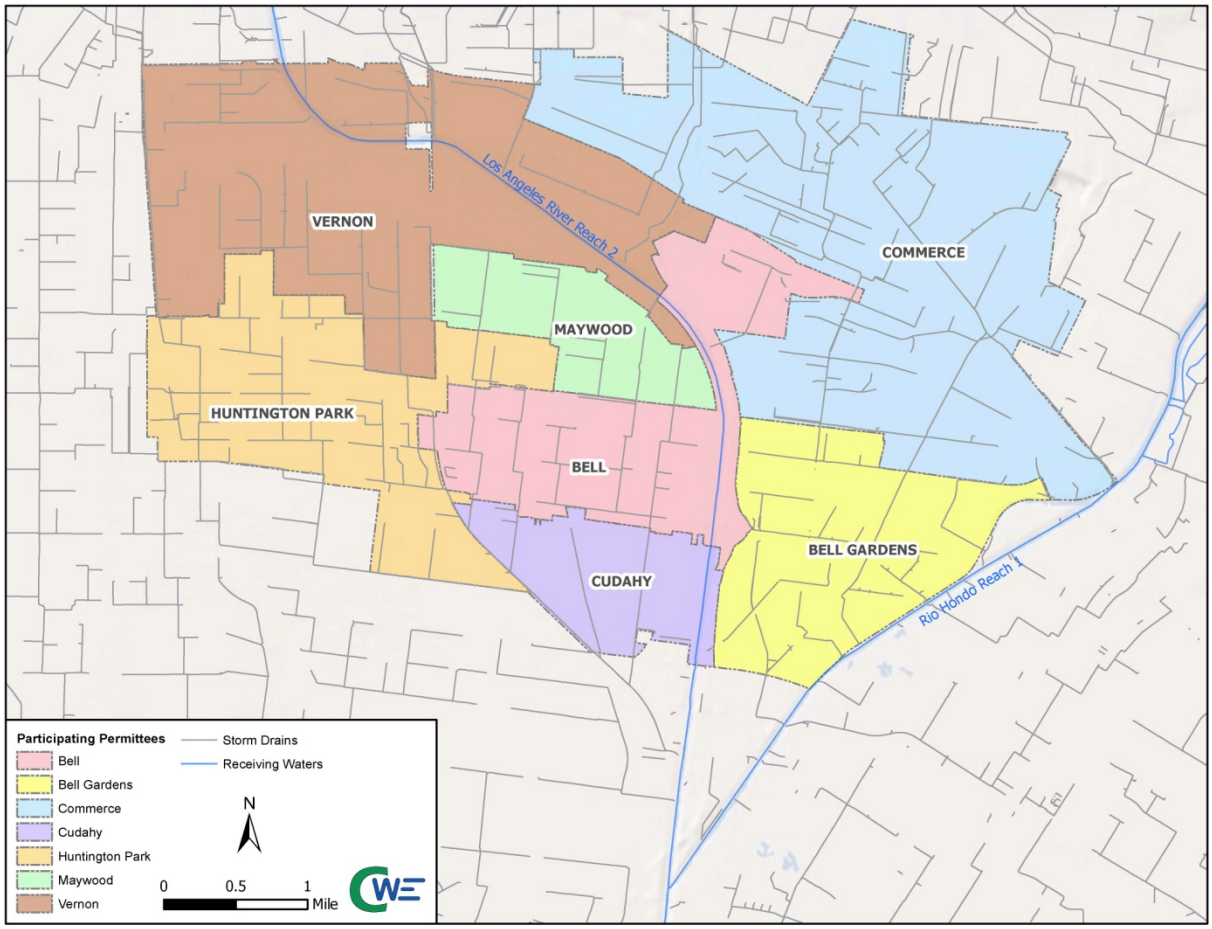

Figure 1 Los Angeles River Upper Reach 2 Watershed Management Area General Location

5.3.2 Programs and Agencies

Agency oversight of the CIMP rests with the Regional Board. The Regional Board will have the opportunity to review and provide comment on all CIMP related work.

5.3.3 Project Schedule

As stated in Permit Attachment E, Part IV.C.6 of the MRP, the LAR UR2 WMA's CIMP implementation will commence within 90 days following CIMP approval by the Executive Officer of the Regional Board, or coordinated with other regional agencies to begin simultaneously for the benefit of comparability of data among adjacent agencies. Implementation of the CIMP for the Los Angeles River receiving water monitoring site is subject to the availability and approval of construction permits from the LACFCD and Army Corps of Engineers (ACOE). If permit approval is not completed within the 90 day schedule, the LAR UR2 WMA will provide quarterly updates to inform the Regional Board of progress in obtaining the permits and constructing the monitoring site facilities. It is anticipated that the permitting and installation of the receiving water monitoring site may take a minimum of 18 months.

CIMP monitoring will start on July 1, 2015, to coincide with the Annual Report period of the Permit as well as to coordinate monitoring with other WMA. Wet-weather monitoring will target the first significant rain event of the wet season (October to April) of the storm year (July 1 to June 30) with a predicted

rainfall of at least 0.25 inch at a seventy percent probability of rain fall, within the LAR UR2 WMA, at least 24 hours prior to the event start time. Dry-weather, for LAR UR2 WMA receiving water monitoring, will be characterized by an estimated flow of less than 20 percent greater than the base flow. The dry season will be from May to September.

5.3.4 Constraints

Stormwater outfall monitoring sites may require encroachment permits and coordination with adjacent agencies and the Los Angeles County Flood Control District (LACFCD). The LAR UR2 WMA Project Manager and Consultant Program Manager will contact, coordinate, and complete the necessary documentation to obtain the necessary permits.

Traffic control plans and/or permits may be required to access the outfall sample locations within the public right-of-way or on public properties. Traffic Control Permits take an estimated five days to process and are generally valid for a limited duration. Traffic controls are necessary for the safety of the field crew and to minimize the overall impact to the flow of traffic on city streets, especially during inclement weather. Safety of the field staff is an overriding concern and sample collection will not be initiated until the location is deemed sufficiently safe to initiate the sampling effort. Depending on storm characteristics, collection of samples may be deemed unsafe during wet-weather conditions.

5.4 Analytical Procedures

The sections below discuss the analytical procedures for data generated in the field and in the laboratory.

5.4.1 Field Parameters

Temperature, pH, dissolved oxygen, turbidity and conductivity will be measured on-site in the same period as grab sampling. The instrument will be calibrated before use and used according to the manufacturer's instructions. After use, the instrument will be cleaned in preparation for the next sampling event. Maintenance will also be performed per the manufacturer's instructions, and the instrument will be stored to prevent fouling of the probes.

This section will contain information on the field equipment specifications once the equipment has been selected.

5.4.2 Analytical Methods and Method Detection and Reporting Limits

Table 1 lists the constituents to be initially analyzed based on Table E-2 of Permit Attachment E and the proposed method of analysis will be determined by the LAR UR2 WMA's members, through the selection of the contracted laboratories, upon CIMP approved.

Table 1 Water Analytical Constituents		
Constituent	**Matrix**	**Method**
Conventional		
Oil and Grease	Water	*TBD*
Total Phenols	Water	*TBD*
Cyanide	Water	*TBD*
pH	Water	*TBD*
Temperature	Water	*TBD*
Dissolved Oxygen	Water	*TBD*
Bacteria (single sample limits)		
Total coliform (marine waters)	Water	*TBD*
Enterococcus (marine waters)	Water	*TBD*
Fecal coliform (marine & fresh waters)	Water	*TBD*
E. coli (fresh waters)	Water	*TBD*
General		
Dissolved Phosphorus	Water	*TBD*
Total Phosphorus	Water	*TBD*
Turbidity	Water	*TBD*
Total Suspended Solids	Water	*TBD*
Total Dissolved Solids	Water	*TBD*
Volatile Suspended Solids	Water	*TBD*
Total Organic Carbon	Water	*TBD*
Total Petroleum Hydrocarbon	Water	*TBD*
Biochemical Oxygen Demand	Water	*TBD*
Chemical Oxygen Demand	Water	*TBD*
Total Ammonia-Nitrogen	Water	*TBD*
Total Kjeldahl Nitrogen	Water	*TBD*
Nitrate-Nitrite	Water	*TBD*
Alkalinity	Water	*TBD*
Specific Conductance	Water	*TBD*
Total Hardness	Water	*TBD*
MBAS	Water	*TBD*
Chloride	Water	*TBD*
Fluoride	Water	*TBD*
Methyl tertiary butyl ether (MTBE)	Water	*TBD*
Perchlorate	Water	*TBD*
Metals (Total & Dissolved)		
Aluminum	Water	*TBD*
Antimony	Water	*TBD*
Arsenic	Water	*TBD*
Beryllium	Water	*TBD*
Cadmium	Water	*TBD*

Table 1 Water Analytical Constituents		
Constituent	**Matrix**	**Method**
Chromium (total)	Water	*TBD*
Chromium (Hexavalent)	Water	*TBD*
Copper	Water	*TBD*
Iron	Water	*TBD*
Lead	Water	*TBD*
Mercury	Water	*TBD*
Nickel	Water	*TBD*
Selenium	Water	*TBD*
Silver	Water	*TBD*
Thallium	Water	*TBD*
Zinc	Water	*TBD*
Semivolatile Organic Compounds		
ACIDS	Water	*TBD*
2-Chlorophenol	Water	*TBD*
4-Chloro-3-methylphenol	Water	*TBD*
2,4-Dichlorophenol	Water	*TBD*
2,4-Dimethylphenol	Water	*TBD*
2,4-Dinitrophenol	Water	*TBD*
2-Nitrophenol	Water	*TBD*
4-Nitrophenol	Water	*TBD*
Pentachlorophenol	Water	*TBD*
Phenol	Water	*TBD*
2,4,6-Trichlorophenol	Water	*TBD*
Base/Neutral		
Acenaphthene	Water	*TBD*
Acenaphthylene	Water	*TBD*
Anthracene	Water	*TBD*
Benzidine	Water	*TBD*
1,2 Benzanthracene	Water	*TBD*
Benzo(a)pyrene	Water	*TBD*
Benzo(g,h,i)perylene	Water	*TBD*
3,4 Benzoflouranthene	Water	*TBD*
Benzo(k)flouranthene	Water	*TBD*
Bis(2-Chloroethoxy) methane	Water	*TBD*
Bis(2-Chloroisopropyl) ether	Water	*TBD*
Bis(2-Chloroethyl) ether	Water	*TBD*
Bis(2-Ethylhexl) phthalate	Water	*TBD*
4-Bromophenyl phenyl ether	Water	*TBD*
Butyl benzyl phthalate	Water	*TBD*
2-Chloroethyl vinyl ether	Water	*TBD*

Table 1 Water Analytical Constituents		
Constituent	**Matrix**	**Method**
2-Chloronaphthalene	Water	*TBD*
4-Chlorophenyl phenyl ether	Water	*TBD*
Chrysene	Water	*TBD*
Dibenzo(a,h)anthracene	Water	*TBD*
1,3-Dichlorobenzene	Water	*TBD*
1,4-Dichlorobenzene	Water	*TBD*
1,2-Dichlorobenzene	Water	*TBD*
3,3-Dichlorobenzidine	Water	*TBD*
Diethyl phthalate	Water	*TBD*
Dimethyl phthalate	Water	*TBD*
di-n-Butyl phthalate	Water	*TBD*
2,4-Dinitrotoluene	Water	*TBD*
2,6-Dinitrotoluene	Water	*TBD*
4,6 Dinitro-2-methylphenol	Water	*TBD*
1,2-Diphenylhydrazine	Water	*TBD*
di-n-Octyl phthalate	Water	*TBD*
Fluoranthene	Water	*TBD*
Fluorene	Water	*TBD*
Hexachlorobenzene	Water	*TBD*
Hexachlorobutadiene	Water	*TBD*
Hexachloro-cyclopentadiene	Water	*TBD*
Hexachloroethane	Water	*TBD*
Indeno(1,2,3-cd)pyrene	Water	*TBD*
Isophorone	Water	*TBD*
Naphthalene	Water	*TBD*
Nitrobenzene	Water	*TBD*
N-Nitroso-dimethyl amine	Water	*TBD*
N-Nitroso-diphenyl amine	Water	*TBD*
N-Nitroso-di-n-propyl amine	Water	*TBD*
Phenanthrene	Water	*TBD*
Pyrene	Water	*TBD*
1,2,4-Trichlorobenzene	Water	*TBD*
Polychlorinated Biphenyls and Pesticides		
Aldrin	Water	*TBD*
alpha-BHC	Water	*TBD*
beta-BHC	Water	*TBD*
delta-BHC	Water	*TBD*
gamma-BHC (lindane)	Water	*TBD*
alpha-chlordane	Water	*TBD*
gamma-chlordane	Water	*TBD*

Table 1 Water Analytical Constituents		
Constituent	**Matrix**	**Method**
4,4'-DDD	Water	*TBD*
4,4'-DDE	Water	*TBD*
4,4'-DDT	Water	*TBD*
Dieldrin	Water	*TBD*
alpha-Endosulfan	Water	*TBD*
beta-Endosulfan	Water	*TBD*
Endosulfan sulfate	Water	*TBD*
Endrin	Water	*TBD*
Endrin aldehyde	Water	*TBD*
Heptachlor	Water	*TBD*
Heptachlor Epoxide	Water	*TBD*
Toxaphene	Water	*TBD*
Aroclor-1016	Water	*TBD*
Aroclor-1221	Water	*TBD*
Aroclor-1232	Water	*TBD*
Aroclor-1242	Water	*TBD*
Aroclor-1248	Water	*TBD*
Aroclor-1254	Water	*TBD*
Aroclor-1260	Water	*TBD*
Organophosphate Pesticides		
Atrazine	Water	*TBD*
Chlorpyrifos	Water	*TBD*
Cyanazine	Water	*TBD*
Diazinon	Water	*TBD*
Malathion	Water	*TBD*
Prometryn	Water	*TBD*
Simazine	Water	*TBD*
Herbicides		
2,4-D	Water	*TBD*
Glyphosate	Water	*TBD*
2,4,5-TP-SILVEX	Water	*TBD*

Multiple ELAP-accredited laboratories were surveyed in order to assess their capabilities to achieve the Permit identified analyte Minimum Levels. Proposed laboratory analytical methods, to be used in the water quality analysis, along with laboratory identified Method Detection Limit (MDL) and Reporting Limit (RL) were gathered. Several laboratories reported difficulties in achieving the Permit identified MDLs for standard pollutants which are usually quantified at higher concentrations in runoff water, an observation which should be conveyed to the Regional Board for consideration. This is often the result of applying a potable or ground water derived assessment standard to runoff water analysis, where the detection limit is rarely approached. Please refer to CIMP Appendix F for a complete summary of the laboratories surveyed and their reported methods and analytical limits.

Table 2 summarizes the analytical procedures reported for use in this project by ES Babcock Laboratory. Footnoted cells represent limits which exceed the Minimum Levels (MLs) stated in Table E-2 of the MS4 permit. For Minimum Levels that meet the MDL, but not by the RL, laboratories typically report the results flagged with a "J" qualifier to signify that it is an estimate. Of the Analytical Methods proposed by each laboratory, a number have not been approved under the stipulations placed in Attachment E, XIV.A.1.d of the MS4 permit. These methods should be approved for use by the Regional Board prior to final laboratory selection.

Of the laboratories surveyed in preparing Appendix F of the CIMP, none were able to comprehensively report at the MLs stated in Table E-2 of the MS4 permit. However, the individual requirements of WMA may render the Minimum Levels irrelevant if the maximum loads or limitations are greater than the MLs. For example, the ES Babcock Laboratory RL is 5 mg/L for Total Suspended Solids. The permit identified ML for Total Suspended Solids is 2 mg/L, thus ES Babcock does not achieve the stated Permit ML, but if the analyte concentration in runoff is above the laboratory's RL, then it would likely be irrelevant that the laboratory RL is above the permit ML.

Table 2 ES Babcock Laboratory Analytical Methods Sample

Analyte	Laboratory / Organization	Analytical Method		Achievable Laboratory Limits		
		Analytical Method / SOP	Modified for Method	MDL	RL	Unit
Conventional Pollutants						
Oil and Grease	ES Babcock	EPA 1664A	No	0.92	2.5	mg/L
Total Phenols	ES Babcock	EPA 420.4	No	0.016	0.02	mg/L
Cyanide	ES Babcock	SM 4500-CN- E	No	4.9	5	µg/L
pH	Field Test	N/A	N/A	N/A	N/A	N/A
Temperature	Field Test	N/A	N/A	N/A	N/A	N/A
Dissolved Oxygen	Field Test	N/A	N/A	N/A	N/A	N/A
BACTERIA (single sample limits)						
Total coliform (marine waters)	ES Babcock	SM9221B	No	2	2	MPN/ 100ml
Enterococcus (marine waters)	ES Babcock	SM 9230B	No	2	2	MPN/ 100ml
Fecal coliform (marine & fresh waters)	ES Babcock	SM 9221E	No	2	2	MPN/ 100ml
E. coli (fresh waters)	ES Babcock	SM 9221E	No	2	2	MPN/ 100ml
General						
Dissolved Phosphorus	ES Babcock	SM 4500-P B	No	0.014	0.05	mg/L
Total Phosphorus	ES Babcock	SM 4500-P B	No	0.014	0.05	mg/L
Turbidity	Field Test	N/A	N/A	N/A	N/A	N/A
Total Suspended Solids	ES Babcock	SM 2540D	No	2.8[1]	5[1]	mg/L
Total Dissolved Solids	ES Babcock	SM 2540C	No	5.5[1]	10[1]	mg/L
Volatile Suspended Solids	ES Babcock	EPA 160.4	No	5[1]	5[1]	mg/L
Total Organic Carbon	ES Babcock	SM 5310B	No	0.16	0.7	mg/L
Total Petroleum Hydrocarbon	ES Babcock	EPA 418.1	No	0.5	1	mg/L

Table 2 ES Babcock Laboratory Analytical Methods Sample						
Analyte	**Laboratory/ Organization**	**Analytical Method**		**Achievable Laboratory Limits**		
		Analytical Method/SOP	**Modified for Method**	**MDL**	**RL**	**Unit**
Biochemical Oxygen Demand	ES Babcock	SM 5210 B	No	1	2	mg/L
Chemical Oxygen Demand	ES Babcock	SM 5220 D	No	6.3	10	mg/L
Total Ammonia-Nitrogen	ES Babcock	SM 4500-NH3 C	No	0.059	0.1	mg/L
Total Kjeldahl Nitrogen	ES Babcock	EPA 351.2	No	0.063	0.1	mg/L
Nitrate-Nitrite	ES Babcock	SM 4500-NO3 F	No	0.11	0.2	mg/L
Alkalinity	ES Babcock	SM 2320B	No	1.7	3[1]	mg/L
Specific Conductance	Field Test	N/A	N/A	N/A	N/A	N/A
Total Hardness	ES Babcock	SM 2340B/EP	No	0.5	3[1]	mg/L
MBAS	ES Babcock	SM 5540C	No	0.035	0.05	mg/L
Chloride	ES Babcock	EPA 300.0	No	1	1	mg/L
Fluoride	ES Babcock	SM 4500-F C	No	0.05	0.1	mg/L
Methyl tertiary butyl ether (MTBE)	ES Babcock	EPA 624	No	0.43	3.0	µg/L
Perchlorate	ES Babcock	EPA 314.0	No	0.49	4	µg/L
METALS (Dissolved & Total)						
Aluminum	ES Babcock	EPA 200.7	No	25	100	µg/L
Antimony	ES Babcock	EPA 200.8	No	0.25	0.5	µg/L
Arsenic	ES Babcock	EPA 200.8	No	0.5	1	µg/L
Beryllium	ES Babcock	EPA 200.8	No	0.25	0.5	µg/L
Cadmium	ES Babcock	EPA 200.8	No	0.12	0.25	µg/L
Chromium (total)	ES Babcock	EPA 200.8	No	0.4	0.5	µg/L
Chromium (Hexavalent)	ES Babcock	EPA 218.6	No	0.013	1	µg/L
Copper	ES Babcock	EPA 200.8	No	0.4	0.5	µg/L
Iron	ES Babcock	EPA 200.7	No	2.3	50	µg/L
Lead	ES Babcock	EPA 200.8	No	0.25	0.5	µg/L
Mercury	ES Babcock	EPA 200.8	No	0.033	0.2	µg/L
Nickel	ES Babcock	EPA 200.8	No	0.5	1	µg/L
Selenium	ES Babcock	EPA 200.8	No	0.5	1	µg/L
Silver	ES Babcock	EPA 200.8	No	0.12	0.25	µg/L
Thallium	ES Babcock	EPA 200.8	No	0.5	1	µg/L
Zinc	ES Babcock	EPA 200.8	No	0.66	1	µg/L
SEMIVOLATILE ORGANIC COMPOUNDS						
ACIDS						
2-Chlorophenol	ES Babcock	EPA 625	No	1.8	2	µg/L
4-Chloro-3-methylphenol	ES Babcock	EPA 625	No	1	1	µg/L
2,4-Dichlorophenol	ES Babcock	EPA 625	No	1	1	µg/L
2,4-Dimethylphenol	ES Babcock	EPA 625	No	1	1	µg/L

Table 2 ES Babcock Laboratory Analytical Methods Sample						
Analyte	**Laboratory / Organization**	**Analytical Method**		**Achievable Laboratory Limits**		
		Analytical Method / SOP	**Modified for Method**	**MDL**	**RL**	**Unit**
2,4-Dinitrophenol	ES Babcock	EPA 625	No	1.6	5	µg/L
2-Nitrophenol	ES Babcock	EPA 625	No	2.1	10	µg/L
4-Nitrophenol	ES Babcock	EPA 625	No	1.1	5	µg/L
Pentachlorophenol	ES Babcock	EPA 625	No	1	1	µg/L
Phenol	ES Babcock	EPA 625	No	1	1	µg/L
2,4,6-Trichlorophenol	ES Babcock	EPA 625	No	1.9	10	µg/L
BASE / NEUTRAL						
Acenaphthene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
Acenaphthylene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
Anthracene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
Benzidine	ES Babcock	EPA 625	No	5	5	µg/L
1,2 Benzanthracene	ES Babcock	EPA 625	No	0.05	0.05	µg/L
Benzo(a)pyrene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
Benzo(g,h,i)perylene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
3,4 Benzoflouranthene	ES Babcock	EPA 625	No	0.05	0.05	µg/L
Benzo(k)flouranthene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
Bis(2-Chloroethoxy) methane	ES Babcock	EPA 625	No	1.8	5	µg/L
Bis(2-Chloroisopropyl) ether	ES Babcock	EPA 625	No	1.9	2	µg/L
Bis(2-Chloroethyl) ether	ES Babcock	EPA 625	No	1	1	µg/L
Bis(2-Ethylhexl) phthalate	ES Babcock	EPA 625	No	2.3	5	µg/L
4-Bromophenyl phenyl ether	ES Babcock	EPA 625	No	1.6	5	µg/L
Butyl benzyl phthalate	ES Babcock	EPA 625	No	1.6	10	µg/L
2-Chloroethyl vinyl ether	ES Babcock	EPA 625	No	1	5[1]	µg/L
2-Chloronaphthalene	ES Babcock	EPA 625	No	1.8	10	µg/L
4-Chlorophenyl phenyl ether	ES Babcock	EPA 625	No	1.8	5	µg/L
Chrysene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
Dibenzo(a,h)anthracene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
1,3-Dichlorobenzene	ES Babcock	EPA 624	No	0.15	0.5	µg/L
1,4-Dichlorobenzene	ES Babcock	EPA 624	No	0.072	0.5	µg/L
1,2-Dichlorobenzene	ES Babcock	EPA 624	No	0.2	0.5	µg/L
3,3-Dichlorobenzidine	ES Babcock	EPA 625	No	2.1	5	µg/L
Diethyl phthalate	ES Babcock	EPA 625	No	1.8	2	µg/L
Dimethyl phthalate	ES Babcock	EPA 625	No	1.7	2	µg/L
di-n-Butyl phthalate	ES Babcock	EPA 625	No	1.9	10	µg/L
2,4-Dinitrotoluene	ES Babcock	EPA 625	No	1.8	5	µg/L

Table 2 ES Babcock Laboratory Analytical Methods Sample						
Analyte	**Laboratory / Organization**	**Analytical Method**		**Achievable Laboratory Limits**		
		Analytical Method / SOP	**Modified for Method**	**MDL**	**RL**	**Unit**
2,6-Dinitrotoluene	ES Babcock	EPA 625	No	1.9	5	µg/L
4,6 Dinitro-2-methylphenol	ES Babcock	EPA 625	No	1.8	5	µg/L
1,2-Diphenylhydrazine	ES Babcock	EPA 625	No	1	1	µg/L
di-n-Octyl phthalate	ES Babcock	EPA 625	No	2.6	10	µg/L
Fluoranthene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
Fluorene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
Hexachlorobenzene	ES Babcock	EPA 625	No	1	1	µg/L
Hexachlorobutadiene	ES Babcock	EPA 625	No	1	1	µg/L
Hexachloro-cyclopentadiene	ES Babcock	EPA 625	No	1.7	5	µg/L
Hexachloroethane	ES Babcock	EPA 625	No	1	1	µg/L
Indeno(1,2,3-cd)pyrene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
Isophorone	ES Babcock	EPA 625	No	1	1	µg/L
Naphthalene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
Nitrobenzene	ES Babcock	EPA 625	No	1	1	µg/L
N-Nitroso-dimethyl amine	ES Babcock	EPA 625	No	1.4	5	µg/L
N-Nitroso-diphenyl amine	ES Babcock	EPA 625	No	1	1	µg/L
N-Nitroso-di-n-propyl amine	ES Babcock	EPA 625	No	1.7	5	µg/L
Phenanthrene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
Pyrene	ES Babcock	EPA 625 SIM	No	0.05	0.05	µg/L
1,2,4-Trichlorobenzene	ES Babcock	EPA 625	No	1	1	µg/L
POLYCHLORINATED BIPHENYLS and PESTICIDES						
Aldrin	ES Babcock	EPA 608	No	0.005	0.005	µg/L
alpha-BHC	ES Babcock	EPA 608	No	0.01	0.01	µg/L
beta-BHC	ES Babcock	EPA 608	No	0.005	0.005	µg/L
delta-BHC	ES Babcock	EPA 608	No	0.005	0.005	µg/L
gamma-BHC (lindane)	ES Babcock	EPA 608	No	0.02	0.02	µg/L
alpha-chlordane	ES Babcock	EPA 608	No	0.045	0.1	µg/L
gamma-chlordane	ES Babcock	EPA 608	No	0.045	0.1	µg/L
4,4'-DDD	ES Babcock	EPA 608	No	0.016	0.05	µg/L
4,4'-DDE	ES Babcock	EPA 608	No	0.01	0.05	µg/L
4,4'-DDT	ES Babcock	EPA 608	No	0.01	0.01	µg/L
Dieldrin	ES Babcock	EPA 608	No	0.01	0.01	µg/L
alpha-Endosulfan	ES Babcock	EPA 608	No	0.011	0.02	µg/L
beta-Endosulfan	ES Babcock	EPA 608	No	0.01	0.01	µg/L
Endosulfan sulfate	ES Babcock	EPA 608	No	0.044	0.05	µg/L
Endrin	ES Babcock	EPA 608	No	0.01	0.01	µg/L
Endrin aldehyde	ES Babcock	EPA 608	No	0.01	0.01	µg/L

Table 2 ES Babcock Laboratory Analytical Methods Sample						
Analyte	**Laboratory / Organization**	**Analytical Method**		**Achievable Laboratory Limits**		
		Analytical Method / SOP	**Modified for Method**	**MDL**	**RL**	**Unit**
Heptachlor	ES Babcock	EPA 608	No	0.01	0.01	µg/L
Heptachlor Epoxide	ES Babcock	EPA 608	No	0.01	0.01	µg/L
Toxaphene	ES Babcock	EPA 608	No	0.5	0.5	µg/L
Aroclor-1016	ES Babcock	EPA 608	No	0.5	0.5	µg/L
Aroclor-1221	ES Babcock	EPA 608	No	0.5	0.5	µg/L
Aroclor-1232	ES Babcock	EPA 608	No	0.42	0.5	µg/L
Aroclor-1242	ES Babcock	EPA 608	No	0.41	0.5	µg/L
Aroclor-1248	ES Babcock	EPA 608	No	0.28	0.5	µg/L
Aroclor-1254	ES Babcock	EPA 608	No	0.5	0.5	µg/L
Aroclor-1260	ES Babcock	EPA 608	No	0.5	0.5	µg/L
ORGANOPHOSPHATE PESTICIDES						
Atrazine	ES Babcock	EPA 525.2	No	0.063	0.5	µg/L
Chlorpyrifos	ES Babcock	EPA 8270C	No	1.2[1]	4[1]	µg/L
Cyanazine	ES Babcock	N/A	N/A	N/A	N/A	N/A
Diazinon	ES Babcock	EPA 525.2	No	0.25[1]	0.25[1]	µg/L
Malathion	ES Babcock	EPA 8270C	No	0.073	4	µg/L
Prometryn	ES Babcock	EPA 525.2	No	0.079	2	µg/L
Simazine	ES Babcock	EPA 525.2	No	0.061	1	µg/L
HERBICIDES						
2,4-D	ES Babcock	EPA 8151A	No	0.17	10	µg/L
Glyphosate	ES Babcock	EPA 547	No	4.5	25[1]	µg/L
2,4,5-TP-SILVEX	ES Babcock	EPA 8151A	No	0.15	1[1]	µg/L

1 – Laboratory RL or MDL exceeds the MS4 Permit MRP Table E-2 Minimum Level

The sample-specific MDL and RL will be reported by the laboratory and will take into account any factors relating to the sample analysis that might decrease or increase the reporting limit (e.g. dilution factor, percent moisture, sample volume, sparge volume or matrix interferences). The contracted laboratory should be directed to report all analytical results to the MDL. In the event that the MDL and reporting limit are elevated due to a matrix limitation and subsequent dilution or reduction in the sample aliquot, the data will be evaluated by Consultant Program Manager and Laboratory Project Manager to determine if an alternative course of action is warranted. Should elevated reporting limits and MDLs continue to occur, the Consultant Program Manager shall consult with the LARWQCB prior to initiating significant corrective actions.

5.5 Data Quality Objectives and Criteria

DQOs describe the anticipated data quality needs necessary to support the analysis and characterization of the CIMP study questions. A seven-step process to identify the required data quality is described in *Guidance on Systematic Planning Using the Data Quality Objectives Process* (USEPA 2006). The MS4 Permit MRP and CIMP-specific DQO process steps are as follows:

1. Assess the chemical, physical, and biological impacts of MS4 discharges on receiving waters.
2. Assess compliance with RWLs and WQBELs numeric limits established to implement Total Maximum Daily Load (TMDL) wet weather and dry weather Waste Load 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 Order.

In order to accomplish these specific DQO, the QAPP process steps will include:

1. State the Problem
2. Identify the Decision
3. Identify Inputs to the Decision
4. Define the Study Area Boundaries
5. Develop a Decision Rule
6. Specify Limits on the Decision Errors
7. Optimize the Design for Obtaining Data

Typical field and laboratory analytical measurement quality objectives, as evaluated based on precision, accuracy, completeness, sensitivity, representativeness, and comparability, are summarized in the following paragraphs and presented in **Table 3**.

5.5.1 Precision

Precision refers to the agreement or reproducibility of a set of duplicate or replicate results obtained from independent analyses completed under identical conditions. Both sampling and laboratory precision will be evaluated by the performance of field duplicates (if collected), laboratory duplicates, and Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSDs).

Precision is expressed as the relative percent difference (RPD) in concentration between the original and duplicate analyses, as determined in the formula:

$$\mathbf{RPD} = \frac{|\mathbf{S} - \mathbf{D}|}{\frac{\mathbf{1}}{\mathbf{2}} \times (\mathbf{S} + \mathbf{D})} \times \mathbf{100}$$

Where:
RPD = Relative percent difference
S = Concentration of analyte in the original sample
D = Concentration of analyte in duplicate sample

Table 3 Data Quality Objectives				
Parameter	**Accuracy**	**Precision**	**Recovery**	**Completeness**
Field Measurements				
Water Velocity (for Flow calc.)	2%	NA	NA	90%
pH	+ 0.2 pH units	+ 0.5 pH units	NA	90%
Temperature	+ 0.5° C	+ 5%	NA	90%
Dissolved Oxygen	+ 0.5 mg/L	+ 10%	NA	90%
Turbidity	10%	10%	NA	90%
Conductivity	5%	5%	NA	90%
Laboratory Analyses – Water				
Conventionals and Solids	80 – 120%	0 – 25%	80 – 120%	90%
Aquatic Toxicity	(1)	(2)	NA	90%
Nutrients(3)	80 – 120%	0 – 25%	90 – 110%	90%
Metals(3)	75 – 125%	0 – 25%	75 – 125%	90%
Semi-Volatile Organics(3)	50 – 150%	0 – 25%	50 – 150%	90%
Volatile Organics(3)	50 – 150%	0 – 25%	50 – 150%	90%
Triazines(3)	50 – 150%	0 – 25%	50 – 150%	90%
Herbicides(3)	50 – 150%	0 – 25%	50 – 150%	90%
OC Pesticides(3)	50 – 150%	0 – 25%	50 – 150%	90%
PCB Aroclors(3)	50 – 150%	0 – 25%	50 – 150%	90%
OP Pesticides(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 2** for a list of individual constituents in each suite for water.

5.5.2 Accuracy

Accuracy, or measurement bias, is an assessment of the agreement between an experimental or observed value and the true value of the parameter being measured. A measurement is evaluated for accuracy by comparing a given observed value to a true value and against an established range specifying a lower limit and an upper limit of acceptability. Laboratory Control Standards (LCS), their duplicates (LCSD), and surrogate spikes will be used to evaluate the accuracy and bias for the project samples. Accuracy is expressed as percent recovery '%R', as determined from the formula:

$$\%\mathbf{R} = \frac{\mathbf{SSR} - \mathbf{SR}}{\mathbf{SA}} \times \mathbf{100}$$

Where:
%R = Percent recovery (percent)
SSR = Spike sample result (concentration units)
SR = Original sample result (concentration units)
SA = Spike added (concentration units)

Method-specific recovery criteria will be reported in the final QAPP for the selected laboratory. For data validation, the more stringent of either the laboratory-specific criteria or the method-specific criteria will be used.

5.5.3 Completeness

Completeness is an assessment of the adequacy of the available data resulting from the sampling and analysis program. It is evaluated for each method, matrix, and analyte combination in order to prevent misinterpretation of the data and to meet the needs of the sampling program. Another aspect of completeness involves the adequacy of the data package in documenting the associated QC data for the project samples. The validated data will provide a measure of completeness, but the usability of the validated data will be determined by the selected Consultants, the LAR UR2 WMA Project Manager, and reviewed by the LARWQCB. The completeness goal for this project is 90 percent; however, for critical samples, the completeness goal will be 95 percent. Percent completeness is expressed as '%PC', as determined from the formula:

$$\%\mathbf{PC} = \frac{\mathbf{N_A}}{\mathbf{N_1}} \times \mathbf{100}$$

N_A = actual number of valid analytical results obtained
N_1 = theoretical number of results obtainable under ideal conditions

5.5.4 Sensitivity

The MDL is defined as the minimum concentration at which a given target analyte can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. Laboratory practical quantification limits (PQLs), contract required quantification limits (CRQLs) or RLs are defined as the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. Laboratory MDLs and RLs will be used to evaluate the method sensitivity and/or applicability. MLs are for use in reporting and compliance determination. To assess the respective method capability, the project criteria listed in Table E-2 of Attachment E of the MS4 Permit for each contaminant of concern have been screened against exemplar laboratory MDLs, RLs, and MLs.

5.6 Special Training Needs/Certification

Field personnel will be properly trained in the use of monitoring equipment and clean/dirty hand sample collection and handling techniques along with all appropriate health and safety protocols prior to conducting monitoring activities. The following elements will be included in the training of field personnel:

- Review of Health and Safety Plan
- Field training

Personnel will have had prior experience performing field sampling and laboratory analyses for the type of water quality monitoring required. All Standard Operating Procedures for collection, records, handling, and analysis will be monitored by the Project and Laboratory QA/QC officers.

5.7 Documents and Records

All field observations will be recorded in standard Field Conditions Data Log sheets. The sheets will be reviewed for errors prior to leaving the sample site. Chain-of-custody (COC) forms will be completed for all water samples before the samples are delivered to the laboratory. Field sheets and COCs will be scanned and stored as an electronic PDF by the Project Manager for a minimum of five years from the time the MRP is completed. Additionally, the records saved shall include the following information:

- Site identification and location
- Date and time that sampling or measurements were taken
- Individual(s) who performed the sampling or measurements
- Analytical methods used
- Results of analyses
- Data sheets showing toxicity test results

The Laboratory Manager reviews the laboratory analytical results, verifies completeness, and logs the date of sample receipt, analysis, internal QA/QC and final reporting to the client. The reports and data are then transferred to the Project Manager and filed with all other original project documentation in order to maintain complete project records. The laboratory will provide analytical data in electronic format for maintenance and management in Microsoft® Excel® Access®. The Project Manager will semi-annually submitted to the LARWQCB as directed in MS4 Permit Attachment E Part XIV.L.

Table 4 summarizes the record retention, archival, and disposition guidelines for each type of document.

Table 4 Document and Record Retention, Archival, and Disposition Information

Records	Identify Type Needed	Retention	Archival	Disposition
Project Plan	Monitoring and Reporting Program	Paper/Electronic	Document	Minimum 5 years
	QAPP	Paper/Electronic	Document	Minimum 5 years
Field Data	Field Conditions Data Log Sheets	Paper/Electronic	Project File/PDFs	Minimum 5 years
	Photographs	Electronic	Project File	Minimum 5 years
Sample Collection Records	Chain-of-Custody	Paper/Electronic	Project File	Minimum 5 years
	Calibration and Maintenance	Paper	Project File	Minimum 3 years
	Original strip charts	Paper/Electronic	Project File	Minimum 3 years
Analytical Records	Lab Notebooks	Paper	Notebook	Minimum 5 years
	Lab Reports (include COCs)	Electronic	Notebook/Excel	Minimum 5 years
	Electronic Data File	Electronic	Database	Minimum 5 years
Assessment Records	QA/QC Assessment	Paper/Electronic	Document	Minimum 5 years
	Final Report	Paper/Electronic	Document	Minimum 5 years

6. Sampling Methods and Sample Handling

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

6.1 Sampling Process Design and Method

The monitoring plan schedule, rationale behind sampling design, and sampling design assumptions for locating and selecting environmental samples (sampling locations, frequencies, rationale for selection) are detailed in the Sections 2, 4, and 5 of the CIMP to comply with the requirements of the MS4 Permit. Additional sampling may be requested during field operations. The exact sample locations and the total number of samples may change from those established upon approval from the RWQCB.

6.2 Sample Handling

The laboratory will provide appropriate sample containers according to **Table 5**. All samples will be pre-labeled with the project name, site ID, sample type, bottle number, sampler name, preservative, and analysis. All sample bottles will also be pre-labeled with a unique Sample ID to track the sample throughout its analyses. At the time of sample collection, the sample labels will be completed in the field with the date and time. The Sample IDs will also be entered directly onto the Field Conditions Data Log Sheets and the COC Forms. The COC forms will accompany the collection of all samples.

The following sample handling protocols will be followed when collecting samples to minimize the possibility of contamination:

- New unused sample bottles will be employed. Sample bottles and bottle caps will be protected from contact with solvents, dust, or other contaminants during storage and handling.
- Samplers will make a reasonable effort to prevent large gravel and uncharacteristic floating debris from entering the sample containers. The sampler will avoid sediments disturbance from storm drain invert.
- The inside of the sampling container will not be touched to the maximum extent practicable during preparation and sampling activities.
- Vehicle engines will be turned off during sampling activities to minimize exposure of samples to exhaust fumes.
- All samples will be collected in accordance with clean sampling techniques.
- Manual water grab samples will be collected by inserting the transfer container under or down current of the direction of flow, with the container opening facing upstream.
- Once sample containers are filled, they will be promptly placed on ice, in a clean cooler (target temperature 6 degrees Celsius), in the dark and transported to the laboratory for processing to meet holding times. All necessary pre-processing for analysis, such as filtration and acidification, will take place in the laboratory by certified personnel.
- After the field crew collects and delivers the samples to the laboratory, the laboratory will conduct the analysis within appropriate holding times. These field and laboratory activities will be coordinated to make sure all samples are handled within the proper holding time.

When the laboratory receives composited water samples, laboratory technicians will dispense the sample into containers that contain the required analytical volume specified in **Table 5**. The laboratory will preserve the water samples using the appropriate preservative and the laboratory will conduct the analysis within the maximum holding time limits. Following completion of analyses, the laboratory will dispose of expired samples in a manner appropriate to local discharge laws.

Table 5 Sample Handling and Custody				
Constituent	**Container Type**	**Minimum Sample Volume**	**Preservation**	**Holding Time**
Nutrients (Water Analysis)				
TBD	*TBD*	*TBD*	*TBD*	*TBD*

6.3 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.

6.3.1 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. 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.
2. Place the sample on ice.
3. Collect the remaining samples including quality control samples, if required, using the same protocols described above.

6.3.2 Autosamplers

Automatic sample compositors (autosamplers) are used to characterize the entire flow of a storm in one analysis. They can be programmed to take aliquots at either time- or flow-based specified intervals. 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. Install pre-cleaned tubing into the pump. Clean tubing will be used at each site and for each event, in order to minimize contamination.
2. Attach strainer to intake end of the tubing and install in sampling channel.
3. If running flow based composite samples; install flow sensor in sampling channel and connect it to the automatic compositor.
4. 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 ice.
5. 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 the last sample time on the field log, as this will be used on 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 the autosampler and secure 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.

6.4 Chain of Custody

The laboratory will supply the Chain-of-Custody (COC) forms that will be utilized by the sampling team. COC procedures will be used for all samples throughout the collection, transport, and analytical process to ensure the most accurate results. COCs will be pre-printed along with the bottle labels and will contain the same data as the labels. The COCs will be completed in the field with dates, times, and sample team names, and will be cross-checked with the bottles to make sure proper samples have been collected. Documentation of sample handling and custody will include the following:

- Sample identification;
- Type of sample;
- Sample collection date and time;
- Any special notations on sample characteristics or analysis;
- Analyses to be performed;
- Initials of the sampling team member that collected the sample; and
- Date the sample was delivered to/sent to the laboratory.

The COC forms for the samples will be transported with the samples to the analytical laboratory. Sampled water will be kept properly chilled and transferred to an analytical laboratory within specified holding times. When custody of the samples is transferred to the laboratory, the COC will be signed and dated, and a PDF copy will be sent from the laboratory. An example COC form is included in **Figure 2**. The COCs will be reviewed by personnel at the receiving laboratory to make sure no samples have been lost in transport. The laboratory will also verify that each sample has been received within the appropriate holding times. COC records will be included in the final reports prepared by the analytical laboratory and are considered an integral part of the report. Analytical methods and detection limits for this project are listed in **Table 2**.

CHAIN OF CUSTODY RECORD

Company:				Phone:			Job No.														Page _____ of _____		
Project Manager:				Email:			Analysis Requested														Test Instruction & Comments		
Project Name:				Project #																			
Site Name: & Address:																							
	Sample ID	**Lab ID**	**Date**	**Time**	**Matrix**	**Container Number/Size**	**Pres.**																
1																							
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							
13																							
14																							
15																							

Sample Receipt: To Be Filled By Lab	**Turn Around Time**	Relinquished By: 1	Relinquished By: 2	Relinquished By: 3
Total Number of Containers	Normal	Signature	Signature	Signature
Custody Seals Yes No N/A	Rush	Printed Name		Printed Name
Received in Good Condition Yes No	Same Day	Date Time	Date Time	Date Time
Properly Cooled Yes No N/A	24 Hrs	Received By 1	Received By 2	Received By 3
Samples Intact Yes No N/A	48 Hrs	Signature	Signature	Signature
Samples Accepted Yes No	72 Hrs	Printed Name	Printed Name	Printed Name
		Date Time	Date Time	Date Time

Figure 2 Example Chain-of-Custody Form

6.5 Laboratory Custody Procedures

Laboratories will follow sample custody procedures as outlined in the laboratory's Quality Assurance (QA) Manual. A copy of each contract laboratory's QA Manual should be available at the laboratory upon request. Laboratories shall maintain custody logs sufficient to track each sample 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 SMB EWMP 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, remaining water samples will be stored at the laboratory for at least 60 days. After this period, samples may be disposed of properly.

7. Quality Assurance/Quality Control

This section describes the quality assurance and quality control requirements and processes. Quality control samples will be collected in conjunction with environmental samples to verify data quality. Quality control samples collected in the field will generally be collected in the same manner as environmental samples. There are no requirements for quality control for field analysis of general parameters (e.g., temperature, pH, conductivity, dissolved oxygen, and pH) outlined in the SWAMP. However, field crews will be required to calibrate equipment as outlined in **Section 2** of this Attachment. **Table 6** 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 6 Quality Control Requirements

QC 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	1 per Sampling Event	< 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.

Table 6 Quality Control Requirements

QC Sample Type	QA Parameter	Frequency[1]	Acceptance Limits	Corrective Action
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).
2. Equipment blanks will be collected by the field crew before using the equipment to collect sample.
3. Or control limits set at + 3 standard deviations based on actual laboratory data.

7.1 QA/QC Requirements and Objectives

Quality assurance/quality control requirements include comparability, representativeness, and completeness. Each of these requirements is summarized in the subsections below.

7.1.1 Comparability

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

7.1.2 Representativeness

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

7.1.3 Completeness

Data completeness is an assessment of the cumulative number of successfully collected and validated data relative to the amount of data planned for collection during 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 LAR UR2 WMA 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.

Reasonable data objectives are desirable 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 3**, 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.

7.2 QA/QC Field Procedures

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

7.2.1 Equipment Blanks

The purpose of 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.

7.2.2 Field Blanks

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

- At a frequency of one per sampling event for: 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 6**), further collection and analysis of field blanks for other media and analytes need only be performed on an as-needed basis, or during annual performance audits.

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 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.

7.2.3 Field Duplicates

The purpose of analyzing field duplicates is to demonstrate the precision of sampling and analytical processes. Field duplicates will be prepared at the rate of 5% of all samples, and analyzed along with the associated environmental samples. Field duplicates will consist of two 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 6** 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.

7.3 QA/QC Laboratory Analyses

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

7.3.1 Method Blanks

The purpose of analyzing method blanks is to demonstrate that sample preparation and analytical procedures do not result in sample contamination. Method blanks will be prepared and analyzed by the

contract laboratory at a rate of at least one for each analytical batch. Method blanks will consist of laboratory-prepared blank water processed along with the batch of environmental samples. If the result for a single method blank is greater than the MDL, or if the average blank concentration plus two standard deviations of three or more blanks is greater than the RL, the source(s) of contamination should be corrected, and the associated samples should be reanalyzed.

7.3.2 Laboratory Duplicates

The purpose of analyzing laboratory duplicates is to demonstrate the precision of the sample preparation and analytical methods. Laboratory duplicates will be analyzed at the rate of one pair per sample batch. Laboratory duplicates will consist of duplicate laboratory fortified method blanks. If the RPD for any analyte is greater than the percentage stated in **Table 6** 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.

7.3.3 Matrix Spikes and Matrix Spike Duplicates

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

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

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

7.3.4 Laboratory Control Samples

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

7.3.5 Surrogate Spikes

Surrogate recovery results are used to evaluate the accuracy of analytical measurements for organics analyses on a sample-specific basis. A surrogate is a compound (or compounds) added by the laboratory to method blanks, samples, matrix spikes, and matrix spike duplicates prior to sample preparation, as specified in the analytical methodology. Surrogates are generally brominated, fluorinated or isotopically

labeled compounds that would rarely be present in environmental media. Results are expressed as percent recovery of the surrogate spike.

7.4 Review of Procedures

Data collected from the aforementioned processes will be regularly reviewed against the Data Quality Objectives in Section 5.5. In the event of suspect data or failed checks, corrective action will be taken. Corrective actions will verify the procedures done and review analytical techniques. If any issues are found, errors will be corrected, when possible. The sample will also be re-analyzed, when possible.

8. Instrument/Equipment Testing, Inspection, and Maintenance

All field testing equipment used in monitoring and sampling will be tested, operated, and maintained according to the manufacturer's specifications and associated SOPs. Probes will be inspected for any deficiencies and corrective action will be taken for any problems that arise. All equipment will also be cleaned and inspected before and after each sampling event. Field personnel will be trained in the operation and maintenance of instruments and equipment.

Laboratories will test, inspect, and maintain equipment in accordance with laboratory SOPs and QA procedures, which include those specified by the manufacturer. The laboratory will document and resolve any issues that arise. The Laboratory Manager will oversee testing, inspection, and maintenance of laboratory equipment. The Project QA Officer will review all laboratory procedures to ensure compliance with project requirements.

9. Instrument/Equipment Calibration and Frequency

All instruments and equipment will be calibrated daily or prior to each usage event according to the manufacturer's specifications and/or associated SOPs. Calibration will be done by trained personnel. If the calibration is unsuccessful, the instrument will be cleaned and parts will be replaced until calibration is successful. If calibration cannot be completed successfully, the Project Director will be notified and any sampling or analysis will be postponed until the problem is resolved. Any affected data will be flagged. Documentation of all calibration will be maintained in a log book appropriate to the equipment.

10. Inspection/Acceptance of Supplies and Consumables

All glassware, sample bottles, and collection equipment will be inspected upon receipt and prior to use. Supplies will be sourced from the accredited laboratory. The Sampling Manager and Laboratory Manager will oversee the inventory of sampling supplies and reorder when necessary. Logs will be maintained for all supplies used and any deficiencies will be recorded.

Upon receipt, buffer solutions, standards, reagents, and field test kits used will be inspected for leaks or broken seals. Reagents will be replaced before they exceed the manufacturer's recommended shelf life. Bottles and glassware will be inspected for sterility and structural integrity prior to use. All inspections will occur according to individual SOPs. Test organisms will be maintained and inspected for health prior to testing.

11. Non-Direct Measurements

Section 1 of the CIMP details existing and past monitoring programs relevant to the region. Based on the review of past monitoring programs, monitoring data for the LAR UR2 WMA is limited. Due to the limitations, compliance evaluation cannot be achieved. LAR UR2 WMA will analyze all constituents listed in Table E-2 of the MS4 Permit. Photo documentation, topographical maps, land use, and hydrological maps from Los Angeles County and individual cities within LAR UR2 WMA will be requested for use when appropriate.

All of the study data will be generated directly by the CIMP. However, any new data involving water quality and flow from other sources will be reviewed against the data quality objectives listed in Section A5 of this document and only data which meet all of the criteria will be used when appropriate. The SOP and QAPP involved for the external sources will also be reviewed to ensure that the data is valid. Questionable data will be rejected. Data obtained from this method will be integrated with study data to evaluate compliance with the MS4 permit.

12. Data Management

The Sampling Manager will be responsible for the proper management of field measurement and observation data. The Sampling Manager will review all Field Conditions Data Log Sheets for completeness and maintain the original hardcopies in the project file. All data sheets will be signed by the Sampling Manager after review. The Field Conditions Data Log Sheet responses will also be manually entered into an electronic version of the Field Conditions Data Log Sheet and these fields will be saved into a database. The data will be checked for accuracy before being saved in the database. Photographs of the monitoring sites taken by field personnel will be uploaded into the project file. Field team members will name the photographs using the photograph naming convention developed specifically for this project.

The Laboratory Manager will be responsible for the proper management of laboratory data. The laboratory will conduct quality control checks on the data per laboratory QA/QC procedures, and record the data electronically. The results of the analysis will be sent to Project Manager in the form of a hard copy and electronic copy. The Project Manager will review the data for completeness and errors. The results will then be filed with the project data and recorded in the database. All original documentation such as lab notes will be kept with project files in a secure location.

13. Assessment and Response Actions

The Project Manager will oversee day-to-day activities within the project. The QA Officer will oversee all QA/QC activities within the project and ensure that procedures are being followed. The Sampling Manager will regularly review procedures in reference to the QAPP to ensure that all elements of it are being implemented correctly. The use of approved equipment and methods when obtaining water samples and conducting field measurements will be verified for proper techniques following SOPs in cleaning, inspection, maintenance, calibration, and sampling. Equipment quality and record keeping techniques will also be reviewed. All documentation will be reviewed before leaving the sample sites to ensure that the data is complete and accurate. If there are any issues presented, the Sampling Manager will review the necessary procedures with the field technician(s) and take any necessary corrective action. The sample will be re-collected and noted, if possible. If not, the error will be noted in the sample documents. In the event of a situation that may affect the integrity of the data, the field technician(s) will contact the Project Manager or QA Officer to determine the corrective actions necessary. The issue and actions taken will be documented in the project file.

The Laboratory QA Specialist will periodically review procedures in the analysis of samples and verify proper techniques following SOPs in cleaning, inspection, maintenance, calibration, and analysis. Equipment and record keeping will also be reviewed. The QA Specialist will also review QA/QC of all data generated from analysis in the lab. If in any case the data is deemed erroneous, the samples will be re-analyzed when possible, and the error will be noted with the analysis results. The QA Specialist will review procedures and take corrective action for issues that lead to the error. The Project Manager will be notified of any issues that occur in the laboratory. All actions taken will be documented and submitted to the QA officer for filing.

The QA officer will manage all activities and has the authority to halt all sampling and analytical work if deviations are detrimental to the quality of the data. The QA Officer may follow up and inspect results when deemed necessary.

14. Reports to Management

The field monitoring data, calibration records, and other quality assurance/quality control forms will be reviewed for completeness, correctness and other errors by the Project Manager on a regular basis. The laboratory results will be reviewed by the Laboratory Manager prior to the release of results to the Project Manager and consultant team. The laboratory submission will be signed as a confirmation of completeness and correctness of the procedures and results of the analysis.

Results of monitoring from each receiving water or outfall based monitoring station conducted in accordance with the Standard Operating Procedures under Standard Provision 14 of Attachment E will be submitted semi-annually to the Regional Water Board's Storm Water website. Results in excess of limitations, action levels, and aquatic toxicity thresholds will be highlighted. The data will be in the Southern California Municipal Storm Water Monitoring Coalition's Standardized Data Transfer Format. Additionally, the results will be included in an annual monitoring report to be submitted to the Regional Water Board Executive Officer as outlined in **Table 7**.

Table 7 Reports to Program Management

Type of Report	Frequency	Projected Delivery Date (s)	Person(s) Responsible for Preparation	Report Recipients
TBD	*TBD*	*TBD*	*TBD*	*TBD*

15. Data Review, Verification and Validation

Data generated by project activities will be reviewed against the DQO listed in Section 5.5 and the quality assurance/quality control practices cited in Section 7.0. The field and laboratory personnel, as well as the QA Officers will be responsible for verifying that the sample collection, handling, and analysis were done in accordance with the approved QAPP. Field and laboratory personnel will review any calculation, transcription, recording, and transformation of the data for correctness and completeness. In addition, the QA officer will be primarily responsible for reviewing the data for completeness and compliance with necessary requirements such as method or contractual specifications.

If the data meets all quality and QA/QC objectives, the data will be qualified as acceptable for the project. If the results fail to meet any DQO, the results will be flagged by the Laboratory QA Specialist and/or the Project QA Officer for further review. Batch QA samples will be reviewed to determine the potential cause of failure to meet the DQO. If the cause cannot be readily ascertained, reserve samples will be reanalyzed, provided they are within the appropriate sample holding time. If samples fail to meet the DQOs a second time, or the cause of failure cannot be identified and rectified, the data will be excluded from the study results. All rejected data will be retained in the project database, qualified as rejected data. Data that is only accepted after further review will be flagged as such.

15.1 Verification and Validation Methods

Data verification is the process of evaluating the completeness, correctness, and conformance of the dataset against the method, procedural, or contractual requirements. Data quality indicators will be continuously monitored by the analyst producing the data (field and lab personnel), as well as the Reporting and Laboratory Manager and Sampling Manager, with assistance from the QA Officer, throughout the project to make sure corrective actions are taken in a timely manner. Laboratory and field personnel responsible for conducting QA analysis will be responsible for documenting when data does not meet measurement quality objectives as determined by data quality indicators.

In coordination with the QA Officer, the Sampling Manager will validate and verify field measurements and activities (sample collection and handling) and the Laboratory QA Specialist will validate and verify laboratory analysis (sample analysis and handling). Following sample delivery, the laboratory will maintain COCs and sample manifests. Laboratory validation and verification of the data generated is the responsibility of the laboratory. The Laboratory Manager maintains analytical reports in a database format as well as all QA/QC documentation for the laboratory. The Laboratory QA Specialist will perform checks of all of its records.

The Laboratory and Sampling Managers are responsible for oversight of data collection and the analysis of the raw data obtained from the field and the laboratory. Reconciliation and correction of data that fails to meet the DQOs will be done by the responsible manager in consultation with the project QA Officer and the Project Manager. Corrections require a unanimous agreement that the correction is appropriate.

Data verification and validation of field sample collection and handling consists of the following tasks:

- Verification that the sampling activities, sample locations, number of samples collected, and type of analysis performed is in accordance with QAPP requirements.
- Documentation of any field changes or discrepancies.
- Verification that the field activities (including sample location, sample type, sample date and time, name of field personnel. etc) were properly documented.
- Verification of sample labels, COCs forms, and secure storage of samples.

Data verification and validation for the laboratory sample analysis and handling activities will include the following tasks:

- Verification that all samples recorded on COCs forms were received by the laboratory.
- Verification that the appropriate analytical methodology has been followed.
- Verification that QC samples meet performance criteria.
- Verification that analytical results and documentation are complete.

Verification and validation of data entry includes:

- Sorting data to identify missing or mistyped (too large or too small) values.
- Double-checking all typed values.
- Data is entered in the proper format for each database fields (i.e., text for text, integers for integers, number for numbers, dates for dates, times for times, etc.).

15.2 Reconciliation with User Requirements

The data quality will be evaluated according to this document with respect to the sampling design, sampling methods, field and laboratory analyses, quality control, and maintenance. By properly following the guidelines in this document and references, the data quality will be validated. If samples or procedures used in this study fail to meet the guidelines listed in this document, the data will be flagged and reported to the Project Manager. The limitations and assumptions of the data will be provided to the end-user to allow the user to determine the data's usefulness.

The end-user will use this data to determine the compliance of the MS4 discharges within the management area. This data will help to characterize pollutant loads and identify the sources responsible for pollutants. The results will identify areas where the permittees must refine and improve pollutant control measures. Any pollutants found in excess of maximum levels will require continuous monitoring for the remainder of the life of the permit. A summary of this will be published in an annual report, to be submitted to the Regional Water Board.

16. References

California Regional Water Quality Control Board, Los Angeles Region. "Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges Within the Coastal Watersheds of Los Angeles County, Except Those Discharges Originating from the City of Long Beach MS4." California Environmental Protection Agency. 2012 November 8.

California Watershed Engineering (CWE). "Quality Assurance Project Plan for City of Carson Machado Lake Nutrient TMDL Monitoring and Reporting Plan." 2011 October 27.

Nagoda, C. and L. Busse. "Quality Assurance Project Plan for Screening of cyanotoxins in lakes/reservoirs and coastal wetlands in the San Diego Region." San Diego Regional Water Quality Control Board. 2013 June 11.

Nichol, G. and E. Reyes. "Electronic Template for SWAMP-Compatible Quality Assurance Project Plans." California Environmental Protection Agency. 24 March 2004.

State Water Resources Control Board. "Quality Assurance/Quality Control." California Environmental Protection Agency. 31 January 2014. http://www.swrcb.ca.gov/water_issues/programs/quality_assurance/index.shtml

Thermo Scientific. "Applications Tip of the Week: Laboratory Duplicates and Matrix Spike Duplicates." http://static.fishersci.com/cmsassets/downloads/segment/Scientific/pdf/WaterAnalysis/Log113TipLaboratoryDuplicatesMatrixSpikeDuplicates.pdf. 21 December 2011.

United States Environmental Protection Agency, Office of Water Engineering and Analysis Division (4303). Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels. July 1996

United States Environmental Protection Agency, Region 6. Tribal Water Quality Monitoring QAPP Template Table of Contents. http://www.epa.gov/region6/qa/qatools.htm. June 2014

Appendix F

Summary of Laboratory Capabilities in Relation to Permit Minimum Levels

Summary of Laboratory Capabilities

Analytical Method	Analyte	Permit ML	Unit	Advanced Technology Laboratories			BSK Associates		CalScience Laboratories			ES Babcock			Orange Coast			Weck Labs	
				PQL	MDL	Comment	MRL	MDL	RL	MDL	Comment	MRL	MDL	Comment	MRL	MDL	Comment	MRL	MDL
Conventional Pollutants																			
EPA 1664A	Oil and Grease	5	mg/L	2	1.9		5	0.718				2.5	0.92					5	1.3
EPA 413.2	Oil and Grease	5	mg/L						1	0.33									
SM 5220B	Oil and Grease	5	mg/L				5	0.718							5	2.64			
EPA 420.1	Total Phenols	0.1	mg/L	0.03	0.02		[a]	[a]	0.1	0.046					0.5[b]	0.033[b]	0.1 possible	0.01	0.0042
EPA 420.4	Total Phenols	0.1	mg/L				[a]	[a]				0.02	0.016						
SM 4500-CN-E	Cyanide	0.005	mg/L	0.0005	0.00019		0.005	0.0017	0.001	0.00069		0.005	0.0049		0.02[a]	0.0059[a]			
ASTM D7511	Cyanide	0.005	mg/L															0.002	0.00048
SM 4500-H+ B	pH	0 - 14	pH	0.1	0.1	Field test	[a]	[a]	0.01	0.01		1	1		0-14	0-14		0.1	0.1
SM 2550B	Temperature	N/A	C	N/A	N/A	Field test	[a]	[a]				1	1						
SM 4500-O G	Dissolved Oxygen	Sensitivity to 5	mg/L	1	1	Field test	[a]	[a]	0.01	0.01		0.1	0.1		0.1	0.1		1	0.5
Bacteria (single sample limits)																			
SM9221B	Total coliform (marine waters)	10,000	MPN/100ml	[a]	[a]		2		1	1		2	2		[a]	[a]	contract	2	
SM9221B/E	Enterococcus (marine waters)	104	MPN/100ml	[a]	[a]		[a]	[a]	1	1					[a]	[a]	contract	1	
SM 9230B	Enterococcus (marine waters)	104	MPN/100ml	[a]	[a]		[a]	[a]				2	2		[a]	[a]	contract		
SM 9221E	Fecal coliform (marine & fresh waters)	400	MPN/100ml	[a]	[a]		2					2	2		[a]	[a]	contract	2	
SM9230B	Fecal coliform (marine & fresh waters)	400	MPN/100ml	[a]	[a]				1	1					[a]	[a]	contract		
SM 9221E	E. coli (fresh waters)	235	MPN/100ml	[a]	[a]							2	2		[a]	[a]	contract		
SM9221B/F	E. coli (fresh waters)	235	MPN/100ml	[a]	[a]		2		1	1					[a]	[a]	contract	2	
General																			
SM 4500-P E	Dissolved Phosphorus	0.05	mg/L				0.01	0.007											
SM 4500-P E	Dissolved Phosphorus	0.05	mg/L	0.01	0.01				0.1[b]	0.026[b]					0.05	0.0076		0.01	0.00083
SM 4500-P B	Dissolved Phosphorus	0.05	mg/L									0.05	0.014						
SM 4500-P E	Total Phosphorus	0.05	mg/L	0.01	0.01				0.1[b]	0.022[b]					0.05	0.0076		0.01	0.0014
SM 4500-P B	Total Phosphorus	0.05	mg/L									0.05	0.014						
EPA 365.4	Total Phosphorus	0.05	mg/L				0.01	0.0068											
SM 2130 B	Turbidity	0.1	NTU			Field test	0.1	N/A	0.05	0.044		0.2	0.1						
EPA 180.1	Turbidity	0.1	NTU	0.1	0.1	Field test									0.5	0.064		0.1	0.024
SM 2540D	Total Suspended Solids	2	mg/L	1	1		5[b]	N/A	1	0.95		5[a]	2.8[a]	may reach with J flag or out of reach	2	2		2	

Summary of Laboratory Capabilities

Analytical Method	Analyte	Permit ML	Unit	Advanced Technology Laboratories			BSK Associates		CalScience Laboratories			ES Babcock			Orange Coast			Weck Labs	
				PQL	MDL	Comment	MRL	MDL	RL	MDL	Comment	MRL	MDL	Comment	MRL	MDL	Comment	MRL	MDL
SM 2540C	Total Dissolved Solids	2	mg/L	10[a]	10[a]		1	N/A	1	0.82		10[a]	5.5[a]	may reach with J flag or out of reach	10[a]	7.99[a]		10[a]	4[a]
SM 2540E	Volatile Suspended Solids	2	mg/L	10[a]	5[a]		5[b]	N/A	1	1								[a]	[a]
EPA 160.4	Volatile Suspended Solids	2	mg/L	10[a]	5[a]							5[a]	5[a]	may reach with J flag or out of reach	5[a]	3.1[a]		5[a]	3.1[a]
SM 5310B	Total Organic Carbon	1	mg/L	0.3	0.09		0.2	0.047	0.5	0.24		0.7	0.16		1	0.388			
EPA 1664A	Total Petroleum Hydrocarbon	5	mg/L	2	0.61		1	0.72	1	0.8					5			[a]	[a]
EPA 418.1	Total Petroleum Hydrocarbon	5	mg/L						1	0.95		1	0.5						
SM 5210 B	Biochemical Oxygen Demand	2	mg/L	5[a]	5[a]		1	N/A	1	0.58		2	1		2	2		2	2
EPA 410.4	Chemical Oxygen Demand	20-900	mg/L	5	4.4		3	N/A							15	3.5		5	0.73
SM 5220 C	Chemical Oxygen Demand	20-900	mg/L						5	4.8									
SM 5220 D	Chemical Oxygen Demand	20-900	mg/L				3	1.1				10	6.3						
SM 4500-NH3 C	Total Ammonia-Nitrogen	0.1	mg/L	0.03	0.02		0.1	0.029	0.1	0.067		0.1	0.059		0.05	0.0345		0.1	0.048
EPA 351.2	Total Kjeldahl Nitrogen	0.1	mg/L	0.1	0.05		0.1	0.055	0.2[b]	0.047[b]		0.1	0.063		0.1			0.1	0.05
SM4500-NH3 C	Total Kjeldahl Nitrogen	0.1	mg/L	0.1	0.05										0.1				
SM 4500-NO3 F	Nitrate-Nitrite	0.1	mg/L	0.1	0.03		0.1	0.033	0.1	0.029		0.2[a]	0.11[a]	may reach with J flag or out of reach	0.1			0.1	0.02
SM 2320B	Alkalinity	2	mg/L	5[b]	1.6[b]		3[b]	N/A				3[b]	1.7[b]	may reach with J flag or out of reach	2	4.75		2	0.56
EPA 120.1	Specific Conductance	1	umho/cm	0.1	0.1	Field test	1	N/A							10	0.44			
SM 2510 B	Specific Conductance	1	umho/cm			Field test			1	0.5		1	1					1	0.23
SM 2340C	Total Hardness	2	mg/L	2	0.45				2	0.99					1	0.799			
SM 2340B/EP	Total Hardness	2	mg/L									3[b]	0.5[b]	may reach with J flag or out of reach					
EPA 200.7	Total Hardness	2	mg/L				0.1	0.0455										0.1	0.016
SM 5540C	MBAS	0.5	mg/L	0.05	0.02		0.05	0.0055	0.1	0.064		0.05	0.035		0.05	0.0477		0.05	0.019
EPA 300.0	Chloride	2	mg/L	0.5	0.05		1	0.45	1	0.12		1	1		0.1	0.033		0.5	0.1
EPA 300.0	Fluoride	0.1	mg/L	0.1	0.06				0.1	0.025					0.1	0.015		0.1	0.02
SM 4500-F C	Fluoride	0.1	mg/L				0.1	0.015				0.1	0.05						

Summary of Laboratory Capabilities

Analytical Method	Analyte	Permit ML	Unit	Advanced Technology Laboratories			BSK Associates		CalScience Laboratories			ES Babcock			Orange Coast			Weck Labs	
				PQL	MDL	Comment	MRL	MDL	RL	MDL	Comment	MRL	MDL	Comment	MRL	MDL	Comment	MRL	MDL
EPA 624	Methyl tertiary butyl ether (MTBE)	1	mg/L	0.0005	0.000259				0.0005	0.000059	524.2	0.003	0.00043					1	0.25
EPA 8260B	Methyl tertiary butyl ether (MTBE)	1	mg/L				0.5	0.1							1	0.2			
EPA 314.0	Perchlorate	4	µg/L	2	0.91		2	0.18				4	0.49		2	0.391		2	0.95
EPA 331.0 (M)	Perchlorate	4	µg/L						0.1	0.021									
Metals (Total & Dissolved)																			
EPA 200.8	Aluminum	100	µg/L	5	7.6		5	2.9							5	0.354		5	2.1
EPA 200.7	Aluminum	100	µg/L									100	25						
EPA 1640	Aluminum	100	µg/L						1	0.227									
EPA 200.8	Antimony	0.5	µg/L	0.5	0.11		0.5	0.34				0.5	0.25		0.5	0.0155		0.5	0.034
EPA 1640	Antimony	0.5	µg/L						0.05	0.0154									
EPA 200.8	Arsenic	1	µg/L	1	0.93		0.1	0.041				1	0.5		0.5	0.277		0.4	0.13
EPA 1640	Arsenic	1	µg/L						0.03	0.0122									
EPA 200.8	Beryllium	0.5	µg/L	0.5	0.11		0.5	0.36				0.5	0.25		0.1	0.0122		0.1	0.015
EPA 1640	Beryllium	0.5	µg/L						0.5	0.0635									
EPA 200.8	Cadmium	0.25	µg/L	0.5[b]	0.07[b]		0.25	0.025				0.25	0.12		0.1	0.0169		0.1	0.017
EPA 1640	Cadmium	0.25	µg/L						0.03	0.00567									
EPA 218.6	Chromium (Hexavalent)	5	µg/L	0.2	0.06		0.2	0.027				1	0.013		0.3			0.3	0.0048
EPA 7199	Chromium (Hexavalent)	5	µg/L						1	0.067									
EPA 200.8	Chromium (total)	0.5	µg/L	0.5	0.21		0.5	0.17				0.5	0.4		0.5	0.0702		0.2	0.024
EPA 1640	Chromium (total)	0.5	µg/L						0.5	0.164									
EPA 200.8	Copper	0.5	µg/L	1[b]	0.18[b]		0.5	0.33				0.5	0.4		0.1	0.0375		0.5	0.036
EPA 1640	Copper	0.5	µg/L						0.03	0.00898									
EPA 200.8	Iron	100	µg/L	10	5.7		10	0.61							10	1.86			
EPA 200.7	Iron	100	µg/L									50	2.3					0.01	0.011
EPA 1640	Iron	100	µg/L						0.5	0.0634									
EPA 200.8	Lead	0.5	µg/L	1[b]	0.08[b]		0.1	0.034				0.5	0.25		0.1	0.0745		0.2	0.024
EPA 1640	Lead	0.5	µg/L						0.03	0.0135									
EPA 245.1	Mercury	0.5	µg/L	0.2	0.06													0.05	0.0039
EPA 200.8	Mercury	0.5	µg/L				0.2	0.091							1[b]	0.02[b]			
EPA 200.8	Mercury	0.5	µg/L									0.2	0.033						
EPA 7470A	Mercury	0.5	µg/L						0.2	0.0453									
EPA 200.8	Nickel	1	µg/L	1	0.12		1	0.05				1	0.5		0.5	0.0326		0.8	0.091
EPA 1640	Nickel	1	µg/L						0.05	0.00607									
EPA 200.8	Selenium	1	µg/L	5[b]	0.28[b]		1	0.14				1	0.5		0.5	0.18		0.04	0.081
EPA 1640	Selenium	1	µg/L						0.05	0.0121									
EPA 200.8	Silver	0.25	µg/L	0.5[b]	0.08[b]		0.25	0.2				0.25	0.12		0.5[b]	0.0581[b]		0.2	0.012
EPA 1640	Silver	0.25	µg/L						0.05	0.00822									
EPA 200.8	Thallium	1	µg/L	0.5	0.09		1	0.21				1	0.5		0.5	0.0119		0.2	0.034

Summary of Laboratory Capabilities

Analytical Method	Analyte	Permit ML	Unit	Advanced Technology Laboratories			BSK Associates		CalScience Laboratories			ES Babcock			Orange Coast			Weck Labs	
				PQL	MDL	Comment	MRL	MDL	RL	MDL	Comment	MRL	MDL	Comment	MRL	MDL	Comment	MRL	MDL
EPA 1640	Thallium	1	µg/L						0.03	0.0087									
EPA 200.8	Zinc	1	µg/L	10[a]	4.8[a]		1	0.45				1	0.66		1	0.356		1	0.5
EPA 1640	Zinc	1	µg/L						0.5	0.0736									
Semivolatile Organic Compounds																			
Acids																			
EPA 625	2-Chlorophenol	2	µg/L	5[b]	1.6[b]		0.5	0.11	0.5	0.13		2	1.8					1	0.28
EPA 8270	2-Chlorophenol	2	µg/L												2	0.02			
EPA 625	4-Chloro-3-methylphenol	1	µg/L	5[a]	2.4[a]		0.5	0.1	0.5	0.12		1	1					1	0.23
EPA 8270	4-Chloro-3-methylphenol	1	µg/L												1	0.06			
EPA 625	2,4-Dichlorophenol	1	µg/L	5[a]	2.1[a]		0.5	0.1	0.5	0.12		1	1					1	0.26
EPA 8270	2,4-Dichlorophenol	1	µg/L												1	0.02			
EPA 625	2,4-Dimethylphenol	2	µg/L	5[b]	2[b]		0.5	0.15	1	0.22		1	1					1	0.3
EPA 8270	2,4-Dimethylphenol	2	µg/L												2	0.06			
EPA 625	2,4-Dinitrophenol	5	µg/L	50[b]	3.5[b]		1	0.27	5	1.3		5	1.6					5	1.6
EPA 8270	2,4-Dinitrophenol	5	µg/L												5	0.5			
EPA 625	2-Nitrophenol	10	µg/L	10	3		0.5	0.21	0.5	0.11		10	2.1					1	0.26
EPA 8270	2-Nitrophenol	10	µg/L												5	0.02			
EPA 625	4-Nitrophenol	5	µg/L	50[b]	2.1[b]		1	0.26	10[b]	0.52[b]		5	1.1					5	0.45
EPA 8270	4-Nitrophenol	5	µg/L												5	0.5			
EPA 625	Pentachlorophenol	2	µg/L	20[b]	2.3[b]		0.5	0.2	0.5	0.13		1	1					1	0.19
EPA 8151A	Pentachlorophenol	2	µg/L									0.6	0.42						
EPA 515.3	Pentachlorophenol	2	µg/L				0.2	0.011											
EPA 8270	Pentachlorophenol	2	µg/L												2	0.04			
EPA 625	Phenol	1	µg/L	10[b]	0.78[b]		0.5	0.1	0.5	0.06		1	1					1	0.16
EPA 8270	Phenol	1	µg/L												1	0.02			
EPA 625	2,4,6-Trichlorophenol	10	µg/L	10	3		0.5	0.14	0.5	0.15		10	1.9					1	0.22
EPA 8270	2,4,6-Trichlorophenol	10	µg/L												5	0.02			
Base / Neutral																			
EPA 625	Acenaphthene	1	µg/L	10[b]	0.72		0.01	0.004										1	0.4
EPA 625 SIM	Acenaphthene	1	µg/L									0.05	0.05					0.1	0.1
8310/8270SIM	Acenaphthene	1	µg/L						0.2	0.021					0.05	0.03			
EPA 625	Acenaphthylene	2	µg/L	10[b]	0.52[b]		0.01	0.0023										1	0.1
8310/8270SIM	Acenaphthylene	2	µg/L						0.2	0.018					0.05	0.005			
EPA 625 SIM	Acenaphthylene	2	µg/L									0.05	0.05					0.1	0.1
EPA 625	Anthracene	2	µg/L	10[b]	0.54[b]		0.01	0.002										1	0.34
EPA 625 SIM	Anthracene	2	µg/L									0.05	0.05					0.1	0.1
8310/8270SIM	Anthracene	2	µg/L						0.2	0.034					0.05	0.02			
EPA 625	Benzidine	5	µg/L	5	1.2		5	1.4	5	2.2		5	5					5	3.7
8270	Benzidine	5	µg/L												5	0.2			

Summary of Laboratory Capabilities

Analytical Method	Analyte	Permit ML	Unit	Advanced Technology Laboratories			BSK Associates		CalScience Laboratories			ES Babcock			Orange Coast			Weck Labs	
				PQL	MDL	Comment	MRL	MDL	RL	MDL	Comment	MRL	MDL	Comment	MRL	MDL	Comment	MRL	MDL
EPA 625	1,2 Benzanthracene	5	µg/L	10[b]	0.54[b]	Benzo(a)Ant						0.05	0.05						
8310/8270SIM	Benz(a)anthracene	5	µg/L			1,2 Benzan			0.2	0.024					0.05	0.02			
EPA 625	Benzo(a)pyrene	2	µg/L	10[b]	1.8[b]		0.01	0.0033										1	0.13
EPA 625 SIM	Benzo(a)pyrene	2	µg/L									0.05	0.05					0.1	0.1
EPA 525.2	Benzo(a)pyrene	2	µg/L									0.1	0.09						
8310/8270SIM	Benzo(a)pyrene	2	µg/L						0.2	0.036					0.05	0.02			
EPA 625	Benzo(g,h,i)perylene	5	µg/L	10[b]	0.76[b]		0.01	0.0038										2	0.1
EPA 625 SIM	Benzo(g,h,i)perylene	5	µg/L									0.05	0.05					0.1	0.1
8310/8270SIM	Benzo(g,h,i)perylene	5	µg/L						0.2	0.022					0.05	0.03			
EPA 625	3,4 Benzoflouranthene	10	µg/L	10	0.58	Benzo(b)fluor	10	0.00207				0.05	0.05						
8310/8270SIM	Benzo(b)fluoranthene	10	µg/L			3,4 Benzofluoranth			0.2	0.025					0.05	0.02			
EPA 625	Benzo(k)flouranthene	2	µg/L	10[b]	0.62[b]		0.01	0.0028										1	0.22
8310/8270SIM	Benzo(k)fluoranthene	2	µg/L						0.2	0.023					0.05	0.02			
EPA 625 SIM	Benzo(k)flouranthene	2	µg/L									0.05	0.05					0.1	0.1
EPA 625	Bis(2-Chloroethoxy) methane	5	µg/L	10[b]	0.58[b]		0.5	0.1	0.5	0.066		5	1.8					1	0.25
8270	Bis(2-Chloroethoxy) methane	5	µg/L												5	0.07			
EPA 625	Bis(2-Chloroisopropyl) ether	2	µg/L	2	1.2		0.5	0.12	0.5	0.068		2	1.9					1	0.38
8270	Bis(2-Chloroisopropyl) ether	2	µg/L												2	0.03			
EPA 625	Bis(2-Chloroethyl) ether	1	µg/L	5[b]	1.2[b]		0.5	0.15	0.5	0.096		1	1					1	0.27
8270	Bis(2-Chloroethyl) ether	1	µg/L												1	0.03			
EPA 625	Bis(2-Ethylhexyl) phthalate	5	µg/L	10[b]	0.63[b]		1	0.29	5	0.91		5	2.3					5	2.3
8270	Bis(2-Ethylhexyl) phthalate	5	µg/L												3	0.06			
EPA 625	4-Bromophenyl phenyl ether	5	µg/L	10[b]	0.54[b]		0.5	0.1	5	1.4		5	1.6					1	0.36
8270	4-Bromophenyl phenyl ether	5	µg/L												5	0.04			
EPA 625	Butyl benzyl phthalate	10	µg/L	10	0.56		0.5	0.1	5	1.2		10	1.6					1	0.18
8270	Butyl benzyl phthalate	10	µg/L												5	0.03			
EPA 625	2-Chloroethyl vinyl ether	1	µg/L						1	0.36		5[b]	1[b]	may reach with J flag or out of reach					
EPA 624	2-Chloroethyl vinyl ether	1	µg/L	0.5	0.27		1	0.39											
8260	2-Chloroethyl vinyl ether	1	µg/L												1	0.2			
EPA 625	2-Chloronaphthalene	10	µg/L	10	0.5		0.5	0.1	5	1.4		10	1.8					1	0.45
8270	2-Chloronaphthalene	10	µg/L												5	0.04			

Summary of Laboratory Capabilities

Analytical Method	Analyte	Permit ML	Unit	Advanced Technology Laboratories			BSK Associates		CalScience Laboratories			ES Babcock			Orange Coast			Weck Labs	
				PQL	MDL	Comment	MRL	MDL	RL	MDL	Comment	MRL	MDL	Comment	MRL	MDL	Comment	MRL	MDL
EPA 625	4-Chlorophenyl phenyl ether	5	µg/L	10[b]	0.59[b]		0.5	0.23	5	1.3		5	1.8					1	0.41
8270	4-Chlorophenyl phenyl ether	5	µg/L												5	0.05			
EPA 625	Chrysene	5	µg/L	10[b]	0.56[b]		0.01	0.0011										1	0.19
EPA 625 SIM	Chrysene	5	µg/L									0.05	0.05					0.1	0.1
8310/8270SIM	Chrysene	5	µg/L						0.2	0.019					0.05	0.02			
EPA 625	Dibenzo(a,h)anthracene	0.1	µg/L	10[b]	0.72[b]		0.01	0.0031										2	0.08
EPA 625 SIM	Dibenzo(a,h)anthracene	0.1	µg/L									0.05	0.05					0.1	0.1
8310/8270SIM	Dibenzo(a,h)anthracene	0.1	µg/L						0.2[b]	0.027[b]					0.05	0.01			
EPA 625	1,3-Dichlorobenzene	1	µg/L	10[b]	0.56[b]		0.5	0.1	1	0.27								1	0.53
EPA 624	1,3-Dichlorobenzene	1	µg/L									0.5	0.15						
8270	1,3-Dichlorobenzene	1	µg/L												1	0.03			
EPA 625	1,4-Dichlorobenzene	1	µg/L	10[b]	0.66[b]		0.5	0.1	1	0.29		1	1					1	0.55
EPA 624	1,4-Dichlorobenzene	1	µg/L									0.5	0.072						
8270	1,4-Dichlorobenzene	1	µg/L												1	0.03			
EPA 625	1,2-Dichlorobenzene	1	µg/L	10	0.65		0.5	0.1	1	0.23		2	1.8					1	0.57
EPA 624	1,2-Dichlorobenzene	1	µg/L	0.5	0.44							0.5	0.2						
8270	1,2-Dichlorobenzene	1	µg/L												1	0.02			
EPA 625	3,3-Dichlorobenzidine	5	µg/L	5	3.3		1	0.54	5	1.2		5	2.1					5	1.2
8270	3,3'-Dichlorobenzidine	5	µg/L												5	0.4			
EPA 625	Diethyl phthalate	2	µg/L	10[b]	0.55[b]		0.5	0.1	0.5	0.1		2	1.8					1	0.15
8270	Diethyl phthalate	2	µg/L												2	0.03			
EPA 625	Dimethyl phthalate	2	µg/L	10[b]	0.63		0.5	0.1	0.5	0.11		2	1.7					1	0.18
8270	Dimethyl phthalate	2	µg/L												2	0.03			
EPA 625	di-n-Butyl phthalate	10	µg/L	10	0.7		0.5	0.14	0.5	0.073		10	1.9					1	0.24
8270	Di-n-butyl phthalate	10	µg/L												5	0.05			
EPA 625	2,4-Dinitrotoluene	5	µg/L	10[b]	0.83[b]		0.5	0.1	0.5	0.15		5	1.8					1	0.18
8270	2,4-Dinitrotoluene	5	µg/L												5	0.02			
EPA 625	2,6-Dinitrotoluene	5	µg/L	10[b]	0.7[b]		0.5	0.36	5	1.2		5	1.9					1	0.27
8270	2,6-Dinitrotoluene	5	µg/L												5	0.05			
EPA 625	4,6 Dinitro-2-methylphenol	5	µg/L	50[b]	3.5[b]		0.5	0.11	5	1.1		5	1.8					5	1.7
8270	4,6-Dinitro-2-methylphenol	5	µg/L												5	0.03			
EPA 625	1,2-Diphenylhydrazine	1	µg/L	10[b]	0.62[b]		0.5	0.1	0.5	0.098		1	1					1	0.25
8270	1,2-Diphenylhydrazine	1	µg/L												1	0.06			
EPA 625	di-n-Octyl phthalate	10	µg/L	10	0.58		0.5	0.1	5	1.2		10	2.6					1	0.19
8270	Di-n-octyl phthalate	10	µg/L												5	0.02			
EPA 625	Fluoranthene	0.05	µg/L	10[b]	0.56[b]		0.01	0.0012										1	0.22

Summary of Laboratory Capabilities

Analytical Method	Analyte	Permit ML	Unit	Advanced Technology Laboratories			BSK Associates		CalScience Laboratories			ES Babcock			Orange Coast			Weck Labs	
				PQL	MDL	Comment	MRL	MDL	RL	MDL	Comment	MRL	MDL	Comment	MRL	MDL	Comment	MRL	MDL
EPA 625 SIM	Fluoranthene	0.05	µg/L	2[b]	1.6[b]							0.05	0.05					0.05	0.05
8310/8270SIM	Fluoranthene	0.05	µg/L						0.2[b]	0.027[b]					0.05	0.009			
EPA 625	Fluorene	0.1	µg/L	10[b]	0.53[b]		0.01	0.0043										1	0.35
EPA 625 SIM	Fluorene	0.1	µg/L	2[b]	1.6[b]							0.05	0.05					0.1	0.1
8310/8270SIM	Fluorene	0.1	µg/L						0.2[b]	0.024[b]					0.05	0.02			
EPA 625	Hexachlorobenzene	1	µg/L	10[b]	0.78[b]		0.5	0.15	0.5	0.19		1	1					1	0.49
8270	Hexachlorobenzene	1	µg/L												1	0.03			
EPA 625	Hexachlorobutadiene	1	µg/L	20[b]	0.56[b]		0.5	0.13	1	0.33		1	1					1	0.47
8270	Hexachlorobutadiene	1	µg/L												1	0.05			
EPA 625	Hexachloro-cyclopentadiene	5	µg/L	10[b]	0.67[b]		0.5	0.14	0.5	0.15		5	1.7					5	1.5
8270	Hexachloro-cyclopentadiene	5	µg/L												5	0.2			
EPA 625	Hexachloroethane	1	µg/L	10[b]	0.69[b]		0.5	0.1	1	0.3		1	1					1	0.52
8270	Hexachloroethane	1	µg/L												1	0.02			
EPA 625	Indeno(1,2,3-cd)pyrene	0.05	µg/L	10[b]	1.5[b]		0.01	0.0027										2	1.2
EPA 625 SIM	Indeno(1,2,3-cd)pyrene	0.05	µg/L	2[b]	1.9[b]							0.05	0.05					0.05	0.05
8310/8270SIM	Indeno(1,2,3-cd)pyrene	0.05	µg/L						0.2	0.022					0.05	0.03			
EPA 625	Isophorone	1	µg/L	10[b]	0.6[b]		0.5	0.11	0.5	0.14		1	1					1	0.21
8270	Isophorone	1	µg/L												1	0.2			
EPA 625	Naphthalene	0.2	µg/L	10[b]	0.46[b]		0.01	0.0027										1	0.49
EPA 625 SIM	Naphthalene	0.2	µg/L	2[b]	1.8[b]							0.05	0.05					0.1	0.1
8310/8270SIM	Naphthalene	0.2	µg/L						0.2	0.023					0.05	0.01			
EPA 625	Nitrobenzene	1	µg/L	10[b]	0.65[b]		0.5	0.11	1	0.24		1	1					1	0.36
8270	Nitrobenzene	1	µg/L												1	0.02			
EPA 625	N-Nitroso-dimethyl amine	5	µg/L	50	1.9[b]		0.5	0.48	0.5	0.13		5	1.4					1	0.14
8270	N-Nitroso-dimethyl amine	5	µg/L												5	0.02			
EPA 625	N-Nitroso-diphenyl amine	1	µg/L	10[b]	0.57[b]		0.5	0.24	0.5	0.14		1	1					1	0.19
8270	N-Nitroso-diphenyl amine	1	µg/L												1	0.03			
EPA 625	N-Nitroso-di-n-propyl amine	5	µg/L	10[b]	0.72[b]		0.5	0.1	5	0.92		5	1.7					1	0.26
8270	N-Nitroso-di-n-propyl amine	5	µg/L												5	0.03			
EPA 625	Phenanthrene	0.05	µg/L	10[b]	0.56[b]		0.01	0.0024										1	0.32
EPA 625 SIM	Phenanthrene	0.05	µg/L	2[b]	1.8[b]							0.05	0.05					0.05	0.05
8310/8270SIM	Phenanthrene	0.05	µg/L						0.2[b]	0.031[b]					0.05	0.02			
EPA 625	Pyrene	0.05	µg/L	10[b]	0.57[b]		0.01	0.0014										1	0.25
EPA 625 SIM	Pyrene	0.05	µg/L	2[b]	1.6[b]							0.05	0.05					0.05	0.05
8310/8270SIM	Pyrene	0.05	µg/L						0.2[b]	0.025[b]					0.05	0.02			
EPA 625	1,2,4-Trichlorobenzene	1	µg/L	10[b]	0.53[b]		0.5	0.1				1	1					1	0.55

Summary of Laboratory Capabilities

Analytical Method	Analyte	Permit ML	Unit	Advanced Technology Laboratories			BSK Associates		CalScience Laboratories			ES Babcock			Orange Coast			Weck Labs	
				PQL	MDL	Comment	MRL	MDL	RL	MDL	Comment	MRL	MDL	Comment	MRL	MDL	Comment	MRL	MDL
8270	1,2,4-Trichlorobenzene	1	µg/L						0.5	0.06					1	0.03			
Chlorinated Pesticides																			
EPA 608	Aldrin	0.005	µg/L	0.02[b]	0.003[b]		0.005	0.00079	0.004	0.00065		0.005	0.005		0.1[b]	0.0001[b]		0.005	0.0015
EPA 608	alpha-BHC	0.01	µg/L	0.02[b]	0.003[b]		0.005	0.0025	0.004	0.00067		0.01	0.01		0.2[b]	0.0002[b]		0.01	0.0018
EPA 608	beta-BHC	0.005	µg/L	0.02[b]	0.004[b]		0.005	0.00054	0.004	0.0015		0.005	0.005		0.2[b]	0.0009[b]		0.005	0.0031
EPA 608	delta-BHC	0.005	µg/L	0.02[b]	0.003[b]		0.005	0.0006	0.004	0.00066		0.005	0.005		0.2[b]	0.0003[b]		0.005	0.0025
EPA 608	gamma-BHC (lindane)	0.02	µg/L	0.02	0.004		0.005	0.0025	0.004	0.00093		0.02	0.02		0.2[b]	0.0002[b]		0.02	0.0021
EPA 608	alpha-chlordane	0.1	µg/L	0.02	0.003		0.1	0.026	0.004	0.00062		0.1	0.045	"chlordane"	0.1			0.01	0.0041
EPA 608	gamma-chlordane	0.1	µg/L	0.02	0.003		0.1	0.026	0.004	0.0006		0.1	0.045	"chlordane"	0.1			0.01	0.0044
EPA 608	4,4'-DDD	0.05	µg/L	0.05	0.004		0.005	0.00072	0.004	0.00061		0.05	0.016		0.05	0.0007		0.05	0.003
EPA 608	4,4'-DDE	0.05	µg/L	0.05	0.003		0.005	0.00061	0.004	0.00089		0.05	0.01		0.05	0.0002		0.05	0.0025
EPA 608	4,4'-DDT	0.01	µg/L	0.05[b]	0.004[b]		0.005	0.0007	0.004	0.00059		0.01	0.01		0.01	0.002		0.01	0.0031
EPA 608	Dieldrin	0.01	µg/L	0.05[b]	0.004[b]		0.005	0.00097	0.004	0.00065		0.01	0.01		0.01	0.0002		0.01	0.0021
EPA 608	alpha-Endosulfan	0.02	µg/L	0.02	0.004		0.005	0.00089	0.004	0.00059		0.02	0.011		0.02	0.0002		0.02	0.0017
EPA 608	beta-Endosulfan	0.01	µg/L	0.05[b]	0.004[b]		0.005	0.0018	0.004	0.00065		0.01	0.01		0.01	0.0005		0.01	0.0019
EPA 608	Endosulfan sulfate	0.05	µg/L	0.05	0.004		0.005	0.00074	0.004	0.0006		0.05	0.044		0.05	0.0004		0.05	0.008
EPA 608	Endrin	0.01	µg/L	0.05[b]	0.003[b]		0.005	0.00081	0.004	0.00062		0.01	0.01		0.01	0.002		0.01	0.0028
EPA 608	Endrin aldehyde	0.01	µg/L	0.05[b]	0.005[b]		0.005	0.00067	0.004	0.00064		0.01	0.01		0.01	0.002		0.01	0.003
EPA 608	Heptachlor	0.01	µg/L	0.02[b]	0.003[b]		0.005	0.00069	0.004	0.00072		0.01	0.01		0.01	0.0003		0.01	0.0017
EPA 608	Heptachlor Epoxide	0.01	µg/L	0.02[b]	0.004[b]		0.005	0.00069	0.004	0.00068		0.01	0.01		0.01	0.0002		0.01	0.0019
EPA 608	Toxaphene	0.5	µg/L	2.5[b]	0.36[b]		0.1	0.035	0.05	0.0092		0.5	0.5		0.5	0.03		0.5	0.12
Polychlorinated Biphenyls																			
EPA 608	Aroclor-1016	0.5	µg/L	0.5	0.07		0.1	0.05	0.2	0.059		0.5	0.5		0.5			0.5	0.05
EPA 608	Aroclor-1221	0.5	µg/L	0.5	0.07		0.1	0.063	0.2	0.057		0.5	0.5		0.5			0.5	0.06
EPA 608	Aroclor-1232	0.5	µg/L	0.5	0.07		0.1	0.05	0.2	0.05		0.5	0.42		0.5			0.5	0.15
EPA 608	Aroclor-1242	0.5	µg/L	0.5	0.07		0.1	0.05	0.2	0.025		0.5	0.41		0.5			0.5	0.07
EPA 608	Aroclor-1248	0.5	µg/L	0.5	0.07		0.1	0.02	0.2	0.04		0.5	0.28		0.5			0.5	0.06
EPA 608	Aroclor-1254	0.5	µg/L	0.5	0.07		0.1	0.05	0.2	0.045		0.5	0.5		0.5			0.5	0.04
EPA 608	Aroclor-1260	0.5	µg/L	0.5	0.07		0.1	0.015	0.2	0.053		0.5	0.5		0.5			0.5	0.04
Organophosphate Pesticides																			
EPA 525.2	Atrazine	2	µg/L	0.1	0.1							0.5	0.063		0.1	0.034		0.1	0.022
EPA 8141B	Atrazine	2	µg/L						0.02	0.0044									
EPA 8270C	Atrazine	2	µg/L				0.1	0.028				4[b]	1.4[b]						
EPA 525.2	Chlorpyrifos	0.05	µg/L												0.01	0.0069		0.01	0.0069
EPA 8141B	Chlorpyrifos	0.05	µg/L	1[b]	1[b]				0.01	0.0026									
EPA 8270C	Chlorpyrifos	0.05	µg/L				0.01	0.0029				4[a]	1.2[a]	may reach with J flag or out of reach					
EPA 525.2	Cyanazine	2	µg/L	0.1	0.1													[a]	[a]

Summary of Laboratory Capabilities

Analytical Method	Analyte	Permit ML	Unit	Advanced Technology Laboratories			BSK Associates		CalScience Laboratories			ES Babcock			Orange Coast			Weck Labs	
				PQL	MDL	Comment	MRL	MDL	RL	MDL	Comment	MRL	MDL	Comment	MRL	MDL	Comment	MRL	MDL
EPA 8141B	Cyanazine	2	µg/L						0.02	0.0035									
EPA 8270C	Cyanazine	2	µg/L				0.1	0.036							0.1	0.024			
EPA 525.2	Diazinon	0.01	µg/L	0.1[b]	0.1[b]				0.01	0.0026		0.25[a]	0.25[a]	may reach with J flag or out of reach	0.1	0.096		0.01	0.052
EPA 8141B	Diazinon	0.01	µg/L	1[b]	1[b]				0.01	0.0026									
EPA 8270C	Diazinon	0.01	µg/L				0.01	0.0036											
EPA 525.2	Malathion	1	µg/L												0.01	0.0076		0.01	0.0076
EPA 8141B	Malathion	1	µg/L	1	1				0.02	0.0055									
EPA 8270C	Malathion	1	µg/L				0.01	0.0046				4	0.073						
EPA 525.2	Prometryn	2	µg/L	0.1	0.1							2	0.079		0.1	0.036		0.1	0.024
EPA 8141B	Prometryn	2	µg/L						0.02	0.0039									
EPA 8270C	Prometryn	2	µg/L				0.1	0.019											
EPA 525.2	Simazine	2	µg/L	0.1	0.1		0.1	0.024				1	0.061		0.1	0.015		0.1	0.015
EPA 8141B	Simazine	2	µg/L						0.02	0.0045									
EPA 8270C	Simazine	2	µg/L				0.1	0.024				4[b]	0.84[b]						
Herbicides																			
EPA 515.3	2,4-D	10	µg/L	0.4	0.4		10	0.074										0.4	0.07
EPA 8151A	2,4-D	10	µg/L	0.5	0.5				5	1.8		10	0.17		2	0.083			
EPA 547	Glyphosate	5	µg/L	5	5		5	2.1	5	1.8	Sub to Weck	25[b]	4.5[b]	may reach with J flag or out of reach	5	1.8		5	1.8
EPA 8151A	2,4,5-TP-SILVEX	0.5	µg/L	0.5	0.5				0.5	0.22		1[b]	0.15[b]	may reach with J flag or out of reach	1[b]	0.074[b]			
EPA 515.3	2,4,5-TP-SILVEX	0.5	µg/L	0.2	0.2		1[b]	0.016[b]										0.2	0.09

[a] Laboratory is unable to test for or meet the Permit Minimum Level

[b] MDL is below Permit Minimum Level and will be reported with a "J" Flag qualifier