Marina del Rey
Coordinated Integrated Monitoring Program

Prepared For:

Marina del Rey Enhanced Watershed Management Program Agencies

County of Los Angeles
Los Angeles County Flood Control District
City of Los Angeles
City of Culver City

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%	percent
§	Section
ACP	asbestos cement pipe
BC	Ballona Creek
BMP	best management practice
Caltrans	California Department of Transportation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFS	cubic feet per second
CIMP	Coordinated Integrated Monitoring Program
CMP	Coordinated Monitoring Plans
County	County of Los Angeles
CRA	Coastal Resource Area
DDT	Dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
EIA	effective impervious area
EWMP	Enhanced Watershed Management Program
GIS	Geographic Information System
GPD	gallons per day
IC/ID	illicit connection/illicit discharge
LACDBH	Los Angeles County Department of Beaches and Harbors
LACFCD	Los Angeles County Flood Control District
LADPW	Los Angeles County Department of Public Works
LAMC	Los Angeles Municipal Code
LARWQCB	Los Angeles Regional Water Quality Control Board, also Regional Board
LAX	Los Angeles International Airport
LFD	low flow diversion
LID	Low Impact Development
MAL	Municipal Action Levels
MCM	minimum control measure
MDL	method detection limit
MdR	Marina del Rey
MdRH	Marina del Rey Harbor
ME	mass emission
MGD	million gallons per day
ML	minimum level
MRP	Monitoring and Reporting Program
MS4	Municipal Separate Storm Sewer System
Permit	Municipal Separate Storm Sewer System Permit
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NSW	Non-Storm Water
NWS	National Weather Service
OEHHA	Office of Environmental Health Hazard Assessment

PCB	polychlorinated biphenyl
pH	hydrogen ion concentration
PMRP	Plastic Pellet Monitoring and Reporting Plan
p p'-DDE	p p'-dichlorodiphenyldichloroethylene
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RCB	reinforced concrete box
RCP	reinforced concrete pipe
RWL	Receiving Waters Limitation
SCCWRP	Southern California Coastal Water Research Project
SEA	significant ecological area
SMB	Santa Monica Bay
SMC	Stormwater Monitoring Coalition
SQO	Sediment Quality Objective
SQDV	Stormwater Quality Design Volume
SRP	Spill Response Plan
SUSMP	Standard Urban Stormwater Mitigation Plan
SWAMP	Surface Water Ambient Monitoring Program
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
TMRP	Trash Monitoring and Reporting Plan
TOC	total organic carbon
TSO	time schedule order
TSS	total suspended solids
USEPA	U.S. Environmental Protection Agency
WDID	Waste Discharge Identification Number
Weston	Weston Solutions, Inc.
WLA	waste load allocation
WMA	Watershed Management Area
WMG	Watershed Management Group
WMMS	Watershed Management Modeling System
WMP	Watershed Management Program
WQBEL	water quality based effluent limitations
WQO	water quality objective

EXECUTIVE SUMMARY

The Marina del Rey (MdR) watershed is a small sub-watershed located in the larger, Santa Monica Bay watershed. The Marina del Rey Harbor (MdRH) was officially opened in 1965 and is the world's largest man-made small craft harbor. The tributary area served by the municipal separate storm sewer system (MS4) that drains to MdRH is approximately 1,409 acres and consists of portions of the cities of Culver City and Los Angeles, as well as portions of the unincorporated County of Los Angeles (County). The MdR Watershed Management Area (WMA) is one of the smallest WMAs in the County of Los Angeles, but it is also one of the most important and active watersheds.

The MdR watershed has the one of most aggressive Total Maximum Daily Load (TMDL) schedules for both Toxics and Bacteria and often leads the way in TMDL implementation for the rest of the County.

The extensive ongoing efforts of the County, the Los Angeles County Flood Control District (LACFCD), and the Cities of Culver City and Los Angeles to improve water quality in the MdR watershed include conducting activities and implementing best management practices (BMPs) to help reduce pollutants from storm water runoff from the watershed to the harbor. Over the past 10 years, responsible agencies in the MdR watershed have spent tens of millions of dollars in special studies, low-flow diversions, non-structural BMPs, structural BMPs, and monitoring efforts.

The water quality in the harbor has significantly improved due to the cooperative efforts of the the County, the LACFCD, and the cities of Culver City and Los Angeles (collectively known as the MdR Enhanced Watershed Management Program [EWMP] Agencies). The MdR EWMP Agencies look forward to working with interested stakeholders and the Los Angeles Regional Water Quality Control Board (LARWQCB or Regional Board) to further improve water quality in the watershed.

Background

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Order No. R4-2012-0175 (Permit) was adopted on November 8, 2012, by the LARWQCB and became effective December 28, 2012. This Permit replaced the previous permit (Order No. 01-182). The purpose of the Permit is to ensure the MS4s in Los Angeles County are not causing or contributing to exceedances of water quality objectives (WQOs) set to protect the beneficial uses in the receiving waters in the Los Angeles region. The requirements for the Monitoring and Reporting Program (MRP) are included as Attachment E to the Permit. The primary objectives of the MRP are as follows (II.A of the MRP):

1. Assess the chemical, physical, and biological impacts of discharges from the MS4 on receiving waters.
2. Assess compliance with receiving water limitations and water quality-based effluent limitations (WQBELs) established to implement 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 Permit.

Section II.D of the MRP provides flexibility to allow Permittees the option to develop a Coordinated Integrated Monitoring Program (CIMP) that uses alternative approaches to meet the primary objectives of the Permit. The agencies with jurisdiction in the Marina del Rey WMA, including the unincorporated areas of the County of Los Angeles, the LACFCD, and the Cities of Los Angeles and Culver City, have elected to pursue a CIMP and have provided justification in this document demonstrating fulfillment of monitoring requirements of the Permit and TMDLs.

The monitoring requirements outlined in this CIMP are in accordance with the requirements of the Permit, the Bacteria TMDL, and the Toxics TMDL. An overview of these regulatory drivers is presented in Appendix A. Monitoring requirements differ between these three regulatory drivers on issues such as monitoring station locations, definition of wet/dry weather, monitoring duration, and monitoring constituents. One objective of this CIMP is to leverage resources to create an efficient and effective monitoring program to represent conditions within the receiving water and tributary MS4. An overview of the CIMP monitoring programs is presented in this section.

Receiving Water Monitoring

The 18 receiving water monitoring stations in the Marina del Rey EWMP are shown in Figure ES-1 below. The stations were selected to address both Bacteria and Toxics TMDLs and Permit monitoring requirements. Nine receiving water stations were selected for Bacteria TMDL monitoring, eight receiving water stations were selected for only the Toxics TMDL monitoring, and one receiving water station was selected for Permit-required receiving water monitoring and the Toxics TMDL monitoring. Constituents for monitoring were selected based on water quality priorities, developed during the writing of the Marina del Rey EWMP Work Plan (Weston, 2014) (Submitted June 28, 2014). The water quality priorities were based on existing TMDLs, Clean Water Act Section (§) 303(d) lists, and exceedance of WQOs for other non-TMDL constituents equivalent to the (§) 303(d) listing policy.

Figure ES-1. Marina del Rey WMA Agencies Receiving Water and Outfall Monitoring Locations

Storm Water Outfall Monitoring

Five outfall monitoring locations were selected for monitoring; they are displayed on Figure ES-1 above. One station (MdR-3) was selected for both Permit monitoring and Toxics TMDL monitoring, along with four additional stations which will be monitored as part of the Toxics TMDL outfall monitoring. These stations will capture runoff from representative land use areas, displayed in Figure 4-1 through Figure 4-4, of the Marina del Rey watershed and will also be used to assess Permit and Toxics TMDL compliance in accordance with applicable storm water municipal action levels (MALs) and WQBELS.

Non-Storm Water Outfall Program

A majority of the non-storm water flows from the MdR watershed to the major MS4 outfalls in the MdR WMA are currently diverted to the sanitary sewer through the use of low flow diversions (LFDs).

The areas not addressed by an LFD that discharge into a major outfall are the following:

- Four catch basins that are downstream of the Boone Olive LFD and discharge into a major outfall at Basin E.
- Approximately 118 acres of land area (7.5% of total drainage area) within the City of LA are not addressed by an LFD or a biofiltration unit and discharge to a major outfall (Oxford Basin) at Basin E.
- Nine catch basins near the intersection of Mindanao Way and Lincoln Boulevard that drain into a major outfall into Basin G. Note that some of these catch basins serve Lincoln Boulevard which is owned and maintained by the California Department of Transportation (Caltrans).
- Four major outfalls in Subwatershed 2 (Grand Canal/Ballona Lagoon).

All of the major outfalls not addressed by an LFD in the MdRH are below tide level and inundated with marine waters at all times (Figure ES-2). The tidal inundation of the major outfalls surrounding the MdRH does not allow for the sampling of outfall discharge. Potential discharge (where not addressed by a LFD) is co-mingled with marine waters, making it impossible to discern the impact of potential non-storm water runoff to the receiving water.

Because all the major outfalls are inundated, all catch basins that are not served by an LFD or BMP that have capacity to handle non-storm water discharges and discharge to a major outfall (Figure ES-2) will be visually inspected to determine if further investigation is warranted. Based on the data collected during the observations, the Watershed Management Group (WMG) Agencies will identify MS4 outfalls with significant non-storm water discharges and develop an inventory of major MS4 outfalls with known significant non-storm water discharges as well as those requiring no further assessment. The data collected during the observation will be used to prioritize outfalls for source identification and a source identification study will be performed based on this prioritization. Outfalls that have been determined to convey significant non-storm water discharges comprised of either unknown or non-essential conditionally exempt non-storm water discharges, or continuing discharges attributed to illicit discharges will be monitored.

Figure ES-2. Extent of Tidal Influence, Major Outfalls and Catchbasins for Visual Observations

There are close to 700 small drain outfalls that discharge to the harbor that are not considered major outfalls and are not required to be monitored per the MS4 Permit.

Trash and Plastic Pellet Monitoring

The Permit requires Permittees to develop a Trash Monitoring and Reporting Plan (TMRP) to describe the methodologies that will be used to assess and monitor trash from source areas in the Santa Monica Bay (SMB) WMA and shoreline of the Santa Monica Bay. In 2012, the County submitted a TMRP to the Regional Board which is included in Appendix K of the CIMP. The City of Los Angeles will not be developing a TMRP for MdR because the implementation program for the Ballona Creek (BC) Trash TMDL covers the City's area in MdR. The City of Culver City is in compliance with the TMRP for the Ballona Creek Trash TMDL and is considered in compliance with the Debris TMDL's trash component. These plans are considered to be independent of this CIMP.

Plastic Pellet Monitoring and Reporting Plans (PMRPs) quantifying potential plastic pellet discharges to Santa Monica Bay, along with supplemental Spill Response Plans (SRPs) to address containment of spilled plastic pellets, were submitted to the Regional Board by the City of Culver City (2012), County (LADPW, 2013a), and LACFCD (2013) and are included in Appendix K. The City of Los Angeles does not have plastic pellet facilities in MdR and is therefore not subject to the pellet monitoring requirements of the PMRP; subsequently, the City will coordinate plastic pellets spill and response requirements in conjunction with the SMB and BC watersheds.

New Development and Redevelopment Effectiveness Tracking

The MdR EWMP Agencies have developed mechanisms for tracking new development/re-development projects that include post-construction BMPs pursuant to Permit Section VI.D.7. The specific tracking information for each jurisdiction is unique to each Permittee, and therefore this CIMP provides a general overview of tracking requirements and data necessary to show compliance with the Permit.

Regional Studies

The MRP requires participation in regional studies, including participation in the Southern California Monitoring Coalition's (SMC) Regional Watershed Monitoring Program (Bioassessment Program) and special studies as specified in approved TMDLs.

The LACFCD and City of Los Angeles currently participate in the SMC Monitoring Program. The LACFCD will continue to participate in the Bioassessment Program being managed by the SMC. The LACFCD, on behalf of the MdR EWMP Agencies, will continue to coordinate and assist in implementing the bioassessment monitoring requirement of the MS4 permit on behalf of the permittees in Los Angeles County. Initiated in 2008, the SMC's Bioassessment 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. The SMC Joint Executive Workgroup is currently working on designing the Bioassessment Program for the next five-year cycle, which is scheduled to run from 2015 to 2019.

In addition to the SMC monitoring program, the MdR EWMP Agencies plan to participate in Bight '18, which is also a regional monitoring program conducted by the Southern California Coastal Water Research Project (SCCWRP). The program is focused on regional assessment of marine waters in Southern California, including assessments of water quality, sediment quality, and bioaccumulation of toxins in fish tissue.

1.0 INTRODUCTION

1.1 CIMP Regulatory Background

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Order No. R4-2012-0175 (Permit) was adopted on November 8, 2012, by the Los Angeles Regional Water Quality Control Board (LARWQCB or Regional Board) and became effective December 28, 2012. This Permit replaced the previous permit (Order No. 01-182). The purpose of the Permit is to ensure the MS4s in Los Angeles County (County) are not causing or contributing to exceedances of water quality objectives (WQOs) set to protect the beneficial uses in the receiving waters in the Los Angeles region. The Permit allows the Permittees to customize their storm water programs through the development and implementation of a Watershed Management Program (WMP) or an Enhanced Watershed Management Program (EWMP) to achieve compliance with certain receiving waters limitations (RWLs) and water quality-based effluent limits (WQBELs).

Although extensive default monitoring requirements are specified in the Permit Monitoring and Reporting Plan (MRP), the Permittees have the option to develop a Coordinated Integrated Monitoring Program (CIMP) that uses alternative approaches to meet the primary objectives of the Permit. The agencies with jurisdiction in the Marina del Rey (MdR) Watershed, including the unincorporated areas of the County, the Los Angeles County Flood Control District (LACFCD), and the Cities of Los Angeles and Culver City have elected to pursue a CIMP and have provided justification in this document demonstrating fulfillment of monitoring requirements of the Permit and Total Maximum Daily Loads (TMDLs). More information about LACFCD participation in the CIMP is in Appendix J.

As defined in the MRP, the MdR Watershed CIMP has the potential to be a vehicle to modify TMDL monitoring requirements and other previously implemented monitoring program requirements. Modifications to the MRP and/or TMDL monitoring requirements must satisfy the primary objectives for the CIMP to be considered approvable by the Regional Board Executive Officer. Two TMDL Coordinated Monitoring Plans (CMPs) have been approved by the Regional Board for the MdR Watershed, the *Marina Del Rey Harbor Mothers' Beach and Back Basins Bacterial TMDL Coordinated Monitoring Plan* (Bacteria TMDL CMP) (Los Angeles County Department of Public Works [LADPW], 2007) and the *Marina Del Rey Harbor Toxic Pollutants TMDL Coordinated Monitoring Plan* (Toxics TMDL CMP) (LADPW, 2008a). The MdR Watershed CIMP reflects modifications based on the revised Bacteria TMDL (LARWQCB, 2014), revised Toxics TMDL (LARWQCB, 2015), new Permit requirements, implemented Best Management Practices (BMPs), recent monitoring data, and findings and recommendations of the 2013 *Multi-Pollutant TMDL Implementation Plan for the Unincorporated Area of MdR Harbor Back Basins* (LADPW, 2013b), and the 2012 *Toxics Pollutant TMDL Implementation Plan* prepared by the California Department of Transportation (Caltrans) and the Cities of Los Angeles and Culver City (City of Los Angeles, 2012).

1.2 Enhanced Watershed Management Plan Area

The MdR Watershed is bordered by the Santa Monica Bay Watershed to the west and the Ballona Creek Watershed to the north and east. The MdR Harbor (MdRH) is open to the Santa

Monica Bay through the Main Channel and shares a common breakwater with Ballona Creek. The MdRH is an active harbor for pleasure craft, consisting of the Main Channel and eight basins (A through H). Basins A, B, C, G, and H are known as the Front Basins. Basins D, E, and F are known as the Back Basins. The MdR Watershed includes the Venice Canals and the tributary area to the Ballona Lagoons, which discharge to the MdRH, near the exit to the Santa Monica Bay.

For the purposes of this CIMP, the MdR Watershed does not include the Caltrans-owned right-of-way or lands within the jurisdiction of the State of California (e.g., Ballona Wetland Area). Therefore, for the purposes of this CIMP, the MdR Watershed is limited to approximately 1,409 acres that are served by an MS4 under the jurisdiction of the MdR EWMP Agencies participating in the MdR Watershed CIMP. Four subwatersheds make up the MdR Watershed as shown in Figure 1-1. The acreage by jurisdiction and subwatershed is presented in Table 1-1.

Table 1-1. Subwatersheds and Jurisdictions within the MdR Watershed

Agency	CIMP Participant	Sub-watershed 1 (Acres)	Sub-watershed 2 (Acres)	Sub-watershed 3 (Acres)	Sub-watershed 4 (Acres)	CIMP Watershed (Acres)	% CIMP Watershed Area
City of Los Angeles	Yes	32.9	278.1	70.5	589.8	971.3	69%
City of Culver City	Yes	0.0	0.0	0.0	42.2	42.2	3%
County	Yes	336.2	46.8	0.0	12.7	395.7	28%
LACFCD	Yes	N/A	N/A	N/A	N/A	N/A	N/A
MS4 Area of MdR Agencies		**369.1**	**324.9**	**70.5**	**644.7**	**1,409.2**	**100%**
Caltrans	No	5.4	0.0	0.0	26.4	31.8	N/A
State of California	No	49.3	0.0	0.0	0.0	49.3	N/A
MdR Watershed Area		**423.8**	**324.9**	**70.5**	**671.1**	**1,490.3**	--

Figure 1-1 presents the MdR MS4, the subwatershed boundaries, and the jurisdictional area for each agency within the MdR Watershed. The MdRH/land area in Subwatershed 1 (369.1 acres) is composed of 336.2 acres of unincorporated County land and 32.9 acres within the boundaries of the City of Los Angeles; it has many small drains that discharge into all the Basins. Subwatershed 2 (approximately 324.9 acres) is composed of 46.8 acres of unincorporated County land and 278.1 acres within the boundaries of the City of Los Angeles; it does not drain into the MdRH Front or Back Basins but drains into the Venice Canal and the Ballona Lagoon, which discharge into the Main Channel near the harbor mouth. Boone Olive Pump Plant serves Subwatershed 3, a tributary area of 70.5 acres that lies entirely within the boundaries of the City of Los Angeles. The pump station discharges into Basin E. Subwatershed 4 lies mainly within the jurisdiction of the Cities of Los Angeles and Culver City and totals approximately 644.7 acres. The acreages given exclude the Caltrans and State of California areas. Runoff discharges into Oxford Retention Basin, a storm water retention basin occupying approximately 10 acres within the County. Situated north of the Back Basins, Oxford Retention Basin is operated by the LACFCD and drains into Basin E through two tide gates.

The MdR Watershed includes residential, commercial, recreational, vacant, institutional, and mixed commercial/industrial land uses. The land use area by subwatershed is presented in Table 1-2 and Figure 1-2. Subwatershed 1 consists of right-of-ways, parking lots, and high-density residential land uses immediately surrounding the MdRH, as well as marine waters within the Harbor. Subwatershed 2 consists of residential areas tributary to the Grand Canal (i.e., Venice Canals and Ballona Lagoon). Subwatersheds 3 and 4 consist of a mix of residential, commercial, and mixed commercial/industrial land uses.

Table 1-2. Summary of MdR Watershed Acreage

Land Use Class	Subwatershed Acreage*				Total
	1	2	3	4	
Single Family Residential	1.8	45.8	22.9	167.2	237.7
Multi-Family Residential	137.1	131.8	21.1	96.3	386.3
Institutional/Public Facilities	8.0	10.1	2.6	67.2	87.9
Commercial and Services	120.0	22.8	1.6	124.2	268.6
Industrial/Mixed with Industrial	0.2	0.2	0.3	27	27.7
Transportation/Road Right-of-Way	38.2	83.3	22.0	153.8	297.3
Developed Recreation/Marina Parking	41.6	0.7	0	1.9	44.2
Beach	8.2	0	0	0	8.2
Water**	6.4	30.3	0	7.1	43.8
Vacant	7.6	0	0	0	7.6
Total	369.1	325	70.5	644.7	1,409

*Acreage excludes Caltrans- and State-owned land (Ballona Wetland) not in CIMP Area.

**Marina Boat Area Water and MdRH Water are not included in "Water" class acreage provided here. The Water class includes Ballona Lagoon (14.4 acres), Venice Canals (15.9 acres), Oxford Retention Basin (7.1 acres), and Ballona Shoreline and other water (6.4 acres).

Figure 1-1. Marina del Rey Watershed with MS4, Catch Basins, and Subwatershed Areas

Figure 1-2. MdR Watershed Land Uses and Subwatersheds

1.3 Water Quality Priorities

Multiple monitoring programs and special studies have sought to assess conditions in the MdR receiving waters and surrounding MdR Watershed. All readily available monitoring data, source assessments, and special studies were assessed for interrelationships in terms of pollutants, potential sources, and potential data gaps. Through this evaluation, water-body pollutant combinations were classified into one of the three following categories:

- **Category 1 (Highest Priority):** Pollutants with receiving water limitation or WQBELs as established in Part V1.E and Attachments L through R of the Permit.
- **Category 2 (High Priority):** Section §303(d) listed pollutants in the receiving water that MS4 discharges may be contributing to the impairment.
- **Category 3 (Medium Priority)**: Pollutants with insufficient data to list as §303(d), but which exceed RWLs contained in the Permit, and for which MS4 discharges may be causing or contributing to the exceedance.

Category 1 (highest priority) pollutants are defined by the MS4 Permit as those constituents that have been addressed with receiving water limitations or WQBELs established through a TMDL. The Toxics TMDL establishes waste load allocations for chlordane, total polychlorinated biphenyls (PCBs), total dichlorodiphenyltrichloroethanes (DDTs), p-p'-dichlorodiphenyl-dichloroethylene (DDE), copper, lead and zinc. In addition, the TMDL establishes numeric targets for dissolved copper and total PCBs in the water column in MdRH. The TMDL also addresses the fish consumption advisory and the sediment toxicity listing on the §303(d) list. As a result of the establishment of the TMDL for these constituents, they are classified in accordance with the MS4 Permit as Category 1 pollutants for MdRH (Table 1-3). Trash is also classified as a Category 1 pollutant due to the Santa Monica Bay Debris TMDL, for which compliance is achieved through the Ballona Creek Watershed Trash TMDL (See Appendix A). The Bacteria TMDL established numeric bacterial compliance targets for fecal coliform, *Enterococcus*, and total coliform in MdRH. As a result of the TMDL, these constituents are classified in accordance with the MS4 Permit as Category 1 pollutants for MdR (Table 1-3).

Table 1-3. Waterbody – Pollutant Classification

Waterbody	Pollutant	Classification
Marina del Rey Harbor	Dissolved Copper	Category 1
	Copper	Category 1
	Lead	Category 1
	Zinc	Category 1
	Total PCBs	Category 1
	Total DDTs	Category 1
	p,p’-DDE	Category 1
	Chlordane	Category 1
	Fecal coliform	Category 1
	Enterococcus	Category 1
	Total coliform	Category 1

Waterbody	Pollutant	Classification
	Trash/Debris	Category 1
	Fish consumption advisory	Category 1*
	Sediment toxicity	Category 1*
Ballona Lagoon/Venice Canal	Total PCBs	Category 1
	DDT	Category 1
	Trash/Debris	Category 1
* Sediment toxicity and fish consumption advisory are addressed by the Toxics TMDL.		

Category 2 constituents are defined in the MS4 Permit as pollutants in the receiving water that are listed on the §303(d) list and for which MS4 discharges may be causing or contributing to the impairment. Dieldrin is the only §303(d) listed constituent for MdRH that has not already been addressed by a TMDL, however, the U.S. Environmental Protection Agency (USEPA) made a finding of non-impairment for this constituent so it will not be considered a Category 2 pollutant.

Category 3 constituents are those pollutants with insufficient data to include on the §303(d) but which exceed receiving water limitations contained in the MS4 Permit and for which MS4 discharges may be causing or contributing to the exceedance. The detailed data evaluation of all available sources of data from relevant studies and monitoring completed within the past 10 years that was conducted and described in the Marina del Rey EWMP Work Plan (Work Plan Appendix F), did not result in any constituents being classified as a Category 3 constituent.

1.4 CIMP Overview

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

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

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

The monitoring requirements outlined in this CIMP are in accordance with the requirements of the Permit, and TMDLs applicable to the MdR EWMP area. An overview of these regulatory drivers is presented in Appendix A. Monitoring requirements differ between these regulatory drivers on issues such as monitoring station locations, definition of wet/dry weather, monitoring duration, and monitoring constituents. One objective of this CIMP is to leverage resources to create an efficient and effective monitoring program to represent conditions within the receiving water and tributary MS4. This CIMP discusses the following in the context of the MdR Watershed.

1.4.1 Receiving Water Monitoring

The objectives of the receiving water monitoring include the following:

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

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

1.4.2 Storm Water Outfall Monitoring

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

- Determine the quality of storm water discharge relative to municipal action levels.
- Determine whether storm water discharge is in compliance with applicable storm water WQBELs derived from TMDL waste load allocations (WLAs).
- Determine whether the discharge causes or contributes to an exceedance of RWLs.

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

1.4.3 Non-Storm Water Outfall Program

Objectives of the NSW outfall monitoring include the following:

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

The intent of the NSW Outfall Program is to demonstrate that the Permittees are effectively prohibiting NSW discharges that are not exempt or conditionally exempt discharges to receiving waters and to assess whether NSW discharges are causing or contributing to exceedances of RWLs. By detecting, identifying, and eliminating illicit discharges, the NSW Outfall Program will demonstrate Permittees’ efforts to effectively prohibit NSW discharges to and from the

MS4. Where NSW discharges are deemed "significant", the program will discern whether they are illicit, exempt, or conditionally exempt, and demonstrate whether the discharges may be causing or contributing to exceedances of RWLs.

The NSW Outfall Screening and Monitoring Program (NSW Outfall Program) is focused on dry weather discharges to receiving waters from major outfalls.

1.4.4 New Development and Redevelopment Effectiveness Tracking

The objective of the New Development/Redevelopment effectiveness tracking is to track whether the conditions in the building permit issued by the Permittee are implemented to ensure the volume of storm water associated with the design storm is retained on-site as required by Part VI.D.7.c.i. of the Permit. Permittees are required to maintain a database to track specific information related to new and redevelopment projects subject to the minimum control measure (MCM) requirements in VI.D.7. The Permit contains data tracking requirements in Part X.A of the MRP and in Part VI.D.7.d.iv.

1.4.5 Trash and Plastic Pellet Monitoring

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

1.4.6 Regional Studies

The MRP requires participation in regional studies, including participation in the Southern California Monitoring Coalition's (SMC) Regional Watershed Monitoring Program (Bioassessment Program) and special studies as specified in approved TMDLs.

The LACFCD and City of Los Angeles currently participate in the SMC Monitoring Program. The LACFCD, on behalf of the MdR EWMP Agencies, will continue to participate in the Bioassessment Program being managed by the SMC. The LACFCD will continue to coordinate and assist in implementing the bioassessment monitoring requirement of the MS4 permit on behalf of the permittees in Los Angeles County. Initiated in 2008, the SMC's Bioassessment Program is designed to run over a five-year cycle. Monitoring under the first cycle concluded in 2013. The next five-year cycle is scheduled to run from 2015 to 2019.

The MdR EWMP Agencies also plan to participate in the Regional Bight monitoring program, expected to be conducted during 2018.

2.0 RECEIVING WATER MONITORING PROGRAM

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

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

The following section presents the CIMP Receiving Water monitoring program, including monitoring sites, monitoring parameters and frequency, as well as monitoring coordination. The MdR CIMP will integrate the MRP and applicable TMDLs, as well as existing monitoring requirements in the MdR Watershed, into a single efficient and effective program. As such, its implementation will replace the existing TMDL CMPs applicable to the MdR Watershed.

2.1 Receiving Water Monitoring Sites

The MRP specifies that receiving water monitoring shall be performed at previously designated mass emission stations, TMDL receiving water stations (as designated in TMDL CMPs approved by the Regional Board Executive Officer), and additional receiving water locations representative of the impacts from MS4 discharges, and that in the case where monitoring at a station will be discontinued, justification should be provided. The receiving water monitoring programs in this CIMP are based on the monitoring requirements defined in the Bacteria TMDL CMP, the Toxics TMDL CMP, and the Permit.

Monitoring stations selected to conduct this monitoring are discussed below. More information about these stations can be found in Appendix B based on a site reconnaissance, performed January 2014, in support of the sites selection process. Detailed parameter lists, analytical methods, and method detection limits are provided in Appendix D. Sampling protocols, sample handling procedures, field quality control sampling requirements, and laboratory analytical methods and quality assurance/quality control (QA/QC) requirements are detailed in Appendix C, with reference to Appendix D.

2.1.1 Mass Emission Monitoring Site

Mass emission (ME) receiving water monitoring is intended to determine if RWLs are achieved, assess trends in pollutant concentrations over time, and determine whether designated beneficial uses are supported. ME monitoring provides a long-term record to understand conditions within the EWMP area, for the full suite of parameters, including TMDL parameters.

There are ME stations in seven major watersheds throughout the County. These stations are monitored per the existing NPDES Permit (CAS004001) in an effort to estimate the mass emissions from the collective MS4. There are no ME stations in the MdR watershed; the closest ME station is located in the Ballona Creek Watershed (Ballona Creek Monitoring Station (S01)). Therefore, this CIMP does not include ME station monitoring.

2.1.2 Permit Monitoring Site

MdRH-MC, located in the Main Channel of the MdRH, was selected as the MdRH receiving water station for Permit compliance monitoring. The intent of the Permit is to assess the impacts of storm water runoff on receiving waters, and therefore MdRH-MC is located at the confluence of Basins D, E, and F. The station is located to assess storm water runoff from the major outfalls located in Basin E and other outfalls located in Basin F. Storm water flows are expected to impact the area in the Back Basins near the confluence of Basins D, E, and F. The location of this station is shown in Figure 2-1.

This receiving water monitoring site meets the MRP objectives and data collected at MdRH-MC will support an understanding of potential impacts associated with MS4 discharges.

2.1.3 TMDL Monitoring Sites

The MdR Watershed is impacted by five TMDLs; the Bacteria TMDL, Toxics TMDL, Trash TMDL, Debris TMDL and the *Santa Monica Bay TMDL for DDT and PCBs* (SMB DDT and PCB TMDL). The SMB DDT and PCB TMDL is an anti-degradation TMDL, for which compliance will be achieved through the reduction in storm water volume associated with implementation of the MdR EWMP program. Harbor receiving water stations monitored as part of the Bacteria and Toxics TMDLs CMPs are summarized below (Table 2-1 and Table 2-2, respectively). More information about these stations is provided in Appendix B. The analytical procedures, sampling methods, QA/QC procedures are provided in Appendix C.

2.1.3.1 Bacteria TMDL Sites

The Bacteria TMDL requires receiving water monitoring in the Back Basins and at three shoreline stations along Marina Beach, as well as at major outfalls in the Harbor. Bacteria TMDL receiving water monitoring is conducted at nine receiving water locations; the type and location of the Bacteria TMDL monitoring stations are summarized in Table 2-1 and Figure 2-1. Note that monitoring for Bacteria is scheduled based on prevailing weather conditions during a scheduled sampling event. Dry/Wet Weather classifications are assigned post-monitoring.

Table 2-1. MdR Receiving Water Bacteria Monitoring Stations

CIMP Station ID	Media Sampled	Monitoring Station Location
MdRH-1	Water	Shoreline Site along Marina Beach at playground
MdRH-2	Water	Shoreline Site along Marina Beach at Main Lifeguard Tower
MdRH-3	Water	Shoreline Site along Marina Beach between the boat dock and lifeguard station
MdRH-4	Water	Basin D, near first slip outside swim area (surface and depth)
MdRH-5	Water	Basin E, in front of tide-gate from Oxford Retention Basin
MdRH-6	Water	Basin E, center of basin (surface and depth)
MdRH-7	Water	Basin E, in front of Boone-Olive Pump Outlet
MdRH-8	Water	Back of the Main Channel at the intersection of Basins D, E, and F (surface and depth)
MdRH-9	Water	Basin F, center of basin (surface and depth)
Monitoring Station in Harbor Receiving Water Basins A, B, C, G, and H, designated by MdRH-10, MdRH-11, MdRH-12, MdRH-13, and MdRH-14, respectively are former monitoring station where monitoring was discontinued.		

2.1.3.2 Toxics TMDL Sites

The CIMP's monitoring includes a total of nine receiving water monitoring stations, one in each of the Basins and one in the Main Channel, to comply with the Toxics TMDL monitoring requirement. These locations are summarized in Table 2-2 and Figure 2-1. Water column monitoring will be performed in the main channel every month and on an alternating schedule for the remaining ten Toxics TMDL receiving water stations. Station MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; the following month stations MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled. Sediment sampling will occur at each station on an annual basis. Additional discussion is provided in Appendix I.

Table 2-2. MdR Receiving Water Toxics Monitoring Stations

CIMP Station ID	Toxics TMDL CMP Station ID	Media Sampled	Monitoring Station Description
MdRH-A	MdRH-F-1	Water/Sediment	Mid-channel of Basin A
MdRH-B	MdRH-F-2	Water/Sediment	Mid-channel of Basin B
MdRH-C	MdRH-F-3	Water/Sediment	Mid-channel of Basin C
MdRH-D	MdRH-B-1	Water/Sediment	Mid-channel of Basin D
MdRH-E	MdRH-B-2	Water/Sediment	Mid-channel of Basin E
MdRH-F	MdRH-B-3	Water/Sediment	Mid-channel of Basin F
MdRH-G	MdRH-F-4	Water/Sediment	Mid-channel of Basin G
MdRH-H	MdRH-F-5	Water/Sediment	Mid-channel of Basin H
MdRH-MC	---	Water/Sediment	Main Channel
Water column monitoring will be performed at MdRH-MC every month and on an alternating schedule for the remaining ten Toxics TMDL receiving water stations. Station MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; the following month stations MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled. Sediment sampling will occurr annually at each station. .			

2.1.3.3 Bioaccumulation Monitoring

Fish travel throughout the MdRH; therefore, for the purposes of CIMP compliance monitoring, the entire Harbor is considered to be a single representative area for fish sampling. Trawl transects will be run throughout the Harbor to collect targeted fish species.

Mussels are filter feeders that rely on collecting organic particles as food from a large volume of water. Resident mussels have been observed throughout MdRH; however, in order to control for the period of bioaccumulation, the use of planted mussels is recommended in place of resident mussels. Mussels will be planted in the Back Basin and the Front Basin areas, and then composited into two samples representing these two areas.

More information about bioaccumulation monitoring, including the analytical procedures, sampling methods, and QA/QC procedures, is provided in Appendix C.

Figure 2-1. MdR Watershed CIMP Monitoring Stations

2.1.3.4 Oxford Basin Monitoring Program

The Toxics TMDL specifies that the LACFCD shall monitor discharges of sediment from Oxford Basin to the MdRH after completion of the Oxford Retention Basin Multiuse Enhancement Project (Oxford Basin Project). Additionally, the TMDL states that effectiveness monitoring developed as part of the Proposition 84 grant agreement for the Oxford Basin Project may be used to meet the TMDL monitoring requirement; however, the monitoring must continue beyond the term of the Proposition 84 agreement.

The Oxford Retention Basin Multiuse Enhancement Project Monitoring Plan (LACFCD, 2014) includes a special study that will be conducted during the first year of post-construction. This special study will focus on understanding the exchange of suspended sediment between Oxford Basin and Basin E. The results of the study will help the MdR EWMP group identify if and when a significant amount of total suspended solids (TSS) is being discharged from Oxford Basin to Basin E, which will determine the sampling frequency, method, and procedures for the subsequent years. Details for the proposed year one monitoring program are discussed below. Preliminary suggestions for year two are discussed in the following subsection. Once the data from year one are analyzed, additional details for monitoring in subsequent years will be provided in the MdR EWMP Annual Report. Monitoring will continue after the Proposition 84 grant monitoring requirements are completed, in accordance with the Toxics TMDL.

Post Construction Monitoring - Year One:
Two YSI EXO2 Water Quality Sondes will be installed near the tidal gates in Oxford Basin. Water quality (including turbidity) will be continuously monitored by the sondes. Turbidity results from the sondes will be converted to TSS using surrogate data. However, in order to establish the correlation between TSS and turbidity, TSS grab samples will also be taken in both dry and wet weather conditions in incoming and outgoing tides.

Existing water level transducers located upstream and downstream of the Oxford Basin tidal gates will be used to calculate the volume entering or leaving Oxford Basin. The transducer data, in conjunction with tidal records, may be used as the basis for developing flow estimates or as inputs into a hydrologic/hydraulic computer model of the system to generate net flow volume estimates. Data from the water level transducers and the sondes can be used to estimate the amount of suspended sediment exchange between Oxford Basin and Basin E over an extended period of time that includes dry-weather and wet-weather conditions. The purpose of this analysis is to determine the conditions when sediment is being discharged from Oxford Basin and to quantify the sediment discharge. The analysis will consider factors such as tidal cycles, biogeochemical cycling, and operation of the tide gates. Information from this study will be used to help determine the effective tidal gate operations that maximize water quality benefits, to support future continuous water quality efforts, and to help guide potential sampling of suspended sediments being discharged from Oxford Basin.

Post Construction Monitoring - Year Two and Beyond:
If data collected during year one indicate a statistically significant movement of sediment from Oxford Basin to Basin E (when compared to sediment entering Oxford Basin from Basin E), then sampling will be implemented during year two. The sampling methodology, frequency, and schedule to collect sediment samples will be determined prior to initiating year two sampling, using the data and information collected during the year one study. One potential option is to

install a portable autosampler near the tidal gates to collect storm water samples that can be filtered and analyzed in a lab.

If sediment discharge to Basin E from Oxford Basin is not statistically significant, then sampling during year two will include only sediment exchange analysis between the basins. Each year, the sediment exchange data from the previous year will be used to determine necessity of additional monitoring. Figure 2-2 presents the proposed monitoring program at Oxford Basin.

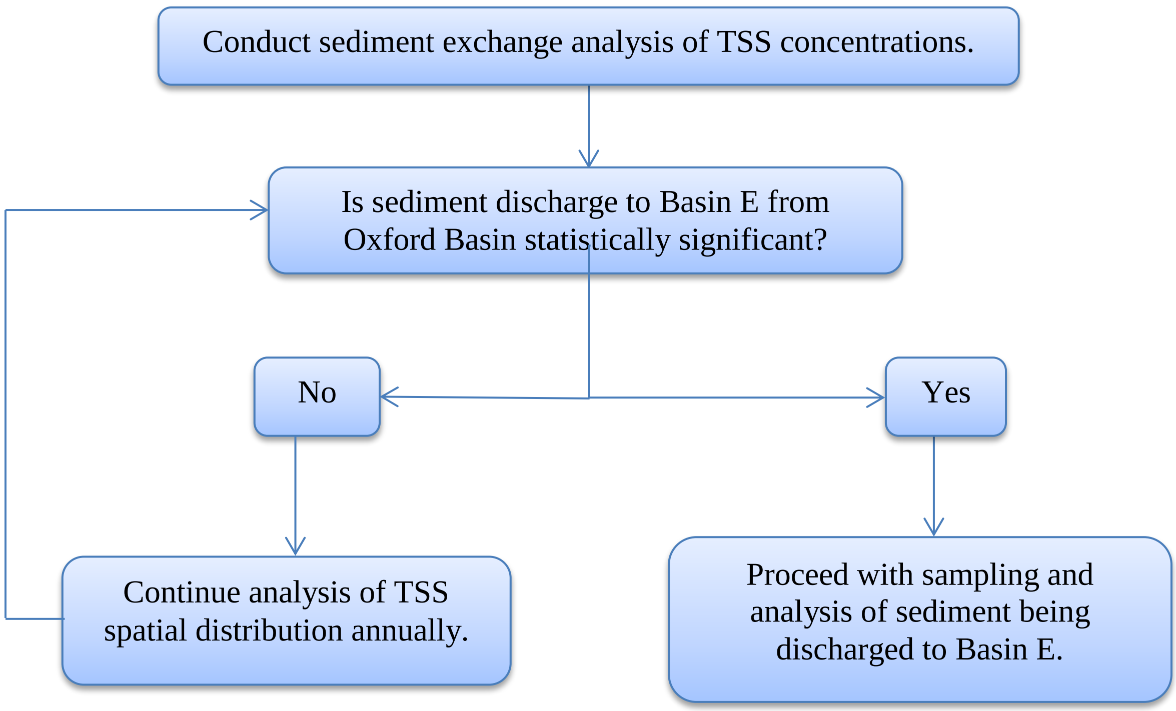

Figure 2-2. Oxford Basin Monitoring Program Overview

2.2 Monitored Parameters and Frequency of Monitoring

The CIMP monitoring programs are summarized in Table 2-3. The table lists all the receiving water stations, their corresponding monitored parameters, and frequency of monitoring for compliance with Bacteria and Toxics TMDL monitoring requirements as well as the Permit monitoring requirements. These monitoring requirements include physical, bacterial, chemical, and toxicity analyses of water, sediment, and tissue samples from the MdR receiving water. Detailed parameter lists, analytical methods, and method detection limits are detailed in Appendix D. Sampling protocols, sample handling procedures, field quality control sampling requirements, and laboratory analytical methods and QA/QC requirements are detailed in Appendix C, with reference to Appendix D.

2.2.1 Permit Compliance Monitoring

Receiving water monitoring will be conducted at the MdRH-MC receiving water station during three storm events each per wet weather season. This will include monitoring during the first significant storm event of each wet weather monitoring season and two additional storm events during each wet weather monitoring season (see Section 2.3 for definition of storm event and significant storm event). During the first significant storm of the first monitoring year all of the parameters in Table E-2 of the MRP will be monitored in addition to those required in MRP Section VI.C.d. If a parameter is detected exceeding the lowest applicable WQO in samples from this initial wet weather event, then the parameter will be analyzed for the remainder of the Permit term during wet weather at MdRH-MC. The remaining two wet events of the first year will be limited to those parameters in Table E-2 that fall under Category 1, described in Section 1.2 of this CIMP, and any parameters that were detected exceeding the lowest applicable WQO in the first large storm event of the first monitoring year. Appendix D monitoring lists will be revised and reported as part of the Annual Monitoring Report.

In addition, toxicity monitoring shall be conducted at MdRH-MC station to evaluate a sublethal effect (e.g., reduced growth, reproduction) twice per year and in accordance with the toxicity clarification memo issued by the LARWQCB on August 7, 2015. See Appendix C for additional detail.

Dry weather monitoring will be conducted at MdRH-MC twice annually. One of these monitoring events will occur in the month of July, which is historically the driest month in the region (LADPW, 2015). Monitoring will be conducted in accordance with MRP Section VI.D.1.b.i, on days with less than 0.1 inch of rain and not less than three days after a rain event of 0.1 inch or greater within the watershed (as measured at the rain gauge located at Electric Avenue Pump Plant). The required parameters are identified in MRP Section D.1.c (see Appendix D) and include aquatic toxicity monitoring once per year, during the July dry weather monitoring event. In addition to the required parameters in MRP Section D.1.c, during the July dry weather monitoring event in the first year of monitoring, parameters in Table E-2 of the permit will also be monitored. If a parameter identified in Table E-2 is not detected at the method detection limit (MDL) (MDLs must be lower or equal to the minimum level [ML] specified in Table E-2), or the result is below the lowest applicable WQO, it will not be analyzed for the remainder of the Permit term at MdRH-MC. If a parameter in Table E-2 is detected above the lowest applicable WQO, then the parameter will be analyzed during dry weather monitoring for the remainder of the Permit term at this station.

2.2.2 Bacteria TMDL Compliance Monitoring

For Bacteria TMDL compliance monitoring, sampling is performed on a scheduled basis. The MdR EWMP Agencies conduct weekly compliance monitoring at all Bacteria TMDL stations, except at two stations along the Marina Beach shoreline where enhanced monitoring efforts have been implemented voluntarily for informational purposes. Daily sampling (Monday through Saturday) has been initiated at Station MdRH-1. At Station MdRH-2, samples are collected twice per week (Monday and Saturday). Bacteria grab samples are collected from the Harbor receiving water from a boat/skiff or from the ankle deep water of an incoming wave along Marina Beach. As a safety consideration, samples are not collected during rainfall. Grab samples are collected on a scheduled basis. Bacteria grab samples collected within the 72-hour window after a storm event are classified as wet weather samples, whereas all other samples are classified as dry weather samples.

2.2.3 Toxics TMDL Compliance Monitoring

The existing Toxics TMDL CMP monitoring program has been modified to improve the effectiveness and efficiency of the program, to take advantage of the increased knowledge of the environmental conditions within the Harbor as a result of the past 10 years of monitoring, and to meet the revised monitoring requirements of the reconsidered Toxics TMDL, as amended by Resolution No. R14-004 (LARWQCB, 2014). For Toxics TMDL receiving water compliance monitoring, water, sediment and tissue samples will be collected from a boat/skiff. Modifications to the existing CMP have been made based on the historical monitoring experience and data gained by the MdR EWMP Agencies. Data analysis supporting the changes below is included in Appendix I.

Samples will be collected as follows:

- Dry weather water quality grab samples will be collected from five Harbor receiving water stations on a monthly basis for copper and total PCBs. Monitoring will be performed in the main channel every month and on an alternating schedule for the remaining ten Toxics TMDL receiving water stations. Station MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; the following month stations MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled (Table 2-2, Figure 2-1).
    - Monthly monitoring of dissolved copper has been conducted in both the Front and Back Basins of the Harbor since 2010. Monitoring results have remained relatively consistent over time, and while they do vary somewhat between Basins, it is possible to monitor a sub-set of Basins each month and rotate the monitoring stations so that they are monitored every other month, without losing important information regarding dissolved copper concentrations. (See Appendix I for details).
    - Due to the logistical, technical, and cost issues for low-detection limit analysis (see additional details in Appendix I) of PCBs, total PCBs will be monitored in the Harbor water column on the same alternating schedule as dissolved copper.
- Sediment chemistry and toxicity analyses will be conducted on an annual basis in each of the Basins and the Main Channel at the stations identified in Table 2-2. Sediment samples will be analyzed for copper, lead, zinc, chlordane, total PCBs, total DDTs, p,p'-DDE, total organic carbon, grain size, and toxicity (Appendix D).
- Sediment Quality Objectives (SQO) monitoring (sediment triad sampling) will be conducted once every five years. Sampling will occur in coordination with the Bight Program at stations selected at random by the Bight Program and at the stations identified in Table 2-2 to match the annual sediment monitoring locations. The Stressor Identification Special Study expected to be completed in 2017 also includes SQO analysis.
- Tissue monitoring (fish and mussel), which provides a strong measure of environmental contamination, will be conducted annually within the Harbor, and will provide a measure of bioaccumulation of total PCBs and other organics from the water column. Sites for resident mussel installation will be selected based on prevailing conditions, as determined by a field reconnaissance conducted prior to sampling. Nine individuals from two species of fish will be collected (halibut and white croaker), in accordance with Office of

Environmental Health Hazard Assessment (OEHHA) guidance. See Appendix C for more information.

Table 2-3. MdR Receiving Water Monitoring Stations Sampling Parameters and Frequency for Wet and Dry Weather

Parameter	Permit		Toxics TMDL (Dry Weather)									Bacteria TMDL								
	MdRH-MC		MdRH-A	MdRH-B	MdRH-C	MdRH-D	MdRH-E	MdRH-F	MdRH-G	MdRH-H	MdRH-MC	MdRH-1	MdRH-2	MdRH-3	MdRH-4	MdRH-5	MdRH-6	MdRH-7	MdRH-8	MdRH-9
	Wet Weather *	Dry Weather**																		
WATER QUALITY																				
Field Parameters[a]	3x/year	2x/year	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pollutants identified in Table E-2 of Permit *(not otherwise listed below)*	1x/year #	1x/year # #	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	2x/year																		
Aquatic Toxicity	2x/year†	1x/year Ω†	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indicator Bacteria: Total Coliform, *E. coli*, *Enterococcus*	3x/year	2x/year	-									6x/week[b]	2x/week[d]	1x/Week[c]	1x/week[c]at surface 1x/week at depth	1xWeek(c	x/week[c]at surface 1x/week at depth	1x/Week[c]	x/week[c]at surface 1x/week at depth	x/week[c]at surface 1x/week at depth
Copper (total/dissolved) and hardness	-		1x/month on an alternating schedule (Station MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled the following month)								1x/month	-								
Total PCBs												-								
FISH / MUSSEL TISSUE QUALITY – DRY WEATHER SAMPLING																				
Chlordane	-	-	1x/year[e] (Harbor-wide sampling, all basins and Main Channel)									-								
Total PCBs																				
Total DDTs																				
p,p'-DDE																				
DRY WEATHER SEDIMENT SAMPLING																				
Grain Size, TOC and Percent Solids	-	-	1x/year at each of the Toxics TMDL Receiving Water stations (9 stations)									-								
Copper, Lead, Zinc																				
Chlordane, total DDTs, p,p'-DDE																				
Total PCBs																				
Sediment Toxicity																				
TRIAD ASSESSMENT – DRY WEATHER SEDIMENT SAMPLING																				
Grain Size and Percent Solids	1x/5 years[f][g]	-	1x/5 years[f][g] at Bight selected stations as well as the Toxics TMDL Receiving Water stations (9 stations)									-								
SQO Parameters[g]																				
Sediment Toxicity																				
Benthic Infaunal Analysis																				

Table 2-3 NOTES:

* First significant storm event and two additional storm events each year

** One of the two dry weather events will occur in the month of July each year, historically the driest month in the region.

[#] All the parameters listed in Table E-2 of the MRP will be monitored during the first large storm of the first monitoring year. Only constituents detected above the lowest applicable water quality objective will be monitored during wet weather events (3x/year) at the station for the remainder of the permit term.

[##] All the parameters listed in Table E-2 of the MRP will be monitored during the July monitoring event in the first monitoring year. Only constituents detected above the lowest applicable water quality objective will be monitored during dry weather (2x/year) for the remainder of the permit term.

[†] Aquatic Toxicity monitoring will follow the guidelines in the August 7, 2015 Toxicity Memo from the LARWCQB.

[Ω] During the July dry weather monitoring event.

(a) Field parameters are defined as dissolved oxygen (DO), hydrogen ion concentration (pH), temperature, and specific conductivity.

(b) Samples collected daily (Mondays through Saturdays). Samples collected during an incoming wave.

(c) Monitoring frequency is weekly regardless of the weather condition. A dry/wet classification is assigned post-monitoring.

(d) Samples collected twice a week, on Mondays and Saturdays. Samples collected during an incoming wave.

(e) Historically, tissue sampling occurs in October of each year.

(f) SQO Parameters include: Total organic carbon (TOC), Cadmium, Copper, Lead, Mercury, Zinc; lower and higher molecular weighted polycyclic aromatic hydrocarbons (PAHs); PCBs (congeners); DDTs; Chlordane; and Dieldrin.

(g) SQO will be performed twice during the first five years of the CIMP implementations, once as part of the Stressor Identification to be completed by Spring 2017 and once in coordination with the BIGHT ’18 program (at random sites).

2.3 Wet Weather Monitoring Mobilization

The Permit requires storm water monitoring during the first significant storm of the year. Section C.1.b(iii) of the MRP establishes mobilization criteria for the first significant storm as the first storm of the year with a 70 percent (%) probability of at least 0.25-inch rainfall, at least 24 hours prior to the start of a rainfall event. The Permit defines a storm event as greater than or equal to 0.1 inch of precipitation, as measured from at least 50% of the County controlled rain gauges within the region. The Bacteria TMDL also defines wet weather as rainfall of 0.1 inch or more. Although the Toxics TMDL does not establish storm mobilization criteria, the Toxics TMDL CMP established a 0.1-inch threshold for storm water monitoring, and capped the number of monitoring events to 24 storms per year.

According to both the Permit and the Bacteria TMDL, wet weather events shall be separated by a minimum of three days of dry conditions (e.g., less than 0.1 inch of rain each day). A minimum of three days of dry conditions (i.e., 72 hours) is also required between a qualified storm event and a non-storm water monitoring event.

For purposes of this CIMP, mobilization for wet weather receiving water monitoring will occur when the following criteria are met:

1. 70% probability of at least 0.1-inch rainfall, at least 24 hours prior to the start of a rainfall event using National Weather Service (NWS) forecast tools. Every attempt will be made to monitor acceptable storms; however, if a storm is not predicted at least 24 hours in advance, it may not be possible to monitor the event.
2. At least three days of dry conditions (e.g., less than 0.1 inch of rain each day) prior to the storm event.

2.4 Monitoring Coordination

Monitoring requirements of the Permit, Bacteria TMDL, and Toxics TMDL include several iterative elements that are incorporated into the overall design and implementation of this CIMP. Considering the multiple possible avenues to demonstrate TMDL compliance, such as BMP implementation and/or water quality monitoring, development of the monitoring approaches will likely require ongoing stakeholder engagement with the Regional Board and affected responsible parties.

Monitoring under the Bacteria and Toxics TMDLs is conducted by two different agencies. The Toxics TMDL monitoring, in accordance with the Toxics TMDL CMP, is conducted by the County. The Bacteria TMDL monitoring, in accordance with the TMDL CMP, is conducted by the City of Los Angeles and samples are collected and analyzed by Hyperion Laboratory.

Currently, compliance monitoring for the Permit is conducted regionally by the County. It is anticipated that new Permit monitoring requirements in the MdR Watershed will continue to be coordinated and implemented by the County on behalf of the other MdR EWMP Agencies.

2.5 Receiving Water Monitoring Summary

Eighteen receiving water stations in the MdR EWMP were selected to address both Bacteria and Toxics TMDLs and Permit monitoring requirements. Nine receiving water stations were selected for Bacteria TMDL monitoring, eight receiving water stations were selected for only the Toxics TMDL monitoring, and one receiving water station was selected for Permit-required receiving water monitoring and Toxics TMDL monitoring. Monitoring parameters and frequency are summarized in Table 2-3 by regulatory driver and station.

3.0 MS4 INFRASTRUCTURE DATABASE

To meet the requirements of Part VII.A of the MRP, a map(s) and/or database of the MS4's storm drains, channels, and outfalls must be submitted with this CIMP and include detailed information (as described in the Permit, page E20-21). An inventory of storm drains, channels, and MS4 outfalls (Inventory) will be maintained by each of the MdR EWMP Agencies in accordance with these Permit requirements. The Inventory will be developed using existing data from Illicit Connection/Illegal Discharge (IC/ID) investigations, institutional knowledge of the MdR Watershed, and other data and observations documenting outfall conditions from historical studies (i.e., Weston Solutions, Inc. [Weston], 2008a; Los Angeles County Department of Beaches and Harbors [LACDBH], 2004). Each EWMP Agency is responsible for the development, maintenance, and upkeep of the MS4 outfall database and will maintained the database for Permit compliance.

The Non-Storm Water Outfall Program requires the development of an MS4 outfall database by the time that this CIMP is submitted. The objective of the MS4 database is to geographically link the characteristics of the outfalls within the MdR Watershed with watershed characteristics including: subwatershed, waterbody, land use, and effective impervious area (EIA). The information will be compiled into Geographic Information System (GIS) layers as described below.

3.1 Available Information

This section summarizes the GIS database submitted with the CIMP and the existing infrastructure information available for the MdR Watershed.

3.1.1 CIMP GIS Database

The GIS database submitted concurrently with this CIMP (Appendix G) was developed using a compilation of data described in this section. Data are continually gathered by the MdR EWMP Agencies and are continually imported into the GIS database. The information is summarized in Table 3-1.

Table 3-1. GIS Database Elements Submitted with CIMP

Permit Section	Database Element	Status	GIS File Names	Original Sources[5]
VII.A.1	Surface water bodies within MdR Watershed	Submitted	surface_waterbody_polygons_MdR	National Hydrography Dataset (NHD)
VII.A.2	HUC-12 boundary	Submitted	MdR_boundary	Los Angeles County Sub Watersheds, LADPW
			MdR_subwatersheds	Los Angeles County Sub Watersheds, LADPW
VII.A.3	Land Use overlay	Submitted	landuse_with_jurisdiction_MdR	Based upon a combination of data sources, including 2008 land use data from SCAG and LA County Watershed Management Modeling System (WMMS) land use, modified/updated for use in EWMP assessment. Intersected with jurisdictional boundaries.
VII.A.4	Effective Impervious Area (EIA) overlay (if available)	Submitted	hruimp061913_as_is_clip_MdR	LA County WMMS land use, LADPW
VII.A.5	Jurisdictional boundaries	Submitted	jurisdictional_bndries_MdR	Los Angeles County Department of Regional Planning
VII.A.6	Location and length of all open channel and underground pipes 18 inches in diameter or greater	Submitted	Open_Channels_MdR	Storm Drain network data from LADPW
			SDLateral_LADPW_MdR	Storm Drain network data from LADPW
			SDMain_LADPW_MdR	Storm Drain network data from LADPW
			Storm_Drain_Line_A	Digitized by Weston from as-built drawings
			SDMain_CulverCity	City of Culver City
			SDLateral_CulverCity	City of Culver City
VII.A.7	Location of all Dry Weather Diversions	Submitted	Dry_Weather_Diversions_MdR	Mapped from coordinates in table provided by LADPW
VII.A.8	Location of all major MS4 Outfalls* within the EWMP Agency's jurisdictional boundary. Each major outfall has been assigned an alphanumeric identifier and mapped.(1)	Submitted	County_Outfalls_GE18LT36in_MdRH County_Major_Outfalls_GE36in_MdRH	LACFCD owned outfalls, provided by LADPW
			City_of_LA_Outfall_GE18LT36in_MdRsw2 City_of_LA_Major_Outfalls_GE36_MdRsw2	City of Los Angeles

Permit Section	Database Element	Status	GIS File Names	Original Sources[5]
VII.A.10	Storm drain outfall catchment areas of each major outfall within the MdR Agencies' jurisdiction.[(2)]	Submitted	MdR_MS4_Drainage_Areas	Delineated by Weston
VII.A.11a	MS4 Outfall Ownership[(3)]	Submitted	See files listed for VII.A.8	Files based on public agency data provider
VII.A.11b	MS4 Outfall Coordinates	Submitted	See files listed for VII.A.8	Provided in GIS file
VII.A.11c	Physical Description of MS4 Outfall	Submitted	See files listed for VII.A.8	Provided in GIS file, see report for additional details recorded during field activities.
VII.A.11d	Photographs of the Outfall, where possible, to provide baseline information to track operation and maintenance needs over time.[(4)]	Ongoing/ Submitted		

*All major Outfalls greater than 36 inches have been identified and defined.

(1) Permit MRP Section VII.A.6 requires the MS4 database and maps to include "all open channel and underground pipes 18 inches in diameter or greater" as part of the Outfall-based assessment program and MS4 database. Due to tidal inundation, these Outfalls have been included for reference purposes only and generally are not considered monitorable for non-storm water assessment.

(2) Drainage areas were not built for the four 36" outfalls identified in Venice Canal.

(3) To the maximum extent feasible.

(4) Photographs were included in historic Outfall assessments and have been provided as an electronic attachment to this CIMP in support of field reconnaissance activities. The MdR EWMP Agencies also collect and manage photos which are maintained and managed by each member separately.

(5) This column provides the original source of the data. Data have been modified from original as needed for use in CIMP (for example, clipped to MdR watershed boundary or intersected with other datasets for combined attribute information).

3.1.2 Existing Infrastructure

In 2004, the County, City of Los Angeles, City of Culver City, and Caltrans conducted an assessment of small storm drains across the MdR Watershed (LACDBH, 2004). The MS4 infrastructure in the MdR Watershed includes four MS4 major outfalls. For the purposes of this MdR CIMP, an MS4 major outfall, as defined by Attachment A of the Permit, is an MS4 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 a circular pipe that is associated with a drainage area of more than 50 acres; or for municipal separate storm sewers that receive storm water from lands zoned for industrial activity [based on comprehensive zoning plans or the equivalent], an outfall that discharges from a single pipe). The characteristics and locations of each major outfall have been summarized in Table 3-2 and are represented on Figure 1-1 as yellow dots. Outfalls with an inner diameter of greater than or equal to 18 inches and less than 36 inches are represented on Figure 1-1 as green dots. The available infrastructure information from digitized MS4 data provided by the MdR EWMP Agencies is summarized in Table 3-4. As indicated by the 2004 Small Drain Report (LACDBH, 2004) and MS4 reconnaissance conducted in 2013 as part of the development of this CIMP (Appendix B), the MS4 system in the MdR Watershed is strongly influenced by tide and a majority of the drains that discharge to the Harbor are partially or fully submerged at their discharge to the receiving water. Due to tidal inundation, these outfalls have been included for reference purposes only and generally are not considered monitorable for non-storm water assessment.

Major outfall CSTL-022A represents discharge from Subwatershed 3 to Basin E, approximately 17.5% (324.7 acres) of the total drainage area of the MdR Watershed. Major outfalls CSTL-022B and C are connected to Oxford Retention Basin, which receives discharge from Subwatershed 4. These major outfalls discharge to Basin E and represent approximately 36.2% (671.1 acres) of the total drainage area of the MdR Watershed. All three major outfalls in Basin E are fully submerged during a majority of the tide cycle. The tides gates protecting CSTL-022A are located upstream within the MS4 near the Boone Olive Pump Station. Tide gates have been installed at adjoining outfalls CSTL-022B and CSTL-022C for flow regulation and flood control protection for Oxford Retention Basin. The fourth major outfall in the MdR Watershed (CSTL-023B) discharges from MdR subwatershed 1 to Basin G. CSTL-023B drains roads and parking lots within the County and Caltrans jurisdictional areas. The drainage area is flat and the publicly available MS4 data are limited. The tributary area was approximated using a combination of GIS software and field observations. Based on this desktop analysis, CSTL-023B represents approximately 2.3% (41.8 acres) of the total drainage area of the MdR Watershed. CSTL-023B is fully submerged during the entire tidal cycle and the upstream MS4 is tidally inundated.

The MS4 network tributary to the Grand Canal (i.e., Venice Canals and Ballona Lagoon) includes four major outfalls. It is, however, separated from the MdRH receiving water by a large tide gate.

The characteristics and locations of these major outfalls have been summarized in Table 3-2 and are represented on Figure 1-1 as yellow dots.

Table 3-2. Major Outfalls in the MdR Watershed (Diameter ≥ 36 inches)

Outfall ID	Location	MdR Subwatershed	Diameter (inches)	Material	Tidal Influence
CSTL-022A	Basin E	3	51	RCP	Yes; Fully submerged Majority of Tide Cycle; Tide Gate
CSTL-022B	Basin E	4	72	RCP	
CSTL-022C	Basin E	4	72	RCP	
CSTL-023B	Basin G	1	54	RCP	Yes; Always Submerged
22	Grand Canal	2	64	RCB	Half Submerged, Controlled by Tide Gate
21	Grand Canal	2	66	RCB	
7	Grand Canal	2	84	RCB	Fully Submerged
10	Grand Canal	2	84	RCB	Fully submerged, Controlled by Tide Gate

RCB - Reinforced Concrete Box; RCP - Reinforced Concrete Pipe

Several improvements have been made to control runoff to the MS4 infrastructure in the MdR Watershed. Immediately upstream of the tidally influenced zone, LFDs have been installed to redirect non-storm water discharges from the MS4 to the sanitary sewer, that otherwise would have discharged through outfalls CSTL-023A, B, and C into Basin E. Details of the three LFD projects are summarized in Table 3-3. In 2007, Line A, a storm water diversion system, was constructed. This system captured storm water runoff from parking lots and land uses surrounding Marina Beach and directed it to Basin C (Figure 1-1). The outfall for storm drain Line A is a 30-inch RCP that diverts the 10-year frequency runoff storm event from Parking Lots 10 and 11, neighboring restaurants, and streets (an approximate 11-acre area, adjacent to Basin D) into Basin C.

Table 3-3. Existing Low Flow Diversion Structures in MdR Watershed

Location of Diversion	Design	Outfall ID	Receiving Water	Diversion Discharge Endpoint
Project 5243: Intersection of Washington Blvd. and Thatcher Ave[(a)]	Low Flow Diversion with a capacity of 92,000 GPD and overtopping flow (significant flow) of 0.22 CFS.	CSTL-022B, CSTL-022C	Basin E	Sanitary Sewer
Project 3872: Oxford Flood Control Basin Pump House[(a)]	Low Flow Diversion with a capacity of 288,000 GPD and overtopping flow (significant flow) of 0.45 CFS.	CSTL-022B, CSTL-022C	Basin E	Sanitary Sewer
Project 3874: Boone-Olive Pump Station Control House[(a)]	Low Flow Diversion with a capacity of 92,000 GPD and overtopping flow (significant flow) of 0.22 CFS.	CSTL-022A	Basin E	Sanitary Sewer

[(a)] Completed 03/2007
CFS – cubic feet per second; GPD – gallons per day

Table 3-4. MdR Watershed Outfalls with Diameters Greater than or Equal to 18 Inches and Less than 36 Inches

Outfall ID	Location	MdR Subwatershed	Diameter (inches)	Material	Tidal Influence
MdR Harbor					
CSTL-019	Main Channel	1	18	CMP	Likely None
CSTL-020A	Basin A	1	18	RCP	Fully Submerged
CSTL-020B	Basin A	1	18	RCP	Fully Submerged
CSTL-020C	Basin B	1	18	RCP	Possibly submerged at High tides
CSTL-021	Basin B	1	18	RCP	Possibly submerged at High tides
CSTL-022D	Main Channel	1	18	CMP	Tidal
CSTL-023A	Basin F	1	18	RCP	Tidal
CSTL-024A	Basin H	1	18	CMP	Fully Submerged
CSTL-024B	Main Channel	1	21	RCP	Possibly submerged at High tides
CSTL-024C	Main Channel	1	18	ACP	Fully Submerged
Storm Drain Line A	Basin D → Basin C	1	30	RCP	Possibly submerged at High tides
Grand Canal (Venice Canals / Ballona Lagoon)					
33	Ballona Lagoon	2	18	Unknown	Fully Submerged
30	Ballona Lagoon	2	18	Unknown	Fully Submerged
9	Ballona Lagoon	2	18	Unknown	Fully Submerged
6	Ballona Lagoon	2	18	Catch basin	Fully Submerged
5	Ballona Lagoon	2	18	Catch basin	Fully Submerged
4	Ballona Lagoon	2	18	Concrete	Fully Submerged
3	Ballona Lagoon	2	18	Concrete	Fully Submerged
23	Ballona Lagoon	2	18	PVC	Visible[#]
31	Ballona Lagoon	2	18	Concrete	Visible
24	Ballona Lagoon	2	18	Concrete	Visible
11	Ballona Lagoon	2	18	PVC	Half Submerged[#]
8	Ballona Lagoon	2	18	Concrete	Half Submerged[#]
12	Ballona Lagoon	2	18	PVC	Visible[#], Controlled by Tide Gate
13	Ballona Lagoon	2	18	PVC	Visible[#]
15	Ballona Lagoon	2	18	PVC	Half Submerged[#]
16	Ballona Lagoon	2	18	PVC	1/3 Submerged[#]
18	Ballona Lagoon	2	18	PVC	Half Submerged[#]
19	Ballona Lagoon	2	18	PVC	1/3 Submerged[#]
20	Ballona Lagoon	2	18	PVC	Half Submerged[#]
17	Ballona Lagoon	2	18	PVC	Submerged[#]
14	Ballona Lagoon	2	18	PVC	Half Submerged[#]
32	Ballona Lagoon	2	22	Concrete	Visible
26	Ballona Lagoon	2	24	Concrete	Visible[#]
28	Ballona Lagoon	2	24	Concrete	Tide Gate
29	Ballona Lagoon	2	34	Concrete	Half Submerged

Table 3-4 Notes:
ACP - Asbestos Cement Pipe; CMP - Corrugated Metal Pipe; RCB - Reinforced Concrete Box; RCP - Reinforced Concrete Pipe; PVC - Polyvinyl Chloride
#Downstream End of Venice Canals

3.2 Pending Information and Schedule for Completion

The elements described in Table 3-5 represent pending information that is primarily expected to be an outcome of implementing this CIMP and outfall-based monitoring programs. As such, a schedule for completing each of the elements is provided. As the data become available, they will be entered into the GIS and water quality databases. Each year, the storm drains, channels, outfalls, and associated databases will be updated to incorporate the most recent characterization data for outfalls. The updates will be included as part of the annual reporting to the Regional Board.

Table 3-5. Pending Information for MS4 Database and Elements to be developed through CIMP Implementation

Permit Section	MS4 Database Requirement/Element	Status	Date of Submission
VII.A.9	Notation of outfall with significant non-storm water discharges	Generally not applicable	June 2016
VII.A.10	Details of analysis of outfall catchment areas for potential new outfall monitoring locations	As needed	Ongoing assessment of Venice Canals
VII.A.11.e	Determination of whether the outfall conveys significant non-storm water discharges	Generally not applicable	June 2016
VII.A.11.f	Outfall monitoring data	Ongoing. Anticipated to be limited to storm water data.	Ongoing

4.0 STORM WATER OUTFALL MONITORING

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

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

4.1 Storm Water Outfall Monitoring Sites

Outfall monitoring stations are monitoring stations within the MS4 system of the MdR Watershed. These stations are used to evaluate watershed conditions in accordance with the Toxics TMDL CMP and related special studies. The sites were selected based on an evaluation of the representativeness of the land uses draining to the outfall location, the jurisdictions draining to the outfall location, the safety and accessibility of the site, and the ability to use autosampling equipment at the location. The data collected at the monitored outfalls will be considered representative of all MS4 discharge within the MdR Watershed EWMP area and will be applied to all MdR EWMP Agencies, regardless of whether a site is located within a particular jurisdiction. Assessment of whether an MdR Agency caused or contributed to exceedances of WQBELs and/or RWLs may be based on the evaluation of comingled discharges. This approach will provide the representative data needed to meet the specific MRP objectives for storm water outfall monitoring and support management decisions of the MdR EWMP Agencies.

The MdR Watershed includes five outfall stations MdR-3, MdR-4, MdR-5, MdRU-C-1, and MdRU-C-2. The locations of these outfalls are summarized in Table 4-1. The tributary drainage area, MS4, jurisdictional boundaries, land uses, and downstream outfall for these Toxics TMDL monitoring stations are presented in Figure 4-1 through Figure 4-4. Note that in 2013, outfall stations MdR-1 and MdR-2 were removed from the Toxics TMDL monitoring program and CMP due to redundancy with downstream outfall station MdR-3 and a decision to focus on an integrated compliance monitoring approach rather than a jurisdiction-specific pollutant reduction compliance monitoring approach.

Table 4-1. MdR Outfall Monitoring Stations

CIMP Station ID[a]	Media Sampled	Monitoring Station Description
MdR-3[b]	Water, Storm-Borne Sediment	Permit Compliance Outfall Station/Toxics TMDL Outfall Station, at the intersection of Washington Blvd. and Thatcher Ave. LFD Project No. 5243
MdR-4[b]	Water, Storm-Borne Sediment	Toxics TMDL Outfall Station at the Oxford Flood Control Basin pump house. LFD Project No. 3872
MdR-5[b]	Water, Storm-Borne Sediment	Toxics TMDL Outfall Station at the Boone-Olive Pump Station control house. LFD Project No. 3874
MdRU-C-1	Water, Storm-Borne Sediment	Toxics TMDL Outfall Station at the catch basin located north of Bali Way and Admiralty Way
MdRU-C-2	Water, Storm-Borne Sediment	Toxics TMDL Outfall Station at the catch basin located north of Abbot Kinney Blvd. and Woodlawn Ave.

[a]Former Outfall monitoring stations MdR-1 and MdR-2 were removed from the Toxics TMDL CMP with Regional Board approval.
[b]Low flow diversions (LFDs) have been installed and divert all known significant Non-storm Water flows to the sanitary sewer. Only Storm Water monitoring is anticipated to be necessary.

Outfall station, MdR-3, is the representative Permit monitoring station. The station selected for Permit compliance monitoring is the most representative of watershed impacts to the Harbor. MdR-3 was selected as the MdR outfall station based on total tributary drainage area, mix of land uses, diversity of jurisdictions, and presence of BMPs (see Appendix B). A map of the tributary drainage area to MdR-3, as well as the land uses and jurisdictional boundaries within the drainage area, is presented in Figure 4-1.

All five outfall stations MdR-3, MdR-4, MdR-5, MdRU-C-1, and MdRU-C-2 are monitoring stations under the Toxics TMDL compliance monitoring.

In general, a higher concentration of constituents from urban runoff enters the MS4 during the initial stages of flow and during peak flow and/or peak rainfall intensity for small rainfall events, which are typical in southern California (Tiefenthaler et al., 2001). Therefore, a successful storm water monitoring event for sampling within the MS4 will be determined by capturing (at a minimum) the initial rise and peak of runoff from the storm event, and by demonstrating that water levels have decreased in relation to the overall storm hydrograph when monitoring is discontinued. A minimum of three days of dry conditions (i.e., 72 hours) is required between qualified storm events.

Flow-weighted storm water composite sampling will be conducted at all outfall stations for Permit compliance, Toxics TMDL compliance, and watershed assessments for special studies. Grab samples will be collected for analysis of parameters not amenable to composite sampling (e.g. bacteria, oil and grease). A full list of these parameters is included in Appendix D. The duration of monitoring at the outfalls will be determined by the characteristics of the storm event and will consist of a minimum of 3 hours and a maximum of 24 hours.

For storm-borne sediment collection, the passive collection devices will be deployed the day of the storm event or, if the rain is expected overnight, the devices will be deployed the afternoon before. For the pumped collection systems located at MdR-5, the submersible pumps will be placed in the wet well in advance but will not be turned on until the storm discharge begins. The typical cycle for observations during a storm event is approximately once an hour. The observations at the passive sediment sites (MdR-3, MdR-4, MdRU-C1, and MdRU-C2) will primarily focus on checking for debris build up and snags on the devices. The observations at the two pumped samplers at MdR-5 will focus on monitoring the filter processing rate to identify pump clogs and/or filter saturation.

Figure 4-1. Outfall Station MdR-3 – Permit and Toxics TMDL Monitoring

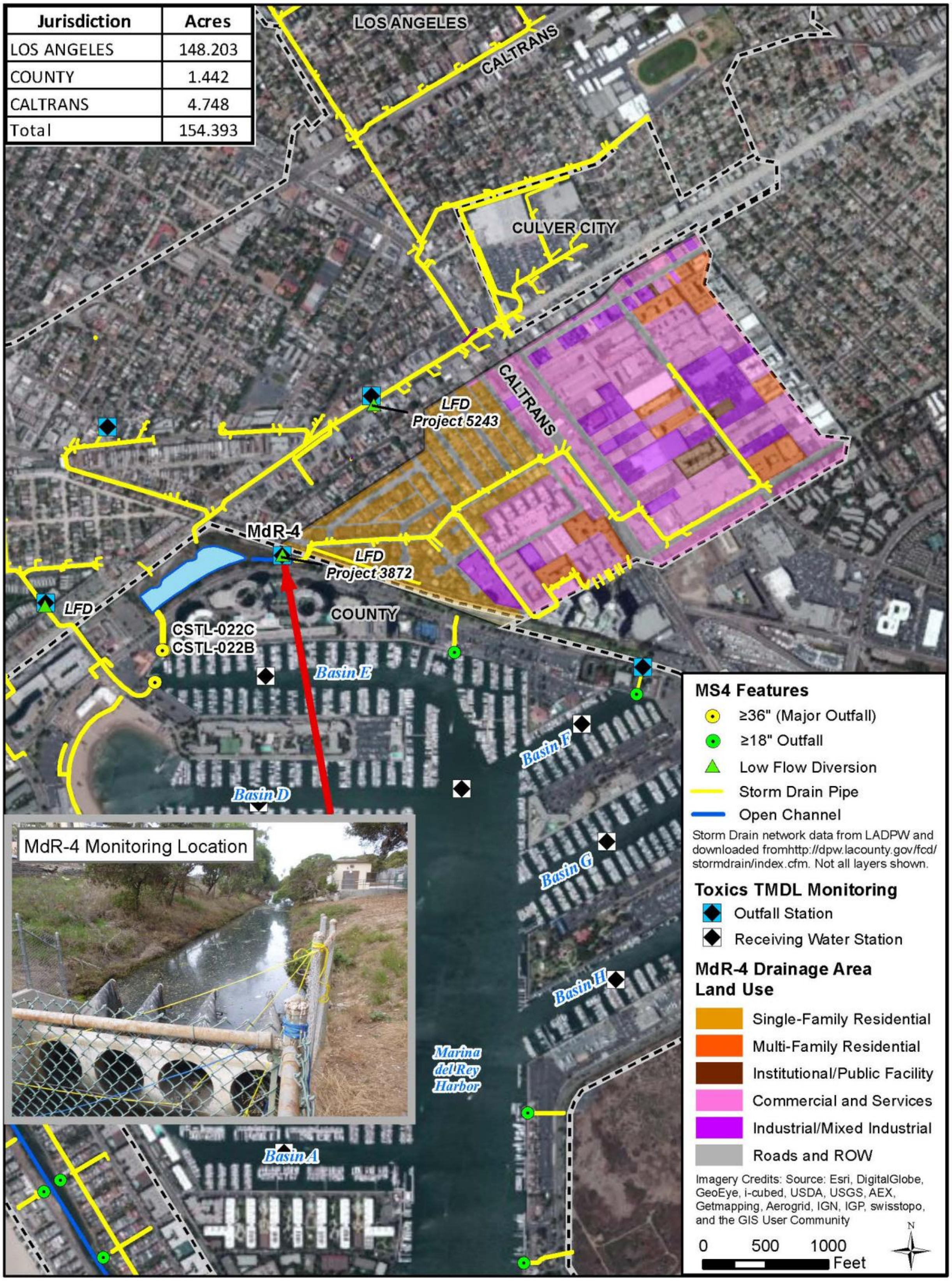

Figure 4-2. Outfall Station MdR-4 – Toxics TMDL Monitoring

Figure 4-3. Outfall Station MdRU-C-1 (Toxics TMDL Monitoring) and Tidally Submerged MS4 Tributary to Major Outfall CSTL-023B

Figure 4-4. Outfall Stations MdR-5 and MdRU-C-2 – Toxics TMDL Monitoring

4.2 Monitored Parameters and Frequency

This section presents an overview of outfall storm water and outfall storm-borne sediment monitoring frequency and parameters. Refined parameter lists, complete with analytical methods and detection limits are provided in Appendix D. Sampling methods, sample handling procedures, and details regarding the collection of QA/QC samples are detailed in Appendix C.

Outfalls will be monitored for all required constituents in accordance with the Toxics TMDL, as amended by Resolution No.R14-004. In addition, the representative Permit monitoring station, MdR-3, will be monitored in accordance with MRP Section VIII.B.c. Monitoring will be conducted during the wet weather monitoring season of October 1st through April 15th. The WMG Agencies will attempt to capture storms occurring in September and early May, if feasible, based upon readiness and other constraints (such as sample holding times for storm-borne sediment).

Permit monitoring at MdR-3 will occur during the first significant storm event of each wet weather monitoring season and two additional storm events during each wet weather season (see Section 4.2 for mobilization criteria). Toxics TMDL storm water and storm-borne sediment outfall monitoring will occur during up to fifteen storms per wet weather season. Fifteen was selected as the maximum number of monitored storm events each wet weather season after a review of historic rainfall data from 1940-2014 (see Section 4.3 for additional discussion). The maximum number of storm events (>0.1 inch with 72 hours of antecedent dry weather) observed in the wet weather months (October-April) during a given year in this time period was fifteen (occurred once during that time period).

Storm-borne sediment samples collected during each storm will be composited at the end of the monitoring season into composite samples for each station. Sampling may cease at a Toxics TMDL outfall monitoring station once enough storm-borne sediment has been collected during the season to analyze the composite sample in duplicate (one composite sample and one duplicate composite sample), or once fifteen storms have been monitored in a wet weather season, whichever comes first.

The amount of storm-borne sediment collected varies at each of the Toxic TMDL outfall stations based on many factors including the size of the sub-watershed draining to the outfall and the land use of the area surrounding the outfall, as well as physical attributes of the outfall itself. Additionally, storm-borne sediment collected during a wet weather event at MdR-5 is only included in the composite sample when storm water flows exceed the capacity of the LFD. If the LFD capacity is not exceeded during a particular wet weather event, then there is no storm flow discharging from this station into Basin E and the storm-borne sediment collected would not be used in the composite sample. A similar situation occurs at MdR-4, which is located in the Oxford Basin pump house (Table 4-1 and Figure 4-2).

An overview of the monitoring frequency and constituents for monitoring, including physical, bacterial, chemical, and toxicity analyses of water and storm-borne sediment samples from the MdR outfalls, is presented in Table 4-2.

Toxicity sampling will be conducted at the MdR-3 outfall station for Permit compliance monitoring in accordance with the MRP and the August 7, 2015 LARWQCB Toxicity Memo. Toxicity sampling will only occur at MdR-3 if it is triggered by the steps outlined in the MRP and clarified in the Toxicity Memo (See Appendix C for additional details). Toxicity testing shall be conducted on a flow-weighted composite sample. If the sample from the outfall discharge exhibits aquatic toxicity, then a Toxicity Identification Evaluation (TIE) shall be conducted in accordance with the requirements outlined in Appendix C.

Additionally, in accordance with MRP Section VIII.B.1.d, parameters listed in Table E-2 of the MRP that are identified as exceeding the lowest applicable WQO at the nearest downstream receiving water station (MdRH-MC) will be monitored during subsequent storm events at MdR-3.

Table 4-2. Storm Water Outfall Monitoring Stations Sampling Parameters and Frequency

Parameter	Permit, Toxics TMDL*	Toxics TMDL**				
	MdR-3	MdR-3	MdR-4	MdR-5	MdR-CU-1	MdR-CU-2
WATER QUALITY						
Flow	3/year	Up to 15 /year	Up to 15 /year	Up to 15 /year	Up to 15 /year	Up to 15 /year
Field Parameters(a)	3/year	-	-	-	-	-
Pollutants identified in Table E-2 of Permit *(and not otherwise listed below)*#	3/year	-	-	-	-	-
Aquatic Toxicity	(b)	-	-	-	-	-
Indicator Bacteria: Total Coliform, *E. coli*, *Enterococcus*	3/year					
Hardness	3/year	-	-	-	-	-
Total Dissolved Solids (TDS)	3/year	Up to 15 /year	Up to 15 /year	Up to 15 /year	Up to 15 /year	Up to 15 /year
Total Suspended Solids (TSS)	3/year	Up to 15 /year	Up to 15 /year	Up to 15 /year	Up to 15 /year	Up to 15 /year
Settleable Solids	3/year	Up to 15 /year	Up to 15 /year	Up to 15 /year	Up to 15 /year	Up to 15 /year
STORM-BORNE SEDIMENT						
Total Organic Carbon (TOC)	Composited over the year Up to 15 storms per year or until enough sample is collected at a station to run the sample and a duplicate. Approximately 54 grams/sample are needed to run a sample. Therefore, a sample plus a duplicate would require 108 grams of sediment.					
Copper						
Lead						
Zinc						
Chlordane						
Total PCBs						
Total Dichlorodiphenyltrichloroethane (DDTs)						
p,p'-DDE						

*Permit monitoring will occur during the first significant storm of the year and two additional storms each wet weather season (October 1st – April 15th).
**TMDL monitoring will be performed for up to 15 storms year wet weather season (October 1st – April 15th). See Section 4-3 for additional discussion.
Table E-2 constituents detected above relevant objectives at the MS4 receiving water monitoring station.
(a) Field parameters are defined as dissolved oxygen (DO), pH, temperature, and specific conductivity.

Parameter	Permit, Toxics TMDL*	Toxics TMDL**				
	MdR-3	MdR-3	MdR-4	MdR-5	MdR-CU-1	MdR-CU-2
(b) Toxicity sampling at outfall stations for Permit compliance will be as needed and conducted in accordance with the MRP and the Regional Boards Toxicity Clarification Memo dated August 7, 2015.						

4.3 Storm Water Monitoring Mobilization Criteria

The Permit requires storm water monitoring during the first significant storm of the year. Section C.1.b(iii) of the MRP establishes mobilization criteria for the first significant storm as the first storm of the year with a 70% probability of at least 0.25-inch rainfall, at least 24 hours prior to the start of a rainfall event. The Permit defines a storm event as greater than or equal to 0.1 inch of precipitation, as measured from at least 50% of the County controlled rain gauges within the region. The Bacteria TMDL also defines wet weather as rainfall of 0.1 inch or more. Although the Toxics TMDL does not establish storm mobilization criteria, the Toxics TMDL CMP established a 0.1-inch threshold for storm water monitoring, and capped the number of monitoring events to 24 storms per year.

According to both the Permit and the Bacteria TMDL, wet weather events shall be separated by a minimum of three days of dry conditions (e.g., less than 0.1 inch of rain each day). A minimum of three days of dry conditions (i.e., 72 hours) is also required between a qualified storm event and a non-storm water monitoring event.

For purposes of this CIMP, mobilization for storm water monitoring will occur when the following criteria are met:

1. 70% probability of at least 0.1-inch rainfall, at least 24 hours prior to the start of a rainfall event using NWS forecast tools. Every attempt will be made to monitor acceptable storms; however, if a storm is not predicted at least 24 hours in advance, it may not be possible to monitor the event.
2. At least three days of dry conditions (e.g., less than 0.1 inch of rain each day) prior to the storm event.

If during implementation of this CIMP, it becomes necessary to adjust the mobilization criteria to improve the likelihood of capturing qualifying storm events, the EWMP Agencies will do so and will notify the Regional Board.

A review of rainfall data from 1940 to 2014 at the Los Angeles International Airport (LAX) rain gauge was conducted to determine the average number and range of storms events (rainfall greater than 0.1 inches with 72 hours of antecedent dry weather) during the wet weather monitoring months of October through April, (Table 4-3). Results indicate the average number of storms for each month is below two storms and the average number of storms per wet weather monitoring season is 8.55. The maximum number of storms observed in one year during the wet weather months of October through April was 15. Based on this analysis, each of the Toxics TMDL storm water monitoring stations will be monitored during the wet weather monitoring period of October 1st – April 15th for up to 15 storms, or until sufficient sediment has been collected to run the sample and a duplicate.

Table 4-3. Number of Storm Events 1940-2014

Month	Minimum	Maximum	Average
January	0	4*	1.45
February	0	3	1.34
March	0	3	1.53
April	0	3	0.91
October	0	3	0.66
November	0	3	1.15
December	0	4	1.53
Average Number of Storms per Year (October – April)			8.55
Maximum Number of Storms per Year (October – April)			15**
* Occurred during 1998 ** Occurred during 2010			

The Bacteria TMDL compliance monitoring program will not be impacted because bacteria samples are collected and analyzed on a scheduled basis (daily and/or weekly). The wet/dry weather season classification of bacteria samples will continue to be characterized based on the 0.1-inch storm threshold of the Bacteria TMDL.

4.4 Storm Water Outfall Monitoring Summary

Five outfall monitoring locations were selected for monitoring. One station (MdR-3) was selected for both Permit monitoring and Toxics TMDL monitoring, along with four additional stations which will be monitored as part of the Toxics TMDL outfall monitoring. These stations will capture runoff from representative land use areas, represented in Figure 4-1 through Figure 4-4, of the MdR Watershed and will also be used to assess Permit and Toxics TMDL compliance in accordance with applicable storm water Municipal Action Levels (MALs) and WQBELs.

5.0 NON-STORM WATER OUTFALL PROGRAM

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

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

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

The NSW Outfall Program is focused on NSW discharges (i.e., discharges occurring during dry weather) to receiving waters from major outfalls (≥36 in diameter or ≥12 in from industrial areas).

5.1 Non-Storm Water Outfall Screening and Monitoring Program

There are eight major outfalls (≥36 inch diameter) in the MdR Watershed (Table 3-2). Four of these outfalls are located in Subwatershed 2 and four of them are located in Subwatershed 1 (Figure 1-1). There are LFDs installed upstream of three of the four major outfalls in Subwatershed 1, CSTL-022A, B, and C (Figure 4-1), that divert non-storm water flows to the sanitary sewer. The remaining major outfall, CSTL-023B, is strongly tidally influenced throughout the system and tidal flow is not discernable from non-storm water discharges. All four of the major outfalls located in Subwatershed 2 are tidally influenced and are inundated with marine waters at all times.

The tidal inundation of the major outfalls in the MdR Watershed does not allow for the sampling of outfall discharge. Potential discharge (where not addressed by a LFD) is co-mingled with marine waters, making it impossible to discern the impact of potential non-storm water runoff to the receiving water. Since all the major outfalls are inundated, the WMG Agencies will conduct visual observations at all catch basins (that are not served by an LFD or BMP) that have capacity to handle non-storm water discharges and that discharge to a major outfall. The observations will be used determine if further investigation is required. See Figure 5-1.

The City of Los Angeles, the County, and LACFCD currently conduct non-storm water observations for the major outfalls located in Subwatershed 1 under the MdRH Bacteria TSO issued on July 10, 2014. The agencies are required to conduct weekly observations and sampling of non-storm water (if present) at major MS4 outfalls during low tide and submit annual progress reports to the LARWQCB. The City of Los Angeles is also required to conduct monthly field observations and submit semi-annual summary reports. The County and City submitted their reports to the LARWQCB on December 15, 2015. Both of these programs are required to extend through December of 2017.

In accordance with the TSO requirements, the County has conducted weekly observations of the major outfalls in the Back Basins, which discharge flow from the Boone Olive Pump Plant and from Oxford Basin. The observations were conducted during low tide and confirm that both major outfalls are always submerged. Due to the fact that the outfalls are submerged, it is difficult to make a determination if non-storm water discharges are present. However, the LACFCD confirms with their telemetry equipment that there are no non-storm water discharges from the Boone Olive pump plant on a regular basis as evidenced by the LACFCD's discovery of the discharge from the permitted construction dewatering activities

To confirm that there are no significant non-storm water inputs to the major outfalls, the County has conducted weekly visual observations of all 13 catch basins in the unincorporated area within the Marina that discharge into the back basins that are not being served by an LFD. This level of observation exceeds what is required in the TSO. These observations have shown that there are no ongoing significant sources of non-storm water discharges into the Back Basins. Due to these observations, County staff has been able to identify and mitigate broken irrigation lines and improper driveway wash-down activities that may have been contributing to minor and occasional non-storm water discharges. For example, on September 3, 2015, County staff identified a consistent flow entering one of the catch basins and was able to trace the flow to a malfunctioning sprinkler system at the Marina City Club Apartments. The County notified the apartment property manager who was able to quickly remedy the situation.

The City of Los Angeles conducted monthly field observations of the 43 catch basins in the 149 acre area north of Oxford Basin that is not served by LFDs (including approximately 30 acres that are served by biofiltration BMPs) (Figure 5-1). This area is tidally influenced, making sampling of the outfall to Oxford Basin infeasible. The findings of these observations were reported to the Regional Board on December 15, 2015. In brief, the majority of the catch basins did not show any signs of water on all field inspections. Five of the 43 catch basins showed damp areas in the gutter immediately upstream of the catch basin on at least one of the seven inspections (April – October 2015), but no flow was observed. Landscape irrigation was determined to be the predominant source, when source identification was possible. There were no prohibited discharges identified during this reporting period. Additional details can be found in the report. On October 14, 2014, the Mayor of the City of Los Angeles issued Executive Order #5 in response to the current drought. Among various other actions, this Executive Directive directs City of Los Angeles facilities to restrict landscape irrigation with potable water to no more than two days a week, and encourages a voluntary reduction of the frequency of outdoor watering by City residents from three to two days per week. This directive may likely result in less over-irrigation and, accordingly, further reduce any dry weather runoff discharges from the City of Los Angeles to Oxford Basin and Basin E.

Figure 5-1. Extent of Tidal Influence, Major Outfalls and Catchbasins for Visual Inspection in the MdR Watershed

5.2 Identification of Outfalls with Significant Non-Storm Water Discharges

Field reconnaissance conducted in January 2014 confirmed that the MS4 in the MdR Watershed is strongly tidally influenced, limiting opportunities for identification of new monitorable stations representative of all watershed drainage areas (Appendix B). Aside from the three LFDs upstream of three of the four major outfalls in Subwatershed 1, the remaining MdR Watershed MS4 infrastructure that discharges to the Harbor or the Grand Canal is frequently submerged during a period of or the entire tidal cycle. Marine water and other signs of tidal inundation, such as mussels and shells, may be found far up into the watershed. Figure 5-1 draws an approximation of the boundary of tidal influence in the MdR Watershed based on the field reconnaissance summarized in Appendix B.

To determine whether outfalls contribute significant non-storm water discharge, three (3) non-storm water catch basin observation events will be performed for catch basins that discharge into a major outfall. These catch basins are indicated in Figure 5-1. A standard field data collection form will be used, consisting of:

- Visual estimate of flow rate
- Clarity
- Presence of odors and foam

If there is flow more than a garden hose entering the catch basins for at least two of the three observation events, that outfall will be deemed as exhibiting significant non-storm water discharge. The screening process for determining significant non-storm water discharge is presented in Table 5-1.

Table 5-1. Screening Process for Determining Significant Non-storm Water Discharge

Component	Description
Data Collection	Visual flow measurement at identified catch basins
Frequency	Three times
Definition	Outfalls will be determined to be significant non-storm water discharges if the flow entering the catch basins is greater than a garden hose for two of the three observation events.
Timeline	Initiation of the screening process will occur within 90 days of approval of the CIMP.

5.3 Inventory of MS4 Outfalls with Non-Storm Water Discharges

The inventory of MS4 outfalls identified during outfall screening will be developed and updated by the MdR EWMP Agencies to classify outfalls with known significant non-storm water discharges and those requiring no further assessment (Part IX.D of the MRP). If the MS4 outfall requires no further assessment, then the inventory will include the rationale for the determination of no further action required based on the following:

- The outfall is not within the geographical scope of the EWMP Watershed Management Area (WMA);
- The outfall does not have flow since the upstream catch basins have no flow;
- The outfall does not have a known significant non-storm water discharge based on catch basins observation; or
- Discharges observed were determined to be exempt during the source identification

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-storm water discharges. The following physical attributes of outfalls with significant non-storm water discharges will be included in the inventory and collected as part of the screening process in accordance with Section IX.D of the MRP:

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

5.4 Significant Non-Storm Water Discharge Source Identification

Part IX.A.2 of the MRP requires Permittees to classify the source identification results into the following types as summarized below:

A. **IC/ID:** If the source is determined to be an illicit discharge, then 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-Storm Water Discharges:** If the source is determined to be an NPDES permitted discharge, a discharge subject to the

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or a conditionally exempt essential discharge, then the Permittee must document the source. For non-essential conditionally exempt discharges, the Permittee must conduct monitoring consistent with Part IX.G of the MRP for the Regional Board Executive Officer to determine whether the discharge should remain conditionally exempt or be prohibited.

C. **Natural Flows:** If the source is determined to be natural flows, then the Permittee must document the source.

D. **Unknown Sources:** If the source is unknown, then the Permittee must conduct monitoring consistent with Part IX.G of the MRP.

E. **Originates Upstream of EWMP WMA**: If the source is determined to originate from an upstream WMA, then the Permittee will inform the upstream WMA and the Regional Board in writing within 30 days of identifying the presence of the discharge, provide all available characterization data and determination efforts, and document actions taken to identify its source.

Source identification will be conducted using site-specific procedures based on the characteristics of the non-storm water 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-storm water source to be authorized, natural, or essential conditionally-exempt flows, the outfall will require no further assessment. However, if the source identification determines that the source of the discharge is non-essential conditionally exempt, an illicit discharge, 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 the outfall will be added to the monitoring list until non-storm water discharge is eliminated. In some cases, source investigations may ultimately lead to prioritized programmatic or structural BMPs. Where the MdR EWMP Agencies have determined that they will address the non-storm water discharge through modifications to programs or by structural BMP implementation, the MdR EWMP Agencies will incorporate the approach into the implementation schedule developed in the EWMP, and the outfall will be eliminated from the monitoring list.

5.5 Non-Storm Water Discharge Monitoring

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

a. Determine whether a Permittee's discharge is in compliance with applicable dry-weather WQBELs derived from TMDL WLAs;

b. Determine whether the quality of a Permittee's discharge exceeds non-storm water action levels, as described in Attachment G of the Permit; and
c. Determine whether a Permittee's discharge causes or contributes to an exceedance of receiving water limitations.

Thus, catch basins that have been determined to convey significant non-storm water discharges where the source identification concluded that the source is attributable to a continued illicit discharge, non-essential conditionally exempt or unknown source must be monitored. Monitoring will be implemented within 90 days of completing the source identification and will be coordinated with the next receiving water dry-weather monitoring event.

After the catch basins observations and determination of which outfalls have significant non-storm water flows; non-storm water monitoring sites will be monitored for two (2) monitoring events. Identified significant non-storm water 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. Outfalls on the monitoring list will be monitored for at least the duration of the Permit term, or until the non-storm water discharge is eliminated.

5.6 Non-Storm Water Outfall Monitoring Summary

The MdR Watershed is strongly tidally influenced and tidal flow is not discernable from non-storm water discharges. In addition, improvements have been made to the MS4 infrastructure to mitigate and eliminate potential water quality impacts of the MS4 on the Harbor receiving waters. These improvements include the installation of LFDs upstream of the three major outfalls to Basin E.

A brief summary of the non-storm water outfall program for the MdR WMA is as follows:

1. **Catch Basin Observation:** Since all the major outfalls are inundated, all catch basins that are not served by an LFD or BMP that have capacity to handle non-storm water discharges and discharge to a major outfall will be visually inspected to determine if it requires further investigation.
2. **Identification of Outfalls with Significant Non-Storm Water Discharge:** Based on the data collected during the observations, the group will identify MS4 outfalls with significant non-storm water discharges.
3. **Inventory of Outfalls with Non-storm Water Discharges:** Develop an inventory of major MS4 outfalls with known significant non-storm water discharges and those requiring no further assessment.
4. **Prioritized Source Identification:** The data collected during the observation will be used to prioritize outfalls for source identification.
5. **Significant Non-storm Water Discharge Source Identification:** For outfalls exhibiting significant non-storm water discharges, a source identification will be performed per the prioritization completed in the previous element.
6. **Monitoring Non-storm Water Discharges Exceeding Criteria:** Outfalls that have been determined to convey significant non-storm water discharges comprised of either

unknown or non-essential conditionally exempt non-storm water discharges, or continuing discharges attributed to illicit discharges will be monitored.

The MdR EWMP Agencies propose to complete the 100% of the source identification of identified significant non-storm water outfalls by December 28, 2017. After completion of this source identification, and in accordance with the Attachment E, Part IX.B.2 of the Permit, the non-storm water monitoring component of the CIMP will be evaluated and re-assessed during the Permit term.

6.0 TRASH AND PLASTIC PELLET MONITORING

The monitoring and reporting requirements of the *Santa Monica Bay Nearshore and Offshore Debris TMDLs* (Debris TMDL) may be broken up into two categories: (1) Trash and (2) Plastic Pellets. The following subsections detail how the MdR EWMP Agencies will meet the requirements specific to each category.

6.1 Trash

The Debris TMDL became effective on March 20, 2012. The Responsible Agencies identified in the Debris TMDL that also have jurisdiction in the MdR Watershed include the County, LACFCD, City of Los Angeles, City of Culver City, and Caltrans. The Debris TMDL specifies that compliance with the trash WLA (zero discharge) applicable to the MS4 Permittees shall be achieved through implementation of the Ballona Creek Trash TMDL (Resolution No. R08-007). The MdR WMG agencies have met the final compliance deadline in the Ballona Creek Trash TMDL, and corresponding schedule in the 2012 MS4 Permit, through installation of full capture devices. In the City of Los Angeles area of the MdR watershed, 293 catch basins have been retrofitted with trash screens (103 City-owned and 190 LACFCD-owned catch basins with trash screens). The City of Culver City has retrofitted four catch basins and the County has retrofitted 40 catch basins in the MdR with full-capture devices.

The Permit requires Permittees to develop a Trash Monitoring and Reporting Plan (TMRP) to describe the methodologies that will be used to assess and monitor trash from source areas in the Santa Monica Bay (SMB) WMA and shoreline of the Santa Monica Bay. In 2012, the County submitted a TMRP to the Regional Board (Appendix K). The City of Los Angeles will not be developing a TMRP for MdR because the implementation program for the Ballona Creek (BC) Trash TMDL covers the City’s area in MdR. The City of Culver City is in compliance with the TMRP for the Ballona Creek Trash TMDL and is considered in compliance with the Debris TMDL’s trash component.

Trash monitoring will be conducted to assess the quantities of trash in the Harbor receiving water associated with storm events. Visual observations of trash will be made and photographs will be taken at MdRH-MC prior to the start of storm event monitoring and again at the end of the storm water monitoring. One photograph will be taken across the Main Channel of MdRH, perpendicular to direction of flow along the channel. The photograph will show as much as possible of both sides of the Main Channel when feasible. The post storm photograph must be taken from the same vantage point. Ideally the two photographs will display relative volumes of trash that were deposited by storm flows, if trash is present.

6.2 Plastic Pellets

Plastic Pellet Monitoring and Reporting Plans (PMRPs) quantifying potential plastic pellet discharges to Santa Monica Bay, along with supplemental Spill Response Plans (SRPs) to address containment of spilled plastic pellets, were submitted to the Regional Board by the City of Culver City (2012), County (LADPW, 2013a), and LACFCD (2013) (Appendix K). The City of Los Angeles does not have plastic pellet facilities in MdR and is therefore not subject to the pellet monitoring requirements of the PMRP; subsequently, the City of Los Angeles will coordinate plastic pellets spill and response requirements in conjunction with SMB and BC watersheds.

7.0 NEW DEVELOPMENT/RE-DEVELOPMENT EFFECTIVENESS TRACKING

The MdR EWMP Agencies have developed mechanisms for tracking new development/re-development projects that have been conditioned for post-construction BMPs pursuant to Permit Section VI.D.7. The MdR EWMP Agencies have also developed mechanisms for tracking the effectiveness of these BMPs pursuant to Permit Attachment E.X. A sample tracking mechanism is attached for reference (Appendix E).

In 2002, the Permittees developed and implemented the Standard Urban Storm Water Management Plan (SUSMP), a Development Planning Program that outlines BMP requirements for development and re-development projects. The Permit expanded the requirements of the SUSMP program outlined in the previous version of the NPDES permit. The goal of the revised program is to reduce water quality impacts associated with urban development by minimizing impervious surfaces and controlling runoff from impervious surfaces (i.e., smart growth). New Development and Re-Development Projects, defined in Table 7-1, are required to retain on-site the volume of water produced by the greater of the following sources:

- Storm Water Quality Design Volume (SQDV) (i.e., 0.75-inch, 24-hour rain event).
- 85^{th} percentile 24-hour rain event (in accordance with the County's 85^{th} percentile Precipitation Isohyetal Map).

If the analysis determines that on-site containment of the full design volume is technically infeasible, alternative compliance measures such as groundwater replenishment and off-site management should be considered. The technical infeasibility threshold must be demonstrated through an analysis of the maximum application of green roofs and rainwater harvest and use, and the analysis must be endorsed by a registered professional engineer, geologist, architect, and/or landscape architect.

Table 7-1. New Development and Re-development Projects Subject to the Permit BMP Tracking Program Requirements

	Project Area	New Development	Re-Development
Planning and Land Development Program	≥10,000 sq ft and ≥1 acre disturbed area	All Projects	--
	≥10,000 sq ft	Industrial Parks Commercial Malls Streets/Roads	Existing Single-Family Homes in hillside areas[a]
	≥5,000 sq ft	Retail Gas Outlets Restaurants Parking Lots* Automotive Facilities	Alter ≥50% impervious surface at site not subject to post-construction BMPs[a]
	≥2,500 sq ft	All projects located in, directly adjacent to, or discharging directly to the Ballona Creek Coastal Resource Area (CRA) [b]	--
	Single Family Homes in hillside areas	All Projects	New or replace ≥10,000 sq ft impervious surface area.

*Includes parking lots with ≥25 parking spaces.

(a) For projects with <50% impervious surfaces re-developed, only the altered area must be mitigated.

(b) The Permit applies to all projects located in, directly adjacent to, or discharging directly to a Significant Ecological Area (SEA). The County has given the term Coastal Resource Area (CRA) to SEAs located in the California Coastal Zone. The Ballona Creek CRA includes the salt marsh, Ballona Creek Channel, Ballona Lagoon, and Del Rey Lagoon (LADPW, 2014). This criterion would apply to projects directly adjacent to or discharging directly to, the Ballona Creek Wetlands (Area A), Fiji Ditch, and the Ballona Lagoon (i.e., projects along the Venice Canals).

7.1.1 Existing New Development/Re-Development Programs

In accordance with the Permit, the Permittees that have such land use authority over new developments or re-development projects or development construction sites are responsible for implementing a storm water management program to inspect and control pollutants from new development and re-development projects within their jurisdictional boundaries.

The LACFCD has no planning, zoning, development permitting, or other land use authority over new developments or re-development projects located in the incorporated or unincorporated areas of the MdR Watershed.

7.1.1.1 Existing New Development/Re-Development Program – County

In 2008, the County adopted Ordinance 22.52.2210 (Ord. No. 2008-0063 §3, 2008), which incorporates the Low Impact Development (LID) requirements outlined in the Permit into the County Code. This Ordinance is the Local Ordinance Equivalence of the Permit and applies to all of the development and re-development projects identified in Table 7-1. Prior to issuance of building permits and/or commencement of any construction activity, the LID BMPs in the project are reviewed by County staff using the *Standard Urban Stormwater Mitigation Plan Review Sheet* (LADPW, 2008b) and the *County of Los Angeles LID Standards Manual* (LADPW, 2009), which describe LID techniques. The County provided an update of the *LID*

Standards Manual (LADPW, 2014) to comply with the LID requirements of the 2012 MS4 Permit.

7.1.1.2 Existing New Development/Re-Development Program – City of Los Angeles

In May 2012, the City of Los Angeles adopted Ordinance 181899 to amend the Los Angeles Municipal Code (LAMC) and expand the applicability of existing SUSMP requirements to include rainwater LID strategies on all projects requiring a building permit. The Ordinance is enforced through a LID Plan Check process, wherein City staff review project drawings and the associated storm water mitigation plan for LID measures prior to issuance of a building permit. The *Development Best Management Practices Handbook* (City of Los Angeles, 2011) describes LID techniques and provides examples and descriptions of how LID systems function.

7.1.1.3 Existing New Development/Re-Development Program – City of Culver City

In 2002, the City of Culver City adopted Ordinance 2002-014 to amend Chapter 5.05 of the Municipal Code to include LID mitigation as part of the SUSMP. The Ordinance is enforced through a LID Plan Check process, wherein City staff review project drawings and the associated storm water mitigation plan for LID measures prior to issuance of all applicable permits. Potential enforcement actions for identified seasonal and/or recurrent violations of SUSMP provisions include cease and desist orders, notice to clean orders, permit revocation (if applicable), and other potential civil and/or criminal remedies deemed appropriate. In December of 2014, a revised LID ordinance was adopted to achieve a local ordinance equivalent to the Permit.

7.1.2 Data Tracking, Inspection, and Enforcement Requirements for Post-Construction BMPs

Section VI.D.7.d.iv of the Permit requires each Permittee to implement an inspection and enforcement program for new development and redevelopment post-construction BMPs and to track data in an electronic database (preferably with a GIS-interface to the MS4 maps). Figure 7-1 presents an iterative approach to collection, tracking, and reporting and data associated with the New Development and Re-Development Program. Existing SUSMP programs may be standardized between MdR EWMP Agencies and shared using a common electronic tracking platform.

The overall data tracking process may be a linear or an iterative process, as needed, based on the findings of each year of implementation. Potential changes to the program and data collection systems will be considered during the annual reporting process, when all available data from the MdR Watershed is compiled by jurisdiction and reviewed in the context of the Permit and TMDLs. The Permittees will conduct a formal review of the overall data tracking program and make necessary programmatic revisions during Year 3 of the program.

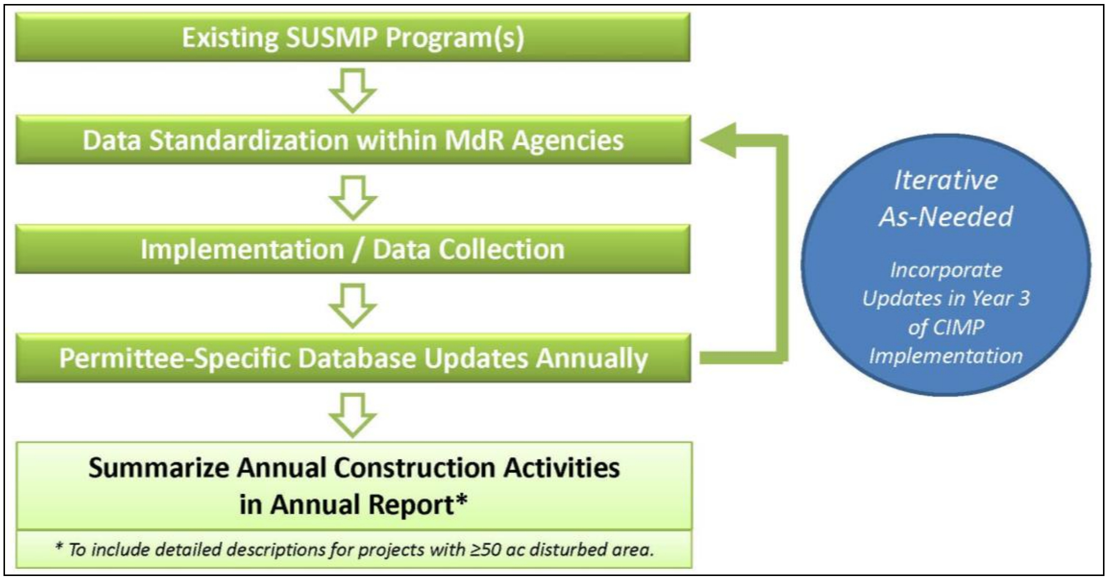

Figure 7-1. Iterative Approach – New Development/Re-Development Program Data Tracking

Existing data tracking protocols and databases, which have been summarized for each Permittee in Appendix E, are based on the SUSMP programs described above. The Permit allows each Permittee to establish Local Ordinance Equivalents to the Permit; therefore, slight variations currently exist for inspection thresholds and data tracking. Consequently, during Year 1 of the program, data review and standardization are necessary to ensure that information collected across the MdR Watershed is consistent and that collected data are tracked and annually shared using consistent methods for reporting purposes.

The Permit minimum data tracking requirements, identified in Table 7-2, establish the basis for data standardization. Key additional data fields, which may allow for more consistent, streamlined data reporting, are also identified in Table 7-2. The additional data fields reflect the following reporting requirements of the Permit:

- A summary of New Development/Re-development Projects are constructed during the reporting year, for each MdR Agency's jurisdictional area.
- A detailed description of control measures applied to projects disturbing more than 50 acres.

An essential factor in overall data standardization between Permittees is agreement on the type of fields to be exported from individual Permittee databases to the master database. This method of standardization may be enhanced through collaborative development of the design and implementation of common inspection forms. Section 7(d)(iv)(1)(c) of the Permit requires Permittees to use a Post-Construction BMP Maintenance Checklist to inspect all BMPs at least once every two years after new and re-development projects are completed in order to assess condition, functionality, and maintenance of the BMPs. Checklists, inspection forms, and training materials may be used to establish consistency between Permittees for naming conventions, reporting units, inspection evaluations (e.g., satisfactory/unsatisfactory), corrective actions, and other factors. Example forms are provided in Appendix E.

Table 7-2. Minimum Database Tracking Requirements

Category	2012 Permit Requirements for New Development/Re-Development Database	Minimum Method of Data Tracking By Section of the Permit
Development Project	Jurisdiction	--
	Project Name	MRP - X.A.1
	Municipal Project Identification No.	VI.D.7.d.iv.1.a.i
	State Waste Discharger Identification (WDID) No.	VI.D.7.d.iv.1.a.ii
	Developer Name / Contact Information	MRP - X.A.1
	Construction Start/Completion Dates	--
	Project Location and Site Map *(preferably linked to GIS storm drain map(s), especially for projects with off-site BMPs)*	--
	Location relative to a significant ecological area (SEA) feature	--
BMP Design	Project Area (acres)	VI.D.7.d.iv.1.a.iii
	Total Disturbed Area *(additional reporting requirements for projects $\geq$50 acres)*	--
	Type of Receiving Water (1)	--
	85th Percentile Storm Event 95th Percentile Storm Event (if "natural" Receiving Water) Other Hydromodification Design Criteria Project Design Storm (inches) Design Storm Volume (gallons/ MGD)	MRP - X.A.4, MRP - X.A.5, MRP - X.A.6, MRP - X.A.7 & 11 MRP - X.A.8 & 10
	Portion of Design Storm to be Retained on-site (%) Portion of Design Storm to be Retained or Treated off-site (%)	MRP - X.A.9 MRP - X.A.12 & 13
BMPs	BMP Type (Infiltration, Biofiltration, Groundwater Replenishment) and Description(2)	VI.D.7.d.iv.1.a.iv
	BMP Location (coordinates)	VI.D.7.d.iv.1.a.v
	BMP Location (on-site / off-site)	--
	Date of Maintenance Agreement	VI.D.7.d.iv.1.a.vii
	BMP Inspection Date and Summary of Findings(3)	VI.D.7.d.iv.1.a.ix
	BMP Corrective Action(s) based on Inspections	VI.D.7.d.iv.1.a.x
	BMP Replacement and/or Repair Date	VI.D.7.d.iv.1.a.xii
	BMP Maintenance Records	VI.D.7.d.iv.1.a.viii
	Date of BMP Acceptance	VI.D.7.d.iv.1.a.vi
	Date Certificate of Occupancy Issued (New Development)	VI.D.7.d.iv.1.a.xi MRP - X.A.3
	BMP Map *(preferably linked to GIS storm drain map(s), especially for off-site BMPs)*	MRP - X.A.2 MRP - X.A.14
	Documentation of Issuance of BMP Requirements to the Developer	MRP - X.A.15

(1) An improved drainage system is a system that has been channelized or armored. A natural drainage system is a system that has not been improved. The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system.
(2) In order to identify and inspect for project-specific design specifications and criteria, it is recommended to integrate this description with electronic (PDF) files of Project Design Drawings and Calculations, which may be on record in a separate database, and with electronic copies of all maintenance records.
(3) Post-Construction BMP descriptions should integrate with the information in the Inspection check-lists. Basic information may be input to the database from design drawings and then field verified during the initial post-construction inspection.

8.0 REGIONAL STUDIES

8.1 Bioassessment Program

The MRP identifies one regional study: the SMC Regional Watershed Monitoring Program. The SMC is a collaborative effort between the Southern California Coastal Water Research Project (SCCWRP), State Water Board's Surface Water Ambient Monitoring Program (SWAMP), three Southern California Regional Water Quality Control Boards, and several county storm water 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.

Prior to the initiation of the SMC Regional Watershed Monitoring Program, in-stream monitoring in southern California was conducted by over a dozen different organizations, each of which had disparate monitoring programs that varied in design, frequency, and the indicators selected for measurement. Even where the monitoring designs were similar, the field techniques, laboratory methods, and quality assurance requirements were often not comparable, making region-wide assessments impossible. In addition, the lack of an integrated information management system precluded data sharing among programs. To address these problems, SCCWRP helped the SMC design and implement a coordinated and regional watershed monitoring program. The SMC works with local programs in the region to facilitate greater data collection and provide a regional context to address site- and watershed-specific questions.

The LACFCD and City of Los Angeles will continue to participate in the Bioassessment Program being managed by the SMC. The LACFCD will continue to coordinate and assist in implementing the bioassessment monitoring requirement of the MS4 Permit on behalf of all the Permittees in Los Angeles County during the current permit cycle. Initiated in 2008, the SMC's Bioassessment 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 in 2014. The next five-year Bioassessment Program is scheduled to run from 2015 to 2019.

8.2 Bight 2013

The Bight program is led and organized by SCCWRP and is considered to be independent of this CIMP. Data from the study, however, will be used to help evaluate long-term assessment of conditions in the MdRH. Historically, the MdRH was included in Bight 2003, Bight 2008, and Bight 2013. The Bight 2013 survey is organized into five technical components: (1) Contaminant Impact Assessment, (2) Shoreline Microbiology, (3) Water Quality, (4) Marine Protected Areas, and (5) Trash and Debris. The MdRH has been included in the 2013 Contaminant Impact Assessment, which focuses on sediment contaminants and associated impacts on benthic infauna and demersal fish. Currently, the MdR EWMP Agencies are planning to voluntarily participate in Bight 2018, which will include the SQO analysis required by the Toxics TMDL.

9.0 SPECIAL STUDIES

9.1 Existing Special Studies

The MRP requires that each Permittee conduct the special studies required by an effective TMDL or an approved TMDL CMP. As such, in addition to ongoing monitoring efforts, the MdR EWMP Agencies have completed special studies outlined in the existing TMDL CMPs in accordance with the requirements of the Bacteria TMDL and Toxics TMDL to better understand conditions in the MdR Watershed. For each of the special studies, where applicable, Table 9-1 provides the location and description of monitoring station used for the study, media sampled, and the type of data collected based on monitoring history.

Table 9-1. Special Studies Completed To Date

Report	Year	TMDL CMP Monitoring Station IDs	Parameters	Outfalls/MS4 (Storm Water)	Harbor Water	Sediment	Sediment Cores
Storm Borne Sediment Collection Pilot Project (Brown and Caldwell, 2013)	2011-2014	MdR-4, MdR-5, MdRU-C-1	Organics	x			
			Metals	x			
			Conventional*	x			
Special Study - Low-Detection Level (Brown and Caldwell, 2011b)**	2011	MdRH-B-1, MdRH-B-2, MdRH-B-3, MdRH-B-4, MdR-3, MdR-4, MdR-5, MdRU-C-1, MdRU-C-2	Organics	x	x	x	
Special Study - Partitioning Coefficient (Brown and Caldwell, 2011a)	2011	MdRH-B-1, MdRH-B-2, MdRH-B-3, MdRH-B-4, MdRH-F-1, MdRH-F-2, MdRH-F-3, MdRH-F-4, MdRH-F-5, MdR-3, MdR-4, MdR-5, MdRU-C-1, MdRU-C-2	Metals	x	x	x	
			Conventional*	x	x	x	
MdRH Sediment Characterization Study (Weston, 2008b)	2008	Multiple locations in the Harbor Back Basins, Front Basins, and Main Channel	Organics			x	x
			Metals			x	x
			Conventional*		x	x	
			Benthic Community			x	
			Toxicity			x	
Nonpoint Source Bacteria Study (Weston, 2008a)	2006	MdR Watershed	Bacteria	x	x	x	

*Based on Table E-2 of the MRP, conventional pollutants are Oil and Grease, total Phenols, cyanide, pH, Temperature.
**The study included storm water, Harbor sediment, and Harbor receiving water characterization.

9.2 Proposed Special Studies

Special studies are a tool to be implemented on an as-needed basis for the adaptive management process throughout the EWMP implementation. The Toxics TMDL requires a Stressor Identification Study to be performed as a special study.

- **Stressor Identification Study:** Biological testing is a useful tool for determining the presence of toxicity from sediment contamination; however, it does not indicate the cause of toxicity. If sediments fail to meet the SQOs during the Sediment Triad Assessment, the Toxics TMDL requires a Stressor Identification Study to be conducted in accordance with Section VII.F of the *Water Quality Control Plan for Enclosed Bays and Estuaries* (State Water Resources Control Board [SWRCB] and Cal EPA, 2009) and for the final report to be submitted to the Regional Board by December 15, 2016. The stressor identification investigations use a variety of tools to determine whether the reason for the narrative objective not being met is due to generic stressors other than toxic pollutants, such as physical alterations or other pollutant-related stressors. According to the SQO guidelines, "If there is compelling evidence that the SQO exceedances contributing to a receiving water limit exceedance are not due to toxic pollutants, then the assessment area shall be designated as having achieved the receiving water limit." Following a review of the investigation data, conclusions will be made based on the data available and/or recommendations will be developed for future studies to further characterize or identify the condition causing the narrative impairment. To determine whether a site is impacted from toxic pollutants, one or more of the following tools may be applied:

  - Evaluate the spatial extent of the area of concern in relation to anthropogenic sources.
  - Evaluate the body burden of the pollutants accumulated in the animals used for exposure testing.
  - Evaluate the chemical constituent results to mechanistic benchmarks.
  - Compare chemistry and biology data to determine whether correlations exist.
  - Alternative biological assessment such as bioaccumulation experiments, pore water toxicity, or pore water chemistry analyses may be conducted.
  - Phase I TIEs conducted in accordance with USEPA 2007 may also be conducted and are often useful for determining the causative agent or class of compounds causing toxicity.

10.0 NON-DIRECT MEASUREMENTS

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

- Conducted and documented in accordance with the sampling procedures outlined in this CIMP.
- Sampling collection is performed and documented by a competent party in accordance with applicable guidance and this CIMP.
- Sample analysis is conducted using approved analytical method by a certified analytical laboratory.

Non-direct measurements related to tidal measurements (e.g., measurements not physically recoded by field staff during field monitoring activities) will be obtained from the National Oceanic and Atmospheric Administration (NOAA). Additional rainfall information will be obtained from the County, as needed.

11.0 ADAPTIVE MANAGEMENT

11.1 Integrated Monitoring and Assessment Program

One of the main objectives of the MdR Watershed CIMP is to leverage resources and create a regionally efficient and effective monitoring program. Adaptive management is a structured, iterative process designed to use resources both effectively and efficiently, resulting in a robust watershed program adapted to local conditions.

The integrated review of existing monitoring programs, TMDL implementation plans, the Regional Board-approved Bacteria TMDL CMP, Toxics TMDL CMPs, and the monitoring data that was used in the development of the 2014 MdR Watershed CIMP represent the "Initial Assessment" of existing conditions in the MdR Watershed. Lessons learned during planning and implementation of Year 1 of the MdR Watershed CIMP (i.e., monitoring station appropriateness and safety considerations for wet weather receiving water monitoring) will be tracked and integrated into the overall program assessment during the QA/QC review of monitoring data and annual reporting. Each annual report will present a summary of TMDL and Permit compliance and will provide an opportunity to identify, as appropriate, modifications to the MdR Watershed CIMP protocols based on lessons learned and monitoring data. A formal programmatic review will occur during Years 1 and 2 of the program and will be integrated into the Year 3 implementation. A more comprehensive review and update of the MdR Watershed CIMP monitoring protocols may also become necessary, especially when preparing for the Triad Sampling for SQO analysis (required once during the five-year Permit Order period per the SQO guidance).

11.2 CIMP Revision Process

Every two years, hence during Year 3 of the implementation of the Permit monitoring program, available monitoring information will be reviewed in the context of the receiving water monitoring program and outfall-based monitoring objectives.

At any stage of the CIMP implementation, where changes are needed, changes will be made to this CIMP, incorporated into monitoring practice, and described in the next Monitoring Annual Report. Identified changes will be discussed in the annual report and implemented starting no later than the first CIMP monitoring event of the next monitoring year. Such changes include, but are not limited to, adding/removing monitored constituents, modifying laboratories/analytical methods, or amending sampling protocol. Should major changes to the approach be required (e.g., moving or removing a storm water outfall or receiving water monitoring station location), the modifications will be proposed in the annual report and in a separate letter to the Regional Board requesting Executive Officer approval of the change.

12.0 DATA MANAGEMENT AND REPORTING

Appendix F details the procedures for managing and reporting monitoring data collected under this CIMP. Data management procedures include data review, verification, and validation.

Annual reporting for Permit compliance is required to be submitted by December 15 of every year. Annual reporting will cover the monitoring period of July 1 through June 30. These reports shall clearly identify all data collected during the monitoring year, as well as strategies, control measures, and assessments implemented by each Permittee within its jurisdiction. Annual Reports will also present watershed scale efforts implemented by multiple Permittees. Discussion shall be provided in accordance with the requirements laid out in MRP Section XVIII. The annual monitoring reports will include the following:

- Watershed Summary Information
  - Watershed Management Area / Subwatershed (HUC-12) Description,
  - Description of MdR EWMP Agency Drainages Area within the MdR Watershed
- Annual Assessment and Reporting
  - Storm Water Control Measures
  - Effectiveness Assessment of Storm Water Control Measures
  - Non-storm Water Control Measures
  - Effectiveness Assessment of Non-Storm Water Control Measures
  - Integrated Monitoring Compliance Report
  - Adaptive Management Strategies
  - Supporting Data and Information.

MAL reports are required to be submitted annually and will compare monitoring data to applicable MALs identified in Attachment G of the Permit. Subwatersheds with a running average of greater than or equal to twenty percent exceedances of the MALs will be identified and beginning in the third year of CIMP implementation (Year 3), a MAL Action Plan will be required for these sub watersheds.

Additionally, semi-annual annual data reports will be submitted with the annual monitoring report, and six months prior to the annual report (June of each year). The June 15 data submittal will cover the monitoring period of July 1 through December 31, and the December 15 data submittal will cover January 1 through June 30. These semi-annual analytical data reports detail exceedances applicable to WQBELs, RWLs, action levels, or aquatic toxicity thresholds, with corresponding sample dates and monitoring locations.

Monthly monitoring reports are required for Bacteria TMDL compliance and annual monitoring reports are also required for Toxics TMDL compliance. These data reports will be submitted as an attachment to Permit annual reports.

13.0 SCHEDULE FOR CIMP IMPLEMENTATION

The MdR Watershed is impacted by five TMDLs, including the Bacteria TMDL, Toxics TMDL, Trash TMDL, Debris TMDL and SMB DDT and PCB TMDL. The compliance schedules for these TMDLs are summarized in Table 13-1. Implementation of new monitoring programs and modifications to existing monitoring programs will be implemented beginning 90 days after the approval of the CIMP. During the transition to the monitoring described in this CIMP, monitoring under the Toxics CMP will be ceased and resources shifted to the new CIMP monitoring program. Bacteria monitoring will continue to be conducted without a transition period.

Table 13-1. TMDL Compliance Schedules

<table>
<tr><th>TMDL</th><th>Matrix</th><th>Parameters</th><th>Goal</th><th>Compliance Date</th></tr>
<tr><td rowspan="5">Marina del Rey Harbor Toxic Pollutants TMDL</td><td>Harbor water</td><td>Dissolved Copper (from boats)</td><td>Meet LAs</td><td>3/22/2024</td></tr>
<tr><td rowspan="2">Harbor sediments (Back Basins)</td><td rowspan="4">Copper, lead, zinc, chlordane, PCBs, DDTs, p'p-DDE</td><td>Interim Sediment Allocations</td><td>3/22/2016*</td></tr>
<tr><td>Final Compliance</td><td>3/22/2018</td></tr>
<tr><td rowspan="2">Harbor sediments (Front Basins)</td><td>Interim Sediment Allocations</td><td>3/22/2019</td></tr>
<tr><td>Final Compliance</td><td>3/22/2021</td></tr>
<tr><td rowspan="3">Marina del Rey Mother's Beach and Back Basins Bacteria TMDL</td><td rowspan="3">Harbor water</td><td rowspan="3">Total coliform, fecal coliform, Enterococcus</td><td>Interim time frame for compliance with allowable exceedance days for summer and winter dry weather</td><td>12/28/2017**</td></tr>
<tr><td>Original final and TSO final dates for compliance with allowable exceedance days for summer and winter dry weather</td><td>12/28/2017**</td></tr>
<tr><td>Compliance with allowable exceedance days for wet weather and geometric mean targets</td><td>7/15/2021</td></tr>
<tr><td rowspan="3">Santa Monica Bay TMDLs for DDTs and PCBs</td><td>Water column</td><td rowspan="3">Total DDTs and Total PCBS</td><td>Numeric targets in Santa Monica Bay</td><td>3/26/2014 for DDTs
3/26/2014 for PCBs</td></tr>
<tr><td>Fish tissue</td><td>Numeric targets in Santa Monica Bay</td><td>3/26/2023 for DDTs
3/26/2034 for PCBs</td></tr>
<tr><td>Bay sediment</td><td>Numeric targets in Santa Monica Bay</td><td>3/26/2023 for DDTs
3/26/2034 for PCBs</td></tr>
<tr><td>Ballona Creek Trash TMDL$^{\Omega}$</td><td colspan="2">Trash</td><td>0 discharge of trash or 0% of the baseline load</td><td>9/30/2015</td></tr>
<tr><td rowspan="5">Santa Monica Bay Nearshore and Offshore Debris TMDL*</td><td colspan="2" rowspan="5">Trash</td><td>20% reduction</td><td>3/20/2016</td></tr>
<tr><td>40% reduction</td><td>3/20/2017</td></tr>
<tr><td>60% reduction</td><td>3/20/2018</td></tr>
<tr><td>80% reduction</td><td>3/20/2019</td></tr>
<tr><td>100% reduction</td><td>3/20/2020</td></tr>
</table>

PCB – polychlorinated biphenyls

p,p'-DDE – p,p'-dichlorodiphenyldichloroethylene
* Interim milestone occurs prior to EWMP approval.
**Deadline or time frame identified in Bacteria TDML Time Schedule Order No. R4-2014-0142
$^{\Omega}$TMDL complied with through the Ballona Creek Trash TMDL

The schedule for MdR CIMP reporting is summarized in Table 13-2. For Bacteria TMDL compliance monitoring, monthly data reports will continue to be submitted to the Regional Board by the City of Los Angeles. For the Toxics TMDL and the Permit, the MdR EWMP Agencies will submit an Annual Monitoring Report to the Regional Board no later than December 15 of each year.

Table 13-2. MdR Watershed Reporting Schedule

Program	Report Type	Due Date(s)
Bacteria TMDL	Data Summary Report	Monthly (last day of month)
Toxics TMDL	Annual Monitoring Report	December 15, Annually
Permit	Annual Monitoring Report	December 15, Annually
	Municipal Action Level Action Plan *(If running storm event average concentrations are only 20% greater than MALs – only applies to MdR-3 for Permit compliance monitored storms)*	December 15, Annually

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APPENDIX A
Regulatory Drivers and Monitoring Requirements

A.0 REGULATORY DRIVERS AND MONITORING REQUIREMENTS

This appendix presents a discussion of the regulatory drivers and ensuing monitoring requirements integrated in the Coordination Implementation Monitoring Plan (CIMP) for the Marina del Rey (MdR) Watershed.

A.1 2010 Section 303(d) List

The federal Clean Water Act (CWA), § 303(d), requires states to identify waters that do not meet applicable water quality standards despite the treatment of point sources by the minimum required levels of pollution control technology. States are required not only to identify these “water quality limited segments” but also to prioritize such waters for the purpose of developing Total Maximum Daily Loads (TMDLs). A TMDL is defined as the “sum of the individual Waste Load Allocations (WLAs) for point sources and load allocations (LAs) for non-point sources and natural background” (40 Code of Federal Regulations [CFR] 130.2), such that the capacity of the waterbody to assimilate constituent loads (the loading capacity) is not exceeded. A TMDL is also required to account for seasonal variations and include a margin of safety to address uncertainty in the analysis conducted by the United States Environmental Protection Agency (USEPA) (USEPA, 2000). The §303(d) list was last updated in 2010 and identifies a number of constituents for the MdR Back Basins and Marina Beach (referred to in the §303(d) listing by the former name Harbor Beach) (Table A-1).

Table A-1. Summary of 2010 Section 303(d) Listings

Water Body	Constituent	Final Listing Decision
Marina del Rey Harbor – Back Basins	Chlordane (tissue and sediment)	List on §303(d) list (being addressed by USEPA-approved TMDL)
	Copper (sediment)	List on §303(d) list (being addressed by USEPA-approved TMDL)
	Dichlorodiphenyltrichloroethane (DDT)* (tissue)	Do Not Delist from §303(d) list (TMDL required list)
	Dieldrin* (tissue)	Do Not Delist from §303(d) list (TMDL required list)
	Fish Consumption Advisory	List on §303(d) list (being addressed by USEPA-approved TMDL)
	Indicator Bacteria	List on §303(d) list (being addressed by USEPA-approved TMDL)
	Lead (sediment)	List on §303(d) list (being addressed by USEPA-approved TMDL)
	Polychlorinated biphenyls (PCBs) (tissue and sediment)	List on §303(d) list (being addressed by USEPA-approved TMDL)
	Sediment toxicity	Do Not Delist from §303(d) list

Table A-1. Summary of 2010 Section 303(d) Listings

Water Body	Constituent	Final Listing Decision
		(being addressed with USEPA-approved TMDL)
	Zinc (sediment)	List on §303(d) list (being addressed by USEPA-approved TMDL)
Marina del Rey Harbor Beach	Indicator Bacteria	List on §303(d) list (being addressed by USEPA-approved TMDL)
*USEPA-approved TMDL has made a finding of non-impairment for this constituent.		

A.2 2012 MS4 Permit

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Order No. R4-2012-0175 (Permit) was adopted on November 8, 2012, by the Los Angeles Regional Water Quality Control Board (LARWQCB or Regional Board) and became effective December 28, 2012. This Permit replaced the previous MS4 permit (Order No. 01-182). The purpose of the Permit is to ensure the MS4s in the Los Angeles County are not causing or contributing to exceedances of water quality objectives set to protect the beneficial uses in the receiving waters in the Los Angeles region. The agencies with jurisdiction in the MdR Watershed Management Area (WMA), including the unincorporated areas of the County of Los Angeles (County), the Los Angeles County Flood Control District (LACFCD), City of Los Angeles, and City of Culver City (collectively referred to as the MdR Agencies), have elected to pursue a CIMP and have provided justification in this document demonstrating fulfillment of monitoring requirements of the Permit and TMDLs. The Monitoring and Reporting Program (MRP) defines the monitoring requirements of the Permit and incorporates monitoring requirements defined in existing TMDLs and Regional Board-approved Coordinated Monitoring Plans (CMPs). Water quality data collected from the MdR receiving water for Permit compliance will be compared with all applicable receiving water limitations. Outfall-based stormwater Permit compliance monitoring data will be compared to all applicable water quality based effluent limitations (WQBELs).

A.3 Total Maximum Daily Loads

The Marina del Rey watershed is subject to five TMDLs; the Santa Monica Bay Nearshore Debris TMDL (Debris TMDL), the Ballona Creek Trash TMDL (Trash TMDL), the Marina del Rey Harbor Mother’s Beach and Back Basin Bacteria TMDL (Bacteria TMDL), the Toxic Pollutants in Marina del Rey Harbor TMDL (Toxics TMDL), and the EPA-established Santa Monica Bay TMDL for DDTs and PCBs (SMB Toxics TMDL).

A.3.1 Santa Monica Bay Nearshore Debris TMDL & Ballona Creek Trash TMDL

The Santa Monica Bay Nearshore Debris TMDL was adopted by the LARWQCB on November 4, 2010 (Resolution No. R10-010) and became effective upon adoption by the USEPA on March 20, 2012. Responsible agencies identified for the Debris TMDL include, among others, the

County, the City of Culver City, and the City of Los Angeles. The Debris TMDL established numeric targets and WLAs of zero discharge of trash and plastic pellets to waterbodies within the Santa Monica Bay WMA, which includes Marina del Rey Harbor (MdRH). The trash WLA applicable to the MS4 Permittees shall be complied with through the Ballona Creek Trash TMDL (Resolution No. R08-007).

The Ballona Creek Trash TMDL was adopted by the LARWQCB on September 19, 2001, and became effective on August 28, 2002. The TMDL was amended in 2004 and the amended TMDL became effective on August 11, 2005. On June 11, 2015 the LARWQCB adopted a second revision to the Trash TMDL but as of the writing of this MdR Enhanced Watershed Management Plan (EWMP), the revised TMDL has yet to be approved by the State Water Resources Control Board, the Office of Administrative Law (OAL), or by the USEPA. The TMDL established WLAs of zero discharge of trash and set a final compliance deadline of September 30, 2015. The MdR Watershed Management Group (WMG) Agencies have met the final compliance deadline in the TMDL, and corresponding schedule in the 2012 MS4 Permit, through installation of full capture devices. In the City of Los Angeles area of the MdR watershed, 293 catch basins have been retrofitted with trash screens (103 City-owned and 190 LACFCD-owned catch basins with trash screens). The City of Culver City has retrofitted four catch basins and the County has retrofitted 40 catch basins in the MdR with full-capture devices.

The Permit requires Permittees to develop a Trash Monitoring and Reporting Plan (TMRP) to describe the methodologies that will be used to assess and monitor trash from source areas in the Santa Monica Bay WMA and shoreline of the Santa Monica Bay. In 2012, the County submitted a TMRP to the Regional Board. The City of Los Angeles will not be developing a TMRP for MdR because the implementation program for the Ballona Creek (BC) Trash TMDL covers the City's area in MdR.The City of Culver City is in compliance with the TMRP for the Ballona Creek Trash TMDL and is considered in compliance with the Debris TMDL's trash component. These plans are considered to be independent of this CIMP.

Plastic Pellet Monitoring and Reporting Plans (PMRPs) quantifying potential plastic pellet discharges to Santa Monica Bay, along with supplemental Spill Response Plans (SRPs) to address containment of spilled plastic pellets, were submitted to the Regional Board by the City of Culver City (2012), County (2013), and LACFCD (2013). The City of Los Angeles does not have plastic pellet facilities in MdR and is therefore not subject to the pellet monitoring requirements of the PMRP; subsequently, the City will coordinate plastic pellets spill and response requirements in conjunction with SMB and BC watersheds.

The TMRPs/PMRPs for the County, City of Culver City, and LACFCD are provided in Appendix K These plans are considered to be independent of this CIMP.

A.3.2 Marina del Rey Harbor Mother's Beach and Back Basin Bacteria TMDL

The Bacteria TMDL (LARWQCB, 2004, 2012) was adopted by the USEPA in accordance with LARWQCB Resolution No. 2003-012 and became effective on March 18, 2004. The Bacteria TMDL was revised by the LARWQCB on June 7, 2012 (Resolution No. R12-007) and a Time Schedule Order (TSO) was approved on July 10, 2014 (TSO No. R4-2014-0142). The Responsible Agencies identified for the Bacteria TMDL include the County, LACFCD, City of

Los Angeles, City of Culver City, and Caltrans. The Responsible Agencies developed the *Marina Del Rey Harbor Mothers' Beach and Back Basins Bacterial TMDL CMP* (Bacteria TMDL CMP) (Los Angeles County Department of Public Works [LADPW], 2007), which was approved by the Regional Board on February 1, 2007. In addition to compliance monitoring, the Bacteria TMDL CMP included additional monitoring in the MdR Front Basins (non-§303(d) listed basins) to help characterize bacteria levels across the Harbor.

The Bacteria TMDL established numeric bacterial compliance targets for marine recreation of 19 illnesses per 1,000 persons based on the acceptable health risk described by the USEPA (USEPA, 1986). The numeric targets are expressed as both single sample limits and geometric mean limits (Table A-2). The Bacteria TMDL numeric targets apply throughout the year. The geometric mean targets may not be exceeded at any time. Resolution R12-007 also standardized the rolling geometric mean calculation to a weekly calculation, using five or more samples, for 6-week periods, starting all calculations on Sunday

Table A-2. Bacteria TMDL Numeric Targets

Indicator	Geometric Mean Limits**	Single Sample Limits
Total coliform	1,000 MPN/100 mL	10,000 MPN/100mL** or 1,000 MPN/100 mL (fecal-to-total coliform exceeds 0.1)
Fecal coliform	200 MPN/100 mL	400 MPN/100 mL
Enterococcus	35 MPN/100 mL	104 MPN/100 mL

* Geometric means shall be calculated weekly as a rolling geometric mean using five or more samples, for six week periods, starting all calculations on Sunday.
** Total coliform single sample limit of 10,000 most probable number (MPN) decreases to 1,000 when the fecal coliform value is greater than 10% of total coliform value.

Each monitoring station is also assigned an allowable number of exceedance days, or the number of days where sampling results can surpass the single sample numeric targets. The Bacteria TMDL WLAs are expressed as allowable exceedance days. Allowable exceedance days are specified by three defined seasons (summer dry, winter dry, and wet weather) and are based on the lesser of two criteria: (1) exceedances days in the designated reference system, and (2) exceedance days based on historical bacteriological data at the monitoring site. The TSO (TSO No. R4-2014-0142) implemented an interim compliance period for summer and winter dry sampling with increased allowable exceedance days for many of the stations. Table A-3 presents a summary of the Bacteria TMDL compliance dates, requirements, and limits by station and season and includes the interim compliance period established by the TSO.

Table A-3. Bacteria TMDL Seasons and Allowable Exceedance Days (Single Sample Targets)

Compliance Season	Summer Dry Weather April 1 – October 31		Winter Dry November 1- March 31		Wet Weather Rain Event*	Geometric Mean Year Round
Deadline	December 28, 2017**		December 28, 2017**		July 15, 2021	
Compliance Monitoring Location	Allowable Exceedance Days/Year					
	TSO Interim Compliance	Final Compliance	TSO Interim Compliance	Final Compliance	Final Compliance	Final Compliance
Daily Sampling						
MdRH-1^Ω	22	0	60	9	17	0
Weekly Sampling						
MdRH-2 ^Ω	11	0	19	2	3	0
MdRH-3	12	0	12	2	3	0
MdRH-4 (S)	3	0	5	2	3	0
MdRH-4 (D)	2	0	3	2	3	0
MdRH-5	5	0	3	2	3	0
MdRH-6 (S)	3	0	5	2	3	0
MdRH-6 (D)	4	0	4	2	3	0
MdRH-7	4	0	5	2	3	0
MdRH-8 (S)	1	0	2	2	3	0
MdRH-8 (D)	2	0	2	2	3	0
MdRH-9 (S)	1	0	2	2	1	0
MdRH-9 (D)	0	0	2	2	1	0

*Rain event ≥ 0.1 inches at LAX rain gauge, and 3 days following the end of the rain event.
** Deadline identified in Bacteria TDML Time Schedule Order No. R4-2014-0142
Ω MdRH-1 is sampled Monday-Saturday while MdRH-2 is sampled Monday and Saturday. All other locations are sampled weekly on Mondays. MDRH-1 exceedances days are based on daily sampling while the other monitoring stations exceedance days are based on weekly sampling.

A.3.3 Santa Monica Bay TMDL for DDTs and PCBs

The Santa Monica Bay TMDL for DDTs and PCBs was approved by the USEPA on March 26, 2012. The TMDL set numeric targets for the water column, sediment and fish tissue in the Bay (Table A-4)

Table A-4. Santa Monica Bay TMDL for DDTs and PCBs Numeric Targets

TMDL Target	Total DDTs	Total PCBs
Water Column	0.17 ng/L	0.019 ng/L
Fish Tissue	40 ng/g	7 ng/g
Sediment (normalized for organic carbon [OC])	2.3 µg/g OC	0.7 µg/g OC

The TMDL set stormwater WLAs at existing estimated pollutant levels (which were lower than the calculated total allowable loads needed to achieve sediment targets) and therefore this TMDL is referred to as an anti-degradation TMDL. The WLA for the Los Angeles County MS4 was set at 27.08 grams per year (g/year) of DDT and 140.25 g/year for PCBs (Table A-5). The reduction in stormwater volume that will occur through implementation of the best management practices (BMPs) proposed in this EWMP will reduce stormwater loading of DDTs and PCBs to Santa Monica Bay below current conditions and will therefore satisfy the requirements of this anti-degradation TMDL.

Table A-5. Los Angeles County MS4 Permit Stormwater Waste Load Allocations from the Santa Monica Bay DDTs and PCBs TMDL

Permit	Total DDTs	Total PCBs
Los Angeles County MS4 Permit	27.08 g/yr	140.25 g/yr

A.3.4 Toxic Pollutants in Marina del Rey Harbor TMDL

The Regional Board adopted the Toxics TMDL on October 6, 2005 (LARWQCB, 2005). The Toxics TMDL was approved by USEPA and became effective on March 22, 2006. The responsible agencies identified for the Toxics TMDL included the County, City of Los Angeles, City of Culver City, and Caltrans. The responsible agencies developed the Toxics TMDL CMP (LADPW, 2008), which was approved by the Regional Board on March 3, 2009, to address the monitoring requirements defined in the original Toxics TMDL. In 2013, the Toxics TMDL was revised, with final USEPA approval on October 15, 2015. The revised Toxics TMDL included the LACFCD as a responsible agency, extended the TMDL to the Front Basins of the Harbor, implemented the final numeric target for PCBs in the water column, reduced the PCB numeric targets for sediment and fish tissue, added total DDTs) and p p'-dichlorodiphenyldichloroethylene (p p'-DDE) sediment targets, changed the metals WLAs, and modified the monitoring requirements. The final Toxics TMDL numeric targets, in-harbor load allocations, and storm water WLAs are discussed below.

A.3.4.1 Toxics TMDL Numeric Targets

The Toxics TMDL numeric targets for sediments in the Back Basins of the MdR and water column and fish tissue in the MdR are summarized in Table A-6. The sediment numeric targets were established using the effects range low (ER-L) (Long et al., 1995) guidelines for copper, lead, zinc, chlordane, total PCBs, total DDTs and p p'-DDE. The numeric target for total PCBs in sediments was established to protect human health from the consumption of contaminated fish based on the food web bioaccumulation model developed by Gobas and Arnot (2010). Water column numeric targets were established for total PCBs and copper. The numeric target for total PCBs is 0.00017 micrograms per Liter (µg/L). Acute and chronic numeric targets were established for dissolved copper, such that the acute numeric target represents the single sample maximum criterion and the chronic numeric target represents the four-day average criterion. Both the copper and PCB numeric targets were developed using the California Toxics Rule (CTR) criterion for the protection of human health from the consumption of aquatic organisms.

The fish tissue numeric target of 3.6 micrograms per kilogram (μg/kg) for total PCBs is the Office of Environmental Health Hazard Assessment (OEHHA) Fish Contaminant Goal (FCG).

Table A-6. Toxics TMDL Numeric Targets for Sediment, Water and Fish Tissue

Constituent Group	Constituent	Toxics TMDL Numeric Targets		
		MdR Back Basins	MdR	
		Sediment	Water Column	Fish Tissue
Organics	Chlordane	0.5 μg/kg	--	--
	Total PCBs	3.2 μg/kg	0.00017 μg/L	3.6 μg/kg
	Total DDTs	1.58 μg/kg	--	--
	p p'-DDE	2.2 μg/kg	--	--
Metals	Copper	34 mg/kg	--	--
	Dissolved copper	--	Acute – 4.8 μg/L Chronic – 3.1 μg/L	--
	Lead	46.7 mg/kg	--	--
	Zinc	150 mg/kg	--	--

A.3.4.2 Toxics TMDL Load Allocations

The Toxics TMDL established loading capacities and LAs for in-harbor sediments and the MdR water column.

The sediment loading capacity was estimated based on annual average total suspended solids (TSS) loads to the MdR (84,612 kilograms per year [kg/year]) based on the assumption that the finer sediments transport the majority of constituents. The Toxics TMDL for sediment was calculated based on the average annual TSS loading and the numeric sediment targets. The sediment in-harbor LAs are the same as the numeric targets. Non-point sources of sediment impairment include direct atmospheric deposition. The sediment LAs for in-harbor sediments and atmospheric deposition are presented in Table A-7.

Table A-7. Toxics TMDL Loading Capacities and Load Allocations for Sediment

Constituent Group	Constituent	Load Allocation		Sediment Loading Capacity*
		In-Harbor Sediment	Atmospheric Deposition	
--	--	**μg/kg**	**g/year**	**g/year**
Organics	Chlordane	0.5	0.005	0.04
	PCBs	3.2	0.225	1.92
	Total DDTs	1.58	0.016	0.13
	p p'-DDE	2.2	0.022	0.19
--	--	**mg/kg**	**kg/year**	**kg/year**
Metals	Copper	34	0.34	2.88
	Lead	46.7	0.46	3.95
	Zinc	150	1.49	12.69

The Toxics TMDL established the dissolved copper loading capacities for the water column of MdR as 557 kg/year (The water column LA for dissolved copper from boats is a reduction of

85% from the baseline load from boats (3,609 kg/year). The MS4 Permittees are not subject to this criterion.

A.3.4.3 Toxics TMDL Storm Water Waste Load Allocations

The Toxics TMDL established point source WLAs for storm water for each of the storm water Permittees. The WLAs for metals and organics are presented in Table A-8. The apportionment between the storm water Permittees has also been presented in Table A-8 based on an estimate of the percentage of land area covered by each storm water permit.

Table A-8. Toxics TMDL Storm Water Waste Load Allocations by Permittee

Storm Water Permittees	Toxics TMDL Storm Water Waste Load Allocations (WLAs)						
	Metals			Organics			
	Copper (kg/year)	Lead (kg/year)	Zinc (kg/year)	Chlordane (g/year)	Total PCBs (g/year)	Total DDTs (g/year)	p p'-DDE (g/year)
MS4 Permittees*	2.26	3.10	9.96	0.0332	1.51	0.10	0.15
Caltrans	0.036	0.05	0.16	0.0005	0.024	0.0017	0.0024
General Construction	0.23	0.32	1.02	0.0034	0.16	0.011	0.015
General Industrial	0.012	0.016	0.053	0.0002	0.0080	0.0006	0.0008
Total WLA	**2.54**	**3.49**	**11.20**	**0.04**	**1.70**	**0.12**	**0.16**

MS4-Municipal Separate Storm Sewer System.
*MS4 Permittees refer to the MdR Agencies subject to the 2012 MS4 Permit.

A.4 References

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APPENDIX B
Monitoring Station Selection Process

B.0 MONITORING STATION SELECTION PROCESS

This Appendix summarizes the receiving water and outfall monitoring stations selected under the Coordination Implementation Monitoring Plan (CIMP). Regional and potential jurisdictional monitoring stations are also described.

B.1 Receiving Water Stations

The Marina del Rey (MdR) receiving waters assessment consisted of field reconnaissance and a desktop review of current monitoring stations identified in the two Total Maximum Daily Load (TMDL) Coordinated Monitoring Plans (CMPs) for the MdR Watershed, the *Marina Del Rey Harbor Mothers' Beach and Back Basins Bacterial TMDL Coordinated Monitoring Plan* (Bacteria TMDL CMP) (Los Angeles County Department of Public Works [LADPW], 2007) and the *Marina Del Rey Harbor Toxic Pollutants TMDL Coordinated Monitoring Plan* (Toxics TMDL CMP) (LADPW, 2008). These stations are mapped in Figure B-1. An overview of Municipal Separate Storm Sewer System (MS4) infrastructure associated with the Grand Canal (i.e., Venice Canals and Ballona Lagoon) was also conducted.

A field reconnaissance was conducted on January 30 to 31, 2014 to fill data gaps related to monitoring station accessibility, the extent of tidal influence, and resident mussel growth across the Harbor in association with existing monitoring stations. Tables summarizing existing receiving water monitoring stations, monitoring programs, and recommended station-specific monitoring modifications are presented below for the main channel and each Basin of MdR Harbor. A discussion of the MS4 infrastructure and unique conditions of the Grand Canal (i.e., Venice Canals and Ballona Lagoon) has also been provided.

B.1.1 Front Basins

These stations are receiving water monitoring stations in the Front Basins under the Toxics TMDL.

Table B-1. Receiving Water Monitoring Stations in the Front Basins under the Toxics TMDL

<table>
<tr><th>Harbor Area</th><th>Station ID</th><th colspan="2">Recommendations</th></tr>
<tr><td>Basin A</td><td>MdRH-F-1</td><td>Rename to MdRH-A</td><td rowspan="3"><u>Water Column:</u>
Monthly Sampling on an alternating schedule for dissolved copper and total polychlorinated biphenyls (PCBs) MdRH-A, MdRH-C, and MdRH-G will be sampled one month; the following month stations MdRH-B and MdRH-H will be sampled.

<u>Sediment:</u>
Annual sampling of copper, lead, zinc, chlordane,</td></tr>
<tr><td>Basin B</td><td>MdRH-F-2</td><td>Rename to MdRH-B</td></tr>
<tr><td>Basin C</td><td>MdRH-F-3</td><td>Rename to MdRH-C</td></tr>
</table>

Basin G	MdRH-F-4	Rename to MdRH-G	total PCBs, total dichlorodiphenyltrichloroethanes (DDTs), p p'-dichlorodiphenyldichloroethylene (p p'-DDE), total organic carbon, grain size and toxicity. Sediment quality objective (SQO) sampling once every five years.
Basin H	MdRH-F-5	Rename to MdRH-H	

Figure B-1. Existing CMP Monitoring Stations

B.1.2 Back Basins

These stations are receiving water monitoring stations in the Back Basins under the Toxics TMDL.

Table B-2. Receiving Water Monitoring Stations in the Back Basins under the Toxics TMDL

<table>
<tr><th>Harbor Area</th><th>Station ID</th><th colspan="2">Recommendations</th></tr>
<tr><td>Basin D</td><td>MdRH-B-1</td><td>Rename to MdRH-D</td><td rowspan="3">Water Column:
Monthly Sampling on an alternating schedule for dissolved copper and total polychlorinated biphenyls (PCBs). MdRH-E will be sampled one month, MdRH-D and MdRH-F will be sampled the following month.

<u>Sediment:</u>
Annual sampling of copper, lead, zinc, chlordane, total, total PCBs, dichlorodiphenyltrichloroethanes (DDTs), p p'-dichlorodiphenyldichloroethylene (p p'-DDE), total organic carbon, grain size and toxicity. Sediment quality objective (SQO) sampling once every five years.</td></tr>
<tr><td>Basin E</td><td>MdRH-B-2</td><td>Rename to MdRH-E</td></tr>
<tr><td>Basin F</td><td>MdRH-B-3</td><td>Rename to MdRH-F</td></tr>
</table>

These stations are receiving water monitoring stations in the Back Basins under the Bacteria TMDL. No changes are recommended for monitoring at these stations.

Table B-3. Receiving Water Monitoring Stations in the Back Basins under the Bacteria TMDL

Harbor Area	Station ID	Existing Monitoring Program
Basin D	MdRH-1	One bacteria grab sample is collected from ankle deep water daily (Monday-Saturday).
Basin D	MdRH-2	One bacteria grab sample is collected from ankle deep water 2x/weekly (Mondays and Saturdays).
Basin D	MdRH-3	One bacteria grab sample is collected weekly (Mondays).
Basin D	MdRH-4	Two bacteria grab samples are collected weekly (Mondays). One sample is collected at the water's surface. One sample is collected at depth. The water at this location is approximately 3 to 4 meters deep.
Basin E	MdRH-5	The tide gate outlet is often 2 to 3 meters below the water's surface. One bacteria grab sample is collected at depth weekly (Mondays). The tide height at which the sample is collected is recorded in field notes to denote surface conditions.
Basin E	MdRH-6	Two bacteria grab samples are collected weekly (Mondays). One sample is collected at the water's surface. One sample is collected at depth. The water at this location is approximately 4 meters deep.

Harbor Area	Station ID	Existing Monitoring Program
Basin E	MdRH-7	MdRH-7 is located downstream of the tide gate where water from the Boone Olive Pump Station flows into the marina (CSTL-022A). The tide gate outlet is often 2 to 3 meters below the water's surface. One bacteria grab sample is collected at depth, and the tide height at which the sample is collected is recorded in field notes to denote surface conditions.
Basin F	MdRH-9	Two bacteria grab samples are collected weekly (Mondays). One sample is collected at the water's surface. One sample is collected at depth. The water at this location is approximately 4 meters deep.

B.1.3 Main Channel

These stations are receiving water monitoring stations in the Main Channel under the Bacteria and Toxics TMDL.

Table B-4. Receiving Water Monitoring Stations in the Main Channel under the Bacteria and Toxics TMDL

Harbor Area	Station ID	Existing Monitoring Program	Recommendation
Main Channel	MdRH-8	This is a Bacteria TMDL monitoring station. Two bacteria grab samples are collected weekly (Mondays). One sample is collected at the water's surface and one e is collected at depth. The water at this location is approximately 4 meters deep.	No change recommended.
Main Channel	MdRH-B-4	This is a Toxics TMDL monitoring station located at the confluence of Basins E, D, and F and represents receiving water conditions downstream of three major outfalls, two 18-inch outfalls, and Marina Beach.	Rename to MdRH-MC. Permit and Toxics TMDL compliance monitoring. **Water Column:** Monitor monthly for dissolved copper and total polychlorinated biphenyls (PCBs). **<u>Sediment:</u>** Annual sampling of copper, lead, zinc, chlordane, total PCBs, total dichlorodiphenyltrichloroethanes (DDTs), p p'-dichlorodiphenyldichloroethylene (p p'-DDE), total organic carbon, grain size and toxicity. Sediment quality objective (SQO) sampling once every five years

B.1.4 Grand Canal (Venice Canals and Ballona Lagoon)

The Grand Canal, consisting of Venice Canals and Ballona Lagoon (within Subwatershed 2), are under the jurisdiction of the City of Los Angeles. The four 36-inch outfalls, twenty-one 18-inch outfalls, and four 18-inch to 36-inch outfalls along the Grand Canal are separated from the MdR Harbor by a large tide gate that releases water to the main channel of MdR Harbor at a point west of the Front/Back Basins during outgoing tides (Figure B-2). The associated MS4 is partially inundated with water from the Grand Canal. According to the City of Los Angeles, the MS4 tributary to the Grand Canal is protected by best management practices (BMPs) (e.g., double screens – one at the catch basin and one at the outfall). The four major outfalls along the Grand Canal are fully submerged making the canal a low priority area for water quality monitoring

Figure B-2. Tide Gate Separating the Grand Canal from MdR Harbor (Ebbing Tidal Conditions)

B.2 Outfall Stations

The watershed station assessment focused on the identification and prioritization of potential watershed monitoring stations associated with major outfalls. During the desktop review, existing monitoring stations were evaluated for watershed representativeness. Each monitoring station drainage area was evaluated using total acreage by jurisdiction and land use (Table B-5 and Table B-6, respectively).

Table B-5. Existing Monitoring Stations and Watershed Representativeness by Jurisdiction

Jurisdiction	MdR-3	MdR-4	MdR-5	MdRU-C-2	MdRU-C-1
County of Los Angeles	0.00%	0.93%	0.00%	0.00%	100.00%
City of Los Angeles	83.04%	95.99%	100.00%	100.00%	0.00%
City of Culver City	11.21%	0.00%	0.00%	0.00%	0.00%
Other - CALTRANS	5.74%	3.08%	0.00%	0.00%	0.00%

Table B-6. Existing Monitoring Stations and Watershed Representativeness by Land Use

Land Use	MdR-3	MdR-4	MdR-5	MdRU-C-2	MdRU-C-1
Single Family Residential	33.44%	18.03%	32.54%	-	-
Multi-Family Residential	9.68%	7.82%	29.95%	63.18%	-
Roads and Right-of-Way	28.06%	18.93%	31.17%	31.50%	92.37%
Public Facilities	15.43%	1.56%	3.69%	0.07%	0.00%
Commercial and Services	12.88%	40.45%	2.31%	5.26%	6.50%
Developed Parks and Recreation	-	0.79%	-	-	1.13%
Industrial	0.51%	12.43%	0.34%	-	-

A field reconnaissance was conducted on January 30 and 31, 2014 to confirm findings from the desktop review and evaluate tidal influence and mussel growth at outfalls. The field reconnaissance showed that automated flow monitoring and sampling equipment are installed within a secure enclosure (Figure B-3) at the current watershed stations. Conduit frequently runs from the street-level equipment enclosure, through the MS4, to the main outfall connection. This or equivalent monitoring equipment design and installation has proven to be successful for water quality monitoring in the MdR Watershed. Tables summarizing existing watershed monitoring stations, monitoring programs, and recommended station-specific monitoring modifications are presented for Basins E, F, and G. These Basins are the only receiving water areas in the MdR Harbor that receive discharge from a major outfall or uniquely regulated TMDL area.

Figure B-3. ISSCO Type Automated Flow and Sampling Equipment

B.2.1 Back Basins - Basin E

Basin E receives storm water discharge from three major outfalls, CSTL-022A, B, and C. Three low flow diversions (LFDs) have been installed in the MS4, immediately upstream of the tidally influenced zone, to redirect any potential non-storm water discharges from Basin E to the sanitary sewer. See CIMP Section 5.0 for detailed description of the CIMP non-storm water program.

There are four current watershed stations tributary to Basin E (MdR-3, MdR-4, MdR-5, and MdRU-C-2) where storm water monitoring is anticipated. As presented in Table B-6, storm water discharges assessed at MdR-3, MdR-4, and MdR-5 cover most land uses in the MdR Watershed. Station MdR-3 represents the largest MS4 drainage area of the MdR Watershed that is able to be monitored. MdR-3 represents a mix of land uses representative of the MdR Watershed, as well as multiple jurisdictional areas. MdR-3 also provides co-located monitoring data with an LFD BMP. Based on these findings, MdR-3 is considered to be the watershed station most representative of existing conditions within the MdR Watershed and is recommended as the watershed station for Permit compliance monitoring. Additional details of the station screening and prioritization are summarized in the tables below.

MdR-3
Located at the intersection of Washington Blvd. and Thatcher Ave. Upstream of Basin E.

SCREENING PARAMETERS:

- **Regulatory Compliance:** Meets criteria.
- **Historic Data:** Current Storm Water monitoring station (Toxics TMDL). Multiple years of data.
- **Safety:** Access from sidewalk/catch basin. No traffic control required.
- **Quality Control:** Above tidal zone. Meets laminar flow criteria (Reinforced Concrete Pipe (RCP)).
- **Land Use:** Mixed land use *(predominantly single family residential with commercial and public facility areas and roads).*
- **Jurisdiction:** Mixed jurisdictions (Cities of Culver City and Los Angeles).
- **BMPs:** Co-located with LFD Project No. 5243. Trash screens installed at catch basin inlet.

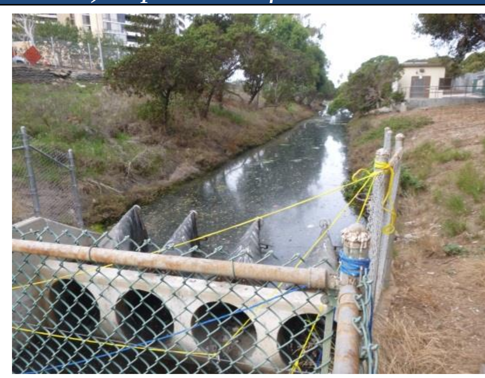
Diameter: 18 inches
Material: RCP
Tributary Area: 376.4 acres (20.3% MdR Watershed)

OUTCOME: Watershed Monitoring Station – Storm Water Monitoring (Permit & Toxics TMDL)

MdR-4
Located at the Oxford Basin Flood Control Basin (east side). Upstream of Basin E.

SCREENING PARAMETERS:

- **Regulatory Compliance:** Meets criteria.
- **Historic Data:** Current Storm Water monitoring station (Toxics TMDL). Multiple years of data.
- **Safety:** Area surrounded by fence. Requires key for access. Site established on concrete platform adjacent to pump house.
- **Quality Control:** Above tide gates. Meets laminar flow criteria (Storm Water).
- **Land Use:** Mixed land use *(predominantly single family residential with commercial, industrial, and roads).*
- **Jurisdiction:** City of Los Angeles.
- **BMPs:** Co-located with LFD Project No. 3872.



Material: Open channel upstream of four outfalls (inflow from 42-inch RCP)
Tributary Area: 154.4 acres (8.3% MdR Watershed)

OUTCOME: Watershed Monitoring Station – Storm Water Monitoring (Toxics TMDL)

MdR-5

Located at the Boone-Olive Pump Station control house. Upstream of Basin E.

SCREENING PARAMETERS:

- **Regulatory Compliance:** Meets criteria.
- **Historic Data:** Current Storm Water monitoring station (Toxics TMDL). Multiple years of data.
- **Safety:** Requires key for access. Site established on concrete platform adjacent to control house.
- **Quality Control:** Above tide gates.
- **Land Use:** Predominantly residential *(mixed single family and multi-family and roads).*
- **Jurisdiction:** City of Los Angeles only.
- **BMPs:** Co-located with LFD Project No. 3874.

Material: Open channel upstream of four outfalls (inflow from 66-inch RCP)
Tributary Area: 70.5 acres (3.8% total Watershed)

OUTCOME: Watershed Monitoring Station – Storm Water Monitoring (Toxics TMDL)

MdRU-C-2

Located at 602 Woodlawn Avenue. Upstream of Basin E.

SCREENING PARAMETERS:

- **Regulatory Compliance:** Meets criteria.
- **Historic Data:** Current Storm Water monitoring station for storm-borne Sediment special study (Toxics TMDL). Ongoing data collection.
- **Safety:** Access from sidewalk/catch basin. No traffic control required.
- **Quality Control:** Above tidal zone. The next accessible manhole in the main MS4 (682 Oxford Ave.) is tidally influenced; mussels in catch basins. Meets laminar flow criteria (RCP).
- **Land Use:** Predominantly residential *(mixed single family and multi-family and roads).*
- **Jurisdiction:** City of Los Angeles.
- **BMPs:** Trash screens installed at catch basin inlet.

Material: 18-inch RCP run into main storm drain line (33-inch RCP)
Tributary Area: 6.5 acres (0.35% MdR Watershed)

OUTCOME: Watershed Monitoring Station – Storm Water Monitoring (Toxics TMDL, Storm-Borne Sediment)

B.2.2 Former Basin E Watershed Stations

Watershed stations MdR-1 and MdR-2 are located in the upper reaches of the MdR Watershed and were included in the Toxics TMDL CMP as upstream/downstream jurisdictional boundary monitoring stations. In a letter to the Regional Board dated August 13, 2013, the County of Los Angeles (County) formally removed MdR-1 and MdR-2 from the Toxics TMDL CMP, citing changes to the overall MdR Watershed compliance strategy. The letter proposed continuing monitoring at MdR-3, the watershed station located upstream of the tidally influenced zone and downstream of MdR-1 and MdR-2. Monitoring at MdR-3 replaces a jurisdictional boundary compliance monitoring approach with the current integrated compliance monitoring approach used in the MdR Watershed CIMP.

MdR-1 represents residential land uses from the City of Los Angeles and MdR-2 represents the combined discharge from City of Los Angeles and Caltrans land uses. To date, no water quality monitoring data have been collected at these stations. The January 30, 2014 field reconnaissance found that MdR-2, located in the middle of Penmar Avenue, approximately 200 feet south of the intersection with Venice Blvd., is no longer safely accessible at street level because of recent street maintenance activities that resulted in paving over the manhole access (Figure B-4). Caltrans is not a participant in the MdR Watershed CIMP, and, therefore, delineating these upstream/downstream discharges is not appropriate. MdR-1 and MdR-2 have not been included in this CIMP as watershed stations.

Figure B-4. Currently No Safe Access to Former Watershed Station MdR-2

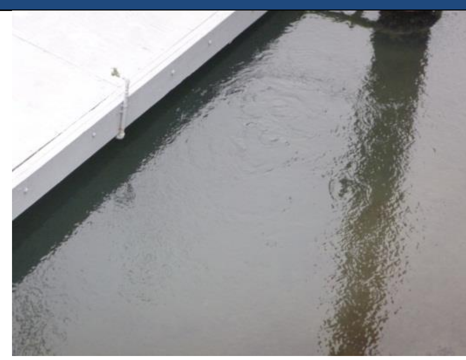
B.2.3 Back Basins - Basin F

Basin F receives discharge from Outfall CSTL-023A. There is one current watershed station, MdRU-C-1, associated with Basin F. The findings of the field reconnaissance are summarized below. Because of the small drainage area, no alternative stations were found.

<table>
<tr><td colspan="2">MdRU-C-1
Located north of Bali Way, near the intersection with Admiralty Way. Upstream of Basin F.</td></tr>
<tr><td><u>SCREENING PARAMETERS:</u>
• Regulatory Compliance: Meets criteria.
• Historic Data: Current Storm Water monitoring station for storm-borne Sediment special study (Toxics TMDL). Ongoing data collection.
• Safety: Access from sidewalk/catch basin. Limited traffic control required (cones for grate access).
• Quality Control: Above tidal zone. Meets laminar flow criteria (RCP).
• Land Use: Predominantly roads.
• Jurisdiction: County.
• BMPs: Temporary (construction) inlet protection BMPs.</td><td>
Material: 18-inch RCP
Tributary Area: 2.6 acres (0.14% total Watershed)</td></tr>
<tr><td colspan="2"><u>OUTCOME:</u> Watershed Monitoring Station – Storm Water Monitoring (Toxics TMDL)</td></tr>
</table>

B.2.4 Front Basins - Basin G

There are no existing watershed stations in Basin G and there is no monitoring requirement under the Bacteria TMDL because it is a Front Basin. Under the Permit, paired upstream and downstream receiving water and MS4 monitoring is not feasible. Major Outfall CSTL-023B is fully submerged for the duration of the tidal cycle. Eddies from the outfall may be observed from the water's surface during ebbing tides. During the field reconnaissance of the MS4 located upstream of CSTL-023B, tidal intrusion was observed. The manhole cleanout access points along Lincoln Boulevard were observed to contain more than 1 foot of standing tidal water in the vault. No new monitoring stations characterizing Basin G are feasible or recommended.

CSTL-023B (Major Outfall) *MS4 upstream of Basin G.*	
<u>SCREENING PARAMETERS:</u> • **Regulatory Compliance:** Meets criteria. • **Historic Data:** None. • **Safety:** Limited access to MS4, especially main storm drain lines. • **Quality Control:** Tidal influence for the full length of MS4. Outfall fully submerged. • **Land Use:** Predominantly roads. • **Jurisdiction:** County. • **BMPs:** None.	 CSTL-023B Material: 54-inch RCP
<u>OUTCOME:</u> No Watershed Stations Recommended.	

B.3 Regional Monitoring Stations – Bight 2013

The Bight 2013 survey is organized into five technical components: 1) Contaminant Impact Assessment, 2) Shoreline Microbiology, 3) Water Quality, 4) Marine Protected Areas, and 5) Trash and Debris. The MdR Watershed has been included in the 2013 Contaminant Impact Assessment, which focuses on sediment contaminants and associated impacts on benthic infauna and demersal fish. MdR Harbor monitoring stations included in Bight 2013 are presented in Table B-7.

Table B-7. Bight 2013 Monitoring Stations in the MdR Watershed

Bight 2013 Document	Bight 2013 Station ID	Latitude	Longitude	Sample Media	Location
Contaminant Impact Assessment Workplan	B13-8407	33.9643	-118.4535	Sediment, Tissue	Main Channel south, outside MdRH
	B13-8409	33.9703	-118.4482	Sediment, Tissue	Main Channel, south of Basin A
	B13-8413	33.9761	-118.4465	Sediment, Tissue	Between Basin G and Basin H
	B13-8417	33.9833	-118.4506	Sediment, Tissue	Basin E

The Bight program is led and organized by Southern California Coastal Water Research Project (SCCWRP) and is considered to be independent of this CIMP; however, data from the study will be used to help evaluate long-term assessment of conditions and TMDL compliance. Participation in future Bight assessments will be determined by SCCWRP and the MdR CIMP Agencies during each five-year period of the program and will be coordinated with Toxics TMDL-required sediment quality objective (SQO) monitoring.

B.4 References

LADPW. 2008. *MdRH Toxic Pollutants Total Maximum Daily Load Coordinated Monitoring Plan*. March 2008.

LADPW (Los Angeles County Department of Public Works). 2007. *Marina Del Rey Harbor Mothers' Beach and Back Basins Bacterial TMDL Coordinated Monitoring Plan* (Bacteria TMDL CMP).

APPENDIX C
Sampling Procedures, Analytical Methods, and Data Quality Control

C.0 SAMPLING PROCEDURES, ANALYTICAL METHODS AND QUALITY CONTROL

C.1 SAMPLING PROCEDURES

This section of the appendix presents a discussion of applicable sampling procedures for water and sediment sample collection, fish and mussel tissue collection, and other monitoring programs during storm water (wet) and non-storm water (dry) weather conditions. These procedures include chain-of-custody protocols, safety considerations, storm characterization, wet weather and dry weather water quality sampling protocols, storm-borne and Harbor sediment sampling protocols, and fish and mussel sampling protocols.

C.1.1 Storm Event Forecasting and Precipitation Monitoring

Storm water monitoring during wet weather is required by the Permit. The Marina del Rey Enhanced Watershed Management Program (MdR EWMP) Agencies propose to conduct wet weather monitoring between October 1st and April 15th for schedule optimization and cost efficiencies. In order to identify qualifying storms for storm water monitoring, at least one National Weather Service (NWS) weather forecast tool will be monitored by members of the MdR EWMP Agencies daily during the wet weather season.

The automatic tipping bucket (intensity measuring) rain gauge located at Electric Avenue Pump Plant (at the intersection of Electric Avenue and Brooks Avenue, latitude: 33.993048, longitude: -188.472793) will be used to evaluate post-storm wet weather monitoring criteria for the MdR Watershed. Local rain gauge data may be used in storm water runoff calculations and to help develop runoff characteristics for the MdR Watershed. In the event that the Electric Avenue Pump Plant rain gauge is not operational, the rain gauge at Los Angeles International Airport (LAX) will be used.

For purposes of this Coordinated Integrated Monitoring Program (CIMP), mobilization for wet weather receiving water monitoring will occur when the following criteria are met:

1. 70% probability of at least 0.1-inch rainfall, at least 24 hours prior to the start of a rainfall event using NWS forecast tools. Every attempt will be made to monitor acceptable storms; however, if a storm is not predicted at least 24 hours in advance, it may not be possible to monitor the event.
2. At least three days of dry conditions (e.g., less than 0.1 inch of rain each day) prior to the storm event.

C.1.2 Water Quality Sampling

Water quality sampling requirements are summarized by regulatory driver and monitoring station for storm water (Table C-1) and non-storm water (Table C-2) monitoring programs. Note that for the Toxics Total Maximum Daily Load (TMDL), non-storm water monitoring at receiving water stations will be conducted in the main channel of MdR monthly and on a rotating monthly schedule for the remaining stations such that MdRH-A, MdRH-C, MdRH-E, and

MdRH-G will be sampled one month; whereas MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled the following month. All stations will be sampled a minimum of six times per year.

Sample preservatives, holding time requirements, analytical methods, detection limits, and holding times for each parameter sampled and analyzed for each monitoring program are provided in Appendix D. The Method Detection Levels (MDLs) must be lower than or equal to the minimum level (ML) values defined in the Permit or per TMDL requirements. Analytical method requirements and water quality objectives (WQOs) for constituents listed in Monitoring and Reporting Program (MRP) Table E-2 (Storm Water Monitoring Program's Constituents with Associated Minimum Levels [MLs]) are presented in Appendix D. Additional requirements for constituents with TMDLs and/or that are 303(d)-Listed have been incorporated, as applicable.

Note that polychlorinated biphenyls (PCBs) were generally manufactured as a mixture of various PCB congeners and manufactured and sold under many names, the most common of which is the Aroclor series (United States Environmental Protection Agency [USEPA], 2014). The Toxics TMDL does not specify the type of analysis required for total PCBs, but historically, water quality samples underwent analysis for Aroclors. The screening parameters in MRP Table E-2 list total PCBs in the form of Aroclors. The sediment triad analysis used to determine Sediment Quality Objectives (SQOs) requires analysis for congeners in order to achieve the sediment quality guidelines. Considering that the regulatory drivers applicable to the MdR Watershed require different analytical and reporting methods of total PCBs, this CIMP proposes using a consistent method of analysis. Therefore, for the purposes of this CIMP, all water, sediment, and tissue samples will undergo analysis for congeners in place of Aroclors.

Table C-1. Monitoring Program by Monitoring Station – Water Quality – Storm Water (Wet Weather)

Sampling Media	*Station Type*	*Wet Weather Monitoring Program*	*Parameter(s)*	*Station ID*	*Latitude*	*Longitude*	*Sampling Frequency*	*Sample No. and Type @ Sample Location*	*No. Samples/ Year*
Water	Harbor Receiving Water Stations	Permit	Field Parameters Bacteria[a] Screening Parameters[b][c] Trash Survey *Flow not feasible in harbor.*	MdRH-MC	33.98054	-118.448191	3 storms/year[b]	1 grab @ Water Surface	3
				Duplicate	33.98054	-118.448191	1 storm/year	1 grab @ Water Surface	1
				Field Blank	33.98054	-118.448191	1 storm/year	Laboratory Blank Water	1
			Toxicity	MdRH-MC	33.98054	-118.448191	2 storms/year	1 grab @ Water Surface	2
	Outfall Stations	Permit	Flow, Field Parameters Bacteria,[a] Screening Parameters [b][c]	MdR-3	33.98919	-118.450627	3 storms/year[b]	1 composite (flow-weighted) @ Water Surface 1 grab @ Water Surface 1 duplicate sample 1 field blank sample	3 + 2 QC
			Toxicity				As needed [d]	1 composite (flow-weighted)	Up to 3
		Toxics TMDL	Flow, Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Settleable Solids	MdR-3	33.98919	-118.450627	Up to 15 storms/year	1 composite (flow-weighted)	Up to 15
				MdR-4	33.9846	-118.459222	Up to 15 storms/year	1 composite (flow-weighted)	Up to 15
				MdR-5	33.98567	-118.45297	Up to 15 storms/year	1 composite (flow-weighted)	Up to 15
				MdRU-C-1	33.98325	-118.443414	Up to 15 storms/year	1 composite (flow-weighted)	Up to 15
				MdRU-C-2	33.98849	-118.457609	Up to 15 storms/year	1 composite (flow-weighted)	Up to 15
				Duplicate	To be determined		2-4 storm/year	1 composite (flow-weighted)	2-4
				Field Blank	Not applicable		2-4 storm/year	1 composite (flow-weighted)	2-4

[a]City of Los Angeles' regional monitoring program uses *E. coli* in place of fecal coliform bacteria. Both indicator bacteria appear on Table E-2 in the MRP.
[b]Table E-2 in the MRP (Reporting Program No. CI-6948). The first significant storm of the first monitoring year will be analyzed for the entire list of parameters on Table E-2 of the MRP. For subsequent storms, only Category 1 constituents will be analyzed along with any parameters from Table E-2 that were above the lowest applicable water quality ojective during the first significant storm
[c]Required for parameters with results at nearest downstream receiving water station that exceeds the lowest applicable WQO.
[d]Toxicity shall be conducted if the TIE conducted during the most recent sampling event at the downstream receiving water monitoring station was inconclusive.
[e]Number of QA samples will be based upon the number of storms sampled each year in accordance with Surface Water Ambient Monitoring Program (SWAMP) protocols (generally 5%).

Table C-2. Monitoring Program by Monitoring Station – Water Quality – Non-storm Water (Dry Weather)

Sampling Media	*Station Type*	*Dry Weather Monitoring Program*	*Parameter*	*Station ID*	*Latitude*	*Longitude*	*Sampling Frequency*	*Sample No. and Type @ Sample Location*	*No. Samples/ Year*
Water	*Harbor Receiving Water Stations*	Permit	Field Parameters Indicator Bacteria(a) Total suspended solids (TSS) *Flow not feasible in harbor.*	MdRH-MC	33.98054	-118.448191	2x/year including once in July*	1 grab @ Water Surface	2
				Duplicate	33.98054	-118.448191	1x/year	1 grab @ Water Surface	1
				Field Blank	Not Applicable		1x/year	In Field	1
			Screening Parameters(b)	MdRH-MC	33.98054	-118.448191	1x in July of the first monitoring year(b)	1 grab @ Water Surface (b)	1(b)
			Toxicity	MdRH-MC	33.98054	-118.448191	1x/year in July	1 grab @ Water Surface	1(c)
		Bacteria TMDL	Indicator Bacteria: Total Coliform, *E. coli,* (a) *Enterococcus*	MdRH-1	33.979886	-118.457175	6 days/week(c)	1 grab @ Ankle Deep	312
				MdRH-2	33.981105	-118.458012	2 days/week(c)	1 grab @ Ankle Deep	104
				MdRH-3	33.981785	-118.456382	1x/week(c)	1 grab @ Water Surface	52
				MdRH-4	33.980535	-118.455992	1x/week(c)	1 grab @ Water Surface, 1 grab @ At Depth	52x2
				MdRH-5	33.983435	-118.456112	1x/week(c)	1 grab @ At Depth(d)	52
				MdRH-6	33.982925	-118.454912	1x/week(c))	1 grab @ Water Surface, 1 grab @ At Depth	52x2
				MdRH-7	33.982805	-118.456332	1x/week(c)	1 grab @ At Depth(d)	52
				MdRH-8	33.981185	-118.448062	1x/week(c)	1 grab @ Water Surface	52
				MdRH-9	33.981935	-118.444992	1x/week(c))	1 grab @ Water Surface	52
		Toxics TMDL	Copper (total/dissolved) and Hardness	MdRH-MC	33.98054	-118.448191	1x/month	1 grab @ Water Surface	12
				MdRH-A	33.97251	-118.45284	1x/every other month (rotational schedule(e))	1 grab @ Water Surface	6(e)
				MdRH-B	33.97514	-118.453465	1x/ every other month h (rotational schedule(e))	1 grab @ Water Surface	6(e)
				MdRH-C	33.97773	-118.453722	1x/ every other month (rotational schedule(e))	1 grab @ Water Surface	6(e)
				MdRH-D	33.98022	-118.453555	1x/ every other month (rotational schedule(e))	1 grab @ Water Surface	6(e)
				MdRH-E	33.98301	-118.453383	1x/ every other month (rotational schedule(e))	1 grab @ Water Surface	6(e)
				MdRH-F	33.98198	-118.445015	1x/ every other month (rotational schedule(e))	1 grab @ Water Surface	6(e)
				MdRH-G	33.97939	-118.444347	1x/ every other month (rotational schedule((e))	1 grab @ Water Surface	6(e)
				MdRH-H	33.97635	-118.444087	1x/ every other month (rotational schedule(e))	1 grab @ Water Surface	6(e)
				Duplicate	To be Determined		1x/quarter – one per Basin	1 grab @ Water Surface	4
				Field Blank	Not Applicable		1x/quarter – one per Basin	in Field	4
			Total PCBs	MdRH-MC	33.98054	-118.448191	1x/month	1 grab @ Water Surface	12
				MdRH-A	33.97251	-118.45284	1x/every other month (rotational schedule(e))	1 grab @ Water Surface	6(e)
				MdRH-B	33.97514	-118.453465	1x/every other month (rotational schedule(e))	1 grab @ Water Surface	6(e)
				MdRH-C	33.97773	-118.453722	1x/every other month (rotational	1 grab @ Water Surface	6(e)

							schedule[e])		
				MdRH-D	33.98022	-118.453555	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-E	33.98301	-118.453383	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-F	33.98198	-118.445015	1x/month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-G	33.97939	-118.444347	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-H	33.97635	-118.444087	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				Duplicate	To be Determined		1x/year – one Basin	1 grab @ Water Surface	1
				Field Blank	Not Applicable		1x/year – one Basin	in Field	1

[*] One of the two required dry weather monitoring events will be conducted during the historically driest month of the year, July.
(a) City of Los Angeles' regional monitoring program uses *E. coli* in place of fecal coliform bacteria. Both indicator bacteria appear on Table E-2 in the MRP.
(b) All the parameters listed in Table E-2 of the MRP will be monitored during the July monitoring event in the first monitoring year. Only constituents detected above the lowest applicable water quality objective will be monitored during dry weather (2x/year) for the remainder of the permit term.
(c) Monitoring is scheduled. Samples collected 6 days/week (Monday-Saturday) at MdRH-1 and twice per week (Monday and Saturday) at MdRH-2, designated shoreline stations at Marina Beach. Samples collected weekly are sampled on Mondays. Season classifications (Wet versus Dry) are assigned post-monitoring, based on prevailing weather conditions during a scheduled sampling event. "Dry Weather" is assigned to samples collected at least 72 hours post a rainfall event.
(d) The outfall tide gate is typically 2 to 3 meters below the water's surface. The tide height at which the sample is collected is recorded in field notes to denote surface conditions.
(e) Sampling will be rotated on a monthly schedule (MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; the following month stations MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled,

C.1.2.1 Water Quality Sampling – Composite versus Grab Sampling

There are two main types of samples which are used in water quality monitoring, grab samples and composite samples. The type of sample taken in a given instance will depend on the monitoring station, the type of test to be performed, frequency of testing, and regulatory requirements. A grab sample consists of a single sample taken at a specific time. A composite sample is a mixed or combined sample created by combining a series of discrete samples (aliquots) of specific volume. The protocols and use of these sampling methods under the CIMP are described below.

C.1.2.1.1 Water Quality Sampling – Grab Sampling

Grab samples will be collected at outfall and receiving water stations to characterize water quality conditions in accordance with regulatory requirements and protocols outlined in this CIMP, as summarized in Table C-3. A single grab sample will be collected at the receiving water station, MdRH-MC, during both storm water and non-storm water (dry weather) sampling. During wet weather sampling, this sample will be used to characterize storm water flows for Permit compliance monitoring and will be collected between one and three hours after monitoring is initiated at the upstream outfall station, MdR-3. Grab samples will also be collected at outfall stations during storm water monitoring events, to help characterize parameters not amenable to composite sampling (Table C-4). These grab samples will be collected during the rising limb of the hydrograph. For safety, grab samples collected during non-storm water monitoring events will be collected during day-light, normal business hours, to the maximum extent practicable.

Table C-3. Primary Method of Grab Sampling for each Monitoring Program

Station Type	Permit	Toxics TMDL	Bacteria TMDL
Outfall	Grab: Center of flow at the peak of storm	Grab: Center of flow at the peak of storm	Grab: Incoming wave, surface water, and/or at depth
Receiving Water	Grab: Center of flow, 1-3 hours after start of monitoring at MdR-3 during storm water sampling.	Grab: Surface water	Grab: Incoming wave, surface water, and/or at depth

Table C-4. Water Quality Parameters Requiring Grab Sample Collection

Constituents Requiring Grab Samples		
Field Parameters	**Conventional Constituents**	**Indicator Bacteria**
▪ Temperature ▪ Hydrogen ion concentration (pH) ▪ Specific conductance ▪ Dissolved Oxygen (DO) ▪ Turbidity	▪ Oil and grease ▪ Total phenols ▪ Cyanide ▪ Total petroleum hydrocarbons (TPH) ▪ Methyl tertiary butyl ether (MTBE) ▪ 2-Chloroethyl vinyl ether	▪ Total coliforms ▪ Fecal coliforms ▪ Fecal enterococci ▪ *Escherichia coli*

All grab samples will be collected from the horizontal and vertical center of flow, whenever possible. Grab samples will be kept clear from uncharacteristic floating debris. Additionally, parameter-specific grab sampling techniques include the following:

- **Bacteria:** Bacteria samples will be collected in a sterile sample bottle and then placed in a clean Ziploc® bag and put on ice container at about 0-4ºC for transport to the laboratory for analysis within the laboratory holding time (e.g., 8 hours).
- **Oil and Grease/Petroleum hydrocarbons:** Oil, grease, and hydrocarbons tend to float. Grab samples for these constituents will be collected at the air–water interface in amber glass bottles. Sample bottles will not be pre-rinsed with sample before collection. If samples are not be able to analyzed within four hours, samples will be preserved with HCl or H_2SO_4 to pH less than two and put in an ice cooler at about 0-4ºC for transport to the laboratory.
- **Field Parameters:** A YSI meter, or equivalent, will be used for collection of pH, dissolved oxygen (DO), specific conductance, turbidity, and temperature data. Meters will be allowed to stabilize for one minute prior to recording readings. Operation of meters will be conducted in accordance with manufacturer instructions, and meters will be calibrated in accordance with manufacturer specifications on the same day field measurements will be taken to ensure accurate functionality. Calibration logs will be available upon request. Field parameters, such as DO and temperature, degrade with exposure. Field parameter measurements will be collected and recorded after a sample has been collected. In the event of equipment malfunction and repair, a field parameter grab sample will be re-collected and tested.

C.1.2.1.2 Water Quality Sampling – Composite Sampling

Composite samples will be collected at outfall stations during storm water monitoring for Permit and Toxics TMDL programs (Table C-5). All composite samples will consist of a minimum of three sample aliquots, separated by a minimum of 15 minutes within each hour of monitoring/discharge. Sample aliquots will be collected on a flow-weighted basis.

Table C-5. Primary Method of Composite Sampling for each Monitoring Program

Station Type	Permit	Toxics TMDL	Bacteria TMDL
Outfall	Flow-weighted	Flow-weighted	N/A
Receiving Water	N/A	N/A	N/A

N/A – Not applicable.
Composite samples will be collected using automated sampling equipment installed on-site prior to an event. In the event of equipment malfunction, composite sampling will be collected manually, if feasible.

Composite samples will be collected using automated sampling equipment installed on-site prior to an event. Sampling equipment will consist of a configuration and design as historically used in the MdR Watershed at outfall stations. At a minimum, sampling equipment used for flow-weighted composite sampling at outfall stations will include: a flow sensor to continuously measure water stage (level or height), flow meter and logger, peristaltic pump, sample bottles, and lockable housing to secure all monitoring equipment (Figure C-1, or equivalent). Flow sensors will be installed in the middle of the municipal separate storm sewer system (MS4) at the system invert. Flow sensors will be used to relay water stage data to the flow meter. The flow meter will be programmed to continually calculate flow rates by inserting the stage information into the preprogrammed discharge equation (e.g., Manning's Equation) or site-specific rating table. All water quality instruments will be calibrated according to the manufacturer specifications during their installation. Equipment quality checks of the calibration may be performed regularly to ensure ongoing equipment performance. Prior to a monitored storm event, automated samplers will be programmed to start automatically when the water level exceeds a site-specific, minimum predetermined level. A sample aliquot will be collected each time a set volume of water has passed the monitoring point. This volume is referred to as the pacing volume or trigger volume. Samples will be stored in glass containers within the sampler. As samples are collected, monitoring data, including discrete sample times and runoff data, are logged and stored for transfer. The automated sampler will be deactivated by field personnel within 48 hours after the end of each storm event.

Figure C-1. ISCO Type Automated Flow and Sampling Equipment Installed at Existing Monitoring Stations

In the event of equipment malfunction, manual grab samples will be collected. The time of each manual grab sample will be recorded and used to create the time-weighted composite sample, which will be submitted to the laboratory for analysis. Time-weighted sample aliquots will be collected by sampling discretely at established time intervals, as follows:

- **Event Duration >24 hours:** Hourly aliquots for the first 24 hours.
- **Storm Event Duration ≤24 hours and >3 hours:** Hourly aliquots for the duration of the event.
- **Storm Event Duration ≤ 3 hours:** Aliquots separated by a minimum of 15 minutes within each hour of discharge. The MRP requires a minimum of three aliquots total. For

the purposes of this CIMP, sample aliquots will be collected at 15 minute intervals for a total of three hours.

In the event of equipment malfunction at an outfall station, flow data necessary for storm water load estimates will be modeled. Rainfall data from the MdR Watershed precipitation station and other regional precipitation stations may be used to populate the model. Data from storm events either before or after the missing data may also be used for model calibration. Additionally, field observations of flow conditions may be used to calibrate models. Field flow measurement and estimation techniques, listed in order of priority, include the following:

- **Float Method:** Measure of average velocity (average of three measurements representing a known distance traveled and measured interval, multiplied by a correction factor of 0.85) and average cross-sectional flow area (width and depth measurements, at a minimum),
- **Direct Volumetric Measurement:** Measure of the time required to fill a container of known volume (only applicable to small flows), and
- **Visual Approximation:** If storm water discharge is not safely measurable using either of these direct measurement techniques, visual approximation of water depth and velocity may be used to estimate flow. Visual approximation is based on best professional judgment and would only be used to confirm the relative changes in magnitude of storm water discharge for modeled flow.

C.1.2.1.3 Equipment Maintenance

All sampling equipment will be cleaned and calibrated according to manufacturer manuals prior to sampling. Decontamination procedures as described by the California Department of Fish and Game (Hosea and Finlayson, 2005) will be employed and will include immersion of sampling equipment in Sparquat 256.

Field meters use sensitive osmotic membranes for the measurement of pH and DO; therefore, neither freezing nor the use of Sparquat 256 will be employed as a decontamination method. Field meters will be visually inspected after use at each location and all snails, mud, algae, and debris will be removed. The meters will then be thoroughly rinsed on-site with deionized water followed by actual sample before taking measurement. Visual inspection of the field meters will be completed prior to departure from the station and before use at the next monitoring location.

C.1.2.2 Water Quality Sampling – Receiving Water Stations – Storm Water

Time-weighted storm water composite sampling will be conducted at the Harbor receiving water station for Permit compliance (MdRH-MC). Note that flow monitoring and, therefore, flow-weighted composite sampling is not feasible in the MdR Harbor. Sampling at the receiving water station will be coordinated to begin after sampling begins at the upstream outfall station (MdR-3) in order to monitor the potential effect of the MS4 on the receiving water. Time-weighted sample aliquots will be collected using automated sampling equipment mounted to existing marina infrastructure accessible from land (e.g., marina docks).

Toxicity monitoring shall be conducted at Harbor receiving water station MdRH-MC to evaluate a sublethal effect (e.g., reduced growth, reproduction) to experimental test organisms in accordance with MRP requirements. Toxicity sampling shall consist of time-weighted composite samples, collected using the methods described above. The total sample volume shall be determined both by the specific toxicity test method used and the additional volume necessary for toxicity identification evaluation (TIE) studies. Sufficient sample volume shall be collected to perform both the required toxicity tests and TIE studies. All toxicity tests shall be conducted as soon as possible following sample collection. A 36-hour sample holding time is preferred for test initiation, with no more than 72 hours elapsed before the conclusion of sample collection and test initiation.

Storm water grab samples will be collected at the Harbor receiving water station MdRH-MC from the water's surface, with the assistance of a sampling pole or bucket. Grab samples will be collected during the initial portion of the storm (i.e. on the rising limb of the hydrograph), and from the horizontal and vertical center of flow whenever possible. Field personnel will take all precautions necessary to ensure safe sampling techniques are used in the field.

A field duplicate and field blank sample will be collected at the MdRH-MC Harbor receiving water station for Permit compliance.

All samples shall be delivered under chain-of-custody to the appropriate analytical laboratory for all analyses summarized in Appendix D. Year 1 results for Permit compliance storm water monitoring will shape monitoring requirements and parameter lists for subsequent storm events and monitoring years, dependent upon results below the MDL (non-detect result) and/or less than the lowest applicable WQO. Appendix D monitoring lists will be revised and a written request will be submitted to the Executive Officer of the Los Angeles Regional Water Quality Control Board (Regional Board).

C.1.2.3 Water Quality Sampling – Receiving Water Stations – Trash Monitoring

Trash monitoring will be conducted to assess the quantities of trash in the Harbor receiving water associated with storm events. Visual observations of trash will be made and photographs will be taken at the MdRH-MC prior to the start of storm event monitoring and again at the end of the storm water monitoring. One photograph will be taken across the Main Channel of MdR Harbor, perpendicular to direction of flow along the channel. The photograph will show as much as possible of both sides of the Main Channel when feasible. The post storm photograph must be taken from the same vantage point. Ideally the two photographs will display relative volumes of trash that were deposited by storm flows, if trash is present.

C.1.2.4 Water Quality Sampling – Receiving Water Stations – Non-Storm Water

C.1.2.4.1 Water Quality Sampling – Receiving Water Stations – Non-Storm Water Monitoring for Permit Compliance

Non-storm water monitoring will be conducted at MdRH-MC twice annually. One of these monitoring events will occur in the month of July, which is historically the driest month in the region (Los Angeles County Department of Public Works [LADPW], 2014a). Monitoring will be conducted in accordance with MRP Section VI.D.1.b.i, on days with less than 0.1 inch of rain and not less than three days after a rain event of 0.1 inch or greater within the watershed (as measured at the rain gauge located at Electric Avenue Pump Plant). The required parameters are identified in MRP Section D.1.c (see Appendix D) and include aquatic toxicity monitoring once per year, during the July dry weather monitoring event. In addition to the required parameters in MRP Section D.1.c, during the July dry weather monitoring event in the first year of monitoring, parameters in Table E-2 of the Permit will also be monitored. If a parameter identified in Table E-2 is not detected at the MDL or the result is below the lowest applicable WQO, it will not be analyzed for the remainder of the Permit term at MdRH-MC. If a parameter in Table E-2 is detected above the lowest applicable WQO then the parameter will be analyzed during dry weather monitoring for the remainder of the Permit term at this station.

C.1.2.4.2 Water Quality Sampling – Receiving Water Stations – Bacteria TMDL Compliance

Water quality grab samples will be collected from Harbor receiving water stations MdRH-1 through MdRH-9 for Bacteria TMDL compliance. Samples collected for Bacteria TMDL compliance are collected on a scheduled basis (weekly or six times per week at two Marina Beach shoreline stations). Bacteria grab samples collected at Harbor receiving water stations MdRH-1 through MdRH-3, which are located along the Marina Beach, will be collected from ankle depth during an incoming wave. Bacteria grab samples collected from Harbor receiving water stations MdRH-4 through MdRH-9 will be collected from a skiff. Samples collected from the skiff will be collected from the water's surface and/or at depth, depending on the sampling schedule in Table C-2. Skiff operations will be subject to all existing field safety protocols and sampling standard operating procedures.

Bacteria samples collected within three days of a storm event are classified as wet weather samples and the sampling location from major outfalls (receiving water stations MdRH-5 and MdRH-7) are subject to TMDL observation requirements. In accordance with the Bacteria TMDL, wet weather bacteria grab samples shall represent flow from the outfall into the surf zone/receiving water at the point of mixing of storm water and marine water. Grab samples shall be taken as close as possible to the initial point of mixing with the receiving water. As a safety consideration, this monitoring location may be shifted no further away than 10 meters (m) down current of the MS4 outfall/point of mixing. The Global Positioning System (GPS) coordinates of this event-specific monitoring location will be recorded in field notes. Care will be taken not to collect a sample from the incoming tidal swash. The tide may push the freshwater discharge back into the MS4 during high tide conditions. Tide observations and potential impacts on water quality conditions will be recorded in field notes.

All bacteria grab samples shall be delivered under chain-of-custody to the appropriate analytical laboratory for all TMDL required bacterial analyses identified in Appendix D, within the designated 8-hour holding time.

C.1.2.4.3 Water Quality Sampling – Receiving Water Stations – Non-Storm Water Monitoring for Toxics TMDL

Water quality grab samples of dissolved copper and total PCBs (e.g., congeners) will be collected from Harbor receiving water stations for Toxics TMDL compliance. Samples will be collected from a skiff. Skiff operations will be subject to all existing field safety protocols and sampling standard operating procedures. As a safety consideration, samples are not collected from the skiff during rainfall. All toxicity samples shall be delivered under chain-of-custody to the appropriate analytical laboratory for all TMDL required analyses (Appendix D).

C.1.3 Sediment Sampling

Multiple sediment monitoring programs are required by the Toxics TMDL. These programs are briefly described below and explained further in the following sections.

The first program required by the Toxics TMDL is the analysis of storm-borne sediment collected from the MdR Watershed. Storm-borne sediment passive collection at outfall stations will be conducted for up to 15 storm events per year. Monitoring will be conducted during the wet weather monitoring season of October 1st through April 15th. The Watershed Management Group (WMG) Agencies will attempt to capture storms occurring in September and early May, if feasible, based upon readiness and other constraints (such as sample holding times).

Storm-borne sediment samples will be analyzed for Toxics TMDL pollutants and used to evaluate the potential sediment and pollutant load entering MdR Harbor from the Watershed. Table C-6 lists the monitoring stations applicable to this program. A pilot study was completed in 2014 (LADPW, 2014b) and can be found in Appendix H.

Sediment monitoring has been conducted in the MdR Harbor for more than 25 years, as part of an annual monitoring program conducted by the Los Angeles County Department of Beaches and Harbors, the Toxics TMDL CMP, a special study conducted by the County in 2008, and the regional Bight program (2003, 2008, and 2013). Sediment monitoring results for the Toxics TMDL constituents have remained relatively consistent over time. Sediment chemistry and toxicity will be conducted annually. Additionally sediment triad sampling (SQO sampling) will be conducted once every five years in coordination with the Bight program. Additionally, SQO sampling will occur as part of a Stressor Identification study being conducted in 2016.

Sample preservatives, holding time requirements, detection limits, and holding times for each parameter are provided for each monitoring program in Appendix D.

Table C-6. Monitoring Programs by Monitoring Station – Storm-Borne Sediment – Storm Water (Wet Weather)

Sampling Media	Station Type	*Wet Weather Monitoring Program*	Parameter(s)	Station ID	Latitude	Longitude	Sampling Frequency	Sample No. and Type @ Sample Location	No. Samples/ Year
Storm-Borne Sediment [a]	Outfall Stations	Toxics TMDL	Copper, Lead, Zinc Total Organic Carbon (TOC), Percent Solids, Total PCBs (congeners), total DDTs, p,p'-DDE, Chlordane	MdR-3	33.98919	-118.450627	Up to 15 storms/year[a]	1 composite sample of all sediment collected during the Wet Season.	1
				MdR-4	33.9846	-118.459222	Up to 15 storms/year[a]	1 composite sample of all sediment collected during the Wet Season.	1
				MdR-5	33.98567	-118.45297	Up to 15 storms/year[a]	1 composite sample of all sediment collected during the Wet Season.	1
				MdRU-C-1	33.98325	-118.443414	Up to 15 storms/year[a]	1 composite sample of all sediment collected during the Wet Season.	1
				MdRU-C-2	33.98849	-118.457609	Up to 15 storms/year[a]	1 composite sample of all sediment collected during the Wet Season.	1
				Duplicate	To be determined		-	1 composite sample of all sediment collected during the Wet Season.	5 (1 per station), if enough sediment collected

[a] Sediment collected during storm water monitoring events at outfalls.

Table C-7. Monitoring Programs by Monitoring Station – (Benthic) Sediment (Dry Weather)

Sampling Media	*Station Type*	*Dry Weather Monitoring Program*	*Parameter(s)*	*Station ID*	*Latitude*	*Longitude*	*Sampling Frequency*	*Sample No. and Type @ Sample Location*	*No. Samples/ 5 Years (SQO)*
(Benthic) Sediment	Harbor Receiving Water Stations	Toxics TMDL	**<u>Sediment Chemistry & Toxicity</u>** Copper, Lead, Zinc, Chlordane, Total PCBs, Total DDTs, p,p'-DDE, Total organic carbon, Grain size, Toxicity	MdRH-MC	33.98054	-118.448191			
				MdRH-A	33.97251	-118.45284			
				MdRH-B	33.97514	-118.453465			
				MdRH-C	33.97773	-118.453722			
				MdRH-D	33.98022	-118.453555			
				MdRH-E	33.98301	-118.453383			
				MdRH-F	33.98198	-118.445015			
				MdRH-G	33.97939	-118.444347			
				MdRH-H	33.97635	-118.444087			
				Duplicate	To be determined				
				Equipment Rinse Blank	Not Applicable				
			<u>SQO Monitoring [a]:</u> Grain Size, Percent Solids, Total Organic Carbon (TOC), Benthic Infauna Analysis, Cadmium, Copper, Lead, Mercury, Zinc, PAHS – lower and higher molecular weights, Total PCBs (congeners), DDTs, p,p'-DDE, Chlordane, Dieldrin, Sediment Toxicity	MdRH-MC	33.98054	-118.448191	SQO: 1x/5 years (Bight)	1 grab of Surficial Sediment	1
				MdRH-A	33.97251	-118.45284	SQO: 1x/5 years (Bight)	1 grab of Surficial Sediment	1
				MdRH-B	33.97514	-118.453465	SQO: 1x/5 years (Bight)	1 grab of Surficial Sediment	1
				MdRH-C	33.97773	-118.453722	SQO: 1x/5 years	1 grab of Surficial Sediment	1

							(Bight)		
				MdRH-D	33.98022	-118.453555	SQO: 1x/5 years (Bight)	1 grab of Surficial Sediment	1
				MdRH-E	33.98301	-118.453383	SQO: 1x/5 years (Bight)	1 grab of Surficial Sediment	1
				MdRH-F	33.98198	-118.445015	SQO: 1x/5 years (Bight)	1 grab of Surficial Sediment	1
				MdRH-G	33.97939	-118.444347	SQO: 1x/5 years (Bight)	1 grab of Surficial Sediment	1
				MdRH-H	33.97635	-118.444087	SQO: 1x/5 years (Bight)	1 grab of Surficial Sediment	1
				Duplicate	To be determined		SQO: 1x/5 years (Bight)	1 grab of Surficial Sediment	1
				Equipment Rinse Blank	Not Applicable		SQO: 1x/5 years (Bight)	1 grab of Surficial Sediment	2

[a] SQO monitoring will be done in coordination with Bight and will also include sampling at randomly selected Bight stations. In addition, a stressor identification study is being conducted in 2016 and includes SQO analysis.

C.1.3.1 Sediment Sampling – Storm-borne Sediments

The Toxics TMDL requires analysis of the settleable and suspended solids of storm water quality samples collected from outfall discharges. The Storm-borne Sediment Pilot Study was conducted to test custom-built passive sediment collection devices at outfall stations MdR-4, MdR-5, and MdRU-C-1 (Brown and Caldwell, 2013; LADPW, 2014b) and develop monitoring protocols for storm-borne sediment sampling.

This CIMP has adopted the storm-borne sediment sampling protocols and recommendations/findings from the Pilot Study (Brown and Caldwell, 2013; LADPW, 2014b). Storm-borne sediment sampling will take place during the wet weather monitoring period of October 1st through April 15th, in alignment with the other wet weather monitoring programs.

Samples will be collected at outfall stations during monitored storm events, up to 15 per year. Fifteen was selected as the maximum number of monitored storm events each wet weather monitoring season after a review of historic rainfall data from 1940-2014. The maximum number of storm events (>0.1 inch with 72 hours of antecedent dry weather) observed in the wet weather months (October-April) during a given year in this time period was 15 (occurred once during that time period) (Table C-8).

Table C-8. Number of Storm Events 1940-2014

Month	Minimum	Maximum	Average
January	0	4*	1.45
February	0	3	1.34
March	0	3	1.53
April	0	3	0.91
October	0	3	0.66
November	0	3	1.15
December	0	4	1.53
Average Number of Storms per Year (October – April)			8.55
Maximum Number of Storms per Year (October – April)			15**
* Occurred during 1998 ** Occurred during 2010			

One sediment sample will be collected per monitored storm event and outfall station. The Pilot Study has shown that it is not feasible to collect and filter sufficient storm water during a single storm event to collect sufficient sediment for analysis. At least 54 grams (wet weight) of storm-borne sediment is required to perform the analyses required by the Toxics TMDL (Brown and Caldwell, 2013; LADPW, 2014b). The amount of sediment collected during the Pilot Study met this requirement at some of the stations during only two of the events monitored (Table C-9).

Therefore, for each station, all samples from the monitored storms will be stored and frozen until the end of the monitoring season and analyzed as a composite. For each station, the composite sample will undergo analysis for the constituents identified in Appendix D. Sampling may cease at a Toxics TMDL outfall monitoring station for the season once enough storm-borne sediment has been collected to analyze the composite sample in duplicate (one composite sample and one duplicate composite sample), or once 15 storms have been monitored in a wet weather season, whichever comes first.

Table C-9. 2011-2014 Pilot Study Sediment Collection Method Results at MdRUC-1, MdR-4, MdR-5

Event No.	Date	MdRU-C1		MdR-4		MdR-5	
		Sediment Collected (grams)[(a)]	Total Suspended Solids (mg/L)	Sediment Collected (grams)[(a)]	Total Suspended Solids (mg/L)	Sediment Collected (grams)[(a)(d)]	Total Suspended Solids (mg/L)
1	3/8/2013	53	36	36	41	63	141
2	11/23/2013	<1	2.1	13	34	<1	25
3	12/9/2013	<1	205[(b)]	65	48	18	3.2
4	2/7/2014	21	251 [(b)]	<1	76	45	2.5
5	3/3/2014	115	54	118 [(c)]	49	128 [(e)]	55
6	4/3/2014	35	17	25 [(c)]	40	30	16

[(a)] Field collected (grams-wet)
[(b)] Outlier values likely due to debris build-up within the catch basin impairing flow and covering the auto-sampler intake tubing, which artificially inflated the stormwater TSS concentration.
[(c)] Two filters were used. The data presented in the table is the sum of the amount of sediment collected by both filters.
[(d)] Two devices were tested at MdR-5, the data in the table represents the data collected using the option determined through the study to be the preferred option at this station, the pressure chamber.
[(e)] Four filters were used. The data presented in the table is the sum of the amount of sediment collected by all four filters.

Storm-borne sediments will be collected using passive sampling devices similar to the systems piloted and documented in Brown and Caldwell (2013) and the Pilot Study (LADPW, 2014b). At the end of field storm water monitoring activities at outfall stations, sediments collected in the passive sediment collection devices will be transferred into certified clean glass jars. The field wet weight will be measured and recorded to provide an initial estimate of sediment volume and load for the monitored storm event. The field wet weight will be calculated by subtracting the tare weight of the empty glass jar weight from the weight of the jar containing the sample.

The amount of storm-borne sediment collected varies at each of the Toxic TMDL outfall stations based on many factors including the size of the sub-watershed draining to the outfall, the land use of the area surrounding the outfall as well as physical attributes of the outfall itself. Additionally, storm-borne sediment collected during a wet weather event at MdR-5 (located at the Boone Olive Pump Plant [See Figure 4-4 of the CIMP]) is only included in the composite sample when storm water flows exceed the capacity of the low flow diversion (LFD). If the LFD capacity is not exceeded during a particular wet weather event, then there is no storm flow discharging from this station into Basin E and the storm-borne sediment collected would not be used in the composite sample. A similar situation is present at MdR-4, which is located in the Oxford Basin pump house (See Figure 4-2 of the CIMP).

As part of the adaptive management process, the MdR EWMP Agencies will re-visit the success of the passive storm-borne sediment monitoring program after two years of implementing the CIMP.

C.1.3.2 Sediment Sampling – MdR Harbor Sediments

The Toxics TMDL requires collection of benthic sediment samples annually for chemistry and toxicity (Table C-7) as well as a complete SQO analysis once every five years. The SQO analysis will be coordinated with Bight monitoring and will include samples collected at random Bight stations in addition to those identified in Table C-7. Samples will undergo the suite of analyses required for SQO analysis, including sediment chemistry, toxicity, and benthic infaunal analysis. Samples will also be analyzed for grain size, percent solids, and total organic carbon (TOC).

Sediment samples will be collected from the MdR Harbor using a stainless-steel, 0.1-square meter (m^2) Van Veen grab sampler or equivalent. An equivalent sediment sampling device will have the following characteristics:

- Constructed of a material that does not introduce contaminants.
- Samples with minimal surface sediment disturbance.
- Does not leak during sample retrieval.
- Has a design that enables safe/easy sample verification that samples meet all applicable sampling criteria (e.g. access doors that allow visual inspection and removal of the undisturbed surface sediment).
- Grab samplers with smaller sampling surface areas may be acceptable depending on the study needs provided the sediment sample obtained is similar or equivalent to the quality of a Van Veen grab.

A sediment sample will be considered acceptable if the surface of the grab is even with minimal surface disturbance and a penetration depth of at least five centimeters (cm). Sediment samples that do not meet these criteria will be discarded and additional grab samples will be collected as needed. Good faith efforts will be made to collect representative sediment samples. If samples cannot be obtained from the exact sample point, a reasonable attempt will be made to collect a sample from the vicinity of the sample point (e.g., within 100 m, as per Bight protocols). If this proves unsuccessful, no sample will be collected from the given sample point. This effort will be fully documented in all field notes. If samples cannot be collected during two consecutive sampling events, alterative sampling point(s) will be proposed to the Regional Board and this CIMP will be updated. Sediment samples will be collected from the top five cm of the grab sampler, avoiding sediment within one cm of the sides of the grab sampler. Sediment samples will be processed as follows:

1. **Grain Size:** Sediments for grain size analysis will be placed in either a quart size Ziploc® bag or a clean glass jar and placed on ice in coolers. These samples will be delivered unfrozen to the laboratory within two days of collection for analyses.
2. **Sediment Chemistry:** Sediments for chemical analyses will be placed into certified clean glass jars with Teflon® lined lids, kept on ice in coolers, and frozen at -20°C within 24 hours. These samples will be delivered frozen to the laboratory within two days of collection for analyses.

3. **Sediment Toxicity:** Sediments for toxicity analysis will be placed in a clean food-grade polyethylene bag or multiple 1-Liter (L) certified clean glass jars, and placed on ice in coolers. These samples will be delivered unfrozen to the laboratory within two days of collection for analyses.
4. **Benthic Infauna:** Sediment collected for benthic infaunal analysis will be rinsed through a 1.0-millimeter (mm) mesh screen. The material retained on the screen will be transferred to a labeled glass or plastic quart jar. A 7% magnesium sulfate ($MgSO_4$) seawater solution will be added for approximately 30 minutes to relax the collected specimens. The samples will then be then fixed in a 10% buffered formalin solution. These samples will be delivered to the laboratory within two days of collection. The benthic infaunal sample will be stored in a formalin solution for a minimum of three days and no longer than five days.

Final sediment sample volumes necessary for grain size, chemistry, benthic infauna, and toxicity analysis will be determined during discussion with the contacted laboratory and to achieve targeted MDLs (Appendix D).

C.1.3.3 Sediment Sampling – Oxford Basin Sediment Monitoring

The Toxics TMDL specifies that the Los Angeles County Flood Control District (LACFCD) shall monitor discharges of sediment from Oxford Basin to the MdRH after completion of the Oxford Retention Basin Multiuse Enhancement Project (Oxford Basin Project). Additionally, the TMDL states that effectiveness monitoring developed as part of the Proposition 84 grant agreement for the Oxford Basin Project may be used to meet the TMDL monitoring requirement; however, the monitoring must continue beyond the term of the Proposition 84 agreement.

The Oxford Retention Basin Multiuse Enhancement Project Monitoring Plan (LACFCD, 2014) includes a special study that will be conducted during the first year post-construction. This special study will focus on understanding the exchange of suspended sediment between Oxford Basin and Basin E. The results of the study will help the MdR EWMP group identify if and when significant amount of total suspended solids (TSS) is being discharged from Oxford Basin to Basin E, which will determine the sampling frequency, method, and procedures for the subsequent years. Details for the proposed year one monitoring program are discussed below. Preliminary suggestions for year two are discussed in the following subsection. Once the data from year one are analyzed, additional details for monitoring in subsequent years will be provided in the MdR EWMP Annual Report. Monitoring will continue after the Proposition 84 grant monitoring requirements are completed, in accordance with the Toxics TMDL.

Post Construction Monitoring - Year One:
Two YSI EXO2 Water Quality Sondes will be installed near the tidal gates in Oxford Basin. Water quality will be continuously monitored by the sondes. Turbidity results from the sondes can be converted to TSS using surrogate data. TSS samples will also be taken in order to correlate with turbidity readings. TSS samples will be taken during both dry and wet weather and incoming and outgoing tides.

Existing water level transducers located upstream and downstream of the Oxford Basin tidal gates will be used to calculate the volume entering or leaving Oxford Basin. The transducer data, in conjunction with tidal records, may be used as the basis for developing flow estimates or as inputs into a hydrologic/hydraulic computer model of the system to generate net flow volume estimates. Data from the water level transducers and the sonde can be used to calculate the amount of suspended sediment exchange between Oxford Basin and Basin E over an extended period of time that includes dry-weather and wet-weather conditions. The purpose of this analysis is to determine the conditions when sediment is being discharged from Oxford Basin and to quantify the sediment discharge. The analysis will consider factors such as tidal cycles, biogeochemical cycling, and operation of the tide gates. Information from this study will be used to help determine the effective tidal gate operations that maximize water quality benefits, to support future continuous water quality efforts, and to help guide potential sampling of suspended sediments being discharged from Oxford Basin.

Post Construction Monitoring - Year Two and Beyond:
If data collected during year one indicate a statistically significant movement of sediment from Oxford Basin to Basin E (when compared to sediment entering Oxford Basin from Basin E), then sampling will be implemented during year two. The sampling methodology, frequency, and schedule to collect sediment samples will be determined prior to initiating year two sampling, using the data and information collected during the year one study. One potential option is to install a portable autosampler near the tidal gates to collect storm water samples that can be filtered and analyzed in a lab.

If sediment discharge to Basin E from Oxford Basin is not statistically significant, then sampling during year two will include only sediment exchange analysis between the basins. Each year, the sediment exchange data from the previous year will be used to determine necessity of additional monitoring. Figure C-2 presents the proposed monitoring program at Oxford Basin.

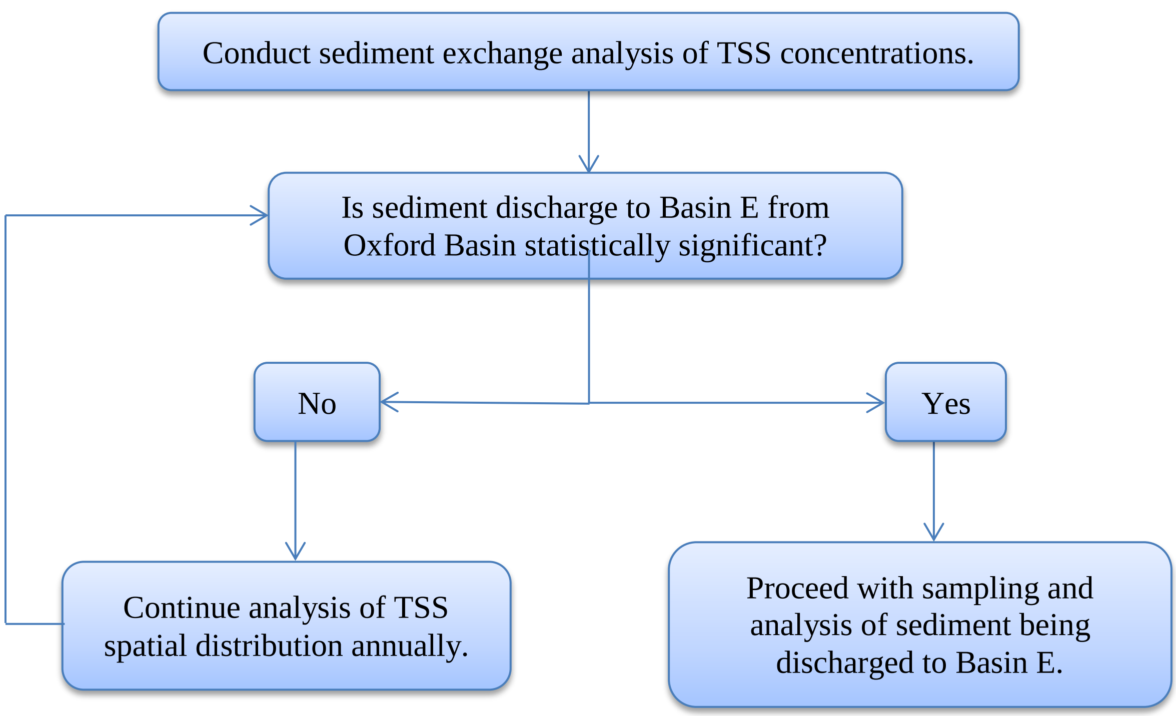


Figure C-2. Oxford Basin Monitoring Program Overview

C.1.4 Bioaccumulation – Fish and Mussel Sampling

Fish and mussel tissue monitoring is required by the Toxics TMDL to determine the integrated accumulation of bioavailable contaminants from various sources. Fish and mussel tissue sampling will be conducted annually, and the timing of sampling will be kept consistent between monitoring years to allow for more reliable long-term data analysis. In 2010 to 2012, fish and mussel sampling were conducted during the month of October. For consistency, this schedule is recommended to continue. The bioaccumulation monitoring program for fish and mussel tissue will be conducted for total PCBs (congeners), chlordane, and total dichlorodiphenyl-trichloroethanes (DDTs) as summarized in Table C-10. Sample preservatives, holding time requirements, analytical methods, detection limits, and holding times for each parameter are presented in Appendix D.

Table C-10. Parameters by Monitoring Program – Fish and Mussel Tissue

Sampling Media	Station ID	Harbor Receiving Water			
		Sample No. and Type	Sampling Frequency	Samples per Year	Parameters
Fish Tissue	MdRH-MC MdRH-A MdRH-B MdRH-C MdRH-D MdRH-E MdRH-F MdRH-G MdRH-H	Individuals and/or composites.	1x/year (October)	18	Chlordane, DDTs, PCBs[(a)]
Mussel Tissue	MdRH-A MdRH-B MdRH-C MdRH-G MdRH-H	One composite representing transplanted mussels in the Front Basins.	1x/year (October)	1	Chlordane, DDTs, PCBs[(a)]
	MdRH-MC MdRH-D MdRH-E MdRH-F	One composite representing transplanted mussels in the Back Basins.		1	

(a). 54 PCB congeners: 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209. These include all 41 congeners analyzed in the SCCWRP Bight Program and dominant congeners used to identify the Aroclors.

C.1.4.1 Fish Sampling

In the Toxics TMDL CMP, six "bottom dwelling fish species" were considered potential candidates for bioaccumulation sampling, including white croaker, California halibut, barred sand bass, queenfish, bat ray, and shiner perch. Considering the nature of fish and the fact that fish do not always cooperate with monitoring activities, the Toxics TMDL CMP allowed sampling to be limited to two bottom-dwelling fish species. During surveys conducted in October 2010, 2011, and 2012, up to five individual fish per targeted species were caught in three of the Back Basins. A total of 30 individual fish from each survey underwent bioaccumulation analysis.

For the purposes of this CIMP, at least two fish species will be targeted during each survey. In order to evaluate the potential impact to the food chain and associated human health impacts, this CIMP has further refined the species targeted for analysis, such that at a minimum a sport fish will be targeted during each survey. Table C-11 presents the species of fish recommended to be targeted by dietary category. White croaker was selected because the species has a "do not consume" fish advisory from the Office of Environmental Health Hazard Assessment (OEHHA, 2009). It was caught during 34 of the 44 historical fish surveys conducted in MdR Harbor (1985 to 2008) and during surveys in 2011 and 2013 (nine individuals analyzed). California halibut was selected because it is a piscivore and demersal fish (i.e., in direct contact with the sediments). California halibut was caught in MdR Harbor during 42 of the 44 historical fish surveys and all three of the most recent compliance surveys (26 individuals analyzed). Queenfish was selected as a third optional sampling species because it is under a current OEHHA fish consumption advisory and represents a dietary guild that consumes both benthic and pelagic species. It was caught in 31 of the 44 historical surveys. If two of the three targeted species are not caught during monitoring, bottom-dwelling species (e.g., barred sand bass, bat ray, and shiner perch) will be targeted.

Table C-11. Target Fish Species

Fish Species	Dietary Guild	Description of Dietary Guild	Target Size Range (total length in mm)
White Croaker (*Genyonemus lineatus*)	Benthic diet without piscivory	Diet largely composed of small benthic invertebrates, such as amphipods and other crustaceans, bivalve mollusks, and polychaete worms.	160-300
California Halibut (*Paralichthys californicus*)	Piscivore	The majority of the diet is fish. Large predatory invertebrates (e.g. cephalopods, decapod crustaceans, and echinoderms) are also consumed to some degree.	560-820
Queenfish (*Seriphus politus*)	Benthic and pelagic diet with piscivory	Diet includes a combination of benthic invertebrates, pelagic invertebrates (e.g. zooplankton, shrimp, and mysidae), and forage fish.	120-260

Note that inclusion of a prey fish, such as topsmelt (*Atherinops affinis*)[1], may also be appropriate to help evaluate conditions throughout the food chain as part of a potential future SQO Part II (indirect effects) analysis. The SQO Part II analysis is not required by the Toxics TMDL and this information has been included for reference purposes only.

C.1.4.1.1 Number of Fish Samples

A total of 18 fish tissue samples (nine each of two species) will undergo analysis per annual survey for Toxics TMDL compliance.

Fish will be analyzed as individuals, unless the fish caught are of insufficient size for individual sample analysis, then fish must be analyzed as composites. If fish are analyzed as composite samples, each composite sample shall include a minimum of three fish, with up to five fish per sample preferred, especially if smaller fish are caught (OEHHA, 2005). All fish composite samples must follow OEHHA's "75 percent rule," where the length of the smallest fish should be at least 75% of the length of the largest fish of a species in a composite sample.

[1] Topsmelt is one of the three test species required for Toxicity analysis under the Permit. If Topsmelt is identified as the "most sensitive" species and selected for ongoing toxicity analysis under the Permit receiving water monitoring requirements, it would also be the preferred prey fish for tissue sampling and analysis.

C.1.4.1.2 Fish Sampling Protocols

Fish swim throughout MdR Harbor; therefore, for the purposes of this CIMP, the entire Harbor is considered to be a single representative area for fish sampling. Trawl transects will be run throughout the Harbor to collect targeted fish species. Fish will be collected during a single day of trawling. At the end of a trawl day, the entire catch will be evaluated for sampling. Fish sampling protocols shall be conducted in accordance with OEHHA's *General Protocol for Sport Fish Sampling and Analysis*[2] (OEHHA, 2005). Fish used for samples shall be of either legal size and/or edible size. The Department of Fish and Wildlife (DFW) Sport Fishing Regulations define legal size requirements using total length. All size measurements are in terms of total length.

In order to have 18 fish tissue samples (e.g., nine samples representing two targeted species), reasonable attempts will be made to collect nine to 16 fish of each targeted species during each survey. This will allow for up to nine individual tissue samples or six individual and three composite tissue samples to undergo sample analysis. If more than 10 trawls are conducted and none the three targeted species are caught (see Table C-11), bottom-dwelling species identified in the Toxics TMDL CMP may be sampled. Listed in order of preference, targeted fish will include: barred sand bass, shiner perch and bat ray.

Fish will be collected using up to three different gear types, if necessary, due to the variation in gear capture efficiency and strata of the various target species. These include otter trawl, lampara net, and gill net. Prior to deployment of the sampling gear, a survey of the sampling area using a fathometer and direct visual observations will be performed to determine whether possible obstructions exist that could prevent proper deployment or damage gear and whether sensitive submerged aquatic vegetation (in shallow water habitat areas) is present that should be avoided. Based on the findings of this survey, the gear will be deployed in order of priority:

1. The first gear type to be employed will be a standard otter trawl with a 7.6-m headrope, 2.5-cm mesh, and 1.3-cm mesh cod end liner. The otter trawl is effective for collecting bottom dwelling demersal fish species. This is the preferred trawl method.
2. The lampara is a semi-pursing, round-haul net, having a cork line of approximately 273 m and a depth of 36 m. The net consists of two full-cut wings (100-m length each; 15-cm stretch mesh), a throat or apron with 5-cm mesh, and a sack or bag of 0.9-cm mesh. The net is set in a circle or ellipse and drawn closed at the bottom during retrieval onto the boat. The lampara net is highly effective for collecting two of the three target species (white croaker and queenfish).
3. Obstructive debris on the Harbor bottom may be problematic for the otter trawl and lampara net, in which case a gill net may be used. The gill net is a 50-m flat panel monofilament net with varying mesh sizes. The net has a float line and lead line so it will sit vertically in the water column, either weighted to capture demersal species or floated to capture pelagic species.
4. Collection of prey fish may require hand-fishing.

[2] Although OEHHA protocols are established for freshwater fish, they may be translated to fish within small and medium sized marine and/or estuarine waterbodies such as MdR Harbor.

Trawling will be conducted at a speed-over-ground of approximately two knots (one meter per second [m/s]), ranging between 1.5 and 2.5 knots (0.75 and 1.25 m/s). For collecting targeted species, the time and length of the trawl may vary, depending on site conditions. In general, the objective will be to limit trawl time to the five-minute period identified in the original Toxics TMDL CMP. Using a standard otter trawl, this will result in linear trawl coverage of 450 m to 600 m. The lampara and purse seine are both deployed in a circle (or oval if space-limited) and “pursed” or drawn closed toward the center as they are retrieved onto the deck.

Once on deck, the contents of the net will be transferred to tubs and processed. Sample processing for fish tissue samples includes evaluation of the length, weight, and sex of each fish.

Fish will be submitted to the laboratory on ice, unfrozen, within two days of sample collection.

C.1.4.2 Mussel Sampling

In the Toxics TMDL CMP, mussels resident to the MdR Back Basin were collected for bioaccumulation sampling and analysis. Transplanted mussel sampling is recommended in place of resident mussel sampling in order to better control for mussel age and, therefore, assessment of tissue bioaccumulation. Studies have found that analysis of transplanted mussels yield results nearly identical to analysis of resident mussels (State Water Resouces Control Board [SWRCB], 2013). Vexar cages, each containing approximately 25 California mussels per cage, will be installed at designated monitoring locations in the MdR Harbor. Vexar cages will remain on-site for one month before transplanted mussels will be retrieved for tissue analysis.

In the Toxics TMDL CMP, tissue from mussels resident to the MdR Back Basins was composited into two replicate samples of five individuals (55 to 65 mm in length, if available). This composite method will be used in this CIMP.

Mussels will be submitted to the laboratory on ice, unfrozen, within two days of sample collection.

C.1.5 Chain of Custody Procedures

In accordance with USEPA sampling protocols, all samples collected will be stored in the appropriate container type for the analytical method to be performed. Additionally, all samples will be stored and chilled in ice chests for transfer to the laboratory and between laboratories.

Chain-of-custody procedures (Woodward-Clyde, 1996) are used for all samples throughout the collection, transport, and analytical process. Samples are considered to be in custody if they are: (1) in the custodian’s possession or view, (2) retained in a secured place (under lock) with restricted access, or (3) placed in a container and secured with an official seal to prevent the sample from being reached without breaking the seal. Chain-of-custody records, field logbooks, and field tracking forms are the principal documents used to identify samples and to document possession. The chain-of-custody procedures will be initiated during sample collection. A chain-of-custody record will be provided with each sample or group of samples. Each person with sample custody will sign the form and ensure the samples are not left unattended unless properly secured. Documentation of sample handling and custody includes the following:

- Bottle label information (i.e., station [site] number, station [site] name, laboratory analysis requested, and date [written at time of sampling]).
- Time (written at time of sampling).
- Number of bottles.
- Temperature of sample.
- Sampler(s), laboratory and sampler/courier signatures, and time(s) sample(s) changed possession (completed upon sample transfer[s]).

Each sample collected shall be associated with a recorded observation of site conditions, which should include (at a minimum) a unique sample identifier, collection date and time, weather conditions, sample characteristics, sampler's name, and field observations that may be relevant to the monitoring being conducted (e.g., types of field investigations conducted, presence/absence of flow and estimated flow volume, connectivity with the receiving water, potential pollutant sources). Field forms and lists of field sampling equipment are provided in Attachment C1.

C.1.6 Field and Laboratory Safety

It is the policy of all participating agencies that all employees have a safe working environment and that all field and laboratory work be performed in a manner that provides the highest level of safety for the protection of every employee.

Sampling should only occur when conditions can be assessed as safe. The safety of the sample collector is the top priority and may preclude scheduled sampling, especially during storm water monitoring. Standard Operating Protocols for the MdR Watershed CIMP are summarized below and or may be referenced from the TMDL CMPs.

In addition, in an effort to improve employee safety and health awareness and prevent occupational related injury and illness, all participating laboratories must develop a safety program with the intention of satisfying the applicable federal, state, and local regulations.

C.2 Analytical Procedures

This section of the appendix presents a discussion of analytical methods to be used for sample analysis.

C.2.1 Analytical Procedures for Water Quality

A complete list of chemical and biological parameters with corresponding analytical methods and detection limits for water samples required by the Permit, Bacteria TMDL and Toxics TMDL (not including Triad Analysis requirements) is provided in Appendix D. All analytical methods used to obtain contaminant concentrations will follow USEPA or Standard Methods (SM) 21st Edition (American Public Health Association [APHA] et al., 2005).

C.2.1.1 Analytical Procedures for Aquatic Toxicity Testing for Permit Compliance Monitoring

Toxicity testing at receiving water station MdRH-MC shall be conducted during two storm events including the first storm event of the year

Toxicity testing will also be conducted at receiving water station MdRH-MC once during dry weather each year (during the month of July, the historically driest month of the year).

As described in the MRP (page E-31), if samples are collected in receiving waters with salinity equal to or greater than 1 part per thousand (ppt) or from outfalls discharging to receiving waters with salinity that is equal to or greater than 1 ppt, then toxicity tests should be conducted on the most sensitive test species in accordance with species and short-term test methods in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (EPA/600/R-95/136, 1995). The marine and estuarine test species identified in the MRP are listed in Table C-12.

Table C-12. Aquatic Toxicity Monitoring Methods

Media	Species	Taxon	Type of Test	Method
Receiving Water with Salinity ≥1 ppt Outfall discharge to Receiving Water with Salinity ≥1 ppt	Topsmelt	*Atherinops affinis*	Static Renewal Toxicity Test: Larval Survival and Growth	Method 1006.01 [a]
	Purple Sea Urchin	*Strongylocentrotus purpuratus*	Static Non-Renewal Toxicity Test: Fertilization	Method 1008.0 [a]
	Giant Kelp	*Macrocystis pyrifera*	Static Non-Renewal Toxicity Test: Growth	Method 1009.0 [a]

[a] Methods from *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (USEPA/600/R-95/136, 1995).

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

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

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

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

The *Haliotis rufescens* (*H. rufescens*) larval development test measures the percent of abnormal shell development in red abalone larvae exposed to toxic samples for 48 hrs. *H. rufescens* is commonly used to test treatment plant effluent, but has had limited use in stormwater compared to the *S. purpuratus* fertilization test. The advantages of *H. rufescens* include a sensitive endpoint, the ability to purchase abalone from commercial suppliers and hold test organisms prior to spawning, and low variability in results compared to other species (e.g., *S. purpuratus* fertilization test). Thus, though not listed as a potential test species for use in stormwater monitoring in the MS4 permit, it was considered as a potentially sensitive species for the purposes of selecting the most sensitive species.

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

These critical life stage chronic toxicity tests shall be conducted on undiluted water samples in accordance with the 2005 *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California* (SWRCB and Cal EPA, 2005). When the State Water Board's draft *Policy for Toxicity Assessment and Control* (SWRCB, 2012) becomes effective, current toxicity program elements may be replaced with standardized methods and procedures in the policy.

Chronic toxicity test biological endpoint data shall be analyzed using the Test of Significant Toxicity (TST) t-test approach specified in *National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document* (USEPA, Office of Wastewater Management, Washington, D.C. EPA 833-R-10-003, 2010). The critical chronic in stream waste concentration (IWC) established in the Permit for the MRP is set at 100% receiving water for receiving water samples and 100% effluent for wet and dry weather outfall samples. A 100% receiving water/outfall effluent sample and a control shall be tested.

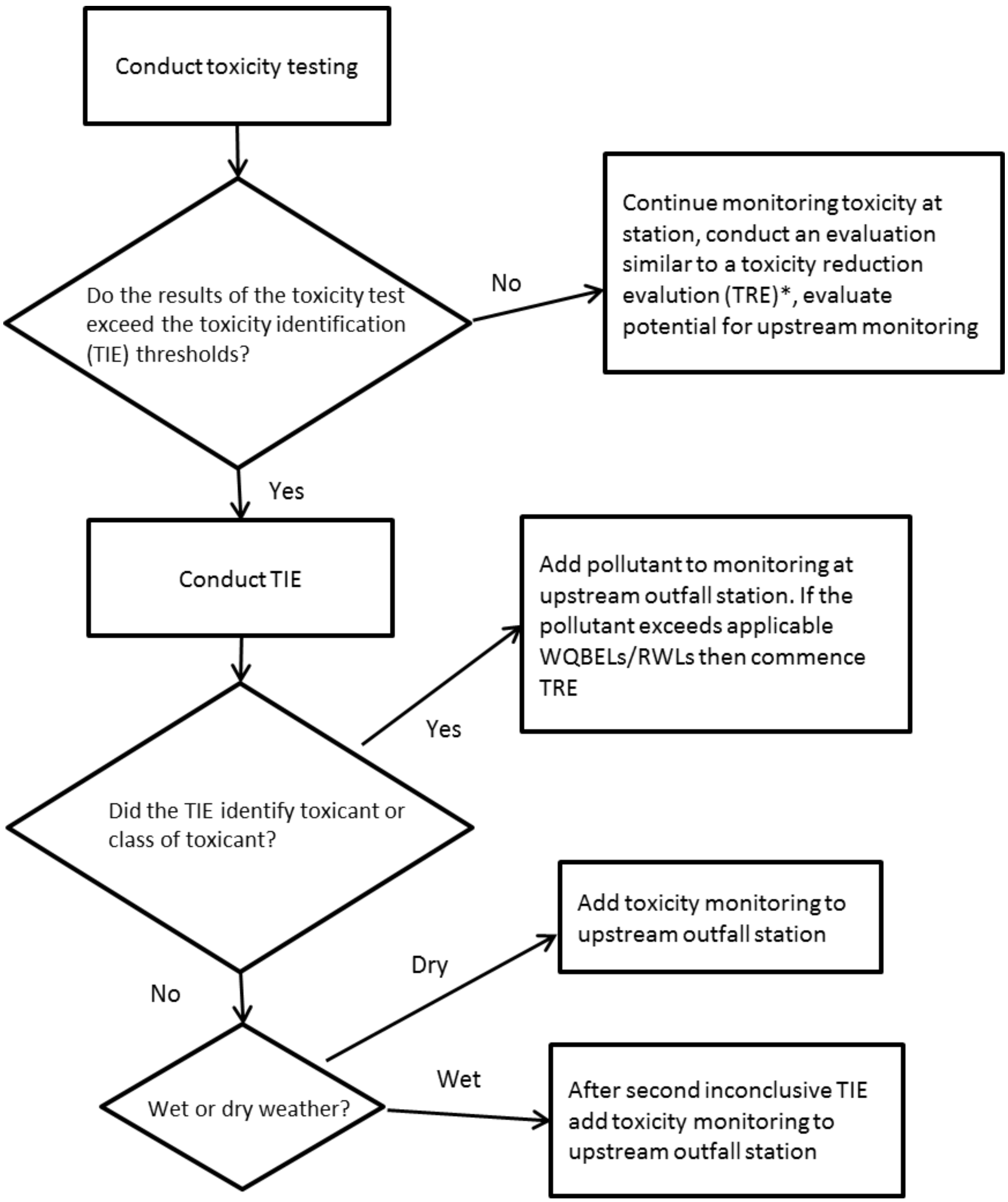
C.2.1.2 Toxicity Endpoint Assessment and Toxicity Identification Evaluation Triggers

A toxicity test sample is immediately subject to TIE procedures to identify the toxic chemical(s), if either the survival or sublethal endpoint demonstrates a percent effect value equal to or greater than 50% at the IWC. Percent effect is defined as the effect value—denoted as the difference between the mean control response and the mean IWC response, divided by the mean control response—multiplied by 100. A TIE shall be performed to identify the causes of toxicity using the same species and test method. The TIE should be conducted on the test species demonstrating the most sensitive toxicity response at a sampling station. TIEs shall be performed in accordance with guidelines for characterizing chronically toxic effluents including USEPA, 1991; USEPA, 1992; USEPA, 1993a; USEPA, 1993b; and USEPA, 1996.

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

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

The general approach to conducting aquatic toxicity monitoring is presented in Figure C-3, which describes a general evaluation process for each aquatic toxicity sample collected as part of routine Permit compliance sampling conducted. Toxicity assessments will follow the guidelines set forth in the MRP and clarified in the Regional Board's August 7, 2015 Toxicity Clarification Memo (Toxicity Memo) (LARWQCB, 2015).



*TRE like evaluation as described in the Los Angeles Regional Water Quality Control Board's August 17, 2015 Toxicity Clarification Memo.

Figure C-3. Aquatic Toxicity Assessment Process – Overview Flow Chart

If a TIE conducted at the receiving water station (MdRH-MC) identified the pollutant or class of pollutants causing the toxicity then the following actions will be taken at the upstream outfall location (MdR-3):

1. The toxicant(s) shall be monitored at the outfall station (MdR-3) during the next scheduled sampling event (at least 45 days following the toxicity sample collection date),
2. Monitoring shall continue until the deactivation criteria are met at the outfall station (two consecutive samples do not exceed receiving waters limitations [RWLs] or water quality based effluent limitations [WQBELs]).
3. If the toxicant is present in the discharge from the outfall at levels above the applicable RWL or WQBEL, a toxicity reduction evaluation (TRE) will be performed for that toxicant at the outfall location. The TRE shall include all reasonable steps to identify the source(s) of toxicity and discuss the appropriate best management practice (BMP[s]) to eliminate the cause(s) of toxicity. TREs shall be performed in accordance with guidelines presented in USEPA, 1999. No later than 30 days after the source of toxicity and appropriate BMPs are identified, the Permittee(s) shall submit a TRE Corrective Action Plan to the Regional Water Board Executive Officer for approval. The requirements of the Corrective Action Plan are outlined in the MRP.

If a TIE conducted at the receiving water station was inconclusive, then the following actions shall be taken at the outfall station:

1. If the sample was collected during dry weather, toxicity monitoring shall be conducted at the outfall monitoring station during the next scheduled monitoring event.
2. If the sample was collected during wet weather, then toxicity monitoring need not commence at the outfall until a second TIE at the receiving water station is inconclusive.

If toxicity samples have been collected at the outfall station for Permit compliance monitoring, toxicity results will be compared to appropriate laboratory controls. If there is no toxicity identified, toxicity monitoring will continue until the deactivation criteria are met (two consecutive samples pass the TST t-test during the same condition [wet or dry]) at the outfall station, or a TIE at the receiving water site identifies the constitute causing toxicity.

If toxicity is present at the outfall station but at levels below the trigger for a TIE, toxicity testing will continue until either the deactivation criteria are met, a TIE conducted at the receiving waster site identifies the pollutant causing toxicity, or the discharged is eliminated. An evaluation similar to the TRE shall also be conducted.

If toxicity is present at the outfall station and meets the trigger for a TIE:

1. If the TIE identifies the pollutant contributing to the toxicity then the pollutant will be added to the monitoring list for this station (until the deactivation criteria are met – two consecutive samples to not exceed RWLs or WQBELs) and a TRE will be conducted.

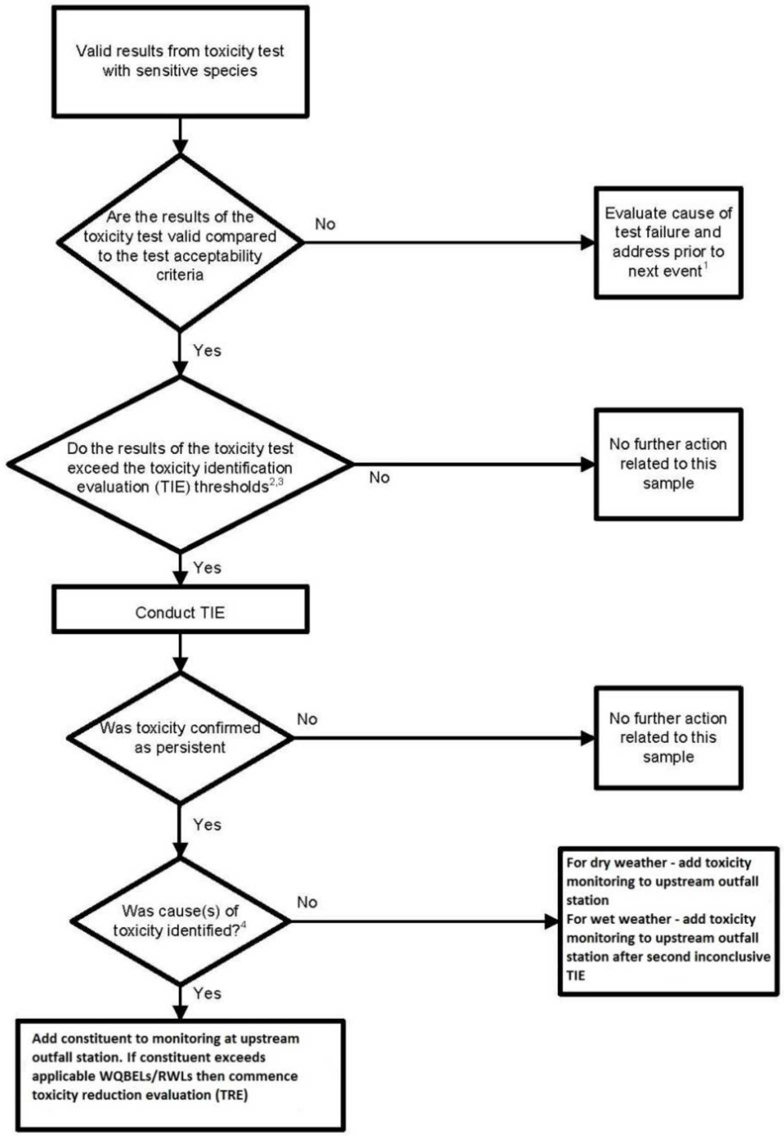
2. If the TIE is inconclusive, a TRE-like investigation will be conducted as described in the Toxicity Memo and toxicity testing will continue at the outfall until two consecutive samples pass the TST t-test, a TIE identifies the pollutant causing the toxicity, or the discharge is eliminated.

As discussed above, the results of toxicity testing will be used to trigger further investigations to determine the cause of observed laboratory toxicity. As described in USEPA's 1991 *Methods for Aquatic Toxicity Identification*, a Phase I TIE utilizes methods to characterize the physical/chemical nature of the constituents which may cause or contribute to toxicity. Such characteristics as solubility, volatility, and filterability are determined without specifically identifying the toxicants. Phase I results are intended as a first step in specifically identifying the toxicants but the data generated can also be used to develop treatment methods to remove toxicity without specific identification of the toxicants. For Permit compliance monitoring, Phase I TIEs will be conducted on samples that exceed a TIE trigger. Water quality monitoring data will be reviewed to further support evaluation of potential toxicants. TIE methods will generally adhere to USEPA procedures documented in conducting TIEs (USEPA, 1991, 1992, 1993a-b). TIEs will perform the manipulations described in Table C-13. Given the wealth of historical data for the MdR Watershed, TIE sample manipulations have been prioritized based on TMDL targeted constituents such as organics and metals. The WMG will identify the cause(s) of toxicity using the treatments in Table C-13 and, if possible, using the results of water column chemistry analyses. Phase I TIEs are anticipated to identify causes of toxicity in the MdR Watershed and more rigorous Phase II and Phase III TIEs are generally not necessary.

Table C-13. Toxicity Identification Evaluation Sample Manipulations

Primary TIE Sample Manipulation	Expected Response
No Manipulation	Baseline test for comparing the relative effectiveness of other manipulations
pH Adjustment (pH 7 and 8.5)	Alters toxicity in pH sensitive compounds (i.e., ammonia and some trace metals)
Filtration or centrifugation	Removes particulates and associated toxicants
Ethylenedinrilo-Tetraacetic Acid (EDTA)	Chelates trace metals, particularly divalent cationic metals
Sodium thiosulfate (STS) addition	Reduces toxicants attributable to oxidants (i.e., chlorine) and some trace metals
Solid Phase Extraction (SPE) with C18 column	Removes non-polar organics (including pesticides) and some relatively non-polar metal chelates
Sequential Solvent Extraction of C18 column	Further resolution of SPE-extracted compounds for chemical analyses
Secondary TIE Sample Manipulation	**Expected Response**
Carboxylesterase addition(1)	Hydrolyzes pyrethroids
Piperonyl Butoxide (PBO)	Reduces toxicity from organophosphate pesticides such as diazinon, chlorpyrifos and malathion, and enhances pyrethroid toxicity
(1) Carboxylesterase addition has been used in recent studies to help identify pyrethroid-associated toxicity (Wheelock et al., 2004; Weston and Amweg, 2007). However, this treatment is experimental in nature and should be used along with other pyrethroid-targeted TIE treatments (e.g., PBO addition).	

A more detailed approach to conducting aquatic toxicity monitoring using the methodologies described in this appendix has been summarized in detail in Figure C-4.



Footnotes

1. Test failure includes pathogen or epibiont interference, which should be addressed prior to the next toxicity sampling event.
2. For freshwater, the TIE threshold is >50% mortality in an acute (wet weather) or chronic (dry weather) sample. If a >50% effect in a sub-lethal endpoint for chronic test is observed, a follow up sample will be collected within two weeks of the completion of the initial sample collection. If the follow up sample exhibits a greater than 50% effect, a TIE will be initiated.
3. For marine and estuarine waters, the TIE threshold is a percent effect value of equal to or greater than 50 percent. Follow up samples will be collected within two weeks of the completion of the initial sample collection and a TIE initiated.
4. The goal of conducting the Phase I TIE is to identify the cause of toxicity so that outfall monitoring can incorporate the toxicant(s) into the list of constituents monitored during outfall monitoring. Thus if the specific toxicant(s) or the analytical class of toxicants (i.e., metals that are analyzed via EPA Method 200.8) are identified sufficient information is available to inform the addition of pollutants to the list of pollutants monitored during outfall monitoring.

Figure C-4. Detailed Aquatic Toxicity Assessment Process – Overview Flow Chart

C.2.2 Analytical Procedures for Sediment Quality

Physical and chemical measurements of sediment were selected to provide data on chemicals of potential concern in MdR. All analytical methods follow USEPA or SM 21st Edition (APHA et al., 2005). A complete list of chemical analytes with corresponding analytical methods and detection limits for sediment is provided in Appendix D.

Physical analyses of sediment include grain size and percent solids. Grain size is analyzed to determine the general size classes that make up the sediment (e.g., gravel, sand, silt, and clay). Grain size analysis will be in accordance with the methods given in Plumb (1981). Percent solids are measured to convert concentrations of the chemical parameters from a wet-weight to a dry-weight basis and will be conducted using SM2540B.

The Triad Assessment requires all results to be presented on a dry-weight basis. Laboratories provide MDLs and reporting limits on a wet-weight basis. The final contracted laboratory will be contacted to ensure that reporting limits for SQO analysis (Appendix D) are low enough to meet the dry-weight levels.

C.2.3 Analytical Procedures for Sediment Toxicity

Sediment toxicity shall be conducted on an annual basis and once every five years as part of a SQO evaluation as detailed in the *Water Quality Control Plan for Enclosed Bays and Estuaries* (SWRCB and Cal EPA, 2009). Sediment bioassay tests will be used to quantify species-specific responses to exposure to surficial sediments under controlled laboratory conditions. In accordance with SQO guidance, at least one short-term survival test and one sublethal test will be conducted (Table C-14). In accordance with the Toxics TMDL, the acute survival test will be a 10-day test using the marine amphipod *Leptocheirus plumulosus*. The selection of this test is a result of findings of toxicity to this species during previous investigations in MdR, which was not observed for other amphipods (e.g., *Eohaustorius estuaries*). The sublethal test will be a 48-hour sediment-water interface test using the marine mussel *Mytilus galloprovincialis* because this species has been used during previous tests. Alternatively, a 28-day *Neanthes arenaceodentata* growth test may be used as the sublethal test in accordance with ASTM E1611-07 and USEPA protocols.

Table C-14. Toxicity Testing Proposed to Evaluate Benthic Sediment Condition

Media	Organism	Taxon	Type of Test	Method
Solid Phase	Amphipod	*Leptocheirus plumulosus*	10-day Acute Survival Test	ASTM E1367-03 and USEPA 1995
Sediment-Water Interface	Mussel	*Mytilus galloprovincialis*	48-Sediment Water Interface Sublethal Development Test	Anderson et al. 1996 and USEPA 1995

False positive sediment toxicity may be determined if naturally high concentrations of ammonia are present in tested sediment samples. The contract laboratory will test ammonia levels in all sediment samples prior to the start of toxicity testing. Toxicity tests will be run as static non-renewal if ammonia concentrations are below test specific criteria, where applicable. If ammonia concentrations are above test-specific criteria, tests may be run as static renewal with no more than two water changes per day; these tests will be initiated after the ammonia concentrations are brought down to levels appropriate for the test species.

Note that MdR Watershed sediment samples collected under the Toxics TMDL CMP in 2013 had ammonia porewater concentrations that did not require ammonia reduction protocols to be initiated.

C.2.4 Analytical Procedures for Sediment Benthic Infaunal Analysis

The benthic infaunal samples will be transported from the field to the laboratory and stored in a formalin solution for a minimum of five days. The samples will then be transferred from formalin to 70% ethanol for laboratory processing. The organisms will initially be sorted using a dissecting microscope into five major phyletic groups (i.e., polychaetes, crustaceans, molluscs, echinoderms, and miscellaneous minor phyla). While sorting, technicians will keep a count for quality control (QC) purposes. After initial sorting, samples will be distributed to qualified taxonomists who will identify each organism to species or to the lowest possible taxon (e.g., use of the Southern California Association of Marine Invertebrate Taxonomists [SCAMIT] Edition 7 for nomenclature and orthography [SCAMIT, 2008], or equivalent).

A quality assurance/quality control (QA/QC) procedure will be performed on each of the sorted samples to ensure a 95% sorting efficiency. A 10% aliquot of a sample will be re-sorted by a senior technician trained in the QA/QC procedure. The number of organisms found in the aliquot will be divided by 10% and added to the total number found in the sample. The original total will be divided by the new total to calculate the percent sorting efficiency. When the sorting efficiency of the sample is below 95%, the remainder of the sample (90%) will be re-sorted.

C.3 Quality Assurance and Quality Control

This section presents a discussion of QA and QC measures for the MdR Watershed CIMP. Field and laboratory QA data will be assessed for accuracy and precision. In addition, the appropriateness of the analytical methods and the achievement of MDLs and MLs by the laboratory will be verified.

C.3.1 Field Measurements

QA/QC for sampling processes begins with proper collection of the samples to minimize the possibility of contamination. Water samples will be collected in laboratory-certified, contaminant-free bottles. Temperature and pH will be measured and recorded using the appropriate calibrated equipment and reviewed immediately using best professional judgment to ensure accurate measurement of parameters. Collected samples will be put on ice and appropriately transported to the processing laboratory.

Field measurements for temperature, DO, specific conductance, turbidity, and pH will be made using an YSI meter, or equivalent, according to manufacturer specifications. Operation of field equipment will be conducted according to manufacturer instructions. Calibrations will be performed and recorded to ensure accurate functionality. Proper storage and maintenance procedures will be followed.

A field log will be completed at each station for each monitoring event. The field data log sheets will include empirical observations of the site and water quality characteristics.

C.3.2 Collection of Quality Control Samples

Samples will be collected in appropriate containers, kept on ice during the sampling event, and placed into coolers along with completed chain-of-custody for transfer to the laboratory. Field crews will ensure that sampling containers are being filled properly and the requirement to avoid contamination of samples at all times is met.

The purpose of a field duplicate sample is to evaluate the precision of samples collected in the field. During reporting, the relative percent difference will be calculated and used to determine precision. The purpose of the field blank sample is to show that no contamination of sample equipment occurred during sample collection. The purpose of a field equipment rinse blank is to demonstrate that targeted parameters are not associated with sampling equipment and that there is no cross-contamination associated with sample processing activities.

QC samples will be collected in accordance with general Surface Water Ambient Monitoring Program (SWAMP) guidelines (see SWAMP Standard Operating Procedures [SOPs] in Attachment C2), which will generally represent 5% of the total samples of the program.

For Permit compliance monitoring, this translates to one field blank and one duplicate sample per year of monitoring during both dry and wet weather monitoring (two sets of field QC samples each year).

For Toxics TMDL compliance monitoring, the following field QC sample sets (one field blank and one duplicate sample) are recommended for water quality sampling:

- **Harbor Receiving Water – Monthly:** Six (6) sets of field QC sample sets per year.
- **Outfalls – Storm Water:** Two (2) - Four (4) sets of field QC sample sets per year, depending upon the number of storms monitored.

For Toxics TMDL compliance monitoring, the following QC sample sets (one duplicate and one equipment rinse blank) are commended for sediment sampling:

- **Harbor Receiving Water:** One (1) QC sample set per year.
- **Storm-borne Sediment:** One (1) QC sample set per year.
- **Sediment Chemistry and Toxicity:** One (1) QC sample set per survey (once per year).
- **Triad Assessment:** One (1) QC sample set per survey (once every five years).

Field QC samples will not be collected in association with tissue sampling.

Bacteria TMDL compliance monitoring is conducted as part of the City of Los Angeles's Regional program. No unique field QC samples will be collected during MdR Watershed compliance monitoring for the Bacteria TMDL.

C.3.3 Laboratory Quality Control

The chemistry, bacteriological, and toxicity analysis of samples will be performed under the guidelines of the QA/QC programs established by the analytical laboratories and their respective quality assurance project plans (QAPPs). These QAPPs vary by laboratory. Objectives for accuracy and precision involve all aspects of the testing process, and may include, but are not limited to the following:

- Methods and SOPs.
- Calibration methods and frequency.
- Data analysis, validation, and reporting.
- Internal QC.
- Preventive maintenance.
- Procedures to ensure data accuracy and completeness.

Results of all laboratory QC analyses will be reported with the final data. Any QC samples that fail to meet the specified QC criteria in the methodology or QAPP will be identified, and the corresponding data will be appropriately qualified in the final report. All QA/QC records for the various testing programs will be kept on file for review by regulatory agency personnel.

C.4 References

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APPENDIX D
Monitoring Lists

Table D-1						
Permit - Receiving Water Quality and Toxicity Screening Parameters (Year 1)*						
Constituent	**Sample Type**	**Method[a]**	**ML[b]**	**Units**	**Preservative**	**Holding Time**
Field Parameters						
pH	Grab	SM4500H B	NA	pH units	-	immediately
Dissolved Oxygen	Grab	SM4500O G	5	mg/L	-	immediately
Temperature	Grab	NA	NA	°Celcius	-	immediately
Specific Conductance	Grab	SM2510B	1	umhos/cm	-	immediately
General						
Oil and Grease	Grab	EPA413.1	5	mg/L	H_2SO_4	28 days
Total Phenols	Grab	EPA420.1	0.1	mg/L	H_3PO_4, $CuSO_4$	7 days
Cyanide	Grab	SM4500-CNE	0.005	mg/L	NaOH	14 days
Indicator Bacteria						
E. coli (fresh water)	Grab	SM9223	235	MPN/100mL	$Na_2S_2O_3$	8 hours
Total Coliform (marine water)	Grab	SM9221E	10,000	MPN/100mL	$Na_2S_2O_3$	8 hours
Fecal Coliform (marine and fresh water)	Grab	SM9221E	400	MPN/100mL	$Na_2S_2O_3$	8 hours
Enterococcus (marine waters)	Grab	SM9230B	104	MPN/100mL	$Na_2S_2O_3$	8 hours
General						
Total Ammonia - Nitrogen	Grab	SM 4500-NH3 D	0.1	mg/L	-	28 days
Chloride	Grab	EPA300.0	2	mg/L	-	28 days
Fluoride	Grab	EPA300.0	0.1	mg/L	-	28 days
Nitrate-Nitrite	Grab	EPA300.0	0.1	mg/L	-	48 hours
Perchlorate[c]	Grab	EPA314	4	µg/L	-	28 days
Alkalinity	Grab	SM2320B	2	mg/L	-	14 days
Hardness, Total	Grab	SM2340C	2	mg/L	HNO_3 or H_2SO_4	6 months
Chemical Oxygen Demand (COD)	Grab	SM5220D	20	mg/L	H_2SO_4	28 days
Total Petroleum Hydrocarbon (TPH)	Grab	EPA418.1	5	mg/L	H_2SO_4	28 days
Total Dissolved Solids (TDS)	Grab	SM2540C	2	mg/L	-	7 days
Turbidity	Grab	SM2130B	0.1	NTU	-	48 hours
Total Suspended Solids (TSS)	Grab	SM2540D	2	mg/L	-	7 days
Volatile Suspended Solids	Grab	SM2540E	2	mg/L	-	7 days
Settleable Solids	Grab	SM2540F	2	mg/L	-	7 days
Methylene Blue Active Substances (MBAS)	Grab	SM5540 C	0.5	mg/L	-	48 hours
Total Organic Carbon (TOC)	Grab	SM5310B/EPA415.1	1	mg/L	HCl, H_2SO_4, or H_3PO_4	28 days
Methyl tertiary butyl ether (MTBE)	Grab	EPA624	1	µg/L	HCl	14 days
Biochemical Oxygen Demand (BOD)	Grab	SM5210B	2	mg/L	-	48 hours
Nutrients						
Dissolved Phosphorus	Grab	SM4500-PE	0.05	mg/L	-	48 hours
Total Phosphorus	Grab	SM4500-PE	0.05	mg/L	H_2SO_4	28 days
Total Ammonia-Nitrogen	Grab	SM4500-NH3	0.1	mg/L	H_2SO_4	28 days
Nitrate-N	Grab	EPA300.0	0.1	mg/L	-	48 hours
Nitrite-N	Grab	EPA300.0	0.1	mg/L	-	48 hours
Total Kjeldahl Nitrogen (TKN)	Grab	SM4500NHorg	0.1	mg/L	H_2SO_4	28 days
Metals						
Dissolved Aluminum	Grab	EPA200.8	100	µg/L	HNO_3	6 months
Total Aluminum	Grab	EPA200.8	100	µg/L	HNO_3	6 months
Dissolved Antimony	Grab	EPA200.8	0.5	µg/L	HNO_3	6 months
Total Antimony	Grab	EPA200.8	0.5	µg/L	HNO_3	6 months
Dissolved Arsenic	Grab	EPA200.8	1	µg/L	HNO_3	6 months
Total Arsenic	Grab	EPA200.8	1	µg/L	HNO_3	6 months
Dissolved Berylium	Grab	EPA200.8	0.5	µg/L	HNO_3	6 months
Total Beryllium	Grab	EPA200.8	0.5	µg/L	HNO_3	6 months
Dissolved Cadmium	Grab	EPA200.8	0.25	µg/L	HNO_3	6 months
Total Cadmium	Grab	EPA200.8	0.25	µg/L	HNO_3	6 months
Dissolved Chromium	Grab	EPA200.8	0.5	µg/L	HNO_3	6 months
Total Chromium	Grab	EPA200.8	0.5	µg/L	HNO_3	6 months
Dissolved Chromium +6	Grab	EPA218.6	5	µg/L	-	24 hours
Total Chromium +6	Grab	EPA218.6	5	µg/L	-	24 hours
Dissolved Copper	Grab	EPA200.8	0.5	µg/L	HNO_3	6 months
Total Copper	Grab	EPA200.8	0.5	µg/L	HNO_3	6 months
Dissolved Iron	Grab	EPA200.8	100	µg/L	HNO_3	6 months
Total Iron	Grab	EPA200.8	100	µg/L	HNO_3	6 months
Dissolved Lead	Grab	EPA200.8	0.5	µg/L	HNO_3	6 months

Table D-1						
Permit - Receiving Water Quality and Toxicity Screening Parameters (Year 1)*						
Constituent	**Sample Type**	**Method[a]**	**ML[b]**	**Units**	**Preservative**	**Holding Time**
Total Lead	Grab	EPA200.8	0.5	µg/L	HNO_3	6 months
Dissolved Mercury	Grab	EPA1631E	0.5	µg/L	HNO_3	6 months
Total Mercury	Grab	EPA1631E	0.5	µg/L	HNO_3	6 months
Dissolved Nickel	Grab	EPA200.8	1	µg/L	HNO_3	6 months
Total Nickel	Grab	EPA200.8	1	µg/L	HNO_3	6 months
Dissolved Selenium	Grab	EPA200.8	1	µg/L	HNO_3	6 months
Total Selenium	Grab	EPA200.8	1	µg/L	HNO_3	6 months
Dissolved Silver	Grab	EPA200.8	0.25	µg/L	HNO_3	6 months
Total Silver	Grab	EPA200.8	0.25	µg/L	HNO_3	6 months
Dissolved Thallium	Grab	EPA200.8	1	µg/L	HNO_3	6 months
Total Thallium	Grab	EPA200.8	1	µg/L	HNO_3	6 months
Dissolved Zinc	Grab	EPA200.8	1	µg/L	HNO_3	6 months
Total Zinc	Grab	EPA200.8	1	µg/L	HNO_3	6 months
Semi-Volatiles Organics (EPA 625)						
2-Chlorophenol	Grab	EPA625	2	µg/L		
2,4-dichlorophenol	Grab	EPA625	1	µg/L		
2,4-dimethylphenol	Grab	EPA625	2	µg/L	Sodium	
2,4-dinitrophenol	Grab	EPA625	5	µg/L	thiosulfate	7 days
2-nitrophenol	Grab	EPA625	10	µg/L	if residual	for extraction
4-nitrophenol	Grab	EPA625	5	µg/L	Chlorine	40 days
4-chloro-3-methylphenol	Grab	EPA625	1	µg/L	is present	for analysis
Pentachlorophenol	Grab	EPA625	2	µg/L		
Phenol	Grab	EPA625	1	µg/L		
2,4,6-trichlophenol	Grab	EPA625	10	µg/L		
Base/Neutral						
Acenaphthene	Grab	EPA625	1	µg/L		
Acenaphthylene	Grab	EPA625	2	µg/L		
Anthracene	Grab	EPA625	2	µg/L		
Benzidine	Grab	EPA625	5	µg/L		
1,2 Benzanthracene	Grab	EPA625	5	µg/L		
Benzo [b] fluoranthene	Grab	EPA625	10	µg/L		
Benzo(a)pyrene	Grab	EPA625	2	µg/L		
Benzo [g-h-i] perylene	Grab	EPA625	5	µg/L		
Benzo(k)flouranthene	Grab	EPA625	2	µg/L		
Bis(2-Chloroethoxy) methane	Grab	EPA625	5	µg/L	Sodium	7 days
Bis(2-Chloroisopropyl) ether	Grab	EPA625	2	µg/L	thiosulfate	for extraction
Bis(2-Chloroethyl) ether	Grab	EPA625	1	µg/L	if residual	
Bis(2-Ethylhexl) phthalate	Grab	EPA625	5	µg/L	chlorine	40 days
4-Bromophenyl phenyl ether	Grab	EPA625	5	µg/L	is present	for analysis
Butyl benzyl phthalate	Grab	EPA625	10	µg/L		
2-Chloronaphthalene	Grab	EPA625	10	µg/L		
2-Chloroethyl vinyl ether	Grab	EPA624	1	µg/L		
4-Chlorophenyl phenyl ether	Grab	EPA625	5	µg/L		
Chrysene	Grab	EPA625	5	µg/L		
Dibenzo(a,h)anthracene	Grab	EPA625	0.1	µg/L		
1,3-Dichlorobenzene	Grab	EPA625	1	µg/L		
1,4-Dichlorobenzene	Grab	EPA625	1	µg/L		
1,2-Dichlorobenzene	Grab	EPA625	1	µg/L		
Base/Neutral						
3,3-Dichlorobenzidine	Grab	EPA625	5	µg/L		
Diethyl phthalate	Grab	EPA625	2	µg/L		
Dimethyl phthalate	Grab	EPA625	2	µg/L		
di-n-Butyl phthalate	Grab	EPA625	10	µg/L		
2,4-Dinitrotoluene	Grab	EPA625	5	µg/L		
2,6-Dinitrotoluene	Grab	EPA625	5	µg/L		
4,6 Dinitro-2-methylphenol	Grab	EPA625	5	µg/L		
1,2-Diphenylhydrazine	Grab	EPA625	1	µg/L		
di-n-Octyl phthalate	Grab	EPA625	10	µg/L		
Fluoranthene	Grab	EPA625	0.05	µg/L		
Fluorene	Grab	EPA625	0.1	µg/L	Sodium	7 days
Hexachlorobenzene	Grab	EPA625	1	µg/L	thiosulfate	for extraction
Hexachlorobutadiene	Grab	EPA625	1	µg/L	if residual	

Table D-1

Permit - Receiving Water Quality and Toxicity Screening Parameters (Year 1)*

Constituent	Sample Type	Method[a]	ML[b]	Units	Preservative	Holding Time
Hexachloro-cyclopentadiene	Grab	EPA625	5	µg/L	chlorine	40 days
Hexachloroethane	Grab	EPA625	1	µg/L	is present	for analysis
Indeno(1,2,3-cd)pyrene	Grab	EPA625	0.05	µg/L		
Isophorone	Grab	EPA625	1	µg/L		
Naphthalene	Grab	EPA625	0.2	µg/L		
Nitrobenzene	Grab	EPA625	1	µg/L		
N-Nitroso-dimethyl amine	Grab	EPA625	5	µg/L		
N-Nitroso-diphenyl amine	Grab	EPA625	1	µg/L		
N-Nitroso-di-n-propyl amine	Grab	EPA625	5	µg/L		
Phenanthrene	Grab	EPA625	0.05	µg/L		
Pyrene	Grab	EPA625	0.05	µg/L		
1,2,4-Trichlorobenzene	Grab	EPA625	1	µg/L		
Chlorinated Pesticides						
Aldrin	Grab	EPA608	0.005	µg/L		
alpha-BHC	Grab	EPA608	0.01	µg/L		
beta-BHC	Grab	EPA608	0.005	µg/L		
delta-BHC	Grab	EPA608	0.005	µg/L		
gamma-BHC (lindane)	Grab	EPA608	0.02	µg/L		
alpha-chlordane	Grab	EPA608	0.1	µg/L		
gamma-chlordane	Grab	EPA608	0.1	µg/L	Sodium	7 days
4,4'-DDD	Grab	EPA608	0.05	µg/L	thiosulfate	for extraction
4,4'-DDE	Grab	EPA608	0.05	µg/L	if residual	
4,4'-DDT	Grab	EPA608	0.01	µg/L	chlorine	40 days
Dieldrin	Grab	EPA608	0.01	µg/L	is present	for analysis
alpha-Endosulfan	Grab	EPA608	0.02	µg/L		
beta-Endosulfan	Grab	EPA608	0.01	µg/L		
Endosulfan sulfate	Grab	EPA608	0.05	µg/L		
Endrin	Grab	EPA608	0.01	µg/L		
Endrin aldehyde	Grab	EPA608	0.01	µg/L		
Heptachlor	Grab	EPA608	0.01	µg/L		
Heptachlor Epoxide	Grab	EPA608	0.01	µg/L		
Toxaphene	Grab	EPA608	0.5	µg/L		
Organophosphate Pesticides						
Chlorpyrifos	Grab	EPA507	0.05	µg/L		7 days
Diazinon	Grab	EPA507	0.01	µg/L		7 days
Prometryn	Grab	EPA507	2	µg/L	Sodium	14 days
Atrazine	Grab	EPA507	2	µg/L	thiosulfate if	14 days
Simazine	Grab	EPA507	2	µg/L	residual chlorine	14 days
Cyanazine	Grab	EPA507	2	µg/L	is present	14 days
Malathion	Grab	EPA507	1	µg/L		14 days
Polychlorinated Biphenyls [d]						
PCB congeners	Grab	EPA 1668	0.5	µg/L	Sodium thiosulfate if residual chlorine is present	7 days
	Grab					for extraction
	Grab					40 days
	Grab					for analysis
Herbicides						
Glyphosate	Grab	EPA547	5	µg/L	$Na_2S_2O_3$	14 days
2,4-D	Grab	EPA515.3	10	µg/L	-	7 days
2,4,5-TP-SILVEX	Grab	EPA515.3	0.5	µg/L	-	7 days
Toxicity - Receiving Water with Salinity ≥ 1 pp						
A. affinis Larval Survival and Growth	Grab	EPA/600/R-95/136	NA	Toxic Units	Deliver on ice, store at $\leq 4^{o}$C	36 hours preferred; up to 72 hours acceptable
S. purpuratus Fertilization	Grab	EPA/600/R-95/136	NA	Toxic Units		
M. pyrifera Germination and Growth	Grab	EPA/600/R-95/136	NA	Toxic Units		

* This list of screening parameters will be monitored only during the first significant storm event of the first year (for wet weather) and during the month of July in the first year of monitoring (for dry weather). Parameters detected above the lowest applicable water quality objective will be monitored in sampling at that station for the remainder of the permit term during the same condition (dry weather or wet weather).

[a] Listed methods are those currently utilized for MS4 Permit compliance. Other EPA and Standard Methods may be acceptable.

[b] ML = Minimum Level, from 2012 MS4 Permit. Method Detection Levels (MDLs) must be lower than or equal to the ML value, as published in MLs published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (SIP), unless otherwise approved by the Regional Board.

[c] Perchlorate is a new addition to the 2012 MS4 Permit Monitoring and Reporting Plan analyte list.

[d] Although the Screening Parameters listed in the Permit are in the form of Aroclors, this CIMP will analyze PCB in the form of congeners for program consistency. At a minimum, the 40 congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed. Also note that the EPA has requested that the Regional Board modify the 2012 MS4 Permit to include PCB congeners in place of Aroclors.

NA = Not applicable

Table D-2							
Permit - Receiving Water Quality and Toxicity							
Constituent		**Sample Type**	**Method[a]**	**ML[b]**	**Units**	**Preservative**	**Holding Time**
Field Parameters							
	pH	Grab	SM4500H B	NA	pH units	-	immediately
	Dissolved Oxygen	Grab	SM4500O G	5	mg/L	-	immediately
	Temperature	Grab	NA	NA	°Celcius	-	immediately
	Specific Conductance	Grab	SM2510B	1	umhos/cm	-	immediately
Indicator Bacteria							
	E. coli (fresh water)	Grab	SM9223	235	MPN/100mL	$Na_2S_2O_3$	8 hours
	Total Coliform (marine water)	Grab	SM9221E	10,000	MPN/100mL	$Na_2S_2O_3$	8 hours
	Fecal Coliform (marine and fresh water)	Grab	SM9221E	400	MPN/100mL	$Na_2S_2O_3$	8 hours
	Enterococcus (marine waters)	Grab	SM9230B	104	MPN/100mL	$Na_2S_2O_3$	8 hours
Other							
	Hardness, Total	Grab	SM2340C	2	mg/L	HNO_3 or H_2SO_4	6 months
	Total Suspended Solids [c]	Grab	SM2540D	2	mg/L	-	7 days
Toxicity - Receiving Water with Salinity $\geq$ 1 ppt							
	A. affinis Larval Survival and Growth	Grab	EPA/600/R-95/136	NA	Toxic Units	Deliver on ice, store at $\leq 4^oC$	36 hours preferred; up to 72 hours acceptable
	S. purpuratus Fertilization	Grab	EPA/600/R-95/136	NA	Toxic Units		
	M. pyrifera Germination and Growth	Grab	EPA/600/R-95/136	NA	Toxic Units		
Addditional Parameters							
	Parameters identified above the lowest applicable water quality objective during the first significant wet weather event of the first year, or during the July dry weather monitoring event of the first year, will be added to the monitoring list and monitored for the remainder of the Permit term during the same condition (wet weather or dry weather).[d]						

[a] Listed methods are those currently utilized for MS4 Permit compliance. Other EPA and Standard Methods may be acceptable.

[b] ML = Minimum Level, from 2012 MS4 Permit. Method Detection Levels (MDLs) must be lower than or equal to the ML value, as published in MLs published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (SIP), unless otherwise approved by the Regional Board.

[c] During dry weather only

[d] Although the Screening Parameters listed in the Permit are in the form of Aroclors, this CIMP will analyze PCB in the form of congeners for program consistency. At a minimum, the 40 congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed. Also note that the EPA has requested that the Regional Board modify the 2012 MS4 Permit to include PCB congeners in place of Aroclors.

NA = Not applicable

Table D-3							
Permit - Outfall Storm Water Quality							
Constituent		**Sample Type**	**Method[a]**	**ML[b]**	**Units**	**Preservative**	**Holding Time**
Field Parameters							
	Flow	Grab					
	pH	Grab	SM4500H B	NA	pH units	-	immediately
	Dissolved Oxygen	Grab	SM4500O G	5	mg/L	-	immediately
	Temperature	Grab	NA	NA	°Celcius	-	immediately
	Specific Conductance	Grab	SM2510B	1	umhos/cm	-	immediately
Indicator Bacteria							
	E. coli (fresh water)	Grab	SM9223	235	MPN/100mL	$Na_2S_2O_3$	8 hours
	Total Coliform (marine water)	Grab	SM9221E	10,000	MPN/100mL	$Na_2S_2O_3$	8 hours
	Fecal Coliform (marine and fresh water)	Grab	SM9221E	400	MPN/100mL	$Na_2S_2O_3$	8 hours
	Enterococcus (marine waters)	Grab	SM9230B	104	MPN/100mL	$Na_2S_2O_3$	8 hours
Other							
	Hardness, Total	Comp	SM2340C	2	mg/L	HNO_3 or H_2SO_4	6 months
Addditional Parameters							
	Parameters identified above the lowest applicable water quality objective during wet weather monitoring at the downstream receiving water station or parameters identified as causing toxicity at the downstream receiving water station will be added to this list. Toxicity testing will also be added if a toxicity identification evaluation (TIE) at the downstream receiving water station is inconclusive.[c]						

[a] Listed methods are those currently utilized for MS4 Permit compliance. Other EPA and Standard Methods may be acceptable.

[b] ML = Minimum Level, from 2012 MS4 Permit. Method Detection Levels (MDLs) must be lower than or equal to the ML value, as published in MLs published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (SIP), unless otherwise approved by the Regional Board.

[c] Although the Screening Parameters listed in the Permit are in the form of Aroclors, this CIMP will analyze PCB in the form of congeners for program consistency. At a minimum, the 40 congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed. Also note that the EPA has requested that the Regional Board modify the 2012 MS4 Permit to include PCB congeners in place of Aroclors.

NA = Not applicable

Table D-3							
Bacteria TMDL - Water Quality							
Constituent		**Sample Type**	**Method [a]**	**ML**	**Units**	**Preservative**	**Holding Time**
Indicator Bacteria							
	Total Coliform	Grab	SM9221E	20	MPN/100mL	$Na_2S_2O_3$	8 hours
	E. coli[b]	Grab	SM92223	20	MPN/100mL	$Na_2S_2O_3$	8 hours
	Fecal Enterococcus	Grab	SM9230B	20	MPN/100mL	$Na_2S_2O_3$	8 hours

[a] Methods used should allow for detection at or below numeric targets outlined in the TMDL. Other EPA and Standard Methods may be acceptable.

[b] *E. Coli is* used as a surrogate for fecal coliform; the standard is the same as for fecal coliform.

Table D-4						
Toxics TMDL - Water Quality						
Constituent	**Sample Type**	**Method [a]**	**ML/ TMDL Limit***	**Units**	**Preservative**	**Holding Time**
General - Saltwater						
Hardness, Total	Comp	SM2340C	2	mg/L	HNO_3 or H_2SO_4	6 months
Metals - Saltwater						
Dissolved Copper	Comp	EPA1640	0.5	µg/L	HNO_3	6 months
Total Copper	Comp	EPA1640	0.5	µg/L	HNO_3	6 months
Polychlorinated Biphenyls - Saltwater c						
PCB congeners[b]	Comp	EPA1668	0.00017b*	µg/L	Sodium thiosulfate if residual chlorine is present	7 days for extraction/40 days for analysis

*Toxics TMDL numeric targets.

[a] Methods used should allow for detection at or below numeric targets outlined in the Toxics TMDL. Other EPA and Standard Methods may be acceptable. Per the Toxics TMDL, "Currently, several consituents of concern have numeric targets that are lower than readily available detection limits. As analytical methods and detection limits continue to improve and become more environmentally relevant, responsible parties shall incorporate new MDLs in the monitoring plan."

[b] Although the Screening Parameters listed in the Permit are in the form of Aroclors, this CIMP will analyze PCB in the form of congeners for program consistency. At a minimum, the 40 congeners listed in Tabel C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed. Also note that the EPA has requested that the Regional Board modify the 2012 MS4 Permit to include PCB congeners in place of Aroclors.

Table D-5					
Sediment Chemistry and Toxicity					
Constituent	**Method**	**Maximum Reporting Limit[a] (Dry Weight)**	**Units**	**Preservative**	**Holding Time**
Physical/Conventional Tests					
Particle Size	Plumb (1981)	1.0	%	-	-
Percent Solids	SM 2540B	0.1	%	-	-
Total Organic Carbon (TOC)	EPA 9060A	0.05	%	-	-
Metals					
Cadmium (Cd)	EPA 6020	0.09	mg/kg		
Copper (Cu)	EPA 6020	52.8	mg/kg	-	-
Lead (Pb)	EPA 6020	25	mg/kg	-	-
Zinc (Zn)	EPA 6020	60	mg/kg	-	-
PCBs (congeners) [b]					
Total PCBs	EPA 8270	-	µg/kg	Deliver on ice, store at <4°C	7 days
Organochlorine Pesticides					
Chlordane-alpha	EPA 8270	0.50	µg/kg	Deliver on ice, store at <4°C	7 days
Chlordane-gamma	EPA 8270	0.54	µg/kg		
trans-Nonachlor	EPA 8270	4.6	µg/kg		
Dieldrin	EPA 8270	2.5	µg/kg		
2,4'-DDD	EPA 8270	0.50	µg/kg		
2,4'-DDE	EPA 8270	0.50	µg/kg		
2,4'-DDT	EPA 8270	0.50	µg/kg		
4,4'-DDD	EPA 8270	0.50	µg/kg		
4,4'-DDE	EPA 8270	0.50	µg/kg		
4,4'-DDT	EPA 8270	0.50	µg/kg		
Total DDTs	Calculated	-	µg/kg		
Toxicity - Sediment					
L. plumulosus 10-day Acute Survival	ASTM E1367-03 and EPA/600/R-95/136	NA	NA	Deliver on ice, store at ≤4°C	10 days preferred; up to 28 days acceptable.
M. galloprovincialis 48-Hour Sediment Water Interface Development Test[c]	Anderson et al. 1996 and EPA/600/R-95/136	NA	NA	Deliver on ice, store at ≤4°C	10 days preferred; up to 28 days acceptable.

[a] Maximum reporting limits as recommended in SCCWRP's "Sediment Quality Assessment Technical Support Manual" (January 2014). These limits are "based on the CSI classification ranges and do not necessarily reflect the maximum performance achievable with available analytical methods". This statement applies for all analytes listed in the table above except the following: particle size, percent solids, and total organic carbon. The concentrations associated with the reporting limits in the table are expressed in dry weight as should all analytical results.

[b] At a minimum, the 40 PCB congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed.

[c] Alternatively, a 28-day *Neanthes arenaceodentata* growth test may be utilized as the sublethal test in accordance with ASTM E1611-07 and USEPA protocols. However, the *M. galloprovincialis* test has been the sublethal test utilized during previous testing.

Table D-6					
Triad Analysis (SQOs) - Sediment					
Constituent	**Method[a]**	**Maximum Reporting Limit[b] (Dry Weight)**	**Units**	**Preservative**	**Holding Time**
Physical/Conventional Tests - SQOs					
Particle Size	Plumb (1981)	1.0	%	-	-
Percent Solids	SM 2540B	0.1	%	-	-
Total Organic Carbon (TOC)	EPA 9060A	0.05	%	-	-
Metals - SQOs					
Cadmium (Cd)	EPA 6020	0.09	mg/kg		
Copper (Cu)	EPA 6020	52.8	mg/kg	-	-
Lead (Pb)	EPA 6020	25	mg/kg	-	-
Mercury (Hg)	EPA 7471A	0.09	mg/kg		
Zinc (Zn)	EPA 6020	60	mg/kg	-	-
Total PAHs - SQOs (MLs are based on 2 grams of soil analyzed)					
Low Molecular Weight PAHs					
1-Methylnaphthalene	EPA 8270	20	µg/kg	-	-
1-Methylphenanthrene	EPA 8270	20	µg/kg	-	-
2,6-Dimethylnaphthalene	EPA 8270	20	µg/kg	-	-
2-Methylnaphthalene	EPA 8270	20	µg/kg	-	-
Acenaphthene	EPA 8270	20	µg/kg	-	-
Anthracene	EPA 8270	20	µg/kg	-	-
Biphenyl	EPA 8270	20	µg/kg	-	-
Fluorene	EPA 8270	20	µg/kg	-	-
Naphthalene	EPA 8270	20	µg/kg	-	-
Phenanthrene	EPA 8270	20	µg/kg	-	-
High Molecular Weight PAHs					
Benzo(a)anthracene	EPA 8270	80	µg/kg	-	-
Benzo(a)pyrene	EPA 8270	80	µg/kg	-	-
Benzo(e)pyrene	EPA 8270	80	µg/kg	-	-
Chrysene	EPA 8270	80	µg/kg	-	-
Dibenzo(a,h)anthracene	EPA 8270	80	µg/kg	-	-
Fluoranthene	EPA 8270	80	µg/kg	-	-
Perylene	EPA 8270	80	µg/kg	-	-
Pyrene	EPA 8270	80	µg/kg	-	-
PCBs (congeners) - SQOs [c]					
Total PCBs	EPA 8270	-	µg/kg	Deliver on ice, store at <4°C	7 days
Organochlorine Pesticides - SQOs					
Chlordane-alpha	EPA 8270	0.50	µg/kg	Deliver on ice, store at <4°C	7 days
Chlordane-gamma	EPA 8270	0.54	µg/kg		
trans-Nonachlor	EPA 8270	4.6	µg/kg		
Dieldrin	EPA 8270	2.5	µg/kg		
2,4'-DDD	EPA 8270	0.50	µg/kg		
2,4'-DDE	EPA 8270	0.50	µg/kg		
2,4'-DDT	EPA 8270	0.50	µg/kg		
4,4'-DDD	EPA 8270	0.50	µg/kg		
4,4'-DDE	EPA 8270	0.50	µg/kg		
4,4'-DDT	EPA 8270	0.50	µg/kg		
Total DDTs	Calculated	-	µg/kg		
Toxicity - Sediment - SQOs					
L. plumulosus 10-day Acute Survival	ASTM E1367-03 and EPA/600/R-95/136	NA	NA	Deliver on ice, store at ≤4°C	10 days preferred; up to 28 days acceptable.

Table D-6					
Triad Analysis (SQOs) - Sediment					
Constituent	**Method[a]**	**Maximum Reporting Limit[b] (Dry Weight)**	**Units**	**Preservative**	**Holding Time**
M. galloprovincialis 48-Hour Sediment Water Interface Development Test[d]	Anderson et al. 1996 and EPA/600/R-95/136	NA	NA	Deliver on ice, store at $\leq 4^{o}C$	10 days preferred; up to 28 days acceptable.

[a] All samples will be tested in accordance with USEPA or American Society for Testing and Materials (ASTM) methodologies where such methods exist. Approval of alternative methods should be obtained from the SWRCB. Additional methods may be acceptable if they produce results at or below the desired reporting limits and are comparable to results generated by USEPA methods.

[b] Maximum reporting limits as recommended in SCCWRP's "Sediment Quality Assessment Technical Support Manual" (January 2014). These limits are "based on the CSI classification ranges and do not necessarily reflect the maximum performance achievable with available analytical methods". This statement applies for all analytes listed in the table above except the following: particle size, percent solids, and total organic carbon. The concentrations associated with the reporting limits in the table are expressed in dry weight as should all analytical results.

[c] At a minimum, the 40 PCB congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed.

[d] Alternatively, a 28-day *Neanthes arenaceodentata* growth test may be utilized as the sublethal test in accordance with ASTM E1611-07 and USEPA protocols. However, the *M. galloprovincialis* test has been the sublethal test utilized during previous testing.

Table D-7						
Toxics TMDL - Outfalls (Water, Storms)						
Constituent	**Sample Type**	**Method**	**ML**	**Units**	**Preservative**	**Holding Time**
Total Suspended Solids (TSS)	Comp	SM2540D	2	mg/L	-	7 days
Total Dissolved Solids (TDS)	Comp	SM2540C	2	mg/L	-	7 days
Settleable Solids	Comp	SM2540F	2	mg/L	-	7 days

Table D-8									
Toxics TMDL - Outfalls (Stormborne Sediment)									
Constituent	**Sample Type**	**Method [a]**	**TMDL Limit***	**ML**	**Units**	**Short-Term Shortage**		**Long-Term Storage**	
						Preservative	**Holding Time**	**Preservative**	**Holding Time**
Metals - Sediments									
Copper	Comp	EPA 6010B	34	4.4	mg/kg	Deliver on ice, store at <4^{o}C	-	Deliver on ice; store/freeze at – 20 °C	1 year
Lead	Comp	EPA 6010B	46.7	2.2	mg/kg		-		
Zinc	Comp	EPA 6010B	150	2.2	mg/kg		-		
Metals - Sediments									
Total Organic Carbon (TOC)	Comp	SM 5310B	-	0.01%	%	-	-	-	-
Polychlorinated Biphenyls - Congeners - Sediments [b]									
PCB congeners	Comp	EPA 8270	3.2	-	µg/kg	Deliver on ice, store at <4^{o}C	7 days	Deliver on ice; store/freeze at – 20 °C	1 year to extract, 40 days to analyze after extraction
Organochlorine Pesticides - Sediments									
Total Chlordane	Comp	EPA 8270	0.5	-	µg/kg	Deliver on ice, store at <4^{o}C	7 days	Deliver on ice; store/freeze at – 20 °C	1 year to extract, 40 days to analyze after
4,4'-DDE	Comp	EPA 8270	220	40	pg/g				
Total DDTs	Calculated	EPA 8270	1.58	-	µg/kg				

*Toxics TMDL numeric targets.

[a] Methods used should allow for detection at or below numeric targets outlined in the Toxics TMDL. Other EPA and Standard Methods may be acceptable. Per the Toxics TMDL, "Currently, several consituents of concern have numeric targets that are lower than readily available detection limits. As analytical methods and detection limits continue to improve and become more environmentally relevant, responsible parties shall incorporate new MDLs in the monitoring plan."

[b] At a minimum, the 40 PCB congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed.

Table D-9						
Toxics TMDL - Fish and Mussel Tissue (Annual)						
Constituent	**Method[a]**	**TMDL Limit***	**RL[b]**	**Units**	**Preservative**	**Holding Time**
Polychlorinated Biphenyls - Congeners[c]						
PCB congeners	EPA 8270	3.6	-	ug/kg	d	7 days for extraction/ 40 days for analysis
Organochlorine Pesticides						
Total Chlordane (calculated)	EPA 8270	-	40	pg/g	d	7 days for extraction/ 40 days for analysis
4,4'-DDE	EPA 8270	-	80	pg/g		
Total DDTs	EPA 8270	-	80	pg/g		

*Toxics TMDL numeric target for Fish Tissue for total PCBs.

[a] Methods used should allow for detection at or below numeric targets outlined in the Toxics TMDL. Other EPA and Standard Methods may be acceptable.

[b] Based on low mass availability for tissue.

[c] At a minimum, the 40 PCB congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed.

[d] Tissue preparation includes whole fish filleting and/or grinding, and/or any less-involved tissue preparation approach.

APPENDIX E
New Development/Re-Development Program Forms

Inspection Check List for Each BMP		
System / Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
Inlet/Outlet		
Drainage • Overall area graded to inlet • No evidence of flow bypassing BMP • Appropriate invert elevation • No evidence of flooding due to clogging/obstruction		
Condition • Sized per specifications • Overall material condition		
Hydromodification Control (riprap/gabions) • No evidence of scouring • Protections visible • Filter fabric intact *(if applicable)*		
Basin/Trench		
Drainage • Dewaters between storms per design specifications • No Ponded/Standing Water* • No Depressions/Low spots		
Aggregate/Rock *(if applicable)* • Clean with no evidence of clogging • Top layer of stone does not need replacement		
Excessive sedimentation (≥ 2 inches deep and/or covers vegetation, or 10% of design capacity)		
Trash/Debris • Adequate maintenance • Requires maintenance		
Vegetation		
Species • Per specifications • No unauthorized plantings		
Health • Lush or dead/diseased/dying • Invasive species** • Maintained or Overgrown (grass greater than 10 inches)		
Embankments		
Hydromodification Control • Coverage per specifications • No erosion/hydromodification • No seeps/leeks/gullies		

Inspection Check List for Each BMP		
System / Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
Bioretention Area (if applicable)		
Drainage • Dewaters between storms per design specifications • No Ponding • No depressions/low spots		
Slopes are stable		
Mulch • Adequate cover • Adequate depth/thickness		
Underdrains • Diameter, Spacing and Material per specifications • Adequate gravel cover		
Excessive sedimentation (covers vegetation or greater than 2 inches deep)		
Trash/Debris • Adequate maintenance • Requires maintenance		
Riser (if applicable)		
Material Reinforced Concrete: ____ Corrugated Metal Pipe:____ Masonry:____ PVC:____		
Condition • Cracks/displacement/joint failures/water tightness • Corrosion • Spalling		
Obstructions • Low flow orifice obstructed • Excessive sediment in riser		
Pre-Treatment Systems (if applicable)		
Grates/Screens • Structural condition • Corrosion		
Obstructions/Clogging		
Sediment/Trash/Debris • Adequate maintenance • Requires maintenance		
Media Filters (if appropriate)		
Media Filter • Filter damage/breakthrough • Staining • Clogging		
Sediment/Trash/Debris • Adequate maintenance • Requires maintenance		
Overflow Bypass (if appropriate)		

Inspection Check List for Each BMP		
System / Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
Spillway Condition • Sized per specifications • Adequate slope protection (e.g., armoring with rip rap)		
Hydromodification • Seeps/leaks on downstream face • Cracking/bulging at toe of spillway • Sliding/gullies		
Obstructions		
Access/Fencing		
Access points in good condition (safe)		
Fences in good condition • No damage which would allow undesirable entry • Lock and gate function		
Other		
All appropriate signage in place		
Animal burrows (gopher holes, etc)		
System modifications since last inspection		
Aesthetics • Vandalism/Graffiti • Odors • Vegetation		
Complaints from residents		
Public Hazards		

* If mosquito larvae are present and persistent, contact the appropriate Vector Control authority.
** Invasive plants should be no greater than 5% of the total vegetated area.

General Post-Construction BMP Inspection Questions	
General Post-Construction BMP Inspection Questions	**Potential Indicators of Improper BMP Design and/or Installation**
1) Has a BMP been installed? 2) Does runoff flow to the BMP? 3) Have the correct inlet/outlet structures been installed? Is there an overflow outlet? 4) Does the BMP drain within design period? 5) Was the correct soil mixture used? 6) Was the BMP protected during construction? 7) Does vegetation meet species/coverage/establishment criteria? Is irrigation needed? 8) Have underdrains been installed to specification? 9) Can the BMP clog? 10) Is there evidence of excess nuisance flow? 11) Are there fencing requirements? 12) Is there access for required maintenance? Is this access safe? <u>Optional Additional Questions:</u> A) Permeability test. B) Is the groundwater table within 10 feet (3 meters) of the BMP invert?	• Limited visible indicators of a BMP (e.g., pipe vent, inlet, etc) • Site grading drains away from an installed BMP • Ponding ○ Deposited trash/sediment/ debris/vegetation ○ High turbidity • Condition of BMP vegetation ○ Coverage ○ Species ○ Vitality • Excess sediment loading (additional controls required) • Rising groundwater table • Soil borings not representative of conditions (e.g., high clay content)

Self-Inspection Form (Maintenance Records)				
What to Look For During BMP Inspection:	**Date of Inspection**	**Satisfactory/ Unsatisfactory**	**Maintenance Required**	**Date of Maintenance / Maintenance Completed**
Accumulation of Sediment, Debris, Litter, Grease, etc.				
Ponded/ Standing Water (Insect Breeding)				
Vegetation: • Overgrown • Establishment • Health				
Erosion/ Sedimentation				
Obstructions				
Clogged Filter Media				
Damage				

APPENDIX F
CIMP Data Management and Assessment

F.0 CIMP DATA MANAGEMENT AND ASSESSMENT

This appendix presents a discussion of the protocols for data management and methods for assessment monitoring data collected under the Coordination Implementation Monitoring Plan (CIMP) for the Marina del Rey (MdR) Watershed.

F.1 Data Management and Review

Laboratories will document, track, and archive the aspects of sample receipt and storage, analyses, and reporting. Further details of each laboratory's data management protocols can be found in each laboratory's respective quality assurance project plans (QAPPs), which will be provided by the laboratories, as needed.

All aspects of the sample collection and analysis process, including final laboratory electronic data deliverables (EDDs), field logs, and chain-of-custody forms will be tracked and documented. All data will undergo verification and validation to ensure accuracy and completeness. The data are compared to information such as the station and sample's history, sample preparation, and quality control (QC) sample data to evaluate the validity of the results. Minimum requirements for data validation include the following:

- Matrix spike and/or duplicate analyses are performed per concentration level and per matrix for every sample batch analyzed (where appropriate).
- Reference materials analyses are compared with "true" values and acceptable ranges. Values outside the acceptable ranges indicate that the sample values are invalid. Following correction of the problem, the reference material should be reanalyzed.

Corrective actions will be taken if data do not meet quality assurance (QA) and QC criteria. Once data are finalized, data will be standardized based on nomenclature developed specifically for the CIMP. Data will then be submitted to the MdR EWMP Agencies on an annual basis for preparation of the Annual Report due December 15.

Additionally, semi-annual annual data reports will be submitted with the annual monitoring report, and six months prior to the annual report (June 15 of each year). The June 15 data submittal will cover the monitoring period of July 1 through December 31, and the December 15 data submittal will cover January 1 through June 30. These semi-annual analytical data reports detail exceedances applicable to water quality based effluent limitations (WQBELs), receiving water limitations (RWLs), action levels, or aquatic toxicity thresholds, with corresponding sample dates and monitoring locations.

F.1.1 Regional Monitoring Program Data Management – BIGHT 2013

The Permit requires submission of SMC program data in the latest SMC Standardized Data Transfer Formats (SDTFs) developed and managed by SCCWRP. The SMC program is not currently being conducted in the MdR Watershed and no watershed-specific data will be available. In the event that bioassessment data are collected and reported for the MdR Watershed, data will be formatted and uploaded using the SDTFs. The latest version of the SMC project SDTF templates and directions available at the time of writing are provided in Attachment F1.

Unique SDTFs exist for Bight 2013. The SDTF templates and directions are also provided in Attachment F1.

F.2 Receiving Water Assessment

F.2.1 Permit – Receiving Water Assessment – Water Quality

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Order No. R4-2012-0175 (Permit) defines the Monitoring and Reporting Program (MRP) requirements, which will be used to assess conditions in the Receiving Water Monitoring Station(s) where data is collected for Permit compliance. This assessment methodology is only applicable to Permit compliance monitoring data and ought not be extrapolated to data collected for Total Maximum Daily Load (TMDL) compliance data assessment.

Water quality data collected from the MdR receiving water for Permit compliance will be compared with all applicable receiving water limitations. According to Section C.2 of the California Ocean Plan, the provisions and water quality objectives defined therein do not apply to enclosed bays and estuaries. Per Appendix I to the California Ocean Plan, enclosed bays include indentation along the coast which enclose an area of oceanic water within distinct headland or harbor works. Therefore, these receiving water limitations do not apply to the MdR Watershed.

The Los Angeles Basin Plan directly or by reference identifies saltwater limitations (Table 1) that may be applicable for assessment of MdR receiving water permit compliance monitoring data.

Table 1. Potentially Applicable Saltwater Receiving Water Limitations for Assessment of MdR Receiving Water Permit Compliance Monitoring Data

Parameter	Units	CMC for Saltwater
4-4'-DDT	µg/L	0.13
Aldrin	µg/L	1.3
Chloride	mg/L	N/A
Chlordane	µg/L	0.09
Cyanide	mg/L	0.001
Dieldrin	µg/L	0.71
Arsenic, Total	µg/L	69
Cadmium, Total	µg/L	42
Chromium (III), Total	µg/L	N/A
Chromium (VI) Total	µg/L	1,100

Table 1. Potentially Applicable Saltwater Receiving Water Limitations for Assessment of MdR Receiving Water Permit Compliance Monitoring Data

Parameter	Units	CMC for Saltwater
Copper, Total	µg/L	4.8
Lead, Total	µg/L	210
Nickel, Total	µg/L	74
Selenium, Total	µg/L	290
Silver, Total	µg/L	1.9
Zinc, Total	µg/L	90
Arsenic, Dissolved	µg/L	69
Cadmium, Dissolved	µg/L	42
Chromium (III), Dissolved	µg/L	BP
Chromium (VI), Dissolved	µg/L	1100
Copper, Dissolved	µg/L	4.8
Lead, Dissolved	µg/L	210
Nickel, Dissolved	µg/L	[Reserved]
Selenium, Dissolved	µg/L	290
Silver, Dissolved	µg/L	1.9
Zinc, Dissolved	µg/L	90
Dissolved Oxygen	mg/L	BP
alpha-Endosulfan	µg/L	0.034
beta-Endosulfan	µg/L	0.034
Endrin	µg/L	0.037
gamma-BHC (lindane)	µg/L	0.16
Heptachlor	µg/L	0.053
Heptachlor epoxide	µg/L	0.053
Nitrate (NO_3)	mg/L	BP
Nitrate-N	mg/L	BP
Nitrite-N	mg/L	BP
Pentachlorophenol	µg/L	13
pH	pH units	BP
Sulfate	mg/L	N/A
Total dissolved solids (TDS)	mg/L	N/A
Toxaphene	µg/L	0.21

Note: This list of parameters is based on the 2012-2013 Monitoring Annual Report and may require modification based on regional (County-wide) implementation of Permit programs.
N/A – Not Applicable.
BP – Freshwater receiving water limitation identified in the Basin Plan.
CMC - Criterion Maximum Concentration, the acute CTR water quality standard.

Table 1. Potentially Applicable Saltwater Receiving Water Limitations for Assessment of MdR Receiving Water Permit Compliance Monitoring Data

Parameter	Units	CMC for Saltwater
*The California Ocean Plan receiving water values do not apply to the MdR Watershed.		

Toxicity assessments will follow the guidelines set forth in the MRP and clarified in the LARWQCB's August 7, 2015 Toxicity Clarification Memo (Toxicity Memo). If toxicity is present in the receiving water sample and if either the survival or sublethal endpoint demonstrates a Percent Effect value equal to or greater than 50% at the instream waste concentration (IWC) then a TIE will be conducted. Percent effect is defined as the effect value—denoted as the difference between the mean control response and the mean IWC response, divided by the mean control response—multiplied by 100. If toxicity is present but does not trigger a TIE, toxicity will continue to be monitored at the station and an evaluation similar to a toxicity reduction evaluation (TRE) will be conducted per the guidelines established in the Toxicity Memo.

If a TIE is conducted at the receiving water station and is inconclusive during dry weather, toxicity monitoring will be added to the upstream outfall monitoring station. If the TIE is inconclusive during wet weather monitoring, toxicity monitoring will be added to the upstream outfall station after a second inconclusive TIE at the receiving water station.

If a TIE is conducted at the receiving water station and identifies the pollutant or class of pollutants contributing to the toxicity, then these pollutants will be added to monitoring at the receiving water station and at the upstream outfall station. If results from monitoring at the outfall station are above applicable WQBELs or RWLs, then a TRE will be conducted.

F.2.2 Bacteria TMDL – Receiving Water Assessment – Water Quality

Bacteria grab samples will be compared with the single-sample numeric targets presented in the Bacteria TMDL. An assessment of the single-sample monitoring data will be conducted monthly using the site-specific allowable number of exceedance days.

Rolling geometric mean calculations will be used to determine compliance with the Bacteria TMDL. Geometric means concentrations will be calculated for each indicator bacteria on a station-by-station basis using the historical dataset available for MdR Watershed. The geometric mean shall be calculated weekly as a rolling geometric mean using five or more samples, for 6-week periods, starting all calculations on Sunday. Geometric mean targets may not be exceeded at any time.

F.2.3 Toxics TMDL – Receiving Water Assessment – Water, Sediment and Fish Tissue Quality

Chemistry data for water, sediment, and fish tissue will be compared to the Toxics TMDL numeric targets defined in the Regulatory Drivers Appendix A.

Sediment toxicity results will be compared to appropriate laboratory controls.

F.2.4 Toxics TMDL – Receiving Water Assessment – Triad Assessment

Sediment chemistry, toxicity, and benthic community condition will be assessed once every five years using California's sediment quality objectives (SQOs) as described in the *Water Quality Control Plan for Enclosed Bays and Estuaries* (SWRCB and Cal EPA, 2009). The goals of the SQOs are to determine whether pollutants in sediments are present in quantities that are toxic to benthic organisms and/or will bioaccumulate in marine organisms to levels that may be harmful to humans. The SQOs are based on a multiple lines-of-evidence (MLOE) approach in which sediment toxicity, sediment chemistry, and benthic community condition are the lines of evidence (LOEs). The MLOE approach evaluates the severity of biological effects and the potential for chemically mediated effects to provide a final station level assessment.

Categorization values for benthic infauna, sediment quality guidelines (toxicity), and SQOs (chemistry) are described in the *Water Quality Control Plan for Enclosed Bays and Estuaries* (SWRCB and Cal EPA, 2009). Data analyses will be performed to determine what physical and chemical factors most greatly influenced the distribution of benthic organisms as discussed below. Data may be integrated and summarized using the reporting template presented in Figure 1.

Benthic Infauna Index of Biotic Integrity
The Benthic community condition was assessed using a combination of four benthic indices, the Benthic Response Index (BRI), Relative Benthic Index (RBI), Index of Biotic Integrity (IBI), and a predictive model based on the River Invertebrate Prediction and Classification System (RIVPACS). The four indices will be calculated following the 2014 guidance provided by SCCWRP entitled, *Sediment Quality Assessment Technical Support Manual* (SCCWRP, 2014).

Each benthic index result was categorized according to four levels of disturbance, including reference, low, moderate, and high disturbance:

- **Reference:** Equivalent to a least affected or unaffected site.
- **Low Disturbance:** Some indication of stress is present, but is within measurement error of unaffected condition.
- **Moderate Disturbance:** Clear evidence of physical, chemical, natural, or anthropogenic stress.
- **High Disturbance:** High magnitude of stress.

Sediment Quality Guidelines (Toxicity)

Sediment toxicity is assessed using two tests, a 10-day *L. plumulosus* survival test and a sublethal test using the mussel *M. galloprovincialis*. Sediment toxicity test results from each site will be statistically compared to control test results; normalized to the control survival; and categorized as nontoxic, low, moderate, or high toxicity. The average of the test responses will be calculated to determine the final toxicity level of exposure (LOE) category. If the average falls midway between the two categories, it will be rounded up to the higher of the two. Tables with criteria are presented in the SQO guidelines (SCCWRP, 2014).

Sediment Quality Objectives (Chemistry)

Concentrations of chemicals detected in sediments will be compared to the California Logistic Regression Model (CA LRM) and the Chemical Score Index (CSI). The CA LRM is a maximum probability model (P_{MAX}) that uses logistic regression to predict the probability of sediment toxicity. The CSI is a predictive index that relates sediment chemical concentration to benthic community disturbance. Sediment chemistry results according to CA LRM and CSI will be categorized as having minimal, low, moderate, or high exposure to pollutants. The final sediment LOE category is the average of the two chemistry exposure categories. If the average falls midway between the two categories, it will be rounded up to the higher of the two. For example, if the CA LRM is low exposure and the CSI is moderate exposure, then the final sediment LOE category will be moderate exposure.

Location: MdR Watershed - Harbor Receiving Water Stations
Station:
Final Site Assessment =

Chemical Analyte	Units	Actual Sediment Concentration	CA LRM P Values	Score As part of CSI Calculation (Benthic Disturbance Category)
Cadmium	mg/kg			N/A
Copper	mg/kg			
Lead	mg/kg			
Mercury	mg/kg			
Zinc	mg/kg			
PAHs, total high MW	ng/g			
PAHs, total low MW	ng/g			
Chlordane, alpha	ng/g			
Chlordane, gamma	ng/g		N/A	
Dieldrin	ng/g			N/A
Trans nonachlor	ng/g			N/A
Total PCBs	ng/g			
4,4'DDT	ng/g			N/A
DDDs, total	ng/g		N/A	
DDEs, total	ng/g		N/A	
DDTs, total	ng/g		N/A	
		PMAX value		
		Mean CSI		
		Category		
		Final Chemistry LOE Category		

Test Species/Endpoint	%Normal Alive	% N-A (Control Normalized)	Statistical Significance	Test Response Category	Final Toxicity LOE Category
Eohaustorius survival					
Mytilus Normal					

Index	Score	Index Disturbance Category	Final Benthic LOE Category
BRI			
IBI			
RBI			
RIVPACS			

CA LRM = California Logistics Regression Model
CSI = Chemical Score Index
PMAX value = maximum probability model value
LOE Category = Line of Evidence category
N/A = Not Applicable

Figure 1. Triad Assessment – Integrated Data Summary Template

F.3 Stormwater Outfall Monitoring – Water Quality Assessment

F.3.1 Permit – Stormwater Outfall Monitoring Assessment – Water Quality

The MRP defines the requirements which will be used to assess conditions at Outfall Monitoring Stations where data is collected for Permit compliance. This assessment methodology is only applicable to Permit compliance monitoring data and ought not be extrapolated to data collected for TMDL compliance data assessment. Water quality data collected from the MdR Outfall Monitoring Station(s) for Permit compliance will be compared to the municipal action levels (MALs) defined in Attachment G of the Permit. The MALs, per Attachment G of the Permit and presented in Table 2, are based on nationwide Phase I MS4 monitoring data for pollutants in Storm Water (upper 25th percentile results). Data assessment will include a running average of water quality data for each Outfall Monitoring Station. If the running average is 20% or greater than the MALs, an MAL Action Plan will be written and submitted beginning in Year 3 of CIMP implementation to the Regional Water Board Executive Officer.

Table 2. Water Quality Assessment of Outfall Data for Permit Compliance – Storm Water Municipal Action Levels

Parameter	Units	Storm Water MALs
pH	pH Units	6.0 – 9.0
Total Suspended Solids (TSS)	mg/L	264.1
Chemical Oxygen Demand (COD)	mg/L	247.5
Total Kjeldahl Nitrogen (TKN)	mg/L	4.56
Total Nitrate & Nitrite	mg/L	1.85
Total Phosphorous	mg/L	0.80
Cadmium, Total Recoverable	µg/L	2.52
Chromium, Total Recoverable	µg/L	20.20
Copper, Total Recoverable	µg/L	71.12
Lead, Total Recoverable	µg/L	102.00
Nickel, Total Recoverable	µg/L	27.43
Zinc, Total Recoverable	µg/L	641.3
Mercury, Total Recoverable	µg/L	0.32

F.3.2 Permit – Stormwater Outfall Monitoring Assessment – Toxicity Endpoint Assessment and Toxicity Identification Evaluation Triggers

Toxicity assessments will be conducted in accordance with the MRP and guidelines set forth in the Toxicity Memo. If toxicity is present in the receiving water sample (station MdRH-MC) and exceeds the trigger for a TIE (see Section F.2.1) then the following actions will be taken at the Permit outfall station (MdR-3):

1. If the TIE at the receiving water station identified the pollutant or class of pollutants causing toxicity then::

   a. The toxicant(s) shall be monitored at the outfall station (MdR-3) during the next scheduled sampling event (at least 45 days following the toxicity sample collection date).
   b. Monitoring shall continue until the deactivation criteria are met at the outfall station (two consecutive samples do not exceed RWLs or WQBELs).
   c. If the toxicant is present in the discharge from the outfall at levels above the applicable RWL or WQBEL, a TRE will be performed for that toxicant at the outfall location.
2. If the TIE at the receiving water station was inconclusive, then the following actions shall be taken at the outfall station:
   a. If the sample was collected during dry weather, toxicity monitoring shall be conducted at the outfall monitoring station during the next scheduled monitoring event.
   b. If the sample was collected during wet weather, then toxicity monitoring need not commence at the outfall until a second TIE at the receiving water station is inconclusive.

The list of constituents monitored at the outfall monitoring station for Permit compliance will be modified based on the results of any TIEs conducted. Monitoring for those constituents will occur as soon as feasible following the completion of a successful TIE (i.e., the next monitoring event that is at least 45 days following the toxicity laboratory's report transmitting the results of a successful TIE). The requirements of the TREs will be met as part of the adaptive management process in the MdR EWMP rather than conducted via the CIMP. The identification and implementation of control measures to address the causes of toxicity are tied to management of the stormwater program, not the CIMP. It is expected that the requirements of TREs will only be conducted for toxicants that are not already addressed by an existing Permit requirement (i.e., TMDLs) or existing or planned management actions.

If toxicity samples have been collected at an outfall station for Permit compliance monitoring, toxicity results will be compared to appropriate laboratory controls. Toxicity test endpoints will be analyzed, per the MRP, using the TST t-test approach (USEPA, 2010). The Permit specifies that the chronic IWC is set at 100% effluent for outfall samples. For chronic marine and estuarine aquatic toxicity tests conducted at outfall stations for Permit compliance monitoring, the percent effect will be calculated. If there is no toxicity identified, toxicity monitoring will continue until the deactiviation criteria are met (two consecutive samples pass the TST t-test during the same condition [wet or dry]) at the outfall station, or a TIE at the receiving water site identifies the constitute causing toxicity.

If toxicity is present but at levels below the trigger for a TIE, toxicity testing will continue until either the deactivation criteria are met (two consecutive samples pass the TST t-test during the same condition [wet or dry]), the TIE conducted at the receiving waster site identifies the pollutant causing toxicity, or the discharged is eliminated. An evaluation similar to the TRE shall also be conducted.

If toxicity is present, exceeds the trigger for a TIE and the TIE identifies the pollutant contributing to the toxicity then the pollutant will be added to the monitoring list for this station until the deactivation criteria are met (two consecutive samples do not exceed RWLs or WQBELs) and a TRE will be conducted. If toxicity is present, exceeds the trigger for a TIE and the TIE is inconclusive, a TRE-like investigation will be conducted as described in the Toxicity Memo and toxicity testing will continue at the outfall until two consecutive samples pass the TST t-test, a TIE identifies the pollutant causing the toxicity, or the discharge is eliminated.

F.3.3 Bacteria TMDL – Stormwater Outfall Monitoring Assessment – Water Quality

Not Applicable.

F.3.4 Toxics TMDL – Stormwater Outfall Monitoring Assessment – Water Quality and Storm-Borne Sediment

Monitored parameters data for water and storm-borne sediment samples will be compared to the Toxics TMDL numeric targets. The Toxics TMDL requires the monitoring of Total Dissolved Solids (TDS), Total Suspended Solids (TSS), and Settleable Solids at the corresponding monitoring stations. The storm-borne sediment monitoring parameters include Total Organic Carbon (TOC), Copper, Zinc, Lead, Chlordane, Total PCBs, Total DDTs, and p,p'-DDE. Although not required by the TMDL, the sediment will be tested for Percent Solids. An overview of monitoring frequency and methods is presented in the CIMP. Appendix C describes the analytical methods, sampling procedures, and data management to be used during the implementation of the CIMP.

F.4 Statistical Analysis

Statistical analysis will be used to assess MdR Watershed monitoring data for Permit and TMDLs compliance and evaluate changes in conditions over time.

Environmental monitoring data possess distributional characteristics that generally require specialized approaches to trend testing. Water quality datasets can contain censored (less than) values, outliers, multiple detection limits, missing values, and serial correlation. These characteristics commonly present problems in the use of conventional parametric statistics based on normally distributed datasets. The presence of censored data, non-negative values, and outliers generally leads to a non-normal data distribution, which is common for many datasets. These skewed datasets require use of specific non-parametric statistical procedures for their analysis. Nonparametric statistical tests are more powerful when applied to non-normally distributed data, and almost as powerful as parametric tests when applied to normally distributed data (Helsel and Hirsch, 1992).

For trend analysis for Permit and Toxics TMDL compliance, data will be organized by station, date of collection, and type of monitoring event (Storm Water or Non-storm Water). It is necessary to include a minimum of 3 years of data in this analysis. The nonparametric Mann-Kendall trend analysis will be used to evaluate whether a constituent has increased or decreased significantly since the base year. The test is non-parametric, rank order-based, and insensitive to missing values. Statistical significance will be based on a 95% confidence level (e.g., a 5% probability of obtaining a test statistic, or a p-value of less than 0.05).

Sen’s slope, a non-parametric estimator of the magnitude of the change in parameter concentration over time (Sen, 1968), will be calculated for parameters with statistically significant trends. Sen’s slope can only be calculated if the proportion of samples assessed below the minimum detection limit (MDL) was less than 15% (Sen, 1968). Sen's slope estimator is insensitive to outliers and can be used to infer the magnitude of a trend in the data.

The dataset may contain results below the MDL. These values will be assigned the value of one-half the MDL. Over time, TMDL requirements and laboratory analytical techniques have lowered their limit of detection. An artifact of this advance is that the lower detection limit values of measurements later in the data record may be falsely detected as a downward trend. To avoid this, water quality values will be censored to one-half of the highest detection limit of the analysis period as part of the data handling prior to analysis.

Datasets with large numbers of values identified as detected but not quantified (DNQ) may create statistical problems for trend analyses. The Mann-Kendall test for trend adjusts variance estimates upward for ties in magnitude (Gilbert, 1990). Considering that DNQ values in the raw dataset produce such ties, trend analyses of datasets with high percentages of DNQ results will be based upon greater variances than those without DNQ results. Thus, the power of the trend analyses is reduced for the datasets with values below detection limit (BDLs) compared to those without detection limits censoring.

A simulation analysis on the effect of DNQ results on Mann Kendall test and Sen’s slope estimator has provided standard guidelines for reporting trend statistics (Alden et al., 2000). These guidelines are widely accepted based on the percentage of DNQ results present in the dataset (Ebersole et al., 2002). The simulation analysis found that the power of the Mann-Kendall test begins to noticeably decline when censoring exceeds 35%. However, if the Mann-Kendall test produces a significant result when the level of censoring is between 35% and 50%, this result may be valid despite the loss of power. If the Mann-Kendall test fails to produce a significant result when censoring is in the 35% to 50% interval, this failure may have resulted from a loss of power. Also; the Sen’s slope estimator begins to exhibit noticeable bias when censoring exceeds 15%. At levels of censoring of 15% or less, both the Mann-Kendall test results and the Sen’s slope estimator were found to be reliable.

The following guidelines were used to report trend information:

- If the percentage of BDL observations is 15 or less, report the trend test p-value, direction, and magnitude of the trend (i.e., Sen Slope).
- If the percentage of BDL observations is greater than 15 and less than or equal to 35, report the trend test p-value and direction only. Do not report the trend magnitude.
- If the percentage of BDL observations is greater than 35 and less than or equal to 50 and the trend test p-value indicates a significant trend, report the trend test p-value and direction. Do not report the trend magnitude.
- If the percentage of BDL observations is greater than 35 and less than or equal to 50 and the trend test p-value does not indicate a significant trend, report that there are too many observations below the detection limit to determine the presence or absence of trend.

If the percentage of BDL observations is greater than 50, report there are too many observations below the detection limit to determine the presence or absence of trend.

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APPENDIX H

Storm Borne Sediment Report

Marina del Rey Harbor Toxics TMDL – Storm-borne Sediment Collection Pilot Study Summary Report

For Reference Only
Marina del Rey Enhanced Watershed Management Agencies
Coordinated Integrated Monitoring Program

Summarized by: County of Los Angeles

12/31/2014

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Marina del Rey Harbor Toxics TMDL
Storm-borne Sediment Collection Pilot Study Summary Report

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Executive Summary

Background

The Basin Plan Amendment for the Marina del Rey Harbor Toxic Pollutants Total Maximum Daily Load (TMDL) (California Regional Water Quality Control Board, Los Angeles Region, October 6, 2005) established waste load allocations for stormwater discharges into the Marina del Rey Harbor that are based on attainment of numeric targets for contaminants in sediment. A critical component of the Marina del Rey Toxic Pollutants TMDL Coordinated Monitoring Plan (CMP) is assessing the average concentration of toxic pollutants in storm-borne sediment; storm-borne sediment is sediment suspended in stormwater flow.

Pursuant to the CMP, a Pilot Study was initiated during the Ambient Monitoring Phase to collect storm-borne sediment samples in preparation for the subsequent Effectiveness Monitoring Phase. During the Effectiveness Monitoring Phase, storm-borne sediment samples would be collected and analyzed during storm events as a means of evaluating progress towards attainment of the TMDL-based waste load allocations.

Overview

The Pilot Study was initiated on February 6, 2013, and continued through the 2013 to 2014 storm season. Four configurations of the passive sediment collection device were deployed and tested during six storm events at three locations: MdRU-C1 near Admiralty Way north of Bali Way, MdR-4 at the pump house at the east end of the Oxford Flood Control Basin, and MdR-5 at the Boone-Olive Pump Station (see Figure 2-1). Two different configurations were tested at MdR-5.

Results

Results of the Pilot Study revealed low total suspended solids (TSS) in the stormwater, low amounts of storm-borne sediment captured, and low solids content (Tables 3, 4, and 5). Although the samples collected at the end of the 2012 to 2013 storm season were submitted to the laboratory for analysis of TMDL constituents, analytical results returned nondetects for Chlordane and Total PCBs (Table 6). During the 2013 to 2014 storm season when preliminary results for the first two storm showed low TSS, low sediment mass, and low solids content, the decision was made to freeze and store the collected samples in a -18 degrees Celsius freezer at the laboratory while options were explored, including conducting an analytical methods review. Based on the analytical methods review, only one storm event produced enough sediment (54 g or more) of sufficient quality (approximate 20% percent solids) to be analyzed. At the end of the 2013 to 2014 season, the frozen samples were thawed, composited on a flow-weighted basis, and analyzed (Table 7).

Quality Control

Quality control sampling was conducted to identify any potential sources of contamination in the process, and any steps that could be incorporated into the procedures to minimize the potential. Filter, air, and pump blanks were collected and analyzed for copper, lead, zinc, PCBs, and Chlordane. There were detections of copper, lead, and zinc in all three samples collected, indicating that there were some metals introduced to the samples during the collection process. Follow-up tests were run on the filter to identify any potential for metals contribution to the filter. While there were some detections of copper and zinc, the concentrations were much lower than the TMDL target.

Recommendations

Based on the Pilot Study results, it is recommended that storm-borne sediment monitoring during the Effectiveness Monitoring Phase incorporate the following:

- Establish a storm season from October 1 through April 15. Historically the majority of storm events occur in this time period. If, however, a qualifying storm event is predicted prior to October 1, efforts should be made to capture this event if any needed modifications and preparations are completed. If a qualifying storm event is predicted after April 15, efforts should be made to capture this event if the compositing process has not begun on the stored samples.

- Collect storm-borne sediment samples using the types of passive sediment collection devices developed and used during the pilot study.

- Collect storm-borne sediment samples at 5 monitoring stations (MdRU-C1, MdRU-C2, MdR-3, MdR-4, and MdR-5) during qualifying storm events. Freeze and store at the laboratory, then composite and analyze after the storm season. Target a minimum of 54 grams of composited sample mass, although more is preferable to allow for high water content in the samples, analysis of quality control samples and duplicates.

- Prepare the composite sample with mass taken from each sample proportionally based on the storm flows discharge to the Marina del Rey Harbor.

- Analyze the composited sample using the following analytical methods:

  Total Solids – SM 2540B
  Total Organic Carbon – EPA 9060A
  Metals (Copper, Lead, Zinc) – EPA 6010
  Chlordane, DDT and PCBs – EPA 8270 SIM

Note: These methodologies are currently being utilized to implement storm-borne sediment monitoring for the 2014-15 monitoring year. Through adaptive management, the program will continue to improve as more knowledge and experience is gained.

1. Introduction

The Basin Plan Amendment for the Marina del Rey Harbor Toxic Pollutants Total Maximum Daily Load (TMDL) (California Regional Water Quality Control Board, Los Angeles Region, October 6, 2005) requires monitoring of harbor water, sediment and fish/mussel tissue, and wet-weather stormwater and storm-borne sediment. The TMDL establishes waste load allocations for stormwater discharges into the Marina del Rey Harbor that are based on attainment of numeric targets for contaminants in sediment. A critical component of the Marina del Rey Toxic Pollutants TMDL monitoring program is assessing the average concentration of toxic pollutants in storm-borne sediment; storm-borne sediment is sediment suspended in stormwater flow. During the Effectiveness Monitoring Phase, storm-borne sediment samples shall be collected during storm events and analyzed after the storm season as a means of evaluating progress towards attainment of the TMDL-established waste load allocations.

The storm-borne sediment Pilot Study was implemented during the Ambient Monitoring Phase to test and evaluate the effectiveness of passive sediment collection devices for use in collecting storm-borne sediment, and to provide recommendations for storm-borne sediment monitoring during the Effectiveness Phase, as described by the *Marina del Rey Harbor Toxic Pollutants TMDL Coordinated Monitoring Plan (CMP)* (Responsible Agencies Technical Committee, August 31, 2009). The Pilot Study involved using passive sediment collection devices installed at monitoring sites MdR-4, MdR-5 and MdRU-C1, as described in Section 2.

The Pilot Study was initiated on February 6, 2013, with the design, permitting, and fabrication of passive sediment collection devices, followed by installation and deployment during storm events. During the period of February 6, 2013, through April 3, 2014, six storm events were used to test the passive sediment collection devices.

This Storm-Borne Sediment Collection Summary Report presents a description of the sampling equipment used to collect samples, sample collection procedures, results of the Pilot Study, evaluation of analytical methods, evaluation of passive sediment collection device performance, and recommendations for implementing storm-borne sediment monitoring during the Effectiveness Phase.

2. Design and Deployment of Sampling Equipment

The design of the passive sediment collection devices was based on research and literature review of similar techniques for collecting suspended sediment transported by flowing water. One technique was implemented in Seattle, Washington[1], where a filter device was installed at the bottom of a storm drain (Bed Loading Sampling and Analysis Results, Short-Term Stormwater Treatment, North Boeing Field). Another technique was developed in England by British Geological Survey Geochemist Barry Rawlings[2], and involved installing and suspending a filter device in a natural stream. After evaluating both options, devices using similar concepts were designed for the Pilot Study.

[1] Landau Associates. 2011. Bed Load Sampling and Analysis Results Short-Term Stormwater Treatment North Boeing Field, Seattle Washington. Technical Memo prepared for the Boeing Company. June 2011. (Available from http://www.epa.gov/region10/pdf/sites/ldw/slip4/6-20-11_Boeing_NBF_Landau_062011_Bedload_Sampling_TM.pdf.

[2] British Geological Survey [internet]. 2011 Jul 18 [cited 2014 Dec 30]. Available from: https://www.youtube.com/watch?v=PnSm4hNAJ4Q.

The devices targeted extracting sediment within stormwater collection facilities throughout the storm event to collect sufficient sediment for analysis of TMDL constituents. The passive sediment devices would be installed to collect representative suspended sediment and deployed prior to each storm event. After the storm event, the filters would be removed and collected sediment would be analyzed using proposed analytical methods. Since MdR-5 does not have a stable, unidirectional flow, two pumped systems, one with and a flow-through baffle box and another with a pressure chamber would be used.

Design drawings for the passive sediment collection devices were approved for installation by the Los Angeles County Department of Public Works (DPW) on February 28, 2013. The initial fabrication and installation was completed at sites MdRU-C1, MdR-4, and MdR-5 between March 1 and March 8, 2013. An overview of the project area and monitoring locations is provided in Figure 2-1. The initial fabrication and installation work was observed by staff from the DPW Watershed Management Division (WMD) and Flood Maintenance Divisions (FMD). As-Installed drawings are provided in Attachment A. In addition, the installation sites were inspected before and after the installation work by an inspector from the DPW's Construction Division. Minor modifications were implemented during the course of the Pilot Study to improve and refine the sample collection procedures. Brief descriptions of the activities at each site are provided below and photographs are included in Attachment B. The passive sediment collection devices were installed in March 2013 and tested at three locations as part of the Pilot Study: MdRU-C1, MdR-4, and MdR-5.

Figure 2-1. Monitoring Locations

2.1 MdRU-C1

MdRU-C1 is located in an 18-inch storm drain lateral accessed by a curb-side cover near Admiralty Way north of Bali Way. Fabrication and installation at MdRU-C1 included:

- Construction of passive sediment collection device including filter basket, debris grate and suspension harness
- Installation of two 3/8-inch-diameter wedge anchors embedded three inches and attachment of 3/8-inch-diameter eye bolts to anchors using coupling nuts
- Fabrication and fitting of tether cable to secure sampling device in catch basin lateral

Photographs of the installation are presented in Attachment B.

2.2 MdR-4

MdR-4 is located at the pump house at the east end of the Oxford Flood Control Basin, and is an open concrete channel approximately 15 feet in width and 8 feet in depth. Anchor bolts and suspension cables were installed to allow placement of the sample collection device in the center of the flow horizontally and vertically. The Pilot Study began with a single passive sediment collection device. A second device was attached to enhance collection effectiveness, and to test multiple sizes of filters. Fabrication and installation at MdR-4 included:

- Construction of passive sediment collection device including filter basket, filter bag, debris grate and suspension harness
- Installation of four 3/8-inch-diameter wedge anchors embedded three inches; attachment of 3/8-inch-diameter eye bolts to anchors using coupling nuts; and fabrication and placement of suspension cable across channel and tightened using turnbuckles
- Fabrication and fitting of tether cable to suspend sampling device in the channel
- Installation of pulley and rope control system to allow for sampler adjustment and retrieval during storm events from top of channel
- Modification of the sampling device during the study period to accommodate a second filter basket to test multiple sizes filters and collect additional storm-borne sediment sample mass.

Photographs of the installation are presented in Attachment B.

2.3 MdR-5

MdR-5 is located at the wet well of the Boone-Olive Pump Station control house. The bottom of the wet well is approximately 20 feet below the ground surface. Two sample collection devices were configured and tested at this location. Fabrication and installation of the two collection devices at MdR-5 included:

- Flow-Through Device – a Flow-Through Baffle Box supplied by a submersible pump (up to 5 gallons per minute) with a drain attached to the passive sediment collection device. This device was developed from the original conceptual design of the pilot project.

  - Fabrication of metal channel strut support frame to hold the Flow-Through Baffle Box; the frame was secured to railing using u-bolts
  - Fabrication of Flow-Through Baffle Box including inlet and outlet structures
- Pressure Chamber Device – a passive sediment collection device fitted inside a pressure chamber supplied by a submersible pump (up to 5 gallons per minute). This device was recommended as an option by the filter bag supplier as a filtration system that was used in biodiesel filtration. The testing of this system was added to the pilot testing as it was another means to meet the objectives of the pilot study.
  - Assembly of inlet and outlet piping for pressure chamber filter housing
  - Fabrication of tether cable for pump and pump discharge hose. Tether was secured to metal channel strut frame to allow for pump depth to be adjusted

Sampling methodology was modified during the study period to change filters within the devices as the flow discharge rate through the filter decreased. The filters on both collection devices were changed at the same time for comparison purposes.

Photographs of the installation are presented in Attachment B.

3. Sample Collection Procedures

Storm sampling events were identified in consultation between the County and the consultant using a general guide of a predicted storm intensity of 0.1 inch within a 24-hour period with a predicted probability of 60 percent. A lower probability was utilized to maximize the opportunities to test the sediment collection devices. During the Pilot Study, the storm identification was the same as for the stormwater sampling program. This allowed the sampling activities of the storm-borne sediment and the stormwater programs to be coordinated.

3.1 General Sampling Procedures

General sample collection procedures began with notification of the County of the predicted storm event and a check of necessary equipment including general hardware and tools to configure the sampling equipment, single-use sample collection filters, and laboratory supplied sample containers.

The principal sample collection device was a polypropylene mesh filter (7-inch diameter, 16-inch length). The filter was placed in a plastic basket of similar dimensions and configured for deployment at each location. The day before the potential storm the equipment was checked to ensure it was functional, and to address any repair needs. Once checked, the equipment was rinsed with deionized or distilled water to remove any dust or dirt on the equipment. The filter baskets were allowed to air dry before preparation for deployment. The filters were then placed in the baskets for each of the sampling devices and secured for sampling. In addition, where required, the debris grate (or protective screen) was placed over the filter opening and secured using zip ties. For the Pilot Study, three sizes of filters were used: 1, 5, and 10 micrometer (µm). Once assembled, the equipment and materials were transported to each sampling location for deployment.

To minimize the chance of capturing non-stormwater runoff, the passive collection devices were deployed the day of the storm event or, if the rain was expected overnight, the devices were deployed the afternoon before. Once installed, the suspension and control cables and fittings were adjusted for proper location of the sampling device. For the pumped collection systems, the pumps were placed in the wet well in advance but were not turned on until the storm discharge began. Photographs of the passive sediment collection devices were also taken to document the conditions and confirm proper installation.

Sampling events were conducted concurrently with storm sampling conducted as part of the Ambient Monitoring Phase. This coordinated effort was conducted to take advantage the efficiency of field crews already deployed for sampling and to utilize the flow and total suspended solids (TSS) collected for each storm event to calculate the estimated pollutant load. For reference, the pollutant load is estimated using the following equation:

Estimated Pollutant Load = Sediment Concentration * TSS * flow

During the storm event periodic field checks were performed to ensure that the sampling devices were functioning and free of debris or clogs. The typical cycle for observations during a storm event was approximately once an hour. The observations at MdRU-C1 and MdR-4 primarily focused on checking for debris build up and snags on the devices. The observations at MdR-5 with the two pumped devices focused on monitoring the filter processing rate to identify pump clogs and/or filter saturation.

The filter baskets in the passive collection devices at sites MdRU-C1 and MdR-4 were retrieved from outside of the sample point by working with the suspension and control fittings and cables to pull the device back to the surface. The opening to the filter baskets were covered with clean plastic to prevent debris from entering the filter bag and transported as a complete unit to the Boone-Olive Pump Station (MdR-5) for processing. The filters used in the pumping configurations at site MdR-5 were retrieved by turning off the pumps and allowing the accumulated water to complete processing though the filter.

After retrieval and transport to Boone-Olive Pump Station, the passive sediment collection device (i.e., the filter basket and the debris grate) were opened and the filter bag was removed. Excess water was allowed to drain through the filter bag. The filter bag was then cut along the top to remove the plastic ring, along the bottom to remove the seal/seam and, finally, along its length to allow access to the inner surface of the filter bag. Once opened, larger pieces of loose trash or organic debris were gently removed, unless covered or imbedded in sediments. Once ready, samples were obtained by removing the accumulated sediment from the inner surface of the filter bag with a polytetrafluoroethylene spatula. Care was used to avoid excessive scraping or pressure on the filter to avoid removing pieces of the filter and collecting it as part of the sample.

Samples were placed in a clean lab-supplied 16-ounce glass jar. The glass jar was weighed and the opened jar weight was noted on the jar lid. The recorded value was subtracted from the sample weight in the jar to estimate the mass of sample collected. This data was a field measurement using a portable electronic scale to determine an initial estimate of the amount of sample collected.

At the conclusion of each storm event, the remaining filters and sample jars were inventoried to determine if any additional field supplies should be purchased in advance of the next sampling event. To prepare for future sample events, additional sample containers were obtained from the laboratory and additional filters/filter baskets were purchased from filter manufacturer. Equipment was also inspected for damage or wear and tear so that any spare parts (cables, zip ties, etc.) that required replacement were replaced and purchased from local suppliers.

Passive sediment collection devices were stored at MdR-5 (Boone-Olive Pump Station). Prior to storing, the sediment collection devices were allowed to dry and the loose debris was then cleaned off of the equipment. Once dry, the equipment was stored inside the existing equipment enclosure at Boone-Olive Pump Station. If required, any repairs were made prior to storing the equipment to ensure it was ready for the next storm event.

Descriptions of conditions and issues encountered during the storm-borne sediment sampling at each site are provided below; photographs from typical sampling events are provided in Attachment B.

3.2 Site Specific Sample Collection Procedures

3.2.1 MdRU-C1

The collection device at MdRU-C1 was positioned at the bottom of the catch basin lateral. The flow velocity was variable based on the depth of the flow in the lateral, which is a function of the storm duration and intensity.

The flow at MdRU-C1 was estimated using the Manning's Equation and the measured depth from the pressure transducer installed in the pipe. This location has a direct connection to Marina del Rey Harbor; therefore, it is assumed that all flows at this location discharge to Marina del Rey Harbor.

There was limited ability to control the velocity profile of the flow to maximize sediment loading of the sampler. In addition, the nature of the flow in the catch basin laterals limits the ability to adjust the sampler position to reduce the amount of debris collected. The only control was through the adjustment in the length of the tether cables to control where in the lateral the device was placed. For the purposes of this Pilot Study, the position of the device was kept constant. Once the filters were removed from the device, samples were collected in accordance with the procedures outlined above in Section 3.1.

This site produced some unique challenges that affected the collection results. For example, from October 2013 through February 2014, repaving work was being conducted along Admiralty Way, which required the installation of construction stormwater best management practices (BMPs) at the catch basin inlets. This restricted the discharge flow rate and associated storm-borne sediment discharge during the 2nd, 3rd, and 4th events. In addition, during this period there was an ongoing issue of debris dumped into the catch basin that blocked the flow from the lateral during the 3rd and 4th events until sufficient depth had been built up behind the unintentional earthen dam on top of the stormwater sampling point that covered the pressure transducer and intake tubing. The presence of the debris on top of the intake tube caused for the sample to be drawn through the debris and as a result artificially inflated the TSS concentration in the stormwater sample. This also restricted the flow rate through the catch basin and had the potential to allow larger particles to settle out. Once the debris and stormwater BMPs were removed, the device successfully collected sediment during the 5th and 6th events. For the long-term, it will be important to keep track of and document events that may affect the sampling for inclusion in future reporting.

3.2.2 MdR-4

For MdR-4, the collection device was fixed approximately 1 to 2 feet above the base of the channel at approximately the mid-depth point for full flow conditions. The position of the filters was adjusted based on the storm prediction published by the National Weather Service; for example, the smaller the predicted storm, the lower the filter was placed in the channel to capture as much of the discharge as possible. At this location, the velocity was variable based on the depth of the flow in the channel, intensity of the storm, tide gate position, and the pump station operation.

The flow at MdR-4 was estimated by measuring the depth of water in the channel, for depth of less than 4.51 ft. (height of the headwall), a polynomial equation:

Volume [cf.] = -864.26*Depth[ft.]^3+7587.2*Depth[ft.]^2-2276.2*Depth[ft.]

was used to calculate the stored volume, and the flow rate is determined by the change in stored volume over time. Once the depth was over 4.51 ft., the acoustic doppler flow meter measures the velocity and that is multiplied by the cross sectional area to obtain the flow:

Flow rate [cfs] = Depth[ft.] - 4.51)*channel width*velocity

For storm events where the depth was never greater than 4.51 feet, the Flood Control District (FCD) records were checked to determine if this stored flow was released to Marina del Rey Harbor via Oxford Basin or if it was retained for release to the sanitary sewer at a later time.

Midway through the Pilot Study the device was reconfigured to hold two filter baskets with the intent of testing two different filter sizes in a storm, testing the device performance, and collecting additional sample mass. The sample mass was documented independently from each filter basket to measure filter performance and establish the predicted mass if only one filter is deployed in the future.

Since there was limited ability to control the velocity profile of the flow in the channel due to external factors, there was a need to be able to move the position of the sampler from the surface to maximize the sediment capture potential. To achieve this, the support cables were lengthened to allow for more range of positions for the sampler in the lower portion of the channel to adapt to FMD operations and flow conditions. This modification limited the maximum height for the filter position due to the channel geometry because the vertical and horizontal position is controlled by a single device.

Once the filters were removed from the device, samples were collected in accordance with the procedures outlined above in Section 3.1.

3.2.3 MdR-5

Two device configurations were tested at MdR-5 to determine the most effective storm-borne sediment approach: a flow-through baffle box and a pressure chamber.

The flow at MdR-5 was estimated by measuring and multiplying the change in water depth in the pump station by the surface area to calculate volume; the flow is estimated as change in volume over time. The program automatically checks the Boone-Olive Telemetry System for discharge pump operation and will adjust the calculated information using the pump discharge rates provided by DPW. The discharge to Marina del Rey Harbor is verified by reviewing the DPW telemetry records and the discharge is calculated using the records and the spreadsheet provided by DPW.

3.2.3.1 Flow-Through Baffle Box

A dedicated submersible pump was used to pump stormwater from the bottom of the wet well to the Flow-Through Baffle Box mounted at the rail above the wet well. The sample device was mounted to the bottom discharge point of the baffle box. The stormwater was pumped to the baffle box and allowed to drain through the sampling device by gravity. The pump operated at a fixed speed with the operation of the pump controlled by a float switch. When the pump discharge rate exceeds the processing rate of the filter, the baffle box would overflow back into the wet well.

During the initial deployment on March 6, 2013, the soft gasket between the sampling device and the baffle box was too flexible once the filter was full of water and the filter basket slipped out. The flexible gasket was subsequently replaced with a rigid ring to support the filter basket and distribute the weight when the filter is full of water. The gaps between the rigid ring and baffle box were sealed to prevent sample loss and leaks. The device ran without a similar malfunction for the remainder of the Pilot Study.

The flow through the filter encountered hydraulic rejection, which led to a large overflow volume from the baffle box. Hydraulic rejection occurs when the sediment collected in the filter affects further effective capture of sediment from the stormwater. As a result, field procedures were modified for the final three events to change the filters once the point of high rejection had been reached to continue to process sample during the storm duration.

After some events with low solids content, it was determined that the sample water content could be reduced by covering the filter opening with plastic and allowing the filter to rest longer before removal and processing. Once the filters were removed from the device, samples were collected in accordance with the procedures outlined above in Section 3.1.

3.2.3.2 Pressure Chamber

A dedicated submersible pump was used to pump stormwater from the bottom of the wet well to the Pressure Chamber that contained the filter. The system used the same fixed speed pump with operation controlled by a float switch. The pressure chamber was placed at the rail above the wet well to allow for the discharge from the filter to drain back to the wet well.

The flow through the filter also encountered hydraulic rejection similar to that of the Flow-Through Baffle Box system, which led to a low volume of discharge from the pressure chamber. As a result the field procedures were modified for the final three events to change the filters once the point of low discharge had been reached to continue to process sample during the storm duration.

As with the Flow-Through Baffle Box, it was determined that the sample water content could be reduced by allowing the sealed pressure chamber to rest longer before removal and processing. Once the filters were removed from the device, samples were collected in accordance with the procedures outlined above in Section 3.1.

3.2.4 Quality Control

Quality Control (QC) blanks were incorporated to determine if the collection procedures have a potential to introduce contamination. Three field QC samples were obtained from different configurations of the passive sediment device followed by rinsing with water. Each of the aqueous QC samples were analyzed for copper, lead, and zinc (EPA 6010B), chlordane (EPA 8270 SIM), and PCB congeners (EPA 8270 SIM). Results of the QC sampling are detailed in Section 4.5.

4. Summary of Pilot Study Results

This section presents the results of the Pilot Test including the data characterizing the storm season as well as the results of the Pilot Test activities. The Pilot Study was implemented for six storm events between February 2013 and April 2014 (see Tables 1 and 2). To show the variation of recorded rainfall precipitation from the nearest rain gauges near the drainage area, the recorded rainfall precipitations from two weather stations located at Los Angeles International Airport (LAX) and Santa Monica Municipal Airport (SMO) were included (Figure 4-1). The sediment collection results for MdRUC-1, MdR-4, and MdR-5 are summarized in Tables 3, 4, and 5 respectively. The rainfall precipitation at the Electric Avenue Pump Plant (PP) was also included in Tables 3 through 5 as it is the closest in proximity to the drainage area (Figure 4-1).

4.1 Summary of Storm Events

The Pilot Study was initiated during the 2012 to 2013 storm season and concluded after the 2013 to 2014 storm season. Table 1 presents the rainfall reported by weather stations located at Santa Monica Municipal Airport and Los Angeles International Airport during the six events sampled for the Pilot Study. Based on total rainfall for these events, the SMO station reported a 20 percent greater amount of rainfall than the LAX station. These differences reflect the difficulty of planning storm events and the spatially inconsistent rainfall in the Marina del Rey area.

Figure 4-1. Location Map of Rain Gauge Stations and Monitoring Stations

Table 1 Summary of Regional Rainfall Data

Event No.	Sampling Events	Rainfall Recorded LAX Rainfall (inches)	LAX Rainfall Percent of Study Period	Rainfall Recorded SMO Airport (inches)	SMO Rainfall Percent of Study Period
1	March 6-8, 2013	0.66	15%	1.03	19%
2	November 20-23, 2013	0.38	8%	0.21	4%
3	December 7-9, 2013	0.26	6%	Trace rainfall amount	
4	February 6-8, 2014	0.14	3%	0.11	2%
5	February 26, 2013 - March 3, 2014	2.91	65%	3.80	71%
6	April 1-3, 2014	0.13	3%	0.22	4%
	Total	4.48	100%	5.37	100%

Notes:
LAX – Los Angeles International Airport
SMO – Santa Monica Municipal Airport
Source: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climatological Data Center

The duration and average intensity of the storm events sampled during the study period is summarized in Table 2 below to provide an overview of the rainfall characteristics.

Table 2 Summary of Storm Event Characteristics

Sampling Events	LAX		SMO		LAX-SMO Average
	Duration (hours)	Average Intensity (inches/hour)	Duration (hours)	Average Intensity (inches/hour)	Average Intensity (inches/hour)
March 6-8, 2013	7	0.094	12	0.086	0.090
November 20-23, 2013	13	0.029	9	0.023	0.026
December 7-9, 2013	5	0.052	Trace rainfall amount		0.026
February 6-8, 2014	5	0.028	3	0.037	0.033
February 26, 2013 - March 3, 2014	27	0.108	29	0.131	0.120
April 1-3, 2014	2	0.065	3	0.073	0.069

Notes:
LAX – Los Angeles International Airport
SMO – Santa Monica Municipal Airport
Duration – Time between first and last measured rainfall
Average Intensity – Total Rainfall / Duration
Duration represents hours where trace rainfall was recorded at the reference station.
Source: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climatological Data Center

4.2 Results of Sample Collection

The sediment collected from the passive sediment collection devices was evaluated to determine the mass of the sediment collected during each sampling event at each sampling location. The sample assessment and analysis consisted of three activities: documentation of the sample condition, field measurement of the sample mass, and laboratory measurement of the sample total solid. Tables 3, 4, and 5 present a summary of the sample collection data, as well as the rainfall recorded at the Electric Avenue Pump Plant (Figure 4-2), the Total Suspended Solids (TSS) of the stormwater collected during the sampling event, and the estimated sediment loading. Documentation of the sample collection was completed by recording notes of the sample condition including apparent water content and visible debris, and photographing the samples. The sample documentation notes are also summarized in Tables 3, 4, and 5.

Table 3 Sediment Collection Method Results at MdU-C1

Event No.	Sampling Events	Electric Ave PP Rainfall (inches)	Sample Amount Field Measured[1] (grams-wet)	Filter Mesh Size (um)	TSS[2] (mg/L)	Storm Flow into Harbor Volume[2] (cubic feet)	Total Solids (%)	Estimated Suspended Sediment Load[3] (kg)	Sample Collection Notes
1	3/8/13	0.82	53	1	36	9,833	49.5	10	Large debris material collected with sample
2	11/23/13	0.27	<1	1	2.1	9	N/A[5]	0.001	Construction stormwater BMPs installed at catch basin. Filter showed some staining. Insufficient accumulation to collect sample.
3	12/9/13	0.20	<1	10	205[4]	47	N/A[5]	0.27[4]	Construction stormwater BMPs installed at catch basin. Debris build-up in catch basin. Filter showed some staining. Insufficient accumulation to collect sample.
4	2/7/14	0.25	21	5	251[4]	80	24.1[5]	0.57[4]	Construction stormwater BMPs installed at catch basin. Debris build-up in catch basin. Filter showed accumulation along bottom. Sufficient accumulation to collect sample.
5	3/3/14	3.08	115	1	54	30	37.7	0.05	Construction stormwater BMP removed. Encountered leaf and tree debris within lateral. Large debris material collected with sample.
6	4/3/14	0.28	35	10	17	16	21.3	0.008	No construction BMP on site. Collected some small organic debris within sampler.

Notes:
1 – Field measured (grams-wet)
2 – As measured at the location by the TMDL Monitoring Program
3 – Estimated sediment load transported during storm event calculated as TSS * Storm Flow Volume * Unit Conversions (28.31685 L/ft^3 * 0.000001 kg/mg)
4 – Results are likely outliers and not included in TSS average. Debris build up within catch basin impaired flow and covered the auto sampler intake tubing, which artificially inflated the stormwater TSS concentrations
5 – Insufficient sample
N/A – Not Applicable
Source: Rainfall data from Los Angeles County Flood Control District data logger at Electric Ave Pump Plant

Table 4 Sediment Collection Method Results at MdR-4

Event No.	Sampling Events	Electric Ave PP Rainfall (inches)	Sample Amount Field Measured[1] (grams-wet)	Filter Mesh Size (um)	TSS[2] (mg/L)	Storm Flow into Harbor Volume[2] (cubic feet)	Total Solids (%)	Estimated Suspended Sediment Load[3] (kg)	Sample Collection Notes
1	3/8/13	0.82	36	1	41	111,982	34.1	130	Minor debris collected with sample
2	11/23/13	0.27	13	1	34	45,000	5.5	43	Low sediment collection in filter, visible staining from smaller particles. Sampler position was high relative to the low flow volume.
3	12/9/13	0.20	65	10	48	45,000	26.3	61	Sampler positioned lower than previous storm. No debris noted with sample.
4	2/7/14	0.25	<1	5	76	No Flow	N/A[4]	No Flow	Low sediment collection in filter, visible staining from smaller particles. Sampler position was high relative to the low flow volume. No sample collected.
5	3/3/14	3.08	31 87 Total 118	1 10	49	440,728	26.1	612	Deployed two filter devices. Minor debris collected/snagged on sampler. No debris noted in sample when collected.
6	4/3/14	0.28	13 12 Total 25	1 10	40	No Flow	9.1	No Flow	Deployed two filter devices for. Low sediment collection in filter, visible staining from smaller particles. Sampler position was high relative to the low flow volume No debris noted in sample when collected.

Notes:
1 – Field measured (grams-wet)
2 – Estimated volume based on water depth in channel, and verification with FCD whether flow was released to Marina del Rey Harbor via Oxford Basin (Section 3.2.2)
3 – Estimated sediment load transported during storm event calculated as TSS * Storm Flow Volume * Unit Conversions (28.31685 L/ft^3 * 0.000001 kg/mg)
4 – Insufficient sample
No Flow discharged to Marina del Rey Monitoring Program due to FCD operations
N/A – Not Applicable
Source: Rainfall data from Los Angeles County Flood Control District data logger at Electric Ave Pump Plant

Table 5 Sediment Collection Method Results at MdR-5

Event No.	Sampling Events	Electric Ave PP Rainfall (inches)	Sample Amount Field Measured[1] (grams-wet)	Filter Mesh Size (um)	TSS[2] (mg/L)	Storm Flow into Harbor Volume[2] (cubic feet)	Total Solids (%)	Estimated Suspended Sediment Load[3] (kg)	Sample Collection Notes
MdR-5 FT (Flow-Through)									
1	3/8/13	0.82	N/A[2]	1	141	81,806	N/A[4]	327	Used one filter. No sample, equipment malfunction
2	11/23/13	0.27	58	1	25	No Flow	9.3	No Flow	Used one filter. Minor debris captured by filter.
3	12/9/13	0.20	27	10	3.2	No Flow	17	No Flow	Used one filter. Water flowing through sampler visually clear. Sample had a green color.
4	2/7/14	0.25	40	1 5	2.5	No Flow	13.6	No Flow	Used two filters. Water flowing through sampler visually clear. Lots of debris collected in first filter, far less debris in second filter.
5	3/3/14	3.08	21, 54 27, 15 Total 117	1, 5 5, 10	55	1,340,886	20.4	2,088,564	Used four filters. Debris collected in all four filters.
6	4/3/14	0.28	43	10	16	No Flow	17	No Flow	Used one filter. Some debris collected in filter.
MdR-5 PC (Pressure Chamber)									
1	3/8/13	0.82	63	1	141	81,806	22.2	327	Used one filter. Minor debris collected with sample
2	11/23/13	0.27	<1	1	25	No Flow	N/A[4]	No Flow	Used one filter. No debris in filter.
3	12/9/13	0.20	18	10	3.2	No Flow	4	No Flow	Used one filter. Some debris in filter. Sample had green color.
4	2/7/14	0.25	N/A[2]	5	2.5	No Flow	9.7	No Flow	Used one filter. Some debris collected in filter.
5	3/3/14	3.08	23, 59, 33, 13 Total 128	1, 5 5, 10	55	1,340,886	21.4	2,088,564	Used four filters. Some debris collected in all four filters.
6	4/3/14	0.28	30	10	16	No Flow	15.8	No Flow	Used one filter. No debris in filter.

Notes:
1 – Field measured (grams-wet)
2 – Volume based on water depth in pump station, and verification with Boone-Olive Pump Station Telemetry System records (Section 3.2.3)
3 – Estimated sediment load transported during storm event calculated as TSS * Storm Flow Volume * Unit Conversions (28.31685 L/ft^3 * 0.000001 kg/mg)
4 – Insufficient sample
N/A – Not Applicable
Source: Rainfall data from Los Angeles County Flood Control District data logger at Electric Ave Pump Plant

4.3 Summary of Sediment Collection by Filter

The sediment mass was collected from each filter deployed for each of the storms during the duration of the Pilot Study period. The summary of the results for the three filter sizes deployed (1 micrometer [µm], 5 µm and 10 µm) are shown below in Figure 4-2. The review of the data did not indicate a discernable pattern between the various filter sizes in regards to the mass of sediment collected. The variation in the size and intensity of the storms appears to be the driving force behind the sediment mass collected during the Pilot Study (see Section 5). Quantitative comparisons of the filter performance are not made as the deployment per storm was limited to a single filter per site.

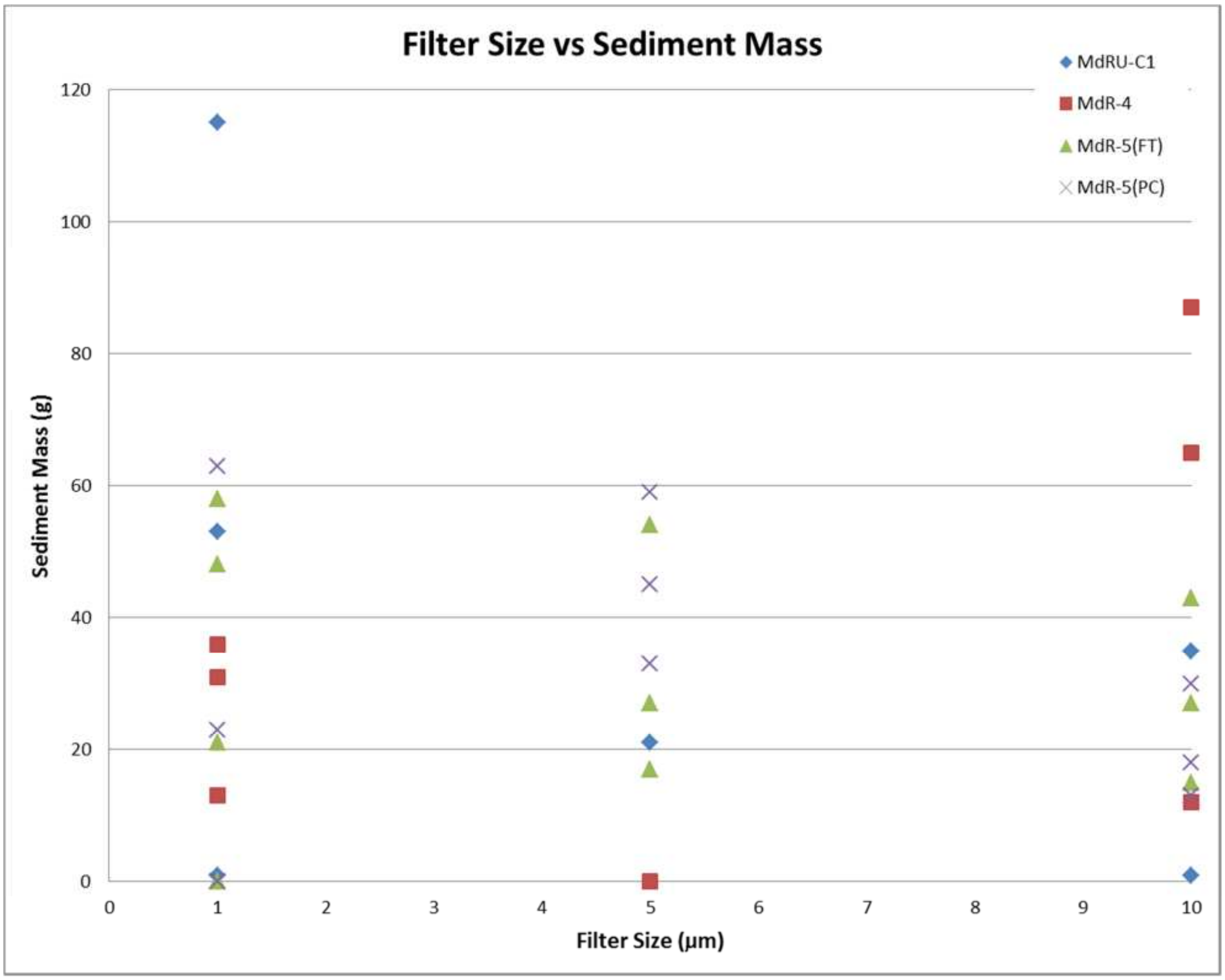


Figure 4-2. Summary of Sediment Collection by Filter

4.4 Evaluation of Results

4.4.1 Results of Sample Analysis for Chemical Constituents (2012-2013)

The samples collected at the end of the 2012 to 2013 storm season (event 1) were submitted to the laboratory for analysis of TMDL constituents (Table 6). The samples collected during the 2013 to 2014 storm season were frozen and stored in a -18 degrees Celsius freezer at the laboratory. These samples were composited on a flow-weighted basis and analyzed at the end of the 2013 to 2014 season.

Table 6 Results of Pilot Study Sample Chemical Analysis

Sample Collection Date	Copper (mg/kg-dry)	Lead (mg/kg-dry)	Zinc (mg/kg-dry)	Chlordane[1] (µg/kg-dry)	Total PCBs[2] (µg/kg-dry)	TSS (mg/L)
Analytical Method	***EPA 6010***	***EPA 6010***	***EPA 6010***	***EPA 8081***	***EPA 8082***	***SM 2450D***
MdRU-C1						
March 8, 2013	202	112	878	43	<29[3]	49.5
MdR-4						
March 8, 2013	502	121	2,260	150	<42[3]	34.1
MdR-5 PC						
March 8, 2013	340	182	1,270	410	1,900	22.2
2005 TMDL Numeric Target						
	34	46.7	150	0.5	22.7	N/A

Notes:
1 – Chlordane reported as Technical Chlordane
2 – Total polychlorinated biphenyl compounds (PCBs) reported as the sum of seven Aroclors
3 – Nondetect values are shown with the "<" symbol and the method detection limit
mg/kg-dry – milligram per kilogram dry weight
µg/kg-dry – microgram per kilogram dry weight

The collection results summarized in Tables 3, 4, and 5 revealed low TSS values and limited amounts of sediment collected. Due to the low TSS values and limited amount of sediment collected from events 2 and 3, the decision was made to freeze and store the samples while options were explored, including conducting an analytical methods review. Based on the analytical methods review, only event 5 produced enough sediment (54 g or more) of sufficient quality (approximate 20% percent solids) to be analyzed. The samples collected during the 2013 to 2014 storm season were frozen and stored in a -18 degrees Celsius freezer at the laboratory, and composited on a flow-weighted basis and analyzed at the end of the 2013 to 2014 season. The method to composite the samples collected from the 2013-14 monitoring period (events 2 to 6) is discussed in Section 4.4.2.

4.4.2 Results of Sample Analysis for Chemical Constituents (2013-2014)

The samples collected for the 2013 to 2014 storm season were initially analyzed for total solids and then frozen at approximately -20 degrees Celsius for storage at the laboratory for the duration of the season. On August 26, 2014, the thawed samples were composited at the laboratory for analysis. The conceptual approach utilized for the compositing of the samples was proportional weight based on a percentage calculated from the runoff generated by the storm event in relation to the total runoff from all of the storm events samples for the season. The samples were prepared in this way to mimic the process going forward where individual samples from each storm would not be analyzed for total solids.

The first step in the compositing process was to weigh the remaining sample in each container. This information was used to identify the limiting storm event for each location, usually the sample with the smallest available sample. Any storm events with no remaining sediment sample or where no discharge reached the Marina del Rey Harbor were removed from the compositing calculations. The final required weights were documented with the chain of custody and provided to the lab to perform the sample compositing work.

During this process the compositing method for each sample varied between locations as described below.

4.4.2.1 MdRU-C1

There was no remaining sample from November 23 and December 9 storm events (events 2 and 3) to include in the composite. In addition, there was concern over the accuracy of the flow measurements due to debris build up related to the road construction interfering with the pressure transducer. As a result the composite proportions were calculated using the rainfall data from each storm event as recorded at the LAX rain gauge to determine the amount required from each sample.

4.4.2.2 MdR-4

There was no remaining sample from the November 23 and February 8 storm events (events 2 and 4) to include in the composite. In addition, due to the outfall structure and operation of the low flow diversion (LFD), no discharges from the February 8 and April 3 (events 4 and 6) storm events reached the marina and were not included. The remaining samples were composited using the runoff generated from the respective storm events.

4.4.2.3 MdR-5

Only runoff from the March 3 storm event had reached the marina, all other storm events were retained at Boone-Olive Pump Station and discharged to the LFD. As a result, 100 percent of the sample came from the single storm event.

Table 7 below summarizes the remaining mass of each sample, the percentage of sample required for the composite, the approximate weight of each sample used, and the total solids results for each respective sample.

Table 7 Summary of Sample Compositing

Event No.	Sample Collection Date	Remaining Weight[1] (grams-wet)	Composite Proportion[2] (percent)	Target Weight[3] (grams-wet)	Weight Used[4] (grams-wet)	Total Solids (percent)	Fine Sediments (percent)
MdRU-C1							
2	11/23/13	0	0	0.0	0.0	N/A	N/A
3	12/9/13	0	0	0.0	0.0	N/A	N/A
4	2/7/14	15.34	4	5.89	5.89	24.1	N/A
5	3/3/14	122.49	92	122.49	107.20	37.7	N/A
6	4/3/14	32	4	5.47	5.47	21.3	N/A
Composite Sample		169.83	100	133.86	118.56	35.8	55
MdR-4							
2	11/23/13	0	0	0.0	0.0	5.5	N/A
3	12/9/13	40.41	9	12.65	12.65	26.3	N/A
4	2/7/14	0	0	0.0	0.0	N/A	N/A
5	3/3/14	123.91	91	123.91	107.88	26.1	N/A
6	4/3/14	22.95	0	0.0	0.0	9.1	N/A
Composite Sample		187.27	100	136.56	120.53	33.0	63
MdR-5 FT							
2	11/23/13	0	0	0.0	0.0	9.3	N/A
3	12/9/13	11.51	0	0.0	0.0	17	N/A
4	2/7/14	54.65	0	0.0	0.0	13.6	N/A
5	3/3/14	124.14	100	124.14	124.14	20.4	N/A
6	4/3/14	40.11	0	0.0	0.0	17	N/A
Composite Sample		230.41	100	124.14	124.14	18.6	66
MdR-5 PC							
2	11/23/13	0	0	0.0	0.0	N/A	N/A
3	12/9/13	5.46	0	0.0	0.0	4	N/A
4	2/7/14	35.38	0	0.0	0.0	9.7	N/A
5	3/3/14	134.6	100	134.60	134.60	21.4	N/A
6	4/3/14	20.73	0	0.0	0.0	15.8	N/A
Composite Sample		196.17	100	134.60	134.60	26.5	65

Notes:
N/A – Insufficient sample for total solids analysis; Not Applicable
Fine Sediments – Sediments under 62.5 microns

1 –Weight of thawed sample that was stored at the laboratory

2 – Percentage of mass individual sample will contribute to the composite sample. The composite proportion was calculated as follows:

- *MdRU-C1: Composite Percentage = Event Rainfall Total / Total Rainfall for All Events*
- *MdR-4 & MdR-5: Composite Percentage = Event Storm Flow Volume into Harbor / Total Storm Flow Volume into Harbor for All Events*
- *Samples with no remaining weight were not included in the composite proportion calculations.*

3 –Target weight is the mass from the individual sample that should be added to the composite sample

4 – Actual weight the lab was able to recover from the sample jar and add to the composite sample.

4.5 Results of Quality Control Sampling

On August 18 and 19, 2014, field quality control blanks were collected to identify if there are potential sources of contaminates in the process and to identify if any particular steps should be incorporated into the procedures to help minimize the potential. To accomplish this goal three types of blanks were identified for collection, as described below. Photographs from the blank collection process are included in Attachment B and a detailed overview of the sampling approach is included in Attachment C.

4.5.1 Filter Blank

The filter blank was collected placing an unused filter in a clean glass jar and then filled with laboratory-provided de-ionized water. The jar was sealed and placed in a cool dark storage area for 24 hours. At the conclusion of the soaking period, the filter was removed from the jar and processed to remove the liquid that absorbed into the filter. Additional de-ionized water was applied to the filter until sufficient sample was collected for analysis.

4.5.2 Air Blank

The air blank was collected by deploying a passive sediment collection (PSC) device with an unused filter at MdR-4 and leaving it out in the field for 24 hours. Once retrieved from the deployment, de-ionized water was applied to filter until sufficient sample was collected for analysis.

4.5.3 Pump Blank

The pump blank was collected placing an unused filter in the pressure chamber PSC and then filled with de-ionized water. The submersible pump was used to cycle water though the system for 24 hours. At the conclusion of the 24 hour period, the filter was removed from the pressure chamber and processed to remove the liquid that absorbed into the filter. Additional de-ionized water was applied to filter until sufficient sample was collected for analysis.

Once the samples were collected they were delivered to the laboratory and analyzed for copper, lead, zinc, PCBs, and Chlordane. The results from the analysis are summarized in Table 8 below.

Table 8

Summary of Blank Results					
	Copper (µg/L)	Lead (µg/L)	Zinc (µg/L)	PCBs[1] (µg/L)	Chlordane[2] (µg/L)
Analytical Method	EPA 200.7			EPA 8270 SIM	
Filter Blank	4.02	ND	350	ND	ND
Air Blank	16.5	6.11	420	ND	ND
Pump Blank	52.2	12.8	1650	ND	ND

Notes:

1 – PCB 44 Congeners (8, 18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194,195, 201, 206, 209) MDL Range (0.0012 to 0.00026); The list is based on a combination of the Bight'13 guidance (SCCWRP Jun 2013, 41 congeners) and the Enclosed Bays and Estuaries SQO guidance (State Water Resources Control Board [SWRCB] Apr 2011, 18 congeners).

2 – Chlordane (cis- and trans-chlordane, cis- and trans-nonachlor, and oxychlordane) MDL Range (0.00046 to 0.00066)

ND – Non-Detect

On September 26, 2014, as a follow up to the initial blank testing, samples of stored filter material were collected and sent to the lab for metals analysis to identify potential for metals contribution to the filter.

- Dry Filter – The dry filter was collected by cutting up an unused filter and placing the pieces of filter in a clean glass jar provided by the laboratory.

- Rinsed Filter – The rinsed filter was collected by rinsing off an unused filter with deionized water and then cutting up an unused filter and placing the pieces of filter in a clean glass jar provided by the laboratory.

- Source Blank – The source blank was collected by pouring unused deionized water from the initial blank collection into a sample jar.

The results from the analysis are summarized in Table 9 below.

Table 9

Summary of Filter Analysis			
	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
Analytical Method	EPA 6010B		
Dry Filter	0.612	ND	4.15
Rinsed Filter	0.144	ND	2.78
	Copper (µg/L)	Lead (µg/L)	Zinc (µg/L)
Analytical Method	EPA 200.7		
Source Blank	ND	ND	5.88

5. Discussion of Results

5.1 Sample Collection

One of the objectives of the Pilot Study was to assess the passive sediment collection device with regard to its efficacy of sample collection. The Marina del Rey Harbor Toxic Pollutants TMDL CMP estimated that 20 grams of storm-borne sediment sample would be necessary to in order to analyze all of the constituents required by the TMDL. The CMP further estimated that the 20 grams of storm-borne sediment sample would be present in 10 gallons (37.85 liter) assuming an average of 560 mg/L of total suspended solids (TSS)[3].

Subsequent discussions with laboratories and reviews of the target detection limits indicate that a larger sample would be necessary for the CMP analytical methods[4] (e.g., the current estimate is 54 grams of sample assuming 20 grams for chlordane, 20 grams for PCBs, 2 grams for metals, 2 grams for TOC, and 10 grams for total solids). In addition, the average total suspended solids value reported for the five stormwater locations monitored by the CMP is 62 mg/L (Figure 5-1) with a median value of 48 mg/L, an order of magnitude less than the 560 mg/L assumed in the CMP. Based on these revised estimates (target of 54 grams of storm-borne sediment sample and a median TSS value of 48 mg/L), the estimated volume of stormwater containing the necessary amount of sediment is approximately 1,125 liters[5].

The samples collected by the Pilot Study passive sediment collection devices in the 2012 to 2013 storm season (one storm, March 8, 2013) ranged from 67 to 117 percent of the targeted 54 gram mass while only sampling one storm. The samples collected by the Pilot Study passive sediment collection devices in the 2013 to 2014 storm season ranged from less than 2 to 237 percent of the target 54 gram value.

[3] Calculation: 560 mg/L * 10 gal * 3.785 L/gal * 0.001 g/mg equals 20 grams (rounded to one significant figure).

[4] The analytical methods are discussed in more detail in Section 6

[5] Calculation: 54 g x 1000 (mg/g)/ 48 mg/L = 1125 Liters

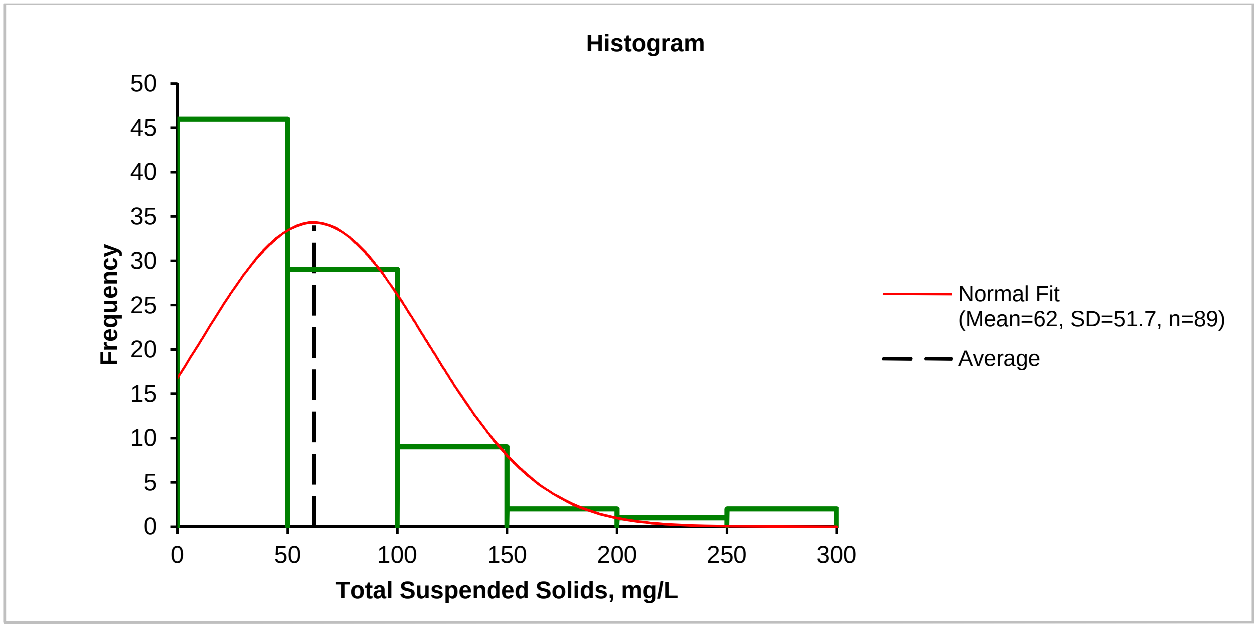


Figure 5-1. Total Suspended Solids, Marina del Rey Stormwater

The relationship between the amount of sample collected and the amounts of rainfall and storm flow is provided in Tables 2 through 5. The data is represented in Figure 5-2, which shows that the collected sample mass is related to the stormwater flow and the rainfall. While this relationship is intuitive, the graph indicates that a storm with a rainfall intensity of approximately 1.3 inches would provide the stormwater flow necessary to collect the target suspended sediment sample amount of 54 grams in a single storm event. The lines shown in Figure 5-2 are best-fit regression lines indicating the general trends in the data. The uncertainties associated with these estimates were not measured. However, the general trends are sufficient to indicate the importance of significant storms in the suspended sediment collection effort.

Based on the performance of the sample collection for the 2012 to 2013 and the 2013 to 2014 storm seasons, the passive sediment collection devices are a reliable method for collecting storm-borne sediment samples in a quantity and quality sufficient for the applicable analytical analysis.

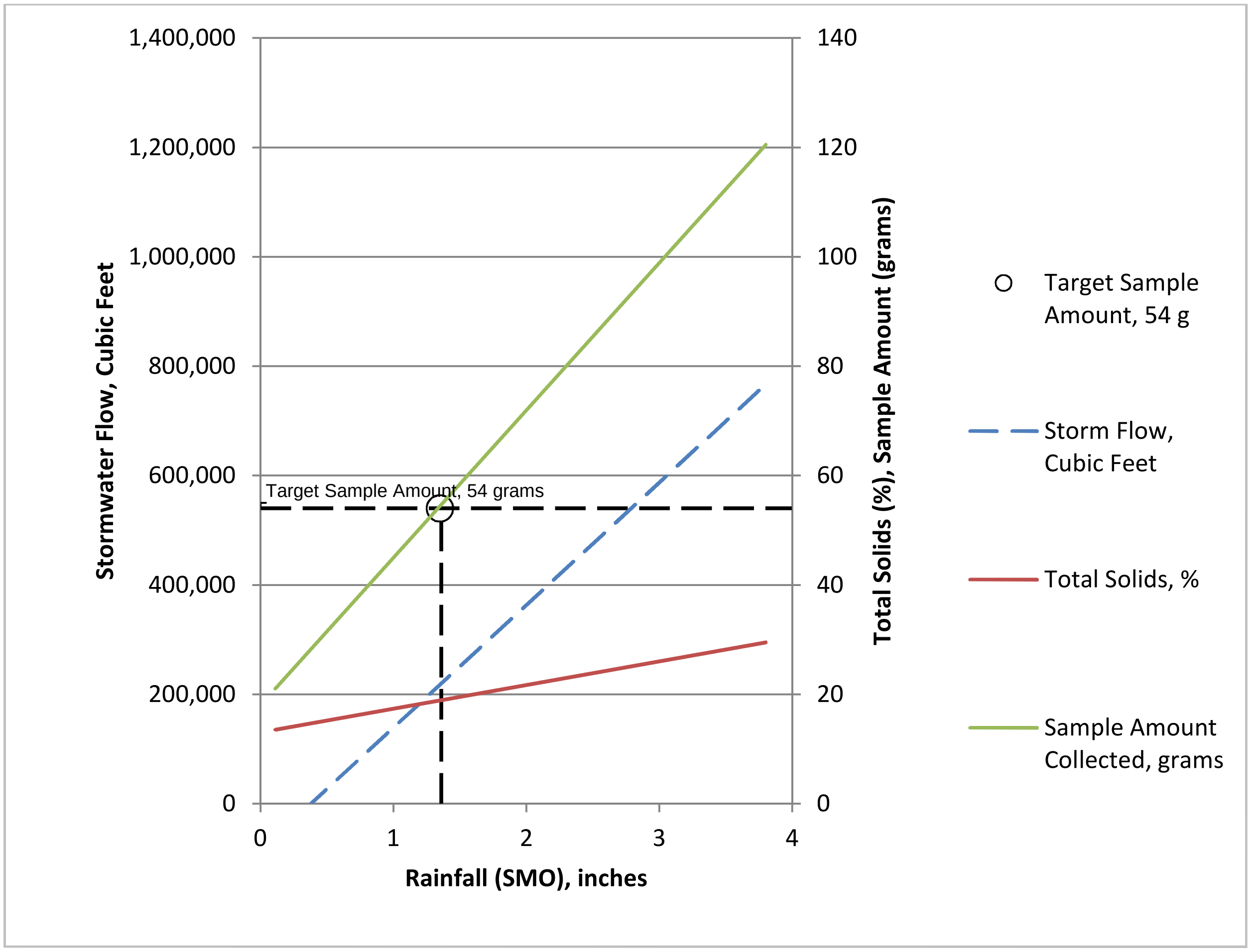


Figure 5-2. Comparison of Rainfall to Stormwater Flow, Amount of Sample Collected, and Sample Total Solids.
(Based on data for the 2012-2013 and 2013-2014 Seasons from the MdRH Wet Weather Monitoring Locations as shown in Tables 3- 5.)

The sediment mass collected was also plotted against the TSS measured in the composite samples collected from the stormwater runoff. The comparison is illustrated in Figure 5-3 which shows generally that the mass of sediment collected increases as the TSS concentration of the storm flow increases. The outliers shown in the figure where there is a higher TSS concentration, but lower sediment mass collected, are from events where there were generally other issues that impacted the sampling. In the case of MdRU-C1, the high TSS was caused by debris build up in the catch basin skewing the TSS results. The outlier value for MdR-4 was from a device issue at the location that was adjusted post storm. Generally, the higher TSS results in higher sediment mass collection; however, is not the best predictive tool as the results are not known until after the storm event.

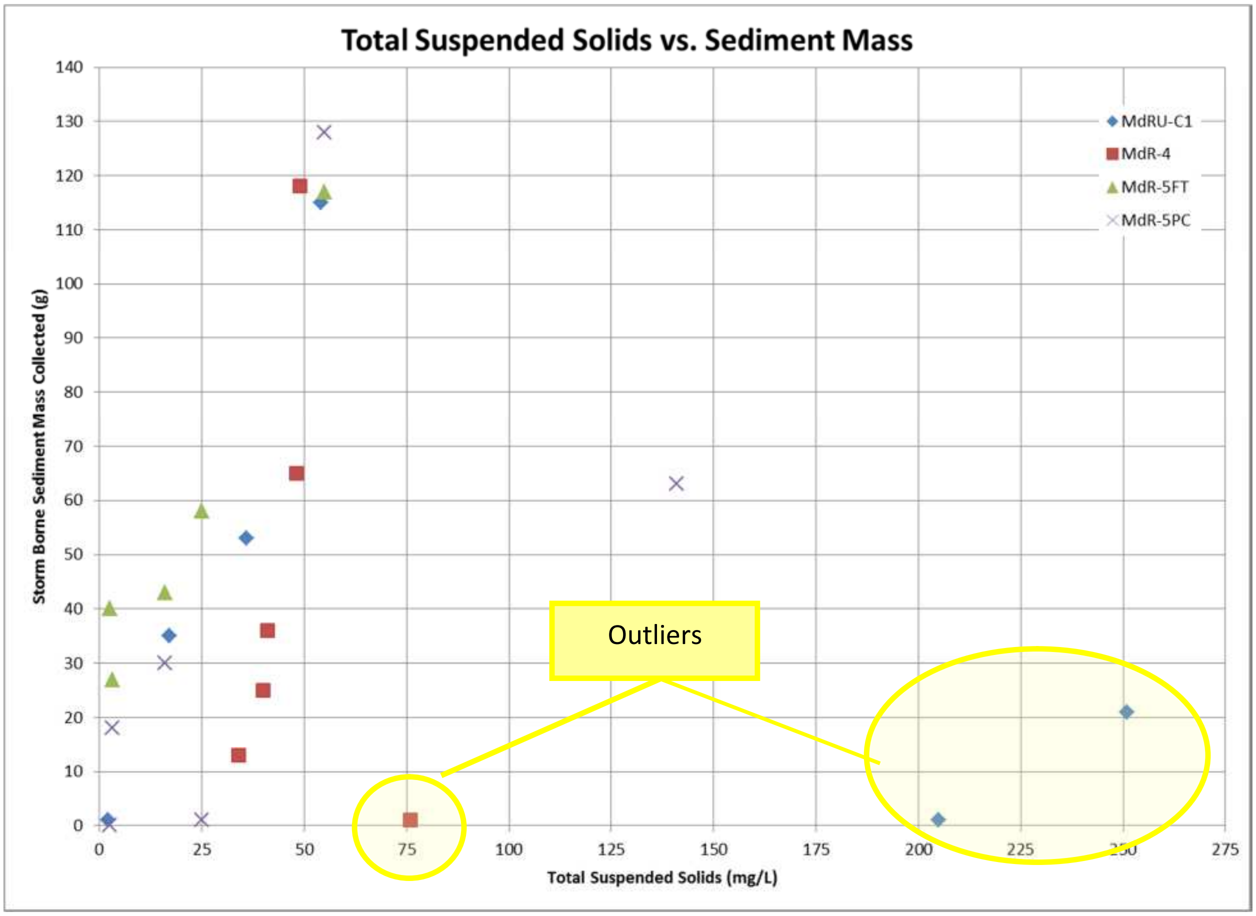


Figure 5-3. TSS vs. Sediment Mass Comparison

The practicality of other collection methods, primarily the traditional capture of storm flow and filtration through a 0.45-um filter or decanting and centrifuging[6], was re-evaluated as well during this evaluation process. This was done by reviewing the TSS data collected throughout the Pilot Study and estimating the amount of storm flow required to extract a minimum of 54 grams at 50 percent total solids. The inherent uncertainty of the anticipated TSS in the storm flow would require each storm to be reasonably over collected even for an annual composite sample to ensure sufficient sample for analysis or compositing at the end of the season or storm event. The resulting estimation of capture volumes per storm (Figure 5-4) resulted in a range of 192 to 12,858 liters of stormwater[7]. This review indicated that the passive sediment collection method is the preferred, practical option.

[6] Collecting storm-borne sediments though stormwater capture, decanting and centrifuging was pilot tested by the City of Los Angeles at Ballona Creek.

[7] Two TSS values from MdRU-C1 were not considered for this calculation because the results were artificially inflated by dirt, sand, and gravel dumped in the catch basin. The results are included in Figure 5-4.

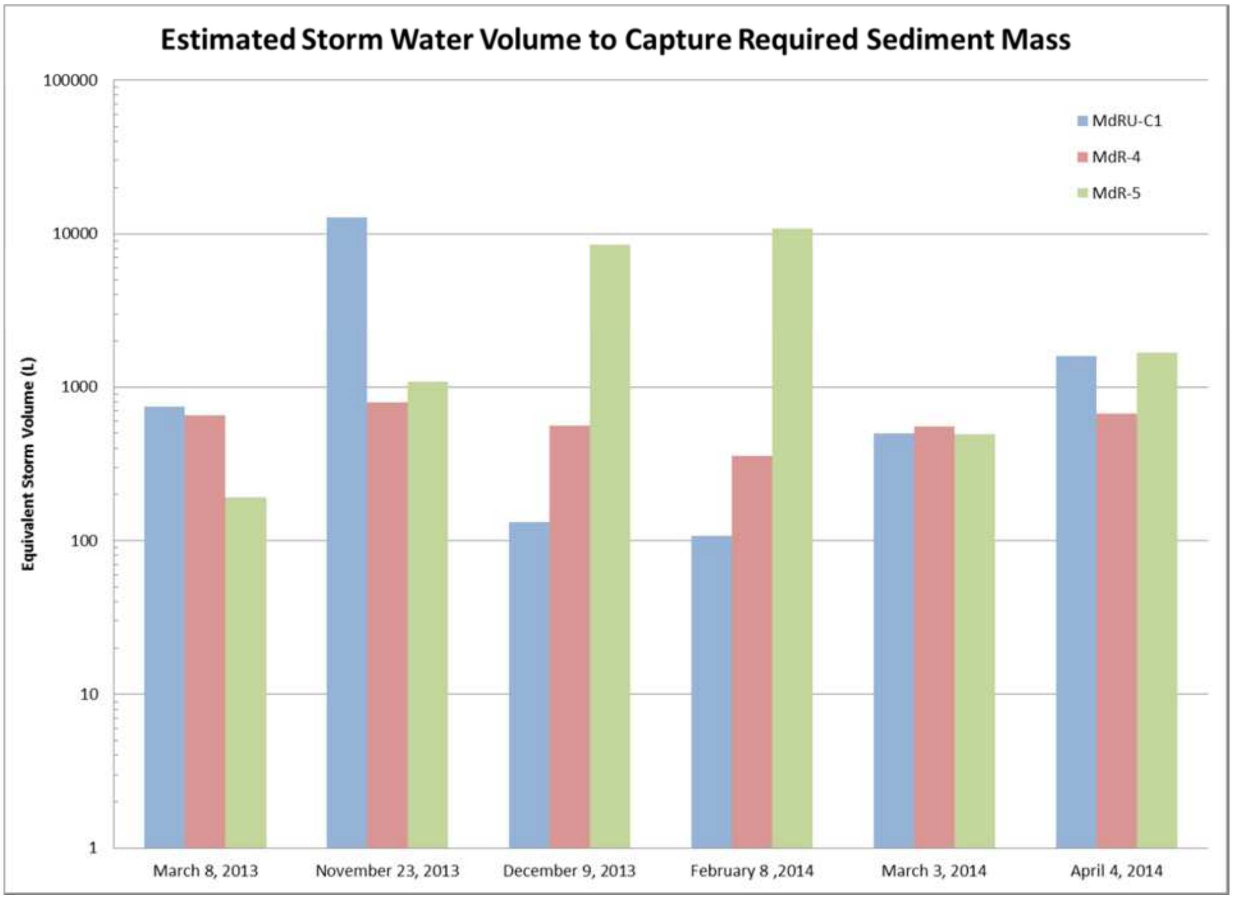


Figure 5-4. Equivalent Stormwater Capture Volumes

5.2 Quality Control Sampling

The three quality control samples collected returned non-detect for PCBs and Chlordane, indicating that the current procedures did not produce detectable spikes of these contaminates of concern. There were detections of copper, lead, and zinc in all three samples collected, indicating that there were some metals introduced to the samples during the collection process.

The analysis to the September 26, 2014 follow up to the initial blank testing returned some detection for copper and zinc for both the dry and rinsed filter material (Table 9). However, the copper detections in the filter were less than 2 percent of the TMDL target and less than 0.3 percent of the lowest concentration of copper measured in the March 2013 storm-borne sediment samples. In addition, the zinc detections in the filter were less than 3 percent of the TMDL target and less than 0.5 percent if the lowest concentration of zinc measured in the March 2013 storm-borne sediment samples.

There were a few aspects of the collection procedure that could have impacted the representativeness of the samples:

- The sample collection time took approximately 1.5 to 2 hours per sample per filter; typical storm-borne sediment sample takes approximately 15 to 30 minutes.

- Filters were not pre-rinsed and any contaminates would have been kept on the filter rather than washed off with the first flush.
- The presence of metals in the air (aerial deposition) could have resulted in the detection of copper, lead, and zinc in the air blank
- The components of the pump itself could have contributed to the detection of copper, lead, and zinc in the pump blank

The results were discussed with the filter manufacturer to identify if there are any parts of the manufacturing process that could introduce metals into the filter. The manufacturer noted the process is designed to be clean because a majority of their filter products are used by consumers that have high purity operations and great care is taken to minimize potential contamination of their products. The likely sources are environmental deposition from the handling and storage of the filters. It should also be noted that the rinse with deionized water reduced the concentration of metals detected on the filters.

6. Analytical Methods Review

This section presents a discussion of the analytical methods available for the TMDL constituents that include copper, lead, zinc, Chlordane, and Total PCBs. The discussion will also include ancillary constituents, such as percent total solids and total organic compounds, that are used to aid the interpretation of the TMDL constituents. For this discussion, the approach for the Chlordane, DDTs, and Total PCBs analysis will be identified.

The ideal methods would achieve method detection limits (MDLs) that are less than the TMDL numeric targets.

6.1 TMDL Targets / Requirements

The 2005 TMDL and the 2009 CMP listed numeric targets for the TMDL constituents. The Regional Water Quality Control Board (RWQCB) initiated a TMDL reconsideration and documented the findings in the Reconsideration of the Total Maximum Daily Load for Toxic Pollutants in Marina Del Rey Harbor, which proposed revised numeric targets. The revised TMDL has been adopted by the RWQCB on February 6, 2014, and the State Water Resources Control Board (SWRCB) on September 9, 2014, but has yet to be approved by the Office of Administrative Law and the Environmental Protection Agency. The original and proposed numeric targets for sediment are presented in Table 10. These numeric targets were also the basis of the loading capacity and waste load allocations presented in the original and revised TMDL.

For the review of analytical methods, the lower concentration of the TMDL numeric targets and the proposed numeric targets were used. This was a conservative selection and was based on the assumption that the proposed numeric targets will be accepted for the next iteration of the TMDL.

Table 10 Summary of TMDL Constituents and Numeric Targets for Sediment

Constituent	2005 TMDL Numeric Target	Proposed Numeric Target
Copper, mg/kg	34	34
Lead, mg/kg	46.7	46.7
Zinc, mg/kg	150	150
Chlordane[1], µg/kg	0.5	0.5
Total PCBs[2], µg/kg	22.7	3.2
4,4'-DDE, µg/kg	N/A	2.2
Total DDT[3], µg/kg	N/A	1.58

Notes:
1 –TMDL does not specify which form of Chlordane should reported
2 –TMDL does not specify which form of PCBs should reported
3 – Proposed TMDL does not specify which chemical compounds comprise Total DDT, but lists Total DDT as the sum of DDD+DDE+DDT
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
N/A – not applicable

6.2 Review of Analytical Methods

The TMDL requires analysis of the storm-borne sediment for concentrations of copper, lead, zinc, Chlordane, and Total PCBs. During the TMDL reopener, Total DDTs and p,p'-DDE were added to the list of constituents that require monitoring in the storm-borne sediments. For this summary report, the preferred methods were both cost effective and reported the TMDL compounds at MDLs less than the TMDL numeric targets.

Storm-borne sediment samples were analyzed for total solids and total organic carbon (TOC) content. The results of the total solids test were used to report the concentrations of the TMDL compounds on a dry-weight basis, which is consistent with the basis of the TMDL numeric targets. Without a conversion to the dry-weight basis, the reported concentrations were biased by the amount of water contained in the sample. The TOC concentration is a typical constituent used to characterize sediments and is related to the distribution and partitioning of certain chemical compounds. Although some sediment constituents and sediment benchmarks are presented on an organic carbon basis, the TOC was not used to adjust any of the analytical results or TMDL numeric targets of the TMDL and this report.

The information available indicated that some of the existing CMP methods for Chlordane (EPA 8081) and PCBs (EPA 8082) are likely insufficient to use moving forward with storm-borne sediment analysis. These methods are unlikely to achieve detection levels below the TMDL Target, and any non-detects would not address the question of contribution to harbor sediment exceedances. A more detailed discussion can be found in Sections 6.2.3 and 6.2.4.

6.2.1 Preservation and Holding Time

All samples were frozen at approximately -20 degrees Celsius (+/- 2 degrees Celsius) after a portion of each sample were analyzed for percent total solids, and stored until the end of the storm season. At the conclusion of the storm season, the samples were thawed and prepared for compositing. Samples can be frozen and stored provided they are analyzed within 12 months.

6.2.2 Analytical Method for Metals – EPA 6010

For the Marina del Rey Harbor Toxic Pollutants TMDL, sediment samples collected during the 2012 to 2013 storm season were analyzed by EPA Method 6010 for concentrations of the metals, copper, lead and zinc. The results from this method have been reported with RLs and MDLs less than the numeric target. The method details for metals are summarized in Table 11.

Table 11 Summary of Analytical Methods for Metals

TMDL Compound	Method	List Price[1]	Sample Amount As-is[2] Basis (grams)	Reporting Limit	Method Detection Limit	TMDL Numeric Target	Units
Copper	EPA 6010	$45	2	0.5	0.135	34	Ppm mg/kg
Lead				0.5	0.132	46.7	ppm mg/kg
Zinc				1.0	0.178	150	ppm mg/kg

Notes:
1 – List price is presented for planning purposes based on a survey of one laboratory in February 2014
2 – As-is basis indicates the sample condition as-collected or as-delivered, with no adjustments for water content of the sample
ppm mg/kg – part per million, milligrams per kilogram

6.2.3 Analytical Methods for Chlordane and DDT – EPA 8270-SIM

Chlordane and DDT are discussed together in this section because they are both chlorinated pesticides, and the analytical methods for these compounds are generally similar. Although not required to be monitored under the current TMDL, DDT was added to the analytical methods review in anticipation of new monitoring requirements in the revised TMDL.

Chlordane is the name of a commercial product that contains a mixture of many compounds. Analytical results for chlordane may be presented as the results for individual chemical compounds of the mixture (usually only a few compounds since the mixture contained a large number of compounds), or reported as a concentration representing the entire mixture without specifying any specific chemical compound of the mixture (e.g., Technical Chlordane). The Chlordane results reported for the March 8, 2013, storm-borne sediment analysis was reported as the latter. However, this report recommends that future analysis of Chlordane be reported as the sum of the detected concentrations for cis- and trans-chlordane, cis- and trans-nonachlor, and oxychlordane. Reporting the results as specific chemical compounds will allow any follow up work to be directed at specific compound rather than a group or mixture. These five Chlordane related compounds are also used by other sediment investigations, which will allow an improved amount of comparability between the TMDL data and other sediment related projects. The method details for Chlordane are summarized in Table 12.

There are two isomers of DDT: 2,4'-DDT and 4,4'-DDT; together they are often labeled DDTs. Total DDTs is a term that usually includes the DDTs as well as the DDEs and the DDDs. There are two isomers of DDE (2,4'-DDE and 4,4'-DDE) and two isomers of DDD (2,4'-DDD and 4,4'-DDD). This report recommends that future analysis of Total DDT be reported as the sum of the detected concentrations of 2,4'-DDT, 4,4'-DDT, 2,4'-DDE, 4,4'-DDE, 2,4'-DDD, and 4,4'-DDD. The method details for DDTs, DDEs, and DDDs (Total DDT) are summarized in Table 12.

Table 12 Summary of Analytical Method for Chlordane and DDT

TMDL Compound	Method	List Price[1]	Sample Amount As-is[2] Basis (grams)	Reporting Limit	Method Detection Limit	TMDL Numeric Target	Units
cis-chlordane	EPA 8270-SIM	$165	20	0.2	0.067	0.5	ppb µg/kg
trans-chlordane				0.2	0.046	0.5	ppb µg/kg
cis-nonachlor				0.2	0.024	0.5	ppb µg/kg
trans-nonachlor				0.2	0.048	0.5	ppb µg/kg
oxychlordane				0.2	0.076	0.5	ppb µg/kg
2,4'-DDD (o,p'-DDD)				0.2	0.049	1.58	ppb µg/kg
4,4'-DDD (p,p'-DDD)				0.2	0.042	1.58	ppb µg/kg
2,4'-DDE (o,p'-DDE)				0.2	0.048	1.58	ppb µg/kg
4,4'-DDE (p,p'-DDE)				0.2	0.071	2.2	ppb µg/kg
2,4'-DDT (o,p'-DDT)				0.2	0.032	1.58	ppb µg/kg
4,4'-DDT (p,p'-DDT)				0.2	0.081	1.58	ppb µg/kg
cis-chlordane	EPA 8081	$140	20	1.0	0.32	0.5	ppb µg/kg
trans-chlordane				1.0	0.32	0.5	ppb µg/kg
cis-nonachlor				1.0	0.29	0.5	ppb µg/kg
trans-nonachlor				1.0	0.29	0.5	ppb µg/kg
oxychlordane				1.0	0.28	0.5	ppb µg/kg
2,4'-DDD (o,p'-DDD)				1.0	0.34	1.58	ppb µg/kg
4,4'-DDD (p,p'-DDD)				1.0	0.32	1.58	ppb µg/kg
2,4'-DDE (o,p'-DDE)				1.0	0.31	1.58	ppb µg/kg
4,4'-DDE (p,p'-DDE)				1.0	0.3	2.2	ppb µg/kg
2,4'-DDT (o,p'-DDT)				1.0	0.3	1.58	ppb µg/kg
4,4'-DDT (p,p'-DDT)				1.0	0.33	1.58	ppb µg/kg

Notes:
1 – List price is presented for planning purposes based on a survey of one laboratory in February 2014
2 – As-is basis indicates the sample condition as-collected or as-delivered, with no adjustments for water content of the sample
ppb µg/kg – part per billion, micrograms per kilogram

6.2.4 Analytical Method for Total PCBs – EPA 8270-SIM

Total PCBs is made up of 209 individual PCB compounds referred to as congeners—meaning members of the group. Analytical methods for total PCBs include test methods to measure for individual PCBs and for Aroclors, which is the name of the primary commercial product containing PCBs. Most of the historical PCBs data for Marina del Rey Harbor sediment is based on the Aroclor measurements (typically seven different Aroclors were reported representing seven different commercial Aroclor products containing various mixtures of individual PCBs). The total PCBs results reported from the March 8, 2013 sampling, storm-borne sediment analyses were reported as the sum of the detected concentrations of seven Aroclors. However, in anticipation of the revised requirements and the option for compliance using the Water Quality Control Plan for Enclosed Bays and Estuaries - Part 1 Sediment Quality Objectives (State Water Resources Control Board, August 2009), EPA 8270-SIM was reviewed as it can produce results in PCB congeners. It is recommended that future analysis of Total PCBs be reported as the sum of the detected concentrations for approximately 44 PCB congeners, including the PCB congeners identified in the *Water Quality Control Plan for Enclosed Bays and Estuaries - Part 1 Sediment Quality* (State Water Resources Control Board, August 2009), and in the *Southern California Bight Regional Marine Monitoring Program (Bight Program) – Quality Assurance Manual* (Southern California Coastal Water Research Project, June 2013). The method details for Total PCBs are summarized in Table 13.

Table 13 Summary of Analytical Method for PCB Congeners

TMDL Compound	Method	List Price[1]	Sample Amount As-is[2] Basis (grams)	Reporting Limit	Method Detection Limit	TMDL Numeric Target[3]	Units
PCB Congeners, (approx. 44)	EPA 8270-SIM	$300	20	0.50-1.0	0.06-0.2	22.7 / 3.2	ppb µg/kg
PCB Aroclor-1016	EPA 8082	$90	50	10	2.9	22.7 / 3.2	ppb µg/kg
PCB Aroclor-1221				10	2.6	22.7 / 3.2	ppb µg/kg
PCB Aroclor-1232				10	2.1	22.7 / 3.2	ppb µg/kg
PCB Aroclor-1242				10	2.5	22.7 / 3.2	ppb µg/kg
PCB Aroclor-1248				10	2.9	22.7 / 3.2	ppb µg/kg
PCB Aroclor-1254				10	2.4	22.7 / 3.2	ppb µg/kg
PCB Aroclor-1260				10	2.3	22.7 / 3.2	ppb µg/kg

Notes:
1 – List price is presented for planning purposes based on a survey of one laboratory in February 2014
2 – As-is basis indicates the sample condition as-collected or as-delivered, with no adjustments for water content of the sample
3 – First value shown is current the TMDL numeric target, second value shown is the revised value
ppb µg/kg – part per billion, micrograms per kilogram

6.2.5 Analytical Method for Total Solids and Total Organic Carbon

The total solids content of sediment samples has be measured by method SM 2540B (*Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, the American Water Works Association, and the Water Environment Federation). The RLs and MDLs from this method have been reported at appropriate levels for assessing the storm-borne sediment. The method details for total solids are summarized in Table 14.

The TOC of sediment samples has been measured by the EPA Method 9060A (*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)*, United States EPA). The RLs and MDLs from this method can be achieved at appropriate levels for assessing the storm-borne sediment. The method details for TOC are summarized in Table 14.

Table 14 Summary of Analytical Method

TMDL Compound	Method	List Price[1]	Sample Amount As-is[2] Basis (grams)	Reporting Limit	Method Detection Limit	TMDL Numeric Target	Units
Total Solids	SM 2540B	$15	10	0.1	0.1	N/A	percent
Total Organic Carbon	SM 9060A	$80	2	50	12	N/A	ppm mg/kg

Notes:
1 – List price is presented for planning purposes based on a survey of one laboratory in February 2014
2 – As-is basis indicates the sample condition as-collected or as-delivered, with no adjustments for water content of the sample
ppm mg/kg – part per million, millograms per kilogram
N/A – not applicable

7. Recommendations

This section outlines the recommended procedures for the Effectiveness Monitoring Phase based on the results of the Pilot Study. Some adjustments were implemented during the Pilot Study.

7.1 Collection Recommendations

It is recommended that a season be established for storm-borne sediment collection. From the data collected during the Pilot Study and the CMP implementation, a reasonable time period can be established from October 1 through April 15, as historically the majority of storm events occur in this time period. However, if the first qualifying storm is predicted to occur before October 1, efforts should be made to deploy the passive sediment collection devices to capture the first storm of the season, provided any needed modifications and preparations are completed. If a qualifying storm event is predicted after April 15, efforts should be made to capture this event if the compositing process has not begun on the stored samples. Another recommendation to consider is to only target storms of over 0.25 inches of rainfall in a 24-hour period. Storms smaller than this typically produce lower quality sediment samples, and transmit a minor fraction of the total suspended sediment load.

There was no definitive assessment to be made regarding the filter mesh size; as a result it is recommended to use the 1 um filter size to maximize capture of fines and the thicker construction results in a more durable filter to deploy. The collection of sample from the filters is straight-forward from the description above. The main recommendation is to allow a few hours for the retained water to complete filtering to provide an incremental increase to the sample total solids. It is not recommend that the filter ever be squeezed to remove water, since this forces the fines captured in the sediment through the filter and out with the filtrate water.

7.1.1 Sampling Sites

The following subsections include site-specific recommendations based on the observations during sampling at each location. In addition, recommendations are made regarding the implementation at additional sites that were not included in the Pilot Study

7.1.1.1 MdRU-C1

The MdRU-C1 installation the device performs well when there is sufficient flow and velocity to transport sediments in the storm flow. There is no current reason to discontinue use of the device as it functions and collects storm-borne sediments. It is recommended to replace the pressure transducer with a bubbler module to address issues with any debris build-up that may cover the pressure transducer. It will be important to continue keep track of and document events that may affect sampling inclusion in future reporting.

Figure 7-1. MdRU-C1 Site Layout

MdRU-C2

The proposed set up at MdRU-C2 is similar to the configuration utilized at site MdRU-C1. MdRU-C2 will be located inside an 18-inch storm drain lateral accessed through a catch basin near the intersection of Woodland Court and Abbot Kinney Boulevard within the City of Los Angeles (see Figure 7-2). A bubbler module will be used instead of a pressure transducer to measure flow. Fabrication and installation of sampling device at MdRU-C2 will be similar to MdRU-C1, and will include:

- Construction of passive sediment collection device including filter basket, debris grate and suspension harness.
- Installation of two 3/8-inch-diameter wedge anchors embedded three inches and attachment of 3/8-inch-diameter eye bolts to anchors using coupling nuts.
- Fabrication and fitting of tether cable to secure sampling device in catch basin lateral.

Figure 7-2. MdRU-C2 Site Layout

MdRU-C2 may encounter similar issues as MdRU-C1. It will be important to keep track of and document events that may affect sampling inclusion in future reporting.

7.1.1.2 MdR-3

MdR-3 will be located inside a storm drain near the intersection of Washington Blvd and Thatcher Avenue within the City of Los Angeles (see Figure 7-3). Fabrication and installation at MdR-3 will be similar to MdR-4, and will consist of designing, constructing, and securing a passive sediment collection device with anchoring bolts and suspension cables. The scope of work includes:

- Construction of passive sediment collection device including filter basket, filter bag, debris grate and securing/retrieving mechanism.
- Installation of suspension system for the passive sediment device
- Installation of system to allow for sampler adjustment and retrieval during or after storm events

The set up for MdR-3 will be similar to the configuration used at site MdR-4, with some modifications to address some of the differences between the site configurations. This location is accessed through a maintenance hole leaving minimal flexibility in the horizontal positioning of the device. The vertical placement of the device will need to be set at the initial deployment as the site logistics limit the ability for in-storm adjustments to be performed. The device set up will use the single device set up from the initial MdR-4 deployment to reduce snag potential on the device. Initial positioning of the device should be above the diversion berm at the site location to avoid the bed load.

Figure 7-3. MdR-3 Site Layout

7.1.1.3 MdR-4

The MdR-4 installation will be modified to allow for the position of the sampler to be adjusted independently in the vertical and horizontal directions. To address this issue, the control system should be modified to allow for horizontal and vertical position adjustments across the channel. This would be accomplished through the construction of a two-part device to control the horizontal position using traveler installed on the suspension cables to move the device back and forth across the channel and a separate cable system to adjust the vertical position and overcome the channel geometry limitations. This adjustment would address the range limitations from the single point adjustment and overcome the limitations from the cross-section of the storm drain. The ability to adjust the position of the device fully in both dimensions would better allow the sampler to adapt the position of the PSC during by-pass pumping and overflow conditions that occur based on the hydrologic response of a given storm. There is no current reason to discontinue use of the device as it functions and collects storm-borne sediments.

Figure 7-4. MdR-4 Site Layout

7.1.1.4 MdR-5

At MdR-5, both the Pressure Chamber and Flow-Through Baffle Box worked well at collecting sample mass overall, but they experienced sample quality issues when the TSS was low in the wet well during small storm events. The Flow-Through Baffle Box depended on gravity to process flow and reached its hydraulic rejection sooner than the Pressure Chamber, which would continue to process with the additional pressure provide by the pump. Both devices function but, in the interest of simplicity, the Pressure Chamber is the preferred alternative.

The occurrence of hydraulic rejection in the devices is unavoidable as the sediment collection restricts the capacity of the filter to process flow to a point where the head required to pass water through the filter is greater than the head produced by the pump. When this occurs, the filter should be replaced to continue collecting sample. It is not advisable to use a pump with a lower flow rate, as that approach would result in requiring more time to collect the same amount of sample.

Figure 7-5. MdR-5 Site Layout

The sampling program will be reviewed on a periodic basis and adjusted in response to changing conditions and operation of adjacent Los Angeles County Flood Control District (LACFCD) facilities.

7.2 Sample Handling Recommendations

Based on the results of the Pilot Study, the current procedure for sample handling, from placement in the jar in the field to the laboratory, are unchanged from the similar procedures used for the harbor sediment samples.

7.2.1 Sediment Removal

Before collecting the sample from the filters, allow a few hours for the retained water to complete filtering to provide an incremental increase to the sample total solids. Do not squeeze the filter to remove water, since this forces and fines captured in the sediment through the filter and out with the filtrate water.

7.2.2 Sample Preservation

It is recommended that the individual samples be frozen at approximately -20 degrees Celsius (+/- 2 degrees Celsius) upon delivery to the laboratory and stored until the established end of the storm season, which should occur less than one year after the first storm of the season. At the conclusion of the storm season the samples would be thawed and prepared for compositing.

7.2.3 Compositing

There are two possible options to take with compositing; the approach taken will largely depend on the length and intensity of the storm events, the speculated quality of the sediment, and the amount of sediment collected. It is important to note that 54 grams is the minimum sample required, however it is desirable to provide more sample to the lab to allow for the following items:

- High water content in collected samples
- Analysis of quality control samples
- Analysis of duplicates
- Less than 100% sample recovery (sediment stuck to sides of jars, etc.)
- Leftover sample for follow up / reanalysis

Option 1: If the storm season has been relatively mild and yielded smaller storms, combine the individual samples into one annual composite per site based on the following reasons:

- The smaller storms have proven challenging to capture enough sediment of sufficient quality for analysis as a single event; this is largely due to the short duration and low intensity of the storms, compounded by the low TSS of the stormwater discharge.
- Compositing a subset of the wet weather season once there is enough sediment for analysis may leave the remaining storms short of sample to analyze at the end of the year. This approach has the potential for over and under representing the annual load.
- The majority of the discharges appear to be concentrated in a smaller subset of storms.
- To ensure that the sample being analyzed is representative of the majority of discharges.

Option 2: If the storm season has been relatively wet and yielded several significant storms that allow for the samples to be clustered into groups, combine the individual samples by the designated groups per site. The groupings can provide a different level of evaluation by size of storm, which can be applied to Best Management Practices analysis[8].

The composite sample would be prepared with mass taken from each sample proportionally based on the discharge to the MdRH. For the purposes of this process, the samples would be composited on a flow weighted basis by each storm's contribution to the total storm season discharge. In the event that any of the flow data is corrupted or lost, the flow could be estimated using hydrologic equations (i.e., Modified Rational Method) or the total rainfall accumulation to develop the proportioning for sample compositing. If there is no flow into the harbor from a monitoring location for a particular storm, the sediment collection from that site/event would not be included for compositing. Once the proportions are determined, the equivalent wet mass from each stored sample will be combined to create a homogenized sample that would then be used to take aliquots for analysis. It is anticipated that one composite sample will be prepared per site, and that multiple sites will not be composited.

Once thawed and composited, pretreatment steps may be considered to reduce water prior to the start of the analytical method. A sample with low solids content may be pretreated at the laboratory to

8 Before proceeding with this approach the calculations for the sample compositing should be completed to verify that the sample produced will have sufficient mass to perform the required analysis and quality control samples as outlined in the CIMP and/or Sampling and Analysis Plan.

remove water by filtering, air drying, freeze-drying, or centrifugation. The filtering method would be impractical because the small particle size would rapidly clog the filter requiring multiple filter changes. The air-drying method involves spreading the sample out and waiting 1 to 5 days. The freeze-drying method requires many days using specialized equipment. The centrifugation method is recommended as the most reasonable option because it is quick (15 minutes) and usually efficient at separating solids from liquids. Sample specific characteristics such as the amount of settleable verses nonsettleable material and the amount of debris (e.g., twigs, etc.) may influence the performance of a pretreatment method. These methods may be best assessed in consultation with the laboratory chemists after the samples are collected and inspected.

The sample preparation for compositing should consist of the following steps to document sample masses and providing guidance to the lab for sample compositing:

- Sample Collection (During Sampling Event)
  - Record Sample Mass Collected As-Is
    - Measure Mass of Empty, Closed, Labeled Jar (grams)
    - Write on lid of jar (grams)
    - Measure Mass of Closed Jar with Storm-Borne Sediment Sample (grams)
  - Collect Field Notes & Photographs
  - Storm Information
    - Collect Rainfall, Flow, etc.
    - Request Discharge confirmation (MdR-4 and MdR-5) from LACFCD to determine that storm flows entered the harbor
- Sample Storage
  - Deliver sealed containers to lab for storage
  - Freeze at approximately -20 degrees Celsius (+ / - 2 degrees)
- Sample Compositing
  - Determine contribution by flow proportion from each storm
  - Identify limiting storm event (storm event requiring 100 percent of sediment sample)
  - Provide laboratory with list of sample IDs and mass required from each sample to be added to the composite sample
  - Laboratory thaws and weighs sample jars, and then performs sample compositing. A new chain of custody should be provided to document the new samples and the required analysis
  - Laboratory documents actual sediment mass taken from each sample and total mass of new composite sample from each site

The mass of the new composite sample would be used to determine the analytical approach using the recommendations provided in Section 7.3.

7.3 Analytical Recommendations

The recommended analytical methods are as follows:

Total Solids – SM 2540B
Total Organic Carbon – EPA 9060A
Metals (Copper, Lead, Zinc) – EPA 6010
Chlordane, DDT and PCBs – EPA 8270 SIM

Prior to proceeding with the analysis of the composite sample, it is recommended that the process be reviewed with the laboratory to ensure the sample is strictly utilized to meet the objectives of the analysis. This discussion should verify the amount of sample required for each analysis and how additional sample should be allocated to benefit the analysis. The purpose of this discussion is to ensure that there is an understanding of what work is being performed since there is no ability to go out and get an additional sample (i.e., the laboratory should not perform internal quality control sample without approval). Included in this discussion is the additional sample processing required if the composite sample had a low total solids concentration and if the sample total solids should be increased utilizing centrifugation.

Table 15

Summary of Analytical Method for PCB Congeners							
TMDL Compound	Method	List Price[1]	Sample Amount As-is[2] Basis (grams)	Reporting Limit	Method Detection Limit	TMDL Numeric Target	Units
Copper	EPA 6010	$45	2	0.5	0.135	34	Ppm mg/kg
Lead				0.5	0.132	46.7	Ppm mg/kg
Zinc				1.0	0.178	150	Ppm mg/kg
cis-chlordane	EPA 8270 SIM	$165	20	0.2	0.067	0.5	ppb µg/kg
trans-chlordane				0.2	0.046	0.5	ppb µg/kg
cis-nonachlor				0.2	0.024	0.5	ppb µg/kg
trans-nonachlor				0.2	0.048	0.5	ppb µg/kg
oxychlordane				0.2	0.076	0.5	ppb µg/kg
2,4'-DDD (o,p'-DDD)				0.2	0.049	1.58	ppb µg/kg
4,4'-DDD (p,p'-DDD)				0.2	0.042	1.58	ppb µg/kg
2,4'-DDE (o,p'-DDE)				0.2	0.048	1.58	ppb µg/kg
4,4'-DDE (p,p'-DDE)				0.2	0.071	2.2	ppb µg/kg
2,4'-DDT (o,p'-DDT)				0.2	0.032	1.58	ppb µg/kg
4,4'-DDT (p,p'-DDT)				0.2	0.081	1.58	ppb µg/kg
PCB Congeners, (approx. 44)	EPA 8270 SIM	$300	20	0.50-1.0	0.06-0.2	22.7 / 3.2[3]	ppb µg/kg
Total Solids	SM 2540B	$15	10	0.1	0.1	N/A	percent
Total Organic Carbon	EPA 9060A	$80	2	50	12	N/A	Ppm mg/kg

Notes:
1 – List price is presented for planning purposes based on a survey of one laboratory in February 2014
2 – As-is basis indicates the sample condition as-collected or as-delivered, with no adjustments for water content of the sample
3 – First value shown is the current TMDL numeric target, second value shown is the revised value
ppb µg/kg – part per billion, micrograms per kilogram
ppm mg/kg – part per million, millograms per kilogram
N/A – not applicable

7.4 Quality Control

Based on the results from the quality control samples during the pilot study, the recommendations for the control of potential of influences on the sampling procedures include:

- Rinse all equipment and filters with de-ionized water prior to deployment
- Regularly inspect equipment for signs of wear and oxidation
- Document pre- and post-storm equipment observations

The highest concentrations of metals were shown in the pump sample blank (Table 8). As part of the storm-borne sediment monitoring implementation, the pump materials should be checked for potential contamination sources and, if necessary, replaced with a pump with stainless (or equal) components to reduce the chance of contamination and increase durability of the equipment being used.

The filter blank should be collected placing an unused filter in a clean glass jar as described in Section 4.5.

Attachment A – As-Installed Drawings

MdRU-C-1 Conceptual Drawings

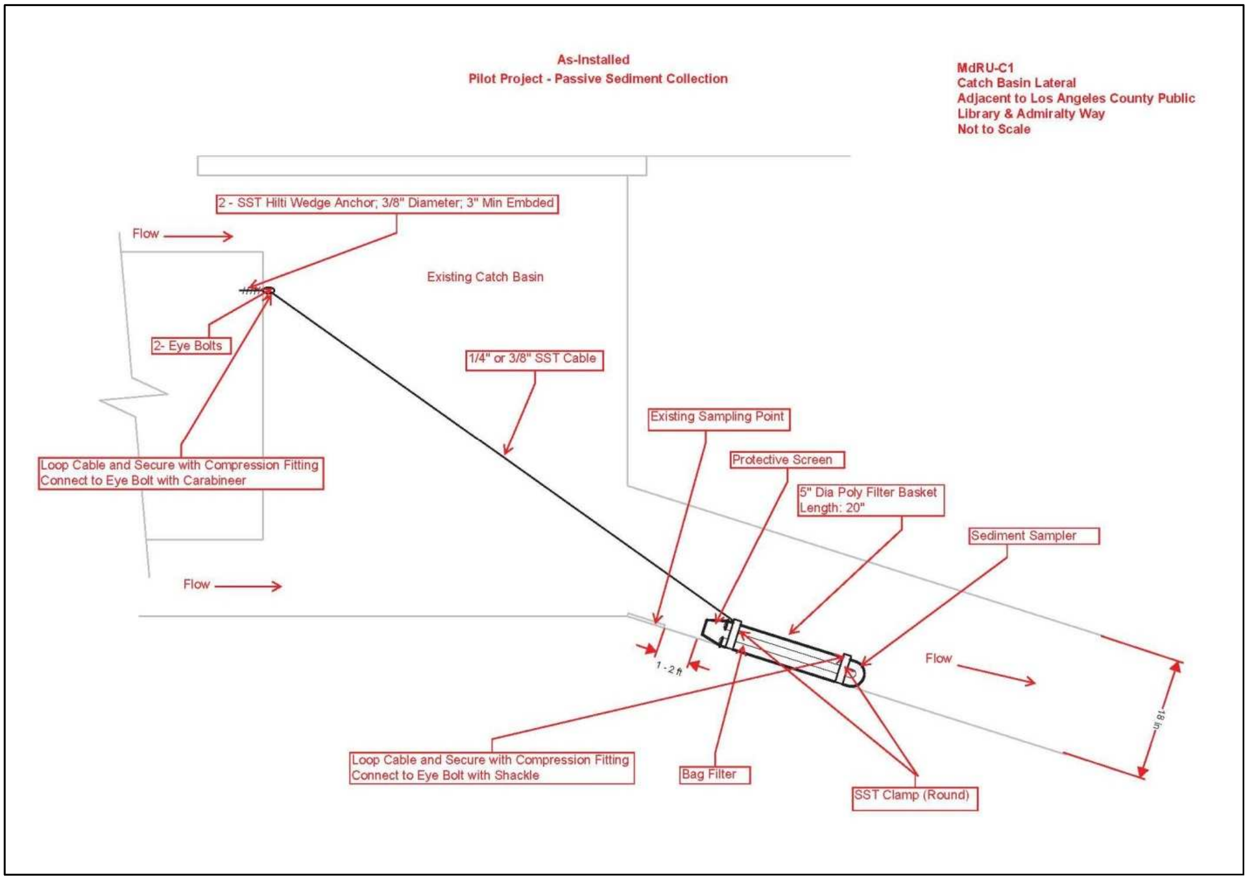


Figure 6 - Installation of storm-borne sediment sampling device installed at MdRUC-1 station and applicable to MdRUC-2

MdR-4 Conceptual Drawings

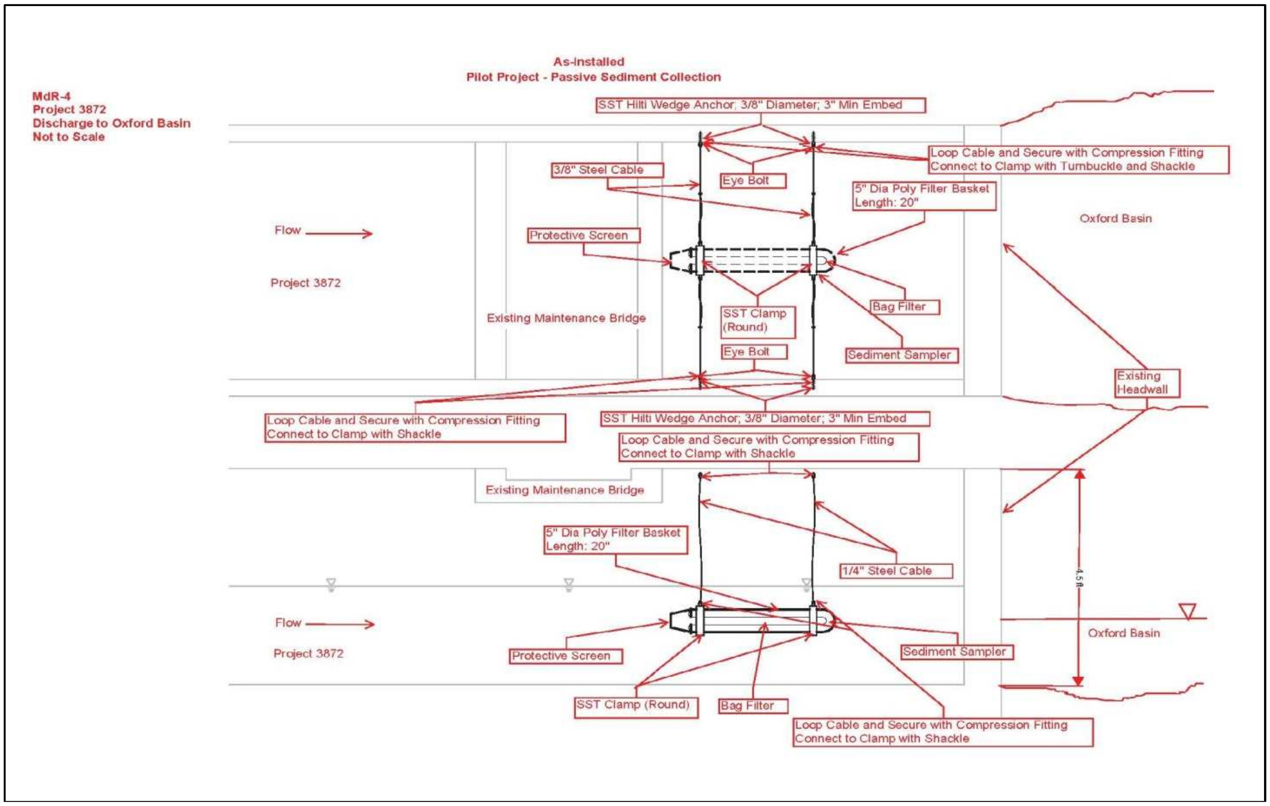


Figure 2 - Storm-borne sediment sampling device installed along a channel

MdR-5 Conceptual Drawings

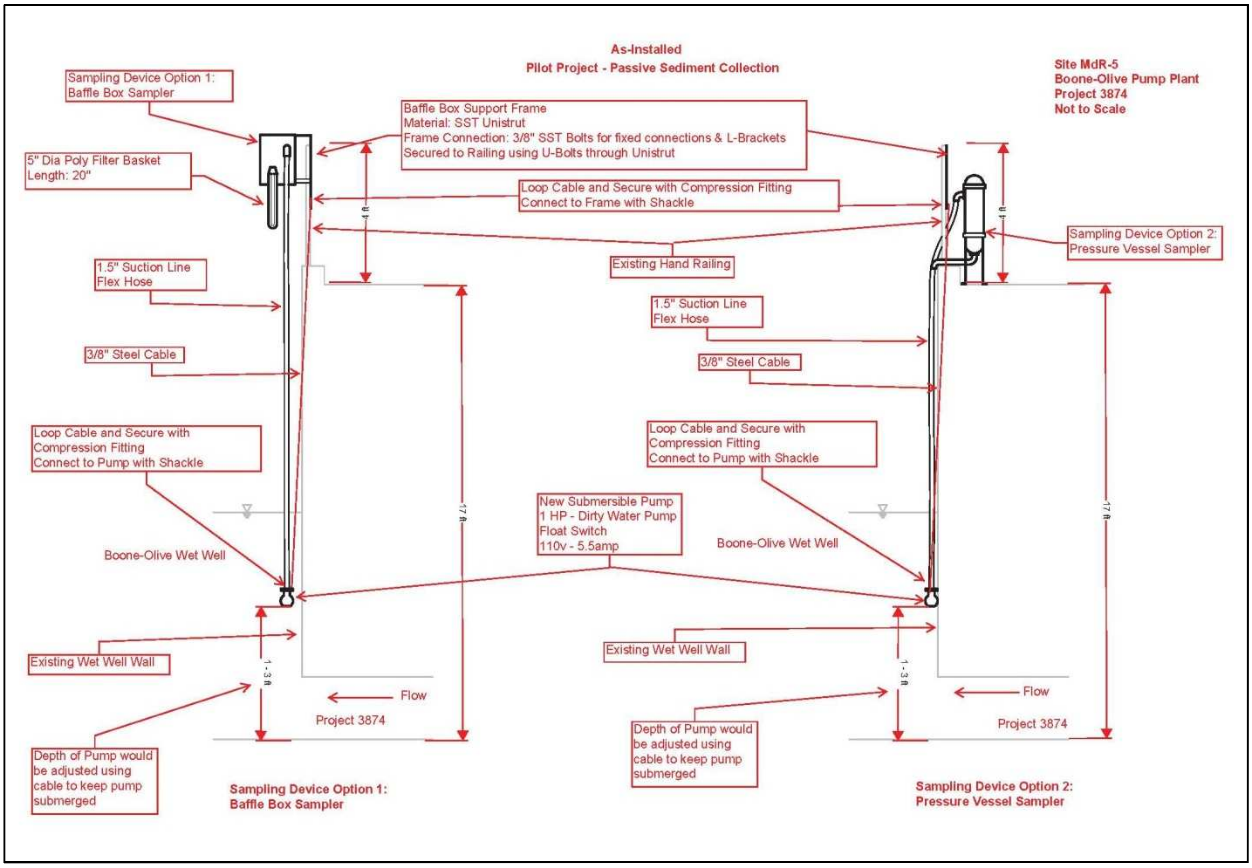


Figure 3 - Set-up of two different sampling devices for storm-borne sediment from a wet well using submersible pumps

MdR-5 Conceptual Drawings

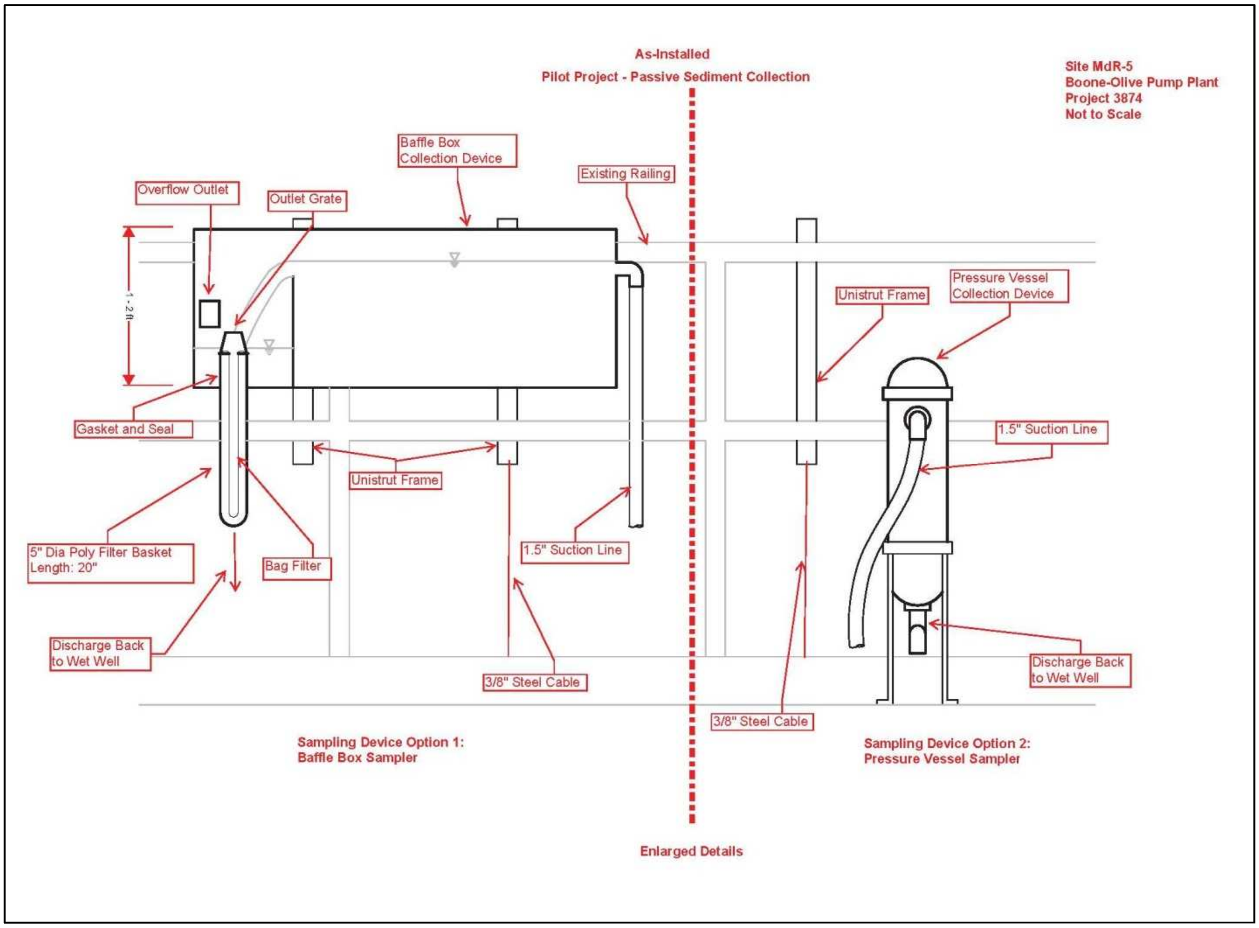
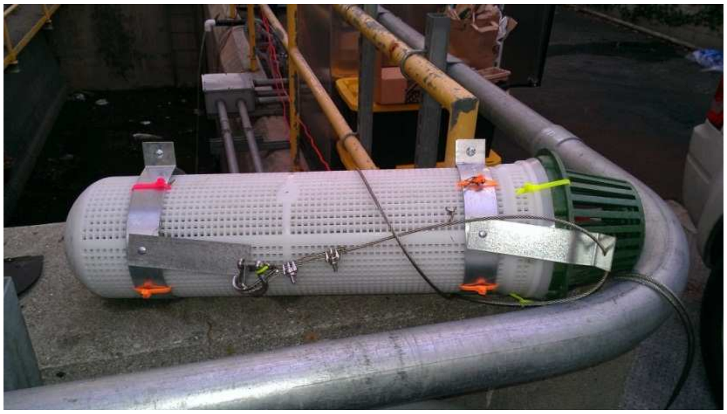


Figure 4 - Set-up of two different sampling devices for storm-borne sediment from a wet well using submersible pumps

Attachment B - Sampling Sites/Photo Log

MdRU-C1

Device Construction



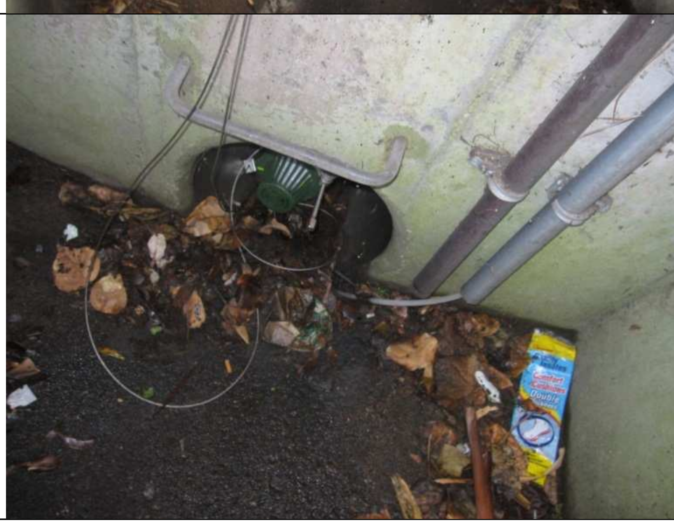
The device is set up by placing the filter inside of the rigid plastic cylinder. This cylinder reduces the chance of the filter tearing or being damaged during the event. The filter is protected from large debris by the green cap secured over the end.

The bridle for the device is constructed out of two metals rings secured around the device by which the tether cables are secured to the device.

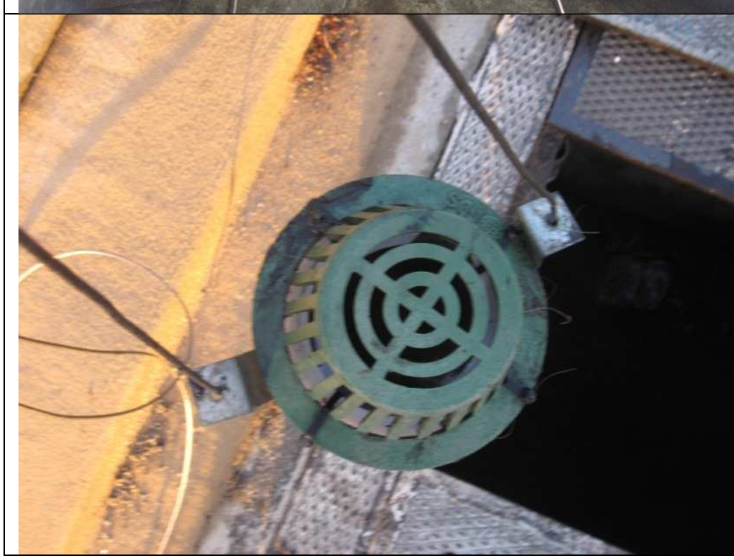
Installation / Deployment

The mounting points are two wedge anchors installed into the face of the catch basin wall with eye bolts to allow for the equipment to be secured and retrieved without entering the catch basin.

Mounting points were installed inset from the edges of the inlet to reduce the potential for debris entering the catch basin to snag on the tether cables.



For deployment the device is connected to the mounting points via the tether cables and slides into the catch basin lateral where the sediment sample is collected.

MdRU-C1	
	The deployment of the sample device involves pushing it into the catch basin lateral beyond the existing stormwater sampling equipment to reduce the chance of the sampling device snagging on the installed equipment.
Equipment Retrieval	
	For retrieval the device is retrieved using the tethers to pull the device out of the catch basin lateral. In six events the device was removed without issue or need to enter the catch basin for retrieval.
	The device typically looks like this upon removal with minimal debris build up on the device.

MdRU-C1	
	Excessive buildup of leafy debris occurred during one event, however since the catch basin was not entered some of this debris may have snagged on the device during removal.
	The filter is removed from the device so that the filter can be cut open for sediment collection. Some loose organic debris is noted on the device and is gently removed prior to cutting open the filter.
Sample Collection	
	This is a typical filter from a storm that would produce sufficient intensity to submerge the filter. The filter is coated in sediment and accumulated small organic debris. The loose organic debris was removed. However, some organic debris was too difficult to remove from the collected sediment and was included with the sample delivered to the lab.

MdRU-C1	
	This is a typical filter from a to moderate size storm, but without sufficient intensity to fully submerge the filter. Without full submergence, sediment only accumulated along the bottom of the filter where there was a flow.
	This is a typical filter from a smaller storm in terms of rainfall accumulation and intensity that produces low flow rates within the catch basin and limited opportunity to deposit sediments in the device. Some sediment was collected in the filter to stain the filter; however, there was insufficient sediment to collect a sample.
	This is what a typical filter that was fully coated with sediments would look like after the loose debris is removed and the sediment is collected. There is staining on the filter from the smaller particles embedded in the filter.

<table>
<tr><th colspan="2">MdRU-C1</th></tr>
<tr><td colspan="2">Sample</td></tr>
<tr><td>
</td><td>Sample collected from storm event that produced a large sediment mass</td></tr>
<tr><td>
</td><td>Sample collected from storm event that produced a small sediment mass.</td></tr>
</table>

MdR-4	
Device Construction	
	Original device used for the first four storms. The device is set up by placing the filter inside of the rigid plastic cylinder. This cylinder reduces the chance of the filter tearing or being damaged during the event. The filter is protected from large debris by the green cap secured over the end. The bridle for the device is constructed out of two metals rings secured around the device by which the tether cables are secured to the device.
	Modified sampling device for final two storms for testing. Used to test the performance of different filter sizes. The bridle for the device is constructed out of metal frame and rings secured around the device by which the tether cables are secured to the device.
	The device consists of placing the filter inside of the plastic filter holder cylinder to reduce the chance of the filter tearing during the event. The filter is protected from large debris by the green cap secured over the end.

<table>
<tr><th colspan="2">MdR-4</th></tr>
<tr><td>Installation / Deployment</td><td></td></tr>
<tr><td></td><td>There is a suspension cable system installed across the width of the channel. The device is deployed by attaching the device to the tether cables on suspension cable system.

The device is lowered into the basin and the position can be adjusted using the ropes secured to the device.</td></tr>
<tr><td></td><td>There is a suspension cable system installed across the width of the channel. The device is deployed by attaching the device to the tether cables on suspension cable system.

The device is lowered into the basin and the position can be adjusted using the ropes secured to the device.</td></tr>
<tr><td></td><td>Typical view of the sampling device when submerged.</td></tr>
</table>

<table>
<tr><th colspan="2">MdR-4</th></tr>
<tr><td colspan="2">Equipment Retrieval</td></tr>
<tr><td></td><td>The device typically looks like this upon removal with minimal debris build up on the device. There is evidence of some external sediment build up. For the purposes of the pilot study, this build up was not collected.</td></tr>
<tr><td></td><td>The device typically looks like this upon removal with minimal debris build up on the device.</td></tr>
</table>

<table>
<tr><th colspan="2">MdR-4</th></tr>
<tr><td></td><td>The device typically looks like this upon removal with minimal debris build up on the device. There is evidence of some external sediment build up. For the purposes of the pilot study, this build up was not collected.

On event there was a plastic bag snagged on the tethers, but it was easily removed.</td></tr>
<tr><td colspan="2">Sample Collection</td></tr>
<tr><td></td><td>This is a typical filter from a larger storm that produced sufficient intensity to mobilize sediments within the channel instead of settling within the storm drain. The filter is coated in sediment and accumulated small organic debris.

The loose organic debris was occasionally collected and removed. However, some organic debris was too difficult to remove from the collected sediment and was included with the sample delivered to the lab.</td></tr>
</table>

MdR-4	
	This is a typical filter from a small storm with a low intensity that allowed for the larger particles to settle out limiting the available suspended sediment for collection. Some sediment was collected in the filter to stain the filter; however, there was insufficient sediment to collect a sample.
	This is what a typical filter that was fully coated with sediments would look like after sediment collection. There is staining on the filter from the smaller particles embedded in the filter.

<table>
<tr><th colspan="2">MdR-4</th></tr>
<tr><td colspan="2">Sample</td></tr>
<tr><td></td><td>Sample collected from a storm event that produced a small sediment mass.</td></tr>
<tr><td></td><td>Sample collected from a storm event that produced a large sediment mass</td></tr>
</table>

MdR-5	
	Two different configurations were designed and tested to sample storm-borne sediment from a wet well.
	Submersible Pumps were used to sample stormwater from a wet well into each of the devices.

<table>
<tr><th colspan="2">MdR-5 Flow-Through Device</th></tr>
<tr><td colspan="2">Device Construction</td></tr>
<tr><td></td><td>The device is constructed out of a bucket with an inlet and outlet to allow water from the wet well to be pumped up and processed through the filter.</td></tr>
<tr><td></td><td>The fresh filter is placed inside the device to allow the water to drain and capture the sediment samples. For the first three events only one filter was used, for the last three events, the filters were replaced once the processing rate and slowed significantly.</td></tr>
</table>

<table>
<tr><th colspan="2">MdR-5 Flow-Through Device</th></tr>
<tr><td colspan="2">Installation / Deployment</td></tr>
<tr><td></td><td>The sample collection system is a bucket with a filter inside. This version is fabricated out of off the shelf components and is attached to a stainless steel pump that is place in the wet well. The pump operates at approximately 5 gpm, depending on the depth of the wet well and the sediment saturation of the filter. Once the pump rate exceeds the filtration rate the excess flow overflows back to the wet well</td></tr>
<tr><td></td><td>Top view of flow-through device while stormwater from the Boone-Olive Pump Station is processed through the filter.</td></tr>
</table>

MdR-5 Flow-Through Device	
Equipment Retrieval	
	Typical filter at the conclusion of the sampling event
	Typical inside of the filter after removal from the sampling device prior to sediment collection.

MdR-5 Flow-Through Device	
Sample Collection	
	This is a typical filter from a larger storm that produced sufficient intensity to mobilize sediments within the channel instead of settling within the storm drain. The filter is coated in sediment and accumulated small organic debris. The loose organic debris was occasionally collected and removed. However, some organic debris was too difficult to remove from the collected sediment and was included with the sample delivered to the lab.
	This is a typical filter from a small storm with a low intensity that allowed for the larger particles to settle out limiting the available suspended sediment for collection, however for these events the total solids concentration tended to be low.
	This is what a typical filter that was fully coated with sediments would look like after sediment collection. There is staining on the filter from the smaller particles embedded in the filter.

<table>
<tr><th colspan="2">MdR-5 Flow-Through Device</th></tr>
<tr><td colspan="2">Sample</td></tr>
<tr><td></td><td>Sample collected from a storm event that produced a small sediment mass.</td></tr>
<tr><td>
</td><td>Sample collected from a storm event that produced a large sediment mass</td></tr>
</table>

<table>
<tr><th colspan="2">MdR-5 Pressure Chamber</th></tr>
<tr><td colspan="2">Device Construction/ Installation / Deployment</td></tr>
<tr><td></td><td>The sample collection system is a pressure cylinder with a filter inside. This version is typically used as a bio-diesel filter that is attached to a stainless steel pump that is place in the wet well. The pump operates at approximately 5 gpm, depending on the depth of the wet well and the sediment saturation of the filter.</td></tr>
<tr><td></td><td>The filter is installed in the top of the device and then sealed inside. The pressure from the pump processes the water through the filter.</td></tr>
</table>

<table>
<tr><th colspan="2">MdR-5 Pressure Chamber</th></tr>
<tr><td colspan="2">Equipment Retrieval</td></tr>
<tr><td></td><td>The device is allowed to drain, then opened to remove the filter for cleaning. Various scenarios were tried to allow for the filter to rest and the remaining water to drain.</td></tr>
<tr><td colspan="2">Sample Collection</td></tr>
<tr><td></td><td>This is a typical filter from a larger storm that produced sufficient intensity to mobilize sediments within the channel instead of settling within the storm drain. The filter is coated in sediment and accumulated small organic debris.

The loose organic debris was occasionally collected and removed. However, some organic debris was too difficult to remove from the collected sediment and was included with the sample delivered to the lab.</td></tr>
<tr><td></td><td>This is a typical filter from a small storm with a low intensity that allowed for the larger particles to settle out limiting the available suspended sediment for collection, however for these events the total solids concentration tended to be low.

The loose organic debris was occasionally collected and removed. However, some organic debris was too difficult to remove from the collected sediment and was included with the sample delivered to the lab.</td></tr>
</table>

<table>
<tr><th colspan="2">MdR-5 Pressure Chamber</th></tr>
<tr><td></td><td>This is what a typical filter that was fully coated with sediments would look like, however for some events the total solids concentration tended to be low.</td></tr>
</table>

MdR-5 Pressure Chamber	
Sample	
	Sample collected from a storm event that produced a small sediment mass.
	Sample collected from a storm event that produced a large sediment mass

Quality Control Sample Collection	
Filter Blank	
	The unused filter was placed inside of a clean glass jar and filled with de-ionized water. The filter was allowed to soak for a 24-hour period before the blank sample was collected
	The jar was kept inside of one of the autosamplers to protect it during the soaking period.
	Once the soaking period had completed the filter was opened and the sample water was skimmed off of the surface of the filter and collected.

Quality Control Sample Collection	
Air Blank	
	The PSC was suspended at site MdR-4 for 24-hours exposed to the surrounding environment. At the conclusion of the 24-hour period the device was retrieved and transported to Boone-Olive Pump Station for processing.
	The filter was removed from the sampling device and the sample water was skimmed off of the surface of the filter and collected.

Quality Control Sample Collection	
Pump Blank	
	The pumped system was set up to run as a closed system recycling approximately 10 -15 gallons of deionized water through the sample filter. This process ran for 24-hours before the blank sample was collected.
	Once the soaking period had completed the filter was opened and the sample water was skimmed off of the surface of the filter and collected. Note there was some accumulated debris that came loose from the system. This debris was removed by hand similar to what is done with debris accumulated during regular samplings.

Attachment C – Storm-borne Sediment Quality Control Guidelines

TMDL Storm-borne Sediment Pilot Study

Field QC sample collection plan utilized to gather additional Information to develop recommendations for quality control procedures for future implementation.

QC Sample	Purpose / Procedure
EQB-1 (Submersible Pump)	• Assess whether TMDL chemicals are present after clean, decontaminated equipment is used to collect a sample. • Prepare pressure chamber in the normal manner and insert filter. Place pump collection and discharge points in supply of deionized water. This will recirculate water. Operate pump running water through pressure chamber for 24 hours. Potential contaminant sources are the pump internal workings, the tubing, and the filter material. Pump rate is set at five gallons per minute. After 24 hours remove filter and prepare for Sample Collection Procedure (described below).
EQB-2 (Filter)	• Assess whether TMDL chemicals are present after filter is exposed to deionized water for a period similar to the sampling period. Assess whether filter material is a potential source. • Place a clean filter in a glass container (dark, 3 liter approximate). Leave for 24 hours. Potential contaminant source is the filter material. After 24 hours remove filter and prepare for Sample Collection Procedure (described below).
EQB-3 (Air)	• Assess whether TMDL chemicals are present after filter is exposed to air for a period similar to the sampling period. Assess whether filter material is a potential source. • Place a clean filter in a filter basket fitted with a debris grate. Deploy at the MdR-4 location and leave for 24 hours. Potential contaminant sources are the filter material and incidental airborne materials. After 24 hours remove filter and prepare for Sample Collection Procedure (described below).
Sample Collection/Processing Procedure	• Prepare clean working surface and clean tools for cutting the filter and for skimming the filter surface to collect sample material. • Place filter on clean working surface. • Cut the filter to remove the top ring and the bottom seam. • Cut the filter along its length and open to expose the internal surface. • Scrape gently or skim the accumulated deionized water on the filter surface into a sample container. • Add deionized water to saturate filter surface and repeat the skim step. Continue until sufficient sample volume is obtained. • Total target volume of collected water is 1.5 liters in single container for the following analysis: o DDTs, Chlordane and PCBs (EPA 608.LL, 1 liter) o Total Cu-Pb-Zn (EPA 200.7, 250 milliliters).

QC Sample	Purpose / Procedure
Follow Up QC Sampling	
Filter (dry)	• Assess whether metals are present in a clean filter once is removed from storage. • Further assess whether filter material is a potential source for metals.
Filter (rinsed)	• Assess whether metals are present in a clean filter once is removed from storage. • Filter was rinsed with deionized water prior to sample collection. • Further assess whether filter material is a potential source for metals.
Sample Collection/Processing Procedure	• Prepare clean working surface and clean tools for cutting the filter to collect sample material. • The filter is removed from the storage bag, cut up and pieces placed in an 8 oz. sample jar. • Filter is collected in single container for the following analysis: o Total Cu-Pb-Zn (EPA 6010, 8 oz. jar).

Attachment D – Parts List

Passive Sediment Device – MdRH Toxic Pollutants
TMDL CMP Pilot Study Materials

Inventory – MdRU-C1 (at Catch Basin next to County of L.A Public Library)

Item No.	Description	Distributor
1	Protective Screen (debris grate)	Home Depot
2	Filter basket (20-inches long & 5-in diameter).	Midwest Filter Company
3	Filter Bag (1, 5, 10 µm)	Midwest Filter Company
4	¼-in Tether cable with 3/8-in eye bolts	Home Depot
5	Two Round Clamps	Home Depot
6	Compression Fittings	Home Depot

Inventory – MdR-4 (East of Oxford Basin)

Item No.	Description	Distributor
1	Two (2) - 3/8”Steel Cable	Home Depot
2	Two (2) – ¼” Steel Cable	Home Depot
3	Two (2) SST Round Clamps	Home Depot
4	Protective Screen	Home Depot
5	5” diameter Poly Filter Basket Length 20”.	Midwest Filter Company
6	Filter Bag (1, 5, 10 µm)	Midwest Filter Company
7	Turnbuckle	Home Depot
8	Shackle	Home Depot
9	Compression Fittings	Home Depot

Inventory – MdR-5 (Boone-Olive Pump Station) – Pressure Chamber

Item No.	Description	Distributor
1	5” diameter Poly Filter Basket Length 20”.	Midwest Filter Company
2	Filter Bag (1, 5, 10 µm)	Midwest Filter Company
3	Pressure Vessel (Convertible Filter Housing) with inlet and outlet piping	Midwest Filter Company
4	1.5-in suction line flex hose	Home Depot
5	3/8-in steel cable	Home Depot
6	Compression Fitting	Home Depot
7	Shackle	Home Depot
8	1 HP Submersible Pump (2 gpm)	Harbor Freight & Tools
9	Cable ties	Home Depot

Inventory – MdR-5 (Boone-Olive Pump Station) – Flow-Through Device

Item No.	Description	Distributor
1	Baffle box with inlet and outlet	Home Depot
2	Filter Bag (1, 5, 10 µm)	Midwest Filter Company
3	5” diameter Poly Filter Basket Length 20”.	Midwest Filter Company
4	Outlet Grate	Home Depot
5	3/8” Steel Cable	Home Depot
6	1.5-in Suction Line	Home Depot
7	1 HP Submersible Pump (2gpm)	Home Depot
8	Four (4) SST Unistrut	Home Depot
9	U-Bolts	Home Depot
10	3/8” SST Bolts	Home Depot
11	Four (4) L-Brackets	Home Depot
12	Cable ties	Home Depot

Attachment E – Rain Gauge Data

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Asheville, North Carolina 28801

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QUALITY CONTROLLED Local Climatological Data:

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
Data Version: VER3

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY PRECIPITATION TABLE
LOS ANGELES INTERNATIONAL AIRPORT
(23174)
LOS ANGELES, CA
(02/2014)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

	A.M. HOUR(L.S.T) ENDING AT													P.M. HOUR(L.S.T) ENDING AT												
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QUALITY CONTROLLED Local Climatological Data:

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
Data Version: VER3

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY PRECIPITATION TABLE
LOS ANGELES INTERNATIONAL AIRPORT
(23174)
LOS ANGELES, CA
(03/2014)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

	A.M. HOUR(L.S.T) ENDING AT													P.M. HOUR(L.S.T) ENDING AT												
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U.S. Department of Commerce
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QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY PRECIPITATION TABLE
LOS ANGELES INTERNATIONAL AIRPORT (23174)
LOS ANGELES, CA
(04/2014)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

	A.M. HOUR(L.S.T) ENDING AT													P.M. HOUR(L.S.T) ENDING AT												
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QUALITY CONTROLLED Local Climatological Data:

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National Oceanic & Atmospheric Administration
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QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY PRECIPITATION TABLE
SANTA MONICA MUNI AIRPORT (93197)
SANTA MONICA, CA
(03/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

	A.M. HOUR(L.S.T) ENDING AT													P.M. HOUR(L.S.T) ENDING AT												
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QUALITY CONTROLLED Local Climatological Data:

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
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QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY PRECIPITATION TABLE
SANTA MONICA MUNI AIRPORT (93197)
SANTA MONICA, CA
(04/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

	A.M. HOUR(L.S.T) ENDING AT													P.M. HOUR(L.S.T) ENDING AT												
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QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY PRECIPITATION TABLE
SANTA MONICA MUNI AIRPORT (93197)
SANTA MONICA, CA
(05/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

	A.M. HOUR(L.S.T) ENDING AT													P.M. HOUR(L.S.T) ENDING AT												
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National Oceanic & Atmospheric Administration
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QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY PRECIPITATION TABLE
SANTA MONICA MUNI AIRPORT (93197)
SANTA MONICA, CA
(06/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

	A.M. HOUR(L.S.T) ENDING AT													P.M. HOUR(L.S.T) ENDING AT												
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QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY PRECIPITATION TABLE
SANTA MONICA MUNI AIRPORT (93197)
SANTA MONICA, CA
(07/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

	A.M. HOUR(L.S.T) ENDING AT													P.M. HOUR(L.S.T) ENDING AT												
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QUALITY CONTROLLED Local Climatological Data:

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
Data Version: VER2

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY PRECIPITATION TABLE
SANTA MONICA MUNI AIRPORT (93197)
SANTA MONICA, CA
(08/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

	A.M. HOUR(L.S.T) ENDING AT													P.M. HOUR(L.S.T) ENDING AT												
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U.S. Department of Commerce
National Oceanic & Atmospheric Administration
Data Version: VER2

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY PRECIPITATION TABLE
SANTA MONICA MUNI AIRPORT (93197)
SANTA MONICA, CA
(09/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

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U.S. Department of Commerce
National Oceanic & Atmospheric Administration
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QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY PRECIPITATION TABLE
SANTA MONICA MUNI AIRPORT (93197)
SANTA MONICA, CA
(10/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

	A.M. HOUR(L.S.T) ENDING AT													P.M. HOUR(L.S.T) ENDING AT												
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U.S. Department of Commerce
National Oceanic & Atmospheric Administration
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QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA
(final)
HOURLY PRECIPITATION TABLE
SANTA MONICA MUNI AIRPORT (93197)
SANTA MONICA, CA
(11/2013)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

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A.M. HOUR(L.S.T) ENDING AT

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APPENDIX I
Data Analysis used to Support Toxics TMDL Monitoring Program Changes

I.0 DATA ANALYSIS USED TO SUPPORT TOXICS TMDL MONITORING PROGRAM CHANGES

This appendix presents the data and data evaluations used to support the proposed monitoring program changes for the Toxics Total Maximum Daily Load (TMDL). The proposed changes are included in the main body of the Coordinated Integrated Monitoring Program (CIMP) for the Marina del Rey (MdR) Watershed. A summary of the monitoring requirements and proposed changes is presented in Table I-1. Justification and data analysis for each change follows the table, organized by matrix and contaminant (Harbor Water – Dissolved Copper, Harbor Water – Total Polychlorinated biphenyls [PCBs], and Sediment).

Table I-1. Summary of Toxics TMDL Monitoring

Toxics TMDL Monitoring Component	Pre-CIMP Monitoring	CIMP Monitoring
Monitoring Frequency		
Frequency of Toxics TMDL Storm Water Monitoring	During wet weather events, up to 24.	Up to 2 storms per month at the five existing monitoring station for a maximum of 14 storm events each year.
Frequency of Toxics TMDL Harbor Water Monitoring	Monthly dissolved copper and Total PCB (Aroclor) monitoring.	1. Dissolved Copper - no change to monitoring frequency (monthly). 2. Total PCBs - Analyze PCB congeners instead of Aroclors, using EPA Method 1668.
Frequency of Toxics TMDL Sediment Monitoring	Annual chemistry and toxicity monitoring.	No Change.
Frequency of Toxics TMDL Fish and Mussel Tissue Monitoring	Annual monitoring.	No change.
Monitoring Locations		
Toxics TMDL Monitoring Locations - Storm Water	Five locations within the watershed.	No change.
Toxics TMDL Monitoring Locations - Harbor Water	Dissolved copper monitored in each front and back basin and in the main channel between Basins D and E. PCB Aroclors monitored in each back basin and in the main channel between Basins D and E.	1. Dissolved Copper - Monthly rotation - station MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; the following month stations MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled. 2. Total PCBs - Follow the same monthly rotation schedule as described for dissolved copper.

I.1 Toxics TMDL Storm water Monitoring

Toxics TMDL storm water and storm-borne sediment outfall monitoring will occur during up to fifteen storms per wet weather season (October 1st through April 15th). Fifteen was selected as the maximum number of monitored storm events each wet weather season after a review of historic rainfall data from 1940-2014 (Table I-2). The maximum number of storm events (>0.1 inch with 72 hours of antecedent dry weather) observed in the wet weather months (October-April) during a given year in this time period was fifteen (occurred once during that time period).

Table I-2 Number of Storm Events 1940-2014

Month	Minimum	Maximum	Average
January	0	4*	1.45
February	0	3	1.34
March	0	3	1.53
April	0	3	0.91
October	0	3	0.66
November	0	3	1.15
December	0	4	1.53
Average Number of Storms per Year (October – April)			8.55
Maximum Number of Storms per Year (October – April)			15**
* Occurred during 1998 ** Occurred during 2010			

I.2 Toxics TMDL Dissolved Copper Harbor Water Data Analysis

Monthly monitoring of dissolved copper has been conducted in both the Front and Back Basins of the Harbor since 2010. Monitoring results have remained relatively consistent over time, and while they do vary somewhat between basins, it is possible to monitor a sub-set of basins each month and rotate the monitoring stations without losing important information regarding dissolved copper concentrations. Box whisker plots of the data collected between 2010 and 2013 are presented in Figure I-1, below. The median is shown, along with the range of the data and the 25th and 75th percentiles. The TMDL target of 4.8 micrograms per Liter (µg/L) is shown as a red line.

Further examination of the data was conducted to determine the intra-station variability, and therefore the necessity of continued monthly monitoring at every station (i.e., if the observed variability of dissolved copper concentrations at a station is low, it is not necessary to continue monitoring at the same frequency). Table I-4 includes all of dissolved copper samples analyzed between 2010 and 2013 at each of the monitoring locations, as well as summary statistics. Note that the coefficient of variation (standard deviation divided by the mean) for dissolved copper concentrations in the individual basins has ranged between 0.36 and 0.43. A coefficient of variation less than one is considered low for environmental data.

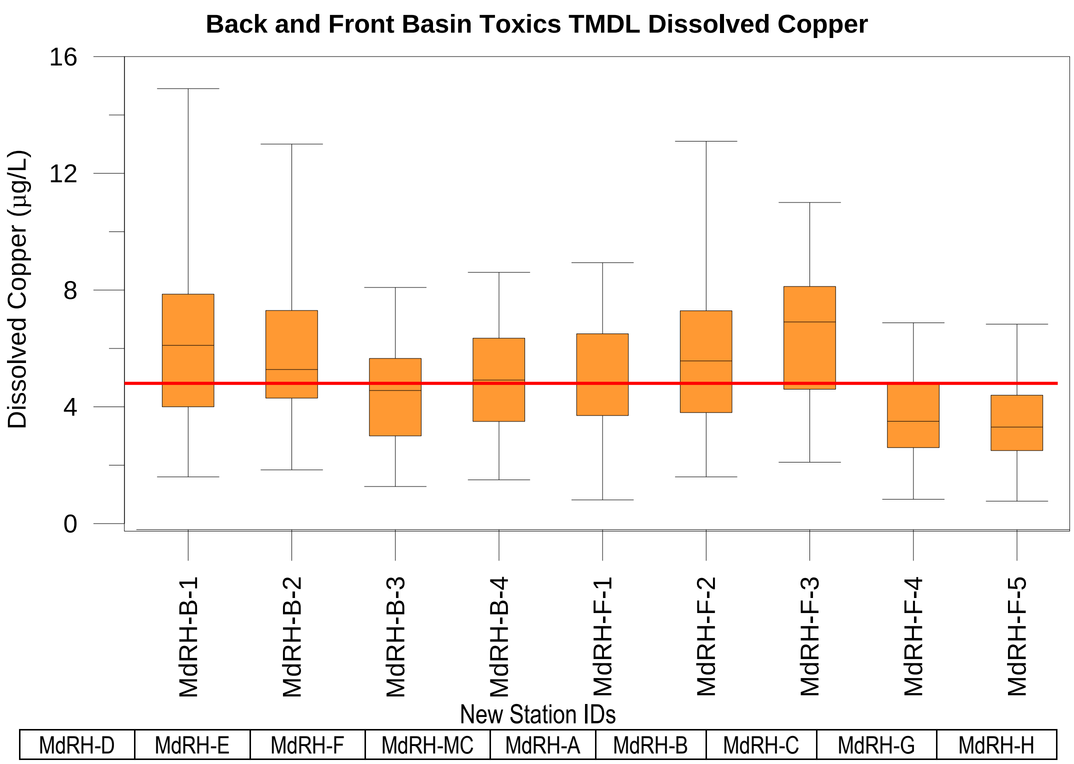

Figure I-1. Marina del Rey Toxics TMDL Dissolved Copper Compliance Monitoring Results (2010-2013)

Table I-3. Marina del Rey Toxics TMDL CIMP Harbor Water Monitoring Schedule

Monitoring Schedule	Front Basins	Back Basins	Main Channel
Month 1, 3, 5, 7, 9, 11	MdRH-A , MdRH-C, MdRH-G	MdRH-E	MdRH-MC
Month 2, 4, 6, 8, 10, 12	MdRH-B and MdRH-H	MdRH-D and MdRH-F	MdRH-MC

Table I-4. Marina del Rey Toxics TMDL Dissolved Copper Monitoring Results and Summary Statistics (2010-2013)

Summary Statistics										
Station ID (new)	**Units**	**MDRH-D**	**MdRH-E**	**MdRH-F**	**MdRH-MC**	**MdRH-A**	**MdRH-B**	**MdRH-C**	**MdRH-G**	**MdRH-H**
Historic Station ID		**MdRH-B-1**	**MdRH-B-2**	**MdRH-B-3**	**MdRH-B-4**	**MdRH-F-1**	**MdRH-F-2**	**MdRH-F-3**	**MdRH-F-4**	**MdRH-F-5**
Average	mg/L	6.20	5.73	4.57	4.92	4.98	5.66	6.66	3.72	3.55
Standard Deviation	mg/L	2.68	2.35	1.69	1.75	1.79	2.46	2.40	1.43	1.38
Coefficient of Variation		0.43	0.41	0.37	0.36	0.36	0.43	0.36	0.39	0.39
Standard error	mg/L	0.446	0.392	0.282	0.292	0.299	0.409	0.400	0.239	0.229
Raw Data										
Date	**Units**	**MdRH-B-1**	**MdRH-B-2**	**MdRH-B-3**	**MdRH-B-4**	**MdRH-F-1**	**MdRH-F-2**	**MdRH-F-3**	**MdRH-F-4**	**MdRH-F-5**
8/20/2010	mg/L	7.71	5.04	5.26	5.87	6.74	6.6	8.12	5.58	3.61
9/20/2010	mg/L	6.88	5.26	5.26	5.88	6.74	4.47	6.15	5.02	4.96
10/22/2010	mg/L	10.4	8.67	8.09	7.5	8.94	9.82	10.9	6.88	6.63
11/16/2010	mg/L	6.4	3.8	3.6	6.5	4.5	5	7.1	3	3.6
12/9/2010	mg/L	8.6	7.3	5.4	6.1	6.6	8.2	10	2.4	2.4
1/25/2011	mg/L	7.7	5.1	4.6	4.6	5.3	6.1	7.7	3.2	4.4
2/24/2011	mg/L	4.1	2.1	2.6	4.5	4.6	5.8	6.9	2.8	3.2
3/23/2011	mg/L	2.4	2.7	2.1	1.5	0.81	1.6	2.1	0.83	0.77
4/21/2011	mg/L	3.1	4.6	3.2	3.4	4.3	4.3	4.5	2.9	2.8
5/19/2011	mg/L	4	5	3.6	3.5	3.7	4.3	4.6	2.6	2.5
6/23/2011	mg/L	7.4	7.2	5.5	6.4	6.5	6.5	7.9	3.9	3.4
7/21/2011	mg/L	3.6	5.8	4.5	4	3.2	4.6	3.7	1.9	2.9
8/25/2011	mg/L	5.3	6	4.4	5	4.1	3.9	5.1	3.6	3.7
9/22/2011	mg/L	6.1	5.3	4.5	4.9	6.3	6.2	6.2	2.6	3.8
10/27/2011	mg/L	3.4	3.3	2.6	2.5	2.7	1.8	2.2	1.7	2.2
11/17/2011	mg/L	6.1	5.8	4.3	4.7	4.3	4.5	5.5	3.8	3.1
12/14/2011	mg/L	4.7	5.5	5.4	4.1	3.9	3.5	4.8	4.3	3.2
1/11/2012	mg/L	5.6	13	5.9	4.8	3.8	3.9	5.6	3.4	3
2/8/2012	mg/L	4.7	4.7	2.9	2.3	3.5	3.7	4.3	2.3	2.1
3/7/2012	mg/L	4.4	4.9	3	3.8	3.2	3.4	4	2.9	2.4
4/12/2012	mg/L	2.8	2.8	2.6	2.3	3.7	3.8	4.9	2.7	2.7
5/10/2012	mg/L	3.8	4.3	2.5	3.2	3.5	3.4	3.7	2.2	1.8
6/7/2012	mg/L	2.7	3	2.2	2.8	2.8	3.3	3.7	1.9	1.6
7/3/2012	mg/L	7.07	8.55	5.96	4.93	7.69	7.29	7.5	6.33	5.17
8/29/2012	mg/L	1.6	4.54	1.27	2.01	1.63	1.96	6.9	4.09	3.84
9/26/2012	mg/L	9.12	7.15	6.03	8.61	6.43	9.01	9.62	4.24	4.93
10/17/2012	mg/L	6.11	3.79	4.92	5.4	5.18	8.49	7.88	3.06	3.78
11/15/2012	mg/L	7.54	9.98	6.67	6.63	6.37	7.91	9.77	5.97	6.83
12/19/2012	mg/L	7.96	5.68	4.7	6.35	6.26	6.39	7.91	5.06	4.04
1/9/2013	mg/L	14.9	1.84	4.52	6.34	5.28	13.1	10.5	3.97	2.77
2/14/2013	mg/L	7.86	7.77	5.66	4.48	6.65	6.25	7.35	4.82	6.08
3/6/2013	mg/L	9.55	8.44	7.61	8.24	7.12	8.59	11	5.93	5.37
4/4/2013	mg/L	7.03	5.07	3.66	5.04	4.72	5.87	6.91	4.6	2.31
5/14/2013	mg/L	8.46	8.63	7.04	6.49	6.48	7.28	9.49	5.13	4.23
6/5/2013	mg/L	8.16	7.71	7.57	6.73	6.9	7.6	8.3	4.74	4.6
7/1/2013	mg/L	5.99	6.04	4.79	5.59	4.96	5.35	6.92	3.41	3.21

I.3 Toxics TMDL Dissolved Total PCB Data Analysis

Total PCBs in harbor water have been monitored as part of the MdR Coordinated Monitoring Plan (CMP) monitoring from 2010-present. However, Total PCBs have not been detected using Method 608. Method 608 detection limits are higher than the TMDL target for Total PCBs in the water column, which, in turn, makes the compliance assessment uncertain. During the Low Detection Level study (LDL study) conducted for the MdR Enhanced Watershed Management Plan (EWMP) Agencies and Caltrans, harbor water samples from the Back Basins of the harbor were analyzed using a high resolution method, EPA Method 1668. Results (Table I-5) were consistent during the spring and summer timeframe within a single Basin. The coefficient of variation was also low within each basin, ranging from 0.07 in Basin D to 0.30 in Basin F and an overall coefficient of variation of 0.31 for the Back Basins as a whole.

Table I-5. Marina del Rey Toxics TMDL Special Study (Low Detection Limit) Total PCB Results

Constituent			Total PCBs	Average	Standard Deviation	Coefficient of Variation
New Station ID	**Existing Station ID**	**Date**	**pg/L**	**pg/L**	**pg/L**	**pg/L**
MdRH-D	**MDRH-B-1**	3/23/2011	3380			
		4/21/2011	3380			
		6/23/2011	3440			
		7/21/2011	3911	3527.8	257.1	0.07
MdRH-E	**MdRH-B-2**	3/23/2011	2100			
		4/21/2011	2260			
		6/23/2011	3760			
		7/21/2011	2536	2664.0	752.5	0.28
MdRH-F	**MdRH-B-3**	3/23/2011	4230			
		4/21/2011	3950			
		6/23/2011	6240			
		7/21/2011	3104	4381.0	1328.6	0.30
MdRH-MC	**MdRH-B-4**	3/23/2011	3580			
		4/21/2011	2030			
		6/23/2011	3560			
		7/21/2011	2499	2917.3	777.7	0.27
Back Basins Average				3372.50	1033.07	0.31
Trip Blanks		3/23/2011	3990	NA	NA	NA
		4/21/2011	1260	NA	NA	NA
		6/23/2011	837	NA	NA	NA
		7/21/2011	1609.5	NA	NA	NA

NA – not applicable

In addition to the successful PCB data collection, the MdR EWMP Agencies learned through the study that:

- Only one laboratory in California, and a few in the nation, currently have the capability to conduct the high resolution method, meaning the analytical method is not commercially, locally readily available for a routine monitoring program, such as this CIMP. Using such a method may create logistical issues including shipping and handling of the samples on a regular basis. Moreover, a prime contract laboratory will add-on a surcharge per sample for shipping and handling on top of the already high analytical cost.

- PCBs are ubiquitous in the environment. Background PCB concentrations measured in trip blanks were higher than the TMDL target. Special blank water must be obtained from the contract laboratory in order to properly collect samples, which adds to the analytical cost of the method. Properly cleaned sample bottles and sampling equipment are also necessary, which adds even more additional cost.
- Analytical cost per sample is very high compared to the method used in the current monitoring program. PCB analytical cost under the current program is $55 per sample, whereas the cost for the high resolution method was $970 per sample during the LDL study.

Due to these logistical, technical, and cost issues, PCBs will be monitored in the Harbor water column at five locations each month, on a rotating basis. The rotating schedule will be the same as that described in Section 0 and Table I-3 above with monitoring occurring one month at stations MdRH-A, MdRH-C, MdRH-E, MdRH-G, and the main channel (MdRH-MC). The next month of sampling will be conducted at stations MdRH-B, MdRH-D, MdRH-F, MdRH-H and MdRH-MC. This approach will help use monitoring resources as efficiently as possible while ensuring that the recommended detection limits in the Toxics TMDL are met.

APPENDIX J
Los Angeles County Flood Control District Background

LACFCD Background Information

In 1915, the Los Angeles County Flood Control Act established the Los Angeles County Flood Control District (LACFCD) and empowered it to manage flood risk and conserve stormwater for groundwater recharge. In coordination with the United States Army Corps of Engineers, the LACFCD developed and constructed a comprehensive system that provides for the regulation and control of flood waters through the use of reservoirs and flood channels. The system also controls debris, collects surface storm water from streets, and replenishes groundwater with storm water and imported and recycled waters. The LACFCD covers the 2,753 square-mile portion of Los Angeles County south of the east-west projection of Avenue S, excluding Catalina Island. It is a special district governed by the County of Los Angeles Board of Supervisors, and its functions are carried out by the Los Angeles County Department of Public Works. The LACFCD service area is shown in Figure 1**.**

Unlike cities and counties, the LACFCD does not own or operate any municipal sanitary sewer systems, public streets, roads, or highways. The LACFCD operates and maintains storm drains and other appurtenant drainage infrastructure within its service area. The LACFCD has no planning, zoning, development permitting, or other land use authority within its service area. The permittees that have such land use authority are responsible under the Permit for inspecting and controlling pollutants from industrial and commercial facilities, development projects, and development construction sites (Permit, Part II.E, p. 17).

The MS4 Permit language clarifies the unique role of the LACFCD in storm water management programs: "[g]iven the LACFCD's limited land use authority, it is appropriate for the LACFCD to have a separate and uniquely-tailored storm water management program. Accordingly, the storm water management program minimum control measures imposed on the LACFCD in Part VI.D of this Order differ in some ways from the minimum control measures imposed on other Permittees. Namely, aside from its own properties and facilities, the LACFCD is not subject to the Industrial/Commercial Facilities Program, the Planning and Land Development Program, and the Development Construction Program. However, as a discharger of storm and non-storm water, the LACFCD remains subject to the Public Information and Participation Program and the Illicit Connections and Illicit Discharges Elimination Program. Further, as the owner and operator of certain properties, facilities and infrastructure, the LACFCD remains subject to requirements of a Public Agency Activities Program." (Permit, Part II.F**,** p. 18.).

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

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

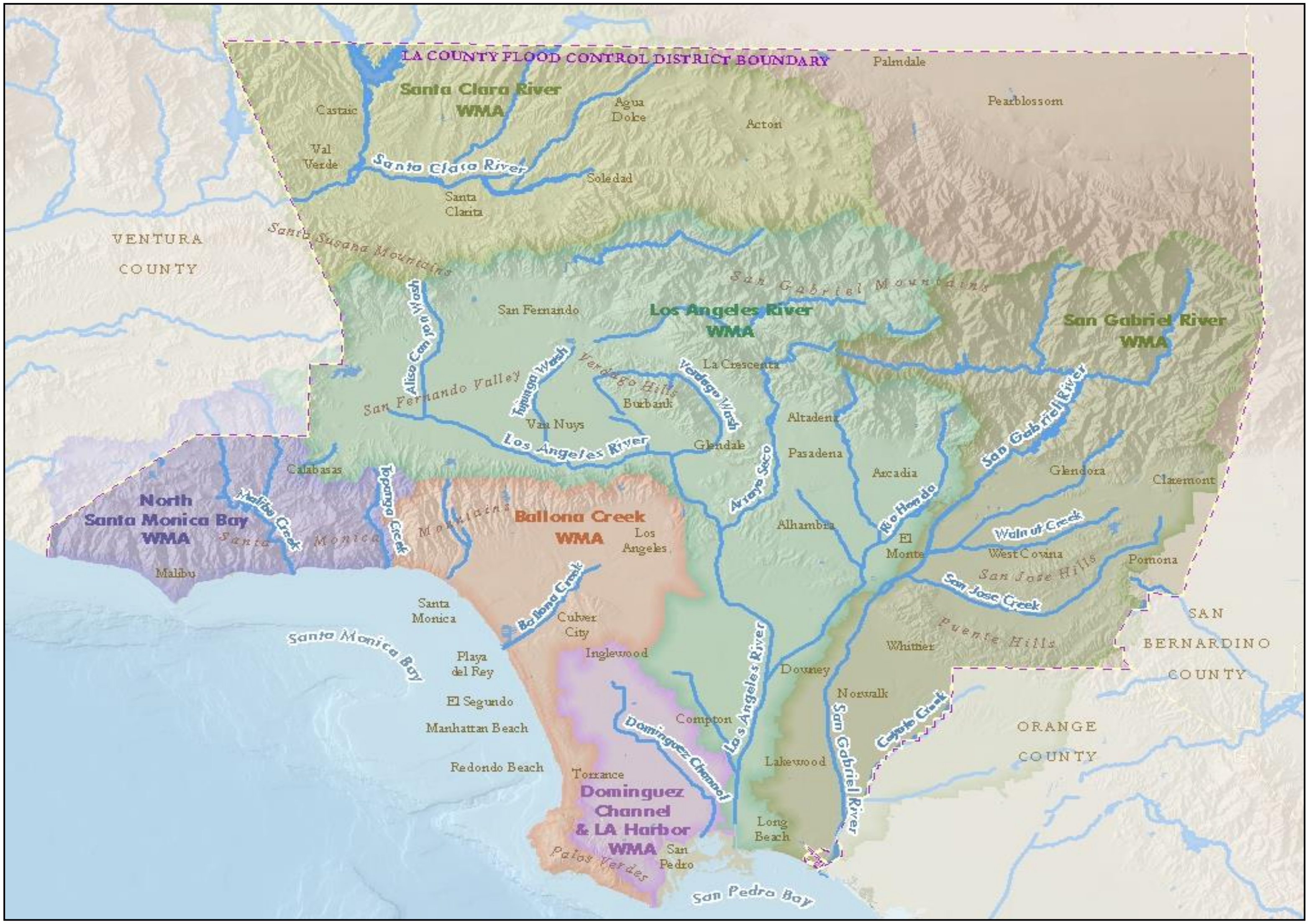

Figure 1: Los Angeles County Flood Control District Service Area

APPENDIX K
Santa Monica Bay Debris TMDL
Plastic Pellets Monitoring Plan – LACFCD
Plastic Pellets Monitoring Plan – County of Los Angeles
Trash Monitoring Reporting Plan – County of Los Angeles
Plastic Pellets Monitoring Plan – Culver City

Culver CITY

CULVER CITY excellence PUBLIC WORKS

Environmental Programs
& Operation Division

PLASTIC PELLET MONITORING AND REPORTING PLAN (PMRP)

in compliance with

Water Quality Control Plan – Los Angeles Region
Santa Monica Bay Nearshore and Offshore Debris TMDL
Basin Plan Amendment, Resolution No. R10-010

June 2012

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CHAPTER **PAGE**

PROBLEM STATEMENT

Discharges of debris, including trash and plastic pellets, into Santa Monica Bay violate water quality objectives, impair beneficial uses, and cause pollution and nuisance. Nearshore and offshore areas of the Santa Monica Bay were listed on the 1998, 2002, and 2006 Federal Clean Water Action Section 303(d) lists of impaired waterbodies for debris.

The water quality objectives applicable to debris include “Floating Materials” in Chapter 3, and “Floating Particulates” in the California Ocean Plan (2005). The following designated beneficial uses of Santa Monica Bay are impaired by debris:

- Industrial service supply (IND),
- Navigation (NAV),
- Water contact recreation (REC-1),
- Non-contact water recreation (REC-2),
- Commercial and sport fishing (COMM),
- Estuarine habitat (EST),
- Marine habitat (MAR),
- Preservation of biological habitats (BIOL),
- Migration of aquatic organisms (MIGR),
- Wildlife habitat (WILD),
- Rare, threatened, or endangered species (RARE),
- Spawning, reproduction, and/or early development (SPWN),
- Shellfish harvesting (SHELL), and
- Wetland habitat (WET)

1.0 NUMERIC TARGET

Interpretation of the narrative water quality objectives for floating materials/particulates, and solid, suspended, or settleable materials, used to calculate the load allocations.

Trash: **ZERO** trash in Santa Monica Bay
Plastic pellets: **ZERO** plastic pellets in Santa Monica Bay

2.0 SOURCE ANALYSIS

Along the West Coast, land-based debris comprises more than half of the debris observed in the marine environment, undetermined sources of debris comprise less than half of the debris observed in the marine environment, and ocean-based debris comprises only approximately one-tenth of the debris observed in the marine environment.

Most of the land-based debris is discharged to the marine environment through storm drains. The primary sources of debris discharged from storm drains include litter, debris from commercial establishments and public venues, industrial discharges, garbage transportation, landfills, and construction debris.

The principal source of plastic pellets is point source discharges through storm drains from industry that imports, manufactures, processes, transports, stores, recycles or otherwise handles plastic pellets. Accidental spills during transfer and transportation also contribute to plastic pellets entering storm drains and, ultimately, the Santa Monica Bay.

Land-based nonpoint sources of debris include inappropriate disposal of debris at land areas such as beaches and marinas adjacent to Santa Monica Bay or waterbodies within the Santa Monica Bay Watershed Management Area. Other nonpoint sources of debris include direct deposition and dumping.

Marine-based sources of trash include boats and vessels.

3.0 LOADING CAPACITY & MARGIN OF SAFETY

Zero for both trash and plastic pellets, as defined in the Numeric Target. Zero is a conservative numeric target for both trash and plastic pellets, which contains an implicit margin of safety.

4.0 SEASONAL VARIATIONS AND CRITICAL CONDITIONS

Discharge of trash and plastic pellets from storm drains and open channels occurs primarily during or shortly after a major rain event. Discharge of trash from nonpoint sources occurs during all seasons, but can increase during high wind events, which are defined as periods of wind advisories issued by the

National Weather Service. Additionally, weekends and holidays, particularly those between April 15 through October 15, result in a substantial increase of trash littered on beaches, open space and parks.

5.0 WASTE LOAD ALLOCATIONS (for point sources)

Trash

The WLA is zero trash. Zero trash is defined as no trash discharged into waterbodies within the Santa Monica Bay Watershed Management Area (WMA) and then into Santa Monica Bay or on the shoreline of Santa Monica Bay.

Responsible agencies and jurisdictions covered by the Ballona Creek Watershed Trash TMDL including Caltrans, County of Los Angeles, and the Cities of Beverly Hills, Culver City, Inglewood, Los Angeles, Santa Monica, and West Hollywood, and responsible agencies and jurisdictions identified in the Malibu Creek Trash TMDL including Caltrans, Los Angeles County, Ventura County, Ventura County Watershed Protection District, and the Cities of Agoura Hills, Calabasas, Hidden Hills, Malibu, Thousand Oaks, and Westlake Village are also responsible for point source discharges of trash into the Santa Monica Bay via open channels and storm drains. **The WLA applicable to MS4 Permittees that is established herein, and the associated requirements for these responsible agencies and jurisdictions shall be complied with through the Ballona Creek Trash TMDL (Regional Board Resolution No. R01-014 and any amendments thereto)** and the Malibu Creek Trash TMDL (Regional Board Resolution No. R08-007 and any amendments thereto).

Each responsible jurisdiction and agency, identified above, shall comply with the interim or final Waste Load Allocations for trash assigned to it and, therefore, should utilize all compliance strategies within its authority to achieve these allocations. If these strategies include installation of full or partial capture systems in the infrastructure of a flood control district, the jurisdiction is responsible for obtaining all necessary permits to do so.

Plastic Pellets

The WLA for plastic pellets is zero. Zero plastic pellets is defined as no discharge of plastic pellets from the premises of industrial facilities that import, manufacture, process, transport, store, recycle or otherwise handle plastic pellets. The WLA is consistent with Cal. Water Code § 13367 and 40 CFR 122.26(b)(12).

WLAs for plastic pellets are assigned to permittees of the Industrial Storm Water General Permit (Order No. 97-03-DWQ, and NPDES Permit No. CAS 000001) within the Santa Monica Bay WMA. The Standard Industry Classification (SIC) codes associated with industrial activities involving plastic pellets may include, but are not limited to, 282X, 305X, 308X, 39XX, 25XX, 3261, 3357, 373X, and 2893. Additionally, industrial facilities with the term "plastic" in the facility or operator name, regardless of the SIC code, may be subject to the WLA for plastic pellets. Other industrial permittees within the Santa Monica Bay WMA that fall within the above categories, but are regulated through other general permits and/or individual industrial storm water permits are also required to comply with the WLA for plastic pellets.

6.0 IMPLEMENTATION – Point Sources

Trash

WLAs for trash shall be implemented through municipal separate storm sewer system (MS4) permits and via the authority vested in the Executive Officer by California Water Code sections 13267 and/or 13383. Dischargers may comply with the WLA in any lawful manner, including the use of full capture systems; partial capture systems; and/or institutional controls.

(1) Compliance with the final WLA may be achieved through an adequately sized and maintained full capture system, once the Executive Officer has certified that the system meets the following minimum criteria. A full capture system, at a minimum, consists of any device or series of devices that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate (Q) resulting from a one-year, one-hour, storm in the subdrainage area. The rational equation is used to compute the peak flow rate: $Q = C \times I \times A$, where

Q = design flow rate (cubic feet per second, cfs);
C = runoff coefficient (dimensionless);
I = design rainfall intensity (inches per hour); and
A= subdrainage area (acres).

Point source discharges that choose to comply using full capture systems must demonstrate a phased implementation of full capture devices over an 8-year period until the final WLA of zero is attained. Zero will be deemed to have been met if full capture systems have been installed on all conveyances discharging to the waterbodies within the Santa Monica Bay WMA and the Santa Monica Bay.

(2) Responsible agencies and jurisdictions may achieve compliance by using partial capture systems and/or institutional controls. Point source dischargers that elect to use partial capture systems or institutional controls shall use a mass balance approach based on the trash Daily Generation Rate (DGR), to demonstrate compliance.

Plastic Pellets

The WLA of no discharge of plastic pellets shall be implemented through the statewide Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activity (NPDES Permit No. CAS00001) (IGP), other general permits, individual industrial stormwater permits, or other Regional Board orders, consistent with California Water Code § 13367 and 40 CFR 122.26(b)(12).

Jurisdictions and agencies identified as responsible jurisdictions for point sources of trash in this Santa Monica Bay Debris TMDL and in the existing Malibu Creek and Ballona Creek Trash TMDLs, including the Los Angeles County Flood Control District and the Ventura County Watershed Protection District, shall either prepare a Plastic Pellet Monitoring and Reporting Plan (PMRP), or demonstrate that a PMRP is not required under certain circumstances, as follows:

(1) Responsible jurisdictions that have industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets within their jurisdiction shall prepare a PMRP to (i) monitor the amount of plastic pellets being discharged from the MS4; (ii)

establish triggers for increased industrial facility inspections and enforcement of SWPPP requirements for industrial facilities identified as responsible for the plastic pellet WLA herein; and (iii) address possible plastic pellet spills.

(2) Responsible jurisdictions that have no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets, may not be required to conduct monitoring at MS4 outfalls, but shall be required to include a response plan in the PMRP. In order to be absolved of the requirement to conduct monitoring at MS4 outfalls, documentation of the absence of industrial facilities and activities within the jurisdiction that are related to the manufacturing, handling and transportation of plastic pellets must be provided in the proposed PMRP.

(3) A MS4 Permittee may demonstrate to the Regional Board that it has only residential areas within its jurisdiction, and that it has limited commercial or industrial transportation corridors (rail and roadway), such that it is not considered a potential source of plastic pellets to Santa Monica Bay. Such demonstration may be submitted in lieu of a PMRP and must include the municipal zoning plan and other appropriate documentation. The Executive Officer may approve an exemption from the requirement to prepare a PMRP for the MS4 Permittee on the basis of this demonstration, if appropriate.

If a jurisdiction changes its zoning and land use plans, or issues operating licenses to industries that import, manufacture, process, transport, store, recycle or otherwise handle plastic pellets within its jurisdiction, then it shall be subject to the requirement to submit a PMRP, if it has not already done so, within 90 days of any one of those actions.

The Regional Board shall be notified by the agency or jurisdiction within 24 hours of the responsible agency or jurisdiction becoming aware of a spill. The PMRP shall include protocols for a timely and appropriate response to possible plastic pellets spills within their jurisdictional area, and a comprehensive plan to ensure that plastic pellets are contained.

The Regional Board may reconsider the TMDL to assign the WLA for plastic pellets to additional jurisdictions and agencies including, but not limited to, industrial permittees, MS4 permittees, and any agencies or jurisdictions which are responsible for discharging plastic pellets to the Santa Monica Bay.

7.0 MONITORING AND REPORTING PLAN

Trash

Responsible agencies and jurisdictions shall develop a Trash Monitoring and Reporting Plan (TMRP) for Executive Officer approval that describes the methodologies that will be used to assess and monitor trash in their responsible areas within the Santa Monica Bay WMA or along Santa Monica Bay.

For purposes of compliance determination, the default Baseline WLA for Los Angeles County, Cities of Los Angeles, Culver City, Santa Monica, El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, Torrance, Palos Verdes Estates, Rancho Palos Verdes, Rolling Hills, and Rolling Hills Estates is 807 gal/mi^2/yr.

The existing Ballona Creek Trash TMDL assigned a Baseline WLA of 86 cubic feet per square mile per year (ft^3/mi^2/yr) (equivalent to 643.3 gal/mi^2/yr) to jurisdictions including the County of Los Angeles, the Cities of Beverly Hills, Culver City, Inglewood, Los Angeles, Santa Monica, and West Hollywood.

The TMRP shall include a plan to establish a site specific trash Baseline WLA if responsible agencies and jurisdictions elect to not use the default Baseline WLAs assigned above.

Requirements for the TMRP shall include, but are not limited to, assessment and quantification of trash collected from source areas in the Santa Monica Bay WMA, and shoreline of the Santa Monica Bay. The monitoring plan shall provide details on the frequency, location, and reporting format. Responsible jurisdictions shall propose a metric (e.g., weight, volume, pieces of trash) to measure the amount of trash discharged from their jurisdictional areas.

The TMRP shall include a prioritization of areas that have the highest trash generation rates. The TMRP shall give preference to this prioritization when scheduling the installation of full capture devices, BMPs, or trash assessment and collection (MFAC) programs. The TMRP shall also evaluate and identify the most appropriate BMPs to implement given the nature of the trash impairment.

Consistent with the requirements of their respective MS4 permits, the flood control districts, including the Los Angeles County Flood Control District and the Ventura County Watershed Protection District, and other MS4 Permittees are responsible for visually monitoring and removing trash and debris from all open channels and other MS4 drainage structures under their ownership. These requirements are intended to address fugitive trash and debris that has been deposited either illegally or through wind transport into the open channels. The flood control districts and other MS4 Permittees shall also identify and prioritize problem areas of illicit discharge. For these problem areas, the flood control districts and other MS4 Permittees shall propose a more frequent schedule of inspection and removal beyond the standard requirements of their MS4 permits. Alternatively, the flood control districts and other MS4 Permittees shall demonstrate that fugitive trash and debris is captured or removed prior to its discharge from the MS4 to Santa Monica Bay.

Plastic Pellets
Industries responsible for discharge of plastic pellets shall enroll with the California State Water Resources Control Board (State Board) as a permittee of the statewide Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activity (IGP) or apply for a general permit or an individual industrial stormwater permit from the Regional Board. Permittees of the IGP shall prepare a SWPPP and keep it onsite for inspection. Permittees for other general permits or individual industrial stormwater permits shall submit a Best Management Practices Plan and/or SWPPP to the Regional Board. All responsible permittees as defined under the Waste Load Allocation section are required to prepare and submit annual monitoring reports with monitoring designed to ensure compliance with the assigned WLAs, to the Regional Board. The requirements for the monitoring report preparation shall be consistent with provisions specified in the IGP, any appropriate general permit, or individual industrial permit.

MS4 permittees identified as responsible jurisdictions and agencies for point sources of trash in this Santa Monica Bay Debris TMDL and in the existing Malibu Creek and Ballona Creek Trash TMDLs, including the Los Angeles County Flood Control District and the Ventura County Watershed Protection District, shall either prepare a Plastic Pellet Monitoring and Reporting Plan (PMRP), or demonstrate that a PMRP is not required under certain circumstances, as follows:

~~(1) Responsible jurisdictions that have industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets within their jurisdiction shall prepare a PMRP to (i) monitor the amount of plastic pellets being discharged from the MS4 at critical locations and times (including, at a minimum, once during the dry season and once during the wet season); (ii) establish triggers for increased industrial facility inspections and enforcement of SWPPP requirements for industrial facilities identified as responsible for the plastic pellet WLA herein; and (iii) address possible plastic pellet spills.~~

(2) Responsible jurisdictions that have no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets, may not be required to conduct monitoring at MS4 outfalls, but shall be required to include a response plan in the PMRP. In order to be absolved of the requirement to conduct monitoring at MS4 out falls, documentation of the absence of industrial facilities and activities within the jurisdiction that are related to the manufacturing, handling and transportation of plastic pellets must be provided in the proposed PMRP.

~~(3) A MS4 Permittee may demonstrate to the Regional Board that it has only residential areas within its jurisdiction, and that it has limited commercial or industrial transportation corridors (rail and roadway), such that it is not considered a potential source of plastic pellets to Santa Monica Bay. Such demonstration may be submitted in lieu of a PMRP and must include the municipal zoning plan and other appropriate documentation. The Executive Officer may approve an exemption from the requirement to prepare a PMRP for the MS4 Permittee on the basis of this demonstration, if appropriate.~~

The PMRP shall include protocols for a timely and appropriate response to possible plastic pellets spills within a Permittee's jurisdictional area, and a comprehensive plan to ensure that plastic pellets are contained.

8.0 TRASH MONITORING AND REPORTING PLAN

Please see the Attachment 1.0, Ballona Creek Trash TMDL Annual Report.

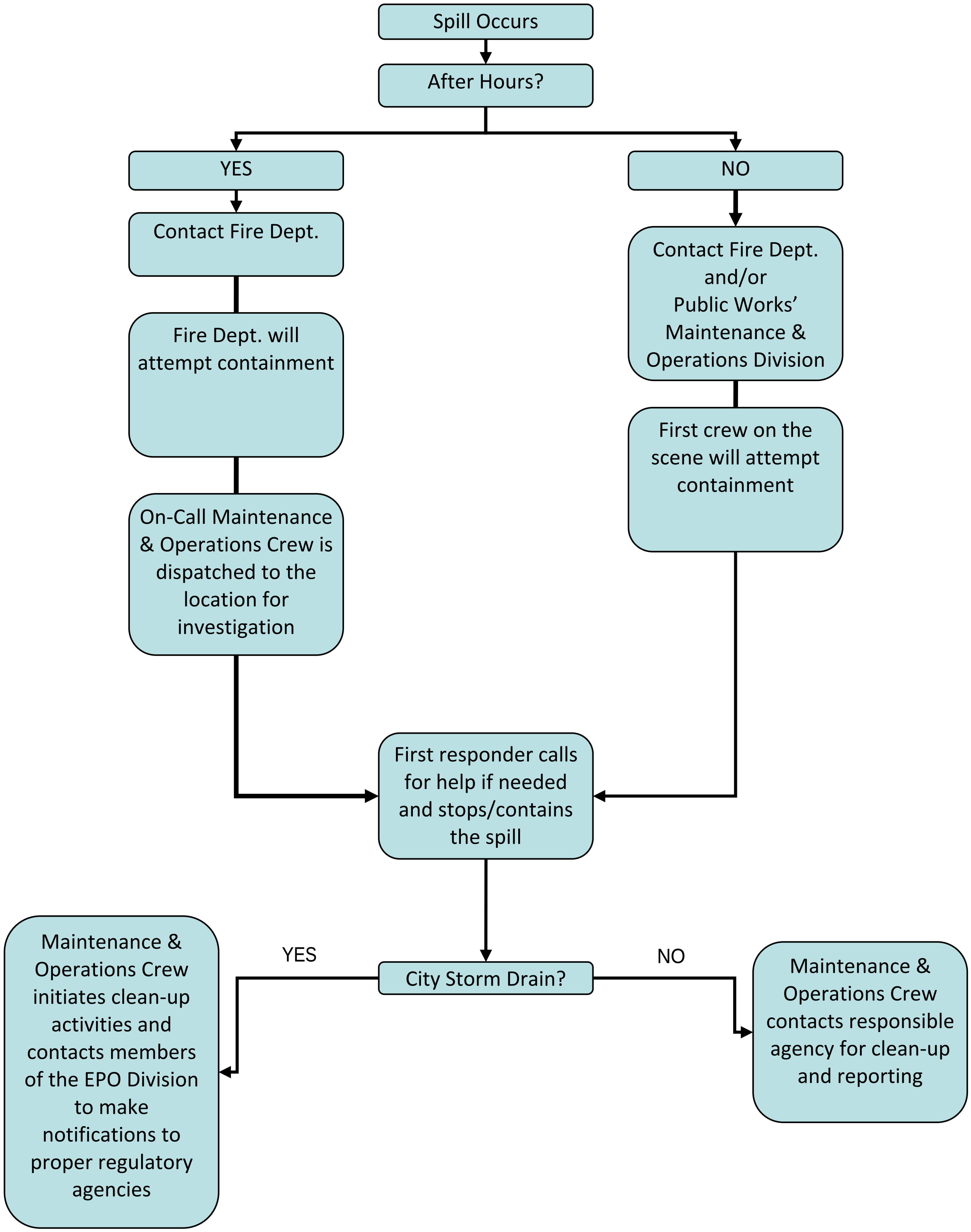
9.0 PLASTIC PELLET MONITORING AND REPORTING PLAN

The City of Culver City (City) has no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets. Therefore, the City is not required to monitor MS4 outfalls.

The City has reviewed its business license and there are no businesses with SIC codes that are regulated for plastic pellets. In addition, there are no businesses with the word "plastic" in its name that must comply with this TMDL. City staff also verified with the Industrial General NPDES Permit and did not find any businesses in the City on that list either.

As required by the TMDL, below is the City's response plan:

PLASTIC PELLETS SPILL RESPONSE PLAN



Proper notification procedures so that the primary responders and regulatory agencies are informed of plastic pellet spill in a timely manner;

SPILL NOTIFICATION CONTACT NUMBERS		
AGENCY	INFO	NOTIFICATION TIME FRAME
<u>CULVER CITY PUBLIC WORKS</u>: **Charles D. Herbertson**, Director of PW/City Engineer **Damian Skinner**, EPO Div. Manager **May Ng**, WDR (Sewers) Engineer **Kaden Young**, NPDES (Stormwater) Engineer **Lee Torres**, Senior Civil Engineer **Eric Mirzaian**, Maintenance Operation Div. Manager **Benny Tenorio**, Sewer Crew Lead **Mate Gaspar**, Engineering Services Div. Manager **Culver City Fire HazMat**	 (310) 253-5630 (310) 253-6421 (310) 253-6406 (310) 253-6445; (562) 308-8269 (310) 253-6457 (310) 253-6444 (310) 849-8937; (310) 236-1345 (310) 253-5602 (310) 253-5930	Immediately
State Water Resources Control Board (SWRCB)	Submit info on this page at http://ciwqs.waterboards.ca.gov/	ASAP
California Office of Emergency Services (Cal OES)	(800) 852-7550; 24-hour reporting	Immediately
Los Angeles Regional Water Quality Control Board (LARWQCB)	(213) 576-6657; business hours (213) 305-2253; non-business hours (213) 620-6140; fax written notification	Immediately
Los Angeles County Department of Health Services (DHS)	(213) 974-1234; 24-hour reporting (626) 430-5420	Immediately
Los Angeles County Flood Control District	(818) 896-0594 (818) 248-3842; business hours only	Immediately

The Fire Chief or Director of Public Works/City Engineer will be the official who will receive immediate notification. The Chief or Director or his designee shall be immediately dispatched to the site to take control of the scene as the Incident Commander. Unless otherwise noted, the Incident Commander is responsible to ensure all listed procedures are carried out. Field crews are prepared to respond immediately with all available equipment including diking materials, pumps, vacuum truck and traffic control equipment.

The Incident Commander shall assess the magnitude of the spill by estimating the volume by the accumulation of spillage. If any plastic pellet enters the storm drain system, immediately notify the appropriate agencies according to the chart above. If the situation does not permit the Incident Commander to contact the agencies immediately, contact the Environmental Programs and Operations (EPO) Division staff to report the spill to the appropriate agencies. If EPO staff cannot be reached, contact Culver City Fire HazMat to report the spill.

The City's Fire Department and Public Work's Maintenance & Operations Crew are trained and prepared to respond to spills and overflows of all sorts. They are ready to respond at a moment's notice and secure the perimeter for necessary activities such as traffic and crowd control.

General Response Procedures

The three fundamental phases of all responses to a plastic pellet spill are: *contain*, *control*, and *cleanup*.

The first personnel on scene are to *contain* the spill or, in other words, to keep it from entering the storm drainage system or other receiving waters. This may be done in any number of ways, including the use of sand or soil dikes, sand bags, or by plugging the outlet pipe of a catch basin.

Once the spill is contained, it needs to be brought under *control*. That is, upright any fallen containers/vehicles and closing all lids and doors.

The third and final step of the response is *cleanup*. All surfaces touched by the spill must be swept and vacuumed for proper disposal. The spill should never be blown/swept down into a storm drain, it must be vacuumed.

SPILL RESPONSE PROCEDURES

1. Immediately notify the Maintenance & Operations Division Manager, who in this case should act as the Incident Commander. Incident Commander shall immediately notify the appropriate departments/division managers.

2. Contain the spillage immediately by building berms around the spills using sandbags and vacuum truck. Block openings of nearby storm drain catch basins using sandbags. If any plastic pellets enter the storm drain, build a temporary dam (using sandbags) in downstream storm drain system, to avoid plastic pellets entering the receiving waters.

3. Take photographs of the spill and include them for review by the WDR Engineer and Department Head. If the spill was not generated from a private property but entered private property, a copy of the report and photos must be forwarded to Risk Management. Staff will request permission of the occupant of the private property before taking any pictures on private property. Confine pictures to only the areas affected by the spill.

4. Investigate the incident and develop a written chronology that describes:

    a. time, date, and cause of the spill;
    b. events and actions that led up to the spill;
    c. the approximate volume of the spill and route, if any, storm drains that were compromised;
    d. names and titles of personnel present on scene of spill; and
    e. actions taken to correct the situation, including containing the spill.

5. Clean up the spill area and remove containment.

    a. Vacuum contaminated areas or streets, block all nearby storm drain catch basin openings with sandbags to prevent pellets from entering the storm drain system.
    b. If storm drain system was compromised with plastic pellets a temporary dam will be erected downstream to capture spillage until it is vacuum extracted.
    c. Remove sandbags.
    d. Leave the area as clean as practicable.

6. The Incident Commander must verify that a Plastic Pellet Report form has been completed. This task is completed by the NPDES Engineer and filed to the State's online reporting system.

OUTSIDE RESOURCES CONTACT LIST

Spill Response Companies

Allwaste
2222 E. Sepulveda Boulevard
Carson, CA 90810
(310) 595-1000

National Plant Services
1461 Harbor Avenue
Long Beach, CA 90813
(562) 436-7600

Ocean Blue (Environmental Services, Inc.)
925 W. Esther Street
Long Beach, CA 90813
(562) 624-4120

Cleanstreet
1937 W. 169th Street
Gardena, CA 90247
(800) 225-7316 x1111

OUTSIDE AGENCY NOTIFICATION NUMBERS

A. City of Los Angeles

a. If spill is originating from a City of Los Angeles
   City of Los Angeles – Bureau of Sanitation
   Phone: (213) 485-7575 (Sewage Spill Hotline Main #)
   Phone: (213) 485-5391 (Sewage Spill Hotline Weekdays, 6:30AM – 1:00AM)
   Phone: (310) 823-5507; (310) 822-0777 (Night Emergencies, 1:00AM – 6:30AM)

B. County of Los Angeles

a. When spill enters storm drain system
   L.A. County Department of Public Works
   Floor Maintenance Division
   Phone: (800) 675-4357, ext. #1

b. Call ONLY if storm drain is compromised or if spills enter receiving water(s)
   L.A. County Department of Health Services
   Phone: (626) 430-5420, After hours: (213) 974-1234

C. California Office of Emergency Services

a. If spill exceeds 1,000 gallons or presents hazard to human health or environment
   Hazardous Spills Notification
   Phone: (800) 852-7550

D. Other Agencies (to request assistance)

a. City of Los Angeles:	(213) 485-7575
b. County of Los Angeles:	(800) 675-HELP (4357)
c. City of Hawthorne:	(213) 216-2356 (Richard Carver)
d. City of El Segundo:	(310) 524-2760
e. City of Manhattan Beach:	(310) 802-5320; (310) 345-2442 (Justin Gervais)
MB Police Station:	(310) 802-5100

E. Regional Water Quality Control Board

a. When spill enters the storm drain system
   Technical Support Unit – Spills Report Duty Officer
   (213) 576-6720, if no answer, (213) 576-6600
   After hours: (213) 774-4238
   Fax: (213) 576-6640

F. California Coastal Commission

a. When spill enters coastal waters or have the potential to enter coastal waters
   (805) 585-1816; (562) 590-5071

G. California Department of Fish and Game

a. When spill enters coastal waters or have the potential to enter coastal waters
   (562) 708-7757

S E P T E M B E R 2 0 1 2

Santa Monica Bay Watershed Management Area (WMA) Trash Monitoring and Reporting Plan (TMRP) - Final

Submitted to:

COUNTY OF LOS ANGELES

L A R R Y
W A L K E R
ASSOCIATES

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List of Acronyms

BMP	Best Management Practice
BPA	Basin Plan Amendment
CPS	Connector Pipe Screen
DGR	Daily Generation Rate
DBH	Department of Beaches and Harbors
FCS	Full Capture System
LA	Load Allocation
MFAC	Minimum Frequency of Assessment and Collection
MS4	Municipal Separate Storm Sewer System
PCS	Partial Capture System
TMDL	Total Maximum Daily Load
TMRP	Trash Monitoring and Reporting Plan
WLA	Waste Load Allocation

Overview

The purpose of this document is to detail a Trash Monitoring and Reporting Plan (TMRP) and Minimum Frequency of Assessment and Collection/ Best Management Practice (MFAC/BMP) program to implement the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load (TMDL), effective March 20, 2012. The implementation of the TMDL covers the entire Santa Monica Bay Watershed Management Area (WMA).

The TMRP encompasses a description of an MFAC program, procedures to assess compliance with the MFAC program, current BMPs, a monitoring program to quantify trash from source areas, and information on sources to prioritize BMP implementation. The TMRP includes monitoring and assessment procedures that allow for determination of compliance for both point and nonpoint sources.

The TMRP and MFAC/BMP program described herein are being submitted on behalf of the County of Los Angeles (County), the Los Angeles County Department of Beaches and Harbors (DBH), and the City of Hermosa Beach, three of the responsible parties identified in the TMDL, to address point and non-point source trash in the Unincorporated County Areas, on beaches and harbors owned and operated by the County, and non-point source trash within the Hermosa Beach owned by the City of Hermosa Beach within the Santa Monica Bay Watershed Management Area. Future implementation efforts may warrant changes based upon outcomes of subsequent studies and findings. Significant deviations from the County TMRP and MFAC/BMP program will initiate notification to the Los Angeles Regional Water Quality Control Board (Regional Board).

TRASH DEFINITION

For purposes of the TMRP and MFAC/BMP program, trash is any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the environment. Materials properly placed within trash collection bins (e.g., cans or dumpsters) are not considered trash with regards to MFAC assessment or trash generation rate evaluations. Naturally occurring vegetation waste is also not considered trash.

TMRP REQUIREMENTS

TMRP requirements apply to both point sources (e.g., catch basins within the municipal separate storm sewer system) and nonpoint sources (i.e., beaches, harbors, non-beach open space and parks.) As outlined in the TMDL, assessment metrics for point source waste load allocations (WLAs) and nonpoint source load allocations (LAs) are as follows:

Point sources:

- The installation of full capture devices on all conveyances discharging to waterbodies within the Santa Monica Bay WMA[1].

Nonpoint sources:

[1] Where full capture devices are not feasible (e.g., due to size limitations), the County will elect to use partial capture devices or other controls to remove trash from the subdrainage area at the commensurate trash generation rate.

- No trash on Beaches or in Harbors immediately after a cleanup event.
- Trash is not accumulating in deleterious amounts.
- Trash generation rate of sources areas does not exceed the benchmark of 113,150 pounds per mile per year (310 lbs/mi/day) for Beaches and Harbors, or 162,468 pounds per square mile per year (640 gal/mi^2/yr) for Non-Beach Open Space and Harbors, and displays a decreasing trend over time.

In the event the assessment metrics are not met, the County may evaluate the BMPs currently being employed and determine if additional BMPs may result in attaining the metrics. If changes to existing BMPs or implementation of additional BMPs are determined to likely result in attaining the assessment metrics, the County will describe the proposed modifications and the schedule for effecting the modifications as part of the Annual Monitoring Report. Where assessment metrics are not met, the County will be in compliance with the TMDL by completing the BMP evaluation, reporting the results and schedule for changes as appropriate in the Annual Monitoring Report, and, as appropriate, implementing the identified changes.

The TMRP is designed to address the following requirements:

- Assessment and Monitoring
    - Establish nonpoint source monitoring requirements
    - Develop initial monitoring protocols, locations, and frequencies
        - MFAC assessment program for Beaches and Harbors (nonpoint sources)
        - MFAC assessment program for Non-Beach Open Space and Parks (nonpoint sources)
        - Evaluation of trash generation rates from nonpoint source areas
    - Establish reporting requirements
- BMP Implementation
    - Prioritize High Trash Generation Areas (point and nonpoint sources)
    - Evaluate and identify most appropriate Full Capture Systems (FCS) or Partial Capture Systems (PCS)/BMPs to install or implement (point and nonpoint sources)
    - Evaluate MFAC/BMP program effectiveness (nonpoint sources)
- Point source implementation
    - Outline FCS sizing.
    - Propose definitions for “major rain event” and “proper operation and maintenance”

Trash receptacles placed for proposer disposal of unwanted items, and cleanup events to collect trash, are the major BMPs of the MFAC program. The following are the proposed collection and monitoring procedures that will be used for the TMRP:

MFAC Collection Program:

- Maintain existing daily cleanup events for Beaches, Harbors, and Burton Chace Park.
- Implement daily cleanup events for trash source areas of Beaches, Harbors, and Burton Chace Park.
- Continue conducting as-needed cleanup events for Non-Beach Open Space and Parks.

Assessment program for MFAC:

- Define MFAC Assessment Sites.
- Visually survey and collect any trash within 100 foot long site reach at defined locations immediately after a cleanup event. If any trash is found, it will likely necessitate additional field staff training or evaluation of modified collection procedures to capture all trash.

Evaluation program and definition of trash generation rate for nonpoint source areas:

- Define Source Area Evaluation Sites.
- Collect all trash within evaluation area at defined locations in the late afternoon before dusk, and weigh the trash collected.
- Extrapolate the collected trash data from evaluation sites to the whole location (e.g., a beach) for comparison with the benchmark.
- Demonstrate a decreasing trend in trash generation rates over time.

Trash Monitoring Program

- Conduct monitoring as per the MS4 permit, if so required.

The proposed components of the monitoring program and the purposes they serve in the TMRP for meeting the TMDL requirements are listed in Table 1, in addition to the frequency at which the components of the program will be conducted.

Table 1. Proposed Components of the MFAC Program and the Frequency of Implementation.

Component	Purpose	Frequency
MFAC Collection Program (Cleanup Events)	Zero-trash requirement to be met immediately after cleanup events	Daily for Beaches and Harbors Daily for source areas of Beaches and Harbors Daily for Non-Beach Open Space and Parks near shorelines
MFAC Assessment Sites	MFAC assessment that zero-trash metric has been met immediately after cleanup events	Annually for Beaches and Harbors Annually for Non-Beach Open Space and Parks
Source Area Evaluation Sites	Collection of trash to determine trash generation rate for specific areas	Semi-annually for Beaches and Harbors Semi-annually for Non-Beach Open Space and Parks
Point Sources	Determination of attaining the specified point source WLAs and progressive reduction	None. Assumes all County point sources will be implementing full capture Assumes monitoring of MS4 system and drainage channels will be addressed through the MS4 permit

In addition, the County TMRP will serve as the monitoring guidelines and procedures that will be used for the MFAC/BMP program effort. Any changes and revisions to the described procedures will be included with annual monitoring reports. The MFAC/BMP program as defined in the BPA is “Established at an interval that prevents trash from accumulating in deleterious amounts that cause nuisance or adversely affect beneficial use between collections”.

MFAC/BMP Program Requirements

The MFAC/BMP program applies to nonpoint sources only. Requirements for the MFAC/BMP program are associated with TMRP requirements and are as follows:

- Develop initial minimum frequency of monitoring and collection, as well as protocol and locations (nonpoint sources)
    - Collection and monitoring program for Beaches and Harbors
        - Routine trash generation rate evaluation
    - Collection and monitoring program for Non-Beach Open Space and Parks
        - Routine trash generation rate evaluation
- Implement an initial suite of structural and/or nonstructural BMPs
- Develop Health and Safety Plan

Data and results gathered from the MFAC/BMP program will assist in determining TMRP required BMP Implementation actions and may additionally affect monitoring protocols, locations, and frequencies.

GENERAL APPROACH

The County will initially use the default baseline load allocations (LAs) for nonpoint sources and the default WLA for point sources, as given in the BPA (see **Comparison with Established Baselines** section). The County TMRP proposes the following procedures for meeting the TMDL requirements as listed in the BPA:

1. Conduct initial TMRP actions to meet the following goals:
    a. Cleanup events (no monitoring), conducted daily to remove trash from Beach and Harbor shorelines, Beach and Harbor source areas, and Harbor waters.
    b. MFAC assessments, conducted annually immediately after a cleanup event to ensure all trash is collected.
    c. Evaluation of source areas, conducted semi-annually with collection conducted in late afternoon before dusk to determine if the trash generation rate is decreasing and whether the trash is accumulating at a rate deleterious to beneficial uses.
2. Prepare a monitoring report one year from the start of the required monitoring[2] and each year thereafter that provides the following information:
    a. Results of all nonpoint source monitoring efforts
        i. MFAC assessment results
        ii. Source area evaluation results
        iii. Number of cleanup, MFAC assessment, and source area evaluations conducted
    b. Summary of all efforts implemented at point sources
        i. Number of installed FCSs and percent of coverage
        ii. Summary of any point sources not addressed with FCSs
        iii. Description of point sources to be addressed the following year
    c. Determine if the County is within with TMDL assessment metrics
        i. Zero trash after MFAC assessment events
        ii. Trash generation rates below baseline
        iii. Reduction in trash generation rates
    d. Discussion of effectiveness of the MFAC/BMP program
    e. If necessary, proposed revisions to the MFAC/BMP program and TMRP, including:
        i. Assessment site revisions
        ii. Evaluation site revisions
        iii. Monitoring frequency revisions

[2] The start of the required monitoring program will be based upon receipt of the Regional Board Executive Officer's approval letter

iv. BMP implementation revisions.

These proposed procedures comprise a tentative list that may be modified after the monitoring efforts begin. Any major deviations will warrant Regional Board notification. The annual reports will incorporate TMRP results and description of components and/or elements added or modified by the County.

PROGRAM COVERAGE

The Basin Plan Amendment (BPA) lists numerous responsible parties who are not participating in the County TMRP effort and are not covered by any component of the County TMRP. The County is assuming that non-participating responsible parties will implement their own plan/s and the Regional Board will enforce all requirements associated with BPA milestones and requirements in an equitable manner to ensure that the trash impairments are addressed in all listed areas.

The TMRP is developed to assess and evaluate the trash collection and generation rate in areas under the County jurisdiction. Specifically, the beaches may receive trash from areas outside the County jurisdiction, including from Caltrans (Pacific Coast Highway) and storm drain discharges from upstream non-County urban areas. The site selection and monitoring presented herein are designed to exclude to the extent possible trash emanating from areas outside of County control.

As subsequent implementation efforts take place, other parties within the watershed may agree to join this implementation effort, whereupon modified procedures (e.g., notification to the Regional Board of party joining the effort, increased sampling and/or MFAC/BMP program requirements, and reporting requirements covered under the joint effort) will be followed.

TRASH COLLECTION PROCEDURES

Trash collection will occur primarily through cleanup events, which occur generally on a daily basis at Beaches and Harbors. Secondary trash collection may occur through source area evaluation events. Ideally, there will be no trash remaining during MFAC assessment events, which are scheduled to occur immediately after the primary cleanup events, however, remaining trash collection will be collected and weighed. A schedule of monitoring events including cleanup, MFAC assessment, and source area evaluation events is provided in Table 2.

Cleanup Events

Cleanup events will include collection of trash from sandy beach areas and harbor waters. A specific protocol is not required for collection procedures occurring at cleanup events. As long as the frequency of cleanup events meets the frequencies specified herein, the County may use any methods or techniques desired for trash collection at cleanup events.

Monitoring, Assessment, and Evaluation Approach

For the TMRP, MFAC monitoring sites are identified for locations that fall under County jurisdiction. Depending on existing monitoring and assessment activities at each of these sites, changes in monitoring may be proposed in the future to refine the evaluation and assessment of the MFAC/BMP program. The intent of the monitoring and assessment approach is to ensure that the MFAC program requirements are being met, and to utilize available resources to the extent possible to meet other TMRP requirements so that duplicative efforts are minimized.

MONITORING SITE LOCATION APPROACH

The impaired locations listed in the BPA consist of broadly defined areas, including the waterbodies within the Santa Monica Bay WMA, the Santa Monica Bay, and the shoreline/beaches of the Santa Monica Bay. Adjacent land areas which may contribute trash to these areas (e.g., beaches, marinas, open spaces, and parks in the WMA) are also included. It is important to note that there are various leased or privately owned Beach and Harbor areas scattered along the Santa Monica Bay shoreline. Leased and privately owned areas are not addressed in the TMRP and are to be avoided when conducting TMRP and MFAC/BMP activities. Only areas owned by the County and maintained by DBH will be covered by the County TMRP. In addition, the unique topography in certain areas of the WMA contains dangerous and inaccessible areas, such as cliffs and bluffs, which cannot be safely cleaned of trash or monitored, as described in the Health and Safety Plan (see **Attachment B**).

The proposed approach for meeting both the MFAC and TMRP requirements includes the use of two types of monitoring sites:

- MFAC Assessment Sites (Assessment Sites)
- Source Area Evaluation Sites (Evaluation Sites)

The Assessment Sites are specific sites located adjacent to impaired waterbodies within the WMA, which are representative of the critical areas defined in the BPA. These sites are also considered a component of the MFAC/BMP program, and are used to monitor the assessment metric of no trash remaining after a cleanup event.

The Evaluation Sites will primarily be used to determine the trash generation rates for the nonpoint source areas. Data from Evaluation Sites will be used to help identify High Trash Generating Areas adjacent to selected Assessment Sites, evaluate the effectiveness of the MFAC/BMP program, and determine the assessment metrics to compare with TMDL baseline and trending reduction requirements.

Specific assessment and evaluation sites are listed in **Attachment A**. The following is a discussion of the site selections.

MFAC ASSESSMENT SITES

MFAC Assessment Sites (Assessment Sites) serve the following purpose under the TMRP:

- Allow for repeatable monitoring efforts and comparable data analysis to evaluate assessment metrics and the TMDL load allocation.

The Assessment Sites were selected for their representation of impaired areas as well as their safety and accessibility. Each Assessment Site is intended to provide a representative assessment of the County jurisdiction as listed in the BPA and locations for long-term assessment. For each Beach and Harbor location, generally one Assessment Site has been proposed.

Detailed monitoring of 100 foot sections of a shoreline will be conducted at each Assessment Site. Procedures for conducting monitoring are described in the **Monitoring Procedures** section of the TMRP report. Specific details pertaining to each site sampled will be included in subsequent annual monitoring reports.

SOURCE AREA EVALUATION SITES

The Source Area Evaluation Sites (Evaluation Sites) meet the following TMRP requirements:

- Evaluation of the trash generation rate for nonpoint sources.
- Measure over time for to determine trend.
- Evaluate the effectiveness of the MFAC/BMP program.

Evaluation Sites are focused in or around locations likely to be trash hotspots (e.g., parking lots, pay stations, recreation areas, and restaurants). Evaluation sites are generally areas that are cleaned on a daily basis. Monitoring procedures conducted at the Evaluation Sites will include weighing and photographing all trash that is collected. Monitoring procedures are described in the **Monitoring Procedures** section. No specific source identification data will be collected and the specific amount of information collected per Evaluation Site may vary based on feasibility, necessity of information, and accessibility of the site. Similar to the Assessment Sites, Evaluation Sites will not be located in areas deemed unsafe, inaccessible or on leased/private property where access has not been granted.

TMRP COVERAGE

The County will not be held accountable for other responsible parties not participating in the County TMRP effort (as listed in the **Overview**). The County will not be held responsible for any monitoring not conducted in the areas defined as being outside the Watershed or County boundaries characterized in Figure 1. Additionally, Trash TMDLs are effective for both the Malibu Creek and Ballona Creek Watersheds (both of which being part of the Santa Monica Bay WMA). The Malibu Creek and Ballona Creek Trash TMDL each specify the requirements for their respective areas, and are not readdressed here.

More specifically, the TMRP will cover locations deemed to be “source areas” within the WMA. Source areas[3] may be defined as locations that are in immediate proximity of the Santa Monica Bay, and thus have a strong likelihood of contributing trash directly to the waters of the Santa Monica Bay (i.e., all locations situated on a coastline waterfront, such as Beaches and Harbors). Though the TMRP will also address other locations that are likely to indirectly contribute trash to the waters of the Santa Monica Bay (e.g., Open Space and Parks not along a coastline waterfront), the only requirement for these sites will be to ensure trash is not discharged to Santa

[3] Distinct from “point source” and “nonpoint source” categorizations, which primarily serve to indicate the pattern of trash dispersion, can be used broadly to refer to any locations where trash may potentially be released, and may or may not also qualify as source areas

Monica Bay by conducting trash assessments as needed. Appropriate BMPs, which may or may not include a MFAC program, will be implemented to ensure trash is not discharged from these areas. More intensive monitoring procedures are applied at Beach and Harbor source areas, where the County plans to focus its resources. Monitoring efforts at Beaches and Harbor source areas are intended to capture all trash that would otherwise come in contact with the waters of the Santa Monica Bay.

The City of Hermosa Beach has elected to use the County TMRP and associated documents for Hermosa Beach. City of Hermosa Beach, not the County, will be solely responsible for implementation of the actions proposed in the TMRP for Hermosa Beach. Will Rogers, Venice, Dockweiler, and Point Fermin beaches will not be covered in the LA County Santa Monica WMA TMRP as the individual cities which have jurisdiction over these beaches plan to prepare separate TMRPs that will cover these locations. White Point/Royal Palms Beach will not be covered in the Santa Monica Bay WMA TMRP because shoreline conditions preclude MFAC Assessments and there are no suitable source areas under County jurisdiction. If such constraints change, the beach will be added to the TMRP and MFAC/BMP program requirements.

There is some likelihood that trash sources within the WMA that are not under County jurisdiction discharge trash to the selected monitoring locations in the TMRP, potentially causing an exceedance of the baseline WLA and/or LA. Such exceedances may likely occur with point and nonpoint sources or infrastructure maintained by Caltrans or other Municipal Separate Storm Sewer System (MS4) Permittees, especially under storm conditions. Since it is not currently feasible to differentiate County trash from non-County trash once it has been discharged and dispersed, the County will monitor all trash that is found in its source areas. For the TMRP, however, the evaluation sites are selected to exclude areas dominated by trash from non-County sources. The County will utilize all the strategies within its authority to achieve its allocations, pursuing any actions necessary to prevent or resolve such issues (e.g., obtaining necessary permits to install FCS or PCS in the infrastructure of the County flood control district). For the purposes of the TMRP, the County will assume that any further actions that are required[4] will be covered by the MS4 permits and addressed through requirements outlined within the respective permits. Documentation and discussion of these issues will be included in subsequent annual monitoring reports.

[4] Including visual monitoring and removal of trash, addressing fugitive trash deposited either illegally or through wind transport, and identifying and prioritizing areas of illicit discharge in all open channels and other MS4 drainage structures

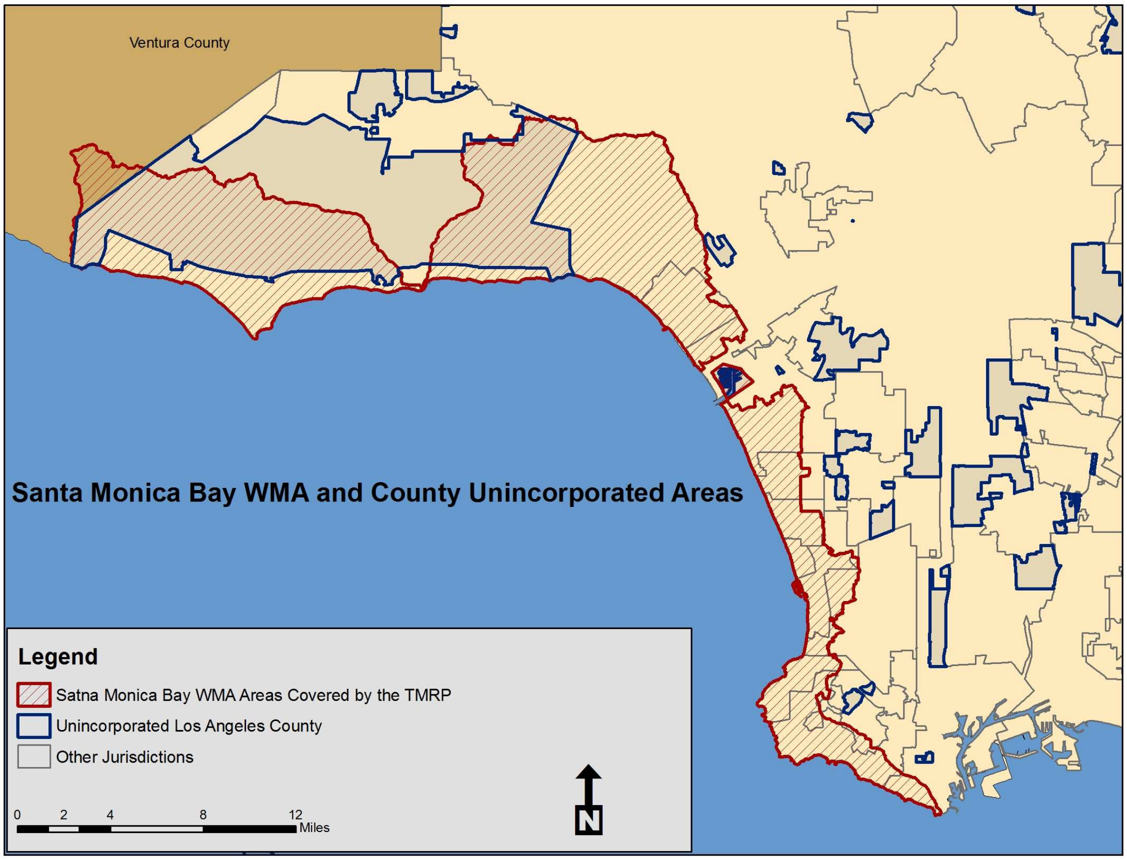

Figure 1. Santa Monica Bay WMA and County Unincorporated Areas

INACCESSIBLE AREAS

Areas of the WMA that are deemed inaccessible due to safety concerns or limited access will not receive cleanings and will not be assessed by the TMRP effort. Specifics on areas deemed inaccessible will be included in the annual monitoring reports.

MONITORING PROCEDURE APPROACH

Trash monitoring for the TMRP requires the collection of trash in a specified manner that allows for the generation of reproducible results that can be compared over time. Additionally, the monitoring procedure needs to define the metric that will be used to measure the trash collected. The standard procedures for each type of site (Assessment Site vs. Evaluation Site) also vary, with a more detailed approach used at the Assessment Sites. The procedures for monitoring can be found in the **Monitoring Procedures** section of the TMRP, and the Standard Operating Procedures for monitoring can be found in the **Standard Operating Procedures** section of the Health and Safety Plan.

The monitoring procedure approach that has been selected for the TMRP is to record the weight of trash collected.

Monitoring Locations and Frequencies

MONITORING SITE LOCATIONS

Assessment and Evaluation Sites are proposed for nonpoint sources owned by the County or maintained by DBH and are presented in **Attachment A**. Generally, each beach maintained by the DBH contains one Assessment Site and one Evaluation Site. Assessment and Evaluation Sites are summarized in Table 2.

Assessment Sites will be selected at locations where cleanup event assessment metrics will be measured. The level of monitoring effort for Assessment Sites should be minimal. These sites will be approximately 100 feet in length and follow the detailed procedures for identification and assessment given in the TMRP. The number of Assessment Sites will be based on the County's selected approach.

Evaluation Sites will be used to provide additional coverage requirements for the impaired areas listed in the BPA. These sites will be utilized for source area evaluation, assessment for Areas of High Trash Generation, and/or BMP effectiveness requirements. The level of effort for Evaluation Site monitoring will be greater than that required for Assessment Sites.

MONITORING FREQUENCY

The frequency of required monitoring for impaired locations listed in the BPA may vary from one to two times per year. The overview of the proposed frequency of cleanup, MFAC assessment, and source area evaluation events is presented in Table 2.

A summary of the event frequencies is as follows:

1. Total Assessment Sites = 13 (one per nonpoint source where site conditions permit)
    a. 11 sites monitored once per year (Beaches)
    b. 1 site monitored once per year (Harbors)
    c. 1 site monitored once per year (Non-Beach Open Space and Parks)
2. Total Evaluation Sites = 12 (one per Beach, Harbor, Open Space and Park)
    a. 10 sites monitored twice per year (Beaches)
    b. 1 site monitored twice per year (Harbors)
    c. 1 site monitored twice per year (Non-Beach Open Space and Parks)

Table 2. Proposed Monitoring Events in the Santa Monica WMA

Location	Event Frequency		
	Cleanup	Morning MFAC Assessment(1)	Afternoon Source Area Evaluation(2)
Beaches			
Nicholas Canyon Beach	Once per day	Annually	Semi-annually
Zuma Beach	Once per day	Annually	Semi-annually
Point Dume Beach	Once per day	Annually	Semi-annually
Latigo Shores Beach	Once per day	None(3)	Semi-annually
Dan Blocker Beach	Once per day	Annually	None(4)
Malibu/Surfrider Beach	Once per day	Annually	None(4)
Las Tunas Beach	Once per day	None(3)	Semi-annually
Topanga Beach	Once per day	Annually	Semi-annually
Marina Beach	Once per day	Annually	Semi-annually
Manhattan Beach	Once per day	Annually	None(4)
Hermosa Beach	Once per day	Annually	Semi-annually
Redondo Beach	Once per day	Annually	Semi-annually
Torrance Beach	Once per day	Annually	Semi-annually
White Point/ Royal Palms Beach	Once per day	None(3)	None(4)
Harbors			
Marina Del Rey	Once per day	Annually	Semi-annually
Non-Beach Open Space and Parks			
Burton Chace Park	Once per day	Annually	Semi-annually

(1) MFAC assessments performed immediately after cleanup events, generally at one site per location
(2) Source Area evaluations performed generally at one site per location
(3) Shoreline conditions preclude MFAC Assessments
(4) No suitable source areas under County jurisdiction

MFAC Assessment Sites

MFAC assessments at Beaches and Harbors will be performed on an annual basis, immediately following a cleanup event. Cleanup events at Harbor shorelines and sandy areas of Beaches are performed on a daily basis year round.

Burton Chace Park in Marina del Ray is the only park within the County jurisdiction identified as potentially contributing trash to beach shorelines or harbor waters. DBH performs daily cleanups at Burton Chace Park. Annual MFAC assessments will be conducted at Burton Chace Park. If other Non-Beach Open Spaces and Parks are found to be source areas of trash to the Santa Monica Bay shoreline or Harbor waters, then appropriate BMPs will be defined and applied to these areas. Instead of conducting MFAC assessment at other Non-Beach Open Spaces and Parks, however, the County may opt to focus its resources on monitoring efforts at Beaches and Harbors where trash has the highest likelihood of making contact with the waters of the Santa Monica Bay.

No point source monitoring is proposed because it is anticipated that all County point sources will be addressed through full capture. FCSs are designed to capture any particles measuring 5 millimeters or more in any direction, and will be sized for the peak flow rate of a “major rain event”, defined as a one-year, one-hour storm in the subdrainage area. For full capture, the County will use connector pipe screen (CPS) devices.[5]

A CPS device is a vertical screen with 5 mm openings, installed inside a catch basin directly upstream of the connector pipe in such a manner that all water entering the basin must pass through the device. A vertical opening is provided around the perimeter of the screen to allow storm water to bypass in the event of a large storm or if the screen becomes clogged. CPS devices are currently manufactured and installed by Advanced Solutions (Stormtek) and American Storm Water (Debris Dam). CPS screens and bypass openings will be sized according to the recommendations and procedures given in the County CPS design manual.[6]

The purpose of a Connector Pipe Screen (CPS) is to contain trash within a catch basin and exclude it from the storm drain system. As such, routine maintenance will likely be necessary to remove trash from the catch basin to prevent it from accumulating to a point that would affect the performance of the CPS or the catch basin itself. Per the County CPS design manual, “proper operation and maintenance” will be defined as inspecting and cleaning each catch basin each year (e.g., at least once between May 1 and September 30), as well as inspecting and providing additional cleaning of any catch basin that is at least 40% full of trash and/or debris.

The County will perform phased implementation of FCSs at point sources over an eight year period. See Table 4 for a schedule of planned FCS implementation. If FCSs cannot be or are otherwise not implemented at point sources, trash generation rate monitoring procedures will need to be implemented. Monitoring at these locations will use the weight of trash collected from the catch basins not draining to a FCS.

For MFAC assessment sites, the proposed schedule of monitoring frequency is given in Table 2.

Source Area Evaluation Sites

Source area evaluation will be performed at Beaches and Harbors source areas on a semi-annual basis. For both Beaches and Harbors, source area evaluation will be conducted in the afternoon. To optimize usage of County resources, the frequency and locations of subsequent (e.g., year two) Evaluation Site monitoring may be modified upon review of the data gathered. As listed in the BPA, after the first year effort, monitoring frequencies may be revised pending review of the data collected through the MFAC/BMP program. A proposed monitoring schedule for Evaluation Sites is given in Table 2.

The County will initiate the given monitoring program within six months from the receipt of a letter of approval from the Regional Board Executive Officer (E.O.).

[5] CPS devices were certified by the Regional Board as an approved full-capture device on August 1, 2007

[6] Connector Pipe Screen Design: Full Capture TMDL Compliance, Screen and Bypass Sizing Requirements, Technical Report (April 2007), available at: http://www.waterboards.ca.gov/rwqcb4/water_issues/programs/tmdl/fcc/la%20county%20full%20capture%20request%20package.pdf

Monitoring Event Preparation

Monitoring events should only be conducted during daylight hours under safe weather conditions. The weather forecast should be checked immediately prior to each monitoring event. Monitoring events will not occur during or immediately after storm events. Precipitation events within the WMA can cause elevated water levels and unsafe conditions. If at any time during a monitoring event, field personnel feel that site conditions are unsafe for any reason, the event should be abandoned and the project manager notified of the situation.

Prior to mobilization for each monitoring event, field personnel should prepare the equipment necessary to conduct the trash assessment monitoring event. Required equipment is listed in Table 3.

Table 3. Equipment Checklist

Required Trash Assessment Items	
☐ First Aid Kit ☐ Cellular Telephone ☐ Copy of TMRP document	☐ Large Trash Bags (e.g., Green 'N' Pack Eco Friendly Lawn & Leaf Bags [30" x 33" x 1.1 mil, 30 gallon] or Glad ForceFlex Lawn Drawstring Bags [32.5" x 38" x 1.1 mil, 39 gallon])
☐ Trash Monitoring Worksheets	☐ Work Gloves/Medical Gloves
☐ Hazardous Material/Intractable Trash Logs	☐ Sharps Container
☐ Clipboard	☐ Digital Camera
☐ Notebook	☐ Garbage Bag Tags
☐ Pens/Pencils and Permanent Marker	☐ Scale (e.g., Hand-Held Scale)
☐ Side Pack/Messenger Bag	☐ Hiking Boots
☐ GPS Unit	☐ Wader Boots
☐ Measuring Wheel/Tape Measure	☐ Maps and Aerial Photos
☐ Cones/Flagging Stakes	☐ Sunscreen Lotion
☐ Timepiece	☐ Hat/Sunglasses
☐ Trash Grabber (e.g., Ettore 49036 Grip 'n Grab)	☐ Coins and small bills for parking

Additionally, any necessary permits required for access to restricted areas and/or trash removal will be obtained prior to the monitoring event.

SITE DEFINITION

For all monitoring locations, site locations have been identified as listed in the **Monitoring Site Locations** section. At each of the selected monitoring locations (see **Attachment A**), monitoring will take place at a defined 100 foot section of the impaired area that is identified as the monitoring site. All subsequent monitoring events will take place within the same identified 100 foot area. If for any reason the location of a site is modified during an assessment event, the field crews will need to note the change and contact the project manager of the deviation.

Site Length

When the site is first established the 100 foot section will be accurately measured that includes sinuosity of the location. The length should be measured as the actual shoreline, channel/drain, open space, or park length (including curves), not necessarily in a straight line. Where possible, the upper and lower boundaries of each site should be identified by clearly visible and fixed landmarks, such as structures or natural formations that are notable. If possible, the boundaries may be flagged or physically marked to save time during subsequent assessment events. In addition, GPS coordinates should be recorded for the boundaries of each site during the first event. Again, if a section of the length is blocked or deemed inaccessible, the site can be moved to a more accessible location but any move will need to be noted and the project manager notified upon completion of the event.

Site Width

During the first site visit, the field team will document the transverse boundaries of the lengths to be monitored. For trash assessment events at Beaches, the site boundaries will be defined by the area between the current visible high-water line or beach crest[7] and the lowest level to which the water recedes. For trash assessment events at Non-Beach Open Space and Parks as well as trash evaluation events at all nonpoint sources, site boundaries will be five to ten feet wide and will represent the areas within which trash can be carried to the waterbody by wind or water. For trash assessment events at Harbors, the site boundaries will be confined to the water. As appropriate, the boundaries may be defined by a physical structure, such as a fence or roadway, and will be documented in field notes and/or with digital photographs. Subsequent monitoring events will follow similar procedures within the same specified boundaries. If unable to resample previous areas, field crews will note the change and reason for the change in the monitoring worksheets.

[7] The approximate line along and closest to a shoreline where the slope of the beach changes in steepness due to wave action. No sand or rocks wetted by waves will be found above the current visible high-water line or beach crest.

Monitoring Procedures

For the required monitoring events, trash will be collected following standard operation procedures as outlined in the TMRP. The amount of effort per event will vary based on the types of sites being monitored for that specific event. In particular, the BPA specifies that assessment shall focus on the shorelines or interface along Santa Monica Bay. However, procedures as outlined in TMRP are still required to be followed. During each monitoring event the weight of trash will be recorded. As such, the amount of trash will be determined using weight of trash as the standard metric.

MFAC Assessment and Source Area Evaluation Events

During each MFAC assessment and source area evaluation event at each site, a crew comprised of a minimum one or two-person monitoring crew will move through the entire Assessment Site or Evaluation Site. Though there should be no trash present at Assessment Sites during an assessment event, the monitoring crew will note and collect any trash not captured by the prior collection event. Trash collected during an assessment event will be weighed and recorded. At Evaluation Sites and Assessment Sites, the monitoring crew will collect and weigh every piece of trash[8] found. Collecting all trash items will allow the site to be revisited and re-assessed for impairment and usage patterns. No waste receptacles will be covered by MFAC assessment and source area evaluation efforts.

A trash grabber or similar tool (e.g., metal kitchen tongs) should be used to help pick up trash. It is important to look under vegetative cover to see if trash has accumulated beneath. The ground and substrate should be inspected to ensure that small items are picked up and collected.

*****To avoid injury while picking up trash, team members should always wear gloves and avoid touching trash with unprotected hands*****

All collected trash shall be placed in trash bags and weighed to determine the weight of trash collected at each site. The amount of time needed for the trash monitoring should also be recorded.

To account for items which are too heavy to be lifted or are embedded in the area (e.g., boats that wash up during storms), referred to as intractable or "legacy trash", specific notes will be written on the trash monitoring worksheet (along with GPS coordinates and/or digital photographs) as to avoid noting the same item/s during the next monitoring event. Legacy trash items will need to be removed by qualified individuals with appropriate equipment, therefore the monitoring crew will not attempt to remove these items themselves.[9]

Prior to deployment, the monitoring crew shall be informed or trained as to what hazardous materials are and may potentially be, and how to safely remove these items. If a potentially hazardous item is found during the assessment, the crew will not touch or move the item but shall inform the lead field technician. If the lead field technician determines that the item cannot

[8] Trash as defined in the TMRP

[9] Intractable or legacy trash is usually heavy and will interfere with assessment and evaluation efforts, which use weight as the single metric for measuring amounts of trash

be safely removed, the location of the item will be documented (along with photographs and/or GPS coordinates). Hazardous material identification and removal is further defined in the Health and Safety Plan along with a detailed list of items that are considered “Hazardous” and banned from disposal in the trash. More information can be found on the California Integrated Waste Management Board Website: www.ciwmb.ca.gov/hhw/info/. The appropriate authorities will be contacted immediately for removal of the hazardous item(s), if proper training or collection materials are not available to the monitoring crew.

MFAC ASSESSMENT SITE PROCEDURES

MFAC assessment will occur at Beaches and Harbors as well as Non-Beach Open Space and Parks. While monitoring Assessment Sites, the field crew will fill out a trash Monitoring Worksheet (**Attachment D**). Trash MFAC assessment will be conducted using the following procedures:

At Beaches

Before the first event at each site, set the specific shoreline location for the reference endpoints. Provide the coordinates for the two reference endpoints of each site, as located along the current visible high-water line or beach crest. Each site reach must be approximately 100 feet in length. Also provide a description for the general location.

1. Immediately after a cleanup event at each designated site, at least one field crew member will be deployed for the follow-up assessment event.

2. A Monitoring Worksheet will be used to record observations and notes. If available, multiple individuals can participate in an assessment event, but only one individual is to be recording information on the Monitoring Worksheet in order to minimize the potential for errors.

3. Using the description and coordinates of the reference endpoints, find the approximate location at which to begin the assessment.

    a. If for some reason it is not possible to access an endpoint or entire site, note the reason/s and contact the project manager for further directions.

    b. If project manager is unavailable, note the time of the visit and continue on to the next site.

4. Record the coordinates for each of the two corners of the starting location.[10] The distance between these points should encompass the site width to be monitored, with the higher point situated on the current visible high-water line or beach crest and the other point on the lowest level to which the water recedes.

5. Before beginning the assessment, record the starting time.

[10] If a line were drawn between the two corner points, the line would lie roughly perpendicular to the adjacent shoreline.

6. Proceed to walk along and visually sweep the shoreline area between the current visible high-water line or beach crest and the lowest level to which the water recedes. Look carefully for any articles of trash. Head towards the far end of the 100 foot reach, noting and collecting any trash that may be found within the site. Make additional notes as appropriate, and check the GPS device every so often to ensure that assessment efforts are confined to the approximate designated location.

7. If large items are identified or hazardous materials are found, follow the procedures in the **Identified Hazardous Materials and Intractable Trash** section of the Health and Safety Plan.

8. Upon arriving at the approximate end location, record the stop time and then record the coordinates of each of the two corners of the end location.

9. Take a digital photograph to document the cleanliness of the site.

10. Complete any remaining relevant portions of the Monitoring Worksheet.

If the monitoring group identifies a more efficient and/or modified method to record monitoring information, the method will be noted in the subsequent annual report.

At Harbors

Before the first event at each site, set the specific shoreline location for the reference endpoints. Provide the coordinates for the two reference endpoints of each site, as located along land-water interface. Each site reach must be approximately 100 feet in length. Also provide a description for the general location.

1. Immediately after a cleanup event at each designated site, at least one field crew member will be deployed for the follow-up assessment event.

2. A Monitoring Worksheet will be used to record observations and notes. If available, multiple individuals can participate in an assessment event, but only one individual is to be recording information on the Monitoring Worksheet in order to minimize the potential for errors.

3. Using the description and coordinates of the reference endpoints, find the approximate location at which to begin the assessment.

    a. If for some reason it is not possible to access an endpoint or entire site, note the reason/s and contact the project manager for further directions.

    b. If project manager is unavailable, note the time of the visit and continue on to the next site.

4. Record the coordinates for each of the two corners of the starting location.[11] The distance between these points should encompass the site width to be monitored.

5. Before beginning the assessment, record the starting time.

6. Proceed to move along and visually sweep the general area. Look carefully for any articles of trash. Head towards the far end of the 100 foot reach, noting and collecting any trash that may be found within the site. Make additional notes as appropriate, and check the GPS device every so often to ensure that assessment efforts are confined to the approximate designated location.

7. If large items are identified or hazardous materials are found, follow the procedures in the **Identified Hazardous Materials and Intractable Trash** section of the Health and Safety Plan.

8. Upon arriving at the approximate end location, record the stop time and then record the coordinates of each of the two corners of the end location.

9. Take a digital photograph to document the cleanliness of the site.

10. Complete any remaining relevant portions of the Monitoring Worksheet.

At Non-Beach Open Space and Parks

Before the first event at each site, set the specific endpoints by providing coordinates for each of the four corners of the site. Each site reach must be 100 feet in length and at least 5 to 10 feet in width. Also provide a description for the general location.

1. Immediately after a cleanup event at each designated site, at least one field crew member will be deployed for the follow-up assessment event.
2. A Monitoring Worksheet will be used to record observations and notes. If available, multiple individuals can participate in an assessment event, but only one individual is to be recording information on the Monitoring Worksheet in order to minimize the potential for errors.

3. Using the description and coordinates of the endpoints, find the approximate location at which to begin the assessment.

    a. If for some reason it is not possible to access an endpoint or entire site, note the reason/s and contact the project manager for further directions.

    b. If project manager is unavailable, note the time of the visit and continue on to the next site.

[11] If a line were drawn between the two corner points, the line would lie roughly perpendicular to the adjacent shoreline.

4. Record the coordinates for each of the two corners of the starting location. The distance between these points should encompass the site width to be monitored.

5. Before beginning the assessment, record the starting time.
6. Proceed to walk along the length of the reach, visually sweeping across the width. Look carefully for any articles of trash. Head towards the far end of the 100 foot reach, removing any trash that may be found within the site for subsequent weighing. Make additional notes as appropriate, and check the GPS device every so often to ensure that assessment efforts are confined to the approximate designated location.

7. If large items are identified or hazardous materials are found, follow the procedures in the **Identified Hazardous Materials and Intractable Trash** section of the Health and Safety Plan.
8. Upon arriving at the approximate end location, record the stop time and then record the coordinates of each of the two corners of the end location.

9. Take a digital photograph to document the cleanliness of the site.

10. Complete any remaining relevant portions of the Monitoring Worksheet.

MFAC Assessement Site Completion

Following the completion of the site assessment, the team should check the Monitoring Worksheet for completion. The total time for the assessment event, including start time and end time, should also be noted on the worksheet. It is important to complete the worksheets before leaving the site while the memory is still fresh.

Observations about the condition of the site, locations of any possible trash found, potential contributing sources, and other observations should be recorded in the appropriate spaces on the trash monitoring worksheet.

SOURCE AREA EVALUATION SITE PROCEDURES

The effort for the Evaluation Site monitoring will include trash collection and take place at a later time of day. Trash collection may include items on the ground or items caught within structures or vegetation, but will exclude all items contained within waste receptacles. Source area evaluation will occur at Beaches and Harbors as well as Non-Beach Open Space and Parks. Evaluation procedures are as follows:

At Beaches, Harbors, Non-Beach Open Spaces and Parks

Before the first event at each site, set the specific endpoints by providing coordinates for each of the four corners of the site. Each site reach must be 100 feet in length and at least 5 to 10 feet in width. Also provide a description for the general location.

1. In the late afternoon before dusk, at least two field crew members will be deployed for an evaluation event. A Monitoring Worksheet will be used to record observations and notes, but only one individual is to be recording information on the worksheet to minimize the potential for errors.

2. Using the description and coordinates of the endpoints, find the approximate location at which to begin the assessment.

    a. If for some reason it is not possible to access an endpoint or entire site, note the reason/s and contact the project manager for further directions.

    b. If project manager is unavailable, note the time of the visit and continue on to the next site.

3. Before beginning the evaluation, record the start time.
4. Proceed to walk along the length of the reach, visually sweeping across the width.
5. Collect any articles of trash found, heading towards the far end of the 100 foot reach. Make additional notes as appropriate, and check the GPS device periodically to ensure that evaluation efforts are confined to the approximate designated location.

    a. In areas where large amounts of trash are accumulating, note any observations on the Monitoring Worksheet.

    b. If large items are identified or hazardous materials are found, follow the procedures in the **Identified Hazardous Materials and Intractable Trash** section of the Health and Safety Plan.

6. Upon arriving at the approximate end location, record the stop time and then record the coordinates of each of the two corners of the end location.

7. Take a digital photograph to document the cleanliness of the site.

8. If trash was found and a trash bag used to contain items found within the site, secure the bag opening and label the bag with the site name and date.

9. Use a hand-held scale to weigh the bag. Record the weight on the Monitoring Worksheet.

10. Complete any remaining relevant portions of the Monitoring Worksheet.

Source Area Evaluation Site Completion

Following completion of the site, the team should check the Monitoring Worksheet for completion. The total time for the collection event, including start time and end time, should also be noted on the worksheet. General site observations should be recorded on the trash monitoring worksheet as well. It is important to complete the worksheets before leaving the site while the memory is still fresh.

POST-EVENT ACTIVITIES

At the completion of source area evaluation events, all collected trash will be taken to a County facility. At the County facility, all trash will be placed in a dumpster and subsequently be sent to a landfill or recycling facility for appropriate disposal.

The contracted agency should make all reasonable attempts to recycle the materials collected during the event, with time permitting. The recycling of materials is not a requirement of the TMDL or the TMRP/MFAC and is at the discretion of the contractor. If items are too large to remove or are deemed hazardous or “Legacy Trash”, the contractor shall immediately contact the program manger to initiate removal of the items.

In addition, the trash generation rate will be calculated at the completion of source area evaluation events. Dividing the weight of trash collected by the site length (Beaches and Harbors) or area (Non-Beach Open Space and Parks) will yield an approximated site-specific trash generation rate, which may be used to estimate the trash generation rate for the entire location. For trash generation rate calculations, site length will be 100 feet and site width may be calculated using the coordinates of the monitored area, as recorded on a Monitoring Worksheet. The collected data will be used to inform the annual report in assessment of the comparison to baseline and, over time, evaluation of reducing trend in the rate.

Special Circumstances for Safety Consideration

Within the Santa Monica WMA there are several potentially hazardous factors that exist. One of these is the potential to encounter homeless individuals that are known to occupy the area. The other factors include steep cliffs and access trails, ocean currents, confined spaces, and invasive species. The potential for these special circumstances are discussed in more detail below and in the Health and Safety Plan (**Attachment B**). The Health and Safety Plan provides a more comprehensive review of special circumstances for safety consideration, including additional special circumstances not covered in the TMRP. Cleanup, assessments, and evaluations will not occur in areas with safety concerns.

HOMELESS INDIVIDUALS AND PROPERTY

There is the potential for encounters and/or interactions with homeless individuals during trash collection activities. The possibility of unknowingly collecting items which may be deemed property of a homeless individual may create the potential for a serious altercation. During any cleanup or monitoring event, field staff are required to use discretion in all interactions with individuals in the field (standard for any encounter, homeless or not) and should handle themselves in a professional and courteous manner. If at any time field staff feel uncomfortable or in danger, activities must immediately cease and all staff must return to a safe location. Field staff will record the amount of monitoring that took place prior to the work interruption, and note on the field sheets the end point location and time. If any situation escalates to a perceived dangerous level, field staff must immediately leave the area and contact the appropriate authorities. In the event that trash items appear to be property of a homeless individual, field staff should thus consider the items “Legacy Trash” and follow procedures outlined in the **Hazardous Materials and Legacy Trash** section of the Health and Safety Plan. Care must be taken when collecting pertinent data, and as previously stated, if at any time during monitoring or cleanup field staff feel threatened or in danger, cease all activities and move to a more secure location.

STEEP CLIFFS AND ACCESS TRAILS

Some of the assessment sites are located near or at the base of steep cliff sides and access trails. Commonly paired with crumbling earth, sharp rocks, and uneven terrain, the potential to slip and fall causing serious injury is possible at these locations, even during the driest of weather. Steep cliffs may also present the danger of landslides. Field crews will need to ensure that all precautions are taken when sampling adjacent to environments exhibiting these conditions. Field crews should avoid cliff sides and precarious trails, and identify safe routes to the designated sites. During assessment efforts, field crews should take caution when using dirt access trails and ensure that all procedures as outlined in the Health and Safety Plan are followed. Dangerous environments are deemed off limits during all assessment events.

OCEAN TIDES AND CURRENTS

The combination of ocean tides and rocky terrain often produce slippery surfaces. Especially when working in close proximity to the water, strong waves and/or rip currents may present additional dangers. Field crews should be aware of their surroundings at all times, take precaution when walking on wet surfaces, and consider wearing a pack to keep their hands as free as possible.

Collection, assessment, and evaluation events may be curtailed during periods of high surf.

CONFINED SPACES

At no time are field crews to enter any confined spaces, including storm drain outlets, freeway underpass tunnels, or any confined area located at or near a monitoring location. These confined spaces can include areas of dangerous gas buildup and other potential hazards that field crews will not be trained properly in addressing. If trash is accumulating in a confined space, notification will be given the project manager which will include a specific site location, a brief narrative of the observations, and the time and date of the observation.

Reporting Requirements

ANNUAL MONITORING REPORT

Each year, an annual monitoring report will be submitted to the Regional Board. The annual report will address Point Sources, Beaches, Harbors, and Non-Beach Open Space and Parks. Any instances of not attaining TMDL WLAs or LAs, TMRP, or MFAC/BMP Program provisions; and any BMPs proposed to address assessment metrics not meeting desired levels will also be described in the annual report.

Point Sources

For point sources, the County will:

- Include a report of the number and percent coverage of installed FCSs.
- State whether the County is attaining the TMDL schedule for installation.
- Provide an estimate of the number of point sources to be included in County efforts for the following year.
- Identify any point sources that cannot be fitted with a FCS (e.g., at a catch basin due to size constraints).

In the case that a point source is not suitable for or cannot be fitted with a FCS, the County will default to using a PCS or performing institutional controls to demonstrate the removal of trash at the daily generation rate (DGR). Institutional controls that are used at point sources without FCSs will be noted in the annual report.

Beaches

For Beaches, the County will:

- Provide a tabulation of the number of cleanup, assessment, and evaluation events conducted at shorelines and source areas.
- Include results from MFAC assessments.
- Include results from source area evaluations.
- State whether the County is attaining the following:
  - Zero trash after assessments
  - Trash generation rate below baseline
  - Trash generation rate at a reducing trend (evaluated beginning with the third annual report)

In the event any of the above are not achieved, the County will evaluate current BMPs and propose changes to existing BMPs or institute additional BMPs to ensure future assessment metrics are met in the future. Possible BMPs that may be implemented include providing additional training for field crew members, providing additional trash receptacles, or increasing legal enforcement for littering. If determined necessary, proposed modifications will be included in the Annual Report.

Harbors

For Harbors, the County will:

- Provide a tabulation of the number of cleanup, assessment, and evaluation events conducted at shorelines and source areas.
- Include results from source area evaluations.
- State whether the County is attaining the following:
    - Zero trash after assessments
    - Trash generation rate below baseline
    - Trash generation rate at a reducing trend (evaluated beginning with the third annual report)

In the event any of the above are not achieved, the County will evaluate existing BMPs and propose changes to existing BMPs or institute additional BMPs to ensure future assessment metrics are met in the future (e.g., additional training for field crew members, additional trash receptacles, and increasing legal enforcement for littering). If determined necessary, proposed modifications will be included in the Annual Report.

Non-Beach Open Space and Parks

For Non-Beach Open Space and Parks, the County will:

- Provide a tabulation of the number of cleanup assessment, and evaluation events conducted.
- Include results from MFAC assessments.
- Include results from source area evaluations.
- State whether the County is attaining the following:
    - Zero trash after assessments
    - Trash generation rate below baseline
    - Trash generation rate at a reducing trend (evaluated beginning with the third annual report)

In the event any of the above are not achieved, the County will evaluate existing BMPs and propose changes to existing BMPs or institute additional BMPs to ensure future assessment metrics are met in the future and include a description of any program modifications in the annual report.

TMRP/MFAC REVISION

All proposed revisions the County determines to be necessary to the TMRP and/or MFAC/BMP program will be proposed in the annual monitoring report. Revisions may include procedural modifications, increasing or reducing the frequency of MFAC assessment and collection, redefining “critical conditions” as given in the BPA, and changing the location or number of MFAC assessment and source area evaluation sites.

COMPARISON WITH ESTABLISHED BASELINES

To perform source area evaluation, the County will be using the baseline LAs and WLA as established in the BPA, for nonpoint sources and point sources, respectively.

Nonpoint Sources

For Beaches and Harbors, the data collected at Evaluation Sites will be used to compare trash generation rates to the TMDL default baselines. Additionally, monitoring sites are to show a decreasing trend of accumulation.[12] As mentioned in the BPA, compliance with the nonpoint source LAs may be achieved through the implementation of the MFAC/BMP program.

Point Sources

Point sources will be addressed using FCSs. A FCS "is any single device or series of devices that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate Q resulting from a one-year, one-hour, storm in the subdrainage area".[13,14] If there are physical constraints that prevent the usage of a FCS, alternative methods of compliance will be proposed on a case-by-case basis. As such, a small percentage of catch basins may require some combination of PCS/BMPs.

For the annual monitoring report, the County will prepare and include a plan outlining the proposed FCS installation schedule and/or PCS installation and BMPs to be implemented. Point sources will not be prioritized for FCS installation. For the TMRP, the County has identified 62 catch basins for inclusion as shown in Figure 2 of **Attachment A**. The projected general timeline for FCS installation at the identified point sources is given in Table 4.

Table 4. General Timeline for FCS Installation.

Final Date	Number of FCSs Installed(1)
March 20, 2016	13
March 20, 2017	25
March 20, 2018	38
March 20, 2019	50
March 20, 2020	62

(1) Based on 62 catch basins covered by the TMRP

CURRENT BMP EFFORTS

The County actively engages in a three-pronged approach for pollution prevention: 1) Education; 2) Incentives; and 3) Enforcement. Listed below are current trash management procedures or

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[12] A decreasing trend constitutes a negative slope when the data is graphed on a time series plot

[13] Per Resolution No. 04-023, adopted by the Regional Board on March 4, 2004

[14] "Rational equation is used to compute the peak flow rate: Q = C x I x A, where Q = design flow rate (cubic feet per second, cfs); C = runoff coefficient (dimensionless); I = design rainfall intensity (inches per hour, as determined per the rainfall isohyetal map), and A = subdrainage area (acres)."

BMPs that have been put in place by the County. The given BMPs, combined with the monitoring described in the TMRP, represent the initial MFAC/BMP program for the County. As new BMPs are implemented in the Watershed, this list will be updated to account for increased efforts. Each Annual Report will include the suite of BMPs employed for the corresponding year. Current BMPs include:

- Daily cleaning of all County-owned or operated beaches.
- Daily cleaning of all harbor waters.
- *Ordinances*
  - Title 12 Chapter 12.85 - Ban on plastic carryout bags
  - Title 17 Chapter 12.365 - Smoking prohibited on County beaches
  - Title 17 Chapter 4.645 - Smoking prohibited at County parks
  - Low Impact Development Ordinance - Reduce impacts from stormwater runoff
- *FCSs*
  - Ballona Creek Watershed - There are 368 catch basins that collect runoff from County-unincorporated communities located within the Ballona Creek Watershed. To date, the County has achieved a total 88.5 percent reduction to date with the installation of 333 full-capture devices and a 81.1 percent reduction based on a 3-year average for all of the County unincorporated areas within the Ballona Creek Watershed.
  - Malibu Creek Watershed - The County has installed 192 FCSs in catch basins within the Malibu Creek Watershed in unincorporated County areas.
- *Trash and Recycling Receptacles* - Wedded clamshell-lid trash and recycling cans have been installed at areas owned, operated, or otherwise maintained by the County. These receptacles are also marked with messages and images that encourage their usage.
- *Industrial and Commercial Inspections* - Annual inspections targeting facilities lacking minimum stormwater BMPs and housekeeping practices to reduce sources of trash.
- *Maintenance and Cleanup Activities* – Parking lot and street sweeping program with most streets swept on a weekly basis in unincorporated County areas.
- *Public Information and Participation Programs* - CleanLA public outreach program and website (www.888CleanLA.org) educates residents about stormwater pollution prevention. The CleanLA campaign teaches residents about proper disposal of waste and the importance of watershed protection. Information provided through these programs includes how to report illegal dumping, why it is important to prevent animal waste and general pollution from entering the storm drain system, and locations for proper RV sewage waste disposal. The creative multimedia campaign includes broadcast of stormwater pollution prevention messages through radio, television, billboards, newspapers, video aired on Metro buses, and the Internet.
- *Storm Drain Markers* - All storm drains in the unincorporated County are appropriately marked with a “no dumping” message.

- *Development Planning Program* - The County requires post-construction BMPs to reduce the impact of development on water quality including reducing the transport of trash via stormwater runoff.

S E P T E M B E R 2 0 1 2

Santa Monica Bay Watershed Management Area (WMA) Trash Monitoring and Reporting Plan (TMRP) - Monitoring Sites

Submitted to:

COUNTY OF LOS ANGELES

L A R R Y
W A L K E R
ASSOCIATES

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Proposed Monitoring Sites

Nonpoint and point sources are provided below, along with select monitoring sites for each nonpoint source. These sites highlight approximate areas of concern, and may exceed the 100 foot length to be used during the monitoring events. For the first monitoring event at each site, the County will select a 100 foot reach within or otherwise encompassing these sites and document the exact locations so that subsequent TMRP and MFAC/BMP program monitoring events will occur at the same locations so the results can be accurately compared. Proposed designations are included for sites that may be considered for monitoring (i.e., MFAC Assessment Sites [Assessment Sites or MFACs] and/or Source Area Evaluation Sites [Evaluation Sites or Evals]). Proposed Assessment Sites and Evaluation Sites were selected based on observations noted during preliminary site visits. The following general parameters were used to select sites:

- Proximity to structures and objects (e.g., parking lots, food stands, and trash cans)
- Physical/topographical features
- Amount of trash observed
- Volume, concentration, and flow of visitors
- Feedback from lifeguards.

NONPOINT SOURCES

Nonpoint sources include beaches and harbors, as well as non-beach open spaces and parks. The following nonpoint sources are organized by category and listed in sequential order, proceeding from northwest to southeast direction along the Santa Monica Bay coastline. Individual monitoring sites may or may not be listed in the same manner.

Beaches and Harbors

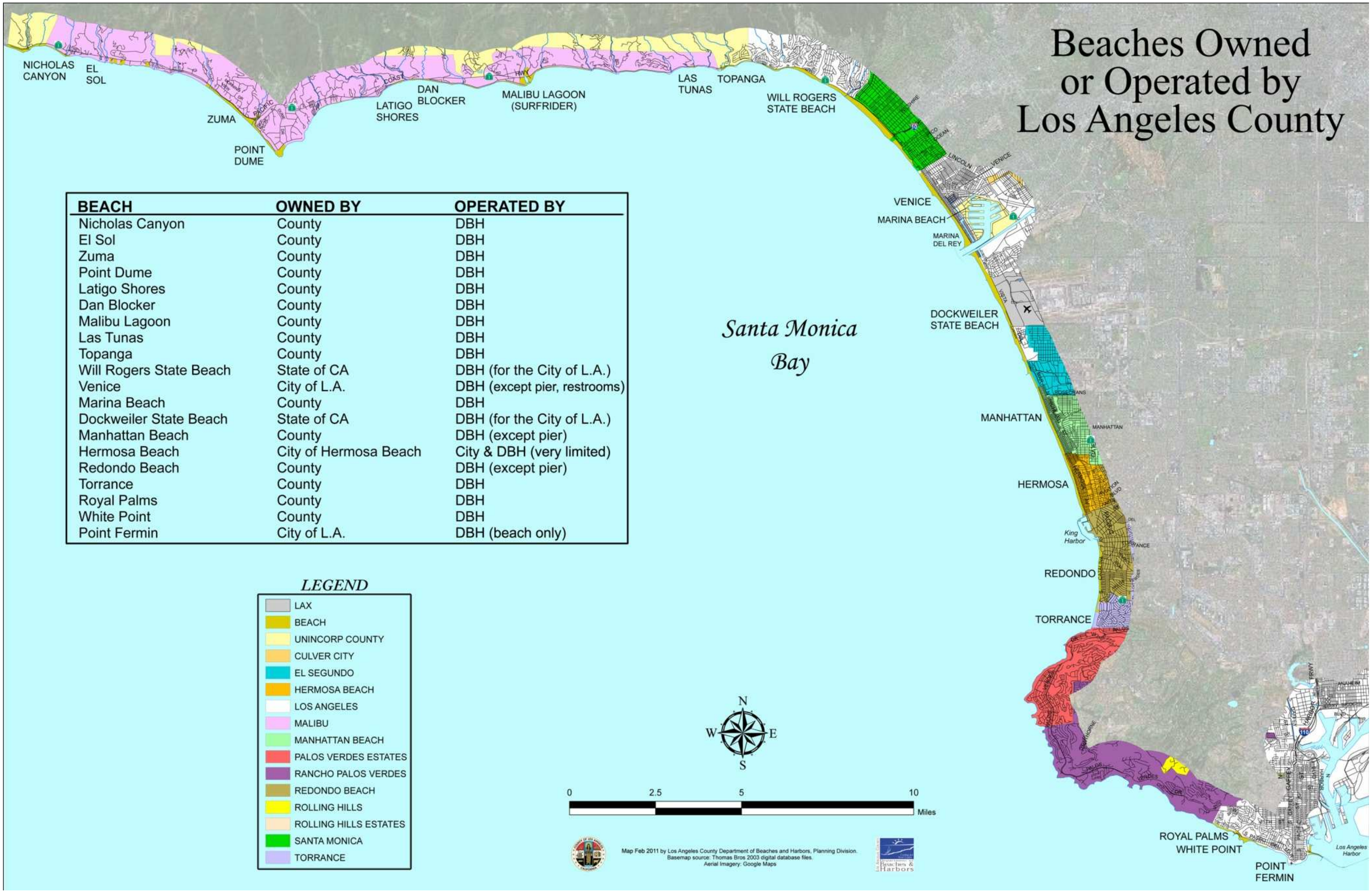
Beaches owned or operated by the County are shown in Figure 1. Preliminary site visits were conducted at the beaches of Nicholas Canyon, Zuma, Point Dume, Latigo Shores, Dan Blocker, Malibu/Surfrider, Las Tunas, Topanga, Marina Beach, Manhattan, Hermosa, Redondo, and Torrance.[1] Will Rogers, Venice, Dockweiler, and Point Fermin beaches will not be covered in the LA County Santa Monica WMA TMRP as the individual cities which have jurisdiction over these beaches plan to prepare separate TMRPs that will cover these locations. White Point/Royal Palms Beach will not be covered in the Santa Monica Bay WMA TMRP because shoreline conditions preclude MFAC Assessments and there are no suitable source areas under County jurisdiction. If such constraints change, the beach will be added to the TMRP and MFAC/BMP program requirements. A site visit was also conducted at Marina Del Rey Harbor. For details on

[1] El Sol Beach is situated at the base of a bluff-top and currently does not have an access trail. Since the beach can only be reached on foot by "making a 20-minute trek at low tide" over algae-covered rocks and the County does not currently have plans to access this location by boat, El Sol will be considered unsafe and inaccessible for the purposes of the Santa Monica Bay WMA TMRP. In the event the County further develops access to the beach, it will be added to the TMRP and MFAC/BMP program requirements. (http://wikimapia.org/5163129/El-Sol-County-Beach-Park-Public-Access-low-tide)

proposed MFAC Assessment and Source Area Evaluation sites at Beaches and Harbors, see Table 1.

Parks and Open Space

One Non-Beach Open Space and Park location was identified for inclusion in the TMRP. The identified location, Burton Chace Park, is located within Marina Del Rey. See Table 2 below for the proposed sites at Burton Chace Park.



BEACH	OWNED BY	OPERATED BY
Nicholas Canyon	County	DBH
El Sol	County	DBH
Zuma	County	DBH
Point Dume	County	DBH
Latigo Shores	County	DBH
Dan Blocker	County	DBH
Malibu Lagoon	County	DBH
Las Tunas	County	DBH
Topanga	County	DBH
Will Rogers State Beach	State of CA	DBH (for the City of L.A.)
Venice	City of L.A.	DBH (except pier, restrooms)
Marina Beach	County	DBH
Dockweiler State Beach	State of CA	DBH (for the City of L.A.)
Manhattan Beach	County	DBH (except pier)
Hermosa Beach	City of Hermosa Beach	City & DBH (very limited)
Redondo Beach	County	DBH (except pier)
Torrance	County	DBH
Royal Palms	County	DBH
White Point	County	DBH
Point Fermin	City of L.A.	DBH (beach only)

Figure 1. Beaches Owned or Operated by the County

Table 1. Proposed Assessment (MFAC) and Evaluation (Eval) Beach and Harbor Sites

Proposed Designation[1]					
MFAC	Eval	Location	Description	GPS Coordinates[2] (Lat, Long)	Notes
Nicholas Canyon Beach (NIC)					
✓		Shoreline (NIC_S1)	Area parallel to concrete emergency beach access ramp, all the way to edge of eroded stretch of ramp pavement	(34.0438,-118.9192)	Nearby trash can at ramp bottom seldom serviced; likely source of beach trash/debris
	✓	Parking lot (NIC_P)	Southeast corner, curbside closest to ocean	(34.0427, -118.9152)	Trash hotspot, trash also in dirt planters/caught in vegetation
Zuma Beach (ZUM)					
✓		Shoreline (ZUM_S1)	Adjacent to picnic tables/ parking lot	(34.0228, -118.8332) to (34.0218, -118.8318)	Well frequented, no trash
	✓	Shoreline (ZUM_S2)	Adjacent to volleyball courts/ parking lot on southeast end	(34.0153, -118.8229) to (34.0153, -118.8219)	Well frequented, no trash
Point Dume Beach (PTD)					
✓	✓	Shoreline (PTD_S1)	LG station 3-4	(34.0098, -118.8163)	Minimal trash
Latigo Shores Beach (LTS)					
	✓	Parking lot (LTS_P)	Roadside off PCH, east of intersection of PCH and Latigo Shores Dr.	(34.0312, -118.7497)	Lots of trash at road/fence interface
Dan Blocker Beach (DBL)					
✓		Shoreline (DBL_S2)	From outfall pipe (at given Lat/Long) to channel outflow underpass/bridg e west of LG station 2	(34.0329, -118.7329)	Well frequented

continued

Table 1. Continued.

Proposed Designation[1]					
MFAC	Eval	Location	Description	GPS Coordinates[2] (Lat, Long)	Notes
Malibu Lagoon/Surfrider Beach (MLS)					
✓		Shoreline (MLS_S3)	Approximate midpoint of beach	(34.0319, -118.6800)	Beach nearly clean and trash-free
Las Tunas Beach (LTN)					
	✓	Parking lot (LTN_P)	Dirt lot adjacent to LG station LT1, specifically next to concrete safety barrier and portable toilets	(34.0393, -118.5972)	
Topanga Beach (TOP)					
✓	✓	Shoreline (TOP_S1)	Between American Apparel and outfall (Topanga Creek)	(34.0378, -118.5841)	
Marina Beach (MAR)					
✓		Shoreline (MAR_S1)	At high water mark of eastern end bordered by riprap; near kayak/boat/dingy rentals and boat launch walkway	(33.9814, -118.4559)	Some trash
	✓	Parking lot (MAR_P)	Lot closest to gazebo barbeque/picnic table area, LG station, and buoyed swim area	(33.9816, -118.4586)	Moderate trash

continued

Table 1. Continued.

Proposed Designation[1]					
MFAC	Eval	Location	Description	GPS Coordinates[2] (Lat, Long)	Notes
Marina Del Rey Harbor (MDR)					
✓		Water (MDR_W1)	Along Basin H, Parcel 77, or any berths in Marina	(33.9775, -118.4430)	All berths accumulate trash in varying amounts
	✓	Misc. (MDR_M)	Trash and recycling collection pen near end of Basin E, located on sidewalk overhang above water	(33.9812, -118.4555)	Moderate amount of trash piled in holding pen
Manhattan Beach (MAN)					
✓		Shoreline (MAN_S3)	On north end of beach, between Rosecrans and 45th St.	(33.9032, -118.4227)	Well frequented
Hermosa Beach (HER)[3]					
✓		Shoreline (HER_S1)	At southern end of beach, bordered by jetty	(33.8507, -118.3997)	
	✓	Parking lot (HER_P)	Lot A, at corner of 11th St. and Hermosa Ave.	(33.8615, -118.4001)	
Redondo Beach (RED)					
✓		Shoreline (RED_S2)	Between LG station AVE A and main maintenance building	(33. 8278, -118.3911)	No trash, adjacent to temporary trash collection center (parked cleaning vehicles, equipment, cans, etc.) (pictured)- may potentially release trash
	✓	Shoreline (RED_S3)	Around LG station AVE H	(33.8202, -118.3908)	No trash

continued

Table 1. Continued.

Proposed Designation[1]					
MFAC	Eval	Location	Description	GPS Coordinates[2] (Lat, Long)	Notes
Torrance Beach (TOR)					
✓		Shoreline (TOR_S1)	Far southern section where beach turns to cobble and sand diminishes	(33.8035, -118.3951) to (33.8040, -118.3944)	
	✓	Shoreline (TOR_S3)	Between LG stations RAMP and HR	(33.8116, -118.3916)	

(1) MFAC = MFAC Assessment Site, Eval = Source Area Evaluation Site
(2) Approximate locations given primarily in Description field. GPS coordinates are supplementary, and may refer to the actual reach of interest; or a relevant landmark, midpoint, or endpoint within the described site
(3) City of Hermosa Beach, and not the County, will be solely responsible for TMRP implementation at the identified non-point source sites. The Santa Monica Bay WMA TMRP serves only to propose how the non-point source TMRP component for Hermosa Beach will be addressed and monitored.

Non-Beach Open Space and Parks

One Non-Beach Open Space and Park location was identified for inclusion in the TMRP. The identified location, Burton Chace Park, is located within Marina Del Rey. See Table 2 below for the proposed sites at Burton Chace Park.

Table 2. Proposed Sites at Burton Chace Park (BCP)

Proposed Designation(1)					
MFAC	Eval	Location	Description	GPS Coordinates(2) (Lat, Long)	Notes
✓	✓	Shoreline	Along fence line between park and harbor	(33.9765, -118.4454) to (33.9766, -118.4451)	West of restrooms

(1) MFAC = MFAC Assessment Site, Eval = Source Area Evaluation Site

(2) Approximate locations given primarily in Description field. GPS coordinates are supplementary, and may refer to the actual reach of interest; or a relevant landmark, midpoint, or endpoint within the described site

POINT SOURCES

Point sources proposed for TMRP coverage include 62 Los Angeles County Flood Control District (LACFCD) catch basins which are shown in Figure 2.

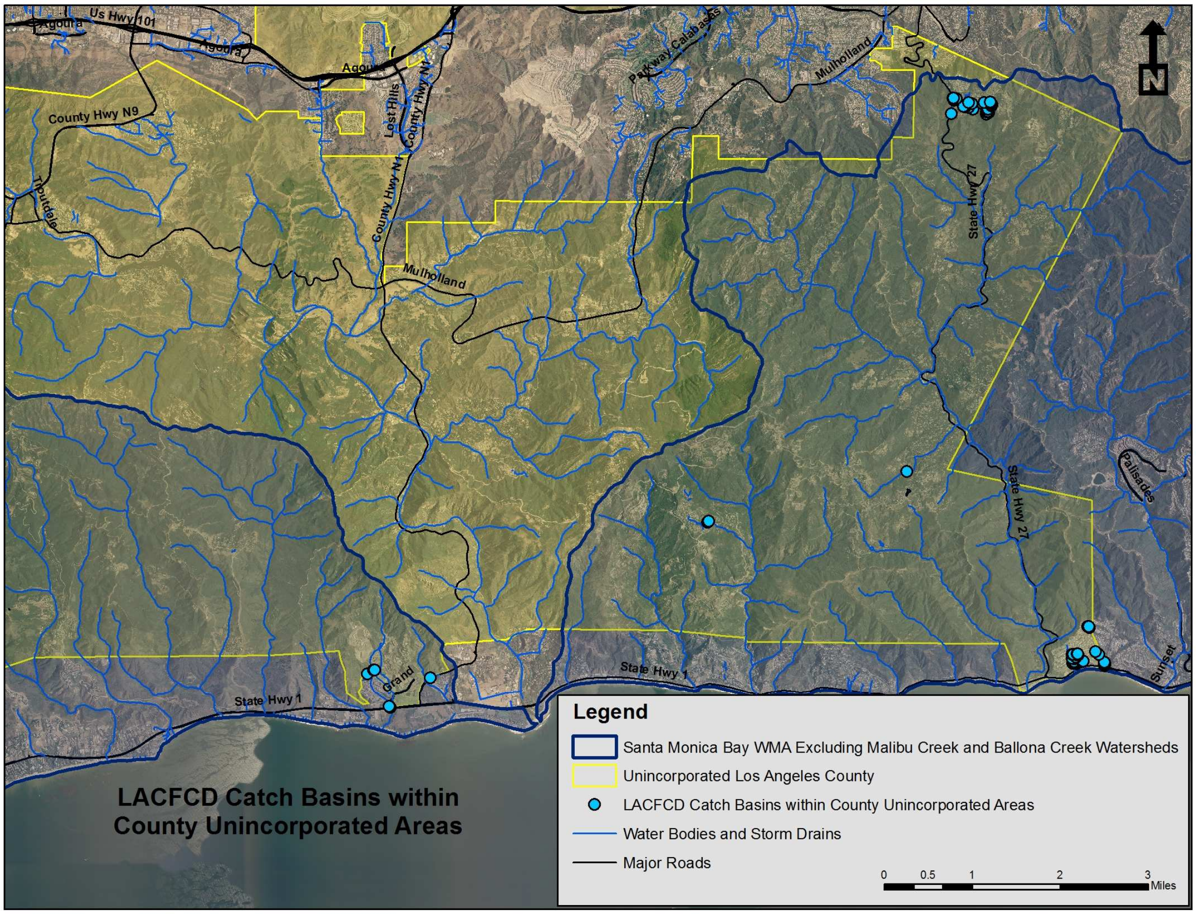


Figure 2. County Unincorporated Area LACFCD-Owned Catch Basins

S E P T E M B E R   2 0 1 2

Santa Monica Bay Watershed Management Area (WMA) Trash Monitoring and Reporting Plan (TMRP) - Health and Safety Plan (HSP)

Provided for the:

COUNTY OF LOS ANGELES

L A R R Y
W A L K E R
ASSOCIATES

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List of Acronyms

HM	Hazardous Materials
HSP	Health and Safety Plan
IT	Intractable Trash
MFAC	Minimum Frequency of Assessment and Collection
PM	Program Manager
PPE	Personal Protective Equipment
SOPs	Standard Operating Procedures
TMDL	Total Maximum Daily Load
TMRP	Trash Monitoring and Reporting Plan
WMA	Watershed Management Area

Overview

The objective of the Health and Safety Plan (HSP) is to provide a guidance document that supplements the information provided in the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load (TMDL) Trash Monitoring and Reporting Plan (TMRP), protects Field Staff from injury or illness during their monitoring activities, and ensures that such activities do not compromise any County laws, ordinances or safety policies. Prior to any monitoring activities, Field Staff should review any existing HSPs or similar documents that may be in place. The objective of the Santa Monica Bay Watershed Management Area (WMA) TMRP HSP will be achieved through planning, common sense, effective communication, and training. The HSP can be used in conjunction with, or to complement any existing plan.

The HSP alone cannot create a safe work environment, and it is not intended to be a comprehensive "safety manual" for the program, the HSP should serve to remind staff of health and safety policies that apply specifically to field monitoring, trash collection/assessment, and associated activities of this program. The HSP will also act as a general guide regarding how collection activities should be performed.

All Field Staff that will be participating in trash collection efforts associated with the TMRP and MFAC/BMP program shall follow the HSP. All staff participating in any component of the collection and assessment/evaluation effort shall be responsible for reading the HSP and following its procedures. The HSP should also be reviewed periodically and updated as needed, but annually at a minimum. Numerous items may be identified, including omitted items not initially considered, clarification of a particular component of the program, corrections, or additions once monitoring has been initiated, and should be addressed during the review and updating process.

The HSP has been divided into two sections, the first being an overview of the Standard Operating Procedures (SOPs) that should be followed prior to, during, and after a monitoring event. The first section is meant to complement the information included in the **Monitoring Procedures** section of the TMRP. The second section focuses on the general health and safety procedures that must be incorporated into day to day activities associated with monitoring efforts. This second section is meant to complement the information contained in the **Special Circumstances for Safety Consideration** section of the TMRP.

Standard Operating Procedures

The **Standard Operating Procedures** (SOPs) section outlines general operating procedures that should be followed by all individuals involved with this program. The **SOPs** section provides basic guidance that will allow for more efficient collection efforts and build a basic structure that will ensure HSP procedures are followed. This section should be reviewed periodically and updated as necessary, but annually at a minimum.

KEY STAFF

This section specifies key program personnel involved in the TMRP activities. Table 1 includes generic titles and specific responsibilities with relation to maintaining compliance with the HSP guidelines. While it is not mandatory to adopt the actual titles in this table, it should be used as a guide and general hierarchical structure.

Table 1. Key TMRP HSP Staff and Responsibilities

Title	Responsibilities
Program Manager	• Ensure that program is performed in compliance with the HSP • Monitor HSP compliance • Manage and resolve issues dealing with health and safety • Ensure that the program HSP is continually implemented • Ensure that program resources are allocated to fully implement and support the HSP • Ensure that adequate training or safety briefing(s) are provided and completed • Communicate with the stakeholder(s) regarding any issues and/or incidents related to the TMRP and MFAC/BMP program HSP
Crew Leader	• Directly responsible for Field Staff health and safety • Report all health or safety issues to the Program Manager (PM) including any unsafe conditions or practices • Assist PM in HSP implementation • Inspect all field equipment before mobilization to ensure that all health and safety equipment is available on-site • Implement emergency procedures as needed • Conduct health and safety assessments as needed
Field Staff	• Be familiar with the TMRP HSP and related issues • Report all health and safety issues to the Crew Leader • Assist in HSP implementation • Ensure that HSP procedures are followed • Implement emergency procedures as needed • Conduct health and safety assessments and inform the Crew Leader of concerns

TMRP HSP REVIEW PROCEDURES

Prior to the initiation of any field activities, a thorough review of all documents (TMRP, HSP and any other identified safety oriented documents) should be conducted. All questions and/or concerns should be addressed prior to moving forward with any monitoring effort. All key staff should be included in this review process to ensure that all requirements of the TMRP are understood and the guidelines and procedures outlined in this HSP are clearly defined and understood. The following steps should be carried out by Key Staff identified above:

1. The Program Manager (PM) should review and be familiar with all TMRP and HSP requirements and procedures. The PM should be able to answer all questions that Field Staff and/or the County may have concerning any element of this effort. The PM will also be responsible for communication between Field Staff and the County.
2. The PM and Crew Leader(s) should thoroughly review the TMRP and HSP requirements and procedures in a meeting to take place prior to the required start date of the TMRP activities. The PM should ensure that the Crew Leader(s) is/are adequately trained and able to convey all requirements to Field Staff. All questions should be fully addressed by the PM prior to initiating any field monitoring. The PM should also review any additional items identified by the Crew Leader(s) that may not be a component of the HSP.
3. The Crew Leader(s) should review and ensure that all Field Staff understands the TMRP and HSP requirements and procedures. It is up to the Crew Leader(s) to conduct trainings and ensure that all Field Staff understand and comply with the procedures outlined in both the TMRP and HSP. The Crew Leader(s) will be responsible for ensuring all TMRP requirements are being met in the field, and Field Staff are complying with the HSP procedures.

It is up to every individual to perform and carry out all field activities in a safe manner. By adequately training and addressing all questions early in the process, all individuals should be prepared to conduct themselves in an appropriate manner. Both the PM and all field staff should continually review the HSP procedures and communicate with all participants to ensure the HSP is up to date and accurate.

MONITORING PREPARATION

After all individuals have reviewed and understand the components of the TMRP and HSP, Field Staff may begin preparations for the monitoring event. The following requirements detail what should be completed prior to any monitoring event.

Pre-monitoring Event Requirements

Prior to all monitoring events, the Crew Leader should contact the PM to coordinate all necessary activities. The PM must also contact the appropriate County and/or Agency contact prior to the monitoring event to ensure that the tentative monitoring dates do not conflict with any planned or anticipated activities that may inhibit the completion of the event. All pertinent contacts and contact information will be established at the initiation of this program and updated as necessary. The following should be addressed during this coordination effort:

1. Any hazards and/or activities that may be happening in the watershed that will inhibit the completion of the tentative monitoring event. This would include circumstances such as construction activities, closed roads, wildfires, possible rain/wind events, and/or special events.

2. A general monitoring event plan should be developed that includes the names of staff conducting the collection event, approximate start time, sites to be completed, and site schedule.
3. A review of all important contact information with revisions made as necessary.

The PM will be responsible for ensuring all appropriate contacts have been made and all of the above items have been addressed prior to any monitoring.

Critical Event Pre-monitoring Requirements

All of the pre-monitoring event requirements should be met prior to any critical event (rain or wind event) effort. Additionally, due to the potential increase of hazardous conditions during critical event monitoring, the PM will be responsible for ensuring that conditions are safe for the collection event. Depending upon the request of County, the PM may be required to contact state and/or local safety agencies for updates on environmental conditions. Again, the PM will be responsible for contacting all appropriate agencies prior to any critical monitoring event.

CRITICAL EVENT PROCEDURES

As described above, a portion of this effort potentially include monitoring of conditions prior to and after rain and wind events. The coordination of any critical event monitoring will be the responsibility of the PM. Prior to any critical event, the PM must monitor all available information outlets and ensure Field Staff has adequate time to complete the monitoring event in safe conditions. Examples of these outlets include:

- National Weather Service - http://www.weather.gov/
- Fox Weather - http://www.foxnews.com/weather/us/index.html
- AccuWeather - http://www.accuweather.com/
- Intellicast Weather - http://www.intellicast.com/

For monitoring post-critical monitoring events, the PM must ensure that conditions are deemed safe. It is assumed that safe conditions would be when channel flows have resumed to at or near base flow conditions.

At no time will staff be in the field during any rain event. If unexpected rain occurs during an event, Field Staff should cease all collection activities and note on the Trash Monitoring Worksheet (**Attachment D** to the TMRP) the time and location of the completed work.

MONITORING EVENT CONSIDERATIONS

The TMRP includes specific information pertaining to the SOPs for monitoring events. The **Monitoring Procedures** section of the TMRP details all procedures that must be followed during and after every monitoring event. As stated previously, it is up to every individual to ensure that they conduct themselves in a safe and cautious manner while in the field. During a monitoring event, all staff should consider the following while performing monitoring activities:

1. The Crew Leader(s) are responsible for the supervision of all activities. Field Staff are required to listen to and adhere to the directions of the Crew Leader(s).

2. A pre/post site safety meeting must be conducted at each site for all events. Many of the sites include shoreline/wet sand assessments, so crews should discuss tide and currents during the safety meeting.
3. Prior to starting a monitoring event, the Crew Leader should review the site information, including the site boundaries, potential hazards, and other important information that warrants review.
4. All staff should stay alert and aware of site conditions and their surroundings, including slippery surfaces, steep cliffs, and any other areas of concern. Where there are unsafe conditions cleanups, assessments, and evaluations will not occur.

The TMRP includes specific post-event activities. Again, the Crew Leader(s) should review all information, ensure all required procedures are complete, and all equipment and trash have been accounted for. The Crew Leader(s) will be required to contact the PM, who subsequently should contact the County to acknowledge the event has been completed.

Prohibited On-Site Activities

The following on-site activities are **prohibited** at all times:

- Entering any confined space[1] at any time
- Entering any private property without obtaining permission to enter
- Insubordination
- Any rough-housing and/or un-professional activities that may increase the risk for injury or decrease overall safety of the individual or crew
- Operating any heavy machinery or County owned vehicles and boats without authorization, adequate knowledge, or safety training
- Any site visit or monitoring activity that has not been cleared by the PM
- Smoking while on site or during working (non-break) hours
- Being under the influence of drugs or alcohol on site of during working hours
- Eating or drinking on-site or during working (non-break) hours, or without prior decontamination
- Any illegal activity
- Conducting any activity that has potential to harm oneself or other staff without first consulting the Crew Leader

This list may be modified and/or increased as this effort moves forward and more items are identified as prohibited activities.

[1] Confined Spaces includes storm drains, sewer areas, or any other space as defined by the County. The U.S. Occupational Safety and Health Administration (OSHA) classify storm sewers as confined spaces. Regulations for entry into confined spaces are provided in the OSHA Confined Space Standard (Title 29 Code of Federal Regulations [CFR] 1910.146) and in Section 5157 of CalOSHA CCR 8

General Health and Safety Requirements

Only Field Staff who have reviewed both the TMRP and HSP will be allowed to participate in trash monitoring efforts and/or related field visits. It will be the responsibility of both the PM and Crew Leader(s) to properly and adequately train all staff and ensure that enough staff are prepared to complete required monitoring events.

SITE SAFETY MEETINGS

All trained Field Staff members involved in monitoring activities will:

- Be involved in a pre/post site safety meeting and continually update the Crew Leader(s) of items that need to be addressed
- Continually be briefed on the specific safety requirements and program expectations
- Acknowledge and comply with terms and conditions of the HSP

INCIDENT REPORTING

Health and Safety incidents must be reported to the PM immediately in order to assess and diagnose current risks and eliminate future incidents.

Any incident involving the following must be reported immediately:

- Any illness, injury, or reaction caused by environmental or chemical exposure
- Any scale of physical injury, even if it does not require medical attention
- Any unnatural or notable occurrence such as fire, gaseous vapors, etc.
- Any property damage (including public or private), public complaints, or HSP violations

REPORTING PROCEDURES

Incident report forms can be obtained from the PM or County. This report is to be filled out by the incident victim and filed promptly for future use or investigation. Reports involving medical treatment must be completed by the PM within 24 hours of the incident.

HSP UPDATES

This HSP has been developed based upon previous experiences with similar monitoring efforts. While this report covers basic HSP items, it should continually be reviewed and updated as new items are identified and/or addressed. This document should be revised as necessary, but at least annually during the TMRP annual reporting efforts, to incorporate the lessons learned during the previous year. If updated, Regional Board staff must be notified and provided the revised HSP for their records.

Health and Safety Procedures

The **Health and Safety Procedures** section of this HSP includes specific procedures and information that must be considered prior to and during any monitoring activity. All staff should review and fully understand this section to ensure that safety procedures and considerations are being implemented. Again, it is up to the individual to conduct themselves in a safe and cautious manner during a monitoring event. As described in the **Special Circumstances for Safety Consideration** section of the TMRP, there are several potentially dangerous factors that exist within the Santa Monica Bay WMA. This section includes numerous items of concern (including those listed in the TMRP). <u>This section should be reviewed periodically and updated as necessary.</u>

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Wearing appropriate attire can minimize the likelihood of injury or exposure. The following sections detail the various specifics regarding appropriate clothing and layering techniques that should be considered to avoid heat or cold stress. All Field Staff should wear appropriate field clothing, including proper footwear, dungarees and shirts for field work, gloves, eye protection, and head wear to protect from the sun. It will be the responsibility of the Crew Leader(s) to train all Field Staff in what is deemed proper clothing and footwear and ensure that Field Staff is dressed appropriately before a monitoring event. The individual will be prohibited from conducting any monitoring activities if an individual does not have the appropriate clothing.

A first aid kit will be present in each vehicle used for field work. It is the responsibility of the Crew Leader(s) to be sure their vehicles have a fully stocked first aid kit before entering the field. For a field crew consisting of approximately four members, the American Red Cross suggests the following items be included in a first aid kit:

- 2 absorbent compress dressings (5 x 9 inches)
- 25 adhesive bandages (assorted sizes)
- 1 adhesive cloth tape (10 yards x 1 inch)
- 5 antibiotic ointment packets (approximately 1 gram)
- 5 antiseptic wipe packets
- 2 packets of aspirin (81 mg each)
- 1 blanket (space blanket)
- 1 breathing barrier (with one-way valve)
- 1 instant cold compress
- 2 pair of non-latex gloves (size: large)
- 2 hydrocortisone ointment packets (approximately 1 gram each)
- Scissors
- 1 roller bandage (3 inches wide)
- 1 roller bandage (4 inches wide)

- 5 sterile gauze pads (3 x 3 inches)
- 5 sterile gauze pads (4 x 4 inches)
- Oral thermometer (non-mercury/non-glass)
- 2 triangular bandages
- Tweezers
- First aid instruction booklet

The PM and Crew Leader(s) should consider including specialized items such as an insect sting treatment kit for individuals who may not be aware of allergic reaction to bee stings. The following section regarding safety tips for wildlife encounters. Staff may modify and add as this effort moves forward.

HEAT STRESS

Heat Stress is a significant potential hazard associated with field efforts. When the body becomes overheated, a condition of heat stress exists. It can lead to a number of problems, including heat exhaustion, heat stroke, heat cramps, fainting, or heat rash. The use of protective equipment in hot weather environments can also accelerate heat stress related illnesses.

Heat cramps are brought about by prolonged exposure to heat. The signs and symptoms are as follows:

- Severe muscle cramps, usually in the legs or abdomen
- Exhaustion, often to the point of collapse
- Dizziness or periods of faintness

First aid treatment includes shade, rest and fluid replacement. Normally, the individual should recover within one-half hour. If the individual is not better within 30 minutes of treatment, transport the individual to the hospital for medical attention.

Heat exhaustion usually occurs in a healthy individual who has been exposed to excessive heat while working or exercising. The signs and symptoms of heat exhaustion are as follows:

- Rapid and shallow breathing
- Weak pulse
- Cold and clammy skin with heavy perspiration
- Skin appears pale
- Fatigue and weakness
- Dizziness
- Elevated body temperature

First aid treatment includes cooling the victim, elevating the feet, and replacing fluids. If the individual is not better within 30 minutes of treatment, transport the affected individual to the hospital for medical attention.

Heat stroke occurs when an individual is exposed to excessive heat and stops sweating. This condition is classified as a medical emergency, requiring immediate cooling of the patient and transport to a medical facility. The signs and symptoms of heat stroke are as follows:

- Dry, hot, red skin
- Body temperature approaching or above 105 degrees Fahrenheit
- Large (dilated) pupils
- Loss of consciousness; the individual may go into a coma.

Local weather conditions may produce situations which require restricted work schedules in order to protect personnel.

If at any time during trash monitoring efforts, any heat related illnesses occur, the PM must be contacted immediately and continually updated on the condition of the individual. If necessary, staff should call 911.

COLD STRESS

Staff may be required to work in cold environments, sometimes for extended periods. Cold stress is a common problem encountered in these types of situations. Four factors contribute to cold stress: cold air temperatures, high velocity air movement, dampness of the air, and contact with cold water or surfaces. A cold environment forces the body to work harder to maintain its temperature. Cold air, water, and snow all draw heat from the body. While it is obvious that below freezing conditions, combined with inadequate clothing, can bring about cold stress, it is also important to understand that it can be brought about by moderate temperatures coupled with rain and wind:

- Hypothermia, which means "low heat", is a potentially serious health condition. This occurs when body heat is lost faster than it can be replaced. When the core body temperature drops below the normal 98.6ºF to around 95ºF, the onset of symptoms normally begins. The person may begin to shiver and stomp their feet in order to generate heat. Additional symptoms of hypothermia include loss of coordination, slurred speech, and fumbling with items in the hand. The skin will likely be pale and cold. As the body temperature continues to fall, these symptoms will worsen and shivering will stop. Workers may be unable to walk or stand. Once the body temperature falls to around 85ºF, severe hypothermia will develop and the person may become unconscious, and at 78ºF, the person could die. Treatment depends on the severity of the hypothermia. For cases of mild hypothermia, move to a warm area and stay active. Remove wet clothes, replace with dry clothes or blankets, and cover the head. To promote metabolism and assist in raising internal core temperature, drink a warm (not hot), sugary drink. Avoid drinks with caffeine. For more severe cases, do all the above, plus contact emergency medical personnel (call 911 for an ambulance), cover all extremities completely, and place very warm objects, such as hot packs or water bottles, on the victim's head, neck, chest and groin. Arms and legs should be warmed last. In cases of severe hypothermia, treat the individual very gently and do not apply external heat to re-warm. Hospital treatment is required. Move all extremities as close to the torso as possible to conserve body heat.

- Frostbite occurs when the skin actually freezes and loses water. In severe cases, amputation of the frostbitten area may be required. While frostbite usually occurs when the temperatures are 30ºF or lower, wind chill factors can allow frostbite to occur in above freezing temperatures. Wind chill is the combination of air temperature and wind speed. Frostbite typically affects the extremities, particularly the feet and hands. The affected body part will be cold, tingling, stinging, or aching followed by numbness. Skin color turns red, then purple, then white, and is cold to the touch. There may be blisters in severe cases. Do not rub the area to warm it. Wrap the area in a soft cloth, move the worker to a warm area, and contact medical personnel. Do not leave the worker alone. If help is delayed, immerse in warm (maximum 105ºF), not hot, water. Do not pour water on affected part. **If there is a chance that the affected part will get cold again, do not warm. Warming and re-cooling will cause severe tissue damage.**
- Trench foot or immersion foot is caused by having feet immersed in cold water at temperatures above freezing for long periods of time. It is similar to frostbite, but considered less severe. Symptoms usually consist of tingling, itching or burning sensation. Blisters may be present. To treat trench foot, soak the individuals feet in warm water, then wrap with dry cloth bandages. Have the individual drink a warm, sugary beverage.

Wearing appropriate clothing and being aware of how your body is reacting to the cold are important to preventing cold stress. Although alcohol and smoking are prohibited at the sites, be aware that they may increase the risk of cold stress.

Anyone working in a cold environment may be at risk for cold stress. However, senior citizens may be at more risk than younger adults, since older people are not able to generate heat as quickly. Additionally, certain medications may prevent the body from generating heat normally. These include anti-depressants, sedatives, tranquilizers and others.

Protective clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other hand, retains its insulation even when wet. The following are recommendations for working in cold environments:

- Wear at least three layers of clothing
  - An inner layer of cotton or synthetic weaves to allow ventilation
  - A middle layer of down or wool to absorb sweat and provide insulation even when wet
  - An outer layer to break the wind and allow some ventilation (like Gortex® or nylon)
- Wear a hat. Up to 40% of body heat can be lost when the head is left exposed
- Wear insulated boots or field appropriate footwear
- Keep a change of dry clothing available in case work clothes become wet
- Do not wear tight clothing. Wear loose clothing to allow better ventilation.

Drink plenty of liquids, avoiding caffeinated beverages. It is easy to become dehydrated in cold weather. If possible, heavy work should be scheduled during the warmer parts of the day. Take breaks out of the cold. Keep an eye on other crew members and watch for signs of cold stress. Exhaustion and fatigue are signs of low energy. Be conscious of your body's energy level since energy is needed to keep muscles warm. Take frequent breaks and consume warm, high calorie foods to maintain energy reserves.

Staff should watch for signs of cold or heat stress and allow workers to interrupt their work if they are extremely uncomfortable. The PM should also ensure that water or other beverages are available and that work schedules allow for appropriate rest periods. Staff should use appropriate personal protective equipment (PPE) and work practices to reduce the risk of cold stress.

If at any time during trash monitoring efforts, any cold related illnesses occur, the PM must be contacted immediately and updated on the condition of the individual. If necessary, staff should contact 911.

TRAFFIC AND VEHICLE SAFETY

Traffic hazards will be encountered when working at the side of or in a roadway. The primary threats associated with working in or alongside roadways are Field Staff being struck by passing vehicles or being involved in a vehicular collision. The risks associated with these threats are severe bodily injury and/or death.

Field Crews must never turn their back on traffic. When walking in a roadway either setting up or taking down traffic control, Field Crews must walk facing oncoming traffic. If Field Crew member must turn their back, a coworker shall watch oncoming traffic.

Vehicles, carts, bicycles, and heavy equipment may be present both outside and inside the work area. Field Staff will observe all speed limits for vehicles. Prior to operation of vehicles, staff will check tires, steering, and brakes for proper function. Defective or suspect equipment will not be used.

Be conscious of all vehicular traffic that may be present during monitoring efforts. Be careful when exiting the work area, especially when walking out from between parked vehicles to avoid vehicular traffic.

LIFTING

The potential for back strain exists due to lifting heavy items in the field. Correct manual lifting and handling of a load may prevent strain and reduce effort. The persistent use of bad lifting methods causes strains which may eventually become severe. When lifting a load always follow these principles:

- When possible, use mechanical equipment rather than lifting by hand.
- Never carry a load that cannot be seen over or around.
- When lifting a load:
    - Lift with the legs, not with the back
    - Keep the load close to the body
    - Use the most comfortable posture

    - Lift slowly and evenly, do not jerk the load
    - Do not twist the back while lifting
    - Securely grip the load
- Do not lift an object or load suspected to be too heavy, oddly shaped, or awkward alone. GET HELP!
- Designate one staff member to lead when two or more people carry a load.

SLIPS AND FALLS

Slipping hazards may exist due to uneven terrain, wet surfaces, steep channels, leaking hydraulic fluid, or construction materials. Tripping hazards may be present from elevation changes, debris, or equipment. Falls are possible from elevated platforms, work areas, access ladders, and stairs. Prevention requires alertness, proper procedures, and appropriate protective equipment.

INVASIVE SPECIES

There is the potential for Field Staff to come in contact with invasive species found in the Santa Monica Bay WMA, including the New Zealand Mudsnail, giant reed (Arundo), castor bean, wild tree tobacco, crayfish, bullfrog, mosquito fish, and largemouth bass. Staff have the potential to further spread invasive species if proper precautions are not taken prior to, during, and after an event. Staff must follow procedures as outlined by the CA Department of Fish and Game, New Zealand Mudsnail Invasive Species Program (http://www.dfg.ca.gov/invasives/mudsnail/) and the United States Fish and Wildlife Service Invasive Species Program (http://www.fws.gov/invasives/what-you-can-do.html). Staff should consider developing a Hazard Analysis and Critical Control Points (HACCP) planning document specific to their monitoring sites.

DECONTAMINATION

Decontamination procedures shall be followed by Field Staff between sites, before eating, drinking, or smoking, and at the end of the monitoring event. Crew Leader(s) will ensure that monitoring vehicles are equipped with 2.5 - 5 gallon expandable water carriers with spigots, soap or similar liquid soap, and alcohol based instant hand sanitizer. The following decontamination procedures shall be followed:

- Wash hands, arms, face, and/or neck with water and soap, taking care to keep grey water away from storm drains and adjacent water bodies
- Dry all areas with disposable paper towels
- Thoroughly wet hands with instant hand sanitizer, then briskly rub together until dry.

ARUNDO AND POISON OAK

While unlikely, during trash monitoring there is the potential for contact with Arundo (*Arundo donax*) and Poison Oak (*Toxicodendron diversilobum*). Arundo can grow up to 10 meters in height and create extremely dense vegetated environments. Due to the size and density of Arundo habitats, there is the possibility of tripping and/or entanglement when entering a thicket of Arundo vegetation. **Trash will not be collected within any areas with Arundo vegetation**.

However; trash may be collected on the edge of the vegetation if safe and accessible. Poison Oak growing at or near assessment locations should be avoided if at all possible. Trash seen in the Poison Oak is not required for collection, but should be noted and photographed. Field Staff will be advised to put on Poison Oak protective lotion before entering any sites where the shrub is growing. Field Staff should also be aware that even when Poison Oak is dead, the oil can remain active for up to five years.

STEEP CLIFFS AND ACCESS TRAILS

Some of the assessment sites are located near or at the base of steep cliff sides and access trails. Commonly paired with crumbling earth, sharp rocks, and uneven terrain, the potential to slip and fall causing serious injury is possible at these locations, even during the driest of weather. Steep cliffs may also present the danger of landslides. Field Staff will need to ensure that all precautions are taken when sampling adjacent to environments exhibiting these conditions. Field Staff should avoid cliff sides and precarious trails, and identify safe routes to the designated sites. During assessment efforts, Field Staff should take caution when using dirt access trails and ensure that all procedures as outlined in the Health and Safety Plan are followed. Dangerous environments are deemed off limits during all assessment events.

OCEAN TIDES AND CURRENTS

The combination of ocean tides and rocky terrain often produce slippery surfaces. Especially when working in close proximity to the water, strong waves and/or rip currents may present additional dangers. Field Staff should be aware of their surroundings at all times, take precaution when walking on wet surfaces, and consider wearing a pack to keep their hands as free as possible.

CONFINED SPACES

At no time during the collection effort are Field Staff to enter any confined spaces (confined spaces are defined in footnote [1] on page 6), including storm drain outlets, freeway underpass tunnels, or any confined areas located at or near a collection location. Chemicals can accumulate in confined spaces creating dangerous pockets of gas and other potential hazards that Field Staff are not properly trained to address. If trash is accumulating within a confined space, the PM will be notified of the specific site location, and a brief narrative of the observations including the time and date of the observation will be provided.

SWIFT WATER/FLOOD CONDITIONS

Assessment and evaluation events will not be scheduled during wet weather. However, an unexpected storm may cause flash flood conditions. Under these conditions, the event will likely be abandoned. At no time are Field Staff to be in stream channels (engineered or natural) during swift water and/or high flow conditions, nor should staff be in any channels if a forecasted storm (of 20% or greater chance of precipitation) is predicted for that day. Monitoring for critical storm conditions must take place prior to any rainfall occurring. All activities must be suspended immediately if Field Staff are in the field and rainfall occurs. The extent of collection completed prior to rainfall will be noted on the assessment worksheet. After any rainfall event, staff are prohibited from re-entering stream channels until flow velocities have returned to base flow conditions and/or conditions are deemed safe by the PM or proper authorities.

WILDFIRES

Some of the assessment sites may be located within or near potential burn areas, particularly the sites in or around the Malibu area. All precautions should be taken to ensure no Field Staff, Crew Leader(s), or PM initiate any actions that could start a wildfire, nor hinder or interfere with any wildfire suppression activities. Subsequently, during any wildfire event that is taking place in the Watershed, all monitoring events will cease until the wildfire has been suppressed. After suppression of the wildfire, Crew Leader(s) will confirm with the PM that conditions are safe to reinitiate assessment efforts. If a wildfire begins during a collection event, staff must evacuate immediately, and then proceed to document the extent to which the event was complete. If any situation escalates to a perceived dangerous level, Field Staff must immediately leave the area and contact the PM and if necessary the appropriate authorities (via 911).

HOMELESS INDIVIDUALS AND PROPERTY

There is the potential for encounters and/or interactions with homeless individuals in the course of trash collection activities. The possibility of unknowingly collecting items which may be considered the property of a homeless individual may create the potential for a serious altercation. During any collection event, it is standard procedure for Field Staff to use discretion in all interactions with all individuals in the field and handle themselves in a professional and courteous manner. If at any time Field Staff feel uncomfortable or in danger, activities must immediately cease and all staff must return to a safe location. In the event this takes place, Field Staff must record the amount of collection that took place prior to the work stoppage, and note on the assessment worksheets the end point location and time. If any situation escalates to a perceived dangerous level, Field Staff must immediately leave the area and contact the appropriate authorities. As described above, in the event this takes place, the following actions should occur:

1. If any situation escalates to a perceived dangerous level, Field Staff must immediately leave the area and contact the PM and if necessary the appropriate authorities.
2. Record the amount of monitoring that took place prior to the work stoppage. This includes specifics like bank(s) or area(s) monitored, an estimate of the trash items not collected should be noted, and noting any intractable trash items visually identified upstream, yet not completely assessed .
3. Note on the Monitoring Worksheets the end point location and time.

The Crew Leader and Field Staff must assess the situation based upon multiple factors and the overall safety of the monitoring event. If possible and deemed safe, Field Staff will resume monitoring from the last area of collection as soon as possible that same day if and conditions are deemed safe. If the situation is not deemed safe, Field Staff must exit the location, the Crew Leader should contact the PM, and the PM must advise the County of the situation that the monitoring event is deemed complete.

In the event that trash items appear to be the property of a homeless individual, Field Staff should consider the items “intractable trash” and follow procedures outlined in the Hazardous Materials and Intractable Trash section of the HSP. As stated previously, if at any time during the collection event staff feels threatened or in danger, they must cease all activities and move to a more secure location. Preserving the safety of the field crew is the top priority during all monitoring events.

WILDLIFE

There is the potential to encounter various wildlife that may pose a threat, including but not limited to poisonous reptiles, and stinging insects. Additionally, rodents, raccoons, and opossum may be found in the proposed sites, these animals should be generally avoided due to concerns with rabies. Pets may be encountered during the events, crews are advised to avoid contact with any animal with which they are not familiar. Do not corner, entrap, or attempt to feed any animal. Prior to initiating the monitoring effort, Field Staff must be properly informed and trained on how to avoid encounters with threatening wildlife and how to handle any encounter or interaction in the field. Additionally, crews will avoid contact with protected species (e.g., least tern, snowy plover, and grunion) and any areas designated for protected species.

HAZARDOUS MATERIALS

There is potential that hazardous materials, both physical and chemical substances, may be encountered at the assessment sites. Hazardous gaseous, liquid, and/or solid contaminants may be present as the result of spills and/or illicit dumping. The presence of chemicals and/or chemical vapors may result in (but are not limited to) one or more of the following threats: toxic conditions, oxygen displacement and explosion, and/or fire. The risks associated with these threats include poisoning (acute and/or chronic), asphyxiation, and bodily injury.

The following procedures are recommended to help protect field personnel from the hazards associated with chemical substances:

- Do not inhale vapors
- Do not ingest chemical substances
- Avoid contact with skin, eyes, and clothes
- Wear protective clothing including gloves and proper footwear.

Chemicals can be hazardous if inhaled or ingested, or if they come into contact with the skin or eyes. PPE should be worn to avoid skin contact. Always wash your hands and face before eating, drinking, or smoking and before leaving the work site.

All hazardous materials identified during the monitoring event must be properly dealt with in a safe manner to protect the worker and the environment from further harm. Professionals with training in the removal of the waste material will do the actual collection. If hazardous materials are discovered at a collection site, the Crew Leader will notify the PM who will then coordinate with the County to initiate the extraction of such wastes.

INFECTIOUS AEROSOLS

The potential to encounter infectious aerosols is low. Various aerosols may contain a variety of infectious microorganisms. Skin contact and/or inhalation of aerosols should be avoided when encountered in the field. If infectious aerosols are suspected or a concern, PPE should be worn to facilitate avoidance of skin contact or inhalation. Field Staff must always wash your hands and face before eating and/or drinking and before leaving the work site or facility.

ATMOSPHERIC HAZARDS

The potential to encounter atmospheric hazards while conducting this effort is low. The hazards include atmospheres that are flammable, toxic, or oxygen deficient. These conditions are typical in “confined spaces” like a storm drain or sewer. The U.S. Occupational Safety and Health Administration (OSHA) classify storm sewers as confined spaces. Regulations for entry into confined spaces are provided in the OSHA Confined Space Standard (Title 29 Code of Federal Regulations (CFR) 1910.146) and in Section 5157 of CalOSHA CCR 8.

As previously stated, entry into enclosed spaces by Field Staff is prohibited in this Plan.

Hazardous Materials and Intractable Trash

HAZARDOUS MATERIALS

During the course of any collection event, hazardous materials that pose a health threat to Field Staff may be encountered. The following materials are an example of the types of materials that may be considered hazardous. This HSP is intended to address the most common hazards which are likely to be observed. It is not intended to be an exhaustive or all inclusive list, and only includes the general category for the types of materials that might be encountered. Field Staff should always take care to put personal safety first and contact the PM if they have any questions regarding questionable hazards or issues that may be encountered.

Hazardous Materials Include:

- Ignitable Wastes (including waste oil and used solvents)
- Corrosive Wastes (including spent battery acid)
- Reactive Wastes (including lithium-sulfur batteries and unused explosives)
- Toxic Wastes (including materials containing Mercury, Lead, and PCBs)

Further information on specifics on each type of waste and the hazards posed by each type can be found at the California Department of Toxic Substances Control (DTCS) webpage http://www.dtsc.ca.gov/HazardousWaste/#Hazardous_Waste_Identification.

As stated previously, all items deemed hazardous should be avoided and will require removal via a trained and/or certified professional.

POTENTIAL HAZARDOUS ITEMS

The following is a list of hazardous materials that may be encountered by Field Staff, sorted by general waste category.

Household Hazardous Wastes (HHW) are often dumped into and/or near channels. The types of items classified as HHW can vary greatly, but some items dumped can be dangerous and should be handled with care. For example, fluorescent light bulbs can contain hazardous materials impacting both the environment and staff, and if broken should be handled with care. HHW items can include:

- Abrasive Cleaners
- Air Fresheners
- Antifreeze
- Asbestos
- Bug Sprays
- Batteries/Car Batteries
- Disinfectants/Cleaners
- Drain Cleaners

- Drugs/Pharmaceuticals/Medicine
- Engine Cleaners/Automotive Fluids/Oil Filters
- Fertilizers
- Herbicides
- Pesticides
- Paint/Paint Thinner/Paint Removers
- Pool Chemicals
- Rodent/Pest Poison
- Rug/Upholstery Cleaner

Although not all Electronic Waste (EW) may be considered hazardous, items in poor condition (i.e. heavily damaged, weathered, or broken) may release hazardous materials into the environment and should be handled carefully. Examples of EW that may be considered hazardous include:

- Cell Phones
- Computers
- Electronic Games/Consoles
- Fax Machines
- Microwaves
- NiCad Batteries
- Printers
- Stereos
- Televisions/VCRs/DVD Players

It will be up to the Crew Leader to identify and properly handle any items deemed hazardous. Some items may be removed during the monitoring event, for example household batteries can be removed if disposed of in a proper fashion. Staff should take this list out in the field as a guide to what may or may not be deemed hazardous. This list should be updated during any HSP revision.

IDENTIFIED HAZARDOUS MATERIALS AND INTRACTABLE TRASH

Any material that is deemed "Hazardous" must be dealt with in the following manner:

1. Identify to the best extent possible what the object is and give a detailed description of the material/object on the Monitoring Worksheet. This description should include but is not limited to size estimates, if the material is buried in sediments or entangled in vegetation and number of items if a consolidated dumping area is identified.
2. Create a "Unique ID Number" for each item following this format below:

a. HM (Hazardous Material)
b. Site ID
c. Sequential number starting at 001 (e.g., HM_xxx_001)
3. Obtain GPS coordinates for the location of the material/object.
4. Take pictures of the material(s) and note any surrounding markings/landmarks so as to easily locate the material(s) in the future.
5. Post-event, fill out a new Hazardous Materials and Intractable Trash Log (**Attachment E** of the TMRP) if no Hazardous Materials or Intractable Trash have previously been found in the general location. If there is an existing log for the location, add an entry to the running log for the affected site.
6. The Crew Leader(s) must notify the PM that hazardous materials have been identified and send a copy of the log to the County.
7. The Crew Leader(s) should maintain a Hazardous Materials and Intractable Trash Log that can be referenced from event to event and reviewed when encountering hazardous materials. If an item is still in place, the Crew Leader(s) should notify the PM that the material is still in the site and needs to be removed.

Intractable Trash is defined as items that may not be considered "hazardous" but are too large to remove by Field Staff. These items can vary in size, material, condition, but all pose a threat to safety if attempted to move without proper equipment and/or training of removal procedures. These items must still be addressed, and will follow a similar documentation protocol as hazardous materials. Procedures are as follows:

1. Identify to the best extent possible what the object is and describe the material/object on the data sheet.
2. Create a "Unique ID Number" for each item following this format below:
    a. IT (Intractable Trash)
    b. Site ID
    c. Sequential number starting at 001 (e.g., IT_xxx_001)
3. Obtain GPS coordinates for the location of the material.
4. Take pictures of the material(s) and any surrounding markings that may help for future locating of the material.
5. Post-event, fill out a new Hazardous Materials and Intractable Trash Log for the site if no Hazardous Materials or Intractable Trash have previously been found at the general location. If there is an existing log for the location, add an entry to the running log for the affected site.
6. The Crew Leader(s) will notify the PM that intractable trash has been identified and send a copy of the list to notify the County.

7. The Crew Leader(s) should maintain a Hazardous Materials and Intractable Trash Log that can be referenced from event to event and reviewed when encountering intractable materials. If an item is still in place, the Crew Leader(s) should notify the PM that the material is still in the site and needs to be removed.

Additional Trainings

It is not a requirement of this HSP that individuals obtain training in other safety areas but it is highly recommended that Crew Leaders and Field Staff be trained in basic safety classes including:

- CPR Training
- General First Aid Training
- 8 hr/24 hr HazWORP Training
- First Responder Training

It may be cost effective to only train Crew Leaders in the more advanced first aid training, but overall, it would be in the best interest to train all staff to ensure if any incidents take place in the field, staff will be properly trained and prepared to deal with the situation.

HSP Certification

As stated in the **SOP** section of this document, all staff should thoroughly review this HSP prior monitoring activates. Once all Field Staff have reviewed HSP procedures including proper training in all health and safety aspects of this plan, staff should sign the attached HSP Release form. This form can be used for annual trainings and continued certification efforts. The completed forms should be stored for future reference and held by the PM.

Conclusion

This HSP has been developed to assist all staff participating in field monitoring efforts. Again, this is not an all-encompassing safety guide or manual, it is up to the individual to ensure they follow the procedures outlined in this plan and use common sense when in the field. This plan should be continually reviewed and updated as necessary to ensure procedures are up to date and reflect true conditions encountered in the field. If procedures are followed and common sense is utilized, staff should complete the monitoring safely, efficiently, and effectively ensuring that the ultimate goals of meeting regulatory requirements are achieved.

MCW HSP TRAINING CERTIFICATION

HEALTH AND SAFETY PLAN

FIELD PERSONNEL CERTIFICATION/RELEASE FORM

I, ______________________ hereby confirm that I have read and understand the Health and Safety Plan. I agree to follow this plan and to make every effort to make the workplace safe. I will report any health or safety hazard that I observe to the Project Manager.

I do agree to defend, indemnify, and hold harmless_________________________, its owners, employees, representatives, clients, and the property owner for any accidents, sickness, or injuries resulting from the violation or non-compliance of this Health and Safety Plan.

*Name:*____________________________________ *Title:*_______________________________

*Signature:*_________________________________ *Date:* ______________________________

Contact Sheet

Los Angeles County

Bruce Hamamoto, Los Angeles County Department of Public Works (LACDPW)

Phone: (626) 458-5918

E-mail: BHAMAMO@dpw.lacounty.gov

Address: 900 S. Fremont Ave., Alhambra, CA 91803

Example Trash Monitoring Worksheet

Basic Info

Monitoring Type (Circle one): Assessment / Evaluation Date:________________

Location Name and Type (Beach, Harbor, etc.):________________

Names of Field Crew Members:

Hand Crew:________________

Skimmer Boat Crew:________________

Pre-Event

Starting Site Description (Reference street names, buildings, other structures, etc.):

Site Sketch (Number site corners and label shoreline, if applicable):

Starting Site Boundaries:

Lat, Long (e.g., 34.00000, -118.90000):

1:________________

2:________________

Event **START Time** (e.g., 14:00):________________

During

Monitoring Observations (Trash types, relative proportion of trash types, spatial/temporal trash patterns, possible sources, etc.):

Event **STOP Time** (e.g., 14:00):________________

Post-Event

Ending Site Description (Reference street names, buildings, other structures, etc.):

Ending Site Boundaries:

Lat, Long (e.g., 34.00000, -118.90000):

3:________________

4:________________

(Return to Pre-Event section to complete Site Sketch)

Time Spent Monitoring:

Total (Stop time – Start time):________________

Cumulative (Total Time * Number of Field Crew Members):________________

Weight of Trash (lbs.):

Standard (excludes Hazardous Material/Intractable Trash):________________

Hazardous Material/ Intractable Trash:________________

Additional Notes (Current/recent weather conditions, etc.):

EXAMPLE

Example Hazardous Material/ Intractable Trash Log

Location Name and Type:____

Trash ID Number	Date/Time Found (00/00/00 00:00)	Description and Notes	GPS Coordinates

EXAMPLE

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

GAIL FARBER, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

September 19, 2013

IN REPLY PLEASE
REFER TO FILE: WM-7

Mr. Samuel Unger, P.E., Executive Officer
California Regional Water Quality
Control Board – Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013-2343

Attention Ms. Jenny Newman

Dear Mr. Unger:

PLASTIC PELLET MONITORING AND REPORTING PLAN
UNINCORPORATED AREAS OF THE COUNTY OF LOS ANGELES
SANTA MONICA BAY WATERSHED MANAGEMENT AREA
SANTA MONICA BAY NEARSHORE AND OFFSHORE DEBRIS
TOTAL MAXIMUM DAILY LOAD

On behalf of the County of Los Angeles, we are submitting the enclosed Plastic Pellet Monitoring and Reporting Plan for the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load in accordance with the California Regional Water Quality Control Board, Los Angeles Region, Resolution No. R10-010. The enclosed Plastic Pellet Monitoring and Reporting Plan for areas under the County of Los Angeles' jurisdiction within the Santa Monica Bay Watershed Management Area includes: 1) a Plastic Pellet Monitoring Program to quantify plastic pellet discharges from the Municipal Separate Storm Sewer System outfalls and establish triggers for additional industrial facility inspections and 2) a Spill Response Plan to address the containment of spilled plastic pellets.

If you have any questions, please contact me at (626) 458-4300 or ghildeb@dpw.lacounty.gov or your staff may contact Ms. Angela George at (626) 458-4325 or ageorge@dpw.lacounty.gov.

Very truly yours,

GAIL FARBER
Director of Public Works

Gary Hildebrand

GARY HILDEBRAND
Assistant Deputy Director
Watershed Management Division

DD:jht
P:\wmpub\Secretarial\2013 Documents\Letter\SMB WMA PMRP County.docx\C13325

Enc.

SEPTEMBER 20, 2013

Santa Monica Bay Watershed Management Area (WMA)

Plastic Pellet Monitoring and Reporting Plan (PMRP)

Submitted on behalf of:

THE COUNTY OF LOS ANGELES

LARRY WALKER ASSOCIATES

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List of Acronyms

BMP	Best Management Practice
BPA	Basin Plan Amendment
DPW	Los Angeles County Department of Public Works
IGP	Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activity
LACFCD	Los Angeles County Flood Control District
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
OES	California Office of Emergency Services
SIC	Standard Industrial Classification
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
PMRP	Plastic Pellet Monitoring and Reporting Plan
WLA	Waste Load Allocation

Overview

The purpose of this document is to detail a Plastic Pellet Monitoring and Reporting Plan (PMRP) to implement the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load (TMDL), effective March 20, 2012. The implementation of the TMDL covers the entire Santa Monica Bay Watershed Management Area (WMA). The Basin Plan Amendment[1] (BPA) implementing the TMDL lists the requirements for the PMRP. The following describes the PMRP developed for the unincorporated area of the County of Los Angeles (County) within the Santa Monica Bay WMA.

Monitoring procedures to quantify plastic pellets discharges from municipal separate storm sewer system (MS4) outfalls, levels of plastic pellets triggering additional inspections, protocols for a spill response to address containment of plastic pellets are included in the PMRP.

Future implementation efforts will warrant changes based upon outcomes of subsequent studies and findings. Significant modifications to the PMRP will be outlined in annual reporting and submitted to the Los Angeles Regional Water Quality Control Board (Regional Board).

PLASTIC PELLET DEFINITION

For the purposes of the PMRP, a plastic pellet is a piece of pre-production plastic that is typically formed into a spherical or cylindrical shape measuring less than five millimeters in diameter or length. Varying widely in composition, plastic pellets often incorporate different types of plastic as well as colorants and other additives. Plastic pellets are the base material used in manufacturing plastic products.

PMRP REQUIREMENTS

For the County, the PMRP requirements apply to areas within County jurisdiction, in particular, MS4 outfalls connected to sites associated with industrial facilities that are related to the manufacturing, handling, or transportation of plastic pellets. As defined in the TMDL, the waste load allocation (WLA) for plastic pellets is zero. Facilities associated with plastic pellets include but are not limited to Standard Industry Classification (SIC) codes 282X, 305X, 308X, 39XX, 25XX, 3261, 3357, 373X, and 2893. Additionally, industrial facilities with the term “plastic” in the facility or operator name will be subject to the WLA for plastic pellets. For the County, meeting the WLA will be achieved through implementing the PMRP. For plastic pellet-related facilities within the jurisdiction of the County, meeting the WLA will be achieved through applicable permits and orders[2].The PMRP is designed to address the following requirements:

- Monitoring the amount of plastic pellets being discharged from the MS4 where relevant industrial facilities are identified

[1] Attachment A to Resolution No. R10-010, Proposed Amendments to the Water Quality Control Plan – Los Angeles Region for the Santa Monica Bay Nearshore and Offshore Debris TMDL (http://63.199.216.6/larwqcb_new/bpa/docs/R10-010/R10-010_RB_BPA.pdf)

[2] The Industrial General Permit, other general permits, individual industrial stormwater permits, or other Regional Board orders, consistent with California Water Code § 13367 and 40 CFR 122.26(b) (12)

- Establishing triggers for increased industrial facility inspections and enforcement of Stormwater Pollution Prevention Plan (SWPPP) requirements
- Spill Response Plan.

In County jurisdictional areas with potential plastic pellet-related industrial facilities, the following proposed procedures will be used for the PMRP plastic pellet monitoring program:

- Inspect the industrial facilities where potential plastic pellet use has been identified
- Monitor the amount of plastic pellets discharged from facility areas draining to the MS4 if plastic pellets are found during an industrial facility inspection. Dispose of any captured plastic pellets in accordance with all applicable laws and regulations
- Prepare and submit annual reports to the Regional Board.

Any changes and revisions to the monitoring program will be included with subsequent annual reports.

GENERAL APPROACH

The County does not use or transport plastic pellets. Entities within County jurisdiction that use plastic pellets are presumed to be subject to the Industrial General Permit (IGP) and required to implement BMPs to prevent the discharge of plastic pellets per their SWPPPs developed specifically to address the pellet use by the entity. Discharge of plastic pellets to the MS4 system would occur through entities in violation of their IGPs or through spill during transport. The County PMRP procedures for meeting the TMDL requirements to identify entities discharging plastic pellets include the following:

1. Conduct industrial facility inspections and if relevant, plastic pellet monitoring
2. In the event of a spill, implement Spill Response Plan and notify the Regional Board within 24 hours of the County, responsible agency, or jurisdiction becoming aware of the spill
3. Submit a monitoring report twenty months from the receipt of the letter of approval for the PMRP from a Regional Board Executive Officer, and annually thereafter, that provides the following information:
    a. Summary of all industrial facility inspection and monitoring efforts
    b. Results of any plastic pellet monitoring, and whether additional inspections were triggered
    c. Results, including enforcement actions, from additional inspections triggered through monitoring
    d. If necessary, proposed revisions to the PMRP, including:
        i. Inspection triggers
        ii. Monitoring frequency, procedures, or site revisions
        iii. Spill response protocol revisions
        iv. Description of additional MS4 outfalls and/or industrial facilities to be addressed the following year.

The above proposed procedures comprise a tentative list that will be modified after monitoring efforts begin. Any major deviations will warrant Regional Board notification. The annual reports will incorporate results from activities outlined in the PMRP and a description of components and/or elements added or modified by the County.

PMRP COVERAGE

The BPA lists numerous responsible parties for plastic pellets in the Santa Monica Bay WMA. The County is assuming that all other parties will implement their own plastic pellet plans and the Regional Board will enforce all requirements associated with BPA milestones and requirements in an equitable manner to ensure that the plastic pellets are addressed in all listed areas.

The PMRP was developed to prevent and, in the case of a release during transport, oversee the capture of plastic pellets in areas under the County jurisdiction within the Santa Monica Bay WMA. As subsequent implementation efforts take place, other parties within the watershed will agree to join this implementation effort, whereupon modified procedures (e.g., notification to the Regional Board of party joining the effort, and increased monitoring requirements covered under the joint effort) will be followed. There is no plastic pellet usage by any County facilities.

Monitoring Approach

The TMDL presents a WLA of zero plastic pellets. Zero is defined as no discharge of plastic pellets from the premises of industrial facilities that import, manufacture, process, transport, store, recycle, or otherwise handle plastic pellets. To ensure compliance with the WLA of zero plastic pellets, MS4 outfalls receiving discharges from industrial facilities with confirmed plastic pellet usage, transfer, or other handling within the Santa Monica Bay WMA that are within County jurisdiction will be monitored for plastic pellets. In the event that plastic pellets are found on-site during facility inspections (see the **Industrial Facility Inspections Section**), plastic pellet monitoring will be conducted at critical locations and times including: once during the wet season and once during the dry season.

The WLA is assigned to the County and to permittees of the statewide Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activity (NPDES Permit No. CAS00001) (Industrial General Permit or IGP) and other permitted facilities relevant to plastic pellets that are within County jurisdiction in the Santa Monica Bay WMA. At present, only three facilities that are relevant to, or have the potential to be relevant to plastic pellet manufacturing, handling, or transportation are located within the Santa Monica Bay WMA, specifically in the Marina del Rey watershed, and are included in **Figure 1**.

In addition to monitoring at the three identified facilities, any new or retrofit facilities to be located within the County jurisdiction will be responsible for assisting the County in identifying downstream MS4 outfalls and determining monitoring procedures appropriate for the outfall locations. Example monitoring procedures are included in Attachment A. New facilities will also be expected to implement industrial best management practices (BMPs) for plastic pellets (e.g., install storm drain screens with mesh smaller than the smallest pellet handled at the facility, equip loading areas with vacuums or brooms and dust pans, and provide catch trays for use at all vehicle unloading valves).[3]

[3] These example BMPs and additional examples can be found in the Operation Clean Sweep Manual

Figure 1. Proposed PMRP Monitoring Locations in Marina del Rey

PROPOSED MONITORING LOCATIONS

We propose to conduct plastic pellet monitoring at the catch basin inlets of any facility found to have plastic pellets during on site facility inspections (see the **Industrial Facility Inspections Section)**. The three facilities shown in the following subsections have the potential to manufacture, handle, or transport plastic pellets, however, the County is not aware of any current or recent activities at these facilities involving plastic pellets.

Windward Yacht and Repair and The BoatYard

Windward Yacht and Repair, Inc. and The BoatYard are neighboring businesses that have Standard Industrial Classification (SIC) codes for boat building and repairing[4], and industrial facilities that are adjacent to the Marina del Ray Harbor (see **Figure 2**). Windward Yacht and Repair currently provides boat repair services (e.g., fiberglass hull repair, electrical work, and mechanical work), space for customers to perform their own boat work, dry locations for storing boats and supplies, and a store room for purchasing supplies. Comparable services and amenities are provided at The BoatYard. Stormwater outfalls for both of the facilities emanate from the seawall forming the basin and are periodically submerged by the ocean tides. An example outfall is pictured in **Figure 3**. Windward Yacht Repair employs curb-like structures to decrease the amount of runoff leaving facility grounds. The water is ponded by the curb-like structures resulting in settling of materials from the water column. These materials are collected and properly disposed of as the water is removed. Any runoff that will flow over the curb-like structures onto the walkway is collected by catch basins that are stenciled with “No Dumping” and contain filter media. The curb-like detention BMP at the Windward facility is presented in **Figure 4**. A walkway catch basin is illustrated in **Figure 5**, highlighting the stenciling.

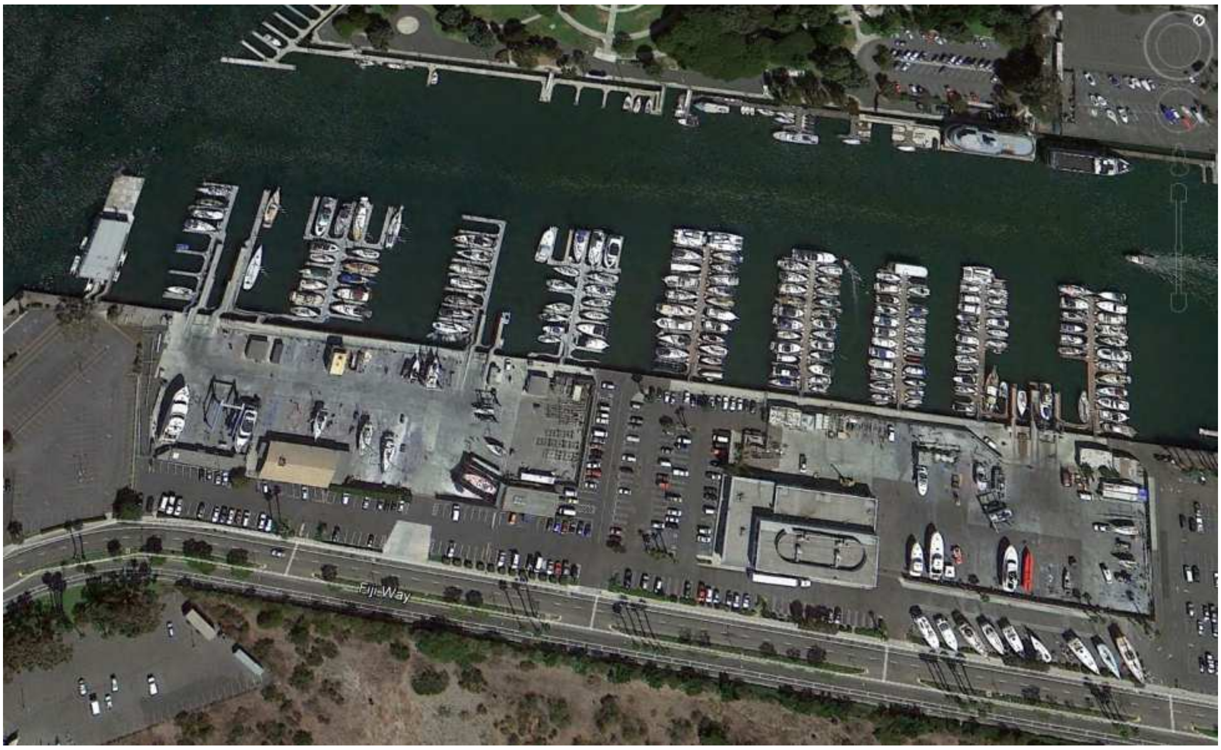

Figure 2. Windward Yacht and Repair, and The BoatYard

[4] SIC code 3732

Figure 3. Example Outfall at Windward

Figure 4. Flow Detention at Windward

Figure 5. Windward Catch Basin Stenciling

The BoatYard utilizes sandbags to reduce the amount of runoff leaving facility grounds. Settling of materials occurs where the water is ponded by the sandbags. These materials are collected and properly disposed of as the water is removed. Any runoff that will flow over the sandbags onto the walkway is collected by catch basins in the walkway and stored in three settling tanks before being discharged into the marina. In addition, water discharging from the roof of the facility is directed towards the walkway, collected by catch basins in the walkway, and stored and treated within a series of three settling tanks before being discharged into the marina. The BoatYard facility is pictured in **Figure 6**. An example outfall at low tide is presented in **Figure 7**. Example catch basins at The BoatYard are presented in **Figures 8** and **9**. The settling tanks at The BoatYard are presented in **Figure 10**. An overview of plastic pellet-related outdoor BMPs at proposed facilities to be monitored is presented in **Table 1**.

Figure 6. The BoatYard

Figure 7. Outfall Adjacent to The BoatYard

Figure 8. Catch Basin at The BoatYard

Figure 9. Example Catch Basin at The BoatYard

Figure 10. Settling Tanks at The BoatYard

Seamark Marine

The Seamark Marine facility is located on the Marina del Rey waterfront as illustrated in **Figure 11**. Similar to Windward and The BoatYard, Seamark is a boat yard that provides general boat repairs including fiberglass, electric, and engine work. As such, Seamark has a SIC code for ship building and repairing.[5] Seamark utilizes oil-absorbing booms placed in a circle around any boat that is being repaired, which impound all water and materials within their area. The impounded water and materials are collected and disposed of in the sanitary sewer. The booms

[5] SIC code 3731

are used during dry and wet weather. Seamark also has catch basins that collect runoff from the facility, which are connected to outfalls along the seawall. An example outfall is pictured in **Figures 12** and **13** at low and high tides, respectively. An example catch basin is presented in **Figure 14**.

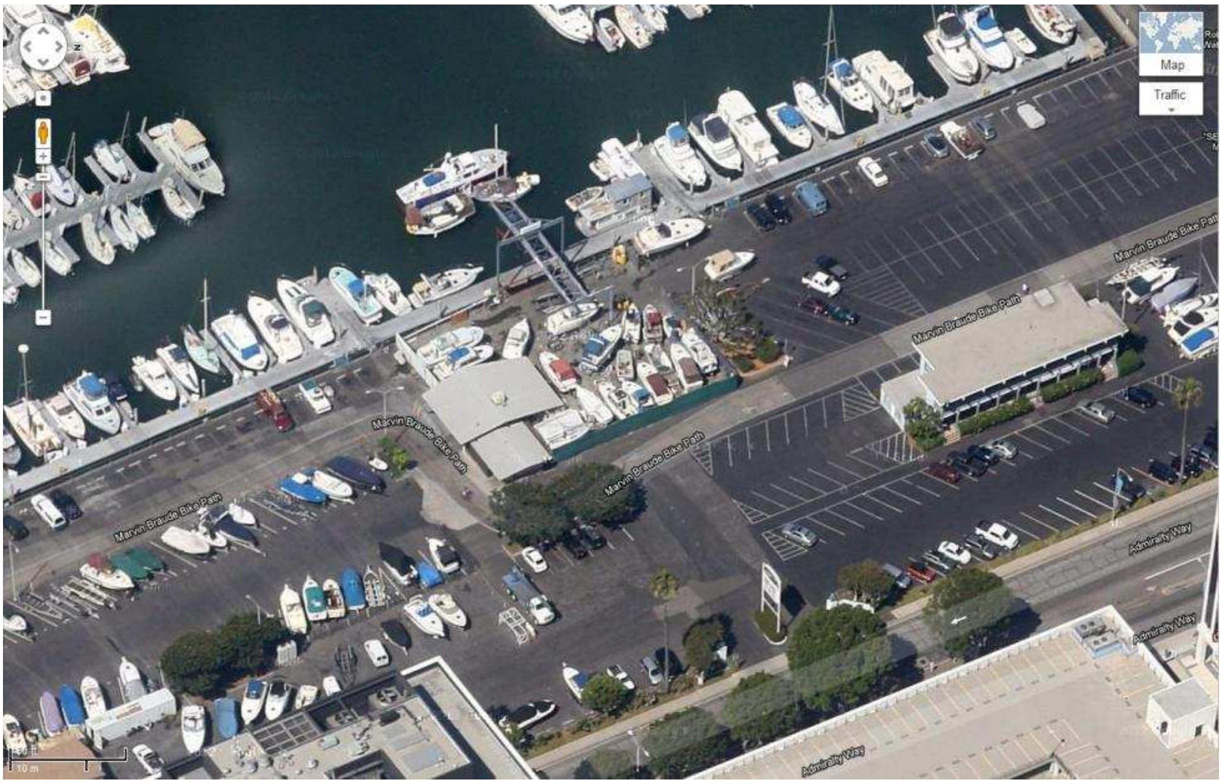

Figure 11. Seamark Facility

Figure 12. Example Seamark Outfall at Low Tide

Figure 13. Example Seamark Outfall Submerged by Tide

Figure 14. Example Catch Basin at Seamark

An overview of proposed PMRP monitoring locations and plastic pellet-related BMPs at each site is presented in **Table 1**.

Table 1. Overview of Plastic Pellet-Related Outdoor BMPs at Proposed Facilities To Be Monitored

Facility Name(s)	Address	On-site BMPs
Windward Yacht and Repair, Inc.	13645 Fiji Way, Marina Del Rey, CA 90202	• Curb-like structures for stormwater runoff retention and debris capture (**Figure 4**) • Manual collection and disposal of materials accumulated by curb-like structures • Catch basin stenciling (**Figure 5**) • Filter media installed in catch basin.
The BoatYard	13555 Fiji Way, Marina Del Rey, CA 90202	• Sandbags to retain stormwater runoff • Manual collection and disposal of materials that accumulate from sandbagging • Catch basins set in walkway to capture excess stormwater runoff not retained by sandbags • Series of settling tanks that walkway catch basin flow is directed to for storage and treatment before discharge to the marina (**Figure 10**).
Seamark Marine	13441 Mindanao Way, Marina Del Rey, CA 90292	• Booms used to impound all water and materials around boats undergoing repair • Manual Collection and disposal of water and materials accumulated within booms.

Proposed Monitoring Locations and Frequencies

MONITORING LOCATIONS

Plastic pellets will be monitored at selected MS4 outfalls downstream of the potential plastic pellet-related industrial facilities detailed in **Figure 1** or catch basins located on the facility grounds if plastic pellets are found on-site during facility inspections (see the **Industrial Facility Inspections Section**). If no plastic pellets, or no evidence of plastic pellet use, are found on-site during the routine annual inspection, and interview of the operator confirms no plastic pellet use, no monitoring will be conducted. Instead, documentation showing the lack of activities related to the manufacturing, handling, and transportation of plastic pellets will be recorded and included in subsequent annual reports. Operators of any new facilities located within the unincorporated County areas will coordinate with the County to develop appropriate extensions to the PMRPs as necessary, by identifying additional proposed monitoring locations and schedules. A model framework to develop programs for new facilities is provided in Attachment A.

MONITORING FREQUENCY

The frequency of required monitoring for MS4 outfalls downstream of locations where plastic pellets are found during facility inspections (see the **Industrial Facility Inspections Section**), is at least once in the rainy season[6] and once in the dry season each year. An overview of the initial proposed frequency of potential monitoring events is presented in **Table 2**.

Table 2. Proposed PMRP Monitoring Events in the Santa Monica WMA

Location	Monitoring Event Frequency
Windward	Semi-annually*
BoatYard	Semi-annually*
Seamark	Semi-annually*

* To be determined after on-site inspection as described above

MONITORING EVENT PREPARATION

Monitoring events will only be conducted during safe weather conditions. As such, the weather forecast will be checked immediately prior to heading out for monitoring field work. Precipitation events within the WMA can cause elevated water levels and unsafe conditions. If at any time during a monitoring event, field personnel feel that site conditions are unsafe for any reason, the event will be abandoned and the project manager notified of the situation.

Prior to mobilization for each monitoring event, field personnel will prepare the equipment necessary to conduct the monitoring event. Equipment will include but is not limited to the equipment listed in **Table 3**.

[6] The rainy season is defined as the period from October 15 to April 15.

Table 3. Equipment Checklist

Plastic Pellet Monitoring Items	
☐ First Aid Kit	☐ Copy of PMRP document
☐ Cellular Telephone	☐ Digital Camera
☐ Life Jackets	☐ Timepiece
☐ Work Gloves/Laboratory Gloves	☐ Notebook and Pen
☐ Trash Bags	

Additionally, any necessary permits required for access to restricted areas and/or plastic pellet removal will be obtained prior to the monitoring event.

MONITORING PROCEDURE

Where necessary, the sampling crew will conduct monitoring for plastic pellets using a two stage mesh. The first stage mesh will be of 5 mm opening to collect trash. The second stage will be a fine screen or cloth 1 mm or finer. The mesh system will be temporarily affixed to the outlet, or within the drop-inlet or catch basin. The volume of the collected plastic pellets will be recorded.

Where there is no flow at the time of sampling, the sampling crew will conduct a visual assessment of the outfall and collect all plastic pellets found in the vicinity of the outfall. Where accessible, the sampling crew will open and visually assess the drop-inlet/catch basin closest to the identified facility. Plastic pellets found in the drop-inlet or catch basin will be collected if accessible. If found in the drop-inlet or catch basin, the facility will be subject to increased inspection.

Industrial Facility Inspections

For industrial facilities, the TMDL WLA will be implemented primarily through the requirements of the IGP, other general permits, individual industrial stormwater permits, or other Regional Board orders. The discharge of plastic pellets from industrial facilities is prohibited. However, if industrial facilities release plastic pellets into the County MS4, facility inspections and enforcement of IGP SWPPP requirements will be used to further control and prevent the release of plastic pellets into the natural environment.

TRIGGERS FOR INSPECTION AND SWPPP ENFORCEMENT

All potentially plastic pellet-related facilities under County jurisdiction, including facilities identified in the **PROPOSED Monitoring Section** (also see **Figure 1**) and new facilities that will emerge, will undergo at least one routine annual inspection. Additional facilities using plastic pellets identified through routine inspections, hotline reporting, or other means will be added into the annual inspection and monitoring will be performed as warranted.

Following a routine facility inspection where plastic pellets are found on-site, plastic pellet monitoring will be conducted on a semi-annual basis developed according to the framework outlined in Appendix A. The data collected from monitoring will be used to trigger enforcement of plastic pellet-related SWPPP requirements. For example, if the volume of plastic pellets captured from facility discharge to the MS4 exceeds 50 mL, the County will conduct a follow-up inspection within four weeks from the completion of the monitoring event. Similarly, in the event that the County determines, based on a routine annual inspection or illicit discharge/spill investigation conducted, that a facility has failed to adequately implement all necessary plastic pellet BMPs, the County will include a follow-up inspection within four weeks from the date of the initial inspection and/or investigation.

After the follow-up inspection, the County will determine if the facility has made progress in implementing required BMPs identified in the initial site inspection and/or monitoring. If the potential problem is not resolved, the County will decide whether there is enough progress to warrant a second follow-up inspection to allow the facility owner/operator more time to meet the requirements, to initiate enforcement actions, or to refer the facility to Regional Board for further actions. The County representatives will follow the legal authority established in the municipal code and ordinances.

ENFORCEMENT OF SWPPP REQUIREMENTS

If during facility inspections, the plastic pellet-related BMPs specified in the SWPPP, and any applicable source control BMPs and any additional BMPs required for compliance with municipal ordinances, are not adequately protective of water quality standards (e.g., at preventing illicit discharges into the MS4 and receiving waters), the County will require additional site-specific controls.

In the event that the County determines that a facility has failed to adequately implement BMPs after a follow-up inspection and has demonstrated a good faith effort to bring the facility into compliance, the County will take enforcement action as established through authority in its municipal code and ordinances or through the judicial system. For those facilities subject to the IGP and in violation of municipal storm water ordinances, the County will escalate referral of a violation of its municipal storm water ordinances and/or California Water Code §13260 to the Regional Water Board (promptly via telephone or electronically) after conducting a minimum of one follow-up inspection and submitting a minimum of one written notice of violation to the facility or site operator regarding the violation. For facilities not subject to the IGP that are in violation of municipal storm water ordinances, the County will refer such a violation to the Regional Water Board after conducting a minimum of two follow-up inspections and submitting a minimum of two warning letters or notices of violation to the facility or site operator regarding the violation.

Emergency Spills

Accidental spills during transfer and transportation contribute to plastic pellets entering storm drains and, ultimately, the Santa Monica Bay. Included below, are protocols for a timely and appropriate response to possible plastic pellet spills within County jurisdiction to address containment of spilled plastic pellets (see **Figure 15**). Railroads do not cross the areas of County jurisdiction within the Santa Monica Bay WMA.

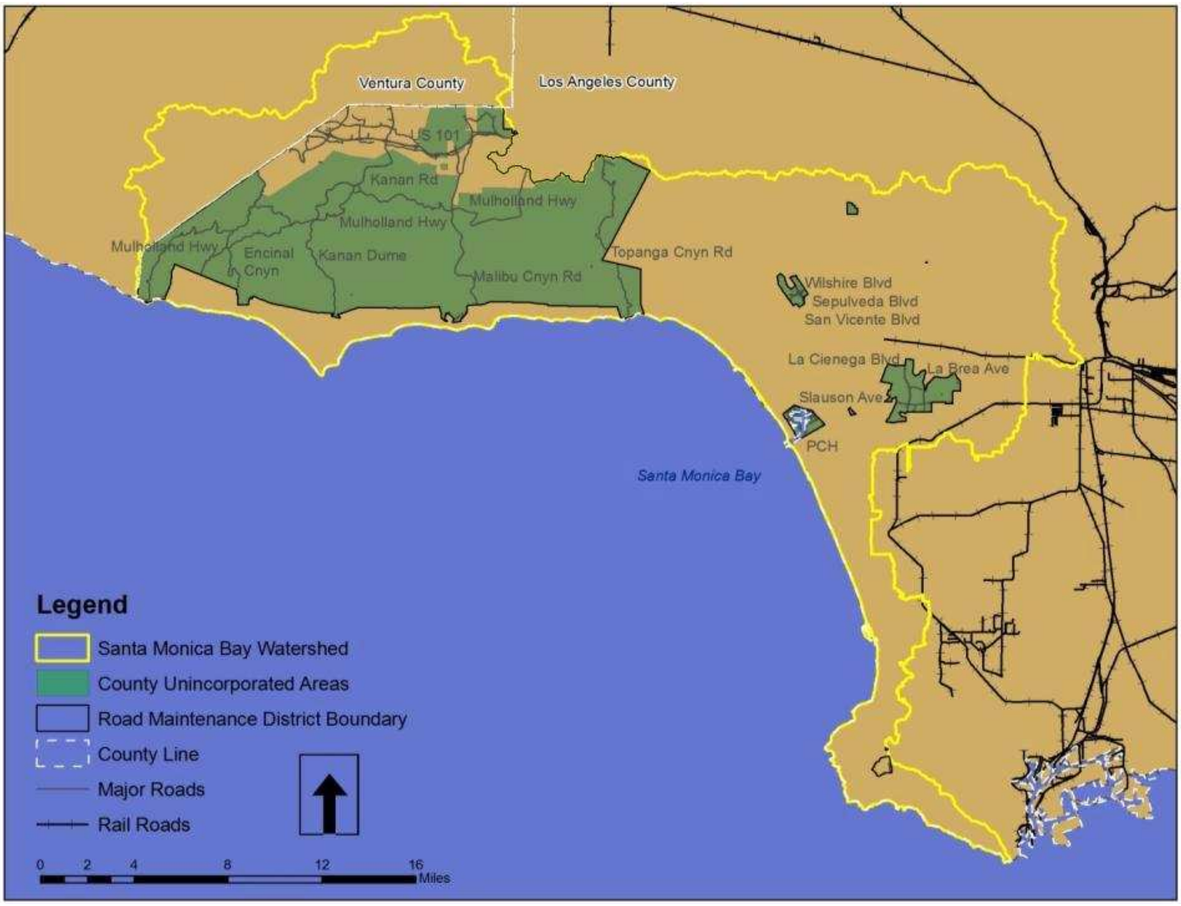

Figure 15. Major Thoroughfares Crossing Areas of County Jurisdiction

SPILL RESPONSE PLAN

The general procedures for the spill response plan are outlined below:

1. Calls come in to our Dispatch Center (e.g., through 24-hour illegal dumping/discharge hotlines) from the general public or responding crew to report spills and other illegal dumping/discharge incidents. Calls or faxes regarding spills, discharges, or dumping information affecting the County can also come in from the California Office of Emergency Services.

   The dispatcher will obtain as much information as possible about the location (e.g., on street, in gutter, or entered waterway such as catch basin or storm drain) and take the following steps:

a. If the spill, discharge, or dumping is on County jurisdiction, the dispatcher will contact the Los Angeles County Department of Public Works' (Public Works) Road Maintenance Division (RMD) and provide them the information.
b. If the spill, discharge, or dumping has entered an Los Angeles County Flood Control District (LACFCD) waterway, storm drain, or catch basin, the dispatcher will contact them and provide them the information
c. If the dumping, discharge, or spill is on a City street or property not contracted with the County, Dispatcher will provide the reporting party (RP) with the telephone number for the appropriate City and/or handling agency. Dispatcher will also transfer RP to the correct agency.

Under the County Spill Response Plan, Public Works' RMD will respond by mobilizing the field crew closest to the spill to investigate and identify the source of the spill. The County and/or the responsible party will either perform the spill cleanup or appoint a third-party emergency response service to perform the spill clean-up. The responding field crew will ask Dispatch Center to contact the local authorities to handle traffic control, if needed.

2. The Regional Board will be notified within 24 hours of the County, other responsible agency, or jurisdiction becoming aware of the spill.
   a. The County staff will call the Regional Board's front desk at (213) 576-6600.

      The County staff handling the spill report will notify the Regional Board's front desk staff that he/she is calling regarding the Santa Monica Bay Debris TMDL and ask to be transferred to the correct staff. If it is on a weekend, the County staff will leave a message including: a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact info.

   b. The County staff will send a notification e-mail to the Regional Board at losangeles@waterboards.ca.gov.

      The e-mail subject line will be "Santa Monica Bay Debris TMDL". The body of the e-mail will include a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact info.

The general flow of communication and responsibility that will occur during spill response is illustrated in **Figure 16**. Additionally, a listing of relevant contact information is included in Attachment B. In identifying the responsible party for the spill, the origin and destination of the plastic pellet shipment will be ascertained to determine if a new plastic pellet industry should be included in the program.

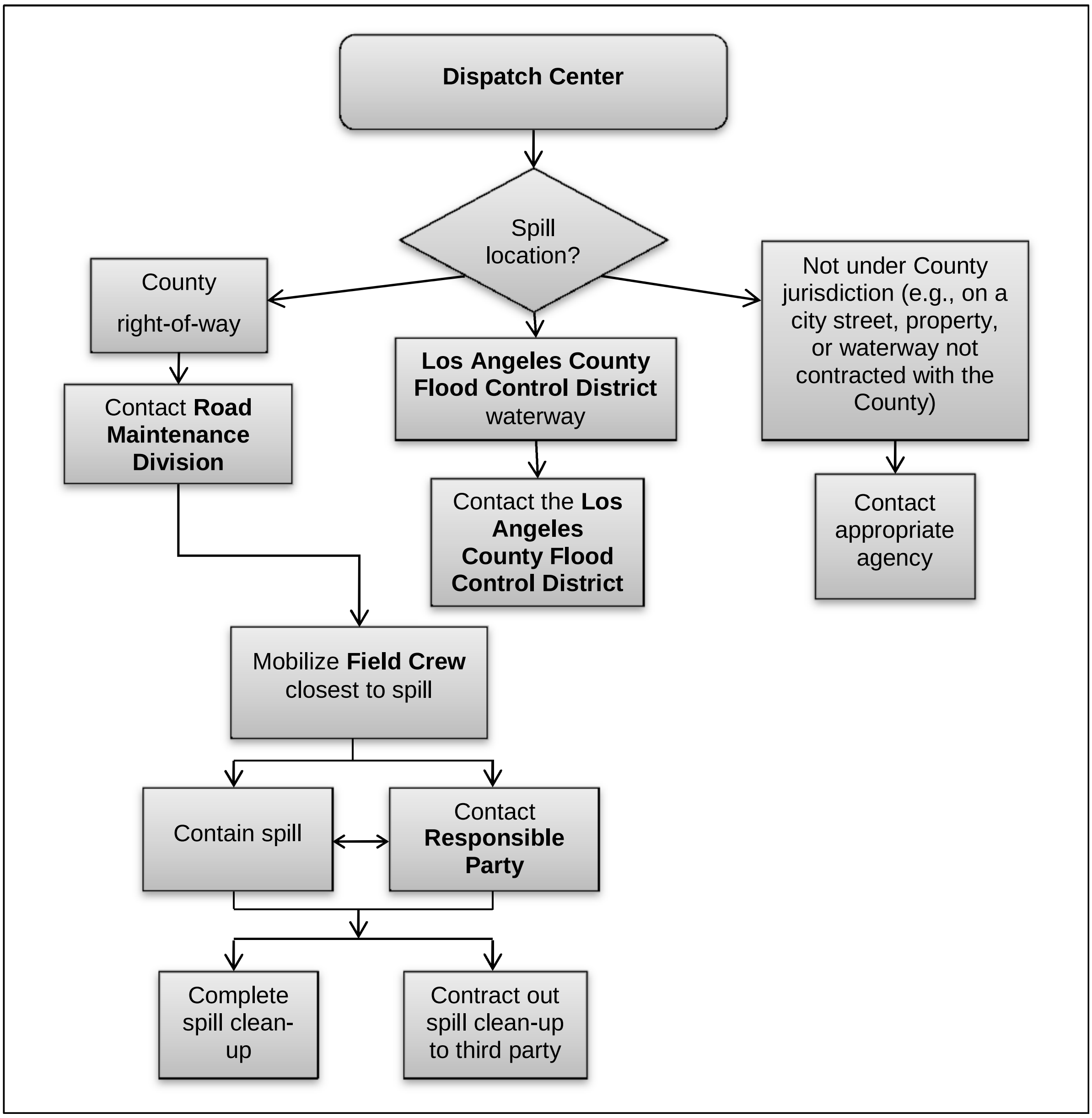

Figure 16. General Flow of Communication and Responsibility for Plastic Pellet Spill Response

COMPREHENSIVE PLAN

To ensure containment of plastic pellets released within County jurisdiction, the County will implement the given Spill Response Plan and uphold the facility inspection, monitoring, and SWPPP enforcement protocols proposed in the PMRP.

For any spill or illicit discharge, Public Works' Environmental Programs Division will provide support by mobilizing personnel to investigate the details of the occurrence. Such investigations will include visual inspections, interviews, sampling, and documentation of findings (e.g., violations of industrial permits and/or city codes). If applicable, documented findings will be used by the County to trigger enforcement activities and/or facility inspections (detailed in the **Industrial Facility Inspections** Section).

The County has standby field and in-office staff available at all times for spill response, and will coordinate with spill response teams throughout all appropriate divisions, programs, and agencies so that maximum water quality protection is provided. Additionally, the County will respond to spills that occur on the boundaries of County jurisdiction and take steps to contain the spill. The County will then coordinate with the responsible party to make sure that all captured plastic pellets are disposed of properly at a landfill.

Special Circumstances for Safety Consideration

In this section, we would like to make the Regional Board aware of the County Health and Safety Protocols when it relates to plastic pellets. Preserving the safety of our field crew is the top priority during all monitoring events. As such we advise our staff that within the Santa Monica WMA there are several potentially hazardous factors that will exist over the course of a sampling event. A sampling crew composed of County employees shall follow the general guidelines of the County Health and Safety Protocols and modified as necessary for the specific site conditions encountered. Contracted sampling teams shall provide their own Health and Safety Plan demonstrating equivalency with the County plan and subject to County approval. One of these is the potential to encounter unsafe environmental conditions. Other factors include traffic and vehicle safety, as well as hazardous materials. The potential for these special circumstances are discussed below. In general, however, if the field crew believes that conditions are unsafe, the project manager shall be notified and monitoring will not commence as planned.

PERSONAL PROTECTIVE EQUIPMENT

Wearing appropriate attire can minimize the likelihood of injury, heat stress, or cold stress. As such, all field staff shall wear appropriate field clothing, including proper footwear, dungarees and shirts for field work, gloves, eye protection, and head wear to protect from the sun. Individuals without appropriate clothing will not participate in conducting any monitoring activities.

A first aid kit will be present in each vehicle used for field work. The field crew leader(s) to be sure their vehicles have a fully stocked first aid kit before entering the field. Crew leader(s) will consider including specialized items such as an insect sting treatment kit for individuals who will not be aware of allergic reaction to bee stings.

HEAT STRESS

Heat stress is a significant potential hazard associated with field efforts. When the body becomes overheated, a condition of heat stress exists. It can lead to a number of problems, including heat exhaustion, heat stroke, heat cramps, fainting, or heat rash. The use of protective equipment in hot weather environments can also accelerate heat stress related illnesses. Local weather conditions will produce situations which require restricted work schedules in order to protect personnel. During field activities, staff will watch for signs of heat related illness and keep the project manager updated on the condition of the individual. Signs of heat related illness include, but are not limited to, elevated body temperature; dizziness or faintness; exhaustion; and dry, hot, red skin or cold and clammy skin with heavy perspiration. If appropriate, staff shall immediately contact emergency personnel (e.g., call 911 for an ambulance).

COLD STRESS

Staff will be required to work in cold environments, sometimes for extended periods. Cold stress is a common problem encountered in these types of situations. Four factors contribute to cold stress: cold air temperatures, high velocity air movement, dampness of the air, and contact with cold water or surfaces. A cold environment forces the body to work harder to maintain its temperature. Cold air, water, and snow all draw heat from the body. While it is obvious that below freezing conditions, combined with inadequate clothing, can bring about cold stress, it is also important to understand that it can be brought about by moderate temperatures coupled with rain and wind. Wearing appropriate clothing and being aware of how your body is reacting to the cold are important to preventing cold stress. Staff will watch for signs of cold stress and keep the project manager updated on the condition of the individual. Signs of cold stress include, but are not limited to, pale and cold skin, numbness, loss of coordination, and slurred speech. If appropriate, staff shall immediately contact emergency personnel (e.g., call 911 for an ambulance).

TRAFFIC AND VEHICLE SAFETY

Traffic hazards will be encountered when working at the side of or in a roadway. The primary threats associated with working in or alongside roadways are field staff being struck by passing vehicles or being involved in a vehicular collision. The risks associated with these threats are severe bodily injury and/or death. Field crews will not turn their back(s) on oncoming traffic. If a crew member must turn their back on oncoming traffic, a coworker will watch out for their safety. Field staff will be conscious of all vehicular traffic that will be present during field events. Field staff will also be careful when exiting the work area, especially when walking out from between parked vehicles to avoid vehicular traffic.

OCEAN TIDES AND CURRENTS

The combination of ocean tides and rocky terrain often produce slippery surfaces. Especially when working in close proximity to the water, strong waves and/or rip currents will present additional dangers. Field staff will be aware of their surroundings at all times, take precaution when walking on wet surfaces, and consider wearing a pack to keep their hands as free as possible.

SLIPS AND FALLS

Slipping hazards will exist due to uneven terrain, wet surfaces, steep channels, leaking hydraulic fluid, or construction materials. Tripping hazards will be present from elevation changes, debris, or equipment. Falls are possible from elevated platforms, work areas, access ladders, and stairs. Prevention requires alertness, proper procedures, and appropriate protective equipment.

SWIFT WATER/FLOOD CONDITIONS

Though weather reports will be checked prior to mobilizing for a field event, an unexpected storm will cause flash flood conditions. Under these conditions, the event will likely be abandoned. At no time will field staff be in stream channels (engineered or natural) during swift water and/or high flow conditions, nor will staff be in any channels if a forecasted storm (of 20% or greater chance of precipitation) is predicted for that day. Monitoring-related field activities for critical storm conditions will take place prior to any rainfall occurring. All activities will be suspended immediately if field staff are in the field and rainfall occurs. After any rainfall event, field staff will not re-enter stream channels until flow velocities have returned to base flow conditions and/or conditions are deemed safe by the project manager or proper authorities.

HAZARDOUS MATERIALS

There is potential that hazardous materials, both physical and chemical substances, will be encountered at the monitoring sites. Hazardous gaseous, liquid, and/or solid contaminants will be present as the result of spills and/or illicit dumping. The presence of chemicals and/or chemical vapors will result in (but are not limited to) one or more of the following threats: toxic conditions, oxygen displacement and explosion, and/or fire. The risks associated with these threats include poisoning (acute and/or chronic), asphyxiation, and bodily injury. Field staff will avoid all suspected hazardous materials and notify the project manager, if appropriate.

CONFINED SPACES

Unless deemed necessary by the project manager and conducted according to the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) guidelines[7] by adequately trained (and if appropriate, permitted) individuals, field staff will not enter any confined spaces, including storm drain outlets, freeway underpass tunnels, or any confined areas located at or near a monitoring location. Chemicals can accumulate in confined spaces, creating dangerous pockets of gas and other potential hazards.

HOMELESS INDIVIDUALS

There some potential for encounters and/or interactions with homeless individuals during monitoring-related field activities. During such activities, field staff will use discretion in all interactions with all individuals in the field and handle themselves in a professional and courteous manner. If at any time field staff feel uncomfortable or in danger, activities will immediately cease and all staff will return to a safe location. The field crew will discuss the situation with the project manager and, if appropriate, contact the appropriate authorities.

WILDLIFE

There is the potential to encounter various wildlife that will pose a threat, including but not limited to poisonous reptiles and stinging insects. Additionally, rodents, raccoons, and opossum will be found near monitoring sites, and will be generally avoided due to concerns with rabies. Stray animals or pets will also be encountered during the events. Field staff are advised to avoid contact with any animal with which they are not familiar. As such, field staff will not corner, entrap, or attempt to feed any animal.

[7] http://www.dir.ca.gov/dosh/Confined_Space_Emphasis_Program.html

Reporting Requirements

ANNUAL REPORT

Each year, an annual report will be submitted to the Regional Board. The annual report will review the results of implementing the PMRP and propose implementation of other measures to attain the required plastic pellet reduction. Additionally, the annual report will include a summary of monitoring results.

PMRP REVISION

All proposed revisions the County determines to be necessary to the PMRP will be outlined in the subsequent annual report. Revisions will include procedural modifications, changes to the facility inspection triggers, updates to the list of relevant facilities, and other PMRP additions.

Attachment A - Model Plastic Pellet Monitoring Program

As an extension to the County of Los Angeles (County) Santa Monica Bay Plastic Pellet Monitoring and Reporting Plan (PMRP), industrial facilities within County jurisdiction that manufacture, handle, or transport plastic pellets[8] are required to develop a Plastic Pellet Monitoring Program. Facilities associated with plastic pellets include but are not limited to Standard Industry Classification (SIC) codes 282X, 305X, 308X, 39XX, 25XX, 3261, 3357, 373X, and 2893. Additionally, industrial facilities with the term "plastic" in the facility or operator name will be subject to the waste load allocation (WLA) for plastic pellets. Identified facilities necessitate the development of a PMRP. Information on plastic pellet monitoring is presented in the PMRP **Monitoring Approach Section** and **Potential Monitoring Locations and Frequencies Section**. Plastic Pellet Monitoring Programs will be subject to County approval.

SITE SELECTION

Potential monitoring sites include all Municipal Separate Storm Sewer System (MS4) outfalls to which the industrial facility will discharge and/or any catch basins/swales/area drains located on the facility grounds. Operators of industrial facilities will work with the County to identify the locations and characteristics of such potential monitoring sites.

MONITORING FREQUENCY

Using the Basin Plan Amendment (BPA) as a reference, industrial facilities will draft a table for the monitoring frequency that will occur at the identified monitoring sites. For example, the minimum frequency per the BPA consists of monitoring once during the wet season, which is defined as the period from October 15 to April 15, and once in the dry season.

While the County will be responsible for conducting the monitoring, industrial facilities are responsible for providing access to facility grounds prior to and/or during a monitoring event.

REPORTING

As provided in the PMRP **Reporting Requirements Section**, the County will submit to the Regional Board annual reports summarizing the results of monitoring at selected and approved monitoring sites . Annual reports will encompass monitoring data collected and whether increased facility inspections (see PMRP **Industrial Facility Inspections Section**) were triggered.

MONITORING PLAN

The approach that has been selected for the PMRP monitoring procedure is to record the volume of plastic pellets collected. As such, example procedures for monitoring plastic pellets are presented in the **Example Monitoring Procedures Section**. Prior to mobilizing for each monitoring event, however, field personnel will prepare necessary equipment and ensure safe

[8] Other industrial facilities will be subject to PMRP requirements, per the Plastic Pellets subsection within the Waste Load Allocations (for point sources) section of the Basin Plan Amendment (Attachment A to Resolution No. R10-010, Proposed Amendments to the Water Quality Control Plan – Los Angeles Region for the Santa Monica Bay Nearshore and Offshore Debris TMDL)

working conditions and sufficient daylight (to the extent possible). Field personnel will also review the procedures presented in **Example Monitoring Procedures Section** below.

Example Monitoring Procedures

Where necessary, the monitoring for plastic pellets generally will be conducted using a two-stage mesh. The first stage mesh will be of 5 mm opening to collect trash. The second stage will be a fine screen or cloth of 1 mm mesh or finer. The mesh system will be temporarily affixed to an MS4 outlet. The volume of the collected plastic pellets will be recorded.

Where there is no flow at the time of sampling, a visual assessment of the outfall will be conducted. Plastic pellets found in the vicinity of the outfall will be collected and weighed. Where accessible, the sampling crew will open and visually assess the drop-inlet/catch basin closest to the identified facility. Plastic pellets found in the drop-inlet or catch basin will be collected if accessible. If found in the drop-inlet or catch basin, the facility will be subject to increased inspection.

Once all field personnel and necessary equipment are properly prepared for the pending monitoring event, mobilization will occur and the monitoring event will proceed as follows:

1. Fit and/or install an end-of-pipe device on the MS4 outfalls to be monitored
2. Record event start time and date
3. Keep device in place for a designated monitoring period (e.g., one week)
4. Remove device at the end of the monitoring period, as the water level, weather conditions, and daylight hours permit
5. Record event stop time and date
6. Collect plastic pellets and sort out any other debris
7. Rinse plastic pellets, if necessary
8. Photograph the plastic pellets
9. Measure the approximate volume of the plastic pellets in milliliters (e.g. using a beaker)
10. Record volume
11. Properly dispose of plastic pellets, in accordance with all applicable laws and regulations.

Field personnel will wish to test and ensure the fit of an end-of-pipe device prior to the first scheduled monitoring event. The end-of-pipe device will consist of a series of screens[9] that trap all particles retained by a 1 mm mesh screen, and will have a design treatment capacity of at least the peak flow rate resulting from a one-year, one-hour storm in the drainage area. Such a device will include appropriate hardware (e.g., a metal collar, wall anchors) to ensure a secure connection with the outfall, metal screens or netting to capture the debris, and compartments to hold the debris. Each location is expected to be a custom installation. If it is not safe or otherwise feasible to attach an end-of-pipe device to the outfall (e.g., due to tidal submersion), a similar device will be installed in-pipe immediately downstream of the last catch basin located before

[9] Minimum of two screens, one to exclude possible trash and another to capture plastic pellets

the MS4 outfall. Field personnel will be required to implement the County Health and Safety Plan or an equivalent health and safety plan customized by location.

Example Monitoring Scenarios

Example monitoring procedures for possible facility/outfall scenarios are detailed below.

Scenario A. Facility within County island that discharges to an identifiable County MS4 outfall:

1. Install end-of-pipe device on outfall
2. Keep device in place for designated period (e.g., one week)
3. Remove device, taking care not to spill contents
4. If the compartment(s) preceding the plastic pellet compartment contains debris, gently shake device from side to side to dislodge plastic pellets that will be caught within the debris
5. Check end compartment for plastic pellets.

Scenario B. Facility discharging directly to a harbor wall with MS4 outfalls either completely or periodically submerged, with no flow during dry weather:

1. Locate catch basin(s) directly upstream of outfalls
2. Lift catch basin grating and any BMP-related installations
6. Check for pellets
7. Optional- if pellets are found, temporarily install and secure a permeable apron (e.g., 1 mm mesh) beneath the grating and beneath any existing installations, or an in-pipe device immediately downstream of the catch basin opening, to capture pellets
   a. Keep installation in place for designated period (e.g., one week)
   b. Remove installation, taking care not to spill contents
   c. Check for pellets.

Scenario C. Facility within County island that discharges to an identifiable County MS4 outfall that is miles downstream, where there is a risk for false positives from other industrial discharges that will occur between the facility in question and the outfall:

1. Install end-of-pipe device on outfall
2. Keep device in place for designated time period (e.g. one week)
3. Remove device, taking care not to spill contents
4. If the compartment(s) preceding the plastic pellet compartment contains debris, gently shake device from side to side to dislodge pellets that will be caught within the debris
5. Check end compartment for pellets
6. If plastic pellets are found, note the presence of any other relevant facilities discharging to the same outfall.

Alternatively, conduct on-site monitoring:

1. Have the facility install a flow detention vault, other stormwater detention structure (e.g., series of above-ground settling drums), or trench drain
2. Clean any contents out of structure
3. Direct facility discharge into the structure (e.g., using a pump)
4. After one week, clean any contents out of structure
5. Check for pellets, sieving contents if necessary

Aside from the considerations presented in the above monitoring scenarios, other site-specific considerations will be necessary due to the wide variation in location/general accessibility, flow rate, and size/shape of MS4 outfalls.

Attachment B - County Plastic Pellet TMDL Contact Sheet

PLASTIC PELLET SPILLS AND ILLEGAL DUMPING/DISCHARGES

Los Angeles County Department of Public Works (Public Works)

Dispatch Center (24-hour hotline)

Phone: (626) 458-4357

Public Works, Dispatch Center (24-hour public hotline)

Call to report illegal dumping/discharges into the storm drain system anywhere in Los Angeles County

Phone: 1(888) 253-2652, or 1(888) CLEAN LA

Public Works, Road Maintenance Division Headquarter

Phone: (626) 458-5954

Public Works, Environmental Programs Division Headquarters

Phone: (626) 458-3517

COUNTY OF LOS ANGELES PMPR CONTACT

Bruce Hamamoto, Public Works, Watershed Management Division

Phone: (626) 458-5918 or (626) 458-4301

E-mail: BHAMAMO@dpw.lacounty.gov

Address: 900 S. Fremont Ave., Alhambra, CA 91803

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

GAIL FARBER, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

IN REPLY PLEASE
REFER TO FILE: WM-7

September 19, 2013

Mr. Samuel Unger, P.E., Executive Officer
California Regional Water Quality
Control Board – Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013-2343

Attention Ms. Jenny Newman

Dear Mr. Unger:

**PLASTIC PELLET MONITORING AND REPORTING PLAN
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
SANTA MONICA BAY WATERSHED MANAGEMENT AREA
SANTA MONICA BAY NEARSHORE AND OFFSHORE DEBRIS
TOTAL MAXIMUM DAILY LOAD**

On behalf of the Los Angeles County Flood Control District (LACFCD), we are submitting the enclosed Plastic Pellet Monitoring and Reporting Plan (PMRP) for the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load in accordance with the California Regional Water Quality Control Board, Los Angeles Region, Resolution No. R10-010. The enclosed PMRP includes a Spill Response Plan to address the containment of spilled plastic pellets in areas under the LACFCD's jurisdiction within the Santa Monica Bay Watershed Management Area.

If you have any questions, please contact me at (626) 458-4300 or ghildeb@dpw.lacounty.gov or your staff may contact Ms. Terri Grant at (626) 458-4309 or tgrant@dpw.lacounty.gov.

Very truly yours,

GAIL FARBER
Director of Public Works

Gary Hildebrand

GARY HILDEBRAND
Assistant Deputy Director
Watershed Management Division

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Santa Monica Bay Watershed Management Area (WMA)

Plastic Pellet Monitoring and Reporting Plan (PMRP)

Submitted on behalf of:

THE LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

Overview

The purpose of this document is to detail a Plastic Pellet Monitoring and Reporting Plan (PMRP) to implement the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load (TMDL), effective March 20, 2012. The implementation of the TMDL covers the entire Santa Monica Bay Watershed Management Area (WMA). The Basin Plan Amendment[1] (BPA) implementing the TMDL lists the requirements for the PMRP. The following describes the PMRP developed for any areas within the Santa Monica Bay WMA that are under the Los Angeles County Flood Control District's (LACFCD's) ownership, including the Municipal Separate Storm Sewer System (MS4) physical infrastructures that are under its authority.

PLASTIC PELLET DEFINITION

For the purposes of the PMRP, a plastic pellet is a piece of preproduction plastic that is typically formed into a spherical or cylindrical shape measuring less than five millimeters in diameter or length. Varying widely in composition, plastic pellets often incorporate different types of plastic as well as colorants and other additives. Plastic pellets are the base material used in manufacturing plastic products.

PMRP REQUIREMENTS

Per the BPA for the Santa Monica Bay Nearshore and Offshore Debris TMDL, the LACFCD is named as a responsible jurisdiction. However, the TMDL states:

> "Responsible jurisdictions that have no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets, may not be required to conduct monitoring at MS4 outfalls, but shall be required to include a response plan in the PMRP."

The LACFCD PMRP details protocols for a spill response to address containment of spilled plastic pellets since it does not have any industrial facilities utilizing plastic pellets and has no activities related to the manufacturing, handling, or transportation of plastic pellets within its MS4 right-of-way.

PMRP COVERAGE

The BPA lists numerous responsible parties for plastic pellets in the Santa Monica Bay WMA. The LACFCD is assuming that all other parties will implement their own plastic pellet plans and the California Regional Water Quality Control Board, Los Angeles Region (Regional Board), will enforce all requirements associated with BPA milestones and requirements in an equitable manner to ensure that the plastic pellets are addressed in all listed areas. The LACFCD will assist other responsible parties in addressing PMRP responsibilities for areas within or adjacent to LACFCD's right of way. The LACFCD's efforts will include:

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[1] Attachment A to Resolution No. R10-010, proposed amendments to the Water Quality Control Plan – Los Angeles Region, for the Santa Monica Bay Nearshore and Offshore Debris TMDL. (http://63.199.216.6/larwqcb_new/bpa/docs/R10-010/R10-010_RB_BPA.pdf)

- Allowing other responsible jurisdictions, such as the County of Los Angeles and cities, to install and maintain approved devices for capturing plastic pellets for the purposes of this TMDL in parts of the MS4 physical infrastructures that are under its authority through the permitting process (i.e., LACFCD Flood Permit); and

- Addressing spillage of plastic pellets and fugitive plastic pellets that have been transported/deposited into the MS4 physical infrastructures that are under the LACFCD's authority, either illegally or through rain/wind transport by visually monitoring and removing plastic pellets from all MS4 drainage structures under the LACFCD's ownership; and

- Identifying and prioritizing illicit discharge problem areas within the MS4 physical infrastructures under the LACFCD's authority; and

- Participating in the response and mobilization of the appropriate field crews to contain plastic pellet spills as outlined in the PMRP spill response plan.

Emergency Spills

Accidental spills during transfer and transportation contribute to plastic pellets entering storm drains and, ultimately, the Santa Monica Bay. Included below are protocols for a timely and appropriate response to possible plastic pellet spills to address containment of spilled plastic pellets in areas within or adjacent to LACFCD's right of way within the Santa Monica Bay WMA (see **Figure 1**), including the MS4 physical infrastructures that are under its authority.

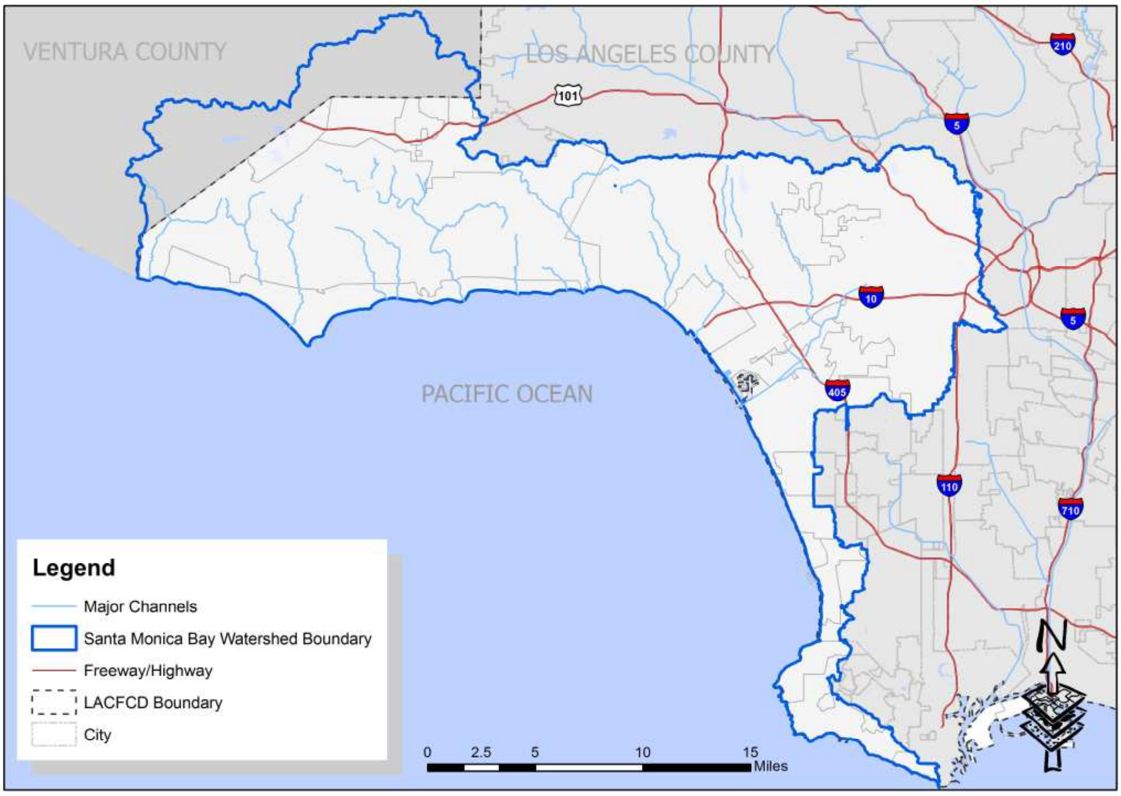

Figure 1. Santa Monica Bay Watershed Management Area

SPILL RESPONSE PLAN

The general procedures for the spill response plan are outlined below:

1. Calls come in to the Dispatch Center (e.g., through 24-hour illegal dumping/discharge hotlines) from the general public or responding crew to report spills and other illegal dumping/discharge incidents. Calls or faxes regarding spills, discharges, or dumping information affecting the LACFCD can also come in from the California Office of Emergency Services.

   The dispatcher will obtain as much information as possible about the location and facilities impacted (e.g., on street, in gutter, or entered waterway such as catch basin or storm drain). If LACFCD waterways, catch basins, and storm drains are not impacted, the dispatcher would contact the other responsible entities for the first response and provide the reporting party with the telephone number for the appropriate city and/or handling agency. The dispatcher will also transfer the reporting party to the correct agency.

If the incident occurred in an area within the LACFCD's jurisdiction, the dispatcher will contact the County of Los Angeles Department of Public Works' (Public Works) Flood Maintenance Division, and provide them the information.

The responding field crew may ask Dispatch Center to contact the local authorities to handle traffic control.

2. The Regional Board will be notified within 24 hours of the LACFCD's becoming aware of the spill.

    a. The LACFCD staff will call the Regional Board's front desk at (213) 576-6600.

       The person reporting the spill will notify the front desk staff that he/she is calling regarding the Santa Monica Bay Debris TMDL and ask to be transferred to the correct staff. If it is on a weekend, the LACFCD staff will leave a message including a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact information.

    b. The LACFCD staff will send a notification e-mail to the Regional Board at losangeles@waterboards.ca.gov.

       The e-mail subject line will be "Santa Monica Bay Debris TMDL." The body of the e-mail will include a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact information.

3. The LACFCD will assist with spill response throughout the Santa Monica Bay WMA when LACFCD facilities are involved.

Under the Spill Response Plan, Public Works' FMD, will respond immediately by mobilizing the field crew closest to the spill to investigate and identify the source of the spill. If a responsible party is identified, the identified responsible party will be given an emergency permit to go into the LACFCD system to clean up the pellets. The LACFCD and/or the responsible party will either perform the spill cleanup or appoint a third-party response service to perform containment and cleanup. All plastic pellets captured will be securely contained and disposed of at a landfill. The general flow of communication and responsibility that will occur during spill response is illustrated in **Figure 2**.

Public Works has stand-by field and in-office staff available at all times for a spill response and will coordinate with spill response teams throughout all appropriate divisions, programs, and agencies so that maximum water quality protection is provided. A list of relevant contact information is included as Attachment A.

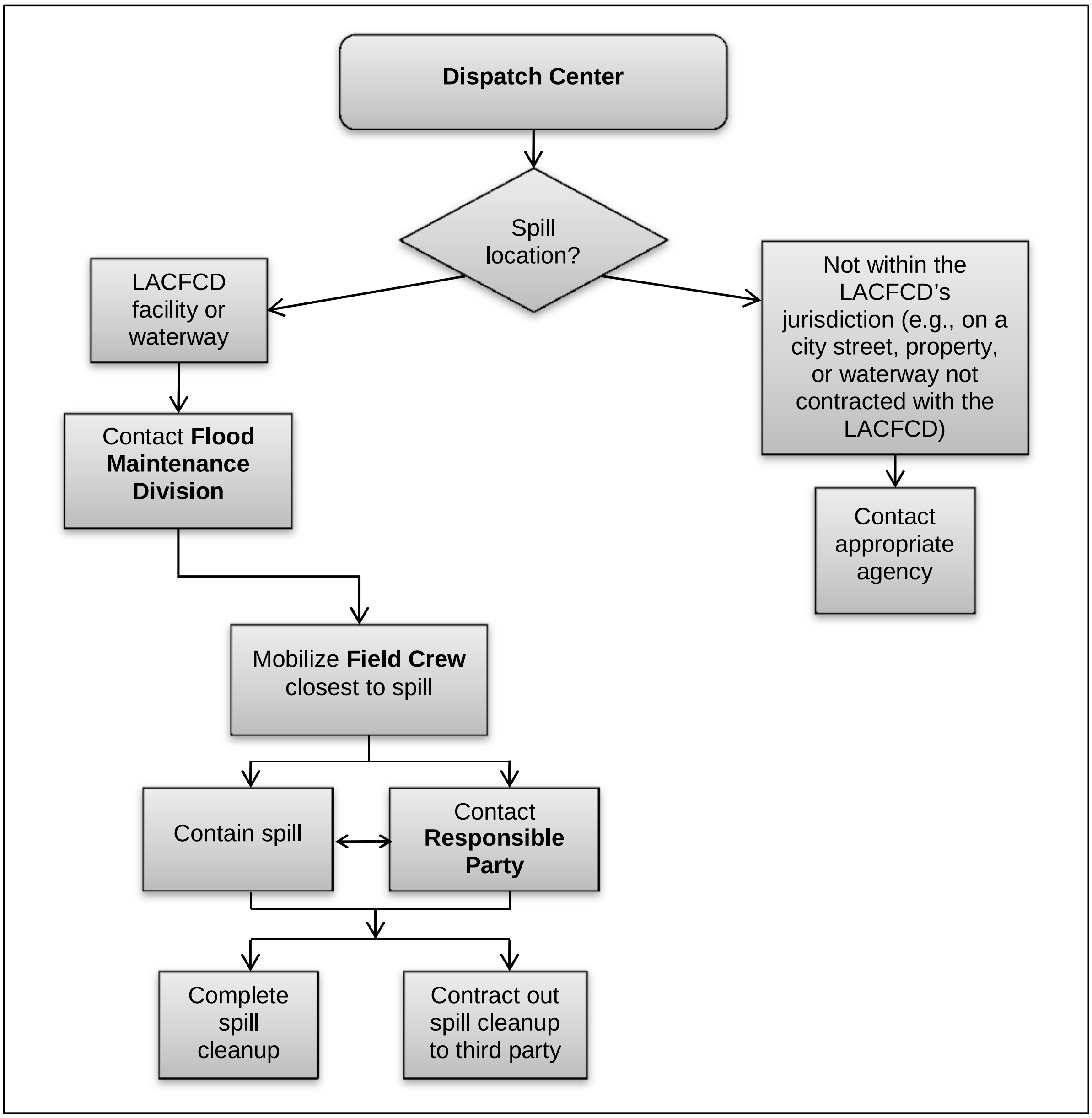

Figure 2. General Flow of Communication and Responsibility for Plastic Pellet Spill Response

Attachment A – LACFCD Plastic Pellet TMDL Contact Sheet

PLASTIC PELLET SPILLS AND ILLEGAL DUMPING/DISCHARGES

Public Works, Dispatch Center (24-hour hotline)

Phone: (626) 458-4357

Public Works, Dispatch Center (24-hour public hotline)

Call to report illegal dumping/discharges into the storm drain system anywhere in Los Angeles County

Phone: 1(888) 253-2652, or 1(888) CLEAN LA

Public Works, Flood Maintenance Division Headquarter

Phone: (626) 458-4146

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PMRP CONTACT

Bruce Hamamoto, Public Works, Watershed Management Division

Phone: (626) 458-5918 or (626) 458-4301

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