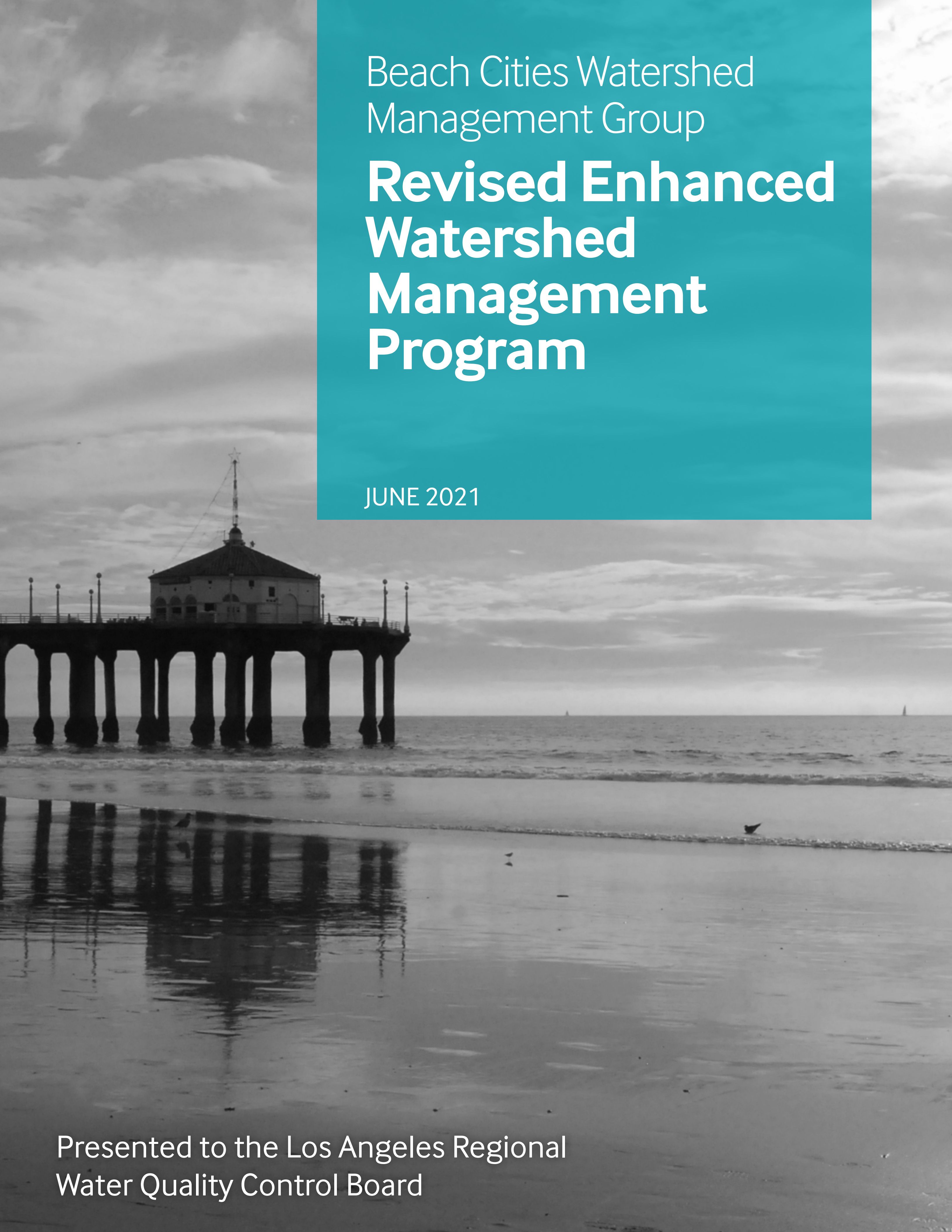

Beach Cities Watershed Management Group

Revised Enhanced Watershed Management Program

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Presented to the Los Angeles Regional Water Quality Control Board

Beach Cities Watershed Management Group

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Revised Beach Cities Enhanced Watershed Management Program (EWMP)

Update 2021

Prepared for

The Los Angeles Regional Water Quality Control Board

Prepared by

Beach Cities Watershed Management Group
(Cities of Hermosa Beach, Manhattan Beach, Redondo Beach, and Torrance
and the Los Angeles County Flood Control District)

DRAFT May 17, 2021

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1 INTRODUCTION AND BACKGROUND

Following adoption of the 2012 Los Angeles Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) Permit (Permit),[1] the Cities of Hermosa Beach, Manhattan Beach, Redondo Beach and Torrance, together with the Los Angeles County Flood Control District (LACFCD), collectively referred to as the Beach Cities Watershed Management Group (Beach Cities WMG) agreed to collaborate on the development of an Enhanced Watershed Management Program (EWMP) for the Santa Monica Bay (SMB) and Dominguez Channel areas within their jurisdictions (referred to herein as the Beach Cities EWMP Area).

On June 26, 2015, in accordance with the Permit, the Beach Cities WMG submitted a draft EWMP to the Los Angeles Regional Water Quality Control Board (LARWQCB). Following public review and comment, as well as multiple reviews by LARWQCB, the Beach Cities WMG submitted a second revised EWMP on February 9, 2016. On April 18, 2016 the Beach Cities' second revised EWMP was approved by LARWQCB.

Based on the Permit-specified adaptive management process, as well as other relevant changes within the Beach Cities Area, multiple updates to the Beach Cities EWMP have occurred since its original approval in April 2016: one in March 2018, and a second in August 2019.

In addition to regularly adapting the EWMP, Permittees are required to submit an updated EWMP with an updated Reasonable Assurance Analysis (RAA) by June 30, 2021 for review and approval by the Regional Water Board Executive Officer. The updated RAA is required to incorporate both water quality data and control measure performance data, and any other information informing the adaptive management process, gathered through December 31, 2020.

The latest version of the Beach Cities EWMP (June 2021) has been drafted to meet these requirements, along with applicable requirements of State Order WQ 2020-0038, issued by the State Water Resources Control Board (State Board) on November 17, 2020 (SWRCB, 2020).

Additional information related to the history of the Beach Cities EWMP development and the regulatory background upon which it is built can be found in Appendix A.

1.1 Revised EWMP Updates

This revised Beach Cities EWMP has been developed to build upon and improve the original Beach Cities EWMP. Since the Beach Cities EWMP was first approved in 2016, significant advancements have been made in the state-of-the-practice of stormwater project planning and RAA modeling. Additionally, the Group has gained invaluable experience and insight with respect to implementation of the EWMP,

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[1] Order No. R4-2012-0175 NPDES Permit No. CAS004001 Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach MS4.

understanding more about both the opportunities and challenges they face in successfully implementing effective stormwater projects.

In particular, the revised Beach Cities EWMP has been updated in the following critical ways:

- **Incorporation of newly available, EWMP-specific data**. The Beach Cities WMG has been successfully implementing their Coordinated Integrated Monitoring Program (CIMP) since 2015, resulting in five years of outfall and receiving water monitoring data from the EWMP Area. Coupled with the long-term Santa Monica Bay Beaches Bacteria (SMBBB) Coordinated Shoreline Monitoring data that has been collected consistently since 2005, the Beach Cities WMG has updated their EWMP to incorporate applicable data. Water quality priorities have been re-evaluated (see Appendix B) based on updated receiving water compliance assessments, as well as paired outfall data that allows for a more-definitive determination of whether MS4 outfalls are causing or contributing to receiving water exceedances.

- **Utilization of the recently updated, County-wide RAA modeling tool**. While the original RAA leveraged the strengths of the Structural BMP Prioritization and Analysis Tool (SBPAT) to perform the wet weather modeling analysis, the revised RAA uses the newly released WMMS 2 modeling platform to maintain consistency with the majority of RAAs across Los Angeles County. Developed by LACFCD and publicly released in May 2020, WMMS 2 utilizes remote sensing, water quality, and hydrology data collected through 2018 to simulate contaminant loading, runoff volume, and flow rate. WMMS 2 contains two major components: a Loading Simulation Program in C++ (LSPC) to determine hydrology and pollutant loading; and a System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN) to assist in BMP selection and performance. An advantage of using the WMMS 2 model is the extensive regional calibration effort that has gone into this recent update of the model. Further details of the RAA modeling can be found in Appendix D.

- **Thorough calibration of the RAA model**. Although WMMS 2 has been calibrated on a regional basis, the default WMMS 2 model was further calibrated and validated using Beach Cities CIMP monitoring data collected through June 30, 2020 to best reflect the baseline hydrology and water quality conditions within the Beach Cities EWMP Area. Further details of the RAA calibration process can be found in Appendix D.

- **A focus on new multi-benefit regional projects**. Although distributed BMPs are necessary and beneficial for watershed planning, regional projects are generally more preferable, as they provide multiple benefits, are more cost-effective, and have a higher likelihood of receiving outside funding. Removing projects and programs that were no longer feasible, the Beach Cities WMG is committed to adding new regional, multi-benefit projects, including regional green streets, that seek to enhance water quality, maximize community benefits, and amplify other environmental objectives.

Incorporating these changes, the revised Beach Cities EWMP more accurately reflects the actual water quality and flow conditions in the EWMP Area; provides updated, measurable milestones that can be tracked over time; and identifies implementable, cost-effective solutions to achieve compliance.

1.2 Beach Cities EWMP Area

This EWMP is applicable to the Beach Cities Watershed Management Area (WMA), which consists of all of the incorporated MS4 areas of the cities of Redondo Beach, Manhattan Beach, Hermosa Beach and Torrance (excluding the Machado Lake Watershed) and includes the infrastructure of the LACFCD within those jurisdictions (Figure 1).[2] This area includes portions of two distinct HUC-12 watersheds,[3] Santa Monica Bay Watershed and Dominguez Channel Watershed, as summarized in Table 1.

The Machado Lake Watershed, which is addressed by the separate Machado Lake Watershed EWMP developed by City of Torrance, is not part of the Beach Cities WMA or Beach Cities EWMP.

As shown in Figure 1, the Beach Cities WMA is divided into two geographic areas, the Santa Monica Bay (SMB) Watershed and Dominguez Channel (DC) Watershed. The western portion of the Beach Cities WMA consists of approximately 7,800 acres of land that drains to SMB (Table 1). This accounts for 53% of the total Beach Cities WMA, and includes portions of the cities of Manhattan Beach, Redondo Beach, and Torrance, and the entirety of the City of Hermosa Beach. This portion of the study area hereinafter is referred to as the SMB WMA.[4]

The eastern portion of the Beach Cities WMA is tributary to Dominguez Channel[5] (including Torrance Carson Channel[6]) and is comprised of approximately 7,024 acres of land (Table 1). This watershed accounts for 47% of the total Beach Cities WMA, and includes portions of the Cities of Manhattan Beach, Redondo Beach, and Torrance. Storm drains from the Cities of Manhattan Beach and Redondo Beach drain through the City of Lawndale before discharging to Dominguez Channel. The City of Torrance's MS4 discharges directly to Dominguez Channel and Torrance Carson Channel (Torrance Lateral). Collectively, this portion of the study area is hereinafter referred to as the Dominguez Channel WMA.

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[2] The LACFCD is not responsible for land within the Beach Cities EWMP Area but does own and maintain infrastructure within all three watersheds. Background information on the LACFCD is provided in Appendix F.

[3] A HUC-12 watershed is defined by a 12-digit hydrologic unit code (HUC) delineation, which identifies the watershed area based on six levels of classification: regional, sub-region, hydrologic basin, hydrologic sub-basin, watershed, and subwatershed.

[4] The Wylie Basin is a retention basin within the SMB WMA with no outlet that is sized to handle events significantly larger than the 85th percentile, 24-hr storm event. Therefore, its drainage area has been excluded from the EWMP RAA.

[5] Other portions of the Dominguez Channel Watershed, including Los Angeles County Unincorporated areas, are addressed by separate EWMP groups.

[6] Also known as the Torrance Lateral.

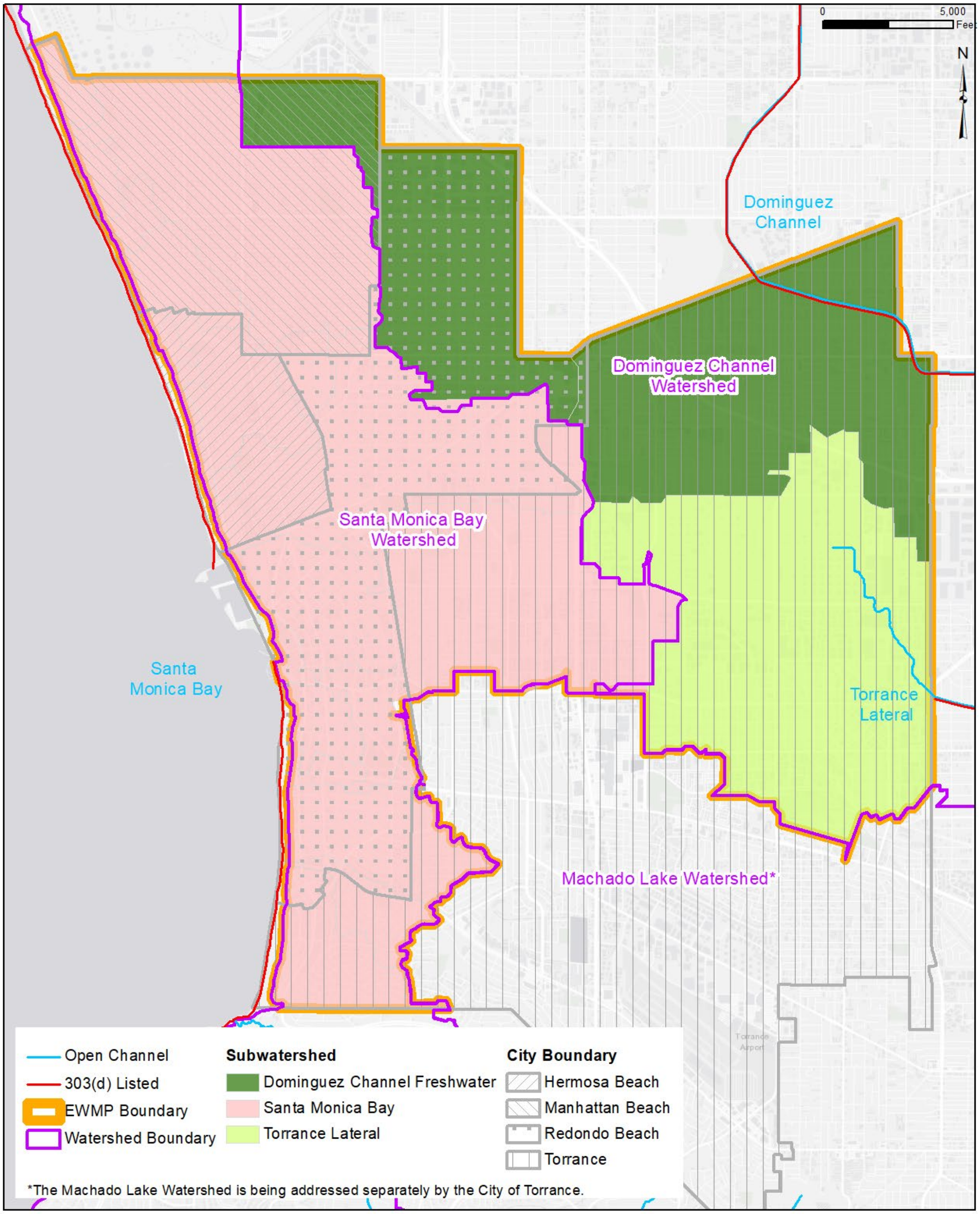

Figure 1. Beach Cities EWMP Area Overview

Table 1. Beach Cities Watershed Management Area Summary

Participating Agency	Area (acres)		
	Santa Monica Bay WMA	Dominguez Channel WMA	Total Beach Cities WMA
City of Redondo Beach	2,592	1,252	3,844
City of Manhattan Beach	2,089	363	2,452
City of Hermosa Beach	846	-	846
City of Torrance	2,274	5,409	7,683
Total	7,801	7,024	14,825

1.3 EWMP Organization

This Beach Cities EWMP addresses the Permit-required watershed management program elements for both the SMB and Dominguez Channel WMAs. Because the SMB and Dominguez Channel WMAs have their own unique water quality conditions, their technical evaluations were performed independently and are documented in separate sections in this EWMP. This includes the water quality prioritization, RAA, and BMP identification. Section 2 provides general information on the EWMP approach that is applicable to both WMAs. Section 3 summarizes the technical aspects of the EWMP specific to Santa Monica Bay WMA while Section 4 covers the same technical elements for Dominguez Channel WMA. Section 5 provides the cost opinions associated with EWMP project implementation. In Section 6, an overview of the adaptive management framework the WMG utilizes to actively manage their EWMP is provided. Building on all of this, Section 7 provides a compliance schedule for the Beach Cities WMG. Lastly, Section 8 includes the references cited in the EWMP.

A large quantity of information in the revised Beach Cities EWMP has been moved to the appendices. This includes a significant amount of detailed background information, such as regulatory framework, water quality prioritization, minimum control measure customization, RAA details, financial strategy, and more. The goal of this approach is to simplify and streamline the information presented within the main body of the EWMP, while still providing the technical details and thoroughness required by such a significant regulatory plan. The hope is that all users, including the permittees, regulators, residents, non-governmental organizations, and other stakeholders will find the revised Beach Cities EWMP to be more user-friendly.

2 EWMP APPROACH

The EWMP is a planning document intended to lay out a framework of activities that will comply with water quality requirements. Therefore, it is necessary to demonstrate that selected BMPs are reasonably expected to meet defined goals and objectives. This demonstration of performance is described through a technically robust and rigorous RAA. Through this analysis, the Beach Cities WMG identified and evaluated BMP implementation scenarios within the Beach Cities EWMP Area for each Waterbody Pollutant Combination (WBPC) identified.

The EWMP approach, including model selection, data inputs, critical condition selection, calibration performance criteria, and output types is consistent with the LARWQCB Reasonable Assurance Analysis

Guidance Document (LARWQCB, 2014) and also leverages previous efforts where relevant models have already been developed. The individual water quality targets, BMPs, RAAs, schedules, and costs for each of the watersheds are summarized in watershed-specific sections that follow.

Details of the RAA, including model selection, calibration, and execution can be found in Appendix D.

2.1 Selection of Appropriate Best Management Practices

The Permit requires the Beach Cities WMG to identify strategies, control measures, and BMPs to implement within their EWMP Area. Specifically, the Permit specifies that BMPs are expected to be implemented so that MS4 discharges meet effluent limits as established in the Permit and to reduce impacts to receiving waters from stormwater and non-stormwater runoff. This expectation assumes the implementation of both types of BMPs – non-structural and structural – by the Beach Cities WMG.

The objectives of selecting and incorporating BMPs into the Beach Cities EWMP include:

1. Preventing and/or eliminating non-stormwater discharges to the MS4 that are a source of pollutants from the MS4 to receiving waters;
2. Achieving all applicable interim and final WQBELs and/or RWLs pursuant to corresponding compliance schedules; and
3. Ensuring that discharges form the MS4 do not cause or contribute to exceedances of RWLs.

The Permit defines BMPs as "practices or physical devices or systems designed to prevent or reduce pollutant loading from stormwater or non-stormwater discharges to receiving waters."

Structural BMPs involve the construction of a physical control measure to alter the hydrology or water quality of incoming stormwater or non-stormwater. There are two categories of structural BMPs, defined by the runoff area treated by the BMP: regional BMPs[7] and distributed BMPs. Regional BMPs are designed to treat runoff from a large drainage area expected to include multiple parcels and various land uses. These may include infiltration basins, treatment plants, and subsurface flow wetlands, among others. Distributed BMPs are designed to treat runoff from smaller drainage areas and are normally installed to collect runoff close to the source from a limited number of parcels. Distributed BMPs typically include drywells, swales, bioretention facilities, biofiltration facilities, and cisterns, among others.

Non-structural BMPs prevent or reduce the release of pollutants or transport of pollutants within the MS4 drainage area but do not involve construction of physical facilities. Non-structural BMPs are often implemented as programs or strategies which seek to reduce runoff and/or pollution close to the source. Examples include but are not limited to: street sweeping, downspout disconnect programs, pet waste cleanup stations, irrigation ordinances, or illicit discharge elimination. Minimum control measures

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[7] The term "regional BMP" does not necessarily indicate that the project can capture and retain the 85th percentile storm, as described in the Permit. The term "regional EWMP project" is therefore used for those regional BMPs that are expected to be able to capture and retain the 85th percentile storm.

(MCMs) as set forth in the Permit are a subset of non-structural BMPs even though some MCMs include measures that require the implementation of structural BMPs by both public and private parties.

In accordance with the Permit, the following types of BMPs were considered in the development of the Beach Cities EWMP.

2.1.1 Minimum Control Measures

The Beach Cities WMG has assessed the MCMs defined in the Permit to identify opportunities for focusing resources on the high priority issues in each watershed. The Permit requires the permittees to implement prescribed MCMs in each of six categories/programs: Public Information & Participation Program (PIPP), Industrial/Commercial Facilities, Planning & Land Development, Development Construction, Public Agency Activities, and Illicit Connection & Illicit Discharges Elimination. These measures include procedures such as outreach programs, inspections, and reporting requirements designed to reduce runoff-related pollution within each permittees' MS4 area. MCMs in each of these categories have been effectively implemented by the Beach Cities WMG for years. In some cases, MCM program enhancements have been implemented to address watershed priorities for TMDL implementation. Details on the selected MCMs, including proposed modifications to any programs, are provided in Appendix C.

2.1.2 Non-Stormwater Discharge Measures

The Permit requires Permittees to identify non-stormwater discharges that cause or contribute to exceedances of RWLs, and to then identify and implement BMPs to effectively eliminate the source of pollutants. These BMPs may include measures to prohibit non-stormwater discharge to the MS4, additional structural BMPs to reduce pollutants in the non-stormwater discharge, diversion to a sanitary sewer for treatment, or strategies to require the non-stormwater discharge to be separately regulated under a general NPDES permit.

In the SMB Watershed, eight low flow diversions have been implemented successfully along the coast to effectively divert significant non-stormwater discharges and prevent them from reaching the ocean. Additionally, due in part to setbacks for smaller outfalls, non-stormwater discharges to the ocean are known to be non-existent. The effectiveness of these measures is consistently confirmed by observations made during weekly and daily shoreline monitoring.

Since initiation of the Permit, the Beach Cities WMG has attempted to eliminate non-exempt dry weather MS4 discharges using a suite of structural BMPs and non-structural source controls (e.g., water conservation incentives, enhanced IDDE efforts, enhanced education/outreach, and inspection/ enforcement to prevent sources of non-stormwater flow). To-date, monitoring has shown that the WMG has been successful at this endeavor, and although dry weather flows do still exist in some outfalls draining to Dominguez Channel, particularly within Torrance Carson Channel, the Group has successfully demonstrated that these discharges are considered conditionally exempt.

2.1.3 Additional BMPs

In addition to the MCMs and non-stormwater discharge measures, the Beach Cities WMG considered numerous additional BMPs to achieve compliance with Permit-specified WQBELs and/or RWLs. Some of these BMPs have already been implemented, while others have been identified as part of the revised EWMP process.

2.2 BMP Selection and Prioritization

In order to demonstrate reasonable assurance of achieving water quality priorities, BMP opportunities were identified and evaluated in a prioritized manner. Prioritization was based on BMP effectiveness for the pollutants of concern (BMPs that had greater treatment efficiency for the pollutant of concern in a particular analysis region were prioritized over other BMPs); implementation feasibility as determined by the Beach Cities WMG; and cost (low cost BMPs were prioritized first).

The RAA process was then carried out in an iterative manner to demonstrate that implementation of the selected BMPs will result in the attainment of applicable Permit-specified WQBELs, and will also prevent discharges from causing or contributing to exceedances of applicable RWLs.

Details on how each BMP was accounted for in the RAA can be found in Appendix D. A summary of existing and proposed BMPs within each watershed can be found in the respective watershed section of the EWMP.

2.3 Legal Authority

The Beach Cities WMG Permittees have the necessary legal authority to implement the BMPs identified in the EWMP. Table 2 includes the water quality ordinance for each agency with a reference link.

Table 2. Beach Cities Water Quality Ordinances

City	Water Quality Ordinance
Hermosa Beach	Chapter 8.44 - Stormwater and Urban Runoff Pollution Control Regulations
Manhattan Beach	Chapter 5.84 – Storm Water and Urban Runoff Pollution Control
Redondo Beach	Title 5 Chapter 7 - Stormwater Management and Discharge Control
Torrance	Division 4 Chapter 10 – Stormwater and Urban Runoff Pollution Control
LACFCD	Flood Control District Code, Chapter 21 - Stormwater and Runoff Pollution Control

3 SANTA MONICA BAY WATERSHED MANAGEMENT AREA

3.1 Identification of Water Quality Priorities

As part of the EWMP process, the Permit requires the Beach Cities WMG to identify water quality priorities within their WMA. The list of water body pollutant combinations (WBPCs) defined in the original Beach Cities EWMP has been revised based on the most recent updates to applicable TMDLs and 303(d) listings, as well as CIMP monitoring data collected through June 2020. The updated WBPC list for SMB is summarized in Table 3.

Table 3. Water Body Pollutant Combinations – Santa Monica Bay

Category	Water Body	Pollutant – Applicable Condition	Reason for Categorization
1: Highest Priority	Santa Monica Bay (including SMB Beaches)	Bacteria – Wet and Dry Weather	SMB Beaches Bacteria TMDL (LARWQCB, 2012b)
		Trash/Debris – Wet and Dry Weather	SMB Debris TMDL (LARWQCB, 2010)
		DDTs – Wet and Dry Weather	SMB PCBs and DDT TMDL (USEPA, 2012)
		PCBs – Wet and Dry Weather	
2: High Priority		Mercury– Wet and Dry Weather	2014-2016 303(d) list
		Arsenic– Wet and Dry Weather	

Details related to the identification, prioritization, and potential sources of each of the SMB WBPCs can be found in Appendix B. Unless otherwise noted, all WBPCs identified in Table 2 have been addressed as part of the revised RAA.

3.2 RAA Results – Baseline Loads and Target Load Reductions

Consistent with the original Beach Cities EWMP RAA, baseline and target load reduction analyses were performed for each analysis region in the Santa Monica Bay WMA. Figure 2 illustrates these analysis regions. Appendix D provides details on how the analysis regions were determined.

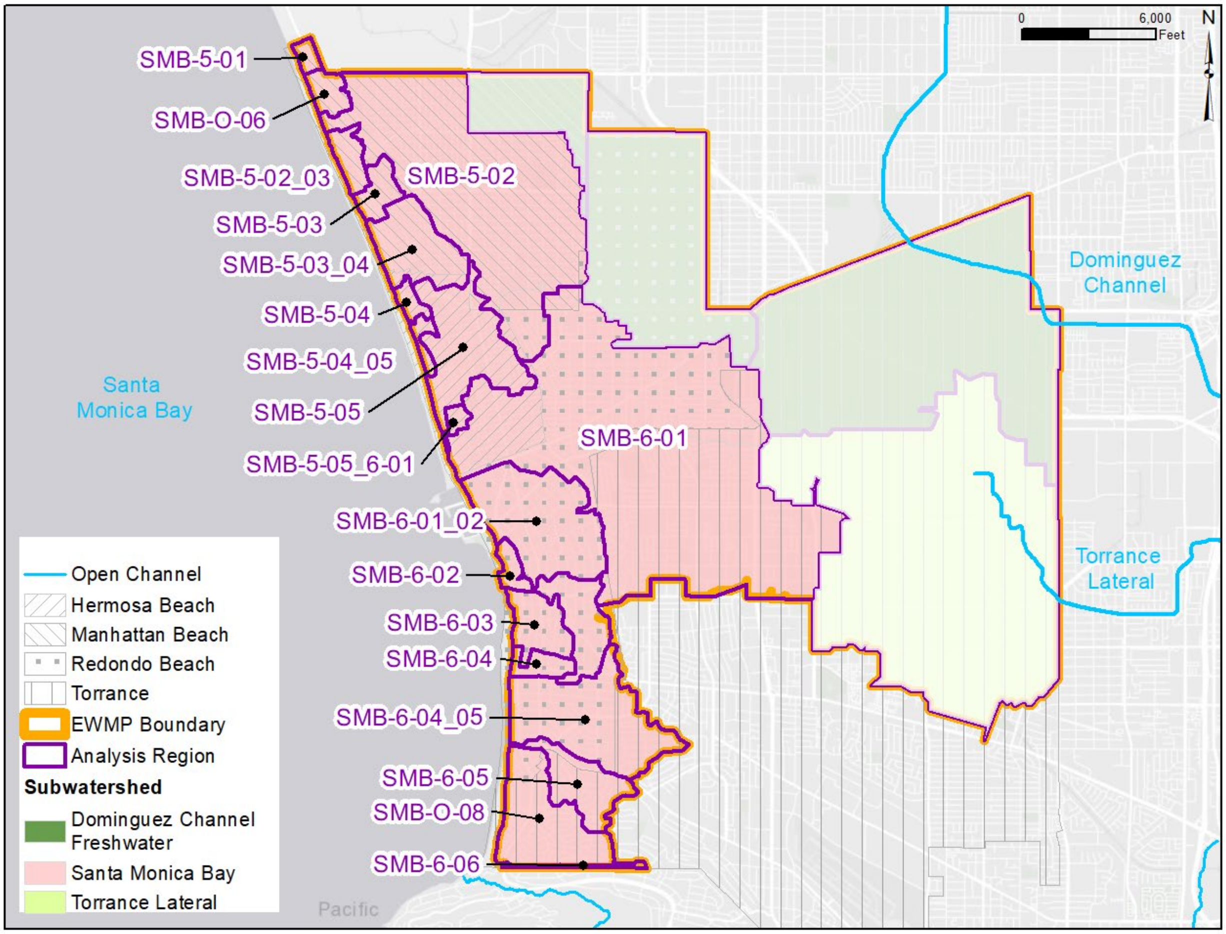

Figure 2. Santa Monica Bay Analysis Region Overview

The process for establishing pollutant target load reductions (TLRs) necessary to meet water quality objectives for the SMB WBPCs is detailed in Appendix D. Based on monitoring data collected throughout the SMB WMA as part of the Beach Cities CIMP efforts, fecal indicator bacteria (i.e., fecal coliform) is the only WBPC for which a TLR was estimated; all other WBPCs have TLRs of zero. Appendix A provides more information on the selection and modeling of WBPCs.

A summary of estimated baseline loads and TLRs for fecal coliform in each analysis region in the SMB WMA is provided in Table 4. For non-zero TLRs, an equivalent 24-hour runoff management volume was estimated as the maximum daily diverted volume needed to achieve the TLR during the critical condition (i.e., throughout the modeled year). Both load-based TLR and the equivalent 24-hour runoff management volume are considered eligible Beach Cities EWMP compliance metrics. Appendix D provides detailed information on the process to calculate TLRs and 24-hour management volumes.

Table 4. Wet Weather Fecal Coliform TLRs for Santa Monica Bay WMA

Analysis Region	Critical Condition	Baseline Load (10^{12} MPN/ year)	Final Target Load Reduction		
			Absolute TLR (10^{12} MPN/ year)	% of Baseline Load	TLR Equivalent 24-Hour Management Volume (ac-ft)
SMB-5-01	90th percentile water year	1.7	Anti-Degradation	0%	0
SMB-5-02		111.9	59.0	53%	67.1
SMB-5-03		7.5	Anti-Degradation	0%	0
SMB-5-04		2.6	Anti-Degradation	0%	0
SMB-5-05		39.0	Anti-Degradation	0%	0
SMB-6-01		112.1	54.7	49%	51.2
SMB-6-02		16.2	Anti-Degradation	0%	0
SMB-6-03		10.0	CIMP data shows compliance with final allowable exceedance days. No RAA required to demonstrate compliance.		
SMB-6-04		4.1			
SMB-6-05		15.3	Anti-Degradation	0%	0
SMB-6-06		1.2	Anti-Degradation	0%	0

For analysis regions with SMBBB TMDL compliance monitoring locations (CMLs) that have anti-degradation-based allowable exceedance days for wet weather, a target load reduction of zero was assumed, consistent with the TMDL's approach that acknowledges that historic bacteria exceedance rates for each of these analysis regions are lower than that of the reference beach, on average. This assumption applies for seven of the 11 total SMBBB TMDL CMLs in Beach Cities SMB WMA – i.e., SMB-5-1, SMB-5-3, SMB-5-4, SMB-5-5, SMB-6-2, SMB-6-5, and SMB-6-6. Historic wet weather monitoring data at these sampling locations through TMDL Year 2019 confirm this understanding, as the long-term exceedance rate at all seven sites varies between 7 and 24%, below the long-term wet weather exceedance rate at the reference beach (26%).

Consistent with the original Beach Cities EWMP, a zero percent TLR was calculated in the analysis region draining to SMB-6-3. Based on all SMBBB monitoring data collected at this CML through TMDL Year 2019,[8] the wet weather exceedance rate (21%) remained lower than the average wet weather exceedance rate at the reference watershed (26%). Additionally, over the past ten years, this site only had one year (TMDL Year 2017) that exhibited more measured wet weather exceedance days (4) than the allowable exceedance days (3). This year had more rainfall and wet days than TMDL Year 2011, which is the 90th percentile year.

Similarly, a zero percent TLR was also calculated in the analysis region draining to CML SMB-6-4. Based on all SMBBB monitoring data collected at this CML through TMDL Year 2019, the wet weather exceedance rate (20%) remained lower than the average wet weather exceedance rate at the reference watershed (26%). Additionally, over the past ten years, this site only had one year (TMDL Year 2011)

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[8] TMDL Year 2019 is defined as November 1, 2018 through October 31, 2019. As of the drafting of the revised EWMP, this was the latest TMDL Year for which a complete data set was available.

that exhibited more measured wet weather exceedance days (5) than the allowable exceedance days (3). This year was the 90th percentile year. Further, SMB-6-4 is an open beach CML with no major MS4 outfall at the sampling location.

3.3 BMP Summary

As discussed in Section 2 and Appendix D, BMPs were identified and accounted for in the RAA to demonstrate attainment of applicable water quality targets. Because the RAA was calibrated using local water quality and flow data through June 2020, only BMPs implemented or planned to be implemented after this date were modeled in the RAA. A summary of these BMPs, including modeled programmatic (i.e., redevelopment) and structural measures, are provided herein.

3.3.1 Redevelopment

The original Beach Cities EWMP assumed land-use specific redevelopment rates based on both literature and local records. Since this time, the Beach Cities WMG has completed five years of implementation and has quantified redevelopment projects triggering low impact development (LID) requirements each year in the annual watershed report. Over the course of this five-year period, the WMG observed a total annual redevelopment rate of 0.08% for applicable land uses (residential, commercial, industrial, education, and transportation). Of the implemented LID projects, 95.6% implemented bioretention, infiltration, or otherwise full capture of the 85th percentile, 24-hour design storm, in accordance with local LID ordinances. The remaining 4.4% of projects used flow-through treatment BMPs to treat a volume equivalent to 1.5 times the 85th percentile, 24-hour design storm.

LID was assumed to be implemented at a rate of 0.08% for all applicable land uses, assuming implementation from July 2020 until the end of the compliance schedule. All LID BMPs constructed through June 2020 were assumed to be accounted for in the model via the calibration process.

An example of a LID redevelopment project in the SMB WMA is the Beach Cities Health District redevelopment project. The redevelopment project will include sufficient stormwater retention BMPs to fully capture and retain the 85th percentile, 24-hour design storm from a total of 10.5 acres of on-site drainage. Projects such as these will further increase the stormwater runoff managed within the SMB WMA.

3.3.2 Analysis Region SMB-5-2

Analysis Region SMB-5-2, which discharges at 28th Street in Manhattan Beach, is one of two priority watersheds for the Beach Cities in the SMB WMA. In addition to existing projects and LID implementation, a single, large-scale regional project near the watershed outfall has been identified for implementation, along with a green street project that is currently in design.

3.3.2.1 28th Street Storm Drain Infiltration Project

The City of Manhattan Beach is implementing the 28th Street Storm Drain Infiltration Project to capture stormwater flows within the 28th Street storm drain system. The project will capture and infiltrate runoff from approximately 1,520 acres and includes two phases.

- Phase 1 project concept includes 48 infiltration drywells at the 26th Street Parking Facility, which is opportunely located downstream in the 28th Street storm drain system, 200 feet from the beach and outfall. A diversion structure installed in the 28th Street storm drain will direct flows through a pretreatment unit and into drywells for infiltration under the parking facility. Additional improvements at the parking facility will include permeable pavement and trees for surface greening.
- Phase 2 project concept includes an infiltration trench along the beach at 28th Street and will only be constructed if additional pollutant load reduction is needed following performance evaluation of Phase 1.

According to RAA modeling, the project is estimated to provide 81.9 acre-feet of 24-hour management volume capacity during the critical condition (90th percentile wet year). The project is currently in the design stage and has submitted a Safe Clean Water Regional Infrastructure application for design and construction funding (Manhattan Beach, 2020). An overview plan of the project is provided in Figure 3, and a concept factsheet of the project is provided in Appendix E.

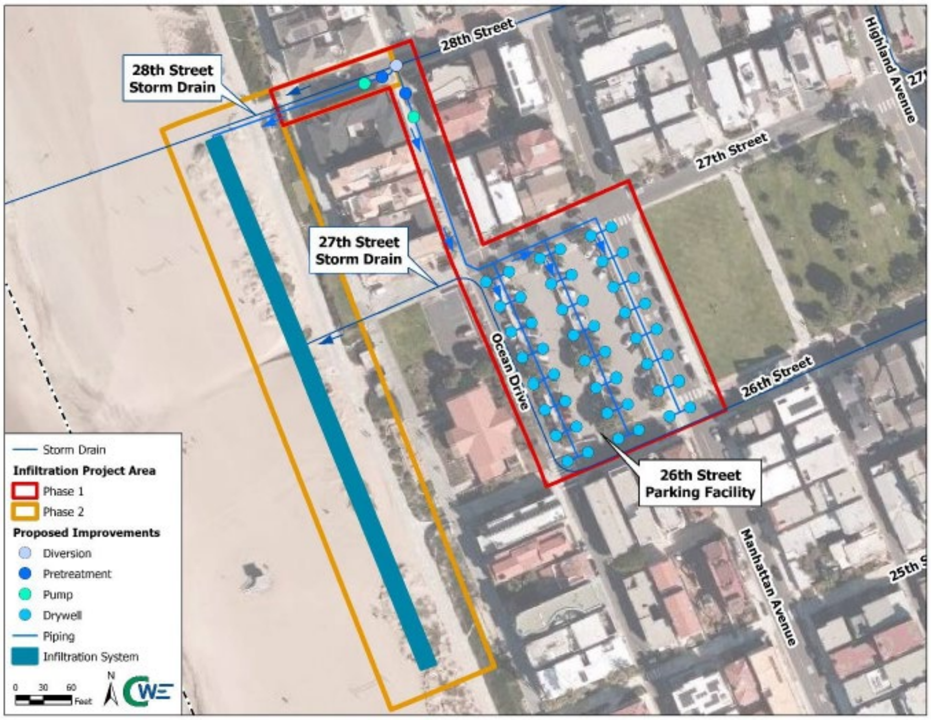

Figure 3. Project Overview – 28th Street Storm Drain Infiltration Project

3.3.2.2 Beach Cities Green Streets 1 (Manhattan Beach 19th Street)

Following project identification in the original Beach Cities EWMP, the WMG initiated design of green infrastructure elements in a targeted neighborhood in the SMB-5-2 watershed. Green street elements will be installed along 19th Street between Sepulveda Boulevard and Pine Avenue in the City of Manhattan Beach to address a 31-acre tributary area consisting of single-family residential and commercial land uses. The project is currently in design with the design objective of achieving full capture of the 85th percentile, 24-hr design storm from the tributary area. A map showing the project drainage area is provided in Figure 4.

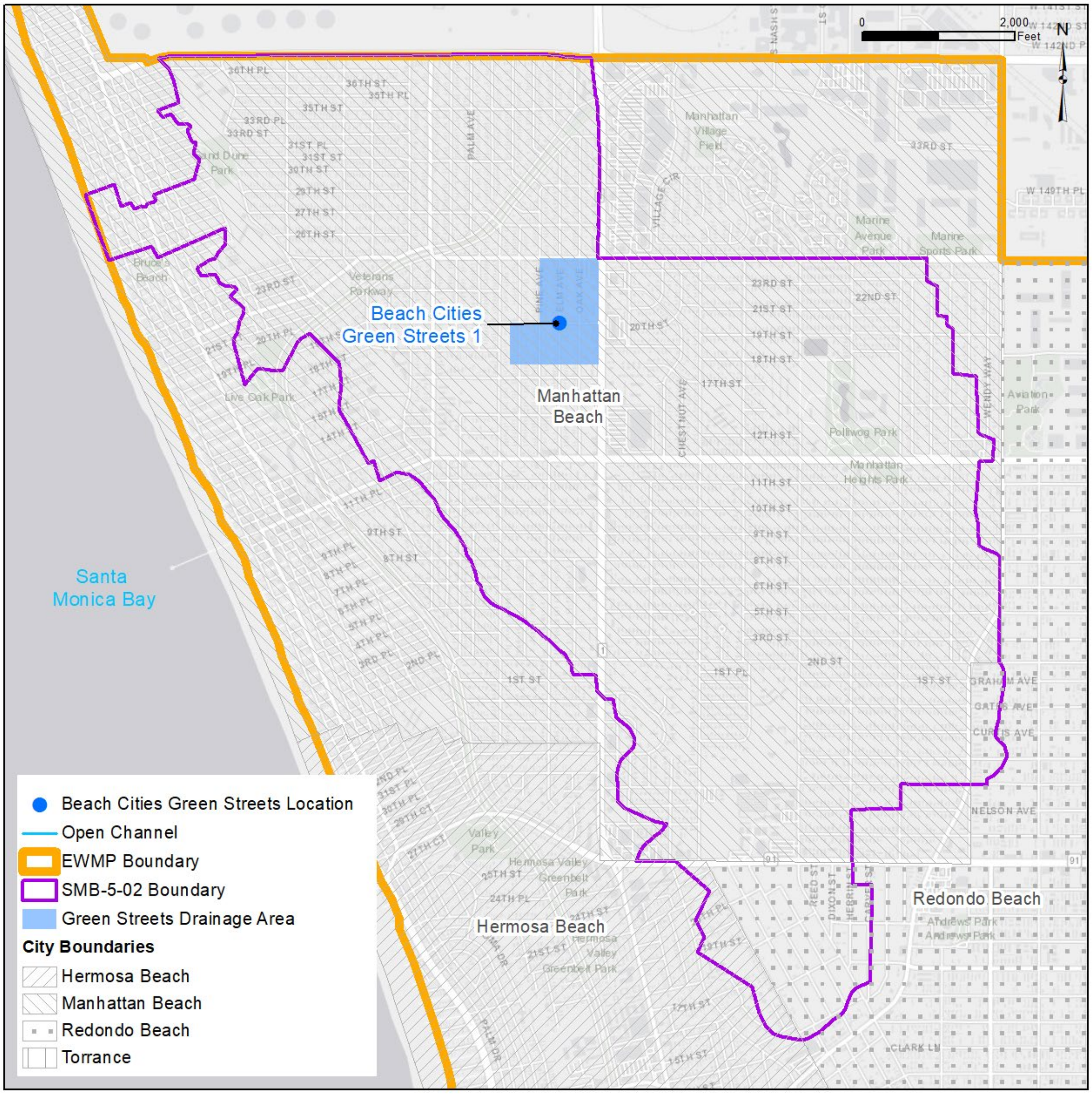

Figure 4. Project Overview – Beach Cities Green Streets Project in SMB-5-2

Since the project is designed to fully capture the 85th percentile, 24-hour design storm from the tributary area, the entire tributary area has been removed from the RAA model.

3.3.3 Analysis Region SMB-6-1

Analysis Region SMB-6-1, which discharges to the beach via a storm drain that runs along Herondo Avenue on the border of Hermosa Beach and Redondo Beach, is the second of two priority watersheds for the Beach Cities in the SMB Watershed. In addition to LID implementation, a selection of green street projects are currently in design; Torrance is enhancing and expanding three existing stormwater detention basins to fully capture the 85th percentile, 24-hour storm event from their combined tributary area; and three additional projects have been identified for implementation.

3.3.3.1 Beach Cities Green Streets Project

Following project identification in the original Beach Cities EWMP, the WMG has initiated design of distributed green infrastructure elements in six distinct areas of the SMB-6-1 watershed. In total, the Beach Cities Joint Green Streets Project will capture, treat, and/or infiltrate runoff from approximately 167 acres, including tributary areas from all four Beach Cities member cities. The project is intended to be a multi-benefit project that will address multiple WBPCs, including trash, bacteria, and more. It will also include neighborhood greening elements, where feasible. Locations and approximate drainage areas of the Green Streets project sites in the SMB-6-1 analysis region are shown in Figure **5**, with brief descriptions of each provided below:

- Beach Cities Green Streets 2 (Manhattan Beach Artesia Blvd): The proposed green street project will be located along the northern side of Artesia Blvd between S. Herrin Street and S. Redondo Avenue. The project area consists of high-density residential land use totaling 7 acres.
- Beach Cities Green Streets 3 (Redondo Beach Anita Street): The proposed green street project will be constructed in residential areas along Anita Street, between Flagler Lane and N. Lucia Avenue and compose approximately 16 acres of drainage area.
- Beach Cities Green Streets 4 (Redondo Beach Ford Avenue): The project will be constructed in high-density residential and commercial areas along Belmont Lane, Pullman Lane, Ford Avenue, Goodman Avenue, and Steinhart Avenue, composing approximately 31 acres of total tributary area.
- Beach Cities Green Streets 5 (Torrance 191st Street): Green street elements will be implemented along 191st Street between Inglewood Avenue and Firmona Avenue, covering a drainage area of 15 acres of commercial corridor.
- Beach Cities Green Streets 6 (Torrance Northwest): Green street elements will be implemented along Kingsdale, Mansel, Grevilea, and Burin Avenues between 182nd Street and 186th Street, covering a drainage area of 51 acres of residential and commercial land uses.
- Beach Cities Green Streets 7 (Hermosa Beach): The project area consists of medium to high density residential and commercial development, covering a total drainage area of 47.6 acres. Improvements are proposed along Hermosa Avenue between 4th Street and Herondo Street, as well as throughout the tributary watershed.

The Beach Cities Green Street Project is currently in design with the design objective of achieving full capture of the 85th percentile, 24-hr design storm from each of the tributary areas.

Since the project is designed to fully capture the 85th percentile, 24-hour design storm from each tributary area, the respective tributary areas have been removed from the RAA model. Additional project design information can be found in the Project Concept Report (Torrance, 2019)

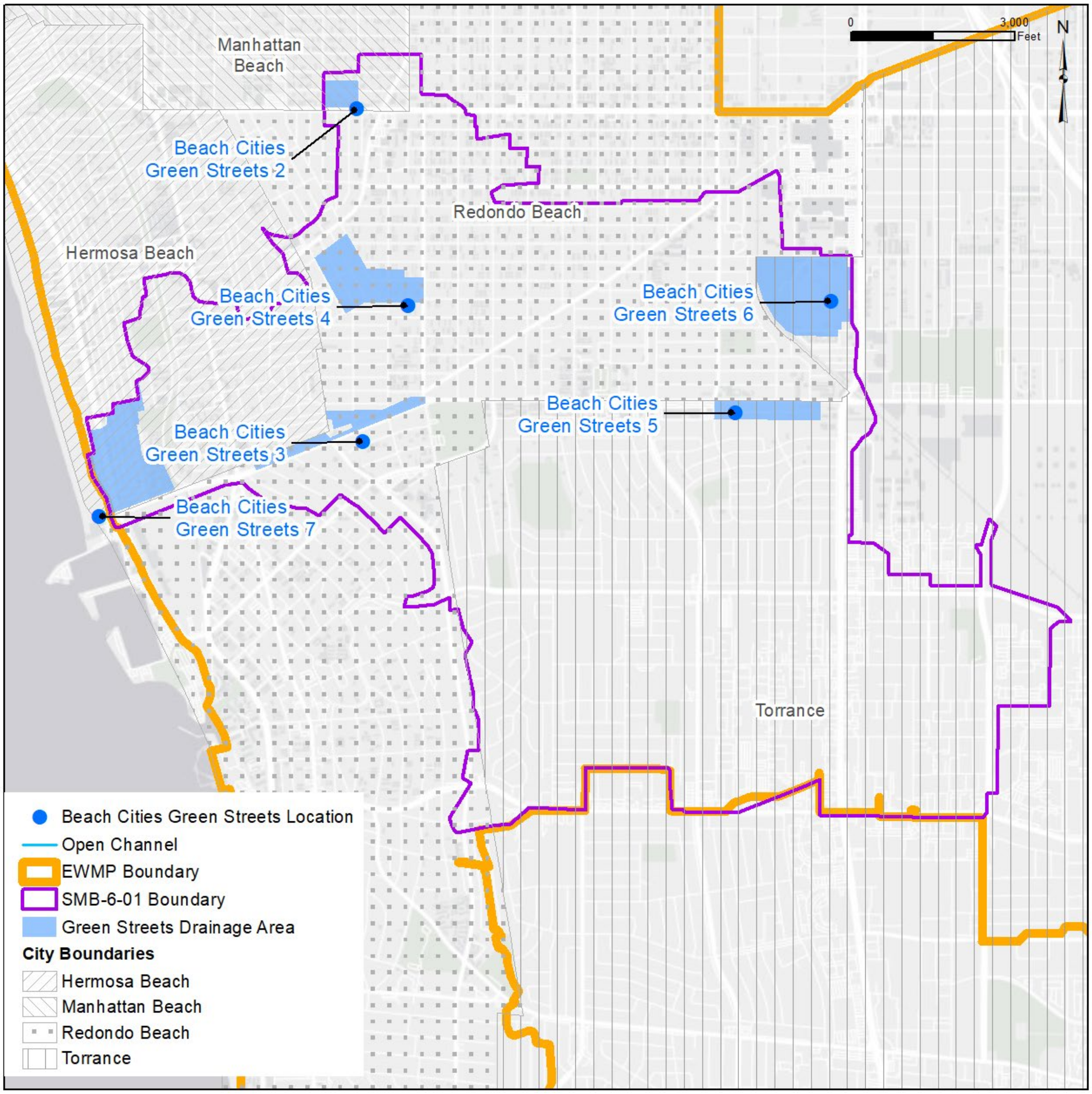
0
3,000
Feet
N
Manhattan Beach
Beach Cities Green Streets 2
Redondo Beach
Hermosa Beach
Beach Cities Green Streets 4
Beach Cities Green Streets 6
Beach Cities Green Streets 5
Beach Cities Green Streets 3
Beach Cities Green Streets 7
Torrance
● Beach Cities Green Streets Location
Open Channel
EWMP Boundary
SMB-6-01 Boundary
Green Streets Drainage Area
City Boundaries
Hermosa Beach
Manhattan Beach
Redondo Beach
Torrance

Figure 5. Project Overview – Beach Cities Green Streets Project in SMB-6-1

3.3.3.2 Torrance Basins Enhancement & Expansion Project

Following initial enhancements to the Amie, Henrietta, and Entradero Flood Control Basin network completed in 2015, the City of Torrance is moving forward with further improvements to expand the capacity of these basins to fully retain the 85th percentile, 24-hour design storm from their combined

1,407-acre tributary area, comprising approximately one half of the tributary area to the Herondo Storm Drain system. The scope of this basin expansion project includes:

- Deepening of the existing Henrietta and Entradero Basins to increase storage capacity;
- Installation of drywells at Henrietta Basin to improve infiltration; and
- Adjustment of pumping levels at Amie Basin to ensure retention of the 85th percentile design storm.

The project, which includes additional benefits such as walking trails and educational material, was recently submitted for funding under the Safe Clean Water Program. Preliminary design of the project is currently in process (City of Torrance, 2020a). A concept factsheet of the project is provided in Appendix E.

Since the project is designed to fully capture the 85th percentile, 24-hour design storm from the tributary area, the entire tributary area has been removed from the RAA model.

3.3.3.3 Hermosa Beach 8th Street Green Infrastructure Project

In 2020, Hermosa Beach completed a street improvement project along 8th Street, stretching from Hermosa Avenue to Valley Drive. The street improvement project incorporated distributed Filterra® biofiltration units that receive and treat surface runoff from 8.1-acres of area draining to the improved street segment. The project treats runoff in both the SMB 5-5 and SMB 6-1 subwatersheds, but was only quantified for the portion of the project that is tributary to analysis region SMB-6-1 (a total of 8.2 acres).

3.3.3.4 Fulton Playfield Infiltration Project

Fulton Playfield is an open green space in the City of Redondo Beach at the southeast intersection of Ripley Avenue and Rindge Lane, located in the upper portion of the SMB-6-1 watershed. The playfield, which is owned and operated by the City of Redondo Beach, is adjacent to an 8.5-foot by 10-foot LACFCD storm drain (BI 6502 Line A) that runs under Ripley Avenue and connects directly to the Herondo Storm Drain on 190th St. An underground flood control retention basin underlies the western half of the playfield and provides approximately 6.4 acre-feet of passive storage to help relieve flooding during storm events. Approximately 432 acres of the City of Redondo Beach and 25 acres of the City of Manhattan Beach are tributary to the basin.

The Fulton Playfield Infiltration Project proposes to add infiltration elements to the existing flood control basin in order to transform it into a multi-benefit regional project while maintaining its flood control capacity and function. Infiltration will be accomplished via the addition of drywells to the eastern portion of the playfield. The project will include a control system for the inlet-outlet structure of the basin to manage and optimize the storage and infiltration capacity of the project. The total 24-hour management volume provided by these distributed BMPs will be 26 acre-feet. The City of Redondo Beach will coordinate with LACFCD to advance the design of this project as expeditiously as possible.

The Project will also incorporate a variety of other benefits. Parkway greening via the installation of rain gardens is proposed along the east side of Ripley Avenue to capture and treat street flows that aren’t currently tributary to the Project. Park enhancements at the playfield, such as playground equipment or outdoor exercise equipment, are being considered. Additionally, as Valor Christian Academy is directly upstream of the Project, cooperation with the school will be prioritized.

The City of Redondo Beach is currently preparing a Feasibility Study for the project to apply for Safe Clean Water regional project funding. An overview of the project is illustrated in Figure 6. A concept plan of the project as envisioned is provided in Appendix E.

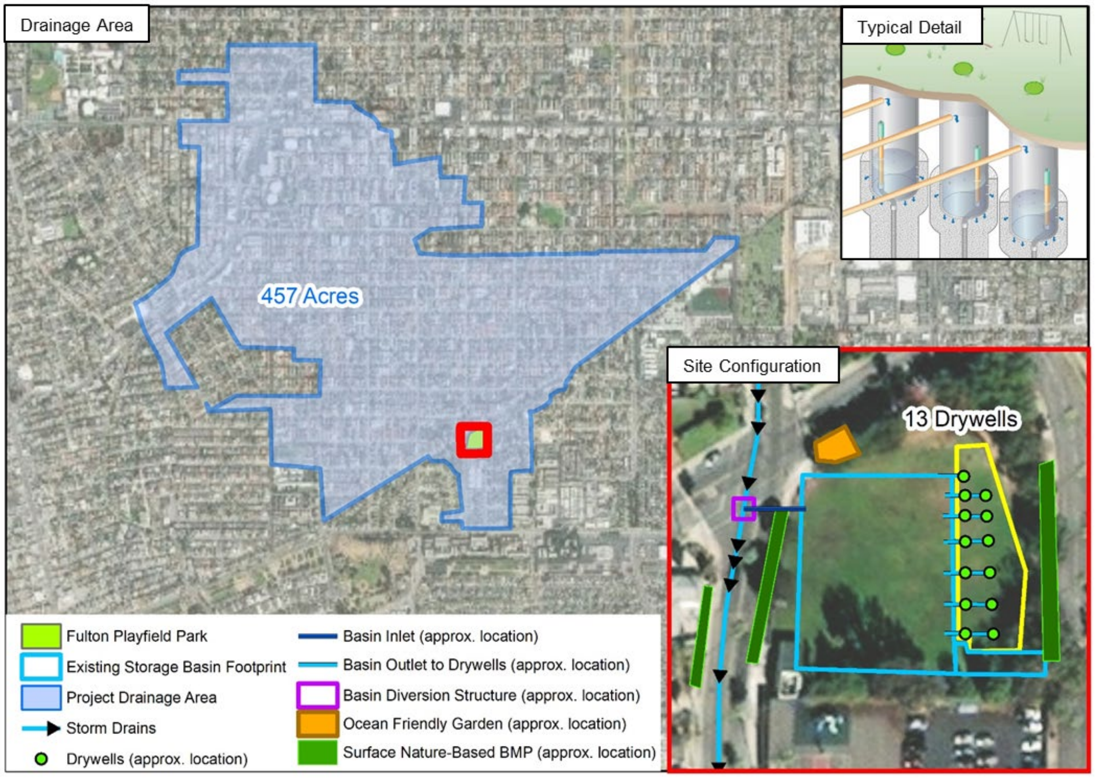
Drainage Area
Typical Detail
457 Acres
Site Configuration
13 Drywells
Fulton Playfield Park
Existing Storage Basin Footprint
Project Drainage Area
Storm Drains
Drywells (approx. location)
Basin Inlet (approx. location)
Basin Outlet to Drywells (approx. location)
Basin Diversion Structure (approx. location)
Ocean Friendly Garden (approx. location)
Surface Nature-Based BMP (approx. location)

Figure 6. Project Overview – Fulton Playfield Infiltration Project

3.3.3.5 Redondo Beach Herondo Distributed Infiltration Project

The City of Redondo Beach is planning to implement a series of distributed infiltration BMPs (e.g., drywells, porous gutters, porous crosswalks, porous parking lanes, bioswales, etc.) within the Herondo Storm Drain watershed. The total 24-hour management volume provided by these distributed BMPs will be at least 17.6 acre-feet.

An overview of the project is illustrated in Figure 7. A concept plan showing a potential distribution of drywells to achieve the required management volume is provided in Appendix E. Exact type and location of each BMP is subject to change.

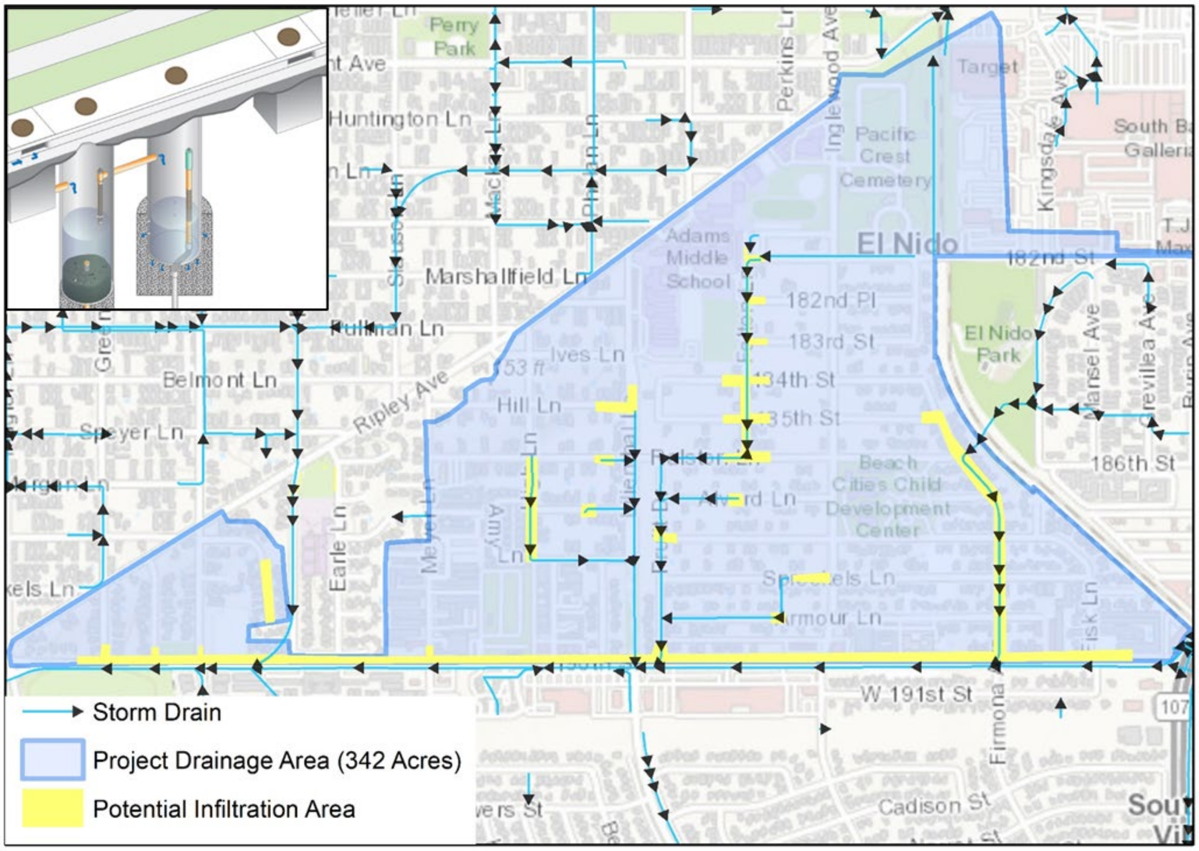

Figure 7. Project Overview – Redondo Beach Herondo Distributed Infiltration Project

3.3.3.6 Hermosa Beach Distributed Drywells

The City of Hermosa Beach is planning to implement a series of drywells within the SMB-6-1 watershed. Based on initial screening, drywells are proposed east of Pacific Coast Highway, between 1st Street and 10th Street.[9] The total 24-hour management volume to be provided by these BMPs is estimated to be 7.7 acre-feet.

Project overview is illustrated in Figure 8. A concept plan showing a potential distribution of drywells to achieve the required management volume is provided in Appendix E. Exact type and location of each BMP is subject to change.

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[9] A drywell is a bored, drilled, or driven shaft or hole whose depth is greater than its width. A drywell may either be a small excavated pit filled with aggregate or prefabricated storage chamber or pipe segment.

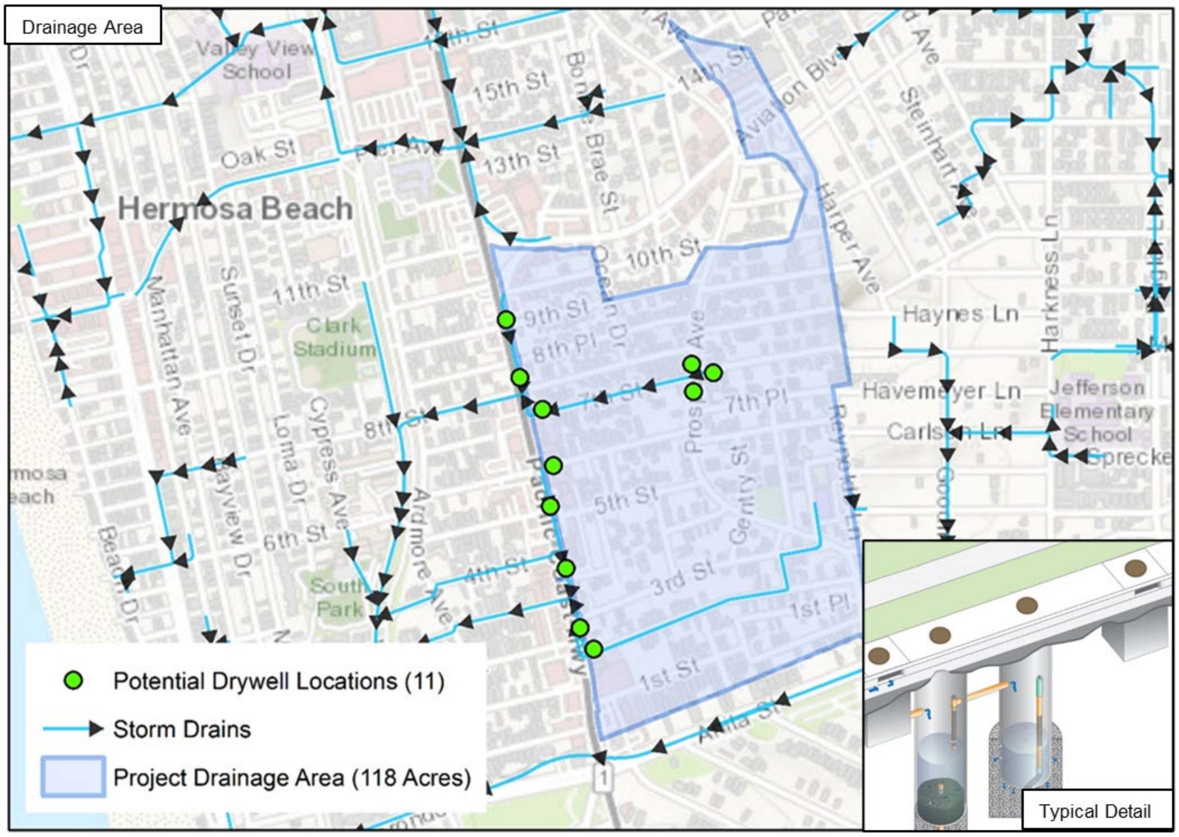

Figure 8. Project Overview – Hermosa Beach Distributed Drywells

3.4 RAA Results – Load Reductions and Compliance Demonstration

Load reduction calculations for the Beach Cities SMB WMA are summarized in Table 5. Through the RAA, the collective load reductions achieved by all existing and proposed BMPs achieved applicable TLRs and TLR-equivalent 24-hour management volumes within each analysis region. As a result, reasonable assurance is demonstrated for the Santa Monica Bay WMA. The 24-hour management volume of each project is shown in Figure 9 both by project category and agency. To spatially represent the RAA output, the 24-hour management volume is illustrated in Figure 10. As shown in the figure, analysis regions with a zero calculated TLR (e.g., anti-degradation areas) were assigned a 0 acre-feet 24-hour stormwater management volume. The 24-hour management volume of a regional project was spatially represented by its drainage area. Drainage areas to 85th percentile, 24-hour design capture projects are shown as hatched polygons, indicating these areas demonstrate compliance through the alternative compliance path of full 85th percentile, 24-hour design stormwater capture.

Details on BMP load quantification and 24-hour management volume calculation for the Santa Monica Bay WMA are provided in Appendix D.

Table 5. Beach Cities Santa Monica Bay WMA RAA Summary

Analysis Region	Fecal Coliform Target Load Reduction (TLR)			BMP Load Reduction (LR) Summary								
				LID Redevelopment		Regional Project		Distributed Project		Total Load Reduction		RAA Achieved?
	10^12 MPN/yr	% of Baseline Load	TLR Equivalent 24-Hour Management Volume (ac-ft)	% of Baseline Load	24-Hour Volume (ac-ft)	% of Baseline Load	24-Hour Volume (ac-ft)	% of Baseline Load	24-Hour Volume (ac-ft)	% of Baseline Load	24-Hour Volume (ac-ft)	
SMB-5-01	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a
SMB-5-02	60.5	53%	67.1	0.3%	0.4	64%	81.9	0%	0	64.3%	82.3	Yes
SMB-5-03	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a
SMB-5-04	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a
SMB-5-05	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a
SMB-6-01	54.7	49%	51.2	0.3%	0.3	24.8%	25.9	24.1%	25.2	49.1%	51.4	Yes
SMB-6-02	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a
SMB-6-03	0.0	0%	0	TLR = 0% based on historical monitoring data. No RAA needed								n/a
SMB-6-04	0.0	0%	0	TLR = 0% based on historical monitoring data. No RAA needed								n/a
SMB-6-05	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a
SMB-6-06	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a

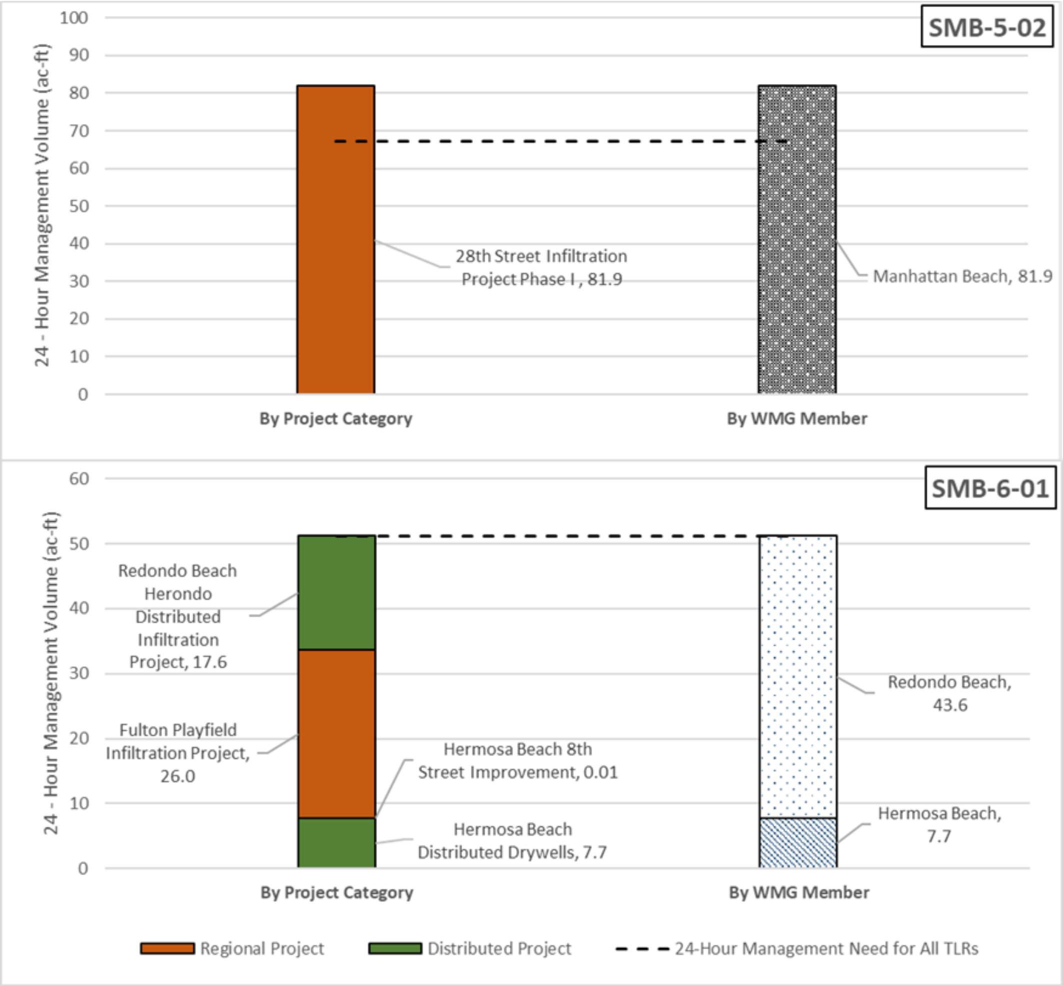

Figure 9 . Project-Specific 24-Hour Management Volume in Santa Monica Bay WMA

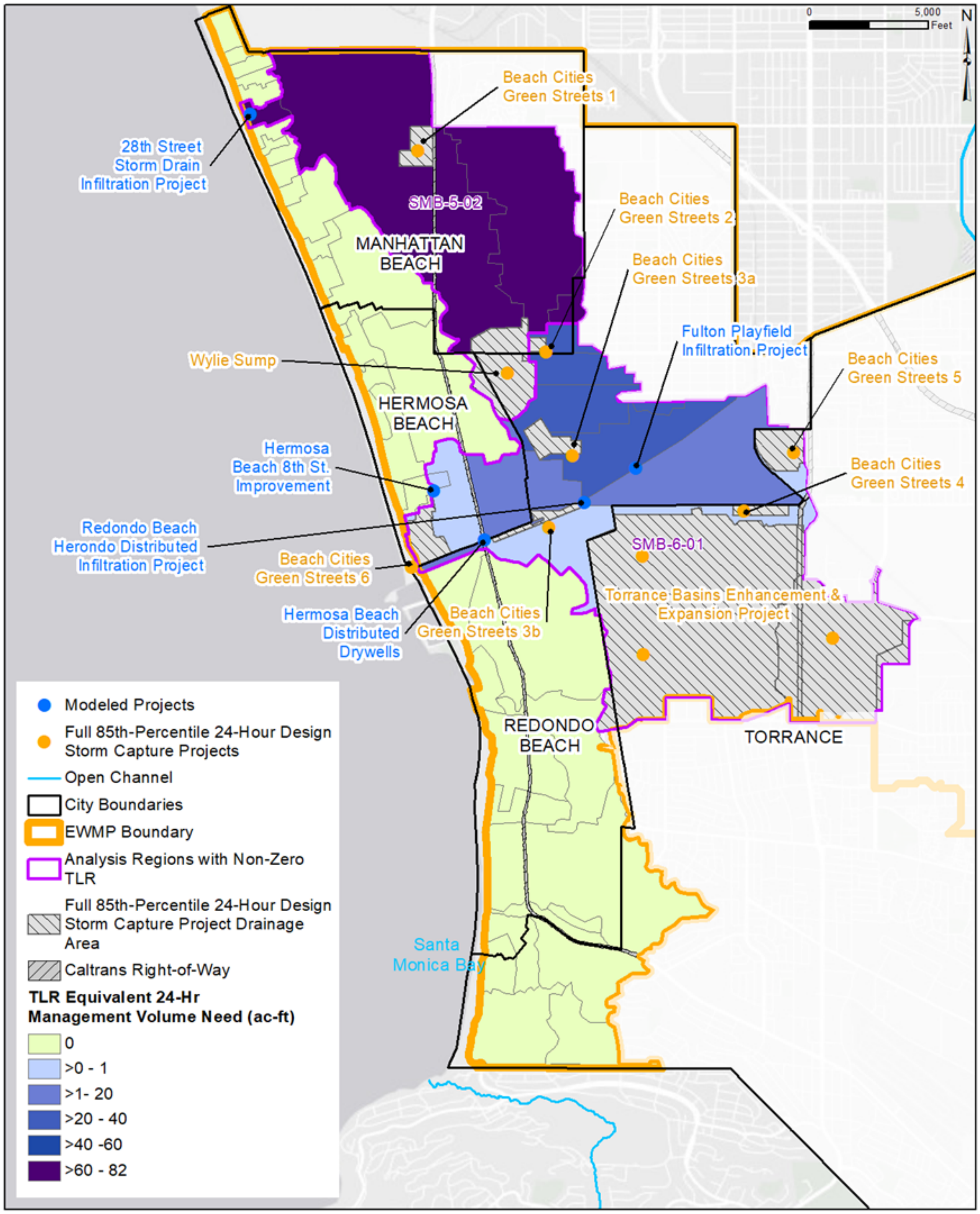
0
5,000
Feet
N
Beach Cities Green Streets 1
28th Street Storm Drain Infiltration Project
SMB-5-02
Beach Cities Green Streets 2
MANHATTAN BEACH
Beach Cities Green Streets 3a
Fulton Playfield Infiltration Project
Wylie Sump
Beach Cities Green Streets 5
HERMOSA BEACH
Hermosa Beach 8th St. Improvement
Beach Cities Green Streets 4
Redondo Beach Herondo Distributed Infiltration Project
SMB-6-01
Beach Cities Green Streets 6
Torrance Basins Enhancement & Expansion Project
Hermosa Beach Distributed Drywells
Beach Cities Green Streets 3b
REDONDO BEACH
TORRANCE
Santa Monica Bay
● Modeled Projects
● Full 85th-Percentile 24-Hour Design Storm Capture Projects
Open Channel
City Boundaries
EWMP Boundary
Analysis Regions with Non-Zero TLR
▨ Full 85th-Percentile 24-Hour Design Storm Capture Project Drainage Area
▨ Caltrans Right-of-Way
TLR Equivalent 24-Hr Management Volume Need (ac-ft)
0
>0 - 1
>1- 20
>20 - 40
>40 -60
>60 - 82

Figure 10. 24-Hour Management Volume for the Santa Monica Bay WMA

As shown in Table 5, reasonable assurance of compliance is demonstrated for the two priority watersheds within the Beach Cities SMB WMA based on full implementation of the suite of projects identified. A schedule identifying implementation milestones for each project is provided in Section 7.1.

3.5 RAA Results - Dry Weather Compliance Demonstration.

According to monitoring and observation data collected through the Beach Cities CIMP, low flow diversions have proven effective at intercepting and diverting non-exempt dry weather flow from SMB. Therefore, reasonable assurance of compliance during dry weather is demonstrated for the Beach Cities SMB WMA.

4 DOMINGUEZ CHANNEL WATERSHED MANAGEMENT AREA

4.1 Identification of Water Quality Priorities

As part of the EWMP process, the Permit requires the Beach Cities WMG to identify water quality priorities within their WMA. The list of WBPCs defined in the original Beach Cities EWMP has been revised based on the most recent updates to applicable TMDLs and 303(d) listings, as well as CIMP monitoring data collected through June 2020. The updated WBPC list for Dominguez Channel WMA is summarized in Table 6.

Table 6. Water Body Pollutant Combinations – Dominguez Channel[a]

Category	Water Body	Pollutant – Applicable Condition	Reason for Categorization
1: Highest Priority	Dominguez Channel Freshwater	Toxicity[b] – Wet Weather	Dominguez Channel and Greater Los Angeles and Long Beach Harbors Toxics TMDL (LARWQCB, 2011)
		Total Copper – Wet Weather	
		Total Lead – Wet Weather	
		Total Zinc – Wet Weather	
	Dominguez Channel Estuary (including Torrance Carson Channel)	Total Copper – Wet Weather	
		Total Lead – Wet Weather	
		Total Zinc – Wet Weather	
		Total Cadmium – Wet Weather	
		Total DDT – Year-Round	
		Total PAHs – Year-Round	
		Total PCBs – Year-Round	
2: High Priority	Dominguez Channel (including Torrance Carson Channel)	Indicator Bacteria	2014-2016 303(d) List
3. Medium Priority	Dominguez Channel Freshwater	Benzo(a)pyrene – Wet Weather	Historical exceedance of applicable receiving water limits (California Toxic Rule Human Health Criteria) where MS4 discharge may be causing or contributing to the exceedance

[a] Does not include WBPCs applicable the Beach Cities WMA within the Machado Lake Watershed, which is addressed by the separate Machado Lake Watershed EWMP developed by City of Torrance.

[b] Toxicity is not directly tied to any single pollutant or group of pollutants that can be readily modeled; rather, it is the result of a wide-array of loading from multiple pollutants from various sources. As a result, toxicity will not be modeled as part of the revised EWMP, consistent with the original EWMP. It is assumed that the implementation of various BMPs and resultant control of other pollutants of concern will sufficiently address in-channel toxicity.

[c] EPA banned diazinon on December 31, 2005. Data from 2006-2010 show no diazinon exceedances in Dominguez Channel. Based on these results, no diazinon TMDLs have been developed at this time.

Details related to the identification, prioritization, and potential sources of each of the Dominguez Channel WBPCs can be found in Appendix B. Unless otherwise noted, all WBPCs identified in Table 3 have been addressed as part of the revised RAA.

4.2 RAA Results – Baseline Loads and Target Load Reductions

Figure 11 illustrates the modeled analysis regions in the Dominguez Channel WMA. Analysis Regions DC-N-MB, DC-N-RB, and DC-S represent the portions of the cities of Manhattan Beach, Redondo Beach, and Torrance, respectively, draining to Dominguez Channel above Vermont Avenue (i.e., Dominguez Channel Freshwater). Analysis Region DC-TL is the portion of the City of Torrance that drains to Torrance Lateral, which continues to the Dominguez Channel Estuary. Appendix D provides additional details related to the analysis regions.

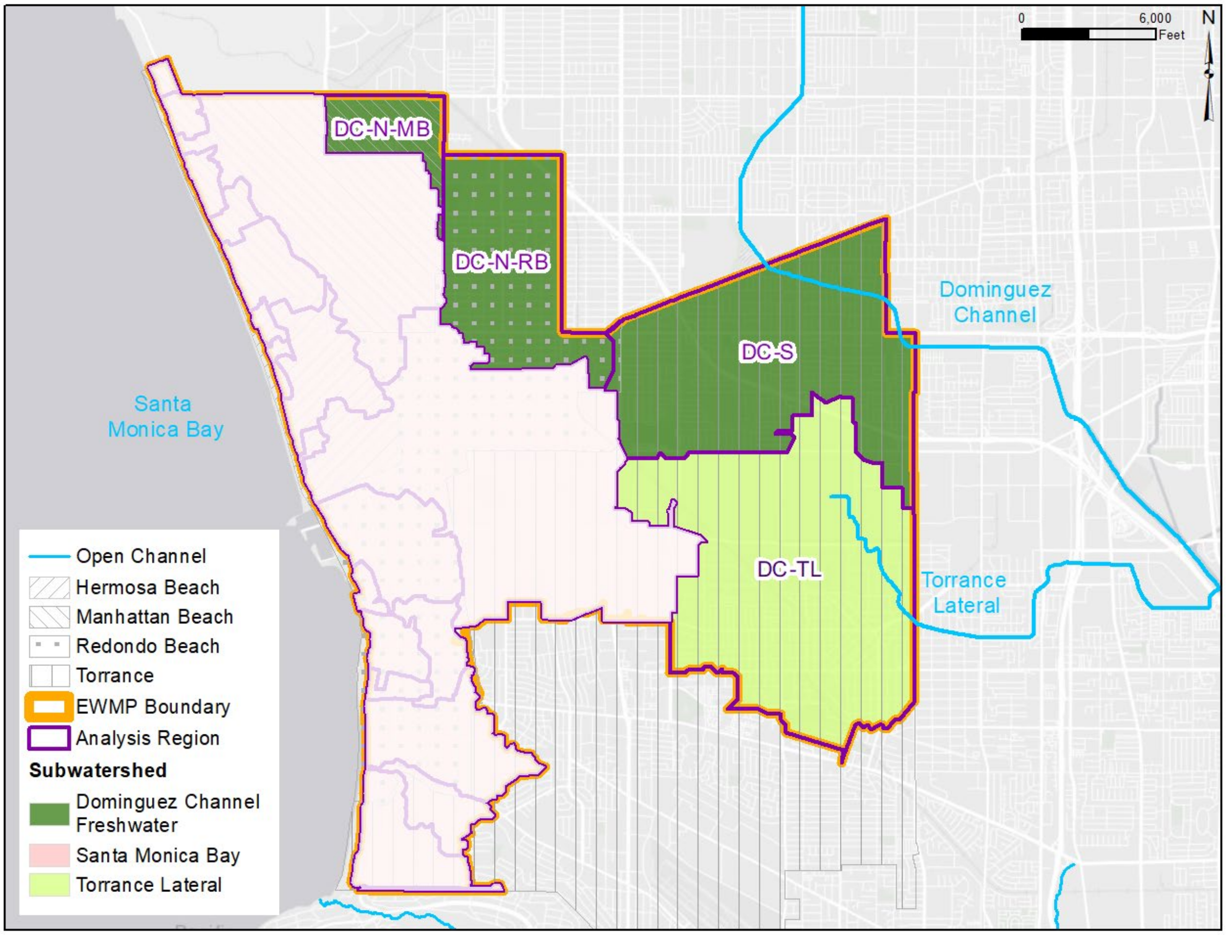

Figure 11. Dominguez Channel WMA Analysis Region Overview

The process for establishing pollutant TLRs necessary to meet water quality priorities for the modeled WBPCs in Dominguez Channel is detailed in Appendix D. A summary of estimated baseline loads and TLRs for each analysis region and WBPC in the Dominguez Channel WMA is provided in Table 7.

Similar to the Santa Monica Bay WMA TLRs, a TLR-equivalent 24-hour management volume was developed for each non-zero TLR. For each analysis region, the largest 24-hour management volume was selected as the target compliance metric, since management of the largest volume will result in management of all others.[10] Both load-based TLRs and the equivalent 24-hour runoff management volumes are considered eligible Beach Cities EWMP compliance metrics. Appendix D provides detailed information on the process to calculate TLRs and 24-hour management volumes.

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[10] Total copper was not included in the assessment of the largest 24-hour management volume, since significant load reductions will be achieved via the copper brake pad reduction (see Section 4.3.2). As a result, the management volumes needed to meet applicable copper TLRs using structural BMPs are significantly reduced.

Table 7. Dominguez Channel WMA Wet Weather TLRs

Analysis Region (Receiving Water)	Pollutant	Critical Condition	Baseline Load		Target Load Reduction			
					Absolute		% of Baseline Load	TLR Equivalent 24-Hour Management Volume (ac-ft)
DC-N-MB (Dominguez Channel Freshwater)	Total Copper	90th percentile daily load	1.3	lb/day	1.1	lb/day	82%	7.3
	Total Lead	CIMP data shows no exceedance in the past 5 years. No RAA needed to demonstrate compliance.						
	Total Zinc	90th percentile daily load	6.9	lb/day	5.3	lb/day	76%	**6.7**[1]
	E. coli	90th percentile water year	46.1	10^{12} MPN/yr	19.0	10^{12} MPN/yr	41%	2.4
	Benzo[a]pyrene	90th percentile daily load	2.6E-03	lb/day	1.8E-03	lb/day	70%	4.0
	Toxicity	CIMP data shows no exceedance in the past 5 years. No RAA needed to demonstrate compliance.						
DC-N-RB (Dominguez Channel Freshwater)	Total Copper	90th percentile daily load	4.1	lb/day	3.3	lb/day	81%	24.3
	Total Lead	CIMP data shows no exceedance in the past 5 years. No RAA needed to demonstrate compliance.						
	Total Zinc	90th percentile daily load	22.0	lb/day	16.3	lb/day	74%	**22.3**[1]
	E. coli	90th percentile water year	149.8	10^{12} MPN/yr	53.0	10^{12} MPN/yr	35%	9.7
	Benzo[a]pyrene	90th percentile daily load	7.7E-03	lb/day	5.2E-03	lb/day	67%	12.8
	Toxicity	CIMP data shows no exceedance in the past 5 years. No RAA needed to demonstrate compliance.						
DC-S (Dominguez Channel Freshwater)	Total Copper	90th percentile daily load	4.0	lb/day	3.0	lb/day	76%	27.1
	Total Lead	CIMP data shows no exceedance in the past 5 years. No RAA needed to demonstrate compliance.						
	Total Zinc	90th percentile daily load	18.4	lb/day	11.9	lb/day	65%	**22.2**[1]
	E. coli	90th percentile water year	393.8	10^{12} MPN/yr	179.1	10^{12} MPN/yr	45%	15.3
	Benzo[a]pyrene	90th percentile daily load	1.0E-02	lb/day	5.5E-03	lb/day	55%	18.7
	Toxicity	CIMP data shows no exceedance in the past 5 years. No RAA needed to demonstrate compliance						
DC-TL (Torrance Lateral and Dominguez Channel Estuary)	Total Copper	90th percentile daily load	11.5	lb/day	10.4	lb/day	91%	36.8
	Total Lead	CIMP data shows no exceedance in the past 5 years. No RAA needed to demonstrate compliance.						
	Total Zinc	90th percentile daily load	65.1	lb/day	57.4	lb/day	88%	**35.8**[1]
	Total Cadmium	90th percentile daily load	0.15	lb/day	0.13	lb/day	87%	35.2
	E. coli	90th percentile water year	360.8	10^{12} MPN/yr	175.3	10^{12} MPN/yr	49%	16.2
	Benzo[a]pyrene	90th percentile daily load	2.0E-02	lb/day	1.3E-02	lb/day	67%	34.1
	Total PAHs	CIMP data shows no exceedance in the past 5 years. No RAA needed to demonstrate compliance.						
	Toxicity	CIMP data shows no exceedance in the past 5 years. No RAA needed to demonstrate compliance.						
	Total PCBs	CIMP data shows no exceedance in the past 5 years. No RAA needed to demonstrate compliance.						
	Total DDTs	CIMP data shows no exceedance in the past 5 years. No RAA needed to demonstrate compliance.						

[1] Bold value is the representative ("controlling") 24-hour management runoff volume for each analysis region.

4.3 BMP Summary

As discussed in Section 2 and Appendix D, BMPs were identified and accounted for in the RAA to demonstrate attainment of applicable water quality targets. Because the RAA was calibrated using local water quality and flow data through June 2020, only BMPs implemented or planned to be implemented after this date were accounted for in the RAA. A summary of these BMPs, including programmatic and structural measures, is provided herein.

4.3.1 Redevelopment

Redevelopment in the Dominguez Channel WMA was accounted for in the same manner as it was in the SMB Watershed. See discussion in Section 3.3.1 and Appendix D.

An example of LID redevelopment project in the Dominguez Channel WMA is the Manhattan Village Mall. The mall is undergoing significant renovations that include a rainwater harvesting and use system, as well as a biofiltration system. The rainwater harvesting system is sized to fully capture the 85th percentile, 24-hour design storm from a total of 13.7 acres of on-site drainage area. Projects such as these will further increase the stormwater runoff managed within the Dominguez Channel WMA.

4.3.2 Copper Brake Pad Reduction

As was the case in the original Beach Cities EWMP, a load reduction was assumed for copper due to the phased elimination of copper in brake pads. In 2010, California Senate Bill 346 (SB 346) was enacted to eliminate nearly all use of copper in brake pad manufacturing. In 2013, TDC Environmental prepared a technical study for the California Stormwater Quality Association (CASQA) describing the expected percent reduction for copper as a result of the passage of SB 346 (TDC Environmental, 2013). The TDC study identified three possible implementation scenarios, the least aggressive of which estimated that a 52% load reduction in copper will be achieved by 2032 due to the brake pad phase-out.

Since the referenced study assumed a 21.2% reduction in urban runoff copper by 2020, and the RAA model was calibrated with local water quality data through June 2020, the load reduction accounted for in the revised RAA was estimated as a weighted fraction of 52%. The difference in estimated total load reduction between 2020 and 2032 (i.e., 52% - 21.2%, or 30.8%) was divided by the assumed remaining load in 2020 (100% - 21.2%, or 78.8%) to estimate the remaining expected load reduction due to the copper brake pad phase-out. Therefore, a 39.1% load reduction was assumed for copper in the Beach Cities Dominguez Channel WMA.

To avoid double-counting load reductions, this reduction was applied to the copper load before accounting for future BMP load reductions (i.e., 39.1% was applied to the baseline loads before all other BMP load reductions were accounted for, since BMP performance is dependent on influent loads).

4.3.3 Analysis Region DC-N-MB & DC-N-RB

Analysis regions DC-N-MB and DC-N-RB include discharges from the cities of Manhattan Beach and Redondo Beach to Dominguez Channel respectively. Both analysis regions also drain to the Alondra Park Stormwater Capture Project.

4.3.3.1 Alondra Park Stormwater Capture Project

The Alondra Park Stormwater Capture Project is a multi-benefit stormwater project proposed at Alondra Park, a large park located in the unincorporated County area of EI Camino Village that consists of two park areas and a golf course. The park is due east of Manhattan Beach and Redondo Beach, under the jurisdiction of Los Angeles County Department of Parks and Recreation.

The proposed project has been strategically located in the 13.5-acre park space in the northwest corner of the site. The Project provides the opportunity to capture dry weather flows and stormwater and improve water quality by diverting flows from the LACFCD District Project No. 12 Drain in Manhattan Beach Boulevard and the LACFCD Alondra Park Drain into underground storage galleries totaling 34-acre-feet in total capacity.

The captured flows are proposed to be diverted from the galleries into an existing sewer system. During storm events when flows are higher than sewer capacity, water will be treated before being diverted back to the storm drain. The diversion structure and storage galleries will intercept and store dry weather flows and approximately a 0.1-inch storm from the 4,945-acre watershed tributary to Alondra Park.

Two existing baseball fields will be restored to new condition and a brand-new soccer field will be installed after the underground storage is constructed, providing enhanced active recreation spaces.

Bioswales with native plants will replace existing turf areas along Manhattan Beach Boulevard, providing new habitat and a natural way to slow and treat stormwater and dry weather runoff. The parking lots will be reconstructed with permeable pavement and bioswales. New trees will be planted throughout the park to provide shade and bolster the performance of other green infrastructure.

The cities of Manhattan Beach and Redondo Beach collectively account for approximately 1,424 acres (29%) of the tributary area to the Alondra Park Stormwater Capture Project. As project partners, they will receive a portion of water quality benefits from the overall project, proportional to their drainage area and additional funding that may be provided. At the time of this revised EWMP, Manhattan Beach was estimated to receive 1.76-acre-feet of storage credit and Redondo Beach was estimated to receive 5.29-acre-feet of storage credit. The project has been modeled in the Beach Cities RAA assuming these proportional volumes for each city.

Additional information for the project can be found in the Alondra Park Regional Project Safe Clean Water Feasibility Study Report (Los Angeles County, 2019). A high-level project concept is illustrated in Figure 12.

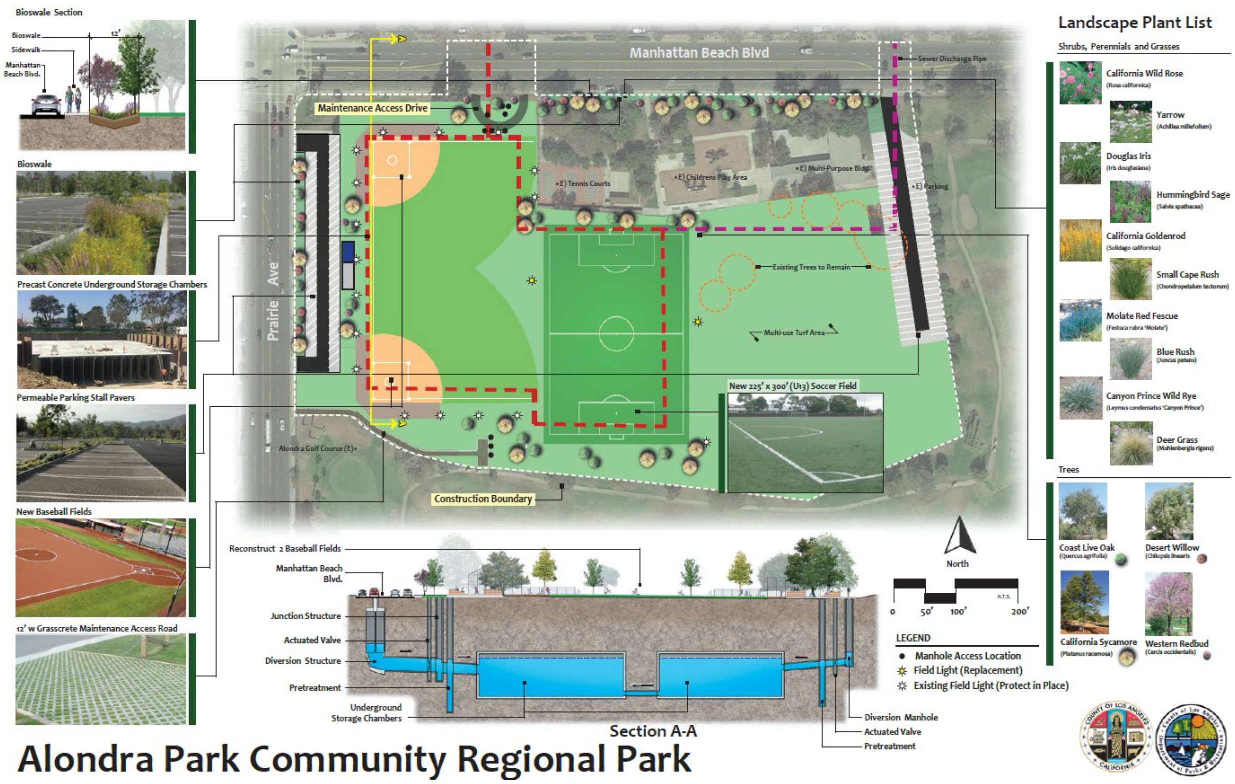
Bioswale Section
Bioswale
Sidewalk
Manhattan Beach Blvd.
12'
Bioswale
Precast Concrete Underground Storage Chambers
Permeable Parking Stall Pavers
New Baseball Fields
12' w Grasscrete Maintenance Access Road
Manhattan Beach Blvd
Sewer Discharge Pipe
Maintenance Access Drive
E) Tennis Courts
E) Childrens Play Area
E) Multi-Purpose Bldg.
E) Parking
Existing Trees to Remain
Multi-use Turf Area
Prairie Ave
New 225' x 300' (U13) Soccer Field
Alondra Golf Course (E)
Construction Boundary
Landscape Plant List
Shrubs, Perennials and Grasses
California Wild Rose (Rosa californica)
Yarrow (Achillea millefolium)
Douglas Iris (Iris douglasiana)
Hummingbird Sage (Salvia spathacea)
California Goldenrod (Solidago californica)
Small Cape Rush (Chondropetalum tectorum)
Molate Red Fescue (Festuca rubra 'Molate')
Blue Rush (Juncus patens)
Canyon Prince Wild Rye (Leymus condensatus 'Canyon Prince')
Deer Grass (Muhlenbergia rigens)
Trees
Coast Live Oak (Quercus agrifolia)
Desert Willow (Chilopsis linearis)
California Sycamore (Platanus racemosa)
Western Redbud (Cercis occidentalis)
Reconstruct 2 Baseball Fields
Manhattan Beach Blvd.
Junction Structure
Actuated Valve
Diversion Structure
Pretreatment
Underground Storage Chambers
Section A-A
Diversion Manhole
Actuated Valve
Pretreatment
North
0
50'
100'
200'
N.T.S.
LEGEND
● Manhole Access Location
☀ Field Light (Replacement)
☼ Existing Field Light (Protect in Place)
Alondra Park Community Regional Park

Figure 12. Project Overview – Alondra Park Stormwater Capture Project

4.3.3.2 Manhattan Beach Dominguez Channel Distributed Infiltration Project

The City of Manhattan Beach is planning to implement a series of distributed infiltration BMPs (e.g., drywells) within the DC-N-MB analysis region to meet the city's allocation of the TLR. Based on initial screening, infiltration BMPs are proposed on 33rd Street west of N. Aviation Boulevard, or on N. Aviation Boulevard north of Marine Avenue. RAA results (see Section 4.4) show that the total 24-hour management volume provided by these BMPs will be 5.1 acre-ft.

A project concept is illustrated in Figure 13. A concept plan showing a potential distribution of infiltration BMPs to achieve the required management volume is provided in Appendix E. Exact type and location of each BMP is subject to change.

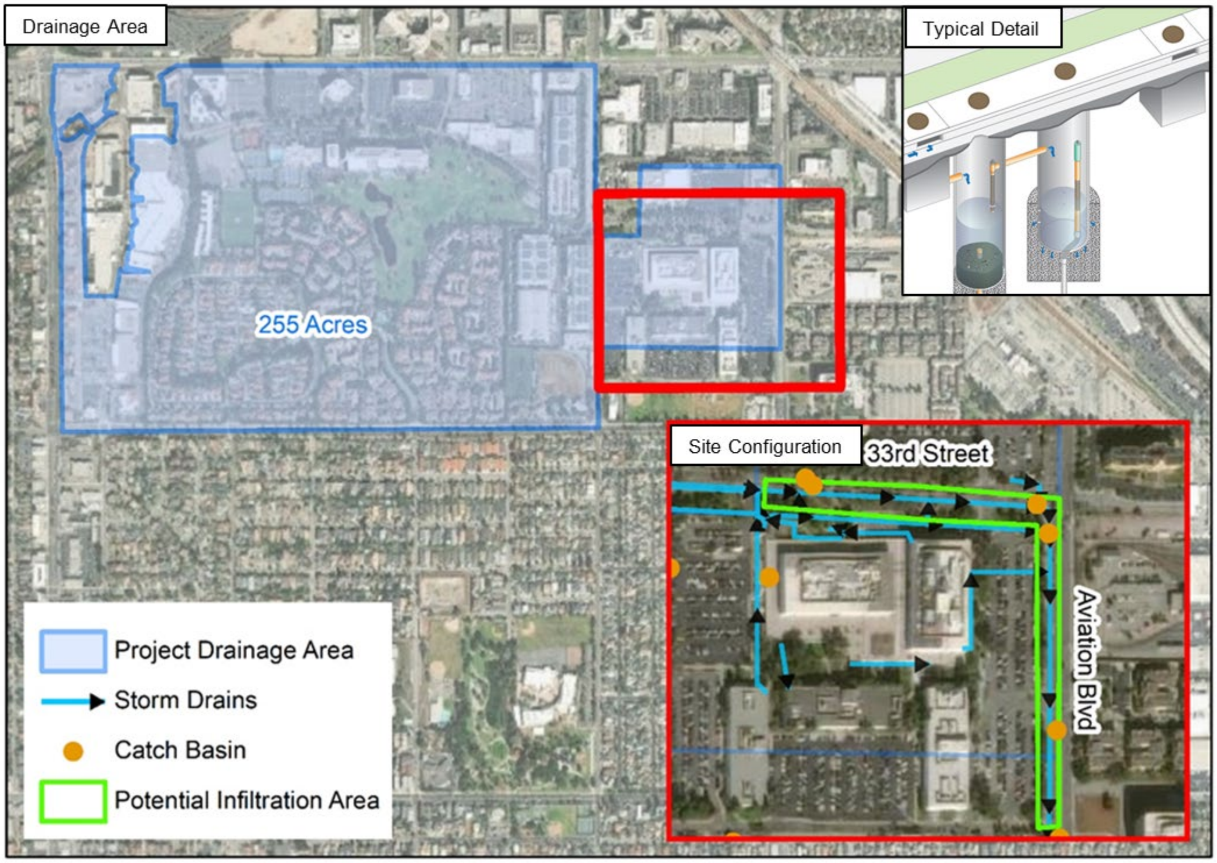

Figure 13. Project Overview – Manhattan Beach Dominguez Channel Distributed Infiltration Project

4.3.3.3 Glen Anderson Park Regional Infiltration Project

Glen Anderson Park is multi-use park in the City of Redondo Beach, located adjacent to Lincoln Elementary School between Rindge Lane, Farrell Avenue, and Vail Avenue. The park has significant green space in addition to baseball fields, tennis courts, basketball courts, and a playground. The park, which is owned and operated by the City of Redondo Beach, is adjacent to a 78-inch reinforced concrete pipe storm drain (LACFCD BI 0729) that runs under Vaile Avenue. Approximately 480 acres of area within the DC-N-RB analysis region is tributary to this storm drain at the point it flows past Glen Anderson Park.

The Glen Anderson Park Regional Infiltration Project will provide infiltration via an underground infiltration basin or a series of drywells, or a combination of both. Pretreatment will be provided following diversion from the Vail Avenue storm drain.

A project concept is illustrated in Figure 14. A detailed concept plan of the project as envisioned is provided in Appendix E.

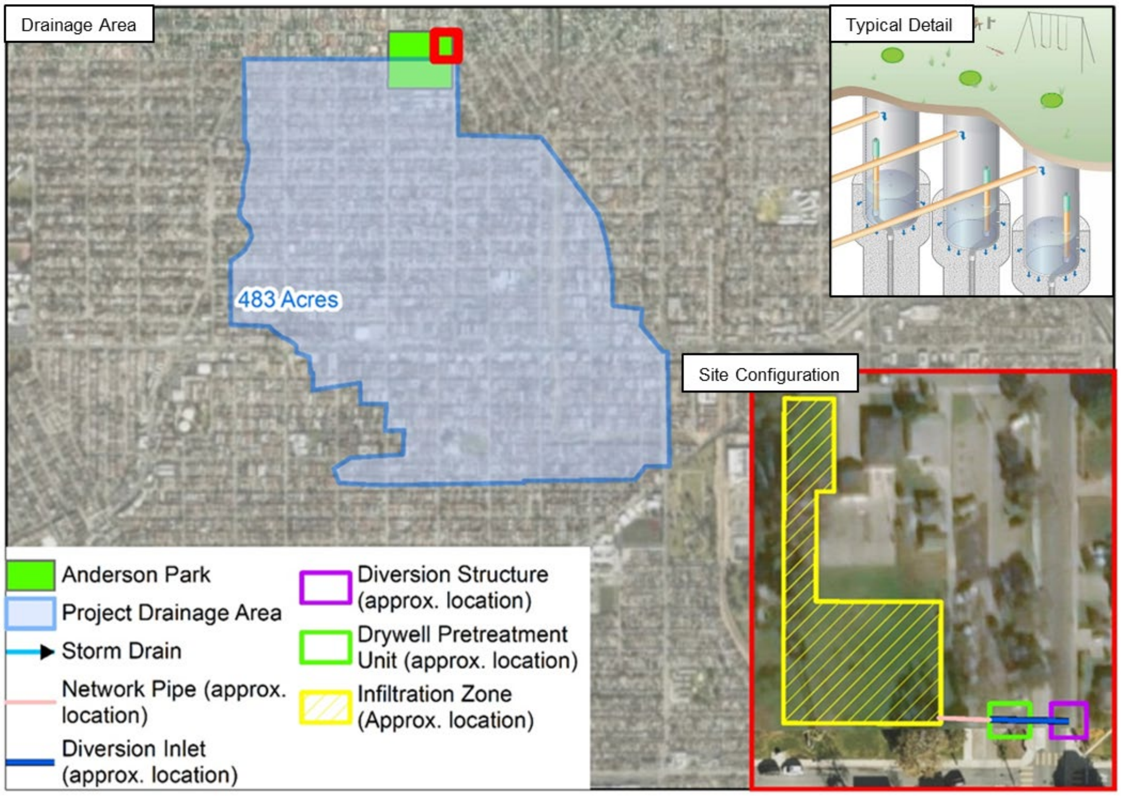
Drainage Area
Typical Detail
483 Acres
Site Configuration
Anderson Park
Project Drainage Area
Storm Drain
Network Pipe (approx. location)
Diversion Inlet (approx. location)
Diversion Structure (approx. location)
Drywell Pretreatment Unit (approx. location)
Infiltration Zone (Approx. location)

Figure 14. Project Overview – Glen Anderson Park Regional Infiltration Project

4.3.3.4 Redondo Beach Dominguez Channel Distributed Infiltration Project

The City of Redondo Beach is planning to implement a series of distributed infiltration BMPs (e.g., drywells, porous gutters, porous crosswalks, porous parking lanes, bioswales, etc.) within the DC-N-RB analysis region to meet the remainder of the city's allocation of the TLR. Based on RAA results (see Section 4.4), the total 24-hour management volume provided by these BMPs will be 8.4 acre-ft.

A project concept is illustrated in Figure 15. A concept plan showing a potential distribution of infiltration BMPs to achieve the required management volume is provided in Appendix E. Exact type and location of each BMP is subject to change.

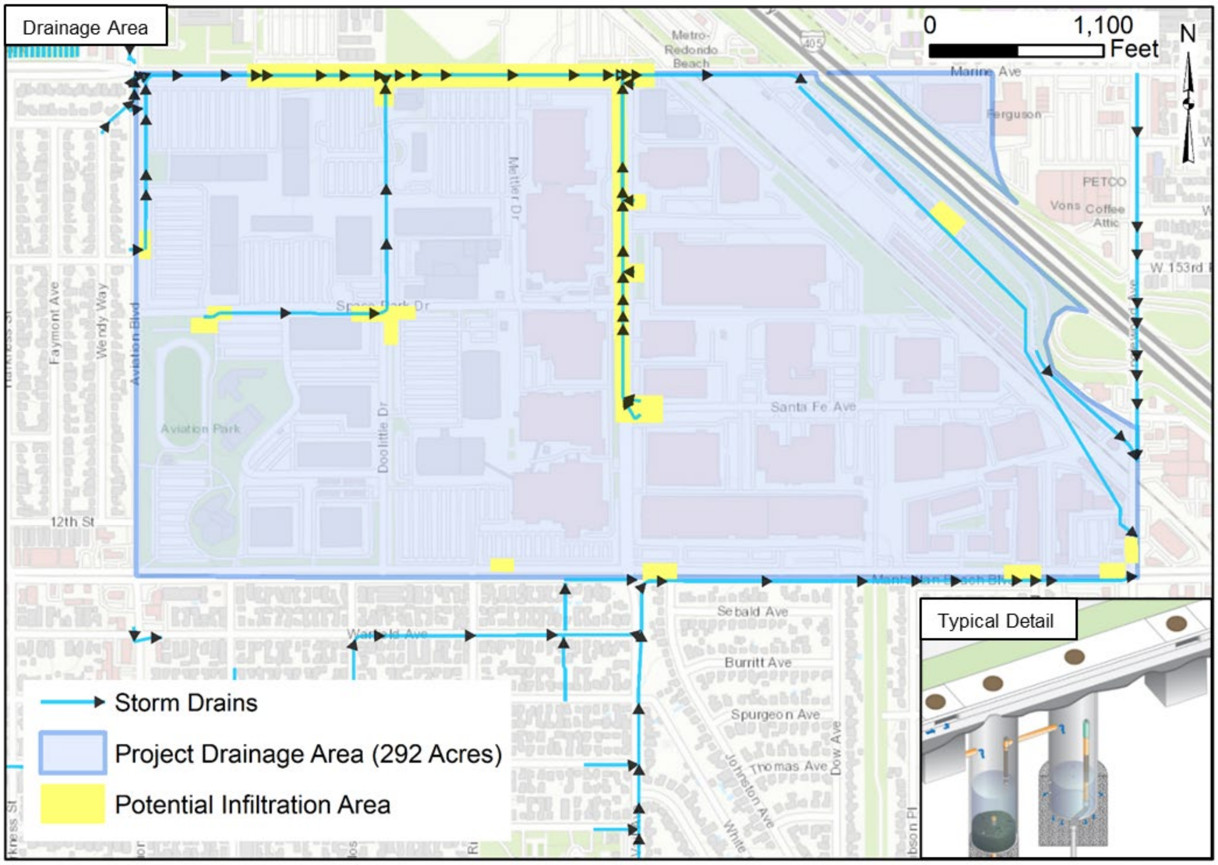

Figure 15. Project Overview – Redondo Beach Dominguez Channel Distributed Infiltration Project

4.3.4 Analysis Region DC-S

This analysis region includes discharges from the City of Torrance to Dominguez Channel.

4.3.4.1 Torrance Parkway BMPs

As discussed in the original Beach Cities EWMP, the City of Torrance is committed to implementing distributed green street BMPs within the watershed to meet RAA requirements. Specific BMP technologies are currently being evaluated, but may include catch basin inlet filters (media filtration devices with a variety of media types and configurations such as cartridge filters, vertical bed filters, etc.), bioretention units, or drywells, where deemed feasible.

The City of Torrance has applied for Safe Clean Water funding under the Technical Resources Program to prioritize catch basins for implementation (City of Torrance, 2020b).

Collectively, the Torrance Parkway BMPs will be implemented by the City of Torrance at a level that meets the EWMP compliance management volume determined in the RAA (see Section 4.4). A concept factsheet for the proposed Torrance Parkway BMPs is provided in Appendix E.

4.3.5 Analysis Region DC-TL

This analysis region includes discharges from the City of Torrance to Torrance Lateral (i.e., Torrance Carson Channel).

4.3.5.1 Torrance Parkway BMPs

The City of Torrance will implement the same distributed parkway BMP approach in the DC-TL analysis region as is being applied to the DC-S analysis region.

4.4 RAA Results – Load Reductions and Compliance Demonstration

Load reduction calculations for the Beach Cities Dominguez Channel WMA are summarized in Table 8. Reasonable assurance has been demonstrated in all analysis regions. The 24-hour management volumes of the projects are shown in Figure 16 as stacked columns. The figure also breaks down the 24-hour management volume by agency. To spatially represent the RAA output, the 24-hour management volume is illustrated in Figure 17. Drainage areas to 85th percentile, 24-hour design capture projects are shown as hatched polygons, indicating these areas achieve compliance through the alternative compliance path of full 85th percentile, 24-hour design stormwater capture. In addition, areas covered under separate stormwater permits (e.g. Caltrans right-of-way, Torrance Refinery) are shown as hatched polygons, as they were not included in the RAA.

Table 8. Beach Cities Dominguez Channel WMA RAA Summary

Analysis Region	Pollutant	Final Target Load Reduction			BMP Load Reduction Summary																Assurance Achieved?
					Non-Structural BMP			LID Redevelopment			Regional Project			Distributed Projects			Total Load Reduction				
		Absolute		%	Absolute		%	Absolute		%	Absolute		%	Absolute		%	Absolute		%		
DC-N-MB (DC Freshwater)	Total Copper	1.1	lb/day	82%	0.5	lb/day	39%	0.01	lb/day	0.9%	0.2	lb/day	16%	0.4	lb/day	33%	1.1	lb/day	89%		Yes
	Total Lead	CIMP data shows no exceedance in the past 5 years. No RAA needed																			n/a
	Total Zinc	5.3	lb/day	76%	0	lb/day	0%	0.1	lb/day	0.9%	1.6	lb/day	23%	3.7	lb/day	54%	5.4	lb/day	78%		Yes
	E. coli	19.0	10^{12} MPN/yr	41%	0	10^{12} MPN/y	0%	0.3	10^{12} MPN/y	0.7%	8.7	10^{12} MPN/yr	19%	19.5	10^{12} MPN/yr	42%	28.5	10^{12} MPN/yr	62%		Yes
	Benzo[a] pyrene	1.8 E-03	lb/day	70%	0	lb/day	0%	2.4 E-05	lb/day	0.9%	4.9 E-04	lb/day	19%	1.4 E-03	lb/day	56%	2.0 E-03	lb/day	76%		Yes
	24-Hour Management Need	6.7	ac-ft	100%	0	ac-ft	0%	0.1	ac-ft	0.9%	1.9	ac-ft	29%	5.2	ac-ft	77%	7.2	ac-ft	100%		Yes
DC-N-RB (DC Freshwater)	Total Copper	3.3	lb/day	81%	1.6	lb/day	39%	0.04	lb/day	0.9%	0.5	lb/day	13%	1.3	lb/day	32%	3.4	lb/day	85%		Yes
	Total Lead	CIMP data shows no exceedance in the past 5 years. No RAA needed																			n/a
	Total Zinc	16.3	lb/day	74%	0	lb/day	0%	0.2	lb/day	1.0%	4.1	lb/day	19%	12.4	lb/day	56%	16.7	lb/day	76%		Yes
	E. coli	53.0	10^{12} MPN/	35%	0	10^{12} MPN/y	0%	1.1	10^{12} MPN/y	0.7%	49.5	10^{12} MPN/yr	33%	19.1	10^{12} MPN/yr	13%	69.7	10^{12} MPN/yr	47%		Yes
	Benzo[a]pyrene	5.2 E-03	lb/day	67%	0	lb/day	0%	7E-05	lb/day	1.0%	2E-03	lb/day	25%	4E-03	lb/day	48%	6E-03	lb/day	73%		Yes
	24-Hour Management Need	22.3	ac-ft	100%	0	ac-ft	0%	0.2	ac-ft/	1.0%	15.5	ac-ft	69%	8.3	ac-ft	37%	24.0	ac-ft	100%		Yes
DC-S (DC Freshwater)	Total Copper	3.0	lb/day	76%	1.5	lb/day	39%	0.1	lb/day	0.9%	0	lb/day	0%	1.4	lb/day	36%	3.0	lb/day	76%		Yes
	Total Lead	CIMP data shows no exceedance in the past 5 years. No RAA needed																			n/a
	Total Zinc	11.9	lb/day	65%	0	lb/day	0%	0.2	lb/day	1.0%	0	lb/day	0%	11.7	lb/day	64%	11.9	lb/day	65%		Yes
	E. coli	179.1	10^{12} MPN/y	45%	0	10^12 MPN/yr	0%	2.2	10^{12} MPN/yr	0.6%	0	10^12 MPN/yr	0%	176.9	10^12 MPN/yr	45%	179.1	10^{12} MPN/yr	45%		Yes
	Benzo[a]pyrene	5.5 E-03	lb/day	55%	0	lb/day	0%	9.4 E-05	lb/day	0.9%	0	lb/day	0%	5.5 E-03	lb/day	54%	5.5 E-03	lb/day	55%		Yes
	24-Hour Management Need	22.2	ac-ft	100%	0	ac-ft	0%	0.3	ac-ft	1.1%	0	ac-ft	0%	21.9	ac-ft	99%	22.2	ac-ft	100%		Yes

Analysis Region	Pollutant	Final Target Load Reduction			BMP Load Reduction Summary																Assurance Achieved?
					Non-Structural BMP			LID Redevelopment			Regional Project			Distributed Projects			Total Load Reduction			
		Absolute		%	Absolute		%	Absolute		%	Absolute		%	Absolute		%	Absolute		%	
DC-TL (DC Estuary and Torrance Lateral)	Total Copper	10.4	lb/day	91%	4.5	lb/day	39%	0.1	lb/day	1.0%	0	lb/day	0%	5.8	lb/day	51%	10.4	lb/day	91%	Yes
	Total Lead	CIMP data shows no exceedance in the past 5 years. No RAA needed																		n/a
	Total Zinc	57.4	lb/day	88%	0	lb/day	0%	0.6	lb/day	1.0%	0	lb/day	0%	56.8	lb/day	87%	57.4	lb/day	88%	Yes
	Total Cadmium	0.13	lb/day	87%	0	lb/day	0%	1.0 E-3	lb/day	0.7%	0	lb/day	0%	0.13	lb/day	87%	0.13	lb/day	87%	Yes
	E. coli	175.3	10^{12} MPN/yr	49%	0	10^{12} MPN/y	0%	2.1	10^{12} MPN/yr	0.6%	0	10^{12} MPN/yr	0%	173.2	10^{12} MPN/yr	49%	175.3	10^{12} MPN/yr	49%	Yes
	Benzo[a]pyrene	1.3 E-02	lb/day	67%	0	lb/day	0%	2E-04	lb/day	0.9%	0	lb/day	0%	1.3 E-02	lb/day	66%	1.3 E-02	lb/day	67%	Yes
	Total PAHs	CIMP data shows no exceedance in the past 5 years. No RAA needed																		n/a
	24-Hour Management Need	35.8	ac-ft	100%	0	ac-ft	0%	0.3	ac-ft	1.0%	0	ac-ft	0%	35.5	ac-ft	99%	35.8	ac-ft	100%	Yes
	Total DDT	CIMP data shows no exceedance in the past 5 years. No RAA needed																		n/a
	Total PCB	CIMP data shows no exceedance in the past 5 years. No RAA needed																		n/a

[2] Please see Table 13 on how the representative 24-hour management volume was selected for each analysis region.

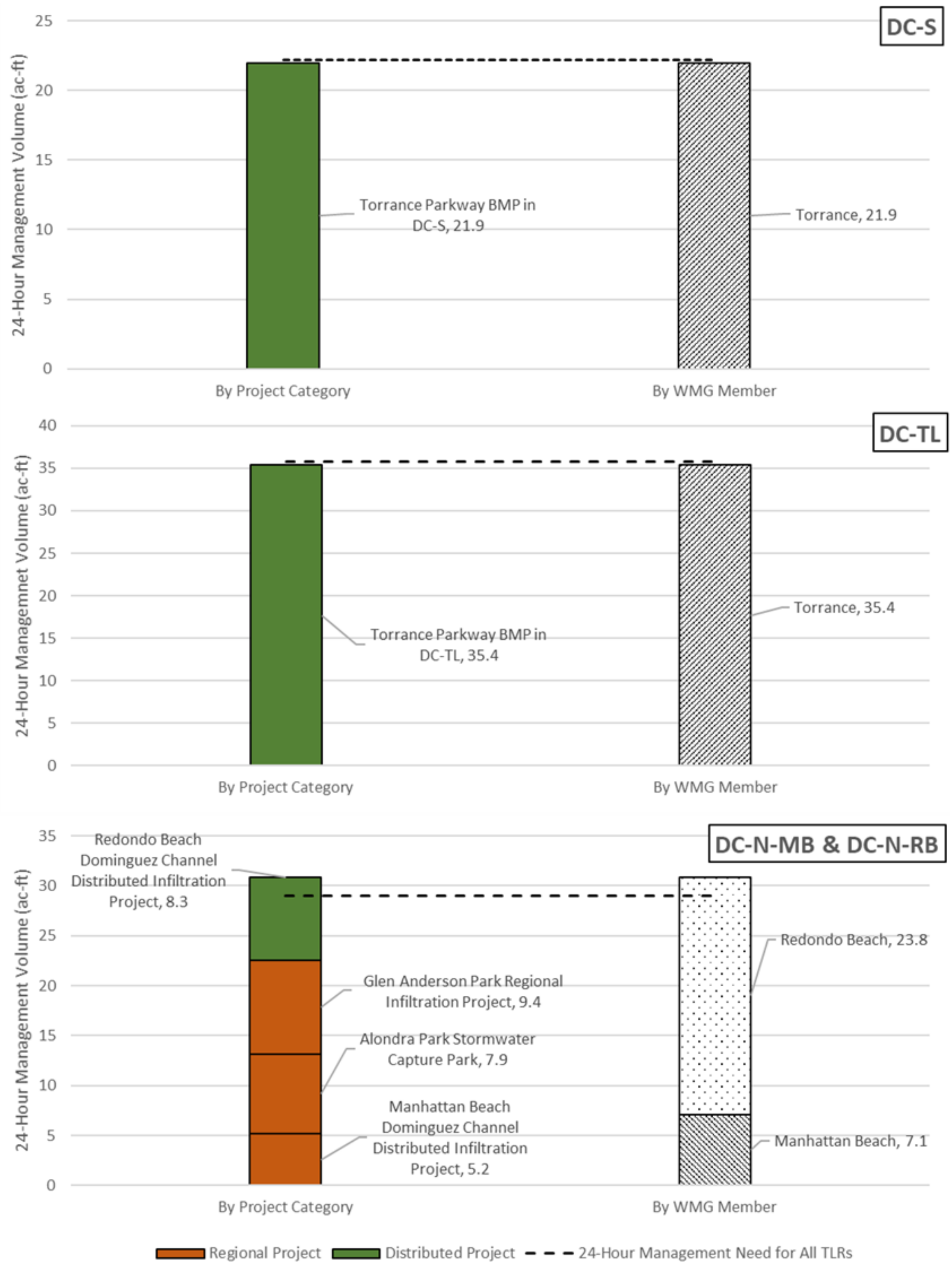

Figure 16. Project Specific 24-Hour Management Volume in Dominguez Channel WMA

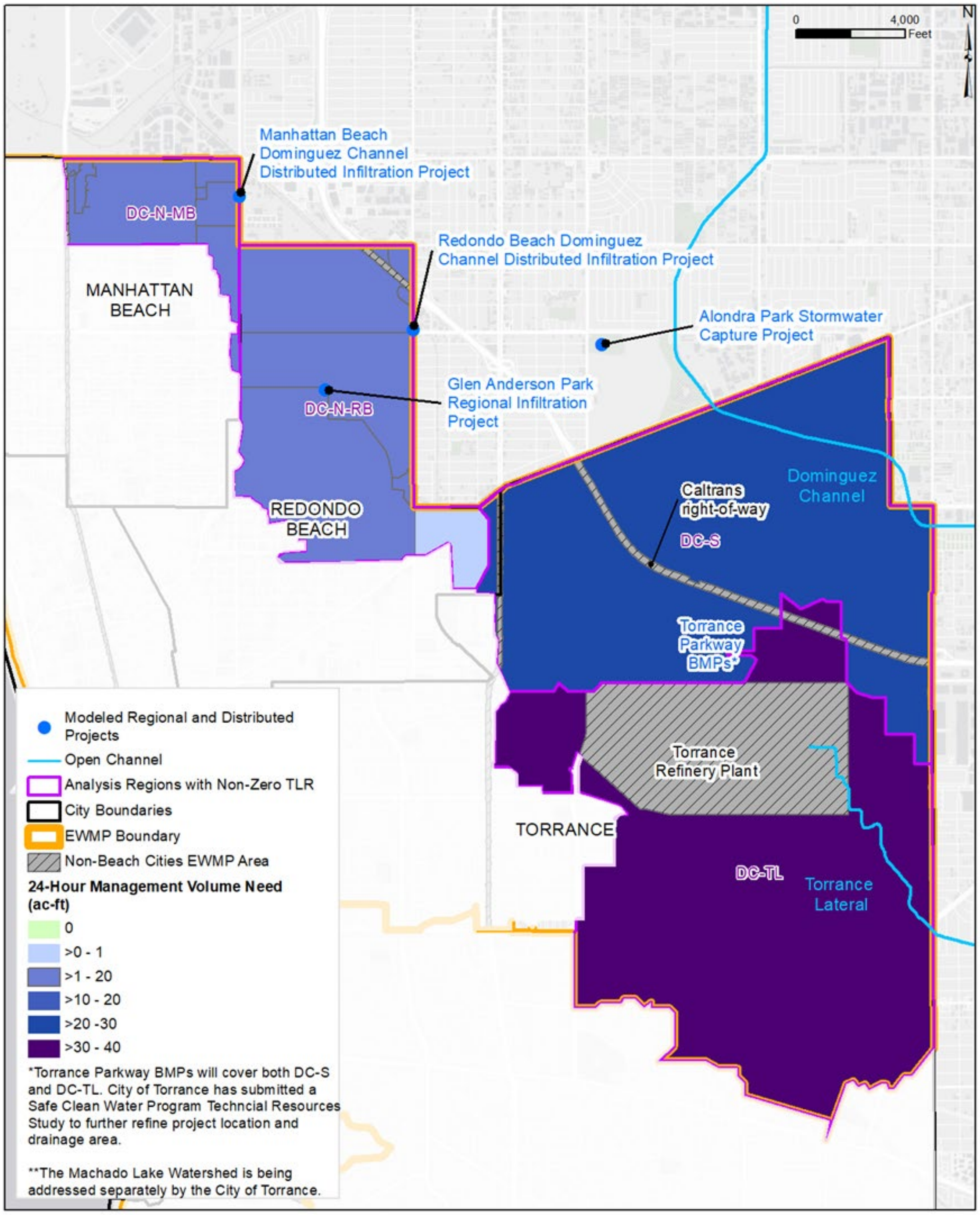
0
4,000
Feet
N
Manhattan Beach Dominguez Channel Distributed Infiltration Project
DC-N-MB
Redondo Beach Dominguez Channel Distributed Infiltration Project
MANHATTAN BEACH
Alondra Park Stormwater Capture Project
Glen Anderson Park Regional Infiltration Project
DC-N-RB
REDONDO BEACH
Dominguez Channel
Caltrans right-of-way
DC-S
Torrance Parkway BMPs*
Torrance Refinery Plant
TORRANCE
DC-TL
Torrance Lateral
Modeled Regional and Distributed Projects
Open Channel
Analysis Regions with Non-Zero TLR
City Boundaries
EWMP Boundary
Non-Beach Cities EWMP Area
24-Hour Management Volume Need (ac-ft)
0
>0 - 1
>1 - 20
>10 - 20
>20 -30
>30 - 40
*Torrance Parkway BMPs will cover both DC-S and DC-TL. City of Torrance has submitted a Safe Clean Water Program Techncial Resources Study to further refine project location and drainage area.
**The Machado Lake Watershed is being addressed separately by the City of Torrance.

Figure 17. 24-Hour Management Volume Mapping in Dominguez Channel WMA

As shown in Table 8, reasonable assurance of compliance is demonstrated for the Beach Cities Dominguez Channel WMA based on full implementation of the suite of projects identified. A schedule identifying implementation milestones for each project is provided in Section 7.2.

4.5 RAA Results – Dry Weather Compliance Demonstration

The Beach Cities WMG has attempted to eliminate non-exempt dry weather MS4 discharges using a suite of structural BMPs and non-structural source controls (e.g., water conservation incentives, enhanced IDDE efforts, enhanced education/outreach, and inspection/enforcement to prevent sources of non-stormwater flow). To date, monitoring has shown that the WMG has been successful at this endeavor, and although dry weather flows do still exist in some outfalls draining to the DC, particularly within Torrance Lateral, the WMG has successfully demonstrated through source investigations that these discharges may be considered conditionally exempt.

In parallel to the ongoing effort of eliminating dry weather MS4 discharges, the Beach Cities WMG has also planned to utilize structural BMPs to intercept dry weather runoff. In both the Manhattan Beach portion and Redondo Beach portion of the Dominguez Channel WMA, monitoring data has demonstrated a lack of persistent dry weather flows. In addition, the Alondra Park Regional Stormwater Capture Project is anticipated to intercept and fully treat all tributary intermittent non-stormwater flows, including those from Manhattan Beach and Redondo Beach. Within the City of Torrance's portion of the Dominguez Channel WMA, significant dry weather source investigations were complete and revealed that persistent non-stormwater discharges were the result of exempt and conditionally exempt sources. The City of Torrance is also committed to targeting non-stormwater discharge sources when implementing the Torrance Parkway BMP distributed projects, thereby treating non-stormwater sources that may be causing or contributing to downstream impairments. A summary of these results is provided in Table 9. Therefore, reasonable assurance of compliance during dry weather is demonstrated for the Beach Cities Dominguez Channel (including Torrance Lateral) WMA.

Table 9. Dry Weather RAA Results – Dominguez Channel WMA

Analysis Region	Is dry weather flow currently non-existent and/or sufficiently treated or diverted?	Are sufficient structural BMP proposed to intercept, treat or divert 100% of dry weather runoff?	Is dry weather reasonable assurance demonstrated?
DC-N-MB	Yes	Proposed	Yes
DC-N-RB	Yes	Proposed	Yes
DC-S	No	Proposed	Yes
DC-TL	No	Proposed	Yes

5 COST ESTIMATE

This section provides estimates of the financial resources that may be required to attain compliance with the MS4 Permit's RWLs and WQBELs. Planning-level cost estimates associated with implementation of the proposed structural BMPs within the Beach Cities WMG area are provided based on RAA results.

Cost estimates are presented as an aid for decision makers and contain considerable uncertainties. Given the iterative and adaptive nature of the EWMP and the many variables associated with the projects, the budget forecasts are subject to change based on site-specific BMP feasibility assessment findings, preliminary and final BMP designs and landscaping, BMP effectiveness assessments, results of outfall and receiving water monitoring, and special studies such as those that might result in site specific objectives which could modify water quality objectives or TMDL Waste Load Allocations for a specific WBPC.

A financial strategy and details regarding potential funding sources and programs to support the financial resources required for the structural BMPs being proposed in the EWMP are provided in Appendix G. These funding sources and programs may be utilized depending on applicability and feasibility.

5.1 BMP Cost Methodology and Assumptions

5.1.1 Hard Cost Assumptions

Costs estimated for structural BMPs include "hard" costs for tangible assets and are determined using a line item unit cost approach, which separately accounts for each material cost element required for the installation of a given BMP. Quantities for each line item were calculated based on BMP storage/treatment volumes and typical design configurations. Unit costs were derived from past projects based in Southern California, recent construction cost/bid information, and vendors. Since the majority of proposed BMPs were located on publicly owned land to reduce land acquisition costs to the extent possible, land acquisition costs were not considered as part of this analysis.

5.1.2 Soft Cost Assumptions

Structural BMP cost opinions also include "soft" costs, which include considerations such as design and permitting. Soft costs are project costs that cannot be calculated on a unit cost basis. For conceptual cost estimating, these costs are generally calculated as a percentage of total capital costs. The soft costs considered for each BMP were:

- **Utility Realignment** — Costs associated with the relocation of utilities that are located within the proposed BMP footprint or inhibit construction activities.
- **Mobilization and Demobilization** – The costs associated with activation/deactivation of equipment and manpower resources for transfer to/from a construction site until completion of the contract.
- **Planning, Permitting, Bond, and Insurance Costs** – Cost, including planning and permit fees and personnel hours, of obtaining required permits for BMP installation. Examples of permits needed may include erosion and sediment control, stormwater, construction, and public space permits. Potential bond and insurance costs are also included.
- **Engineering and Planning** – Costs associated with BMP and site design, as well as access for maintenance, environmental mitigation, buried objects, safety/security, traffic control, limited space, and site restoration.
- **Construction Management** – The costs associated with management and oversight of the construction of the BMP, from project initiation until completion of the contract.

Estimated soft costs as percent of total project capital costs are presented in Table 10**.** These percentages were based on literature, best professional judgment, and data from past projects (Brown and Schueler, 1997; International Cost Engineering Council, 2014).

Table 10. Range of Soft Costs for Proposed Structural BMP Projects as a Percent of Capital

	Cost Range	
Cost Item	**Low**	**High**
Utility Realignment	0%	3%
Mobilization/Demobilization[1]	3%	10%
Planning, permitting, bond, and insurance costs	5%	10%
Engineering and Planning	14%	40%
Construction Management	8%	15%

[1] $2,000 minimum fee

5.1.3 Operations and Maintenance

Based on past projects completed in Southern California, recent construction cost/bid information, and information from vendors, annual Operations and Maintenance (O&M) costs were assumed to be 2% percent of the capital cost for all proposed structural BMPs. Annual Monitoring costs were assumed to be 1.5% of capital costs, but were only assumed to apply for three full years.

O&M opinions for drywells and infiltration basins include cleaning and removal of debris from inlet and drainage pipes, removal of sediment and trash from intake and debris shields, cleanout of trash and accumulated sediment from primary settling chambers, and removal of standing water when observed during dry weather. O&M for green streets includes repairs to eroded areas, incremental landscape maintenance, media and gravel replacement once clogged and surface scarification is no longer effective, removal of trash and debris, and removal of aged mulch with installation of a new layer. O&M costs have been summarized as annual costs, though all activities are not necessarily performed every year of operation.

Additional maintenance will be necessary after the estimated project lifecycle, assumed to be 20 years. Extended maintenance for drywells and other subsurface infiltration systems includes excavation and washing of all drain rock on a 25-year cycle, and is estimated to be approximately 60 percent of capital costs. All drainage elements should be replaced on a 50-year cycle, at approximately 125 percent of capital costs. Green streets should be excavated, disposing of existing soil media, and backfilled with new soil media every 25 to 50 years at approximately 90 percent of capital costs.

Typical maintenance for trash exclusion devices includes removal of trash and sediment, and catch basins should be cleaned at a minimum of once or twice per year. Trash exclusion devices can be plugged if they are overloaded with sediment or debris, greatly reducing their efficiency. Inspection and cleanout are recommended after major storm events, or storms with a rainfall intensity of greater than one inch in 12 hours.

5.1.4 Additional Design Assumptions

Additional design details were assumed for the purpose of the cost estimation presented herein, including, but not limited to:

- The percentage of excavated material requiring hauling;
- The type and length of BMP inflow and outflow conveyance structures;
- The type and quantity of vegetation required for the post-BMP condition;
- The percentage of the parcel area requiring hydroseeding for the post-BMP condition;
- The type of pre-treatment used for each BMP.

5.2 Summary of Cost Estimates

Table 11 summarizes the total cost estimates for each proposed structural BMP, which are composed of the cost to construct or implement each structural BMP plus the associated annual O&M and monitoring costs, with combined costs for proposed structural BMPs by analysis region and by watershed. Not included in these costs are the annual monitoring costs for implementing the CIMP or the costs associated with implementing baseline and enhanced MCMs.

From the analysis of potential costs in this section as summarized in Table 11, it is clear that projected costs of implementing the EWMP are substantial and that availability of funds will be critical for the implementation of the EWMP.

The Beach Cities agencies are relying heavily on funding of projects through LA County's Safe Clean Water Program (SCW Program). The SCW Program is designed to prioritize multi-benefit water quality improvement projects identified in regional EWMPs or related watershed plans, including the structural BMPs proposed in the Beach Cities EWMP. Funding applications are reviewed annually for partial or full funding. Additional information is provided in Appendix G.

In addition, the Beach Cities WMG individually and collaboratively are committed to pursue funding sources at a State, regional, and local level. These potential sources of funding are discussed in greater detail in Appendix G.

Table 11. Cost Estimates for Proposed Structural BMPs by Analysis Region

Analysis Region	Project	Capital Cost		Annual O&M Cost[4]	Monitoring Cost[5]
		Low	High		
SMB-6-1	Fulton Playfield Infiltration Project	$1,995,000	$2,625,000	$45,000	$35,000
	Hermosa Beach Distributed Drywells	$1,615,000	$2,125,000	$35,000	$30,000
	Redondo Beach Herondo Distributed Infiltration Project	$3,230,000	$4,250,000	$70,000	$55,000
	Beach Cities Green Streets Project[1]	$4,900,000	$4,900,000	$20,000	$55,000
	Torrance Basins Enhancement & Expansion Project[1]	$5,300,000	$5,300,000	$30,000	$80,000
SMB-6-1 Total		**$17,040,000**	**$19,200,000**	**$200,000**	**$255,000**
SMB-5-2	28th Street Storm Drain Infiltration Project[1]	**$17,800,000**	**$17,800,000**	**$155,000**	**$50,000**
DC-N-MB	Manhattan Beach Dominguez Channel Distributed Infiltration Project	$1,615,000	$2,125,000	$35,000	$30,000
	Alondra Park Stormwater Capture Project- Manhattan Beach Portion[2]	$2,240,000	$2,240,000	$14,800	-
DC-N-MB Total		**$3,855,000**	**$4,365,000**	**$49,800**	**$30,000**
DC-N-RB	Glen Anderson Park Regional Infiltration Project	$3,135,000	$4,125,000	$65,000	$50,000
	Redondo Beach Dominguez Channel Distributed Infiltration Project	$2,090,000	$2,750,000	$45,000	$35,000
	Alondra Park Stormwater Capture Project- Redondo Beach Portion[2]	$6,730,000	$6,730,000	$44,500	-
DC-N-RB Total		**$11,955,000**	**$13,605,000**	**$154,500**	**$85,000**
DC-S	Torrance Parkway BMPs[3]	**$5,200,000**	**$6,900,000**	**$115,000**	**$95,000**
DC-TL	Torrance Parkway BMPs[3]	**$8,500,000**	**$11,100,000**	**$180,000**	**$155,000**
EWMP Total		**$64,350,000**	**$72,970,000**	**$854,300**	**$670,000**

[1] Cost estimates taken from SCW Program Feasibility Study. As a result, no range is estimated. For the Beach Cities Green Streets Project, costs are not broken down by project sit and therefore cannot be allocated by analysis region. Since the majority of project sites are within the SMB-6-1 analysis region, the project cost has been accounted for here.

[2] Cost estimate based on SCW Program cost allocation by contributing agency as of March 2021.

[3] Cost estimate based on per acre-foot cost for other distributed infiltration projects within the Beach Cities EWMP.

[4] Assumed to apply annually for the duration of the project life cycle.

[5] Assumed to apply annually for the first three years of the project life cycle.

6 ASSESSMENT AND ADAPTIVE MANAGEMENT FRAMEWORK

Adaptive management is a critical component of the EWMP implementation process, and regular EWMP updates are required by the Permit. The CIMP will continue to gather additional data on receiving water conditions and stormwater/non-stormwater quality and flow. These data will continue to support adaptive management at multiple levels, including: (1) tracking improvements in water quality over the course of EWMP implementation, and (2) generating data not previously available to support model updates.

Furthermore, over time, the experience gained through intensive BMP implementation will provide lessons learned to support modifications to the control measures identified in the EWMP.

The adaptive management process also includes a schedule for developing and reporting on the EWMP updates, the approach to conducting the updates, and the process for implementing any modifications to the RAA and EWMP to reflect the updates.

The adaptive management approach for the Beach Cities EWMP area is designed to address the EWMP planning process and the relationship between monitoring, scheduling, and BMP planning. The adaptive management process outlines how the EWMP will be modified in response to monitoring results, updated modeling results, and BMP implementation. It is designed to accomplish three goals:

1. Clarify the short-term and long-term commitments of the Beach Cities WMG within the EWMP.
2. Provide a structured decision-making process for modifications to the EWMP based on the results of monitoring data.
3. Propose a structure for evaluating compliance with water-quality based permit requirements within an adaptive structure.

As previously outlined, the schedule and milestones for the EWMP have been designed around meeting the interim and final TMDL requirements for applicable WBPCs. While the EWMP identifies actions that will lead to compliance with the final TMDL limitations, the specific actions taken will be informed by monitoring data collected under the CIMP, special studies that may be conducted during implementation, and any applicable regulatory changes that could influence the remaining interim and final milestones and schedule.

Monitoring data will be utilized to measure progress towards achieving RWLs and WQBELs. An evaluation of monitoring data will be carried out periodically to determine if modifications to the EWMP are necessary. Modifications that are warranted because final milestones are achieved *more quickly* than anticipated can be made at any time (i.e. no more actions are needed if fewer control measures result in meeting RWLs and/or WQBELs). Modifications that are warranted because insufficient progress is being made will be noted in the annual report and an updated schedule for implementation will be provided.

If at any point during the implementation period any of the Permit conditions are modified in response to a regulatory action, TMDL modification, or local studies, the receiving water and outfall monitoring data will be compared to the new RWLs and WQBELs. The same procedure will be followed for evaluating the data and adapting the EWMP, but the new RWLs and WQBELs will be used for the analysis.

The process outlined herein applies during the implementation period for the EWMP. At the end of the implementation period for the TMDLs, if the final RWL and/or WQBELs are not being met, either the TMDL must be modified to adjust the schedule or the Beach Cities WMG will need to receive an extension of the compliance deadlines.

7 COMPLIANCE SCHEDULE

The following sections present the proposed compliance schedules and project sequencing necessary to meet the final compliance deadlines for the Beach Cities EWMP WPBCs.

7.1 Santa Monica Bay WMA

Within the Beach Cities SMB WMA, bacteria is the only WBPC for which a RAA was performed. All other WBPCs are not currently causing or contributing to receiving water exceedances based on an evaluation of outfall and receiving water data.

The Beach Cities WMG is currently meeting all applicable interim WLAs in the Santa Monica Bay WMA. Therefore, no interim compliance milestones are necessary.

The final wet weather WLA defined in the SMBBB TMDL officially goes into effect in July 2021; however, a Basin Plan Amendment extending the TMDL for three years until July 2024 has been approved by the Regional Board and is pending approval by the State Water Resources Control Board and the State Office of Administrative Law. As discussed by the Beach Cities representatives, other permittees, Regional Board staff, and many other stakeholders during the Regional Board hearing and in comments letters submitted on the TMDL schedule extension, additional time beyond the July 2024 extension will be necessary to complete all of the projects needed to meet the final TLRs. Once the Beach Cities WMG has demonstrated further implementation progress, the WMG anticipates submitting a request via one or more regulatory mechanisms to extend this deadline further.

In light of these assumptions and observations, a project implementation schedule expressed in terms of the 24-hour runoff management volume and project completion date was developed to reasonably assure the Beach Cities WMG will meet final TLRs for bacteria during wet weather in the Santa Monica Bay WMA. The schedule is provided in Table 12.

Table 12. Project Completion Date and 24-Hour Runoff Management Capacity in SMB WMA

Project Name	Responsible Agencies	Milestone Completion Description	Milestone Completion (Year)	24-Hour Runoff Management Capacity (ac-ft)
28th Street Storm Drain Infiltration Project Phase 1	Manhattan Beach	Design	2022	81.9
		Construction	2024	
Torrance Basins Expansion Project	Torrance	Design	2022	85th percentile, 24-hour storm capture (32.2 ac-ft)
		Construction	2024	
Joint Beach Cities Green Streets Project	Hermosa Beach Manhattan Beach Redondo Beach Torrance	Design	2023	85th percentile, 24-hour storm capture
		Construction	2026	

Project Name	Responsible Agencies	Milestone Completion Description	Milestone Completion (Year)	24-Hour Runoff Management Capacity (ac-ft)
Fulton Playfield Infiltration Project	Redondo Beach and LACFCD	Feasibility Study	2022	26.0
		Design	2025	
		Construction	2028	
Hermosa Beach Distributed Drywells	Hermosa Beach	Siting and feasibility study	2025	7.7
		Construction	2028	
Redondo Beach Herondo Distributed Infiltration Project	Redondo Beach	Siting and feasibility Study	2025	17.6
		Construction	2028	

7.2 Dominguez Channel WMA

The Beach Cities WMG has been implementing the Beach Cities CIMP program since October 2016 and have been analyzing outfall monitoring data in the Dominguez Channel WMA against applicable interim MS4 WLA WQBELs. No exceedances of interim WQBELs have occurred to date. As a result, and as demonstrated by the RAA, no additional stormwater control measures are required to address interim WQBELs. Furthermore, distributed projects collectively addressing 110 acres of target land use out of a total of 1448.5 acres of target land use in the DC-N-MB & DC-N-RB analysis regions have been completed to meet both previous interim milestones of addressing 3% of target land use by 2021 and addressing 7% of target land use by 2026. Additionally, catch basin inserts have been installed in 30 high-priority catch basins within the DC-S & DC-L analysis regions to meet the first interim 2021milestone in those analysis regions.

The final applicable WLAs defined in the Dominguez Channel Toxics TMDL will be in effect in 2032. As a result, all proposed stormwater control measures must be implemented by 2032 in order to meet the final TLRs.

A project implementation schedule expressed in terms of the 24-hour runoff management volume was developed to reasonably assure the Beach Cities WMG will meet final TLRs for all WBPCs in the Dominguez Channel WMA.

The estimated project completion time and 24-hour runoff management capacity of proposed projects is summarized in Table 13. The 85th percentile, 24-hour capture projects in the Dominguez Channel WMA are included in Table 13 for informational purposes.

Table 13. Project Completion Date and 24-Hour Runoff Management Capacity in DC WMA

Project Name	Responsible Agencies	Milestone Completion Description	Milestone Completion (Year)	24-Hour Runoff Management Capacity (ac-ft)
Alondra Park Stormwater Capture Project	LACFCD Redondo Beach Manhattan Beach	Design	2022	7.05[1]
		Construction	2023	
Manhattan Beach Dominguez Channel Distributed Infiltration Project	Manhattan Beach	Feasibility Study	2024	5.2
		Design	2026	
		Construction	2028	
Glen Anderson Park Regional Infiltration Project	Redondo Beach	Feasibility Study	2024	9.4
		Design	2026	
		Construction	2028	
Redondo Beach Dominguez Channel Distributed Infiltration Project	Redondo Beach	Feasibility Study	2027	8.3
		Design	2029	
		Construction	2032	
Torrance Parkway BMPs Phase 1 Dominguez Channel above Vermont	Torrance	Siting and feasibility study	2024	21.9
		Design	2026	
		Construction	2028	
Torrance Parkway BMPs Phase 2 Torrance Lateral	Torrance	Siting and feasibility study	2027	35.4
		Design	2029	
		Construction	2032	

[1] Represents the total volume allocation to Manhattan Beach and Redondo Beach, collectively, since the full project will be shared among numerous agencies.

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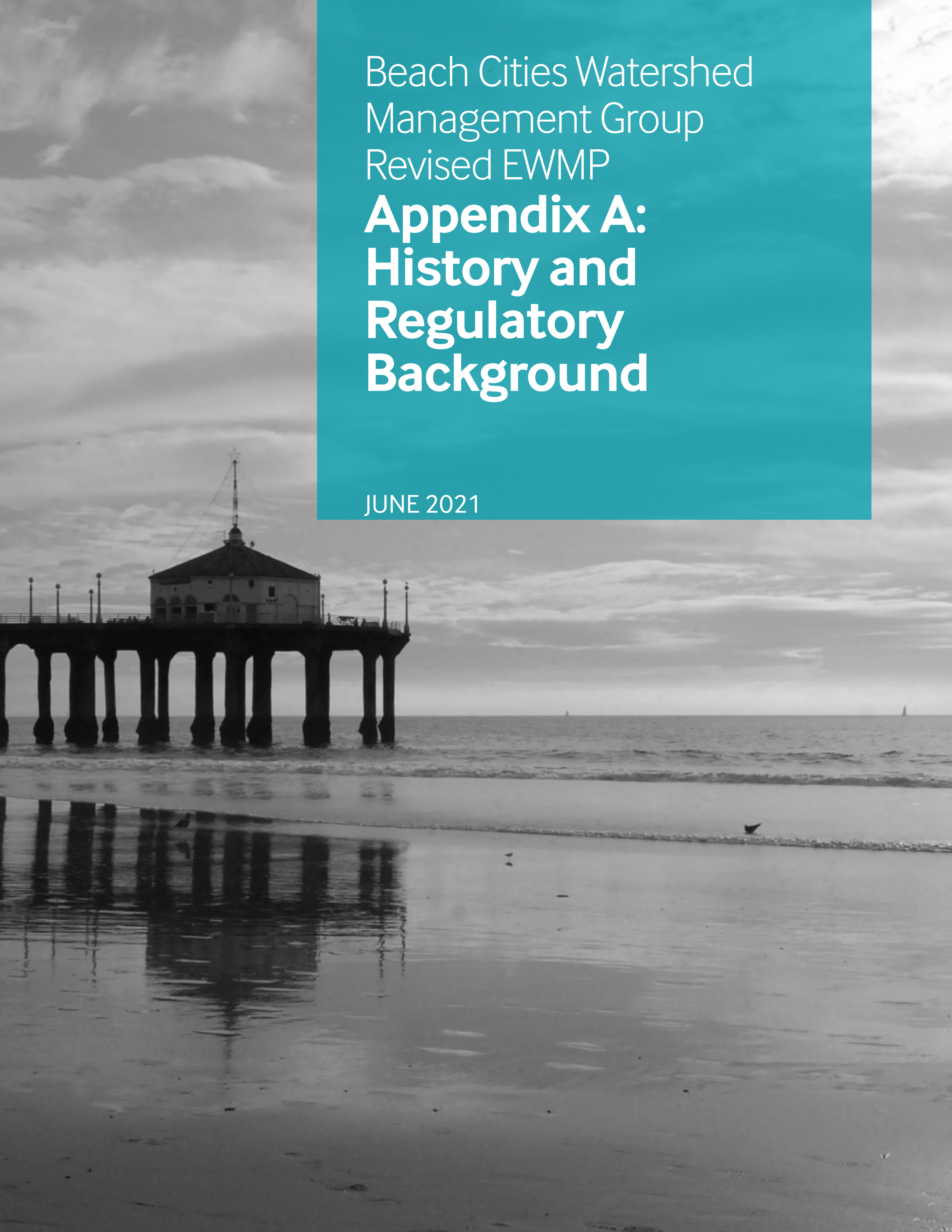
Beach Cities Watershed Management Group Revised EWMP

Appendix A: History and Regulatory Background

JUNE 2021



HISTORY AND REGULATORY BACKGROUND OF THE BEACH CITIES EWMP

BEACH CITIES EWMP HISTORY

Following adoption of the 2012 Los Angeles Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) Permit[1] (Permit), the Cities of Hermosa Beach, Manhattan Beach, Redondo Beach, and Torrance, together with the Los Angeles County Flood Control District (LACFCD), collectively referred to as the Beach Cities Watershed Management Group (Beach Cities WMG) agreed to collaborate on the development of an Enhanced Watershed Management Program (EWMP) for the Santa Monica Bay (SMB) and Dominguez Channel areas within their jurisdictions (referred to herein as the Beach Cities EWMP Area). This EWMP is intended to facilitate effective, watershed-specific Permit implementation strategies in accordance with the Permit and summarizes the SMB and Dominguez Channel-specific water quality priorities identified jointly by the Beach Cities WMG, outlines the program plan, including specific strategies, control measures and best management practices (BMPs)[2], necessary to achieve water quality targets (Water Quality-Based Effluent Limitations [WQBELs] and Receiving Water Limitations [RWLs]), and describes the quantitative analyses completed to support target achievement and Permit compliance.

In compliance with the Permit, the Beach Cities WMG submitted to the Los Angeles Regional Water Quality Control Board (LARWQCB) a Notice of Intent (NOI) to develop an EWMP on June 28, 2013 with a revised NOI submitted December 17, 2013. On March 27, 2014, the Beach Cities WMG received a letter from the Executive Officer of the LARWQCB approving the revised NOI submittal. In compliance with the Permit, the Beach Cities WMG then submitted a draft EWMP Work Plan to the LARWQCB on June 26, 2014. Comments were not received.

Consistent with the draft EWMP Work Plan and in accordance with the Permit, the Beach Cities WMG submitted a draft EWMP to LARWQCB on June 26, 2015. Following public review and comment, as well as review by LARWQCB, the Beach Cities WMG submitted a revised EWMP on January 20, 2016. After the Group's submittal of the revised EWMP, additional comments were provided by LARWQCB and modifications were requested. The WMG submitted a second revised EWMP on February 9, 2016 for LARWQCB review and approval.

On April 18, 2016 the Beach Cities second revised EWMP was approved by LARWQCB. The Beach Cities WMG immediately began implementation of the approved EWMP.

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[1] Order No. R4-2012-0175 NPDES Permit No. CAS004001 Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach MS4.

[2] For simplification, the term "BMP" will be used to collectively refer to strategies, control measures, and/or best management practices. The Permit also refers to these measures as Watershed Control Measures.

ADAPTIVE MANAGEMENT

As outlined in the Permit, the Beach Cities WMG is required to implement an adaptive management process periodically. The adaptive management process serves as a means to comprehensively evaluate the EWMP and evaluate progress toward achieving:

- Applicable WQBELs/RWLs;
- Improved water quality in MS4 discharges and receiving waters;
- Interim milestones; and
- Multi-year efforts that were not completed in the current year and will continue into the subsequent year(s), among other requirements.

Based on the adaptive management process, as well as other relevant changes within the Beach Cities Area, multiple updates to the Beach Cities EWMP have occurred since its original approval in April 2016:

March 2018. In order to investigate the use of centralized high-flow capacity trash device technologies and other approved equivalent systems certified by the State Water Resources Control Board to meet the final Santa Monica Bay Nearshore and Offshore Debris TMDL RWL for trash, the Beach Cities WMG requested an update to the EWMP implementation schedule. The schedule modification only affected interim compliance milestones; no changes to final compliance deadlines occurred. Three tables in the EWMP were updated to reflect the revised interim schedules.

August 2019. Following submittal of an Adaptive Management Report in December 2018, the Beach Cities WMG received a letter from the LARWQCB on July 23, 2019, which approved proposed modifications to the Group's EWMP as set forth in the Adaptive Management Report. Modifications to the EWMP included:

- Changes to Control Measures. The City of Torrance originally proposed to install approximately 200 catch basin inlet filters throughout the Dominguez Channel Watershed portion of their city. Upon further evaluation, the City of Torrance found that the use of modular wetlands, drywells, and other similar BMPs may be feasible in some portions of the watershed. As a result, language throughout the EWMP was revised to allow for the use of a larger suite of BMPs in these cases. The EWMP was also revised to discuss the source tracking investigation that the Group initiated in the Santa Monica Bay Watershed
- Changes to Minimum Control Measures. The EWMP was modified to customize the Group's Public Information and Participation Program to better address watershed priorities by means of direct, targeted outreach to residents .
- Changes to Water Body Pollutant Combinations Based on the 303(d) List. The Group revised its EWMP to reflect changes incorporated into the 2014-2016 303(d) list. These changes included the addition of mercury and arsenic to the Category 2 Water Body

Pollutant Combination (WBPC) list within the Santa Monica Bay Watershed, and removal of ammonia from the Category 2 WBPC list in the Dominguez Channel Watershed.

- Changes to the Final Target Date for Hermosa Beach Trash TMDL. The Santa Monica Bay Marine Debris TMDL allows municipalities that have adopted smoking, polystyrene, and plastic bag ban ordinances an additional three years (until March 20, 2023) to meet the final TMDL compliance deadline. While the City of Hermosa Beach had passed smoking and polystyrene bans within three years of the original adoption date of the TMDL (by March 20, 2015), the final plastic bag ban ordinance was not adopted until September 1, 2015. During the recent reconsideration of the Santa Monica Bay Debris TMDL, the City of Hermosa Beach requested to be granted the additional 3 years. After being open for public comment and receiving no objections, this extension was approved by the Regional Board.

EWMP REVISION AND RESUBMITTAL

In addition to periodically adapting the EWMP , Permittees are required to submit an updated EWMP with an updated Reasonable Assurance Analysis (RAA) by June 30, 2021 for review and approval by the Regional Water Board Executive Officer. The updated RAA is required to incorporate both water quality data and control measure performance data, and any other information informing the adaptive management process, gathered through December 31, 2020.

The latest version of the Beach Cities EWMP (June 2021) has been drafted to meet these requirements, as set forth in the Permit.

REGULATORY FRAMEWORK

Watershed Management Programs (WMPs) are a voluntary opportunity afforded by the Permit for Permittees to collaboratively or individually develop comprehensive watershed-specific control plans and are intended to facilitate Permit compliance and water quality target achievement. WMPs and EWMPs also comprehensively evaluate opportunities for collaboration on multi-benefit regional projects that retain all non-stormwater runoff and runoff from the 85th percentile, 24-hour storm event while also achieving benefits associated with issues such as flood control and water supply. Additional details on the regulatory background for NPDES Permit and Water Quality Standards and the Permit specifics of WMPs and EWMPs are provided below.

NPDES PERMIT

The 1972 Clean Water Act (CWA) established the NPDES Program to regulate the discharge of pollutants from point sources to waters of the United States. In 1990, the United States Environmental Protection Agency (USEPA) developed Phase I of the NPDES Stormwater Permitting Program, which established a framework for regulating municipal and industrial discharges of stormwater and non-stormwater that had the greatest potential to negatively impact water quality within waters of the United States. In particular, under Phase I, USEPA required NPDES Permit coverage for discharges from medium and large MS4 servicing populations greater than 100,000 persons. Operators of MS4s regulated under the Phase I NPDES Stormwater Program were required to obtain permit coverage for municipal discharges of stormwater and non-stormwater to waters of the United States.

The LARWQCB designated the MS4s owned and/or operated by the incorporated cities and Los Angeles County unincorporated areas within the Coastal Watersheds of Los Angeles County as a large MS4 due to the total population of Los Angeles County. All MS4s within the Coastal Watersheds of Los Angeles County are subject to the waste discharge requirements set forth in the Permit. General permit requirements, which are relevant to and must be ensured by WMPs, include (i) a requirement to effectively prohibit non-stormwater discharges through the MS4, (ii) requirements to implement controls to reduce the discharge of pollutants to the maximum extent practicable, and (iii) other provisions the LARWQCB has determined appropriate for the control of such pollutants.

Water Quality Standards and Total Maximum Daily Loads (TMDLs)

The CWA also required that the LARWQCB establish water quality standards for each water body in its region. Water quality standards include beneficial uses, water quality objectives and criteria that are established at levels sufficient to protect those beneficial uses, and an anti-degradation policy to prevent degrading waters. The LARWQCB adopted a Water Quality Control Plan - Los Angeles Region (hereinafter Basin Plan) on June 13, 1994 addressing this portion of the CWA which designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters in the Los Angeles Region. Pursuant to California Water Code section 13263(a), the requirements of the Permit implement the Basin Plan.

The State Water Resources Control Board (State Water Board) adopted the Water Quality Control Plan for Ocean Waters in California, California Ocean Plan (hereinafter Ocean Plan) in 1972 and adopted the most recent amended Ocean Plan on February 4, 2019. The Ocean Plan also establishes water quality objectives and a program of implementation to protect beneficial uses at all MS4 discharge points within Los Angeles County coastal watersheds with the exception of Long Beach.

CWA Section 303(d)(1) requires each state to identify the waters within its boundaries that do not meet water quality standards. Water bodies that do not meet water quality standards are considered impaired and are placed on the state's "CWA Section 303(d) List". For each listed water body, the state is required to establish a TMDL for each pollutant impairing the water quality standards in that water body. TMDLs establish the allowable pollutant loadings for a water body and provide the basis upon which to establish water quality-based controls (required by NPDES Permits). The 2014-2016 CWA Integrated Report and updated 303(d) list were approved by the State Water Resources Control Board (SWRCB) on October 3, 2017 and by the USEPA on April 6, 2018. Provisions regarding TMDLs are included in NPDES Permits once they have been developed and adopted.

State Order WQ 2020-0038

Order WQ 2020-0038, issued by the State Water Resources Control Board (State Board) on November 17, 2020, evaluated nine WMPs and one EWMP to determine whether they satisfied the standards of rigor, accountability, and transparency that were established in the MS4 Permit. Where deemed insufficient in those regards, the Order subsequently ordered the implementation of changes to appropriately satisfy those standards within an assigned schedule. Permittees were required to submit an updated Reasonable Assurance Analysis and EWMP for review and approval by the LARWQCB Executive Officer, including updates to bring the plans into conformance with Order WQ 2020-0038 (SWRCB, 2020).

Among other requirements, Order WQ 2020-0038 required all Los Angeles area EWMPs to be updated to address the following:

- EWMPs must be clear as to which components constitute definite, enforceable benchmarks, such that failure to achieve those components means that Permittees are not fully implementing the program and must instead comply immediately with receiving water limitations and WQBELs and other TMDL-specific limitations.
- For model calibration purposes, the (E)WMPs and associated RAAs must clearly identify the information considered and how that information was used or why it was not used.
- With respect to "limiting pollutants," Groups must justify their use of certain limiting pollutants to ensure that the use of a limiting pollutant can be reasonably expected to result in attainment of water quality standards for all the water body-pollutant combinations addressed.
- Load reductions associated with "non-modeled" controls must be justified. Permittees must not only meet the dates and requirements for implementation of non-modeled controls (to the extent that Permittees rely on them to form milestones), they must also demonstrate that they have actually achieved the assumed load reduction by the milestone date when that milestone is based entirely off non-modeled controls.
- With respect to compliance milestones and scheduling, where anticipated water quality improvements have not occurred despite implementation of the scheduled control measures, the EWMP must be updated to respond.

Order WQ 2020-0038 requires these updates to be incorporated into EWMPs no later than June 30, 2021. The Revised Beach Cities EWMP has been updated to reflect these requirements.

WMPS AND ENHANCED WMPS

The voluntary WMPs and EWMPs allow Permittees to collaboratively or individually develop comprehensive watershed-specific control plans which a) prioritize water quality issues, b) identify and implement focused strategies, control measures and BMPs, c) execute an integrated monitoring and assessment program, and d) allow for modification over time. In general, WMPs and EWMPs are intended to facilitate Permit compliance and water quality target achievement with the goals that: 1) discharges from covered MS4s achieve applicable WQBELs and RWLs and do not include prohibited non-stormwater discharges; and 2) control measures are implemented to reduce the discharge of pollutants to the maximum extent practicable (MEP). WMPs and EWMPs are to be developed based on the LARWQCB's Watershed Management Areas (WMAs) or subwatersheds thereof.

Permittees within a WMA may elect to prepare an EWMP, which is defined in the Permit as a WMP that comprehensively evaluates opportunities for collaboration amongst Permittees and other partners on multi-benefit regional projects that, wherever feasible, retain, 1) all non-stormwater runoff, and 2) all stormwater runoff from the 85th percentile 24 hour storm event while also achieving benefits associated with issues such as flood control and water supply. Where regional projects cannot achieve these standards, the EWMP must demonstrate through a Reasonable Assurance Analysis (RAA), that applicable water quality targets are achieved.

The Permit specifies that an EWMP shall:

1. Be consistent with Permit provisions,
2. Incorporate applicable State agency input on priorities and key implementation factors,
3. Provide for meeting water quality standards and other CWA obligations,
4. Include multi-benefit[3] regional projects which retain stormwater from the 85th percentile, 24-hour storm
5. Include watershed control measures which achieve compliance with all interim and final WQBELs in drainage areas where retention of the 85th percentile, 24-hour storm is infeasible with reasonable assurance,
6. Maximize the effectiveness of funding,
7. Incorporate effective innovative technologies,
8. Ensure existing requirements to comply with technology based effluent limitations and core requirements are not delayed, and
9. Ensure a financial strategy is in place.

APPLICABILITY OF EWMP

The agencies of the Beach Cities WMG have been working together since 2004 to implement the previously developed Jurisdictional Groups 5 and 6 Implementation Plan for the Santa Monica Bay Beaches Bacteria (SMBBB) TMDLs, including a BMP Siting Study (Geosyntec, 2011a) and Dry Weather Source Characterization and Control Study (Geosyntec, 2011b) for two high priority subwatersheds, along with joint implementation of programmatic solutions. Since 2004, the Beach Cities have also been jointly funding receiving water monitoring consistent with the Coordinated Shoreline Monitoring Plan for the SMBBB TMDLs along the shoreline of the Beach Cities WMG EWMP Area. These ongoing efforts by the Beach Cities WMG to comply with the SMBBB TMDLs have been an effective facilitator for the development and implementation of the EWMP.

This EWMP is applicable to the Beach Cities EWMP Area, which consists of all of the incorporated MS4 areas of the cities of Redondo Beach, Manhattan Beach, Hermosa Beach, and Torrance and includes the infrastructure of the LACFCD within those jurisdictions, with the exception of the Machado Lake Watershed, which is being addressed separately by the City of Torrance, and is not addressed in this EWMP. A small portion of the City of Redondo Beach is located within the Machado Lake Watershed boundary but has successfully requested to be removed from the Machado Lake Implementation Plan and other compliance requirements pertaining to the Machado Lake Watershed.

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[3] Potential multiple benefits include neighborhood greening, water conservation and/or supply, groundwater recharge, public education and/or awareness, etc.

The beach areas within the geographic area of the Beach Cities WMG do not have any storm drain infrastructure that collect and discharges beach runoff directly to the receiving water and are therefore considered non-point sources and not subject to the MS4 Permit or EWMP requirements. Similarly, the Hermosa Beach and Manhattan Beach piers are not part of the MS4; they are non-point sources excluded from the MS4 Permit scope and therefore the EWMP. The Redondo Beach Pier including the King Harbor Marina are included in the geographic scope of the Beach Cities WMG EWMP as these areas are equipped with MS4 infrastructure. The Wylie Sump is a retention basin with no outlet and capacity significantly larger than the 85th percentile, 24-hour storm event. Therefore, its drainage area has been excluded from the EWMP, with no analyses required.

EWMP DEVELOPMENT PROCESS

The Permit requires a stakeholder process for collaboration on EWMP development. The development process must:

- Provide appropriate opportunity for stakeholder input;
- Include participation in the Permit-wide Technical Advisory Committee (TAC); and
- Incorporate applicable State agency input on priority setting and other key implementation issues.

The Beach Cities WMG has conducted outreach to engage the public, LARWQCB staff, and other interested parties to support EWMP development. Input has been incorporated, as appropriate. These efforts are described in more detail below.

Public Workshops – Original EWMP. For development of the original EWMP, public workshops were held on May 21, 2014 at the Joslyn Center in Manhattan Beach and on May 27, 2015 at the Redondo Beach Public Library. An informational presentation was provided followed by a question and answer period to encourage stakeholder input. Concerns were noted and considered during EWMP development by the Beach Cities WMG.

Technical Advisory Committee (TAC). The Beach Cities WMG actively participated in the Los Angeles region TAC and applicable subcommittees throughout the EWMP process.

LARWQCB Presentations. The Beach Cities WMG presented the proposed RAA approach to LARWQCB staff on April 9 and June 6, 2014. LARWQCB staff provided feedback during these meetings and in general they were supportive of the proposed approach. One additional meeting was held on July 31, 2014 to discuss Torrance-specific matters. In addition, the Beach Cities WMG presented the EWMP and progress on implementation to the LARWQCB in July 2018.

Public Website – Revised EWMP. As part of the revision process for the Beach Cities EWMP in 2021, the Beach Cities WMG created a website that highlighted the EWMP update process; provided details for each proposed project; and allowed for public comment to be submitted. The website was launched in May 2021.

Public Virtual Webinar – Revised EWMP. The Beach Cities WMG held a public virtual webinar on May 19, 2021 to present the draft Revised EWMP to the Beach Cities communities and receive public input. The webinar was publicized in advance by each of the four Beach Cities.

City Council Review and Adoption. The cities of Hermosa Beach, Manhattan Beach, Redondo Beach, and Torrance each presented the draft Beach Cities EWMP (2015) and draft revised Beach Cities EWMP (2021) to their respective city councils for review and adoption. This process is open to the public, and residents are encouraged and invited to share comments related to the EWMP at these council meetings. Voiced concerns and recommendations were noted and considered for inclusion in the final EWMP and final Revised EWMP.

The EWMP also addresses other State agency priorities, including the following:

California Water Action Plan (2016 Update). The California Water Action Plan proposes several statewide actions that are well aligned with the expected benefits of the proposed projects in this EWMP, including:

- Expand Water Storage Capacity and Improve Groundwater Management (infiltration BMPs): This action aims to address the need to expand the state's storage capacity, whether in surface or groundwater to provide widespread public and environmental benefits. The California Water Action Plan states that "state agencies will work with tribes and federal, regional and local agencies on other actions related to promoting groundwater recharge and increasing storage, including improving interagency coordination, aligning land use planning with groundwater recharge..." The regional and distributed BMP projects proposed in the Beach Cities EWMP may contribute to groundwater recharge and expanding storage capacity throughout the Beach Cities WMG.
- Increase Operational and Regulatory Efficiency: Monitoring data collected under the CIMP to measure progress toward achieving RWLs and WQBELs and to determine if modifications to the Beach Cities EWMP are necessary may provide the benefit of increased operational and regulatory efficiency. Improving data availability may also improve coordination of operations of all major water supply, flood control, hatchery facilities, and habitat restoration projects.

2014 Greater Los Angeles County Integrated Regional Water Management Plan (GLAC IRWM Plan). The goal of the GLAC IRWM Plan is to achieve sustainable management of water resources in the Greater Los Angeles County. The plan lists several regional objectives to achieve this goal. The Beach Cities EWMP contributes to some of the objectives outlined in the plan, including the following:

- Water Quality: This objective aims to comply with water quality regulations by improving the quality of urban runoff, stormwater, and wastewater. The Beach Cities EWMP contributes to this objective by proposing new distributed and regional stormwater capture opportunities in areas prioritized by statewide and regional regulations and water quality conditions.

- Open Space and Recreation: This objective aims to protect, restore, and enhance natural process and habitats. Several of the regional EWMP projects (i.e. 28th Street Storm Drain Infiltration Project, Beach Cities Green Streets Project) provide opportunity for expanded habitat and increased green space.

STORMS Storm Water Strategy (California Water Boards, 2016). The Storm Water Strategy assists in achieving the actions identified in the California Water Action Plan, including the aforementioned action of expanding water storage capacity and improving groundwater management. The Storm Water Strategy supports efforts to improve interagency coordination and identify needs for groundwater recharge opportunity. The Storm Water Strategy also lists six overarching objectives. The Beach Cities EWMP contributes to some of these objectives, including the following:

- Increase Stakeholder Collaboration on a Watershed Scale: The Beach Cities WMG agreed to collaborate on the development of this EWMP for the Santa Monica Bay and Dominguez Channel Watershed areas within their jurisdictions to facilitate effective, watershed-specific Permit implementation strategies.

- Establish Financially Sustainable Storm Water Programs: This EWMP provides an overview of potentially available funding sources for programs and projects proposed in the EWMP. The funding sources identified for consideration are the Safe, Clean Water Program, grants, interagency partnerships, bonds, State Revolving Funds, local funding opportunities, and public private partnerships.

- Increase Source Control and Pollution Prevention: This EWMP identifies non-modeled programmatic source control BMPs that target priority pollutants.

Final Storm Water Resource Plan Guidelines (Guidelines) (December 2015). The Guidelines establish guidance for public agencies to develop Storm Water Resource Plans (Plans) consistent with Water Code sections 10561 through 10565. The Water Code states that a Plan is required as a condition to receive funding for stormwater and dry weather runoff capture projects from any bond approved by voters after January 2014, which also applies to Proposition 1 funding. The Guidelines provide guidance such as clarification on the applicability of the Guidelines, appropriate geographic scale of watersheds for stormwater resource planning, guidance on agencies and organizations to be consulted during Plan development, methods for identifying and prioritizing stormwater and runoff capture projects, project scheduling and implementation strategies, and so forth.

A Self-Certified Checklist provided in the Guidelines includes a complete list of the elements of a Stormwater Resource Plan that are considered mandatory per the California Water Code. Fulfilling the mandatory requirements would make the Beach Cities WMG eligible for Proposition 1 Stormwater Grant funding which would be applied toward the proposed Beach Cities EWMP projects. The mandatory required elements highlighted in the Checklist and Self-Certification are either entirely fulfilled by the Beach Cities EWMP (including appended documents) or will be fulfilled on a project-specific basis (See Appendix I for more details on the Beach Cities Plan). For example, maximizing flood control will be part of detailed design at the project level.

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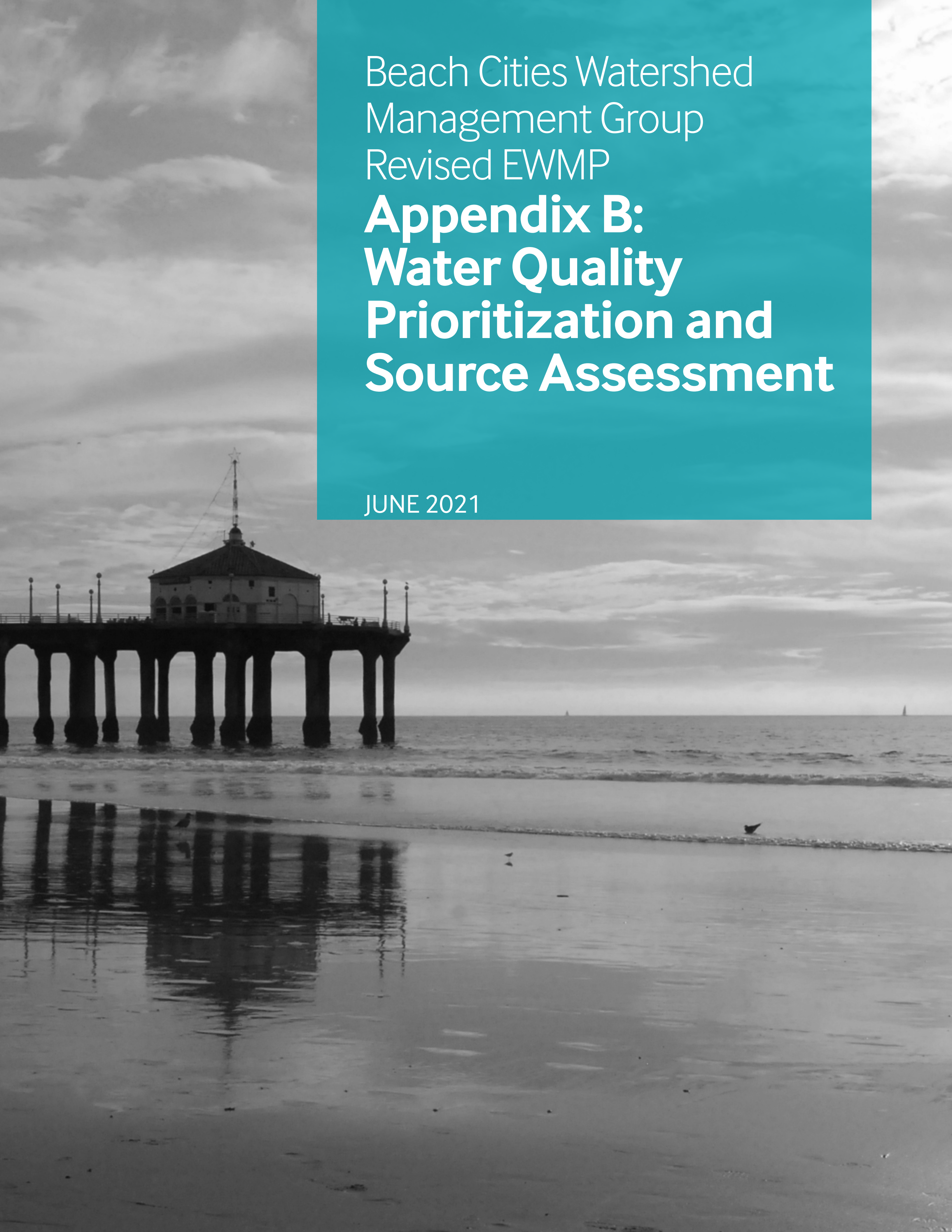
Beach Cities Watershed
Management Group
Revised EWMP

Appendix B: Water Quality Prioritization and Source Assessment

JUNE 2021



WATER QUALITY PRIORITIZATION FOR THE BEACH CITIES EWMP

As part of the EWMP, the Permit requires the Beach Cities WMG to identify water quality priorities within their WMA. To accomplish this, the Beach Cities WMG conducted the following for the Beach Cities EWMP Area:

1. Characterized the water quality of stormwater and non-stormwater discharges from the MS4 as well as receiving water bodies;
2. Prioritized water body-pollutant combinations (WBPCs); and
3. Assessed sources for WBPCs.

This appendix summarizes the above process for the two watersheds comprising the Beach Cities EWMP Area: Santa Monica Bay (SMB) Watershed and Dominguez Channel Watershed.

SANTA MONICA BAY WATERSHED

The western portion of the Beach Cities EWMP Area consists of approximately 7,800 acres of land that drains to SMB. This accounts for 53% of the total Beach Cities WMG area, and includes portions of the cities of Manhattan Beach, Redondo Beach, and Torrance, and the entirety of the City of Hermosa Beach. The majority of the SMB Watershed consists of residential land uses.

Table B-1 provides a land use breakdown of the Beach Cities EWMP Area by city. Land uses for this watershed are shown on Figure B-1.

Table B-1. Beach Cities EWMP Area - SMB Watershed Land Use Distribution

Agency	Agriculture	Commercial	Education	Industrial	MF Residential	SF Residential	Vacant	Total (ac)	Total (%)
Hermosa Beach (ac)	-	130.0	16.3	13.3	254.5	380.4	51.7	846.1	10.8%
Manhattan Beach (ac)	-	210.6	120.5	12.8	209.4	1425.9	109.3	2088.6	26.8%
Redondo Beach (ac)	25.3	312.2	150.2	99.0	717.6	1184.3	103.7	2592.3	33.2%
Torrance (ac)	28.1	246.9	91.6	87.4	335.0	1359.3	125.8	2274.1	29.2%
Total (ac)	53.4	899.8	378.6	212.5	1516.4	4349.9	390.5	7801.1	100%
Total (%)	0.7%	11.5%	4.9%	2.7%	19.4%	55.8%	5.0%	100%	-

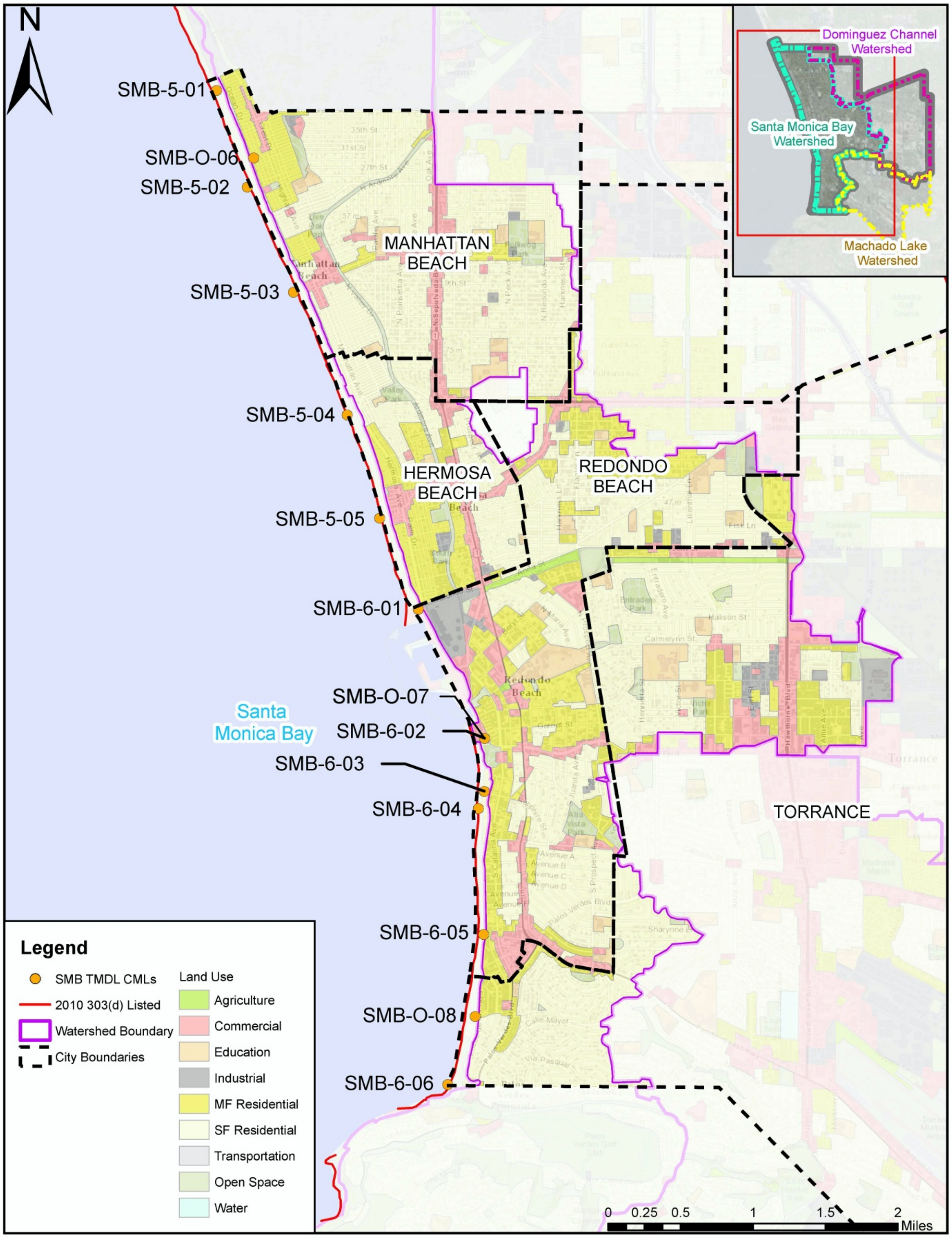


Figure B-1. Beach Cities WMG Land Uses within the Santa Monica Bay Watershed

WATER QUALITY CHARACTERIZATION

Beneficial Uses

The Basin Plan (LARWQCB, accessed 2021) identifies receiving waters within the Los Angeles region and sets regulatory objectives for these receiving waters. Within the SMB Watershed, identified receiving water bodies include SMB itself as well as coastal beaches within the Beach Cities WMG Area. Regulations set forth in the California Ocean Plan (SWRCB, 2019) are therefore also applicable to the SMB Watershed.

Both the Basin Plan and Ocean Plan regulate waste discharges to protect the quality of surface waters for use and enjoyment by the general public. Regulations set forth in the Basin Plan are based on assigned beneficial uses for each receiving water body. Beneficial use designations for receiving waters within the Beach Cities WMG Area include:

Municipal and Domestic Supply (MUN): Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

Industrial Service Supply (IND): Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.

Navigation (NAV): Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

Water Contact Recreation (REC-1): Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, what water activities, fishing, or use of natural hot springs.

Non-Contact Water Recreation (REC-2): Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

High Flow Suspension (HFS): Applies to water contact recreational activities associated with the swimmable goal regulated under the REC-1 use, non-contact water recreation involving incidental water contact regulated under the REC-2 use, and the associated bacteriological objectives set to protect those activities.

Commercial and Sport Fishing (COMM): Uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.

Warm Freshwater Habitat (WARM): Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Marine Habitat (MAR): Uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).

Wildlife Habitat (WILD): Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Rare, Threatened, or Endangered Species (RARE): Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.

Migration of Aquatic Organisms (MIGR): Uses of water that support habitats necessary for migration, acclimatization between fresh and saltwater, or other temporary activities by aquatic organisms, such as anadromous fish.

Spawning, Reproduction, and/or Early Development (SPWN): Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Shellfish Harvesting (SHELL): Uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial, or sports purposes.

Wetland Habitat (WET): Uses of water that support wetland ecosystems, including, but not limited to, preservation or enhancement of wetland habitats, vegetation, fish, shellfish, or wildlife, and other unique wetland functions which enhance water quality, such as providing flood and erosion control, stream bank stabilization, and filtration and purification of naturally occurring contaminants.

According to the Ocean Plan (SWRCB, 2019), "The beneficial uses of the ocean waters of the State that shall be protected include industrial water supply (IND); water contact recreation (REC-1) and non-contact recreation (REC-2), including aesthetic enjoyment; navigation (NAV); commercial and sport fishing (COMM); mariculture; preservation and enhancement of designated Areas of Special Biological Significance (ASBS); rare and endangered species (RARE); marine habitat (MAR); fish migration (MIGR); fish spawning (SPWN) and shellfish* harvesting (SHELL)." Additional beneficial uses are defined as follows:

Mariculture: The culture of plants and animals in marine waters independent of any pollution source.

ASBS: Those areas designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that maintenance of natural water quality is assured. ASBS are also referred to as State Water Quality Protection Areas – Areas of Special Biological Significance (SWQPA-ASBS).

Table B-2 summarizes the existing beneficial uses for the Santa Monica Bay water bodies in the Beach Cities WMG Area, as designated in the Basin Plan.

Table B-2. Beach Cities EWMP Area - SMB Water Bodies and Beneficial Uses

Water Body	MUN	IND	NAV	REC1	REC2	HFS	COMM	WARM	MAR	WILD	RARE	MIGR	SPWN	SHELL	WET[2]
Santa Monica Bay Nearshore + Offshore[1]		E	E	E	E		E		E	E	E	E	E	E	
Manhattan Beach			E	E	E		E		E	E			P	E	
Hermosa Beach			E	E	E		E		E	E			E[3]	E	
King Harbor		E	E	E	E		E		E	E	E				
Redondo Beach		E	E	E	E		E		E	E	E	E	E[3]	E	
Torrance Beach			E	E	E		E		E	E		E	E[3]	E	

E = Existing beneficial use

[1] The Preservation of Biological Habitats (BIOL) beneficial use is not included since no Areas of Special Biological Significance are present within the Beach Cities WMG Area.

[2] Water bodies designated as WET may have wetlands habitat associated with only a portion of the water body. Any regulatory action would require a detailed analysis of the area.

[3] Most frequently used grunion spawning beaches. Other beaches may be used as well.

SMB Watershed Data Analysis

An evaluation of existing water quality conditions, including characterization of stormwater discharges from the MS4 as well as receiving water quality, was carried out as part of this EWMP revision to support identification and prioritization/sequencing of management actions, to the extent possible based on available data. To evaluate water-quality conditions within the SMB Watershed, a review of previous studies was conducted to characterize receiving water bodies within the Beach Cities WMG Area. Monitoring data analyzed were limited to water quality and flow data collected per the Beach Cities Coordinated Integrated Monitoring Program (CIMP); and bacteria data collected as part of the SMB Beaches Bacteria TMDL Coordinated Shoreline Monitoring Program (CSMP). A summary of this analysis is provided below.

WATER BODY-POLLUTANT CLASSIFICATION

Receiving waters (and paired outfalls) from the Santa Monica Bay Watershed portion of the Beach Cities EWMP Area were screened for water quality priorities by reviewing TMDLs, the State's 303(d) list, and additional water quality data. Each identified water quality priority for a given receiving water body was categorized as a waterbody pollutant combination (WBPC). WBPCs were classified into one of three categories, in accordance with the Permit.

Category 1 – Highest Priority

WBPCs under Category 1 (highest priority) are defined in the Permit as "water body-pollutant combinations for which WQBELs and/or RWLs are established." These WBPCs include:

<u>SMB beaches for bacteria (wet and dry weather)</u>: These are considered Category 1 due to the SMBBB TMDL. Although the TMDL remains in effect, both Manhattan Beach and Hermosa Beach (all Jurisdiction 5 sites) were removed from the 2014-2016 303(d) list because applicable water quality standards for the pollutant are not being exceeded.

SMB offshore/nearshore for dichloro-diphenyl-trichloroethanes (DDTs) and polychlorinated biphenyls (PCBs): These are considered Category 1 due to the USEPA TMDL for DDT and PCBs for SMB Offshore/Nearshore. However, the TMDL relied on a limited dataset to establish stormwater load allocations, relying on a single study (Curren *et al*., 2011) from a single creek (Ballona Creek, which is outside the Beach Cities watershed area) to establish MS4 WLAs throughout the entire SMB Watershed. It does not present sufficient data to assign MS4 contributions to the DDT and PCB concentrations observed in SMB; therefore, direct RAA modeling for these pollutants cannot reasonably be conducted at this time without the use of a surrogate (e.g., TSS).

Despite the lack of data for RAA modeling purposes, the load-based WQBELs for DDT and PCBs established by the TMDL were set to be the existing stormwater loads (i.e., based on data used in the TMDL, no MS4 load reduction is expected to be required to achieve TMDL compliance).[1] Therefore, it is assumed that no reductions in DDT and PCB loading from the Beach Cities WMG MS4s are required to meet the TMDL and reasonable assurance of compliance is assumed to be demonstrated without modeling. As discussed below, monitoring data conducted to-date per the Beach Cities CIMP confirms this assumption, as 27 discrete outfall sample events have resulted in no exceedances of either the DDT or total PCBs numeric targets.

SMB Offshore/Nearshore is 303(d)-listed for fish consumption advisory due to DDT and PCBs. Therefore, the fish consumption advisory will be assumed to be addressed by the DDT and PCB categorization.

SMB Offshore/Nearshore was previously 303(d) listed for toxicity, but USEPA's data evaluation showed only 3 out of 116 samples exhibited toxicity (USEPA, 2012). The WBPC was removed from the 2014-2016 303(d) list.

SMB offshore/nearshore for debris: This is considered Category 1 due to the TMDL for Debris for SMB Offshore/Nearshore. The Permit states, "Pursuant to California Water Code section 13360(a), Permittees may comply with the trash [debris] effluent limitations using any lawful means. Such compliance options are broadly classified as full capture, partial capture, institutional controls, or minimum frequency of assessment and collection… and any combination of these may be employed to achieve compliance." While trash was not modeled as part of the RAA, the RAA qualitatively described how the Beach Cities WMG Agencies will comply with the SMB Debris TMDL WQBELs by stating the following: "Compliance with the SMB Debris TMDL will be met through a phased retrofit of full-capture or partial capture systems throughout Beach Cities Santa Monica Bay WMA in combination with institutional measures, e.g., street sweeping with posted no-parking on street sweeping days, to meet each interim and

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[1] The TMDL states, "Because existing stormwater loads from the watersheds are lower than the calculated total allowable loads to achieve sediment targets, the waste load allocations for stormwater in this TMDL are based on existing load estimates of 28 g/yr for DDT and 145 g/yr for PCBs." These WLAs are further divided among Los Angeles County MS4, CalTrans, the Construction General Permit, and the Industrial General Permit. The assigned WLAs for the entire LA County MS4 within the Santa Monica Bay Watershed is 27.08 g/yr for DDT and 140.25 g/yr for PCBs, which are equivalent to the TMDL-estimated existing MS4 stormwater loads.

final compliance deadline. Hence, these constituents do not require a TLR to be calculated and were not modeled as part of the revised RAA" (Beach Cities EWMP, 2021).

"Highest Priority" WBPCs have been assigned based strictly on the Permit definition. Not all of these pollutants (e.g., DDT and PCBs) have been definitively linked to MS4 sources. As a result, this categorization and prioritization will continue to be reevaluated based on results from the water quality monitoring efforts conducted under the CIMP.

Category 2 – High Priority

WBPCs under Category 2 (high priority) are defined in the Permit as, "Pollutants for which data indicate water quality impairment in the receiving water according to the State's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy) (SWRCB, 2015) and for which MS4 discharges may be causing or contributing to the impairment." The following Category 2 WBPCs have been identified in the SMB Watershed portion of the Beach Cities EWMP Area based on the 2016 303(d) list:

<u>SMB offshore/nearshore for Mercury:</u> Although listed on the 2016 303(d) list, no data is available linking MS4 discharges from the Beach Cities EWMP Area with mercury exceedances in Santa Monica Bay. Rather, the listing was based on a limited set of fish tissue and sediment sampling data collected under the City of Los Angeles Hyperion Wastewater Treatment Plant NPDES permit. Two (2) of thirty-two (32) sediment samples exceeded the Basin Plan narrative objective for mercury based on the effects range median for saline waters (predictive of sediment toxicity) for mercury of 0.71 mg/Kg dry weight (Long et. al., 1995). In addition, two (2) of nineteen (19) fish tissue samples exceeded the OEHHA fish contaminant goal of 0.22ppm (Klasing et. al., 2008). This data was collected during 2006 and 2007, more than ten years ago. Since the listing was finalized, mercury has been added to the Beach Cities CIMP suite of analytes for Santa Monica Bay. To-date, mercury has been analyzed through the Beach Cities CIMP during the past three years, comprising a total of 15 wet weather outfall samples and 18 wet weather receiving water samples. No exceedances of the Ocean Plan Target (0.4 ug/L) have occurred. Therefore, it is assumed that no reductions in mercury loading from the Beach Cities WMG MS4s is required to meet the Ocean Plan target and reasonable assurance of compliance is assumed to be demonstrated without modeling. The Beach Cities WMG will continue to monitor for mercury in accordance with their CIMP and will revise their WBPC list, as applicable, based on evaluation of the data.

<u>SMB offshore/nearshore for Arsenic:</u> Although listed on the 2016 303(d) list, no data is available linking MS4 discharges from the Beach Cities EWMP Area with arsenic exceedances in Santa Monica Bay. Rather, the listing was based on a limited set of fish tissue sampling data collected under the City of Los Angeles Hyperion Wastewater Treatment Plant NPDES permit. Nineteen (19) of 19 fish tissue samples collected in the Santa Monica Bay exceeded the USEPA Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories Volume 1: Fish Sampling and Analysis for arsenic in fish tissue of 0.0034 ppm (USEPA, 2000). This data was collected during 2006 and 2007, more than ten years ago. Since the listing was finalized, arsenic has been added to the Beach Cities CIMP suite of analytes for Santa Monica Bay. To-date, arsenic has been analyzed through the Beach Cities CIMP during the past three years, comprising a total of 15

wet weather outfall samples and 18 wet weather receiving water samples. No exceedances of the Ocean Plan Target (80 ug/L) have occurred. Therefore, it is assumed that no reductions in arsenic loading from the Beach Cities WMG MS4s is required to meet the Ocean Plan target and reasonable assurance of compliance is assumed to be demonstrated without modeling. The Beach Cities WMG will continue to monitor for arsenic in accordance with their CIMP and will revise their WBPC list, as applicable, based on evaluation of the data.

Category 3 – Medium Priority

WBPCs under Category 3 (medium priority) are defined in the Permit as, ”Pollutants for which there are insufficient data to indicate water quality impairment in the receiving water according to the State’s Listing Policy, but which exceed applicable RWLs contained in this Order and for which MS4 discharges may be causing or contributing to the exceedance.”

The Beach Cities WMG has been collecting outfall and paired receiving water data in the SMB Watershed per their approved CIMP since 2016. Implementation of the CIMP has resulted in the successful monitoring of 15 wet weather events to-date, with two outfall sites and two receiving water sites monitored per event. Through June 2020, no water quality impairments (besides those discussed above) have been identified.

As a result, there are no Category 3 WBPCs in the SMB Watershed portion of the Beach Cities EWMP Area.

The Beach Cities agencies understand that additional data collected as part of their approved CIMP may result in modifications to WBPCs and water quality priorities. Under these conditions, the Beach Cities EWMP will be updated.

Figure B-2 provides a brief conceptual overview of the process used to identify and categorize the WBPCs within the Beach Cities EWMP Area.

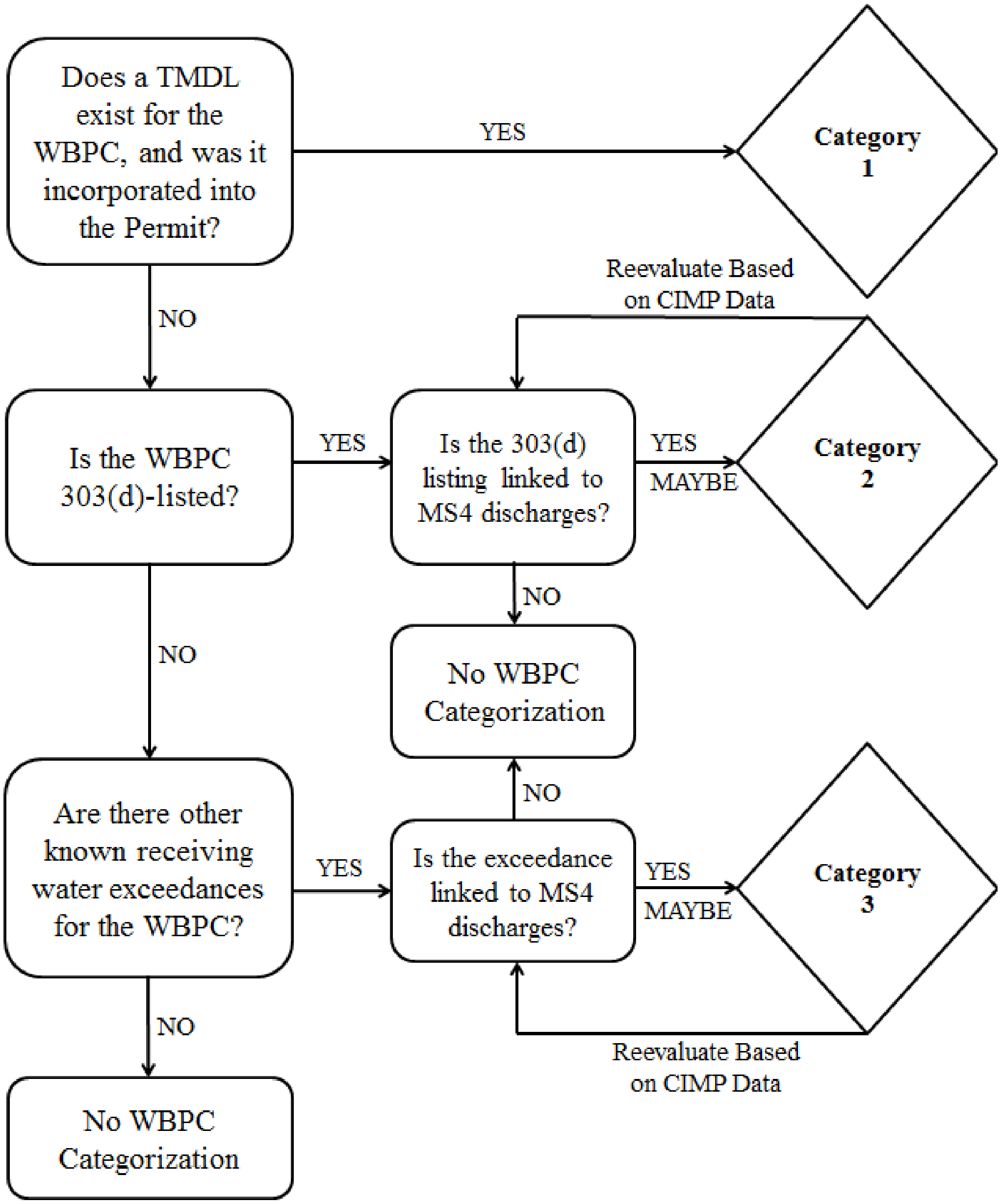
Does a TMDL exist for the WBPC, and was it incorporated into the Permit?
YES
Category 1
NO
Reevaluate Based on CIMP Data
Is the WBPC 303(d)-listed?
YES
Is the 303(d) listing linked to MS4 discharges?
YES
MAYBE
Category 2
NO
No WBPC Categorization
NO
NO
Are there other known receiving water exceedances for the WBPC?
YES
Is the exceedance linked to MS4 discharges?
YES
MAYBE
Category 3
NO
Reevaluate Based on CIMP Data
No WBPC Categorization

Figure B-2. Process for Categorizing Water Body-Pollutant Combinations

SOURCE ASSESSMENT

The following data sources were reviewed as part of the updated source assessment for the WBPCs listed previously:

- Findings from the Permittees' Illicit Connections and Illicit Discharge Elimination Programs (IC/ID);
- Findings from the Permittees' Industrial/Commercial Facilities Programs;
- Findings from the Permittees' Development Construction Programs;
- Findings from the Permittees' Public Agency Activities Programs;

- TMDL source investigations;
- Watershed model results;
- Findings from the Permittees' monitoring programs, including but not limited to, CIMP and TMDL compliance monitoring; and
- Any other pertinent data, information, or studies related to pollutant sources and conditions that contribute to the highest water quality priorities.

The following source assessment is broken down by pollutants applicable to the SMB Watershed.

Indicator Bacteria

The Santa Monica Bay Beaches Bacteria (SMBBB) TMDLs for dry and wet weather were the first bacteria TMDLs adopted by the LARWQCB. The SMBBB TMDLs were opened for reconsideration in 2012 and recently in 2021, although the source assessment was not part of these updates. As a result, the general findings from the original source assessment remain unchanged. These findings are summarized in the 2012 Basin Plan Amendment for the reopened SMBBB TMDL (Attachment A to Resolution No. R12-007):

> "With the exception of isolated sewage spills, dry weather urban runoff and stormwater runoff conveyed by storm drains and creeks is the primary source of elevated bacterial indicator densities to SMB beaches" (LARWQCB, 2012b).

The SMBBB TMDL source assessment (LARWQCB, 2002) maintained that dry weather urban runoff and stormwater runoff were the primary sources of elevated bacteria concentrations at SMB beaches at the time of the TMDL. Although definitive information regarding the specific sources of bacteria within the watershed was not presented, speculation provided in the dry weather staff report provided some insight into possible sources at the time:

> "Urban runoff from the storm drain system may have elevated levels of bacterial indicators due to sanitary sewer leaks and spills, illicit connections of sanitary lines to the storm drain system, runoff from homeless encampments, illegal discharges from recreational vehicle holding tanks, and malfunctioning septic tanks among other things. Swimmers can also be a direct source of bacteria to recreational waters. The bacteria indicators used to assess water quality are not specific to human sewage; therefore, fecal matter from animals and birds can also be a source of elevated levels of bacteria, and vegetation and food waste can be a source of elevated levels of total coliform bacteria, specifically" (LARWQCB, 2002).

Information on non-MS4 sources of surf zone bacteria along specific SMB beaches was provided by the City of Malibu in its comment letter on the SMBBB TMDL reconsideration, based on a comprehensive review of local and Southern California source identification studies (City of Malibu, 2012):

> "A number of recent Santa Monica Bay studies have further identified and confirmed natural (non-anthropogenic) sources of fecal indicator bacteria including plants, algae, decaying organic matter, beach wrack and bird feces – implicating these as potentially significant contributors to exceedances (Imamura *et al* 2011, Izbicki 2012b). Beach sands, sediments and

> beach wrack have been shown to be capable of serving as reservoirs of bacteria, possibly by providing shelter from UV inactivation and predation by allowing for regrowth (Imamura *et al* 2011, Izbicki *et al* 2012b, Lee *et al* 2006, Ferguson *et al* 2005, Grant *et al* 2001, Griffith 2012, Litton *et al* 2010, Phillips *et al* 2011, Jiang *et al* 2004, Sabino *et al* 2011, and Weston Solutions 2010). In fact, enterococci include non-fecal or "natural" strains that live and grow in water, soil, plants and insects (Griffith, 2012). Thus, elevated levels of enterococci in water could be related to input from natural sources. The phenomenon of regrowth of bacteria from either anthropogenic or natural sources has been suggested by several studies as a possible source of beach bacteria exceedances (Griffith 2012, Litton *et al* 2010, Weston Solutions 2010, Izbicki *et al* 2012b, Weisberg *et al* 2009)."

To address the identification of dry weather bacteria sources within or to the MS4s, the Beach Cities WMG agencies have implemented measures to divert dry weather flows from all storm drains discharging at point zero shoreline monitoring locations. A total of eight low flow diversions are operational within the Beach Cities EWMP area, and have proven to be effective at diverting dry weather flows from reaching the wave wash.

Wet weather bacteria sources are believed to be derived from the entire watershed, and potentially include a mixture of human sources, non-human anthropogenic sources (e.g., pet waste), and non-anthropogenic sources (e.g., birds and other urban wildlife, storm drain biofilms/regrowth, beach sands and wrack). A wet weather stormwater monitoring study by the Southern California Coastal Water Research Project (SCCWRP) investigated bacteria concentrations in stormwater runoff from various land uses in the Los Angeles region (Stein *et al*, 2007). Results showed that wet weather runoff event mean concentrations (EMCs) for fecal coliform bacteria were highest for agricultural land uses, followed by commercial and educational, single family residential, multi-family residential, open space, industrial, and transportation. In this study, results showed that bacteria concentrations in stormwater are highly variable, with concentrations often varying by one to two orders of magnitude during a single storm, and by up to five orders of magnitude on seasonal and inter-annual scales.

CIMP data collected by the Beach Cities at various outfalls over the past five years confirms that FIB concentrations within MS4 discharges during wet weather are higher than applicable objectives. However, these results do not distinguish between sources or human health risk.

In 2019, the Beach Cities WMG initiated a screening-level microbial source tracking (MST) investigation at targeted outfalls to determine if human, dog, and bird waste was a source of fecal indicator bacteria (FIB) in MS4 discharges, and therefore potentially of FIB in the surf zone during discharge events. The investigation was focused on two Santa Monica Bay Beaches Bacteria TMDL (SMBBB TMDL) shoreline monitoring locations (antidegradation sites SMB 6-2 and SMB 6-5), including the storm drain network tributary to these locations. Preliminary results from these investigations, which include both dry and wet weather sample events, indicate that both dogs and illicit connections/discharges may be two significant sources of bacteria to the MS4 outfalls. As a result of these findings, programmatic controls such as a robust illicit connection and discharge detection and elimination program as well as dog waste outreach programs may have a significant impact on FIB loads within Santa Monica Bay.

DDT and PCBs

The Palos Verdes Shelf portion of Santa Monica Bay is an active EPA Superfund site that is subject to Superfund Remedial Action Objectives which include institutional controls, natural recovery, capping, and monitored attenuation, and are expected to result in improved water quality (USEPA, 2012). From 1947 to 1971, large quantities of DDT were discharged from the Montrose Chemical plant in Los Angeles to the Los Angeles County Joint Water Pollution Control Plant (JWPCP), which discharges to the Palos Verdes Shelf. PCBs also entered the JWPCP from several industrial sources in the Los Angeles area. These DDT and PCBs discharges passed through the JWPCP and were deposited on the Palos Verdes Shelf. There have also been reports of recently discovered illegal offshore dumping of waste barrels containing DDT acid sludge between Catalina Island and the Palos Verdes coast.[2] There is also concern that the rate of erosion on the southwest portion of the Palos Verdes Shelf could bring previously buried deposits to the surface.

Concentrations of DDT and PCBs deposited in the surface sediments of the Santa Monica Bay have decreased substantially since the early 1970s and during this time period the benthic communities in the Palos Verdes shelf and Santa Monica Bay have improved substantially to the point where impairments to benthic communities are not seen; however, DDT and PCBs are still present at levels of concern for bioaccumulation and human health (USEPA, 2012). This contamination of DDT and PCBs in the sediments of Santa Monica Bay, largely centered on the Palos Verdes shelf, has led to a large number of fish advisories for much of Santa Monica Bay and a commercial fishing ban in the area around the Palos Verdes Shelf. As a result, the USEPA issued the Santa Monica Bay DDT and PCBs TMDL in 2012 and the TMDL objectives were established to meet fish concentrations for human consumption.

With respect to stormwater, the TMDL does not specifically characterize MS4 loadings, though it does recognize that “DDT and PCBs are no longer detected in routine stormwater sampling from Ballona Creek or Malibu Creek.”

Since initiation of implementation of the Beach Cities CIMP in 2016, 15 total storm events have been monitored at a combination of different outfall and receiving water sites across the Beach Cities Area in the Santa Monica Bay Watershed. In total, 27 outfall-specific sample events have taken place over that time.[3] During no event has an exceedance of either the DDT or total PCBs numeric targets occurred.

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[2] https://www.latimes.com/projects/la-coast-ddt-dumping-ground/#nt=1col-7030col1-mainnt=00000173-4a29-dafc-a977-dabb7b330001-liA9promoSmall-1col-7030col1-main

[3] The Beach Cities CIMP requires a rotation of outfalls to be utilized for water quality monitoring. Additionally, prior to the 2019-2020 monitoring year, two outfall sites were combined into a single outfall monitoring site. As a result, some years now include monitoring at two outfalls, while other years include monitoring at only one outfall.

Trash

Source information for trash within SMB is provided by the SMB Nearshore Debris TMDL. A detailed source breakdown is not provided, but other debris TMDLs attribute trash to general areas such as "litter from adjacent land areas, roadways, and direct dumping and deposition" (LARWQCB, 2008) while also attributing trash inputs to point sources such as storm drains.

The plastic pellet portion of the SMB Debris TMDL is not applicable to the Beach Cities WMG, as the respective Agencies have applied and have gained approval to be exempt from this portion of the TMDL.

Arsenic and Mercury

As stated previously, Santa Monica Bay was recently added to the State's 2014/16 and draft 2018 303(d) list as being impaired by arsenic and mercury based on sediment and fish tissue data. There is currently no data tying these impairments to MS4 discharges from the Beach Cities WMG. Since these listings were first finalized, mercury and arsenic have been added to the Beach Cities CIMP suite of analytes for Santa Monica Bay. To-date, both constituents have been analyzed during nine wet weather sample events at two receiving water monitoring locations and a total of three (rotating) outfalls. No exceedances of the Ocean Plan Target for mercury (0.4 ug/L) or arsenic (80 ug/L) have occurred across these events in either the outfall discharges (15 discrete samples) or receiving water samples (18 discrete samples).

WBPC PRIORITIZATION

Based on the water quality characterization above, the WBPCs have been classified into one of three categories, in accordance with the Permit: highest priority, high priority, and medium priority. This categorization is intended to prioritize WBPCs in order to guide the implementation of structural and institutional BMPs. Table B-3 presents the prioritized WBPCs within the SMB Watershed portion of the Beach Cities EWMP Area. WBPCs categorized below are subject to change based on future data collected as part of the CIMP or other monitoring program.

Table B-3. Water Body-Pollutant Combination Prioritization and Pollutant Interim and Final Compliance Targets for Santa Monica Bay Watershed Portion of the Beach Cities EWMP Area

Category	Water Body	Pollutant	Reason for Categorization	WLA/Target Basis	Interim TMDL WLA	Final TMDL WLA or Other Target
1: Highest Priority	Santa Monica Bay Beaches	Dry Weather Bacteria	SMB Beaches Dry Weather Bacteria TMDL	Daily and Weekly Sampling Schedule	N/A	Summer-Dry Single Sample Allowable Exceedance Days (AED)[1] met Winter-Dry period Single Sample AED[1] met
		Wet Weather Bacteria	SMB Beaches Wet Weather Bacteria TMDL	Daily and Weekly Sampling Schedule	50% cumulative percentage reduction from total required exceedance day reduction[2]	Single Sample and Geometric Mean AED[1] and GM target met
	Santa Monica Bay	Trash/ Debris	SMB Debris TMDL	Annual monitoring	Incremental reduction from baseline waste load allocation[3] (6815.6 gals/year)	100% reduction from baseline waste load allocation[3] (6815.6 gals/year)
		DDTs	SMB PCBs and DDT TMDL	3-Year Average	N/A	27.08 g/year[4]
		PCBs	SMB PCBs and DDT TMDL	3-Year Average	N/A	140.25 g/year[4]
2: High Priority	Santa Monica Bay	Mercury	2016 303(d) list	Single Sample Exceedance	N/A	0.4 ug/L[5]
		Arsenic				80 ug/L[5]
3: Medium Priority	Analysis of monitoring data from outfalls and receiving waters do not currently result in the identification of any Category 3 WBPCs					

[1] Per the Basin Plan Objective REC1 Water Bodies Limit for Bacteria. Please refer to the latest version of the MS4 Permit for allowable exceedance day limits of each subwatershed.

[2] Total required exceedance day reduction is defined as the difference between existing exceedance day and the allowable exceedance day for each subwatershed

[3] Baseline WLA is the sum of baseline WLA from Manhattan Beach, Redondo Beach and Hermosa Beach

[4] This limit is applicable to all of Santa Monica Bay.

[5] Ocean Plan target.

DOMINGUEZ CHANNEL WATERSHED

The northeastern portion of the Beach Cities EWMP Area is tributary to Dominguez Channel[4] (including Torrance Carson Channel) and is comprised of approximately 7,024 acres of land, the majority of which is comprised of residential land uses (29.6% single family residential and 10.1% multi-family residential). Industrial land use is the second highest category in the watershed, accounting for 24.9% of all land uses in the watershed. This watershed accounts for 47% of the total Beach Cities EWMP Area, and includes portions of the Cities of Manhattan Beach, Redondo Beach, and Torrance. Storm drains from the Cities of Manhattan Beach and Redondo Beach drain through the City of Lawndale before discharging to the freshwater portion of Dominguez Channel. The City of Torrance's MS4 discharges directly to Dominguez Channel (freshwater) and Torrance Carson Channel (Torrance Lateral). Collectively, this portion of the study area is referred to as the Dominguez Channel Watershed.

Table B-4 provides a land use breakdown of the Beach Cities EWMP Area by city. Compared to the SMB Watershed within the Beach Cities Area, the Dominguez Channel Watershed has significantly lower residential land use (39.7% compared with 75.2% in the SMB Watershed) and significantly higher industrial land use (24.9% compared with 2.7%). Land uses for this watershed are shown on Figure B-3.

Table B-4. Beach Cities EWMP Area – Dominguez Channel Watershed Land Use Distribution

Agency	Agriculture	Commercial	Education	Industrial	MF Residential	SF Residential	Transportation	Vacant	Total (ac)	Total (%)
Manhattan Beach (ac)	-	109.3	-	77.5	51.0	68.5	-	56.8	363.0	4.7%
Redondo Beach (ac)	11.3	225.6	15.7	199.5	458.2	259.6	22.2	59.7	1251.8	16.0%
Torrance (ac)	94.8	763.4	243.6	1667.3	276.3	1978.4	96.6	288.4	5408.8	69.3%
Total (ac)	106.1	1098.3	259.2	1944.3	785.5	2306.5	118.8	404.8	7023.6	100%
Total (%)	1.4%	14.1%	3.3%	24.9%	10.1%	29.6%	1.5%	5.2%	100%	

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[4] Other portions of the Dominguez Channel Watershed, including Los Angeles County Unincorporated areas, are addressed by separate EWMP groups.

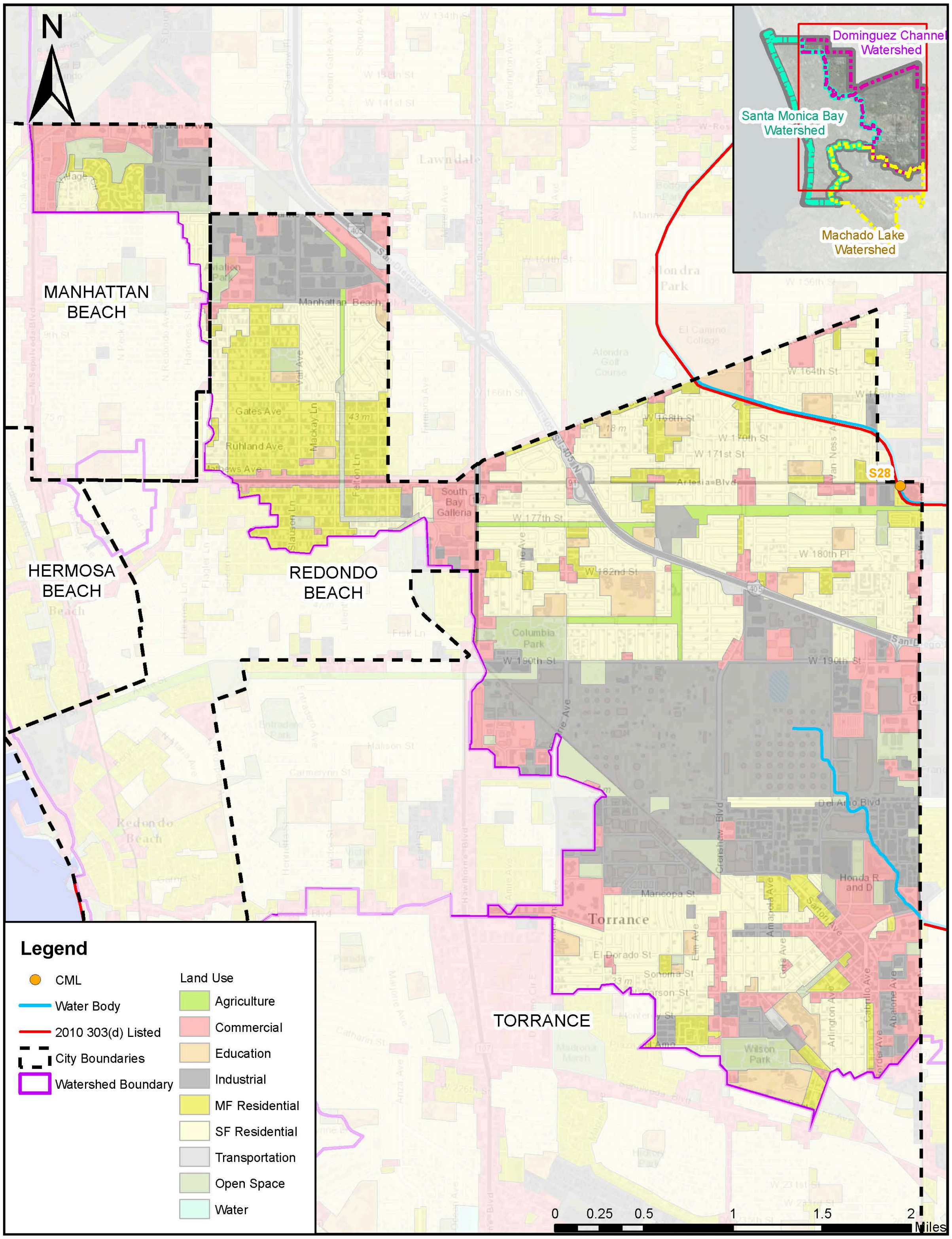

Figure B-3. Beach Cities WMG Land Uses within the Dominguez Channel Watershed

WATER QUALITY CHARACTERIZATION

Beneficial Uses

As discussed previously, the Basin Plan (LARWQCB, accessed 2021) identifies receiving waters within the Los Angeles region and sets regulatory objectives for these receiving waters. The Basin Plan regulates waste discharges to protect the quality of surface waters for use and enjoyment by the general public. Regulations set forth in the Basin Plan are based on assigned beneficial uses for each receiving water body. Beneficial use designations for receiving waters within the Beach Cities Dominguez Channel Watershed Area are summarized in Table B-5 below.

Table B-5. Beach Cities EWMP Area – Dominguez Channel Watershed Water Bodies and Beneficial Uses

Water Body	MUN	NAV	REC1	REC2	HFS	COMM	WARM	EST	MAR	WILD	RARE	MIGR	SPWN	SHELL	WET[3]
Dominguez Channel	P[1]		P	E	E		P			P	E				
Torrance Lateral[2]	P[1]		P	E	E		P			P	E				
Dominguez Channel Estuary		P	E	E		E		E	E	E	E	E	E		

E = Existing beneficial use

P = Potential beneficial use

[1] Designated under SB 88-63 and RB 89-03. Some designations may be considered for exemption at a later date.

[2] Listed in Basin Plan Table 1 as a "major surface water," tributary to Dominguez Channel Estuary.

[3] Water bodies designated as WET may have wetlands habitat associated with only a portion of the water body. Any regulatory action would require a detailed analysis of the area.

The high flow suspension beneficial use, which was approved by the USEPA as a Basin Plan Amendment in 2004, applies to Dominguez Channel and its tributaries. During days on which this beneficial use suspension is in effect, bacteriological objectives applicable to Dominguez Channel and its tributaries are suspended. The high flow suspension applies on days with rainfall greater than or equal to ½ inch and the 24 hours following the end of such an event.

Dominguez Channel Watershed Data Analysis

An evaluation of existing water quality conditions, including characterization of stormwater and non-stormwater discharges from the MS4 as well as water quality of the receiving water bodies within the Beach Cities WMG Area, was carried out as part of this EWMP to support identification and prioritization/sequencing of management actions, to the extent possible based on available data. Analyzed raw monitoring data were limited to data collected as part of the Beach Cities CIMP and the Mass Emission Station monitoring program established by the Los Angeles County Department of Public Works (LACDPW).

The Beach Cities WMG has been collecting outfall data in the Dominguez Channel Watershed per their approved CIMP since 2016. Implementation of the CIMP has resulted in the successful monitoring of 15 wet weather events to-date, with two outfall sites monitored per event. Paired receiving water data are collected and analyzed from two relevant monitoring stations by other agencies: the Dominguez Channel Mass Emission Station (Station S28), located in Dominguez Channel at Artesia Blvd on the Torrance city boundary; and Tributary Station "Project No. 1232" (Station TS19), located in Torrance Carson Channel (Torrance Lateral) within the City of Carson.

WATER BODY-POLLUTANT CLASSIFICATION

Receiving waters (and paired outfalls) from the Dominguez Channel Watershed portion of the Beach Cities EWMP Area were screened for water quality priorities by reviewing TMDLs, the State's 303(d) list, and recent available water quality data. Each identified water quality priority for a given receiving water body was categorized as a WBPC. WBPCs were classified into one of three categories, in accordance with the Permit.

Figure B-2 provides a conceptual overview of the process used to identify and categorize the WBPCs within the Beach Cities EWMP Area. In order to categorize and prioritize the WBPCs within the Dominguez Channel Watershed portion of the Beach Cities EWMP Area, relevant TMDLs, 303(d) listings, recent available monitoring data, and water quality objectives from the Basin Plan were considered.

Category 1 – Highest Priority

WBPCs under Category 1 (highest priority) are defined in the Permit as "water body-pollutant combinations for which WQBELs and/or RWLs are established." These WBPCs include:

<u>Dominguez Channel (above Vermont Avenue) for copper, lead, and zinc in wet weather</u>: These WBPCs are considered Category 1 due to the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxics and Metals TMDL (Dominguez Channel Toxics TMDL) (LARWQCB, 2011).

<u>Dominguez Channel for toxicity</u>: This is considered Category 1 due to the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxics and Metals TMDL. Toxicity is not directly tied to any single pollutant or group of pollutants that can be readily modeled; rather, it is the result of a wide-array of loading from multiple pollutants from various sources. Additionally, toxicity monitoring since 2016 has shown no exceedances of applicable water standards at Dominguez Channel Mass Emissions Station or within Torrance Lateral. As a result, toxicity was not modeled as part of the revised EWMP RAA, consistent with the original EWMP. It is assumed that the implementation of various BMPs and resultant control of other pollutants of concern will sufficiently address in-channel toxicity.

<u>Dominguez Channel Estuary (Dominguez Channel below Vermont Ave) for copper, lead, zinc, cadmium, DDT, PAHs, and PCBs</u>: These WBPCs are considered Category 1 due to the Dominguez Channel Toxics TMDL (LARWQCB, 2011). Copper, lead, and zinc were modeled in the latest iteration of the RAA utilizing calibrated pollutant runoff concentrations in WMMS 2.0. Other pollutants (cadmium, DDT, PAHs, and PCBs) were modeled using TSS as a surrogate, based on collected water quality data at the upstream Beach Cities outfalls.

Category 2 – High Priority

Category 2 (high priority) WBPCs are defined as "pollutants for which data indicate water quality impairment in the receiving water according to the State's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy) (SWRCB, 2015) and for which MS4 discharges may be causing or contributing to the impairment." Aside from those WBPCs already identified as Category 1, the remaining WBPC list can be condensed by excluding pollutants which are not stormwater related (i.e., MS4 discharges are unlikely to cause or contribute to the impairment) as well as pollutants which are already being addressed (directly or indirectly) by one of the TMDLs. Therefore, the Category 2 WBPCs are limited to the following:

<u>Dominguez Channel (including Torrance Lateral) for indicator bacteria</u>. This qualifies as a Category 2 WBPC based on the 303(d) listing for indicator bacteria.

<u>Dominguez Channel Estuary for indicator bacteria</u>. This qualifies as a Category 2 WBPC based on the 303(d) listing for indicator bacteria.

Category 3 – Medium Priority

Category 3 (Medium Priority) designations are applied to WBPCs which are not 303(d)-listed but which exceed applicable RWLs contained in the Permit and for which MS4 discharges may be causing or contributing to the exceedance.

As mentioned previously, the Beach Cities WMG has been collecting outfall data in the Dominguez Channel Watershed per their approved CIMP since 2016, with paired downstream receiving water data collected by other agencies. Implementation of the CIMP has resulted in the successful monitoring of 15 wet weather events to-date, with two outfall sites and two receiving water sites monitored per event. Through June 2021, only a single water quality impairment (besides those discussed above) has been identified:

<u>Dominguez Channel Freshwater (not including Torrance Lateral) for Benzo(a)pyrene</u>. This qualifies as a Category 3 WBPC based on historical exceedance of applicable receiving water limits (California Toxic Rule Human Health Criteria) where MS4 discharges may be causing or contributing to the exceedance.

The Beach Cities agencies understand that additional data collected as part of their approved CIMP may result in modifications to WBPCs and/or water quality priorities. Under these conditions, the Beach Cities EWMP will be updated.

Figure B-2 provides a brief conceptual overview of the process used to identify and categorize the WBPCs within the Beach Cities EWMP Area.

SOURCE ASSESSMENT

The following data sources have been reviewed as part of the source assessment for the WBPCs listed previously:

- Findings from the Permittees' IC/ID Programs;

- Findings from the Permittees' Industrial/Commercial Facilities Programs;
- Findings from the Permittees' Development Construction Programs;
- Findings from the Permittees' Public Agency Activities Programs;
- TMDL source investigations;
- Watershed model results;
- Findings from the Permittees' monitoring programs, including but not limited to, CIMP monitoring and TMDL compliance monitoring; and
- Any other pertinent data, information, or studies related to pollutant sources and conditions that contribute to the highest water quality priorities.

As stated earlier, the Dominguez Channel Watershed has significantly more industrial land use than the Santa Monica Bay Watershed (1,944 acres in Dominguez Channel vs 212 acres in SMB), and as a result, has some notably different pollutant sources when compared to the Santa Monica Bay Watershed. The following source assessment is broken down by pollutants applicable only to the Dominguez Channel Watershed.

Copper, Lead, Zinc, and Cadmium

The Dominguez Channel Toxics TMDL (which applies to wet weather only) provides general information on sources of metals within the Dominguez Channel Watershed but does not provide a detailed source assessment. The TMDL states that "the major pollutant sources of metals into Dominguez Channel and Torrance Lateral freshwaters are stormwater and urban runoff discharges. Nonpoint sources include atmospheric deposition" (LARWQCB and USEPA, 2011).

SCCWRP conducted a detailed study of various wet weather pollutants throughout the Los Angeles region, including Dominguez Channel (Stein et al., 2007). They found that industrial land use sites contributed a substantially higher flux of copper and zinc compared to other land uses evaluated, followed by agriculture, recreational, transportation (for copper), and high density residential (for zinc). Wet weather EMCs for copper and zinc, based on the Los Angeles County land use EMC dataset (Geosyntec Consultants, 2012) were similar to SCCWRP's findings, showing that the highest runoff concentrations are expected from industrial, transportation, and commercial land uses, excluding agriculture. With respect to copper, research has shown that brake pads are a significant source of copper in urban stormwater (TDC Environmental, 2013). Copper and other pollutants are deposited on roads and other impervious surfaces and then transported to aquatic habitats via stormwater runoff.

Pollutant loads of copper from urban land uses is expected to decrease due to Senate Bill (SB) 346 which was signed into law on September 25, 2010. This legislation phases out copper in vehicle brake pads over a period of years; milestones include the following dates:

- January 1, 2021: Limits the use of copper in motor vehicle brake pads to no more than five percent by weight; and
- January 1, 2025: Limits the use of copper in motor vehicle brake pads to no more than 0.5 percent by weight.

A separate study focusing on zinc showed that the major sources of zinc in urban runoff are outdoor zinc surfaces (including galvanized surfaces) and tire wear debris (TDC Environmental, 2013). Cadmium has similar sources, including tires and engine parts, as well as gasoline, antifreeze, and diesel oil. One study found that tire wear accounts for over 50 percent of the total cadmium and zinc loads in urban runoff (David et. al., 2001).

For lead, SCCWRP found that the greatest land use contributors were agricultural (minimal in Dominguez Channel Watershed), high density residential, and recreational (horse) land uses (Stein et al., 2007). Based on the Los Angeles County land use EMC dataset (Geosyntec Consultants, 2012), the highest lead contributing land uses are agriculture, industrial, commercial, and single family residential. Lead was also formerly used as an additive in gasoline and is still used in general aviation gasoline (Avgas) for small piston-engine aircraft. According to Federal Aviation Administration (FAA), Avgas emissions are the largest contribution to relatively low levels of lead emission in the U.S. (FAA, 2015). This has contributed to the contamination of some soils near highways and streets and in drainage ways in urban areas. Exhaust particulates, fluid losses, drips, spills, and mechanical wear products continue to contribute lead to street dust.

For both copper and lead, the SCCWRP and Los Angeles County datasets indicate that average EMCs exceed applicable CTR continuous concentration criteria for each land use sampled. For zinc, some land uses (single family residential, education, and vacant) have average EMCs below the CTR continuous concentration criterion, while others (commercial, industrial, transportation, multi-family residential, and agriculture) exceed this criterion. These land use EMC datasets were used to support BMP placement as part of the RAA.

Significantly, monitoring results collected as part of the Beach Cities CIMP demonstrate that lead levels within Beach Cities discharges are meeting final TMDL limits.

Toxicity

As is the case with metals, the Dominguez Channel Toxics TMDL does not provide a detailed source assessment for toxicity within the Dominguez Channel Watershed, nor is a linkage provided to other specific surrogate pollutants, such as total suspended solids or dissolved metals. The source assessment simply states that "the major sources of organo-chlorine pesticides [and] PCBs…into Dominguez Channel are stormwater and urban runoff discharges. Nonpoint sources include atmospheric deposition and fluxes from contaminated sediments into the overlying water" (LARWQCB and USEPA, 2011).

Pesticides are used in urban settings for structural pest control, landscape maintenance (parks, golf courses, cemeteries, and rights-of-way), vector control, and public health pest control. Two specific pesticides, diazinon and chlorpyrifos, were banned by the USEPA on December 31, 2005. As a result, mass emission monitoring at S28 has resulted in no measured exceedance of the 1 toxicity unit criteria for chlorpyrifos or diazinon in Dominguez Channel since 2006. Similarly, both DDT and PCBs were banned from general production and use in the 1970s, resulting in the elimination of active discharges of these chemicals to Dominguez Channel, SMB, and other local surface water bodies, except from residuals present from legacy sources.

Toxicity monitoring has been conducted by other agencies in the Dominguez Channel to help assess if MS4 discharges are causing or contributing toxicity exceedances in Dominguez Channel. To date, no toxicity exceedances have occurred within Dominguez Channel or Torrance Lateral receiving waters. As a result, a toxicity identification evaluation (TIE) has not been necessary for the Beach Cities WMG.

Indicator Bacteria

Although the Dominguez Channel is 303(d) listed for indicator bacteria, a bacteria TMDL has not yet been developed for the watershed. *E. coli* data collected at outfalls as part of the Beach Cities CIMP indicates that bacteria levels are consistently higher than applicable standards during storm events. The source assessment for indicator bacteria within the Santa Monica Bay watershed portion of the Beach Cities EWMP area is provided above, and many of these urban anthropogenic and non-anthropogenic sources apply to the Dominguez Channel portion of the Beach Cities EWMP Area as well.

Organochlorine Pesticides (DDT)

Organochlorine pesticides (OC pesticides) are a large group of legacy pesticides, including DDT, that were previously used widely throughout the United States. Even though they have been banned from use for many years, they are slow to degrade and continue to persist in the environment. Because of their chemical and physical properties, these pollutants tend to partition and bind preferentially to the surfaces of soil particles. When transported in stormwater-borne sediment to local receiving waters, OC pesticides have been shown to accumulate in the fatty tissue of fish and wildlife and bio-magnify in the food-web.

DDT was used widely in the U.S. between 1939 and 1970 as a pesticide. In 1963, DDT was declared a restricted material in California. The last year that substantial amounts of DDT were applied in California was 1970 when 1.2 million pounds of DDT were applied primarily to agricultural areas (LARWQCB, 2010).

Considering the ubiquitous use of DDT from 1939 through 1970 and understanding the history of land use and development within the Dominguez Channel Watershed, it is reasonable to expect that DDT was used in residential applications and that DDT and its breakdown products, DDE and DDD, may remain in soils within the watershed. However, outfall sampling data conducted to-date under the Beach Cities CIMP has not led to any detectable quantities of DDT in stormwater runoff.

Polychlorinated Biphenyls (PCBs)

Polychlorinated biphenyls (PCBs) are mixtures of synthetic organic chemicals that were commonly used for various applications from approximately 1929 until 1979 when the U.S. banned PCB manufacturing, processing, distribution, and use. PCBs may be present in products that were made before 1977 but are still in use today, such as transformers, fluorescent lighting fixtures, household caulking, paints and waxes (USEPA, 2012). U.S. EPA identifies the following list of products and materials that, if produced and installed prior to the 1979 ban, may still contain PCBs:[5]

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[5] https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls-pcbs#commercial

- Transformers and capacitors
- Electrical equipment including voltage regulators, switches, re-closers, bushings, and electromagnets
- Oil used in motors and hydraulic systems
- Old electrical devices or appliances containing PCB capacitors
- Fluorescent light ballasts
- Cable insulation
- Thermal insulation material including fiberglass, felt, foam and cork
- Adhesives and tapes
- Oil-based paint
- Caulking
- Plastics
- Carbonless copy paper
- Floor finish

The industrial nature of a significant portion of the Dominguez Channel Watershed implies that most of these may continue to be sources of PCBs in stormwater, with the most significant contributions likely coming from external building materials such as caulk or paint or in utility transformers. However, outfall sampling data conducted to-date under the Beach Cities CIMP has not led to any detectable quantities of PCBs in stormwater runoff.

Polycyclic Aromatic Hydrocarbons (PAHs) Including Benzo(a)pyrene

Polycyclic aromatic hydrocarbons (PAHs) are a group of organic contaminants that are associated with the release of petroleum products (petrogenic sources) or form from the incomplete combustion of hydrocarbons (pyrogenic sources). PAHs are an environmental concern because they are toxic to aquatic life and because several of the individual PAH compounds are suspected human carcinogens. Research has shown that the dominant source of origin is pyrogenic (combustion of organic matter) in the Los Angeles Region, and PAHs are often deposited through atmospheric deposition and delivered to waterbodies in stormwater runoff (Sabin et al., 2009). Other non-point sources may include leaking motor oil, tire wear, and vehicular exhaust.

PRIORITIZATION

Based on the water quality characterization above, the WBPCs have been classified into one of three categories, in accordance with the Permit: highest priority, high priority, and medium priority. This categorization is intended to prioritize WBPCs in order to guide the implementation of structural and institutional BMPs. An RAA was performed on the WBPCs in Categories 1, 2, and 3. Table B-6 summarizes the prioritized WBPCs within the Dominguez Channel Watershed portion of the Beach Cities EWMP Area.

Table B-6. WBPC Prioritization and Pollutant Interim and Final Compliance Targets for Dominguez Channel Watershed

Category	Water Body	Pollutant	Reason for Categorization	WLA/Target Basis	Interim TMDL WLA	Final TMDL WLA or Other Target
1: Highest Priority	Dominguez Channel Freshwater[1]	Toxicity	Dominguez Channel Toxics TMDL	Monthly Average	2 TUc [2]	1 TUc
		Total Copper		Wet Weather Single Event	207.51 ug/L[2]	9.7 ug/L[3]
		Total Lead		Wet Weather Single Event	122.88 ug/L[2]	42.7 ug/L[3]
		Total Zinc		Wet Weather Single Event	898.87 ug/L[2]	69.7 ug/L[3]
	Dominguez Channel Estuary (including Torrance Lateral)	Total Copper		Annual Average	220 mg/kg sediment[2]	31.6 mg/kg sediment 22.4 kg/yr[4]
		Total Lead		Annual Average	510.0 mg/kg sediment[2]	35.8 mg/kg sediment 54.2 kg/yr [4]
		Total Zinc		Annual Average	789.0 mg/kg sediment[2]	121 mg/kg sediment 271.8 kg/yr[4]
		Cadmium		Daily Maximum	n/a	1.2 mg/kg sediment
		DDT		Annual Average	1.727 mg/kg sediment[2]	0.25 g/yr[4]
		Total PAHs		Annual Average	31.60 mg/kg sediment[2]	0.134 kg/yr[4]
		PCBs		Annual Average	1.490 mg/kg sediment[2]	0.207 g/yr [4]
2: High Priority	Dominguez Channel (including Torrance Lateral) and Dominguez Channel Estuary	Indicator Bacteria	303(d) List	Exceedance Rate over 30-day Period	n/a	*See Footnote 5*
3: Medium Priority	Dominguez Channel Freshwater	Benzo(a)pyrene	CIMP Monitoring	California Toxics Rule Human Health Standard	n/a	0.049 ug/L[6]

[1] Wet weather only, based on the Dominguez Channel Toxics TMDL

[2] The interim deadline for Dominguez Channel Toxic TMDL is 3/23/2012.

[3] Also applicable to Torrance Lateral as an alternative compliance target.

[4] Annual MS4 WLA to the entire Dominguez Channel estuary drainage area.

[5] Per the Basin Plan Objective REC1 Water Bodies Limit for Indicator Bacteria, the statistical threshold value of E. coli (320/100 mL) is not to be exceeded by more than 10 percent of the samples collected in a calendar month.

[6] The CTR Human Health numeric target is not directly applicable at outfalls, but has been utilized as an evaluative metric in this case.

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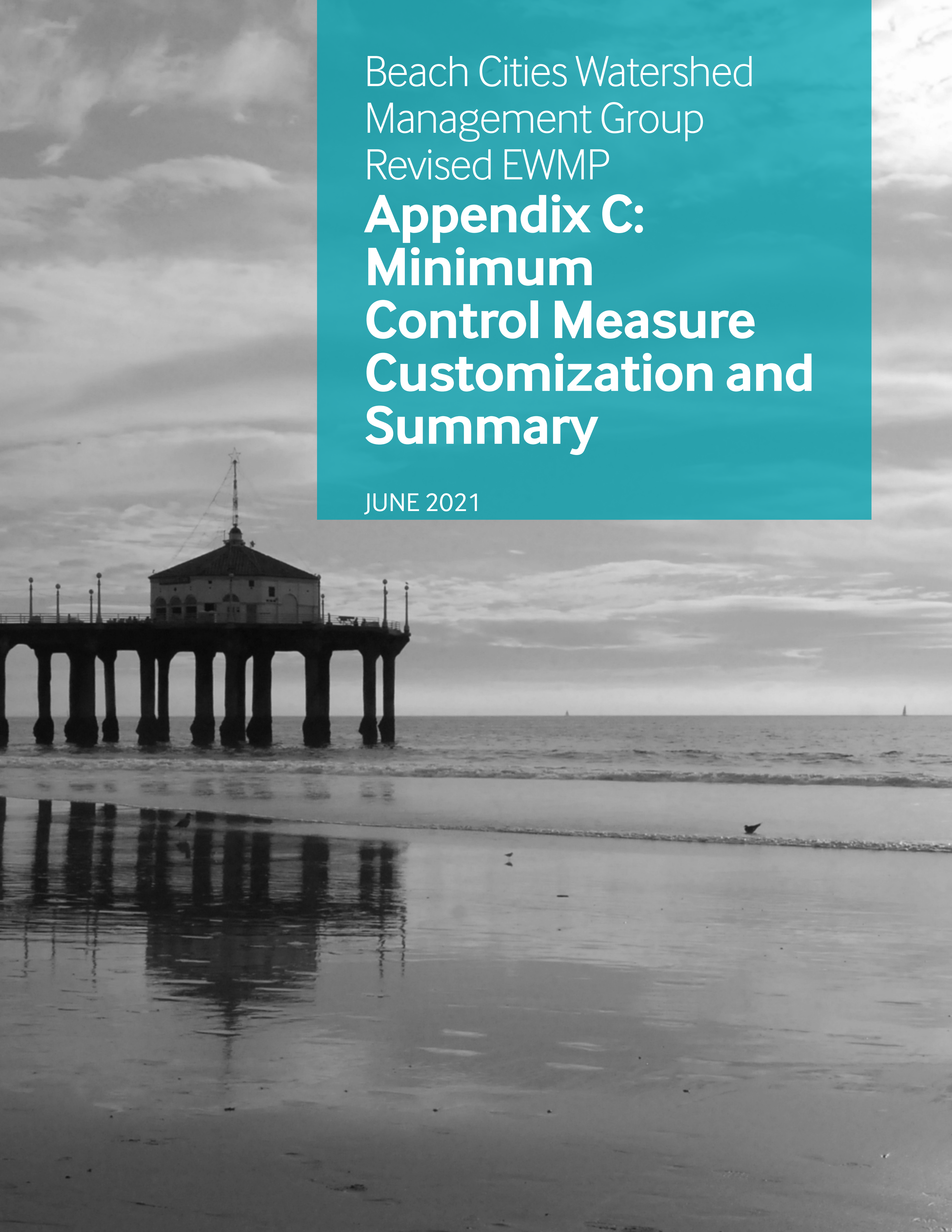

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Revised EWMP

Appendix C: Minimum Control Measure Customization and Summary

JUNE 2021

MINIMUM CONTROL MEASURE SUMMARY AND CUSTOMIZATION

Non-structural BMPs prevent or reduce the release of pollutants or transport of pollutants within the MS4 area but do not involve construction of physical facilities. Non-structural BMPs are often implemented as programs or strategies which seek to reduce runoff and/or pollution close to the source. Examples include but are not limited to: street sweeping, downspout disconnect programs, pet waste cleanup stations, irrigation ordinances, or illicit discharge elimination. Minimum control measures (MCMs) as set forth in the Permit are a subset of non-structural BMPs even though some MCMs include measures that require the implementation of structural BMPs.

The Beach Cities WMG has assessed the MCMs defined in the Permit to identify opportunities for focusing resources on the high priority issues in each watershed. The Permit requires the permittees to implement prescribed MCMs in each of six categories/programs: Public Information & Participation Program (PIPP), Industrial/Commercial Facilities, Planning & Land Development, Development Construction, Public Agency Activities (PAA), and Illicit Connection & Illicit Discharges (IC/ID) Elimination. These measures include procedures such as outreach programs, inspections, and reporting requirements designed to reduce runoff-related pollution within each permittees' MS4 area. As LACFCD has no land use authority, the requirements of Industrial/Commercial Facilities, Planning & Land Development, and Development Construction programs are not applicable to LACFCD outside its own facilities (see Appendix G).

RECOMMENDED MCMS AND NON-STRUCTURAL BMPS

The Permit allows permittees developing an EWMP the opportunity to customize the MCMs specified in the Permit to focus resources on high priority issues within their watersheds. Modifications to the MCMs must be appropriately justified and still be consistent with 40 CFR § 122.26(d)(2)(iv)(A)-(D). A control measure may only be eliminated based on the justification that it is not applicable to a particular permittee. Customized measures, once approved as part of the EWMP, will replace in part or in whole the prescribed MCMs in the Permit. The Planning & Land Development Program is not eligible for customization in that it may be no less stringent than the baseline requirements in the Permit. However, it can be enhanced over the baseline permit requirements if desired.

MCMs in each of the six identified categories are being implemented by the Beach Cities WMG as prescribed under the Permit, and in some cases, MCM program enhancements have been implemented to address watershed priorities for TMDL implementation. A summary of MCM enhancements is provided in Table C-1. Additional modifications may also be made through the Adaptive Management Process.

GENERAL FRAMEWORK FOR MCM CUSTOMIZATION

An approach for evaluating existing institutional MCMs was developed as part of the Beach Cities original EWMP Work Plan and was used to evaluate existing MCMs and develop the customized MCMs. The following steps provide a general framework for MCM customization:

1. Identify MCMs for potential customization. This may include identifying:
   a. MCM requirements prescribed by the Permit which are not already being implemented by the permittee;
   b. Currently implemented MCMs which have been enhanced over the previous Permit as part of TMDL implementation, e.g., Enhanced Restaurant Inspection Program;
   c. Programmatic solutions/non-structural controls identified in TMDL implementation plans which may not yet have been implemented; and
   d. MCMs which are currently being implemented but which may be excessive in scope. For example, commercial inspections being conducted of retail gasoline facilities which are already heavily regulated through other environmental programs in areas that have no receiving water impairments for the pollutants of concern may be carried out less frequently, or discontinued indefinitely.
2. Identify MCMs which are not applicable. A control measure may be eliminated based on the justification that it is not applicable to a particular permittee. For example, if it is the policy of a permittee not to use pesticides in public agency activities, then there is no need for tracking of pesticide use and this MCM may be proposed for elimination.
3. Assess the effectiveness of the incremental baseline MCM requirements with respect to water quality priorities. The data necessary to quantify this will vary greatly by MCM, but may include information such as: receiving water quality, inspection and reporting records, number of qualifying projects (e.g., number of construction projects greater than 1 acre), number of pet station bags used, amount of material picked up by street sweeping activities, number of employees trained, and maintenance records. Additionally, the California Stormwater Quality Association (CASQA) provides a tool to estimate the effectiveness of stormwater management programs (CASQA, 2015). The tool recommends possible assessment metrics that can be used for various stormwater programs.
4. Quantify the additional resources required to implement the incremental baseline MCMs. This may include estimating additional staff resources in terms of full-time employees, consulting resources, and contracted services.
5. Assess the effectiveness and resources required to implement the customized MCM. The process to quantify these will be the same as the process used to quantify the baseline effectiveness of the existing MCM.
6. Compare the assessed effectiveness and resources required to implement the incremental baseline MCMs and the customized MCMs. Customization can be justified in several ways:
   a. If the customized MCM effectiveness is equal to or greater than the baseline MCM, customization can be justified.

   b. If an MCM requirement is not applicable, then elimination is justified.
   c. If the incremental MCM requires additional resources that are disproportionate to the increased effectiveness achieved, then retention of the existing MCM may be justified.

7. Document the customized MCM justification.

MCMs were evaluated based on their effectiveness in addressing the WBPCs specific to the Beach Cities EWMP Area and based on the Beach Cities WMGs knowledge and experience with existing MCMs. In many ways, the WMG's practical experience with MCM implementation over time provides the best insight as to what MCM modifications/enhancements will be most helpful to target the WBPCs of concern in the Beach Cities EWMP Area.

Table C-1 summarizes the proposed MCM enhancements common to the Beach Cities WMG, which include promotion of existing regional programs as part of the residential outreach permit requirement; development and distribution of digital and print outreach materials targeted at pollutants of concern in the Beach Cites watersheds; establishment of South Bay Environmentally Friendly Gardening, Landscaping, and Pest Management webpages; and annual restaurant inspections as commercial pollutant sources. For the MCMs applicable to the LACFCD (namely the PIPP, the IC/ID, and the PAA), the LACFCD will continue to implement the requirements both individually and in collaboration with the WMG as identified in the MS4 Permit.

In addition to the MCM modifications being implemented by the WMG as a group, the Beach Cities WMG has identified additional city-specific MCM enhancements, which include organization and promotion of educational and cleanup-oriented events, maintenance of pet waste collection stations as a part of the residential outreach requirement, bans on plastic bags and polystyrene food containers in Manhattan Beach and Hermosa Beach, and maintenance of environmentally-oriented city websites. City-specific MCMs enhanced beyond Permit requirements are specified in Table C-1. The MCM enhancements shown in this table are examples and are not comprehensive.

Table C-1. Enhancements to MCMs

MS4 Permit MCM Requirements	General Beach Cities MCM Enhancement (all agencies)	City-Specific MCM Enhancement			
		City of Manhattan Beach	City of Redondo Beach	City of Hermosa Beach	City of Torrance
Public Information and Participation Program (PIPP)[1]					
Residential Outreach (individually or with group):	Ongoing development and dissemination of targeted outreach promoting behavior change in activities among the DIY residential community that is a source of priority pollutants. Leveraging of successful existing statewide and regional outreach programs using print and digital distribution methods.	Manhattan Beach is implementing the "Plastic Free MB" campaign to reduce plastic use and waste. The City Council has passed several comprehensive ordinances targeted at plastic reduction: plastic bag ban, ban on polystyrene, prohibition on single-use plastic straws and utensils, and ban on polystyrene meat trays and mylar balloons.		The Hermosa Beach City Council has adopted ordinances to ban certain polystyrene and single-use plastic products in Hermosa Beach as well as plastic bags.	
Dissemination of Public education materials on proper management, recycling and/or disposal of vehicle fluids, household hazardous waste, construction waste, green waste, animal waste, pesticides, fertilizers, and integrated pest management (IPM).	Each of the Beach Cities leverages its solid waste franchise contract to conduct outreach on proper waste management in the form of solid waste bill inserts or direct mailers.	Household hazardous waste collection is offered to single and multi-family residences. Free pharmaceutical drop off and battery recycling collection containers are located at city facilities. Project Pollution Prevention brochures are provided to residents and contractors via the City's website.	The City promotes and hosts annual household hazardous waste roundup events.	Project Pollution Prevention brochures are available at the public counter. The City promotes and hosts annual household hazardous waste roundup events.	BMP brochures are made available at City outreach and environmental events and public counters.
Dissemination of public education information targeted at residential do-it-yourself auto activities	Participation in the CalRecycle Used Oil Program. Development and distribution of a Mobile Business Tip Card targeting mobile auto detailers.				
Dissemination of public education information targeted at residential do-it-yourself home improvement and maintenance activities	Distribution of a Small Site (<1 acre) Construction brochure with information regarding material storage and handling as well as spill prevention and clean-up and disposal. Distribution of LA County Residential Pool and Spa Maintenance BMPs for the Environment flyer. Promotion of West Basin Municipal Water District (WBMWD) programs via SBESC e-blasts and City websites.				

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[1] The Permittees will adapt the PIPP over time to address new information, water quality priorities and stormwater management program priorities – activities listed below provide examples of how the PIPP is currently being enhanced.

MS4 Permit MCM Requirements	General Beach Cities MCM Enhancement (all agencies)	City-Specific MCM Enhancement			
		City of Manhattan Beach	City of Redondo Beach	City of Hermosa Beach	City of Torrance
Dissemination of public education information targeted at residential do-it-yourself landscaping and gardening activities and integrated pest management.	Development and maintenance of Environmentally Friendly Landscaping, Gardening and Pest Control Webpages hosted by the South Bay Environmental Services Center. Development, distribution and promotion of South Bay Homeowner's Guide to Rainwater Harvesting. Promotion of sustainable landscaping, gardening and water efficiency events and programming hosted by West Basin Municipal Water District.	The City provides resources on Ocean-Friendly Gardens and Sustainable Landscapes on its website, and continues to promote Sustainable Landscaping principles in its Green Code planning requirements for new projects or significant remodels. The City maintains a number of California Friendly demonstration gardens.	The City maintains a number of California Friendly demonstration gardens. The City created a "tip card" for residential notifications of excessive over irrigation into the streets that provides tips to control and reduce the overspray and ponding in the gutters.	The City maintains a number of California Friendly demonstration gardens.	The City maintains a number of California Friendly demonstration gardens and hosts rain barrel distribution events.
Distribute public education information targeted at residential pet owners		The City maintains pet waste collection stations in locations with high frequency of use by residents with dogs. The stations are equipped with disposable bags for collecting and disposing of pet waste.	All City parks and the Esplanade are equipped with pet waste collection stations.	All City parks, The Strand and the linear greenbelt are equipped with pet waste collection stations. The City also conducts targeted outreach to pet owners to pick up after their pets and follow the City's pet owner ordinances.	City Parks are equipped with pet waste collections stations. Dog waste BMP brochures are made available at City outreach and environmental events and public counters. Residents can also pick up a free pet waste dispenser with biodegradable bags at the One-Stop Permit Center.
Maintain stormwater website	Development and maintenance of Environmentally Friendly Landscaping, Gardening and Pest Control Webpages hosted by the South Bay Environmental Services Center.	The City maintains integrated Environmental Sustainability webpages which links to the Public Works Environmental Programs page that has information on several Public Works environmental programs such as the Solid Waste and Recycling Program, Hazardous Waste Disposal Program, Water Conservation Program, and Stormwater Pollution Prevention Program.	The City maintains water quality information on its website.	The City has an Environmental Programs webpage, and a Water Conservation webpage which links to the South Bay Environmentally Friendly Landscaping, Gardening and Pest Control Webpages..	The City has an NPDES/Stormwater webpage. The Public Works website provides updates, information and links regarding environmental programs, household hazardous waste, water conservation efforts, and sustainable landscaping and gardening. Torrance also has a dedicated recycling and waste management website.
Provide schools with materials to educate children (K-12); can use state produced materials	The Beach Cities WMG agencies promote the Generation Earth Program delivered by Tree People through funding by Los Angeles County Department of Public Works.	Manhattan Beach K-12 schools participate in the Grades of Green. The Roundhouse Marine Studies Lab and Aquarium located at the end of the Manhattan Beach Pier provides outreach to thousands of students through hands-on pollution and ocean awareness classes.	City of Redondo Beach staff partners with local schools to help educate students regarding stormwater pollution prevention and recycling. The schools are invited to attend various City sponsored cleanup events.	Hermosa Beach elementary schools participate in the Grades of Green program.	

MS4 Permit MCM Requirements	General Beach Cities MCM Enhancement (all agencies)	City-Specific MCM Enhancement			
		City of Manhattan Beach	City of Redondo Beach	City of Hermosa Beach	City of Torrance
D.6 Industrial/ Commercial					
Implement a Business Assistance Program for select sectors or small businesses - technical assistance and distribute materials to specific sectors. Assistance is targeted to select business sectors based on information that activities may be contributing substantial amounts of pollutants of concern to the MS4 and will evolve over time based on new information and feedback from inspectors and the monitoring program. Examples of current targeted Business Assistance Programs are provided at right:	The Beach Cities WMG agencies each implement an annual restaurant inspection program where outreach is provided on proper waste management and stormwater pollution prevention.	The Green Business Program recognizes businesses that incorporate sustainability into their daily business practices with the objective of reducing waste. The City's franchise solid waste hauler offers free commercial waste audits to assess areas of improvement for the reduction of waste. The City also offers a Green Business certification through the California Green Business Network for local businesses that meet certain criteria to reduce impacts on the environment.	The City of Redondo Beach staff periodically meet with various business association districts to help educate them on stormwater pollution prevention and recycling topics. In addition, City staff work with the Redondo Beach Chamber of Commerce on various water quality related issues affecting businesses within the City.	The City of Hermosa Beach offers a Green Business certification through the California Green Business Network for local businesses that meet certain criteria to reduce impacts on the environment.	Torrance distributes outreach to businesses on environmental practices and the City of Torrance has partnered with the Environmental Services Center of the South Bay Cities COG to administer a grant from the California Green Business Network to offer the Green Business Certification to its businesses.
Inspect Commercial Sources	All restaurants are inspected annually instead of twice during 5-year permit.				Commercial facilities including nurseries and automotive facilities are inspected every other year instead of twice during 5-year permit.
Inspect Industrial Sources					Industrial facilities are inspected every other year instead of twice during 5-year permit.
D.7 Planning and Land Development					
Update and Implement ordinance/design standards to conform with LID and Hydromodification requirements			Development in the Coastal Zone that requires a Coastal Development Permit is required to meet the LID standards.	Hermosa LID ordinance requires all new development projects to implement LID with no minimum size threshold.	
D.8 Development Construction Program					
Sites < 1 acre; inspect based upon water quality threat				A building/grading site is inspected on average about 12 times and each time the inspector is on site, the condition of stormwater BMPs is noted by the inspector and, if necessary, corrections required.	
Site < 1 acre; Require sites with soil disturbing activities to implement minimum BMPs	Distribution of Small Site Construction brochure in English and Spanish for sites disturbing less than 1-acre that includes an example site schematic and information on each of the required minimum BMPs.				

MS4 Permit MCM Requirements	General Beach Cities MCM Enhancement (all agencies)	City-Specific MCM Enhancement			
		City of Manhattan Beach	City of Redondo Beach	City of Hermosa Beach	City of Torrance
D.9 Public Agency Activities					
Prevent vehicle/equipment washing discharges to the MS4, including firefighting and emergency response vehicles		City Yard includes designated area for washing vehicles equipped with clarifier and diversion. Additionally, the City Yard bulk storage area includes roof canopies and a dry weather diversion system.	The City Yard is retrofitted with a dry weather diversion to the sanitary sewer.		
Implement IPM program		The City has eliminated the use of non-organic pesticide products in parks and open spaces and City maintenance crews and contractors utilize a combination of organic pest control strategies and products to control invasive weeds, insects and rodents throughout city facilities.	The City has eliminated the use of non-organic herbicide products in post emergent applications at all parks.	Hermosa Beach has designated all City parks pesticide-free zones, and thus uses no pesticides in maintaining these public recreational areas, which include the greenbelt that runs the length of the City.	Torrance's pesticide free zones include around both community gardens, in most playgrounds, and around all picnic areas except for at Columbia and Wilson Park.
Required trash management at public events				The City implements a tiered matrix of requirements for special events in the City to reduce waste and control litter.	
Place and maintain trash receptacles/capture devices at newly identified high trash generating areas		The City maintains more than 125 additional receptacles for recyclable glass, plastic and aluminum beverage containers.	The City has placed trash receptacles in high use area throughout the City, including all bus stops, parks and coastal areas.	The City has placed over 100 recycling bins for beverage containers throughout the City, at all bus stops, in heavily used pedestrian areas and parks.	
Street sweeping - Priority A: 2x/mo.; B: 1x/mo.; C: as needed, not less than 1x/yr.		Streets are swept weekly and posted with no parking signs on street sweeping days.	Streets are swept weekly and posted with no parking signs on street sweeping days.	Streets are swept weekly and posted with no parking signs on street sweeping days.	Streets are swept weekly and posted with no parking signs on street sweeping days.
Inspect and/or clean Permittee owned parking lots 2x/mo.		City parking lots are swept weekly.			
D.10 Illicit Connections and Illicit Discharges Elimination					
Continue IC/ID program	Implementation of the model California Water Efficient Landscape Ordinance or equivalent city-specific ordinance for new landscapes.	The City has a water conservation ordinance as well as CalGreen Code provisions for landscaping and irrigation.	The City has Landscape Regulations included in the Municipal Code, including water conservation.	The City has a Water Conservation and Drought Management Plan Ordinance.	The City has a Water Conservation and Drought Management Program, under which City staff proactively identify irrigation overuse.
Facilitate public reporting via hotline				The City's "Go Hermosa!" app allows residents to report illicit discharges directly to the City via the app.	

Beach Cities Watershed
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Appendix D:
RAA Report

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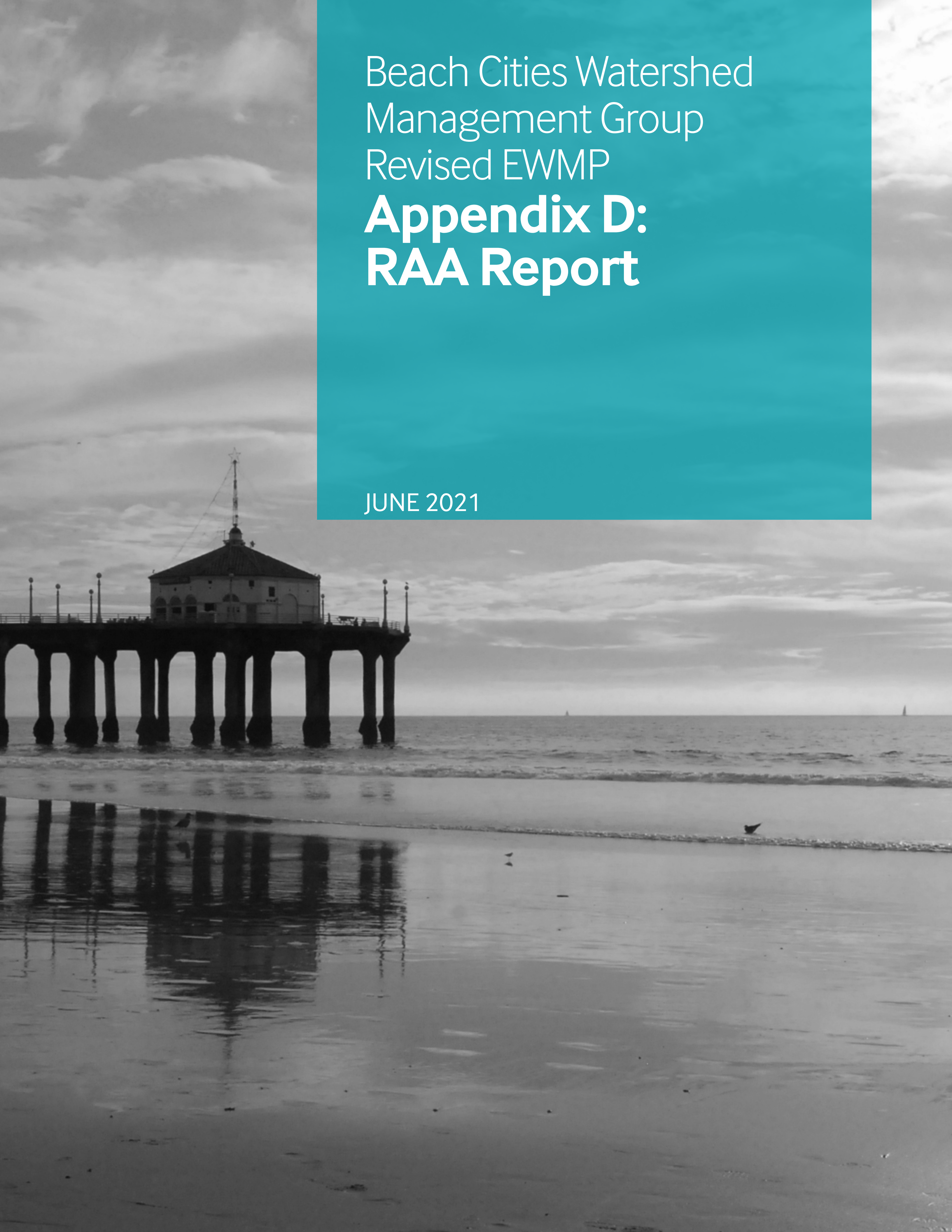

DRAFT

Reasonable Assurance Analysis Report

Revised Beach Cities EWMP 2021

Prepared for

Beach Cities Watershed Management Group

(Cities of Hermosa Beach, Manhattan Beach, Redondo Beach, and Torrance and the Los Angeles County Flood Control District)

Prepared by

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Project Number CWR0645

May 2021

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1. INTRODUCTION

As specified in the 2012 Los Angeles Municipal Separate Storm Sewer System (MS4) National Pollutant Discharge Elimination System (NPDES) Permit[1] (Permit), the Cities of Hermosa Beach, Manhattan Beach, Redondo Beach, and Torrance, together with the County of Los Angeles and the Los Angeles County Flood Control District (LACFCD), collectively referred to as the Beach Cities Watershed Management Group (WMG), developed an Enhanced Watershed Management Program (EWMP) for their drainage areas within the Santa Monica Bay and Dominguez Channel watersheds. As a part of demonstrating progress and adaptive management, the Beach Cities WMG is required to submit a revised EWMP to the Los Angeles Regional Water Quality Control Board (LARWQCB), including an updated Reasonable Assurance Analysis (RAA), by June 30, 2021.

This report has been prepared to summarize the approach and results of the revised RAA. Building upon the original and revised updated plans in 2015 and 2018, the revised RAA has been conducted to conform to the original RAA guidelines developed by the LARWQCB (LARWQCB, 2014a). The revised RAA also provides updates to include recent monitoring data, project planning and implementation, and modeling advances over the past five years. Where appropriate, it also addresses issues and comments raised by the State Water Resources Control Board (SWRCB, 2020), such as inclusion of relevant data for model calibration, non-structural Best Management Practices (BMP) credit, and application of the limiting pollutant approach.

The updated wet weather RAA was conducted using the Watershed Management Modeling System 2.0 (WMMS 2.0), the latest modeling tool developed by LACFCD, to determine a cost-effective implementation strategy to meet applicable water quality standards (i.e., TMDL waste load allocations [WLA] and Basin Plan Objectives) and targets. This modeling platform was approved and endorsed by the LARWQCB as an acceptable regulatory approach for developing the RAA. WMMS 2.0 has the capability of representing wet and dry weather flow discharges, although based on a variety of factors, dry weather flows were not modeled using WMMS 2.0 as part of this effort. For dry weather, a revised semi-quantitative approach was implemented to update the dry weather portion of the revised RAA.

The RAA was completed for the full geographic domain of the Beach Cities EWMP area, as described in the revised Beach Cities EWMP. Unless otherwise noted, all Water Body

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[1] Order No. R4-2012-0175 NPDES Permit No. CAS004001 Waste Discharge Requirements for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles County, except those Discharges Originating from the City of Long Beach MS4.

Pollutant Combinations (WBPCs) identified in the EWMP have been addressed as part of this revised RAA.

2. WATER BODY POLLUTANT COMBINATIONS

The WBPCs defined in the original Beach Cities EWMP were revised based on the most recent updates to applicable TMDLs and 303(d) listings, as well as available Coordinated Integrated Monitoring Program (CIMP) monitoring data.[2] The updated WBPC list is summarized in Table 1 and Table 2 for the Santa Monica Bay watershed management area (WMA) and Dominguez Channel WMA, respectively. These tables include the applicable water quality-based effluent limitations (WQBELs) and the receiving water limitations (RWLs).

As with the original Beach Cities EWMP, the RAA was performed to address all Category 1 WBPC interim and final MS4 waste load allocations (WLAs), and all Category 2 and 3 WBPCs where the Beach Cities WMG may have caused or contributed to historical exceedances. For Category 2 and 3 pollutants that do not have a TMDL WLA, various water quality objectives extracted from California Toxic Rule, LARWQCB Basin Plan Objective and California Ocean Plan Objective were selected and utilized for analysis purposes.

The WQBELs and RWLs for Dominguez Channel Estuary are included in Table 2 because the City of Torrance portion of the Beach Cities EWMP WMA drains to Dominguez Channel Estuary via Torrance Lateral. This conveyance connectivity makes the City of Torrance a responsible permittee with discharges to the Dominguez Channel Estuary as indicated in the MS4 Permit Attachment K.

It should be noted that the table does not imply that compliance can only be achieved and demonstrated via strict attainment of the listed TMDL WLAs. Other compliance pathways (e.g., full diversion or providing treatment of discharges for the 85th percentile 24-hour design storm capture) also are viable options.

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[2] "Available data" includes all data collected through June 30, 2020 by the Beach Cities WMG. As this date marks the end of the 2019-2020 reporting year, it is the most recent complete year of CIMP monitoring that includes data that has been analyzed, verified, and reported according to the Beach Cities standard for quality assurance and quality control (QA/QC). Monitoring data collected after this time has not yet been QA/QC'd in accordance with this protocol, and so has not been used in the revised RAA and EWMP.

Table 1. Updated Waterbody Pollutant Combinations – Santa Monica Bay

Category	Water Body	Pollutant – Applicable Condition	Reason for Categorization	Interim TMDL WLA	Final TMDL WLA or Other Target
1: Highest Priority	Santa Monica Bay (including SMB Beaches)	Bacteria – Wet and Dry Weather	SMB Beaches Bacteria TMDL	50% cumulative percentage reduction from total required exceedance day reduction[2]	Summer-Dry: Single Sample Allowable Exceedance Days (AEDs) Winter-Dry: Single Sample AEDs Wet - Single Sample AEDs[1] and Geometric Mean targets
		Trash/Debris – Wet and Dry Weather	SMB Debris TMDL	Incremental reduction from baseline waste load allocation[3] (6815.6 gals/year)	100% reduction from baseline waste load allocation[3] (6815.6 gals/year)
		DDTs – Wet and Dry Weather	SMB PCBs and DDT TMDL	n/a	0.88 g/yr[4]
		PCBs – Wet and Dry Weather		n/a	4.56 g/yr[4]
2: High Priority		Mercury– Wet and Dry Weather	303(d) list	n/a	0.4 ug/L[5]
		Arsenic– Wet and Dry Weather		n/a	80 ug/L[5]
3: Medium Priority	Analysis of monitoring data from outfalls and receiving waters do not currently result in the identification of any Category 3 WBPCs				

[1] Per the LARWQCB Basin Plan Objective REC1 Water Bodies Limit for Bacteria. Please refer to Beach Cities EWMP Appendix B for allowable exceedance day limits for each subwatershed.

[2] Total required exceedance day reduction is defined as the difference between historical exceedance day and the allowable exceedance day for each subwatershed.

[3] Baseline WLA is the sum of baseline WLA from Manhattan Beach, Redondo Beach, Hermosa Beach, and Torrance.

[4] This mass-based WLA presented in the TMDL is applicable for all Los Angeles County MS4 permittees draining to Santa Monica Bay. WLA applicable to Beach Cities WMG is apportioned based on Beach Cities WMG's tributary area to Santa Monica Bay.

[5] California Ocean Plan target.

Table 2. Updated Waterbody Pollutant Combinations – Dominguez Channel WMA

Category	Water Body	Pollutant	Reason for Categorization	WLA/Standard/Target Basis	Interim TMDL WLA	Final TMDL WLA or Other Target
1: Highest Priority	Dominguez Channel Freshwater]	Toxicity	Dominguez Channel and Greater Los Angeles and Long Beach Harbor Toxics TMDL	Monthly Average	2 TUc	1 TUc
		Total Copper		Wet Weather Single Event	207.51 ug/L	9.7 ug/L 205.5 g/day[3]
		Total Lead		Wet Weather Single Event	122.88 ug/L	42.7 ug/L 906.3 g/day[3]
		Total Zinc		Wet Weather Single Event	898.87 ug/L	69.7 ug/L 1,478.6 g/day[3]
	Dominguez Channel Estuary	Total Copper		Wet Weather Single Event[1] Annual Average[2]	220 mg/kg sediment	3.73 ug/L 31.6 mg/kg sediment 2.1 kg/yr[4]
		Total Lead		Wet Weather Single Event[1] Annual Average[2]	510.0 mg/kg sediment	8.52 ug/L 35.8 mg/kg sediment 5.1 kg/yr [4]
		Total Zinc		Wet Weather Single Event[1] Annual Average[2]	789.0 mg/kg sediment	85.6 ug/L 121 mg/kg sediment 25.5 kg/yr[4]
		Total Cadmium		Wet Weather Single Event[1] Annual Average[2]	n/a	1.2 mg/kg sediment
		Total DDTs		Wet Weather Single Event[1] Annual Average[2]	1.727 mg/kg sediment	0.00059 ug/L 0.02 g/yr[4]
		Total PAHs		Wet Weather Single Event[1] Annual Average[2]	31.60 mg/kg sediment	0.049 ug/L 0.013 kg/yr[4]
		Total PCBs		Wet Weather Single Event[1] Annual Average[2]	1.490 mg/kg sediment	0.00017 ug/L 0.019 g/yr [4]
	Torrance Lateral	Total Copper		Wet Weather Single Event	207.51 ug/L	9.7 ug/L 31.6 mg/kg sediment
		Total Lead		Wet Weather Single Event	122.88 ug/L	42.7 ug/L 35.8 mg/kg sediment
		Total Zinc		Wet Weather Single Event	898.87 ug/L	69.7 ug/L 121 mg/kg sediment

Category	Water Body	Pollutant	Reason for Categorization	WLA/Standard/Target Basis	Interim TMDL WLA	Final TMDL WLA or Other Target
2: High Priority	Dominguez Channel (including Freshwater, Estuary, and Torrance Lateral)	Indicator Bacteria	303(d) List	Exceedance Rate over 30-day Period	n/a	*See Footnote 5*
3: Medium Priority	Dominguez Channel Freshwater	Benzo(a)pyrene	CIMP Monitoring	California Toxics Rule (CTR) Human Health Standard	n/a	0.049 ug/L[6]

[1] Basis for water column- or sediment-based concentration target.

[2] Basis for mass-based target.

[3] Daily MS4 WLA apportioned to Beach Cities WMG draining to the Dominguez Channel Freshwater area.

[4] Annual MS4 WLA apportioned to Beach Cities WMG draining to the Dominguez Channel Estuary area.

[5] Per the LARWQCB Basin Plan Objective REC1 Water Bodies Limit for Indicator Bacteria, the statistical threshold value of E. coli (320/100 mL) is not to be exceeded by more than 10 percent of the samples collected in a calendar month.

[6] The CTR Human Health numeric target is not directly applicable at outfalls but was utilized as an evaluative metric in this case.

3. MODEL SELECTION AND OVERVIEW

While the original RAA leveraged the strengths of the Structural BMP Prioritization and Analysis Tool (SBPAT) to perform the wet weather modeling analysis, the revised RAA uses the newly-released WMMS 2.0 modeling platform to maintain consistency with the majority of RAAs across Los Angeles County. Developed by LACFCD and publicly released in May 2020, WMMS 2.0 utilizes remote sensing, water quality, and hydrology data collected through 2018 to simulate contaminant loading, runoff volume, and flow rate. WMMS 2.0 contains two major components: a Loading Simulation Program in C++ (LSPC) to determine hydrology and pollutant loading, and a System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN) to assist in BMP selection and performance. Detailed descriptions of each model component are provided below. An advantage of using the WMMS 2.0 model is the extensive regional calibration effort that has gone into the recent update of the model.

3.1. WMMS 2.0 LSPC

WMMS 2.0 LSPC (version 6.0) is capable of simulating watershed hydrology, sediment erosion and transport, and water quality processes from both upland contributing areas and receiving streams. Long-term, hourly rainfall data and average monthly evapotranspiration values are used along with land use-linked catchment imperviousness, soil properties, and land use-specific pollutant buildup/wash off rates to estimate wet weather runoff volumes and pollutant loading. LSPC utilizes the following spatial and temporal data to conduct the simulation:

- Hydrologic response unit (HRU), which is a combination of:
    - Soils
    - Land cover
    - Groundwater recharge potential
    - Topography
    - Land use
- Hydraulic network (dams, debris basins, spreading grounds, water reclamation plants, storm drains, open channels)
- Subwatershed/subbasin
- Hourly and spatially interpolated precipitation and evapotranspiration data.

Figure 1 illustrates the HRU of the Beach Cities EWMP area, Figure 2 illustrates the hydraulic network, and subwatershed boundary and the weather station coverage for the Beach Cities EWMP area.

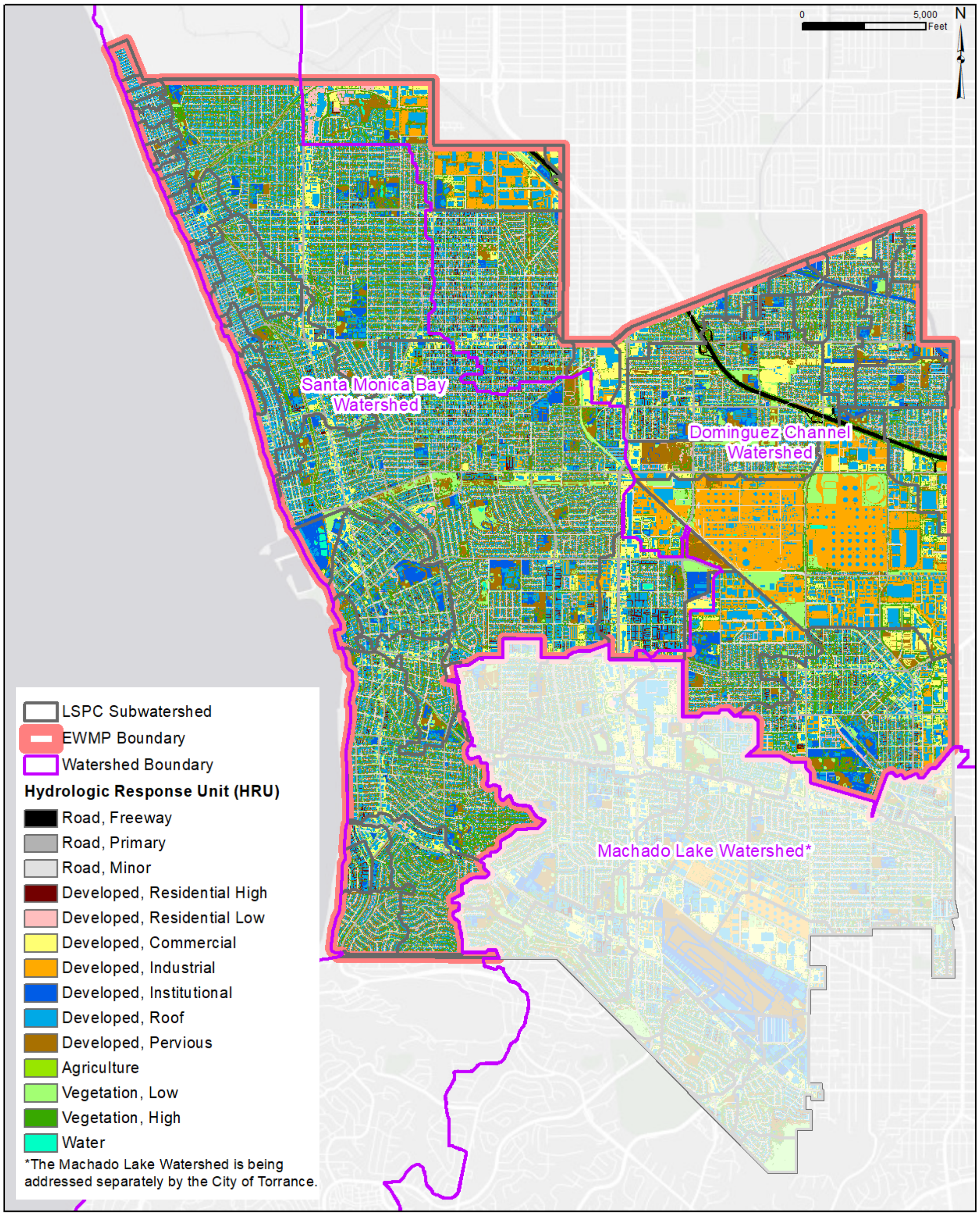

Figure 1. HRU Overview

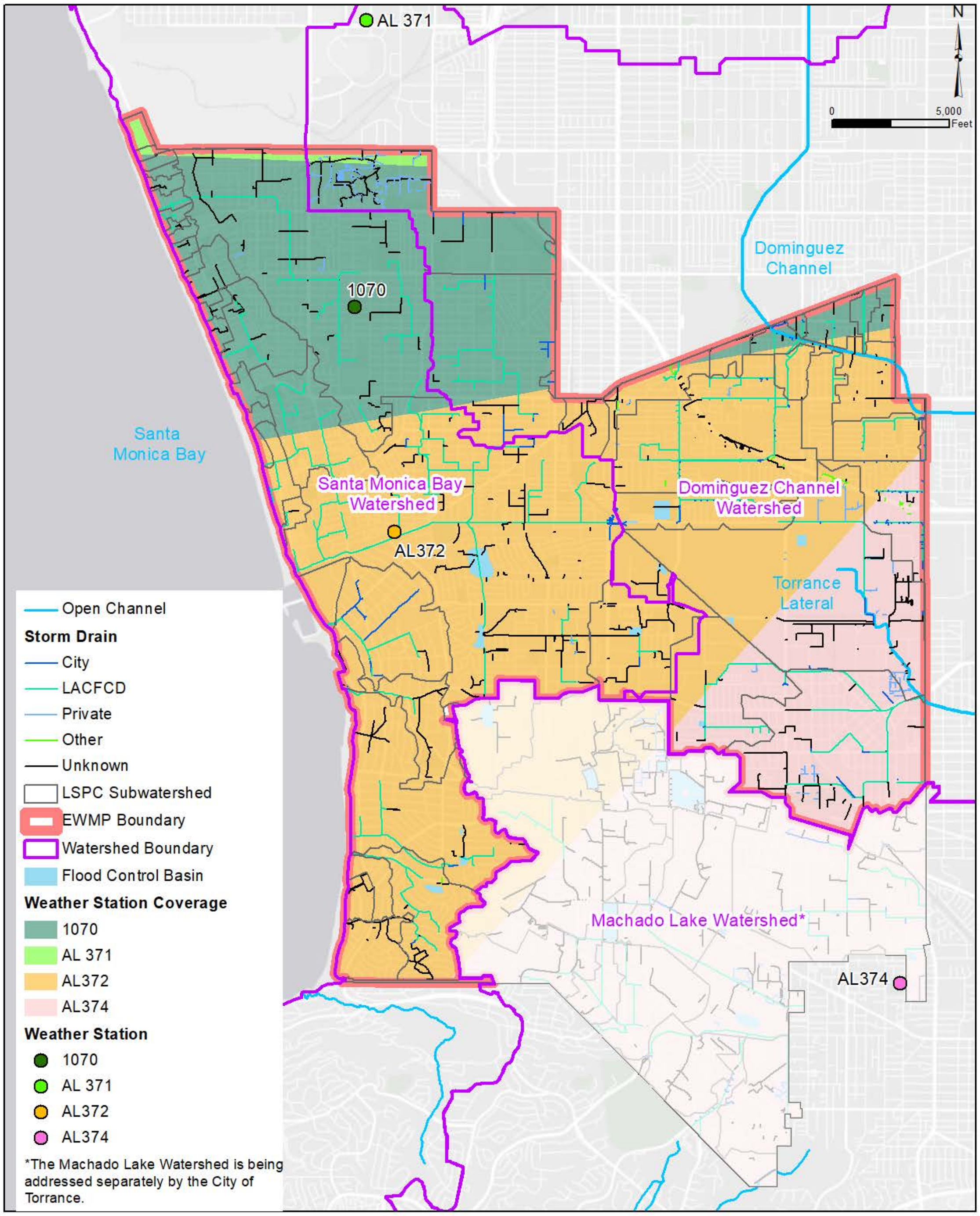

Figure 2. Hydraulic Network, Drainage Delineation, and Weather Station Overview

The default[3] WMMS 2.0 LSPC model has been configured, calibrated, and validated through a regional approach against flow and water quality monitoring data collected at all Mass Emission Stations (MES) in Los Angeles County. The following pollutants are included in the downloaded version of the WMMS 2.0 platform:

- Total Nitrogen
- Total Phosphorus
- Total Zinc
- Total Lead
- Total Copper
- Total Cadmium, and
- Total Suspended Solids (TSS)

The application of this model provides an estimate of the target load reduction (TLR), a numerical expression of the Permit compliance metrics that serves as a basis for confirming, with reasonable assurance, that implementation of the proposed BMPs will result in attainment of the applicable TMDL WLA-based WQBELs in the Permit for Category 1 pollutants, or the Water Quality Objectives for Category 2 and Category 3 pollutants.

The subsections below summarize the modifications to the default WMMS 2.0 LSPC model that were used to conduct the revised RAA.

3.1.1. Updating Weather Data

The default WMMS 2.0 LSPC model database includes precipitation data up to September 2018. Hourly rainfall data between September 2018 and June 2020 from Los Angeles County operated Automatic Local Evaluation in Real Time (ALERT) rain gauges were requested and amended to the model database in accordance with the default WMMS 2.0 rain gauge coverage assignment.

3.1.2. Adding Fecal Indicator Bacteria as a Modeled Constituent

In the original Beach Cities EWMP RAA, fecal indicator bacteria (FIB) compliance demonstration (where the TMDL permit limits are expressed in exceedance days) was performed via using load reductions as the modeled surrogate compliance metric. To maintain consistency with the LARWQCB Basin Plan, fecal coliform[4] was used as the

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[3] The term “default” refers to the “as-downloaded” model released in May 2020.

[4] While the LARWQCB Basin Plan established water quality objectives of total coliform, fecal coliform and enterococcus for marine water, historic monitoring data for a representative beach that demonstrated fecal coliform loads (discharged from the watershed outlets) were significantly correlated with total

representative FIB for marine waters, and *E. coli* was used as the FIB for freshwaters. Because none of the default constituents in WMMS 2.0 LSPC model can be used as surrogate pollutants for FIB, a representative FIB had to be added to the model. For the Santa Monica Bay LSPC model, fecal coliform was used, with model input parameters calibrated using fecal coliform monitoring data collected at Santa Monica Bay Beaches Bacteria (SMBBB) TMDL Compliance Monitoring Locations (CMLs) within the Beach Cities EWMP area. For the Beach Cities Dominguez Channel LSPC model, *E. coli* was used, with model input parameters calibrated using *E. coli* monitoring data collected at outfall monitoring locations draining to Dominguez Channel.

3.1.3. Use of Surrogate Pollutants

Pollutant load rate and concentration for WBPCs involving the seven default WMMS 2.0 LSPC model pollutants and the added FIB were obtained from the WMMS 2.0 LSPC output files directly. A subset of the directly modeled pollutants was used as surrogate pollutants to establish pollutant loading and concentration of pollutants not directly modeled in the WMMS 2.0 LSPC model. Details on surrogate pollutant selection and assignment in the Santa Monic Bay and Dominguez Channel watersheds are presented in Section 6.1 and 6.2, respectively.

3.1.4. Model Calibration and Validation

The default WMMS 2.0 LSPC model is calibrated on a regional basis using data through September 2018. This model was further calibrated and validated using Beach Cities CIMP monitoring data collected up to June 30, 2020 to best reflect the baseline hydrology and water quality conditions within the Beach Cities EWMP area. This date was selected as it marks the most-recently complete CIMP annual reporting year, and therefore is inclusive of the latest available data that have been properly QC'd by the Beach Cities WMG. Detailed information on the model calibration can be found in Section 4.

3.1.5. Revising LSPC Sub-Basin Boundaries

Since the default LSPC subwatershed boundaries were developed at a regional scale and covers the entire Los Angeles Basin, they were found to contain some minor inaccuracies at the finer spatial resolution used for the RAA. As part of the revised RAA process, the subwatershed boundaries were refined to more accurately reflect the drainage boundaries of the Beach Cities EWMP WMA.

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observed wet weather exceedance days for all FIBs for marine water. Hence, fecal coliform was selected as the representative FIB for marine water.

3.2. WMMS 2.0 SUSTAIN

Utilizing hourly hydrograph and pollutograph outputs from LSPC, SUSTAIN (version 2.1) provides estimates of water balance such as volumes: evapotranspired, diverted, captured, treated, and/or released by various BMPs, as well as a conceptually optimal spatial distribution based on cost effectiveness to achieve TLR goals. WMMS 2.0 SUSTAIN also includes a batch-processing framework to inform selection, configuration, and placement of BMPs throughout a watershed based on defined evaluation criteria, such as cost and TLR. The default WMMS 2.0 SUSTAIN model supports estimated performance of BMPs summarized in Table 3.

Table 3. Default BMPs Modeled in SUSTAIN

BMP Type	Performance Type
Distributed BMP	
Bioretention/biofiltration (with optional underdrain)	Volume reduction and flow through treatment
Pervious pavement	Volume reduction and flow through treatment
Cistern/Rain barrel	Volume reduction
Drywell	Volume reduction
Proprietary treatment unit	Flow through treatment
Regional BMP	
Infiltration gallery	Volume reduction
Retention/detention basin	Volume reduction and flow through treatment
Constructed wetland	Volume reduction and flow through treatment
Sewer diversion	Volume reduction
Regional treatment facility	Flow through treatment

For the revised RAA, WMMS 2.0 SUSTAIN was used to estimate the performance of existing and proposed distributed and regional BMPs, thereby assuring that an effective and suitable suite of stormwater management BMPs is implemented to meet applicable interim and final TLR goals. This approach is therefore used to demonstrate a reasonable assurance of compliance for all modeled WBPCs. Details on modeled BMPs in the Beach Cities EWMPs are presented in Section 8.3.

4. RAA APPROACH

Consistent with the original Beach Cities EWMP RAA, the revised RAA was performed per analysis region. An analysis region is defined by one of the following conditions:

1. A subwatershed tributary to a shoreline CML (e.g. SMB-5-01)
2. A subwatershed tributary to the open beach between two CMLs (SMB-03_04)
3. A subwatershed tributary to an EWMP area outlet (e.g. DC-N-MB)
4. A subwatershed to an existing flood control basin or sump (e.g. Wylie Basin)

As shown in Figure 3, there are 20 analysis regions in the Santa Monica Bay WMA and four in the Dominguez Channel WMA. Among the four Dominguez Channel WMA analysis regions, DC-N-MB, DC-N-RB and DC-S are tributary to Dominguez Freshwater. DC-TL is tributary to Dominguez Channel Estuary via Torrance Lateral. The Machado Lake Watershed is being addressed in a separate EWMP/RAA by the City of Torrance.

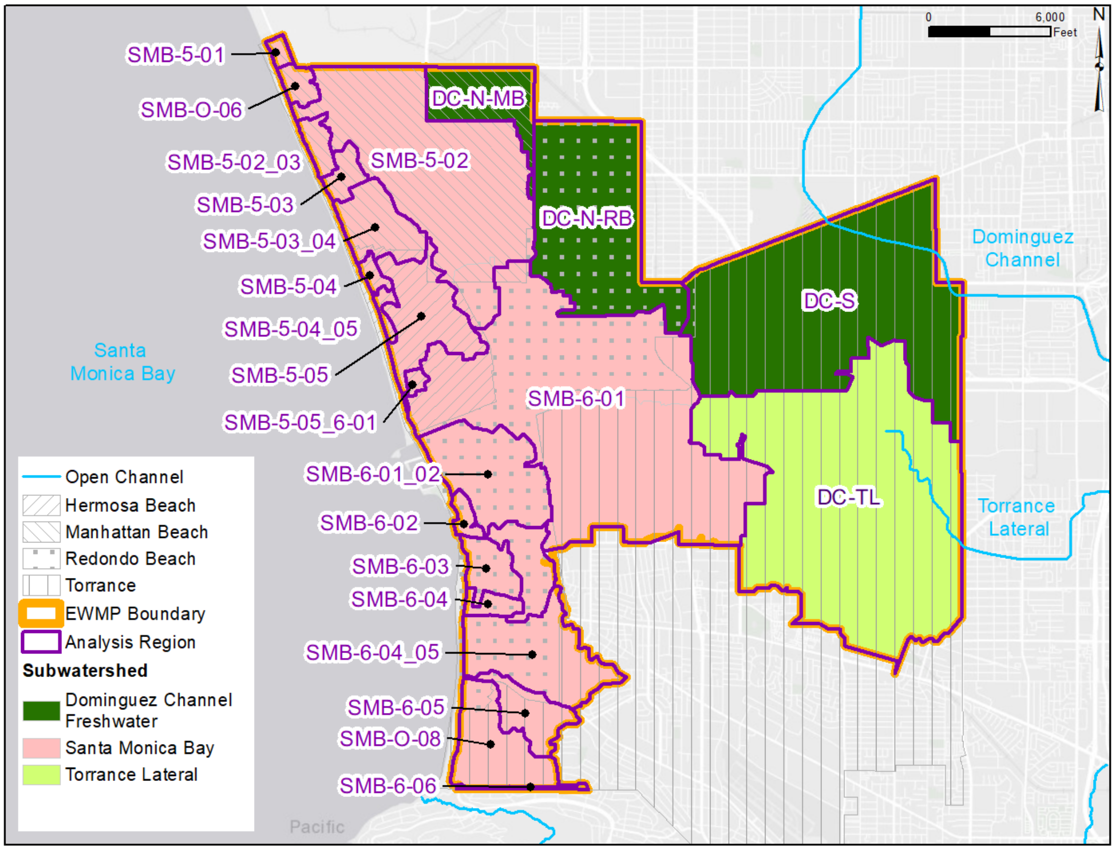

Figure 3. Analysis Region Overview

4.1. Wet Weather RAA Approach

The approach for representing wet weather flows and pollutant management for the RAA, including model determination and calibration, data inputs, critical condition selection, calibration performance criteria, and output types, have all been selected for consistency with the RAA Guidance Document (LARWQCB, 2014b), as well as functionality of WMMS 2.0. The process for the wet weather RAA included the following steps and were applied to the wet weather RAA for both Santa Monica Bay and Dominguez Channel (including Torrance Lateral) WMA.

1. Identify current WBPC list, including all quantifiable parameters requiring model simulation.
2. Revise, as needed, the contributing MS4 service areas to represent the WMA (e.g., remove lands or areas not required to be analyzed and adjust boundaries to match at a more detailed scale). This includes various full 85th percentile 24-hour storm capture basins under existing and proposed conditions (Wylie Basin, Torrance Basins Enhancement and Expansion Project, Beach Cities Green Streets Project), land owned and operated by Caltrans, and facilities operating under their own NPDES permit (e.g., the Torrance Refinery).
3. For analysis regions draining to a CML, review the Beach Cities CIMP and SMBBB TMDL monitoring data and assess if the analysis region is achieving compliance based on water quality history. For these analysis regions, no RAA is needed; compliance is already demonstrated based on monitoring data.
4. Perform hydrologic and water quality calibration on the LSPC model using Beach Cities CIMP outfall monitoring data.
5. Identify WBPC-specific critical condition.
6. Develop interim and final TLRs for identified WBPCs during the respective critical condition.
7. Identify the following with respect to structural and non-structural BMPs:
    a. Significant variations to BMPs accounted for in the original Beach Cities EWMP (e.g., differences in LID implementation levels)
    b. New BMPs that have been implemented since 2014 and were not accounted for in the original EWMP
    c. New BMPs that are planned for implementation and were not accounted for in the original EWMP.
8. Evaluate the pollutant load reductions of existing and proposed BMPs.
9. Compare these estimates with the final TLRs.
10. Revise the BMP implementation scenarios until all final TLRs are met, thereby reasonably assuring compliance with wet weather permit goals.

4.2. Dry Weather RAA Approach

Consistent with the original Beach Cities EWMP RAA, a semi-quantitative approach was implemented to perform the dry weather RAA and demonstrate reasonable assurance of meeting applicable permit goals.

Within the Santa Monica Bay WMA, low flow diversions (to the sanitary sewer) have been implemented successfully along the coast to effectively divert significant non-stormwater discharges away from discharging to the ocean. Additionally, for smaller outfalls, due in part to setbacks from the shoreline, non-stormwater MS4 infiltrates at the open beaches, preventing discharges from reaching the ocean. The effectiveness of these measures and outfall conditions has been consistently confirmed through monitoring. Therefore, compliance with TMDL objectives during dry weather is demonstrated for the Beach Cities Santa Monica Bay WMA via the no discharge permit compliance pathway.

Within the Beach Cities Dominguez Channel WMA, the dry weather RAA is only required for Category 2 and 3 WBPCs for the Dominguez Channel freshwater and Torrance Lateral and for Category 1 WBPC for the Dominguez Channel estuary. The approach outlined in Figure 4 was utilized to perform the dry weather RAA for the Beach Cities Dominguez Channel WMA. In subwatersheds containing proposed BMPs that address wet weather pollutants, it was assumed that dry weather flows would be completely captured and retained by these projects as well and result in no dry weather discharge to the Dominguez Channel.

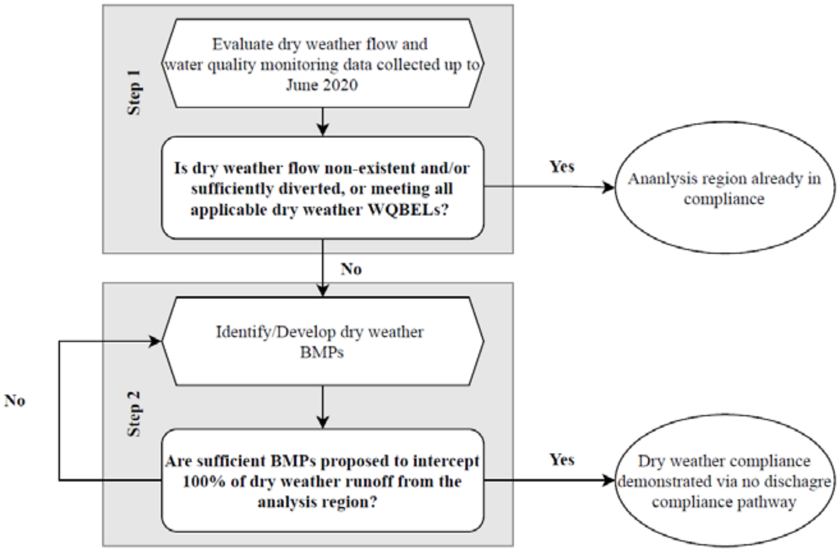
Step 1
Evaluate dry weather flow and water quality monitoring data collected up to June 2020
Is dry weather flow non-existent and/or sufficiently diverted, or meeting all applicable dry weather WQBELs?
Yes
Ananlysis region already in compliance
No
Step 2
Identify/Develop dry weather BMPs
No
Are sufficient BMPs proposed to intercept 100% of dry weather runoff from the analysis region?
Yes
Dry weather compliance demonstrated via no dischagre compliance pathway

Figure 4. Dry Weather RAA Process

5. MODEL CALIBRATION AND VALIDATION

The default WMMS 2.0 LSPC watershed model has been configured, calibrated, and validated by LACFCD through a regional approach against flow and water quality monitoring data collected at all Los Angeles County Mass Emission Stations (MES) between water years 2008 and 2018 (LACFCD, 2020a). Geosyntec further calibrated the model using Beach Cities CIMP wet weather outfall flow and water quality data collected through June 2020. The calibrated Beach Cities LSPC model is used as the foundation for performing the wet weather RAA. Figure 5 shows CIMP monitoring locations utilized for the Beach Cities LSPC watershed model calibration and validation.

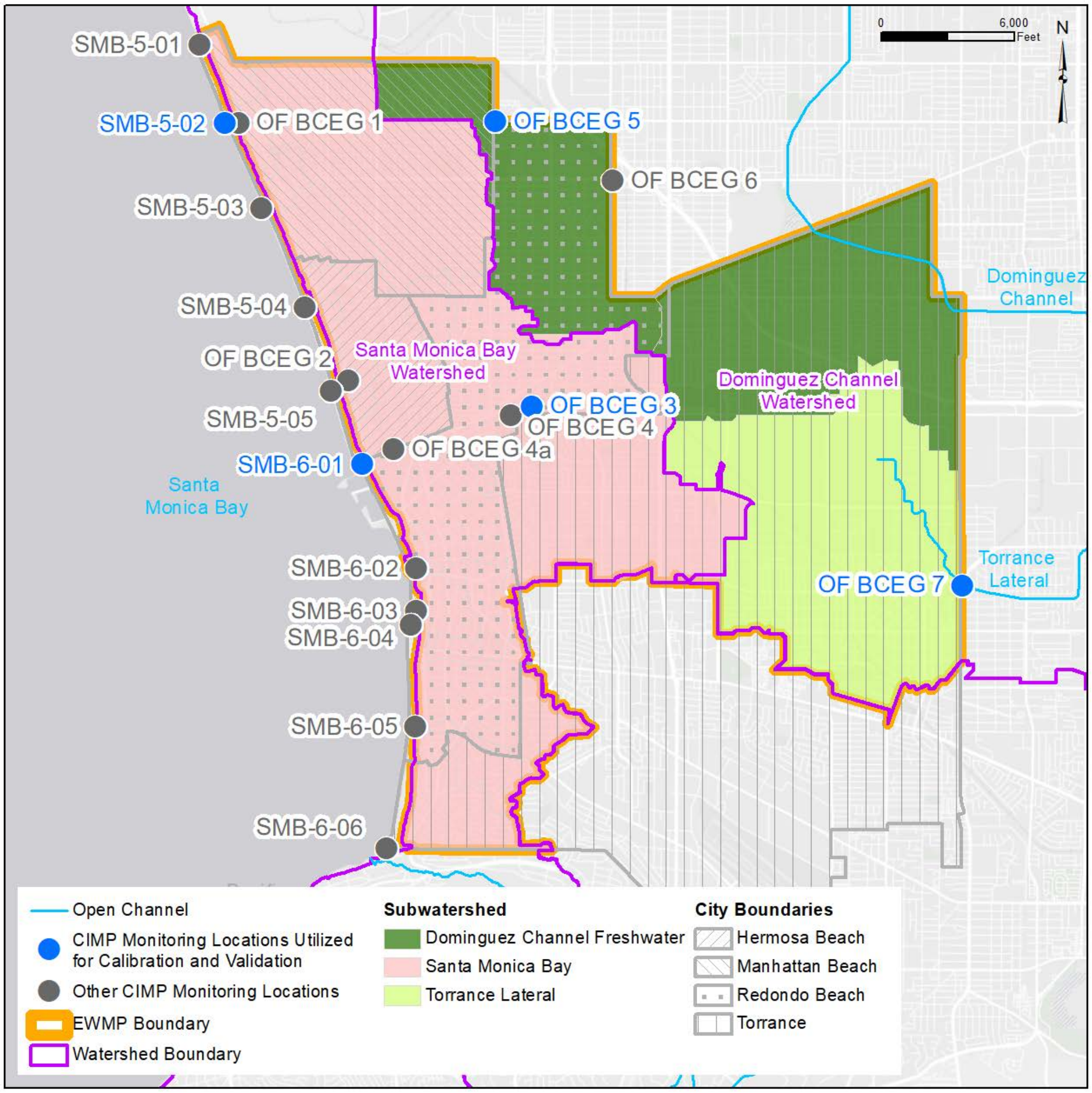

Figure 5. Locations of Monitoring Stations Utilized for Calibration and Validation

Calibrations were performed to meet specifications of the RAA Guidelines (LARWQCB, 2014b), which are summarized in Table 4 below. Consistent with the regional WMMS 2.0 calibration process, percent bias (PBIAS) is the primary statistic used to evaluate agreement between modeled-predicted and observed data. PBIAS quantifies systematic over- or under-prediction. Low values of PBIAS indicate better fit and predictive capability of the model. The lower bound of the "Fair" threshold is considered the minimum acceptable criteria for the model calibration process. If a "Fair" threshold is not achieved during the model validation process, additional model adjustments are made to attain the threshold at the validation site. If such effort is not successful, additional investigations will be performed to examine the modeled and monitored data at the validation site to justify the calibration effort.

Table 4. Calibration Metrics

Category	Percent Difference Between Model-Predicated and Observed Data (PBIAS)		
	Very Good	Good	Fair
Hydrology / Flow	±0 – 10%	≥ ±10% - 15%	≥ ±15% - 25%
Sediment	±0 – 20%	≥ ±20% - 30%	≥ ±30% - 40%
Water Quality	±0 – 15%	≥ ±15% - 25%	≥ ±25% - 35%
Pesticides / Toxics	±0 – 20%	≥ ±20% - 30%	≥ ±30% - 40%

Details of the calibration and validation approach and results are presented in the following subsections.

5.1. Hydrologic Calibration

The objective of hydrologic calibration is to compare observed and model-predicted wet weather flow rates at monitoring sites and demonstrate a PBIAS of 25% or less. While continuous flow data is collected at all outfall monitoring sites, the following outfall monitoring sites were excluded from the hydrologic calibration. Reasons for exclusion are also provided:

- OF-BCEG-01 and OF-BCEG-04a: Drainage areas to these monitoring sites includes large, manually controlled flood control detention basins. Since the objective of the hydrology calibration is to determine modeling parameters that will be globally applied to the entire Beach Cities EWMP area, monitoring data collected at monitoring sites with existing regional stormwater BMPs represent controlled discharges and were therefore excluded.

- OF-BCEG-02: the monitoring site is consistently influenced by tidal impacts, such that the collected flow data do not accurately represent MS4 discharges coming from the upstream drainage area. Therefore, this site was excluded from calibration.
- OF-BCEG-06: Initial comparison between monitored and uncalibrated modeled flow rates revealed that that the monitored flow was consistently less than the modeled flow data by an order of magnitude. Such discrepancy was not observed in other outfalls. The Beach Cities WMG plans to perform further investigation to assess such discrepancy as part of the CIMP. Although there's currently no reason to believe the flow data collected at this site is inaccurate, data from the outfall monitoring site was excluded from the current hydrologic analyses and calibration to avoid overly reducing runoff generation in the LSPC model.

After screening out aberrant outfall monitoring and locations, a site in the Santa Monica Bay WMA was determined to have acceptable flow monitoring data available for hydrologic calibration. A combined hydrologic calibration effort was then conducted to utilize wet weather flow monitoring data collected at OF-BCEG-03 and OF-BCEG-05 to determine modeling parameters applicable to both the Beach Cities Santa Monica Bay and Dominguez Channel LSPC models. Wet weather flow monitoring collected at OF-BCEG-07 was used to validate the calibration effort.

In maintaining consistency with the WMMS 2.0 model regional calibration process, the hydrologic calibration required the evaluation of subsurface storage, infiltration, and groundwater recession modeling parameters. The calibration was performed by iteratively applying multipliers to HRU specific modeling parameters. The resulting hydrology parameters ranges are presented in Table 5 alongside with default value ranges from the WMMS 2.0 LSPC model database and guidance.

Table 5. Summary of Calibrated Hydrology Modeling Parameters

Parameter[1]	Description	Unit	Beach Cities Model Values
INFILT	Index to Infiltration Capacity	in/hr	0.23-4.0
AGWRC	Base groundwater recession	none	0.95-0.99
CEPSC	Interception storage capacity	inches	0.2-0.75

[1] For hydrologic parameters not listed in the table, the default WMMS 2.0 LSPC model values were used without modification.

Table 6 presents a summary of results for hydrology calibration. PBIAS calculations were based on comparison of modeled and observed daily flow at each outfall monitoring site.

For the PBIAS metric, modeled flows achieved “Very good” agreement with observed data at OF-BCEG-05 and OF-BCEG-07, and achieved “Fair” agreement with observation at OF-BCEG-03 according to the Regional Board RAA Guidance metric summarized in Table 4.

Table 6. Model Performance Summary - Hydrology

Calibration Metrics	**Comparison Locations**		
	OF-BCEG-03	**OF-BCEG-05**	**OF-BCEG-07**
PBIAS (%)	16.9	-0.2	2.6

To further evaluate the temporal trends of the hydrology calibration, comparisons between modeled and observed monthly flows were evaluated by examining the time series plots and the average monthly flows between November 2016 and June 2020. The resultant plots were shown in Figure 6 through Figure 8.

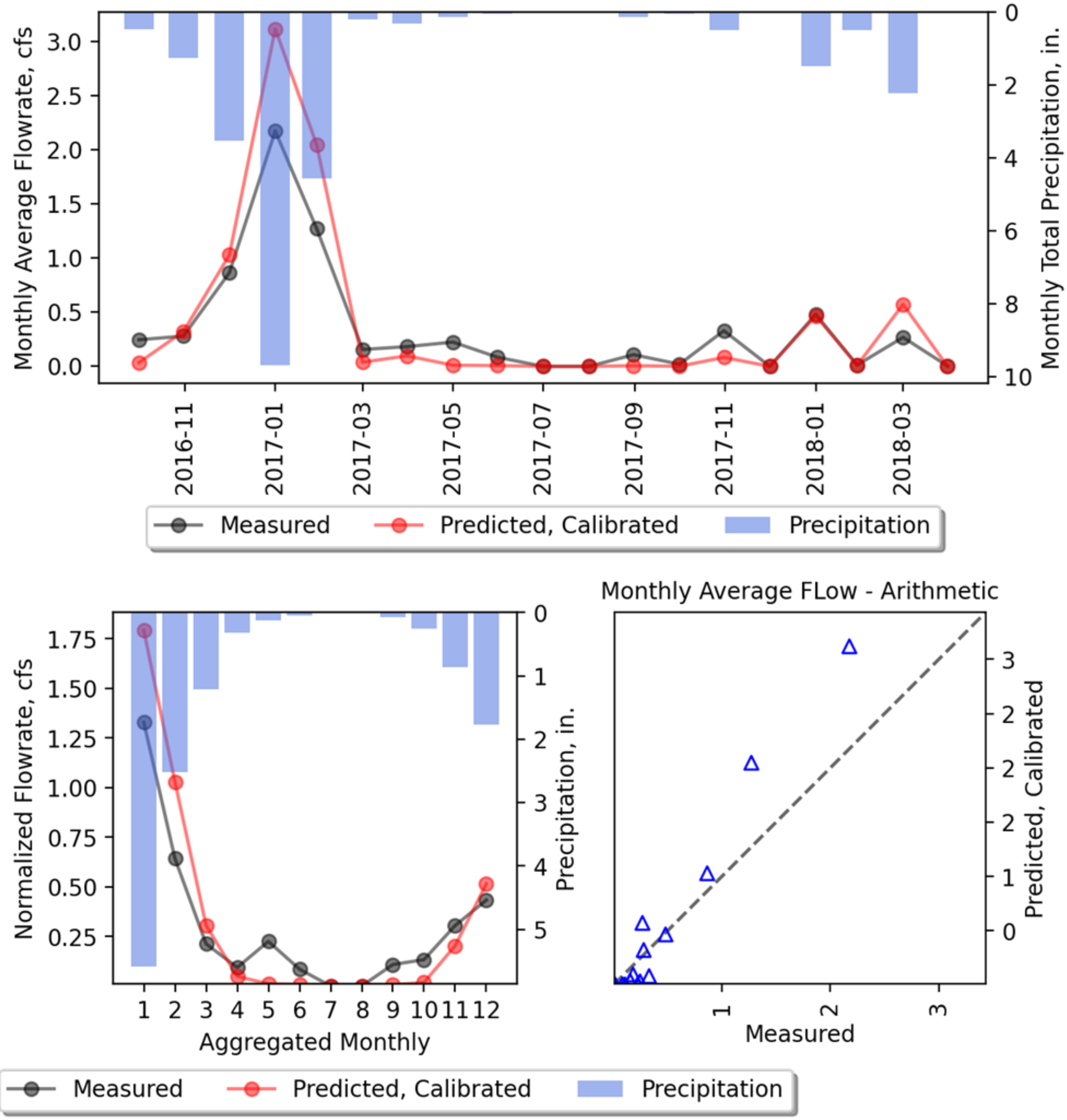

Figure 6. Flow Comparison at OF-BCEG-03

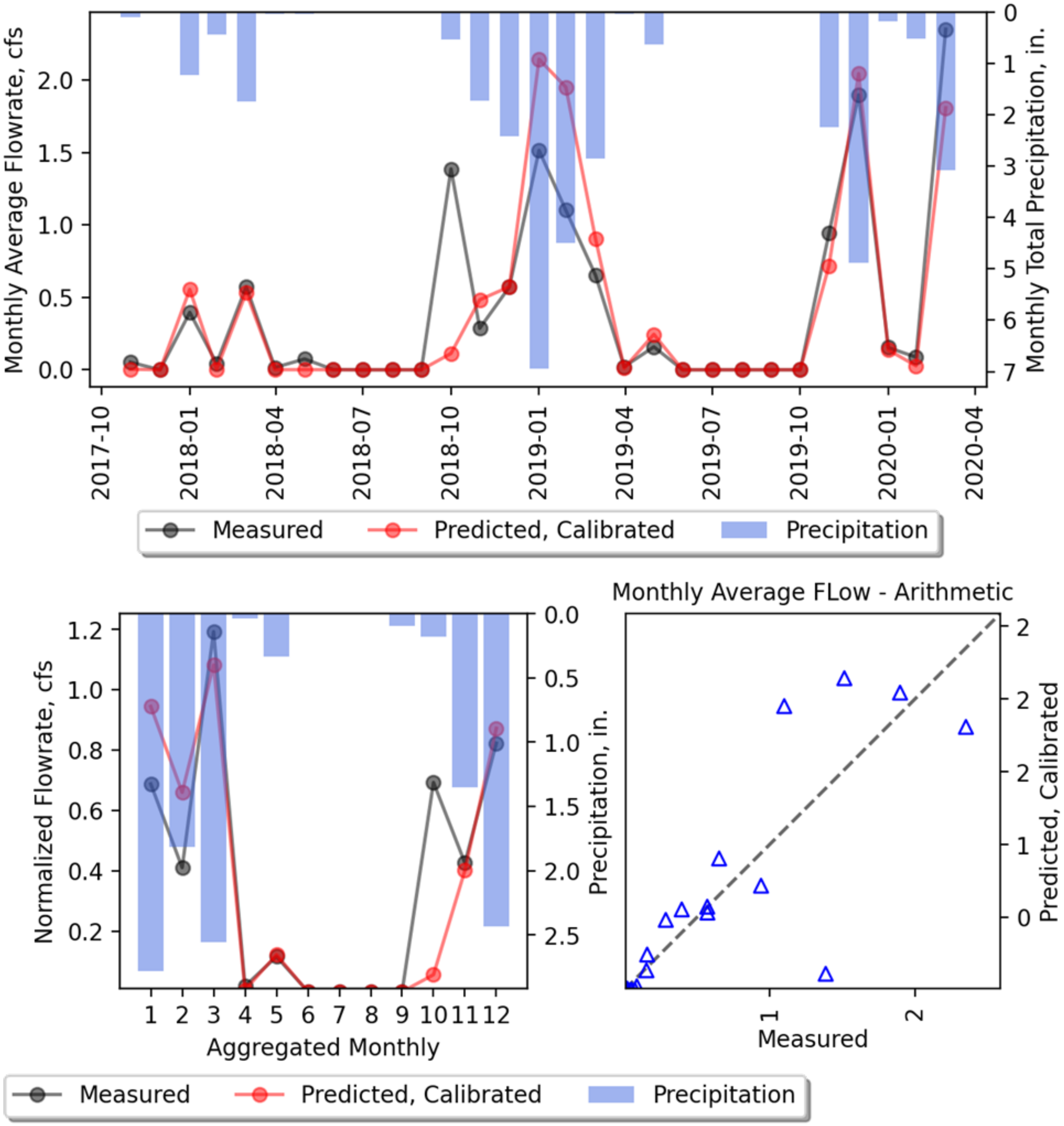

Figure 7. Flow Comparison at OF-BCEG-05

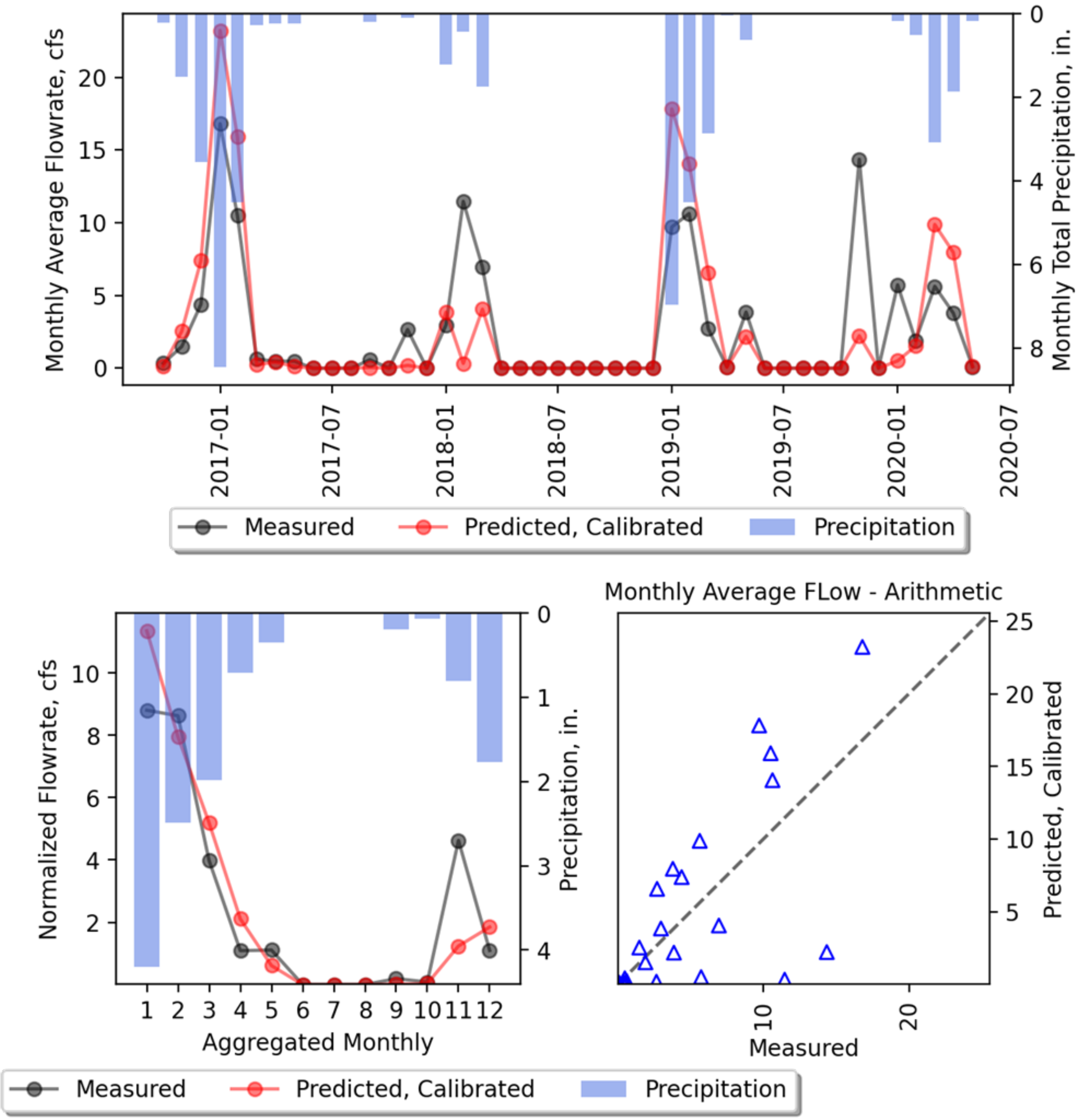

Figure 8. Flow Comparison at OF-BCEG-07

5.2. Water Quality Calibration

The RAA Guidelines require water quality calibration based on available monitoring data from each analysis region over the most recent 10 years (LARWQCB, 2014). The default WMMS 2.0 LSPC watershed model has been regionally calibrated and validated using data collected at Los Angeles County MES and CIMP receiving water monitoring stations throughout the County between water year 2008 and 2018. Building upon the regional calibration and validation efforts, Geosyntec further calibrated the LSPC model using water quality data collected at the Beach Cities CIMP outfall monitoring locations shown in Figure 5. Modeling was completed for the following constituents:

- Fecal Coliform (For the Santa Monica Bay model only)
- *E. coli* (For the Dominguez Channel model only)
- Total Suspended Solids (TSS), which served as a surrogate for numerous other WBPCs
- Metals – Total copper, total lead, total zinc, and total cadmium

The results of the modeling are discussed in the following subsections.

As discussed in Section 3.1.2, FIB representation was added to the WMMS 2.0 LSPC model to demonstrate compliance to TMDL permit limits that are expressed in exceedance days. HRU-specific land use bacteria EMCs from WMMS 1.0 were adopted as the starting point of the calibration. The next step in the calibration process was an iterative application of multipliers to EMCs across all HRUs. For the Santa Monica Bay watershed model, the EMCs were calibrated and validated against wet weather fecal coliform monitoring data collected at the SMBBB CMLs SMB-5-02 and SMB-6-01, respectively. These sites are typically sampled five days a week throughout the year, including wet weather, providing the most wet weather data coverage. For the Dominguez Channel model, the FIB modeling parameters were calibrated and validated against *E. coli* monitoring data collected at outfall sites OF-BCEG-07 and OF-BCEG -05, respectively. OF-BCEG-07 was used as the calibration site because it had more sampled data points (12 events) compared to OF-BCEG-05 (6 events). The calibrated range of parameters are summarized in Table 7.

Table 7. Summary of Calibrated FIB Modeling Parameters

Parameter	Description	Units	Santa Monica Bay Model Values (Fecal Coliform)	Dominguez Channel Model Values (*E. coli*)
SOQC	Concentration of constituent in surface outflow	MPN/ 100mL	900 – 81,900	1,300 – 118,300
IOQC	Concentration of constituent in interflow outflow	MPN /100mL	900 – 81,900	1,300 – 118,300

Although TSS is not a pollutant of concern for the Beach Cities WMG, it is an important driver for sediment-associated pollutant simulation within LSPC. In addition, TSS loads are used as a surrogate for organic pollutants of concern that are not modeled directly in LSPC (e.g., benzo[a]pyrene, total chlordane). TSS calibration was performed by iteratively applying multipliers to HRU-specific parameter associated with sediment load buildup on the land surface. The range of calibrated buildup is summarized in Table 8. TSS was not modeled (and hence not calibrated) in the Santa Monica Bay LSPC model as there are no WBPCs that are sediment-associated in the watershed. For the Dominguez Channel watershed model, the TSS modeling parameters were calibrated and validated against TSS monitoring data collected at outfall sites OF-BCEG-07 and OF-BCEG-05, respectively.

Table 8. Summary of Calibrated Sediment Loading Parameters

Parameter[1]	Description	Units	Beach Cities Model Values
ACCSDP	Rate at which solids accumulate on the land surface	lb/acre/day	0 – 0.002

Calibration for metals was performed by iteratively applying HRU specific multipliers to LSPC model parameters associated with metal potency factors in order to maintain the same relative ratios among HRUs determined in the regionally calibrated WMMS 2.0 LSPC model. The calibration results are summarized in

Table 9. No metals were modeled (and hence were not calibrated) in the Santa Monica Bay model as monitoring data demonstrates that there are no significant MS4-generated metal WBPCs. For the Dominguez Channel watershed model, metal-related modeling parameters were calibrated and validated against monitoring data collected at outfalls OF-BCEG-07 and OF-BCEG -05, respectively.

Table 9. Summary of Calibrated Pollutant Loading Parameters

Pollutant	Parameter Name	Description	Units	Beach Cities Model Values
Total Copper	POTFW	Pollutant wash-off potency factor per mass of sediment	lb/ton	0-1.5
	POTFS	Pollutant scour potency factor per mass of sediment	lb/ton	0-1.9
Total Lead	POTFW	Pollutant wash-off potency factor per mass of sediment	lb/ton	0-0.28
	POTFS	Pollutant scour potency factor per mass of sediment	lb/ton	0-0.28
Total Zinc	POTFW	Pollutant wash-off potency factor per mass of sediment	lb/ton	0-13.8
	POTFS	Pollutant scour potency factor per mass of sediment	lb/ton	0-13.8
Total Cadmium	POTFW	Pollutant wash-off potency factor per mass of sediment	lb/ton	0.001-0.025
	POTFS	Pollutant scour potency factor per mass of sediment	lb/ton	0.001-0.025

Table 10 presents a summary of results for water quality calibration for all WBPCs. Calculations of PBIAS were based on a comparison of modeled and observed daily average concentration at each outfall monitoring site. To further evaluate the temporal trends of the water quality calibration, comparisons between modeled and observed pollutant concentration were evaluated examining the time series plots. An example of the time series plots for total zinc concentration was shown in Figure 9. The remaining time series plots are included in Attachment D.1.

In reference to the RAA Guideline calibration metrics summarized in Table 4, modeled pollutant concentrations achieved “Fair”, “Good”, or “Very Good” agreement with observed data at all comparison sites. It should be noted that the TSS concentration measured at OF-BCEG-05 on 1/9/2018 was deemed as an outlier due to noted laboratory QA/QC flags and was therefore excluded from the model calibration process.

Table 10. Water Quality Model Calibration Summary

Calibration Metric	Constituent Group	Santa Monica Bay Model		Dominguez Channel Model	
		SMB-5-2	SMB-6-1	OF-BCEG-05	OF-BCEG-07
PBIAS (%)	Indicator Bacteria[2]	28.4	-24.3	-3	+7
	TSS	n/a[1]	n/a[1]	-25	+23

Calibration Metric	Constituent Group	Santa Monica Bay Model		Dominguez Channel Model	
		SMB-5-2	SMB-6-1	OF-BCEG-05	OF-BCEG-07
	Total Copper	n/a[1]	n/a[1]	-21	+35
	Total Lead	n/a[1]	n/a[1]	+23	+18
	Total Zinc	n/a[1]	n/a[1]	-11	+10
	Total Cadmium	n/a[1]	n/a[1]	+28	+35

[1] No WBPCs associated with this constituent in Santa Monica Bay watershed.

[2] Fecal coliform for the Santa Monica Bay model; *E. coli* for the Dominguez Channel model.

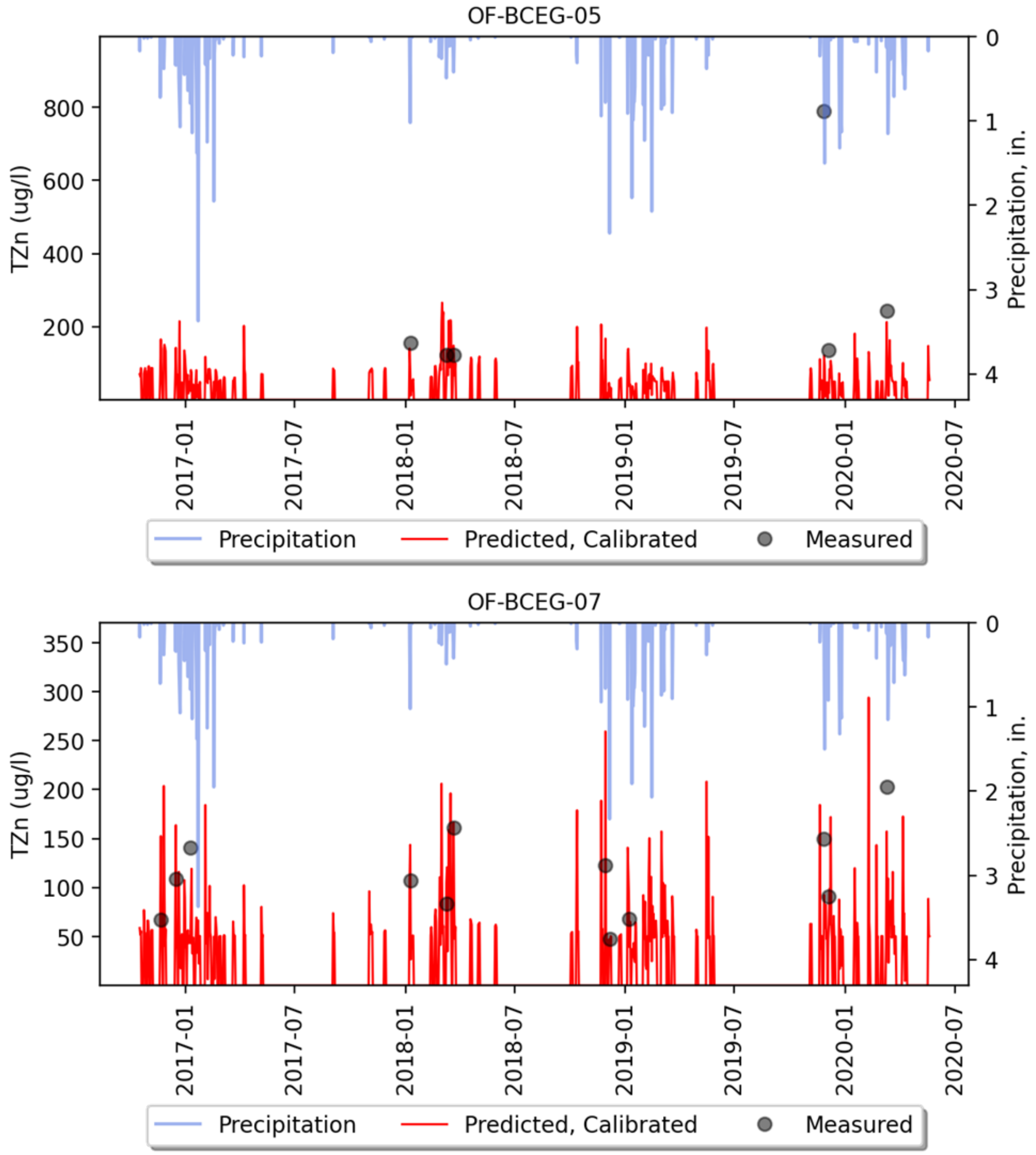

Figure 9. Example Concentration Comparison Plot (Total Zinc)

6. CRITICAL CONDITION DEFINITION

6.1. Santa Monica Bay WMA

6.1.1. Bacteria (Fecal Coliform)

Consistent with the critical condition definition in the Wet Weather SMBBB TMDL and the Regional Board RAA Guidance (LARWQCB, 2014b), the Santa Monica Bay RAA for bacteria was completed utilizing the 90th percentile wet year. Water Year 2011[5] was previously identified for all watersheds in Los Angeles County using WMMS 2.0 hydrologic analysis of the most recent 10-years of rainfall data to define the 90th percentile representative "water year" (LACFCD, 2020c). Water Year 2011 then served as the basis for determination of wet weather bacteria critical condition in the Beach Cities Santa Monica Bay WMA.

6.2. Dominguez Channel WMA

6.2.1. Indicator Bacteria (*E. coli*)

Similar to all existing Los Angeles region bacteria TMDLs for rivers, as well as the Regional Board RAA Guidance (LARWQCB, 2014b), the Dominguez Channel RAA for bacteria used the 90th percentile wet year. As discussed in Section 6.1.1, the 90th percentile wet year timeframe was identified to be Water Year 2011 for the Dominguez Channel WMA (LACFCD, 2020c).

6.2.2. Metals and Organic Pollutants

According to the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Toxics TMDL (herein referred as the Dominguez Channel Toxics TMDL), the critical condition for metals and organic pollutants discharging to Dominguez Channel and Torrance Lateral were defined as the 90th percentile daily pollutant load. The calibrated Beach Cities Dominguez Channel LSPC watershed model was used to compute the daily metals and TSS loads[6] on wet days between 2008 and 2018. The daily loads were calculated and ranked for each pollutant, with the 90th percentile daily load (summarized in Table 11) selected as the defining condition representing the required TLR that must be achieved.

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[5] October 2010 to September 2011

[6] Since organic pollutants cannot be modeled directly in WMMS 2.0, TSS is used as a surrogate to calculate the 90th pollutant load day for organic pollutants

Table 11. Dominguez Channel WMA 90th Percentile Daily Load Summary

Analysis Region (Receiving Water)	Pollutant	90th Percentile Load	Load Unit	90th Percentile Load Day	Runoff Volume During the 90th Percentile Load Day (ac-ft)
DC-N-MB (Dominguez Channel Freshwater)	TSS	1,904	lb/day	3/17/2012	5.5
	Total Copper	1.3	lb/day	12/12/2011	8.4
	Total Lead	0.2	lb/day	12/12/2011	8.4
	Total Zinc	6.9	lb/day	12/12/2011	8.4
DC-N-RB (Dominguez Channel Freshwater)	TSS	5,936	lb/day	10/30/2010	19.2
	Total Copper	4.1	lb/day	12/17/2010	30.1
	Total Lead	0.6	lb/day	12/17/2010	30.1
	Total Zinc	22.0	lb/day	12/17/2010	30.1
DC-S (Dominguez Channel Freshwater)	TSS	7,706	lb/day	11/30/2012	34.3
	Total Copper	4.0	lb/day	11/6/2011	35.4
	Total Lead	0.5	lb/day	11/6/2011	35.4
	Total Zinc	18.4	lb/day	11/30/2012	34.3
DC-TL (Torrance Lateral and Dominguez Channel Estuary[1])	TSS	15,299	lb/day	4/11/2012	50.8
	Total Cadmium[2]	0.15	lb/day	1/21/2012	40.6
	Total Copper	11.5	lb/day	1/21/2012	40.6
	Total Lead	1.6	lb/day	1/21/2012	40.6
	Total Zinc	65.1	lb/day	1/21/2012	40.6

[1] DC-TL drains to Dominguez Channel Estuary via Torrance Lateral.

[1]Cadmium is a pollutant of concern for Dominguez Channel Estuary only. However analysis region DC-TL discharges to the Dominguez Channel Estuary and is shown in the TMDL for this WMA.

7. TARGET LOAD REDUCTIONS

The following subsection documents the development of wet weather TLRs for the Beach Cities EWMP area. The dry weather RAA approach described in Section 4.2 does not require TLRs. See Section 10 for the dry weather RAA result.

7.1. Santa Monica Bay WMA

Wet weather pollutants of concern for the Santa Monica Bay WMA include fecal coliform, PCBs, DDT, mercury, arsenic, trash, and marine debris. The following sections describe the TLR development for each pollutant, or the justifications on why a modeled TLR is not required to demonstrate reasonable assurance of compliance.

7.1.1. Bacteria (Fecal Coliform)

Utilizing the calibrated Beach Cities Santa Monica Bay LSPC watershed model, the bacteria TLR was established by following the same modeling approach developed in the original Beach Cities EWMP, which accounted for site-specific monitoring data at each shoreline CML. As discussed in Section 3.1.2, the modeling methodology correlates the bacteria load to the expected annual bacteria exceedance days, which is the Permit's WQBEL expression for the SMBBB TMDL.

The fecal coliform TLR was estimated by modeling a hypothetical detention basin at each analysis region outlet. As the first step in this process, the allowable discharge days for each analysis region was calculated as the TMDL-specified allowable exceedance days, divided by the 10-year wet weather exceedance rate at the shoreline CML. This approach makes use of site specific wet weather beach bacteria monitoring data to determine the number of discharge days that result in the number of allowable exceedance days at the shoreline. For analysis regions with anti-degradation-based allowable exceedance days, a target load reduction of zero is assumed. This approach is consistent with the SMBBB TMDL which acknowledges that historic bacteria exceedance rates for each of these analysis regions are lower than that of the reference beach, on average, and therefore no additional load reduction is required. This assumption applies for seven of the 11 total SMBBB TMDL CMLs in Beach Cities Santa Monica Bay WMA – i.e., SMB-5-1, SMB-5-3, SMB-5-4, SMB-5-5, SMB-6-2, SMB-6-5, and SMB-6-6. Historic wet weather monitoring data at these sampling locations through TMDL Year 2019 confirm this understanding, as the long-term exceedance rate at all seven sites varies between 7% and 24%. This is below the long-term wet weather exceedance rate at the reference beach (26%) allowing the conclusion that no additional load reduction is required at these locations.

For analysis regions without anti-degradation-based allowable exceedance days, a hypothetical basin was iteratively sized until discharge frequency at the outfall is less than or equal to the allowable exceedance days at that monitoring location. Each hypothetical downstream retention BMP included a diversion with a calculated hydraulic capacity that provides full capture of flows and results in a model-derived bypass frequency (or number of discharge days) for Water Year 2011 that achieves the allowable exceedance day criteria. Each diversion for these conceptual BMPs was separately modeled to determine the hydraulic capacity that results in full capture of discharge. The net load reduction resulting from this conceptual BMP scenario (i.e., baseline analysis region load minus the analysis region load with the diversion system and full capture retention BMP in place) for Water Year 2011 is the TLR. For the RAA, reasonable assurance of compliance is achieved when modeled load reductions associated with proposed BMPs is greater than or equal to the TLR for each analysis region.

In summary, the following approach was implemented to calculate a TLR for each SMB modeled analysis region without anti-degradation-based allowable exceedance days:

1. Each analysis region that does not currently comply with applicable TMDL limits was modeled in LSPC for the 90th percentile wet year (Water Year 2011).
2. The existing, baseline condition (i.e., without an outlet retention BMP) was modeled for each analysis region, resulting in a determination of the baseline fecal coliform load for the 90th percentile water year (baseline load).
3. The 10-year historical wet weather exceedance percentage was determined by dividing the total number of wet weather exceedance days by the total number of discharge days in which wet weather was sampled.
4. The allowable number of discharge days for each analysis region was calculated by dividing the total number of allowable exceedance days (17, per the TMDL) by the exceedance percentage calculated in Step 3.
5. An in-stream diversion to a large hypothetical retention BMP at the outlet of each analysis region was iteratively sized to reduce the number of discharge days to be less than or equal to the allowable discharge days determined in Step 4.
6. Each diversion and hypothetical retention BMP was then modeled to produce a mean fecal coliform load for the 90th percentile year (allowed load).
7. For each analysis region, the difference between the baseline load (Step 2) and the allowed load (Step 6) resulted in a TLR for the 90th percentile year, which was the target load reduction required to meet the 17 allowable TMDL exceedance days for wet weather.
8. A TLR-equivalent 24-hour runoff management volume was estimated as the maximum daily diverted volume during the critical condition (i.e. throughout the modeled year). Both load-based TLR and the equivalent 24-hour runoff

management volume are considered eligible Beach Cities EWMP compliance metrics.

7.1.2. Pesticides and PCBs

Consistent with the original EWMP as well as the SMB PCBs and DDT TMDL, the WLAs for the entire Santa Monica Bay WMA were set equal to the existing estimates of annual loads for DDT and PCBs. Monitoring data collected as part of the Beach Cities CIMP demonstrate that discharges of PCBs and DDTs from the Beach Cities Beach Cities EWMP area into Santa Monica Bay are below the TMDL limits (Beach Cities WMG, 2020). Therefore, the current required additional load reduction to meet TMDL WLAs is zero for PCBs and DDTs, and no BMP modeling analysis is required to demonstrate compliance. For more information, see the Source Assessment portion of the revised Beach Cities EWMP, Appendix B.

7.1.3. Mercury and Arsenic

Mercury and arsenic were recently added to the 303(d) list for Santa Monica Bay WMA. However, CIMP monitoring data collected by the Beach Cities to date demonstrate that outfall concentrations were consistently below the Ocean Plan objectives for these parameters. As a result, no modeling was conducted for mercury or arsenic as part of the revised RAA. For more information, see the Source Assessment portion of the revised Beach Cities EWMP, Appendix B.

7.1.4. Trash and Marine Debris

Compliance with the SMB Debris TMDL will be met through a phased retrofit of full-capture or partial capture systems throughout the Beach Cities Santa Monica Bay WMA in combination with institutional measures (e.g., street sweeping with posted no-parking on street sweeping days) to meet each interim and final compliance deadline. Hence, these constituents do not require a TLR to be calculated and were not modeled as part of the revised RAA.

7.1.5. Final Wet Weather TLR Summary for Santa Monica Bay

TLRs for each analysis region draining to a Santa Monica Bay CML are listed in Table 12**.** Consistent with the original EWMP, non-zero TLRs were only identified in two SMB analysis regions – SMB-5-02 and SMB-6-01. Based on the number of anti-degradation sites within the Beach Cities Santa Monica Bay WMA, coupled with the water quality history at the other sites, these results are appropriate.

Table 12. Santa Monica Bay WMA Wet Weather TLR

Analysis Region	Critical Condition	Baseline Load (10^{12} MPN/ year)	Final Target Load Reduction		
			Absolute (10^{12} MPN/ year)	% of Baseline Load	TLR Equivalent 24-Hour Management Volume (ac-ft)
SMB-5-1	90th percentile water year	1.7	Anti-Degradation	0%	0
SMB-5-2		111.9	59.0	53%	67.1
SMB-5-3		7.5	Anti-Degradation	0%	0
SMB-5-4		2.6	Anti-Degradation	0%	0
SMB-5-5		39.0	Anti-Degradation	0%	0
SMB-6-1		112.1	54.7	49%	51.2
SMB-6-2		16.2	Anti-Degradation	0%	0
SMB-6-3		10.0	CIMP data shows compliance with final allowable exceedance days. Hence no RAA required to demonstrate compliance.		
SMB-6-4		4.1			
SMB-6-5		15.3	Anti-Degradation	0%	0
SMB-6-6		1.2	Anti-Degradation	0%	0

7.2. Dominguez Channel WMA

Wet weather pollutants of concern in the Dominguez Channel WMA include toxicity, total copper, total lead, total zinc, indicator bacteria, and benzo(a)pyrene. Total PCBs, total DDTs, total cadmium, and total PAHs are additional WBPCs for Beach Cities EWMP area tributary to Torrance Lateral and Dominguez Channel Estuary[7]. While the default WMMS 2.0 LSPC model represents a subset of these WBPCs, TLRs and target loads for the other WBPCs were established using surrogate pollutants in order to comply with the State Board's requirement to demonstrate reasonable assurance of attainment of all applicable water quality targets (SWRCB, 2020).

7.2.1. Metals

Total copper, total lead, and total zinc are Category 1 WBPCs in the Dominguez Channel WMA due to the Dominguez Channel Toxics TMDL . Total cadmium is an additional Category 1 WBPCs in Dominguez Channel Estuary due to the Toxics TMDL. Zero TLRs were set for total lead since monitoring data from contributing outfalls have consistently met the respective numeric targets.

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[7] For the Beach Cities EWMP area, analysis region DC-TL drains to Dominguez Channel Estuary via Torrance Lateral. No other Beach Cities EWMP area drains to the Dominguez Channel Estuary or the Torrance Lateral.

Per the MS4 Permit, permittees shall be deemed TMDL compliant with meeting total copper, total lead and total zinc WLAs if loads are less than the allocation when using one of the following calculations:

1. For analysis regions tributary to Dominguez Channel freshwater and Torrance Lateral - Daily loading of pollutants calculated as the water-column WQBEL concentration[8] multiplied by the daily flow volume during the 90th percentile loading day. The TMDL water-column WQBELs in the TMDL are based on California Toxics Rule (CTR) aquatic life criteria maximum concentration criteria.
2. For analysis regions tributary to Dominguez Channel freshwater - Daily mass based WLA calculated as the daily mass-based MS4 WLA to Dominguez Channel freshwater apportioned to Beach Cities WMG tributary area.
3. For analysis region(s) tributary to Torrance Lateral - Daily loading of pollutants calculated as the sediment-column WQBEL concentration multiplied by the daily TSS load during the 90th percentile loading day.

As such, the method that resulted in the least restrictive daily loading of pollutants was used to determine the allowable load in TLR calculations.

According to the Beach CIMP outfall data, the Beach Cities WMG has been meeting all the applicable interim MS4 WLAs for total copper, total lead and total zinc. Hence, zero interim TLRs were assumed.

For total cadmium, the final MS4 WLA in the TMDL is expressed as the daily loading of pollutants calculated as the sediment based WQBEL multiplied by the daily sediment load during the 90th percentile load day. The TMDL WQBEL is based on the sediment numeric targets in the Screening Quick Reference Tables (SQuiRTs) developed by National Oceanic and Atmospheric Administration (NOAA).

The following approach was implemented to calculate a TLR for each metal in the Beach Cities Dominguez Channel WMA:

1. The analysis region was modeled in LSPC for the 90th percentile load day defined in Table 11 to obtain the baseline pollutant load.
2. The allowable load was calculated using the applicable metal TMDL WLA. For pollutants with multiple WLAs, the WLA that resulted in the least restrictive allowable load was selected for calculation of the TLR.

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[8] The Dominguez Channel Toxics TMDL is currently being reconsidered and may introduce the concept of site-specific water-effect ratios for copper and lead, which have been adopted in other freshwater metal TMDLs in the Los Angeles Region. The adoption of site-specific water-effect ratios may result in significant deviation from the current WQBELs, requiring an update to the Beach Cities EWMP.

3. The difference between the baseline load (Step 1) and the allowable load (Step 2) determined the absolute TLR for the 90th percentile load day, the load reduction required to meet the TMDL WLA. A percentage TLR was also calculated by dividing the absolute TLR by the baseline pollutant load.
4. The TLR equivalent 24-hour volume was calculated as the average daily runoff volume multiplied by the percentage TLR.

7.2.2. Pesticides, Organics, and PCBs

Total DDTs, total PCBs, benzo[a]pyrene and total PAHs are Category 1 WBPCs in Dominguez Channel Estuary due to the Dominguez Channel Toxics TMDL. Benzo[a]pyrene is a Category 3 WBPC for Beach Cities WMA tributary to the Dominguez Channel freshwater due to CIMP monitoring results indicating potential contribution towards water quality standard exceedances in the estuary. Zero TLRs were set for total DDTs, total PCBs and total PAHs since the Beach Cities WMG has continuously met the respective numeric targets according to Beach Cities CIMP outfall monitoring data.

When representing Benzo[a]pyrene and total PAHs for the Dominguez Channel Estuary and Benzo[a]pyrene for the Dominguez Channel freshwater segments, these constituents cannot be modeled directly in WMMS 2.0 LSPC. Instead, TSS was modeled and used as a surrogate to compute TLR for these organic pollutants. For representing benzo[a]pyrene contributions to the Dominguez Channel freshwater segments, daily loading was calculated as the TMDL water-column WQBELs multiplied by the daily flow volume during the 90th percentile TSS loading day. For representing Benzo[a]pyrene and total PAH contributions to the Dominguez Channel Estuary, the final MS4 WLA in the Permit were expressed as the daily loading of pollutants calculated as the marine sediment-based WQBEL multiplied by the average daily sediment load.

The following approach was implemented to calculate a TLR for each pesticide or PCB in the Dominguez Channel portion of the Beach Cities WMA:

1. The analysis region was modeled in LSPC for the 90th percentile TSS load day as defined in Table 11 to obtain the baseline TSS load
2. Particulate strength (pollutant-to-TSS ratio) for Benzo[a]pyrene and total PAHs were calculated using paired wet weather monitoring data (e.g. pollutant concentration and TSS concentration from the same sample) collected at outfall monitoring locations in the Dominguez Channel watershed (OF-BCEG-05, OF-BCEG-06, and OF-BCEG-07).
3. The baseline pollutant load was computed by multiplying the baseline TSS load and the organic pollutant particulate strength.

4. The allowable load was calculated using applicable TMDL WLAs.
5. The difference between the baseline load and the allowable load resulted in a TLR for the 90th percentile load day, the load reduction required to meet the applicable water quality standard. A percentage TLR was also calculated by dividing the absolute TLR by the baseline pollutant load.
6. The TLR equivalent 24-hour was calculated as the daily runoff volume multiplied by the percentage TLR.

7.2.3. Indicator Bacteria (*E. coli)*

Within the Beach Cities Dominguez Channel WMA[9], a TLR approach was developed based on allowable exceedance days. Dominguez Channel is 303(d)-listed for bacteria and its targets were developed consistent with the reference system allowable exceedance approach implemented for other Los Angeles region freshwater TMDLs. The DC has a REC-2 beneficial use designation and a High Flow Suspension (HFS) Day allowance.

The Dominguez Channel TLR calculations for bacteria followed a similar methodology as the Santa Monica Bay TLR calculations for fecal coliform. It was assumed that 19% of non-high flow suspension days could exceed 4000 MPN/100mL based on the historical exceedance rates observed at other freshwater bodies in the Los Angeles region (Schiff, Griffith & Lyon, 2005.). This approach is consistent with the Malibu Creek Watershed Bacteria TMDL approach for developing waste load allocations expressed as allowable exceedance days (LARWQCB, 2012b)

7.2.4. Toxicity

According to Beach Cities and Dominguez Channel CIMP data, receiving water monitoring from within the Dominguez Channel has not exceeded the interim and final toxicity WQBELs to date. Hence, reasonable assurance is demonstrated and a TLR was not developed for toxicity for the Beach Cities WMG.

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[9] Includes area tributary to Dominguez Channel Freshwater, Torrance Lateral and Dominguez Channel Estuary.

7.2.5. Final Wet Weather TLR Summary

By implementing the steps described above, TLRs were developed for each modeled pollutant. TLRs for each pollutant are listed in Table 13. A representative 24-hour management volume was selected for each analysis region. For each analysis region, the largest 24-hour management volume was selected as the target compliance metric, since management of the largest volume will result in management of all others[10].

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[10] Total copper was not included in the assessment of the largest 24-hour management volume, since significant load reductions will be achieved via the copper brake pad reduction (see Section 8.2.1). As a result, the management volumes needed to meet applicable copper TLRs using structural BMPs are significantly reduced

Table 13. Dominguez Channel WMA Wet Weather TLRs

Analysis Region (Receiving Water)	Pollutant	Critical Condition	Baseline Load		Target Load Reduction			
					Absolute		% of Baseline Load	TLR Equivalent 24-Hour Management Volume (ac-ft)
DC-N-MB (Dominguez Channel Freshwater)	Total Copper	90th percentile daily load	1.3	lb/day	1.1	lb/day	82%	7.3
	Total Lead	CIMP data shows no exceedance in the past 5 years. Hence no RAA needed to demonstrate compliance						
	Total Zinc	90th percentile daily load	6.9	lb/day	5.3	lb/day	76%	**6.7**[1]
	E. coli	90th percentile water year	46.1	10^{12} MPN/yr	19.0	10^{12} MPN/yr	41%	2.4
	Benzo[a]pyrene	90th percentile daily load	2.6E-03	lb/day	1.8E-03	lb/day	70%	4.0
	Toxicity	CIMP data shows no exceedance in the past 5 years. Hence no RAA needed to demonstrate compliance						
DC-N-RB (Dominguez Channel Freshwater)	Total Copper	90th percentile daily load	4.1	lb/day	3.3	lb/day	81%	24.3
	Total Lead	CIMP data shows no exceedance in the past 5 years. Hence no RAA needed to demonstrate compliance						
	Total Zinc	90th percentile daily load	22.0	lb/day	16.3	lb/day	74%	**22.3**[1]
	E. coli	90th percentile water year	149.8	10^{12} MPN/yr	53.0	10^{12} MPN/yr	35%	9.7
	Benzo[a]pyrene	90th percentile daily load	7.7E-03	lb/day	5.2E-03	lb/day	67%	12.8
	Toxicity	CIMP data shows no exceedance in the past 5 years. Hence no RAA needed to demonstrate compliance						
DC-S (Dominguez Channel Freshwater)	Total Copper	90th percentile daily load	4.0	lb/day	3.0	lb/day	76%	27.1
	Total Lead	CIMP data shows no exceedance in the past 5 years. Hence no RAA needed to demonstrate compliance						
	Total Zinc	90th percentile daily load	18.4	lb/day	11.9	lb/day	65%	**22.2**[1]
	E. coli	90th percentile water year	393.8	10^{12} MPN/yr	179.1	10^{12} MPN/yr	45%	15.3
	Benzo[a]pyrene	90th percentile daily load	1.0E-02	lb/day	5.5E-03	lb/day	55%	18.7
	Toxicity	CIMP data shows no exceedance in the past 5 years. Hence no RAA needed to demonstrate compliance						
DC-TL (Torrance Lateral and Dominguez Channel Estuary)	Total Copper	90th percentile daily load	11.5	lb/day	10.4	lb/day	91%	36.8
	Total Lead	CIMP data shows no exceedance in the past 5 years. Hence no RAA needed to demonstrate compliance						
	Total Zinc	90th percentile daily load	65.1	lb/day	57.4	lb/day	88%	**35.8**[1]
	Total Cadmium	90th percentile daily load	0.15	lb/day	0.13	lb/day	87%	35.2
	E. coli	90th percentile water year	360.8	10^{12} MPN/yr	175.3	10^{12} MPN/yr	49%	16.2
	Benzo[a]pyrene	90th percentile daily load	2.0E-02	lb/day	1.3E-02	lb/day	67%	34.1
	Total PAHs	CIMP data shows no exceedance in the past 5 years. Hence no RAA needed to demonstrate compliance						
	Toxicity	CIMP data shows no exceedance in the past 5 years. Hence no RAA needed to demonstrate compliance						
	Total PCBs	CIMP data shows no exceedance in the past 5 years. Hence no RAA needed to demonstrate compliance						
	Total DDTs	CIMP data shows no exceedance in the past 5 years. Hence no RAA needed to demonstrate compliance						

[1] Bold value is the representative 24-hour management runoff volume for each analysis region.

8. STORMWATER CONTROL OVERVIEW

8.1. Methods to Select and Prioritize BMPs

To demonstrate reasonable assurance, BMPs were identified in a prioritized manner to meet the TLRs. Prioritization was based on cost (lower cost BMPs were prioritized first); BMP effectiveness for the pollutants of concern (BMPs that had greater treatment efficiency for the pollutant of concern in a particular analysis region were prioritized over other BMPs); and implementation feasibility as determined by the Beach Cities WMG.

It was assumed that the baseline model calibration accounted for existing BMPs that are universally implemented in the Beach Cities EWMP area (e.g., street sweeping, catch basin and storm drain cleaning, low impact development prior to June 2020, etc.). As discussed in Section 5.1, monitoring data from watersheds with existing regional stormwater BMPs and green streets were not used for calibration. The effectiveness of existing, location-specific regional BMPs outside the calibration areas has been quantified in this revised RAA.

The RAA was performed according to the following steps:

1. Calculate load reductions associated with future, quantifiable non-structural BMPs (e.g., copper reductions due to brake pad phase-out);
2. Calculate load reductions associated with existing structural BMPs.
3. Calculate load reductions for proposed regional and distributed BMPs that were identified in existing plans; and
4. If necessary, identify new regional or distributed BMPs to meet any remaining TLR.

8.2. Quantified Non-Structural BMPs

In accordance with the State Board Order (SWRCB, 2020), all non-structural BMP credits are required to be adequately justified. Since data is quite limited with respect to load reductions achieved by most non-structural BMPs, the Beach Cities RAA incorporated the assumption that non-structural BMPs implemented prior to June 2020 (including enhanced minimal control measures [MCMs]) have been accounted for as part of the data used in the calibrated baseline condition. As a result, no “blanket” non-structural BMP load reduction credit has been incorporated into the revised RAA.

Source controls implemented by the Beach Cities WMG include a combination of BMPs such as: new or enhanced pet waste controls (ordinance, signage, education/outreach, mutt mitts, etc.); Clean Bay Restaurant Program; human waste source tracking and remediation (e.g., leaking sewer investigations including implementation of each agency's Sanitary Sewer Management Plan consistent with Statewide WDRs, etc.); enhanced street sweeping (e.g., 100% vacuum sweepers, increased frequency, posting of 'No Parking' signs for street sweeping, etc.); increased catch basin and storm drain cleaning; and other new or enhanced nonstructural BMPs that target the pollutants addressed in the original EWMP. Although no pollutant load reductions were assumed in the RAA for the implementation of these BMPs, the Beach Cities WMG will continue to implement a variety of these source controls that have proven to be effective.

One specific non-structural regulatory BMP program was accounted for in the revised Beach Cities EWMP RAA for which a load reduction could be quantified and forecasted based on phased implementation – elimination of copper in brake pads.

8.2.1. Copper Brake Pad Reduction

As was the case in the original Beach Cities EWMP, a load reduction was assumed for copper due to the phased elimination of copper in brake pads. In 2010, California Senate Bill 346 (SB 346) was enacted to eliminate nearly all use of copper in brake pad manufacturing. In 2013, TDC Environmental prepared a technical study for the California Stormwater Quality Association (CASQA) describing the expected percent reduction for copper as a result of the passage of SB 346 (TDC Environmental, 2013). The TDC study identified three possible implementation scenarios, the least aggressive of which estimated that a 52% load reduction in copper will be achieved by 2032 due to the brake pad phase-out.

Since the referenced study assumed a 21.2% reduction in urban runoff copper by 2020, and the RAA model was calibrated with local water quality data through June 2020, the load reduction accounted for in the revised RAA was estimated as a weighted fraction of 52%. The difference in estimated total load reduction between 2032 and 2020 (i.e., 52% - 21.2%, or 30.8%) was divided by the assumed remaining load in 2020 (100% - 21.2%, or 78.8%) to estimate the remaining expected load reduction due to the copper brake pad phase-out. Therefore, a 39.1% load reduction was assumed for copper in the Beach Cities Dominguez Channel WMA.

To avoid double-counting load reductions, this reduction was applied to the copper load before accounting for future BMP load reductions (i.e., 39.1% was applied to the baseline loads before all other BMP load reductions were accounted for, since BMP performance is dependent on influent loads).

8.3. Modeling Structural BMPs

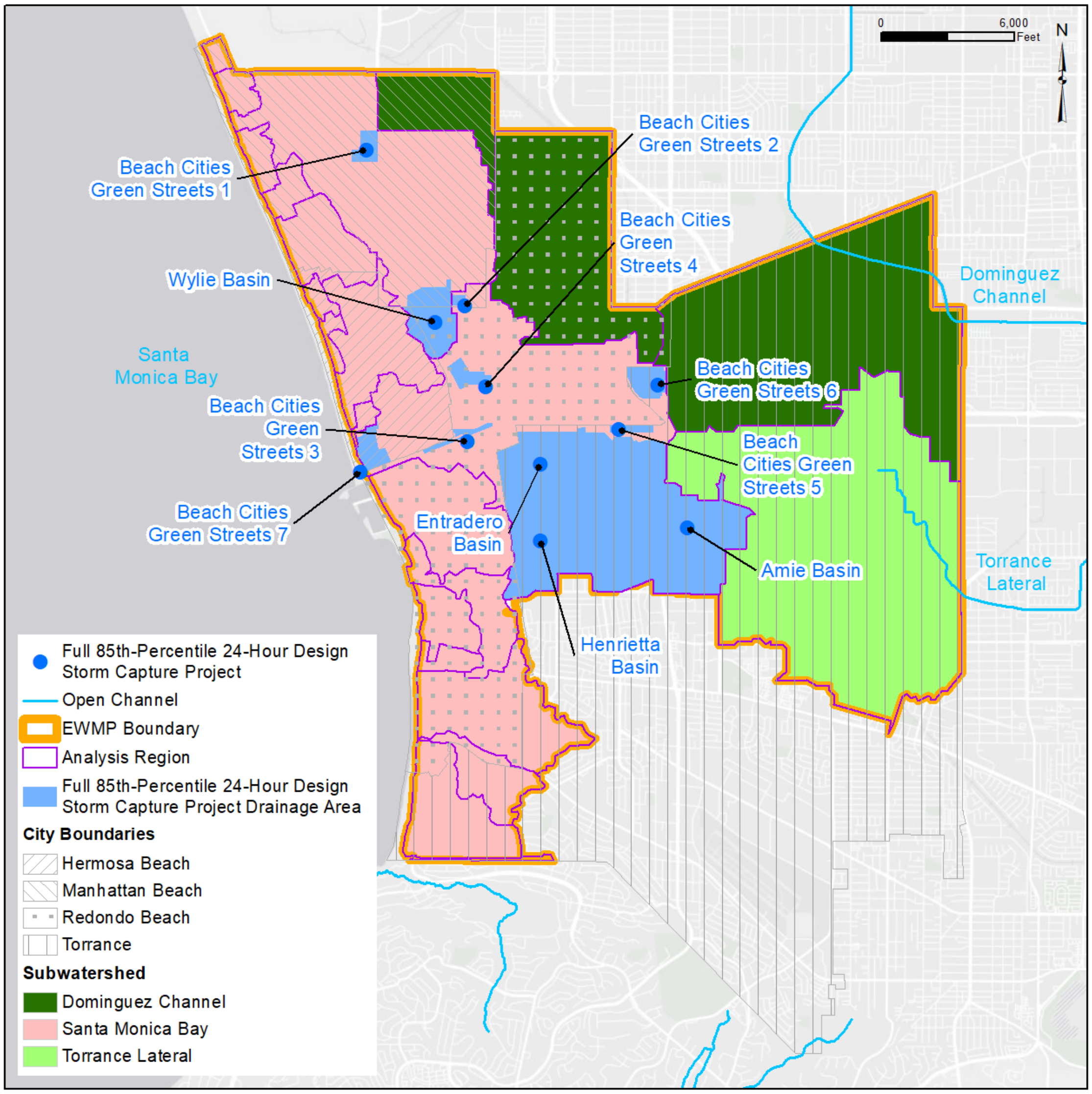
To represent structural BMPs, WMMS 2.0 SUSTAIN was used to account for BMP storage, infiltration, inflow, and outflow capacities using available BMP as-built drawings or conceptual drawings provided by the Beach Cities WMG. For structural BMPs that provide flow-through treatment, the treatment efficacy was represented as either fixed effluent concentration or as a percentage of influent concentration reduction extracted from the following data sources:

- WMMS 2.0 Phase II Report: BMP Model and Optimization Framework (LACFCD, 2020b), which includes effluent concentrations of BMPs included in the default WMMS 2.0 SUSTAIN model.
- The International Stormwater Database (IBMPDB; www.bmpdatabase.org), which is a comprehensive source of BMP performance information, comprised of data from a peer-reviewed collection of studies that have monitored the effectiveness of a variety of BMPs in treating water quality pollutants for a variety of land use types.

Several existing regional projects were sized (or planned to be sized) to capture runoff from at least the 85th percentile, 24-hour storm event. As controls that fully capture the 85th percentile, 24-hour storm are an alternative form of compliance, reasonable assurance is assumed to be achieved in the project drainage areas. These projects and their tributary drainage areas were excluded from this RAA analysis. Table 14 summarizes the 85th percentile 24-hour projects with their locations shown in Figure 10.

Table 14. Summary of Full 85th-Percentile, 24-Hr Design Storm Capture Project

Analysis Region	Project Name
SMB-5-2	Wylie Basin
	Beach Cities Green Streets 1 (Manhattan Beach 19th Street)
SMB-6-1	Torrance Basin Enhancement and Expansion Project (Henrietta, Amie, and Entradero)
	Beach Cities Green Streets 2 (Manhattan Beach Artesia Blvd.)
	Beach Cities Green Streets 3 (Redondo Beach Anita Street)
	Beach Cities Green Streets 4 (Redondo Beach Ford Ave.)
	Beach Cities Green Streets 5 (Torrance 191st Street)
	Beach Cities Green Streets 6 (Torrance Northwest)
	Beach Cities Green Streets 7 (Hermosa Beach)
DC-N-MB	Manhattan Village Mall LID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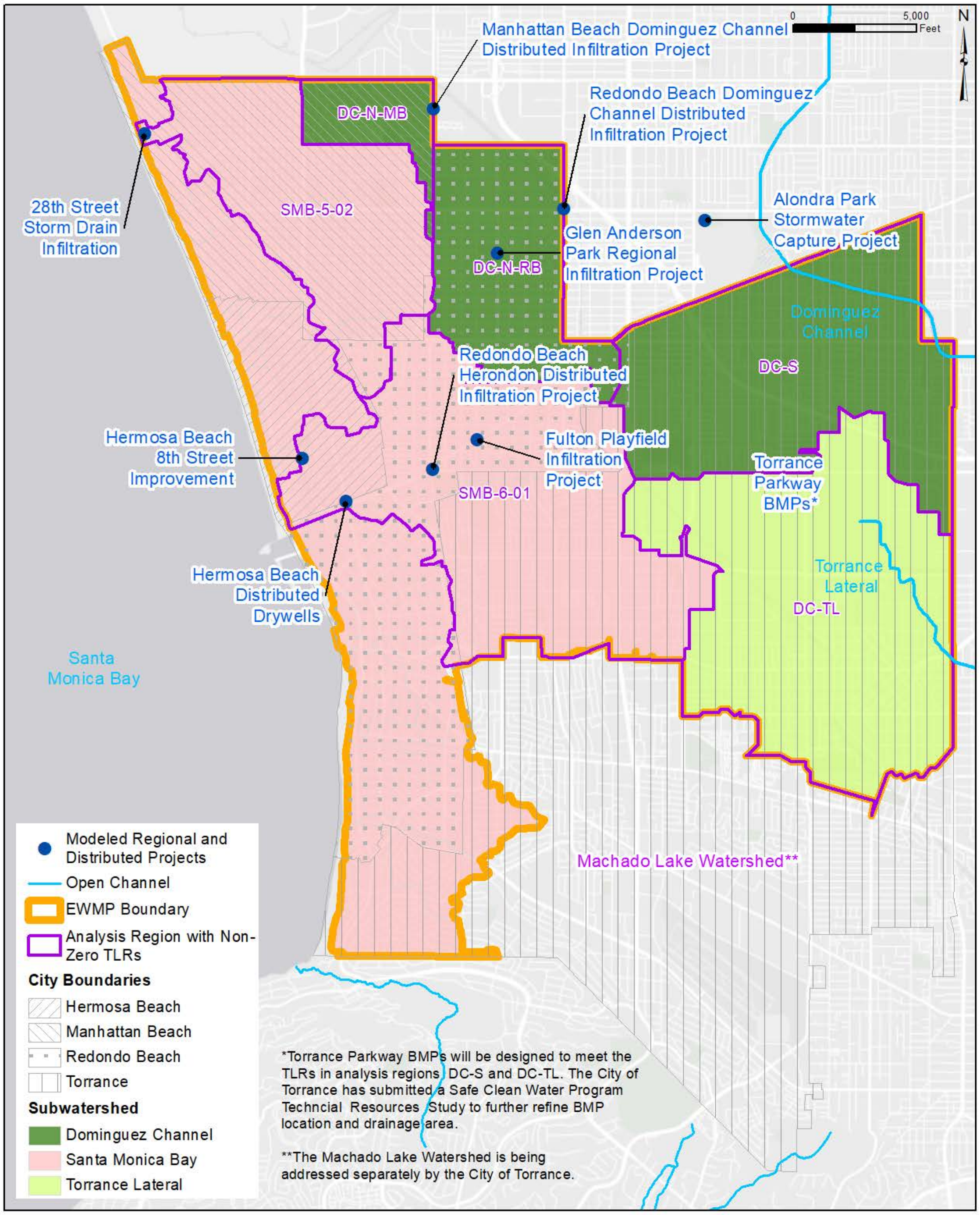
Beach Cities Green Streets 1
Beach Cities Green Streets 2
Beach Cities Green Streets 4
Dominguez Channel
Wylie Basin
Santa Monica Bay
Beach Cities Green Streets 6
Beach Cities Green Streets 3
Beach Cities Green Streets 5
Beach Cities Green Streets 7
Entradero Basin
Amie Basin
Torrance Lateral
Henrietta Basin
Full 85th-Percentile 24-Hour Design Storm Capture Project
Open Channel
EWMP Boundary
Analysis Region
Full 85th-Percentile 24-Hour Design Storm Capture Project Drainage Area
City Boundaries
Hermosa Beach
Manhattan Beach
Redondo Beach
Torrance
Subwatershed
Dominguez Channel
Santa Monica Bay
Torrance Lateral

Figure 10. Overview of 85th-Percentile, 24-Hour Storm Capture Projects

8.3.1. Regional and Distributed Structural Projects

Through the project screening and evaluation process, a total of eight projects, beyond those capturing the 85th percentile, 24-hr storm and described above, are proposed in this RAA. Table 15 summarizes the project types and key modeling parameters. The project locations are shown in Figure 11. Project fact sheets are included in the EWMP within Appendix E.


Manhattan Beach Dominguez Channel Distributed Infiltration Project
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Redondo Beach Dominguez Channel Distributed Infiltration Project
DC-N-MB
28th Street Storm Drain Infiltration
SMB-5-02
Alondra Park Stormwater Capture Project
Glen Anderson Park Regional Infiltration Project
DC-N-RB
Dominguez Channel
DC-S
Redondo Beach Herondon Distributed Infiltration Project
Hermosa Beach 8th Street Improvement
Fulton Playfield Infiltration Project
SMB-6-01
Torrance Parkway BMPs*
Hermosa Beach Distributed Drywells
Torrance Lateral
DC-TL
Santa Monica Bay
Machado Lake Watershed**
● Modeled Regional and Distributed Projects
Open Channel
EWMP Boundary
Analysis Region with Non-Zero TLRs
City Boundaries
Hermosa Beach
Manhattan Beach
Redondo Beach
Torrance
Subwatershed
Dominguez Channel
Santa Monica Bay
Torrance Lateral

*Torrance Parkway BMPs will be designed to meet the TLRs in analysis regions DC-S and DC-TL. The City of Torrance has submitted a Safe Clean Water Program Techncial Resources Study to further refine BMP location and drainage area.

**The Machado Lake Watershed is being addressed separately by the City of Torrance.

Figure 11. Modeled Regional and Distributed Projects

Table 15. Summary of Modeled Projects

Analysis Region	Project	Lead WMG Member	BMP Type	Drainage Area (ac)	Static BMP Volume (ac-ft)	Infiltration /Treatment Rate (cfs)
SMB-5-2	28th Street Storm Drain Infiltration Project	Manhattan Beach	Subsurface Infiltration	1480	1.2	71.5
SMB-6-1	Fulton Playfield Infiltration Project	Redondo Beach	Subsurface Detention Basin & Infiltration Wells	457	7.4	13
	Hermosa Beach Distributed Drywells	Hermosa Beach	Distributed Infiltration Wells	118	0.1	11
	Redondo Beach Herondo Distributed Infiltration Project	Redondo Beach	Distributed Infiltration Wells[1]	342	0.3	22
	Hermosa Beach 8th Street Green Infrastructure Project	Hermosa Beach	Bioretention	8	<0.01	<0.01
DC-N-MB	Manhattan Beach Dominguez Channel Distributed Infiltration Project	Manhattan Beach	Distributed Infiltration Wells[1]	255	0.1	11
DC-N-MB/ DC-N-RB	Alondra Park Stormwater Capture Project	Los Angeles County	Subsurface Detention & Treatment	1445	7.1	0.9
DC-N-RB	Glen Anderson Park Regional Infiltration Project	Redondo Beach	Subsurface Retention and Infiltration	483	0.3	20
DC-N-RB	Redondo Beach Dominguez Channel Distributed Infiltration Project	Redondo Beach	Distributed Infiltration Wells[1]	292	0.2	14
DC-S	Torrance Parkway BMP	Torrance	Bioretention, Treatment, and Infiltration Facilities	This project was not modeled due to uncertainty of its future design and performance. TLRs for DC-S and DC-TL will be used as performance metrics during project siting and design.		
DC-TL						

[1] Drywells were used as a representative BMP through the revised RAA. Equivalent infiltration BMPs with equivalent performance may be considered at project design phase.

8.3.2. Low Impact Development Applied to Redevelopment

The 2012 MS4 Permit established new criteria for redevelopment projects, requiring certain sized projects to capture, retain, or infiltrate the 85th percentile, 24-hr design storm or the 0.75-inch design storm, whichever is greater, or treat 150% of the peak stormwater runoff rate resulting from a 1-year, 1-hour design storm, via the implementation of low impact development (LID) BMPs. All LID BMPs constructed through June 2020 were assumed to be accounted for in the model via the monitoring and calibration process. Moving forward, LID was assumed to be implemented at the annual redevelopment rate of 0.08% per year, assuming implementation from July 2020 until the applicable final TMDL deadline.[11] In accordance with this projected redevelopment rate, which was summarized in the 2019-20 Beach Cities Annual Watershed Report (Beach Cities WMG, 2020), redevelopment that is subject to an LID ordinance was modeled assuming an annual redevelopment of 0.08% per year across all Beach Cities agency jurisdictions for residential, commercial, industrial, institutional, and transportation land uses. To estimate load reductions associated with these redevelopment BMPs, the land use percentages were multiplied by the respective land use areas in each analysis region. This resulted in a calculated area that would be treated by LID BMPs each year. This area was multiplied by the applicable number of years until the TMDL final deadlines, as LID BMPs will be implemented each year at the assumed rate. The total land use area assumed to be redeveloped for each analysis region was then modeled as being treated by assumed required BMPs and the total load reduction was quantified.

To maintain consistency with the BMP types observed in redevelopment activities to-date in the watershed, 96% of the redeveloped land is projected to implement bioretention or similarly functioning systems that fully capture the 85th percentile, 24-hour storm runoff. The remaining 4% of the redeveloped area will implement biofiltration systems that treat 1.5 times the 85th percentile, 24-hour storm storm runoff.

Modeling parameters of the bioretention and biofiltration units are summarized in Table 16.

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[11] July 2026 was assumed to be the final wet weather deadline.

Table 16. Redevelopment LID BMP Modeling Parameters

	Bioretention	Biofiltration
Max Years of Redevelopment Modeled	5 years[1] (Santa Monica Bay) 12 years[2] (Dominguez Channel)	
Pond Depth	12 inches[3]	
Infiltration Rate	5 in/hr[3]	n/a
Soil Depth (in)	36	
Effluent Concentration		
Total Cadmium	n/a	0.07 ug/L[3]c
Total Copper	n/a	5.7 ug/L[3]c
Total Lead	n/a	0.32 ug/L[3]c
Total Zinc	n/a	12 ug/L[3]c
TSS	n/a	10 mg/L[3]
Indicator Bacteria	n/a	*See Footnote 4*

[1] The Beach Cities WMG joined the County of Los Angeles's request for a 5-year Time Schedule Order (TSO) for the SMBBB Wet Weather TMDL. Hence, it is assumed that the Beach Cities WMG will have to meet the final WLAs by July 2026.

[2] Based on the effect year of the final Dominguez Channel Toxics TMDL (2032).

[3] Default WMMS 2.0 SUSTAIN parameters for bioretention/biofiltration BMPs (LACFCD, 2020b)

[4] It is assumed that biofiltration BMP does not provide significant indicator bacteria treatment.

9. WET WEATHER RAA RESULTS

9.1. Santa Monica Bay WMA

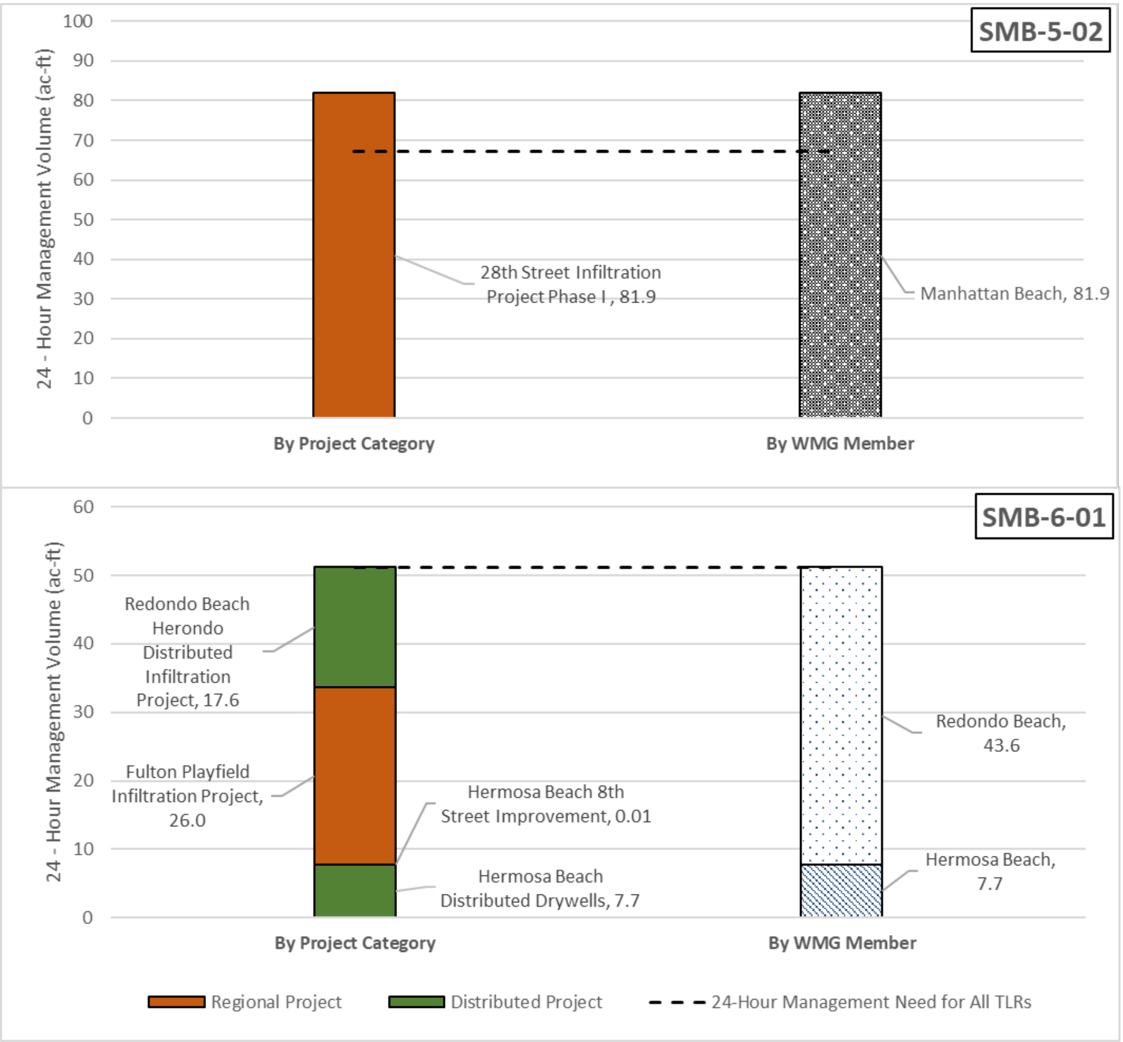
Load reduction calculations for the Beach Cities Santa Monica Bay WMA are summarized in Table 17. Through the RAA, the collective load reductions achieved by all existing and proposed BMPs achieved all the TLRs within the analysis region. Hence, reasonable assurance of compliance is demonstrated.

As discussed in Section 7.1.5, a TLR-equivalent 24-hour stormwater management volume was computed for each non-zero TLR. Through the RAA, the 24-hour management volume achieved by a project was computed as the representative volume apportioned to the load reduction that was or would be achieved by the project. The resultant 24-hour management volume of a project may or may not be equal to its static detention capacity shown in Table 15. The approach of evaluating the 24-hour management volume metric to the TLR resulted in prioritizing more efficient BMPs that provide greater load reduction per BMP capacity per day (24-hour period). The 24-hour management volume of each project is shown in Figure 12.

To spatially represent the RAA output, the 24-hour management volume is illustrated in Figure 13. As shown in the figure, analysis regions with a zero calculated TLR (e.g., anti-degradation areas; areas demonstrating compliance via water quality data) were assigned a 0 acre-feet 24-hour stormwater management volume. The 24-hour management volume of a regional project was spatially represented by its drainage area. Drainage areas to an 85th percentile, 24-hour design capture project are hatched, indicating these areas demonstrate compliance through the alternative compliance path of full 85th percentile, 24-hour design stormwater capture.

Table 17. Beach Cities SMB WMA RAA Summary

Analysis Region	Fecal Coliform Target Load Reduction (TLR)			BMP Load Reduction (LR) Summary								
	10^12 MPN/yr	% of Baseline Load	TLR Equivalent 24-Hour Management Volume (ac-ft)	LID Redevelopment		Regional Project		Distributed Project		Total Load Reduction		RAA Achieved?
				% of Baseline Load	24-Hour Volume (ac-ft)	% of Baseline Load	24-Hour Volume (ac-ft)	% of Baseline Load	24-Hour Volume (ac-ft)	% of Baseline Load	24-Hour Volume (ac-ft)	
SMB-5-01	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a
SMB-5-02	59.0	53%	67.1	0.3%	0.4	64%	81.5	0%	0	64.3%	81.9	Yes
SMB-5-03	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a
SMB-5-04	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a
SMB-5-05	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a
SMB-6-01	54.7	49%	51.2	0.3%	0.3	24.8%	25.9	24.1%	25.2	49.1%	51.4	Yes
SMB-6-02	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a
SMB-6-03	0.0	0%	0	TLR = 0% based on historical monitoring data. No RAA needed								n/a
SMB-6-04	0.0	0%	0	TLR = 0% based on historical monitoring data. No RAA needed								n/a
SMB-6-05	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a
SMB-6-06	Anti-Degradation	0%	0	TLR = 0% for Anti-degradation site. No RAA needed								n/a



Note: Due to comparatively low volumes, LID redevelopment is not shown in the figure

Figure 12. 24-Hour Management Volume Breakdown in Santa Monica Bay WMA

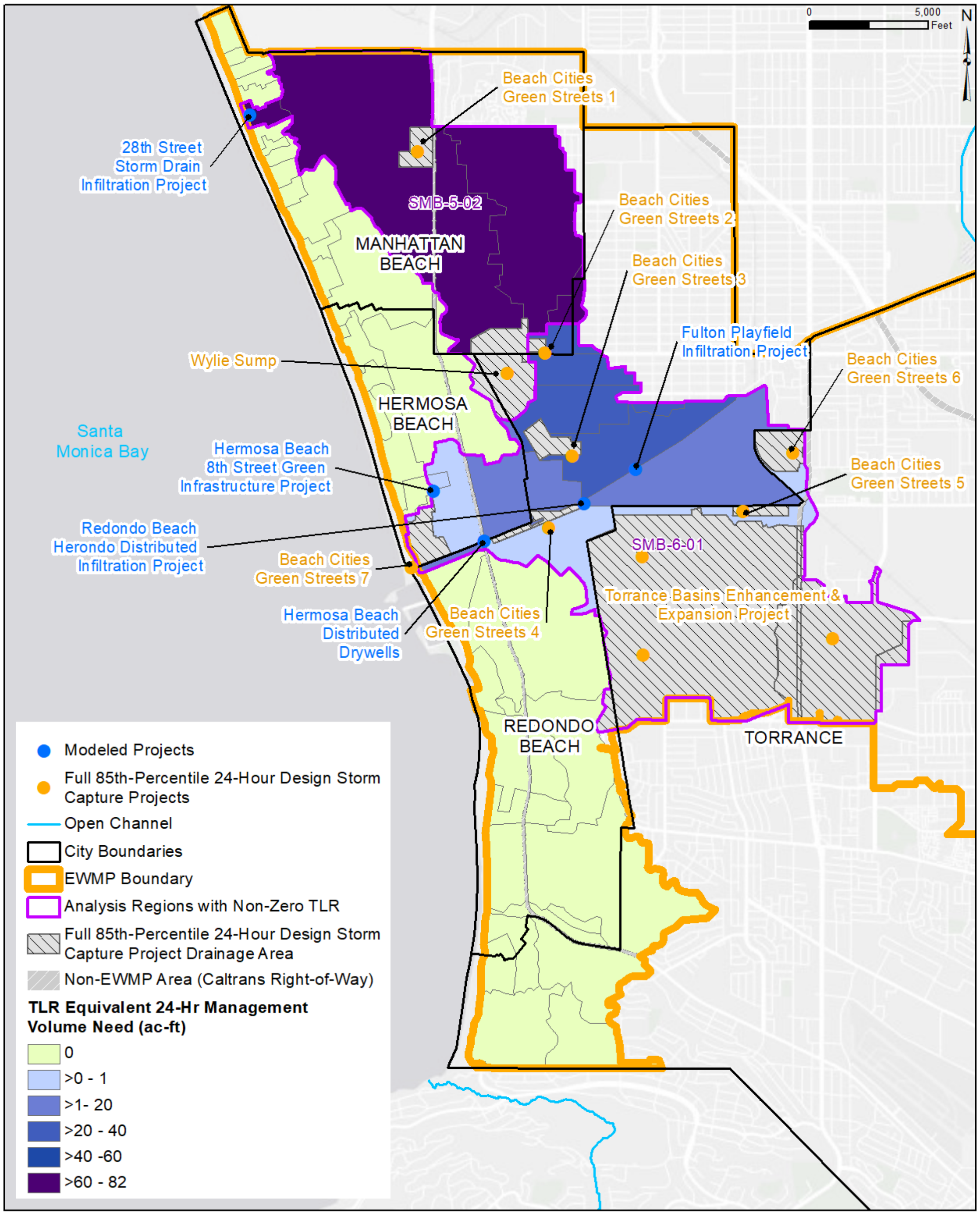


Figure 13. 24-Hour Management Mapping in Santa Monica Bay WMA.

9.2. Dominguez Channel WMA

Load reduction calculations for the Beach Cities Dominguez Channel WMA are summarized in Table 18. Reasonable assurance was demonstrated in all analysis regions.

As discussed in Section 7.2.5, a representative 24-hour stormwater management volume was determined for each analysis region. The 24-hour management volume of the projects are shown in Figure 14. It should be noted that, the Torrance Parkway Stormwater BMPs are not explicitly modeled in the RAA. The Beach Cities WMG has submitted a Safe, Clean Water Technical Resource Program application titled “Prioritize Parkway BMPs for Dominguez Channel Toxics TMDL” to assist in project siting. The Beach Cities WMG intends to use the EWMP compliance metrics summarized under the “Regional Project” column in Table 18 as the design criteria. The WMG expects to deploy a combination of catch basin inserts, green streets and parkway stormwater capture project to meet the TLR and the 24-hour management volume need through the Technical Resources Study.

To spatially represent the RAA output, the 24-hour management volume is illustrated in Figure 15. The 24-hour management volume of each regional project was applied to its drainage area. The volume assigned to areas draining to multiple projects were the cumulative volumes from all projects. Drainage area to a full 85th percentile 24-hour design capture project was hatched, indicating theses area demonstrated compliance through the alternative compliance path of full 85th percentile 24-hour design stormwater capture. In addition, area covered under separate stormwater permit (e.g. Caltrans right-of-way, Torrance Refinery plant) was hatched.

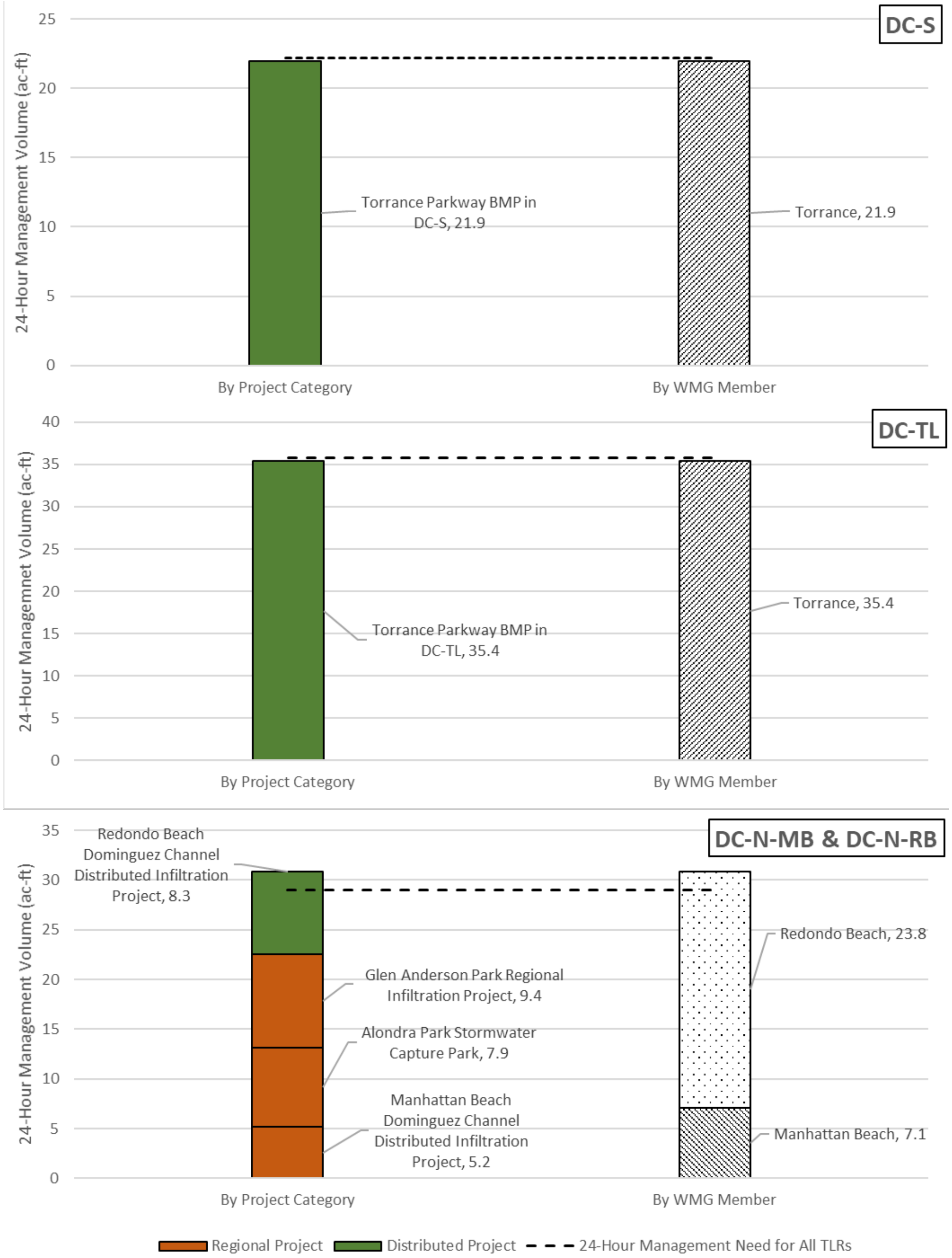
Table 18. Beach Cities DC WMA RAA Summary

Analysis Region[1]	Pollutant	Final Target Load Reduction			BMP Load Reduction Summary															
					Non-Structural BMP			LID Redevelopment			Regional Project			Distributed Projects			Total Load Reduction			Assurance Achieved?
		Absolute		%	Absolute		%	Absolute		%	Absolute		%	Absolute		%	Absolute		%	
DC-N-MB (DC Freshwater)	Total Copper	1.1	lb/day	82%	0.5	lb/day	39%	0.01	lb/day	0.9%	0.2	lb/day	16%	0.4	lb/day	33%	1.1	lb/day	89%	Yes
	Total Lead	CIMP data shows no exceedance in the past 5 years. No RAA needed																		n/a
	Total Zinc	5.3	lb/day	76%	0	lb/day	0%	0.1	lb/day	0.9%	1.6	lb/day	23%	3.7	lb/day	54%	5.4	lb/day	78%	Yes
	E. coli	19.0	10^{12} MPN/yr	41%	0	10^{12} MPN/yr	0%	0.3	10^{12} MPN/y	0.7%	8.7	10^{12} MPN/yr	19%	19.5	10^{12} MPN/yr	42%	28.5	10^{12} MPN/ yr	62%	Yes
	Benzo[a] pyrene	1.8 E-03	lb/day	70%	0	lb/day	0%	2.4 E-05	lb/day	0.9%	4.9 E-04	lb/day	19%	1.4 E-03	lb/day	56%	2.0 E-03	lb/day	76%	Yes
	24-Hour Management Need	6.7[2]	ac-ft	100%	0	ac-ft	0%	0.1	ac-ft	0.9%	1.9	ac-ft	29%	5.2	ac-ft	77%	7.2	ac-ft	100 %	Yes
DC-N-RB (DC Freshwater)	Total Copper	3.3	lb/day	81%	1.6	lb/day	39%	0.04	lb/day	0.9%	0.5	lb/day	13%	1.3	lb/day	32%	3.4	lb/day	85%	Yes
	Total Lead	CIMP data shows no exceedance in the past 5 years. No RAA needed																		n/a
	Total Zinc	16.3	lb/day	74%	0	lb/day	0%	0.2	lb/day	1.0%	4.1	lb/day	19%	12.4	lb/day	56%	16.7	lb/day	76%	Yes
	E. coli	53.0	10^{12} MPN/	35%	0	10^{12} MPN/y	0%	1.1	10^{12} MPN/y	0.7%	49.5	10^{12} MPN/yr	33%	19.1	10^{12} MPN/yr	13%	69.7	10^{12} MPN/ yr	47%	Yes
	Benzo[a]pyrene	5.2 E-03	lb/day	67%	0	lb/day	0%	7E-05	lb/day	1.0%	2E-03	lb/day	25%	4E-03	lb/day	48%	6E-03	lb/day	73%	Yes
	24-Hour Management Need	22.3[2]	ac-ft	100%	0	ac-ft	0%	0.2	ac-ft/	1.0%	15.5	ac-ft	69%	8.3	ac-ft	37%	24.0	ac-ft	100 %	Yes
DC-S (DC Freshwate	Total Copper	3.0	lb/day	76%	1.5	lb/day	39%	0.1	lb/day	0.9%	0	lb/day	0%	1.4	lb/day	36%	3.0	lb/day	76%	Yes
	Total Lead	CIMP data shows no exceedance in the past 5 years. No RAA needed																		n/a
	Total Zinc	11.9	lb/day	65%	0	lb/day	0%	0.2	lb/day	1.0%	0	lb/day	0%	11.7	lb/day	64%	11.9	lb/day	65%	Yes

Analysis Region[1]	Pollutant	Final Target Load Reduction			BMP Load Reduction Summary																
					Non-Structural BMP			LID Redevelopment			Regional Project			Distributed Projects			Total Load Reduction			Assurance Achieved?
		Absolute		%	Absolute		%	Absolute		%	Absolute		%	Absolute		%	Absolute		%	
	E. coli	179.1	10^{12} MPN/y	45%	0	10^12 MPN/yr	0%	2.2	10^{12} MPN/yr	0.6%	0	10^12 MPN/yr	0%	176.9	10^12 MPN/yr	45%	179.1	10^{12} MPN/yr	45%	Yes
	Benzo[a]pyrene	5.5 E-03	lb/day	55%	0	lb/day	0%	9.4 E-05	lb/day	0.9%	0	lb/day	0%	5.5 E-03	lb/day	54%	5.5 E-03	lb/day	55%	Yes
	24-Hour Management Need	22.2[2]	ac-ft	100%	0	ac-ft	0%	0.3	ac-ft	1.1%	0	ac-ft	0%	21.9	ac-ft	99%	22.2	ac-ft	100 %	Yes
DC-TL (DC Estuary and Torrance Lateral)	Total Copper	10.4	lb/day	91%	4.5	lb/day	39%	0.1	lb/day	1.0%	0	lb/day	0%	5.8	lb/day	51%	10.4	lb/day	91%	Yes
	Total Lead	CIMP data shows no exceedance in the past 5 years. No RAA needed																		n/a
	Total Zinc	57.4	lb/day	88%	0	lb/day	0%	0.6	lb/day	1.0%	0	lb/day	0%	56.8	lb/day	87%	57.4	lb/day	88%	Yes
	Total Cadmium	0.13	lb/day	87%	0	lb/day	0%	1.0 E-3	lb/day	0.7%	0	lb/day	0%	0.13	lb/day	87%	0.13	lb/day	87%	Yes
	E. coli	175.3	10^{12} MPN/yr	49%	0	10^{12} MPN/y	0%	2.1	10^{12} MPN/yr	0.6%	0	10^{12} MPN/yr	0%	173.2	10^{12} MPN/yr	49%	175.3	10^{12} MPN/yr	49%	Yes
	Benzo[a]pyrene	1.3 E-02	lb/day	67%	0	lb/day	0%	2E-04	lb/day	0.9%	0	lb/day	0%	1.3 E-02	lb/day	66%	1.3 E-02	lb/day	67%	Yes
	Total PAHs	CIMP data shows no exceedance in the past 5 years. No RAA needed																		n/a
	24-Hour Management Need	35.8[2]	ac-ft	100%	0	ac-ft	0%	0.3	ac-ft	1.0%	0	ac-ft	0%	35.5	ac-ft	99%	35.8	ac-ft	100 %	Yes
	Total DDT	CIMP data shows no exceedance in the past 5 years. No RAA needed																		n/a
	Total PCB	CIMP data shows no exceedance in the past 5 years. No RAA needed																		n/a

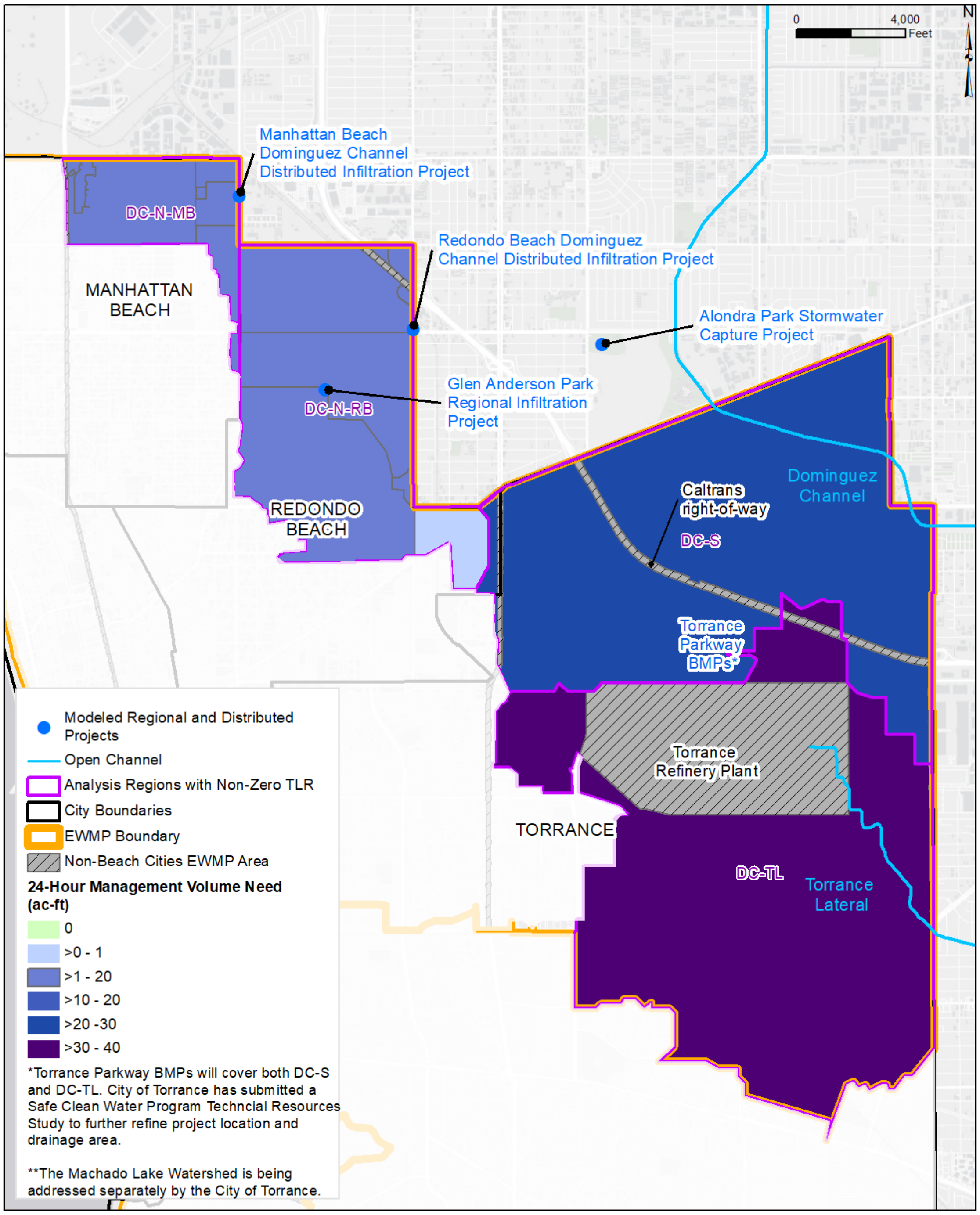
[1] Corresponding receiving water is also listed. DC = Dominguez Channel.

[2]Please see Table 13 on how the representative 24-hour management volume was selected for each analysis region.



Note: Due to comparatively low volumes, LID redevelopment is not shown in the figure

Figure 14. 24-Hour Management Volume Breakdown in Dominguez Channel WMA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Manhattan Beach Dominguez Channel Distributed Infiltration Project
DC-N-MB
MANHATTAN BEACH
Redondo Beach Dominguez Channel Distributed Infiltration Project
Alondra Park Stormwater Capture Project
Glen Anderson Park Regional Infiltration Project
DC-N-RB
REDONDO BEACH
Caltrans right-of-way
Dominguez Channel
DC-S
Torrance Parkway BMPs*
Torrance Refinery Plant
TORRANCE
DC-TL
Torrance Lateral
● Modeled Regional and Distributed Projects
Open Channel
Analysis Regions with Non-Zero TLR
City Boundaries
EWMP Boundary
▨ Non-Beach Cities EWMP Area
24-Hour Management Volume Need (ac-ft)
0
>0 - 1
>1 - 20
>10 - 20
>20 -30
>30 - 40

*Torrance Parkway BMPs will cover both DC-S and DC-TL. City of Torrance has submitted a Safe Clean Water Program Techncial Resources Study to further refine project location and drainage area.

**The Machado Lake Watershed is being addressed separately by the City of Torrance.

Figure 15. 24-Hour Management Volume Mapping in Dominguez Channel WMA

10. DRY WEATHER RAA RESULT

The dry weather RAA was performed in accordance with the semi-quantitative approach outlined in Section 4.2. A summary of the analysis is shown in Table 19. WMA-specific discussion of the dry weather RAA is presented in the following subsections.

Table 19. Dry Weather RAA Summary for Dominguez Channel WMA.

WMA	Analysis Region	Is non-exempt dry weather flow currently non-existent and/or sufficiently treated or diverted?	Are sufficient structural BMP proposed to intercept 100% of dry weather runoff?	Is dry weather reasonable assurance demonstrated?
Santa Monica Bay	All	Yes	n/a	Yes
Dominguez Channel (including Torrance Lateral)	DC-N-RB	Yes	Proposed	Yes
	DC-N-MB	Yes	Proposed	Yes
	DC-S	Yes	Proposed	Yes
	DC-TL	Yes	Proposed	Yes

10.1. Santa Monica Bay WMA

According to monitoring and observation data collected through the Beach Cities CIMP, the effectiveness of low flow diversions that intercept and divert 100% of non-exempt dry weather flow from the receiving water is consistently confirmed by observations. Therefore, reasonable assurance of compliance during dry weather is demonstrated for the Beach Cities Santa Monica Bay WMA.

10.2. Dominguez Channel WMA

For Beach Cities DC (including Torrance Lateral) WMA, a dry weather RAA was performed in accordance with the approach outlined in Section 4.2. The Beach Cities WMG has attempted to eliminate non-exempt dry weather MS4 discharges using a suite of structural BMPs and non-structural source controls (e.g., water conservation incentives, enhanced IDDE efforts, enhanced education/outreach, and inspection/enforcement to prevent sources of non-stormwater flow). To date, monitoring has shown that the WMG has been successful at this endeavor, and although dry weather flows do still exist in some outfalls draining to the DC, particularly within Torrance Lateral, the WMG has successfully demonstrated that these discharges are considered conditionally exempt.

In parallel to the ongoing effort of fully eliminating non-exempt dry weather MS4 discharges, the Beach Cities WMG has also planned to utilize structural BMPs to intercept additional dry weather runoff that may cause or contribute to receiving water exceedances. The Alondra Park Stormwater Capture Project will intercept and capture 100% of dry weather runoff from both the DC-N-RB and DC-N-MB analysis regions. In addition, the City of Torrance plans to provide significant parkway BMP retrofits throughout the DC-S and DC-TL analysis regions, with a particular focus on areas that consistently discharge to the Dominguez Channel during dry weather. For the purposes of this EWMP, and consistent with the original EWMP, it has been assumed that such parkway BMP retrofits will be sufficient to handle the dry weather bacteria loads tributary to the discharge locations. Therefore, reasonable assurance of compliance during dry weather is demonstrated for the Beach Cities Dominguez Channel WMA.

11. CONCLUSIONS

To update the RAA for the revised Beach Cities EWMP, a modeling approach that utilized WMMS 2.0 was applied using the rationale, analytical basis, and process described in this RAA report. The RAA process:

1. Applied an acceptable model tailored to the Beach Cities WMG based on available outfall and receiving water data collected through June 2020.
2. Calculated TLRs necessary to achieve applicable compliance targets.
3. Demonstrated that the existing and proposed suite of projects will attain the TLRs.

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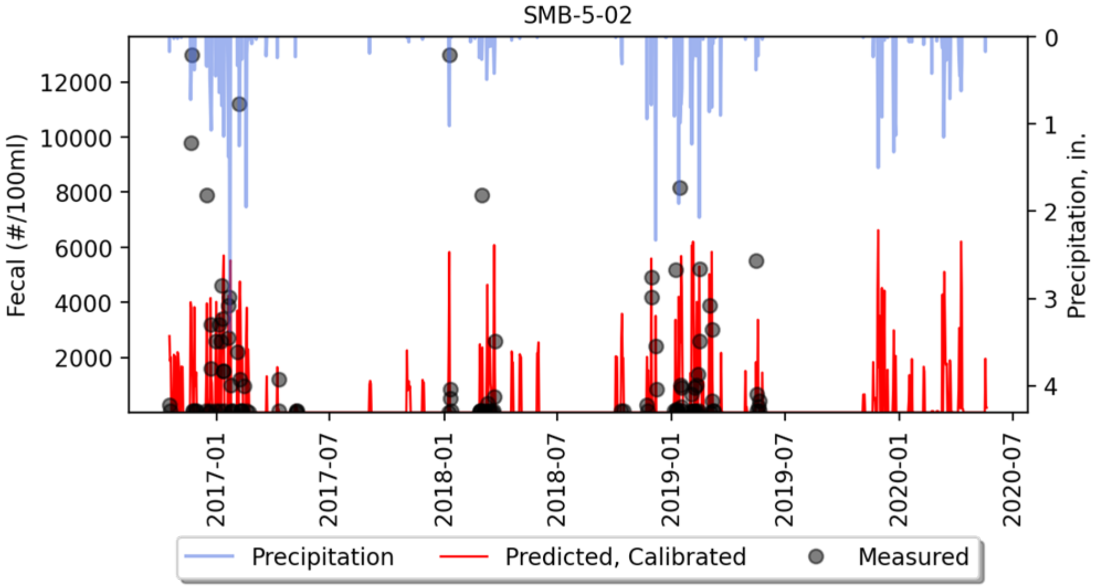
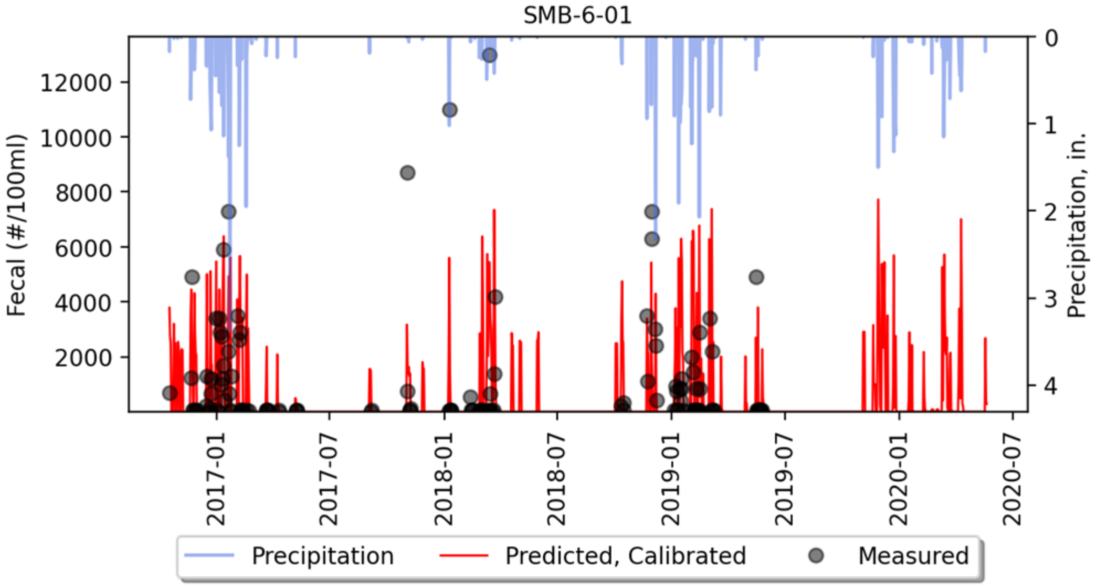
Attachment D.1

Supplementary Calibration Exhibits

Water Quality Calibration

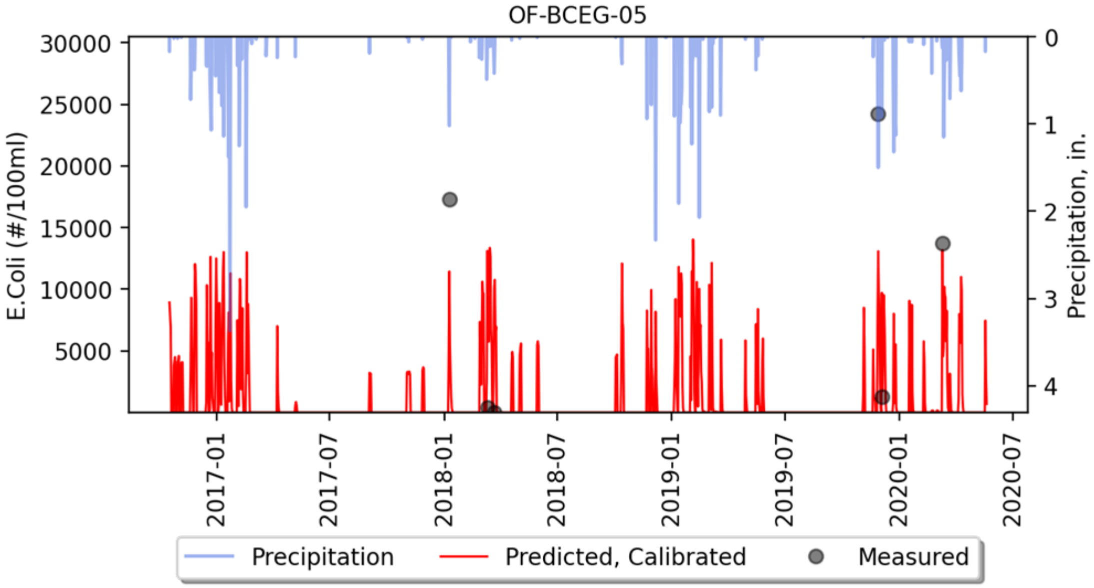
E. Coli

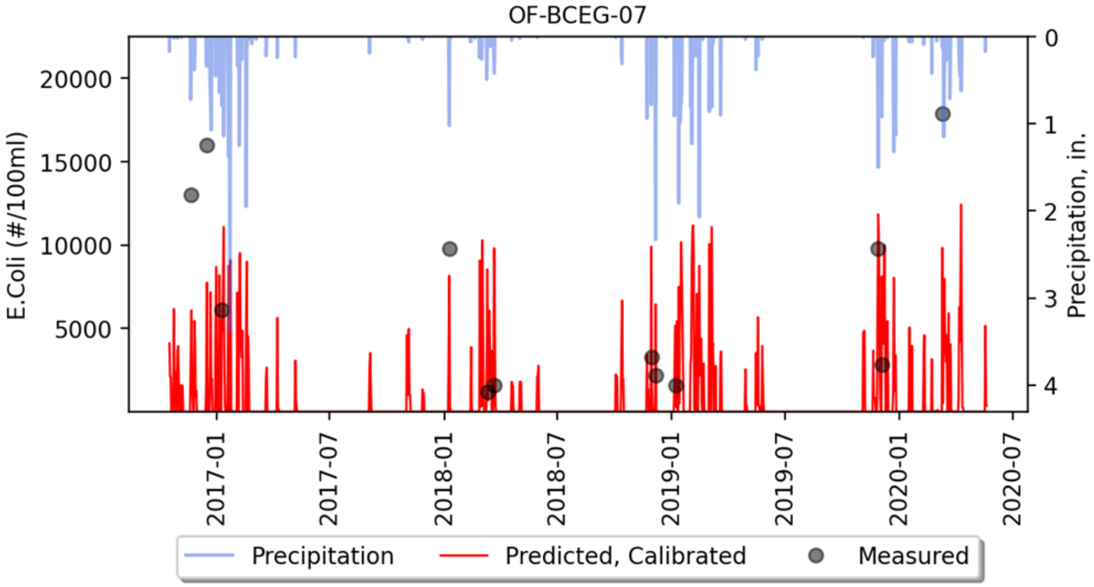




Water Quality Calibration

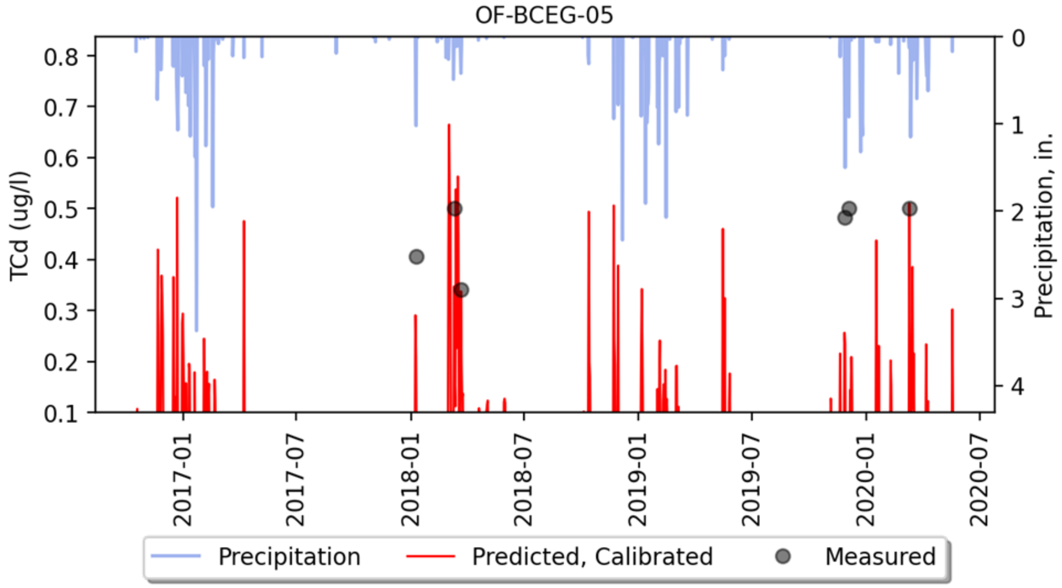
E. Coli

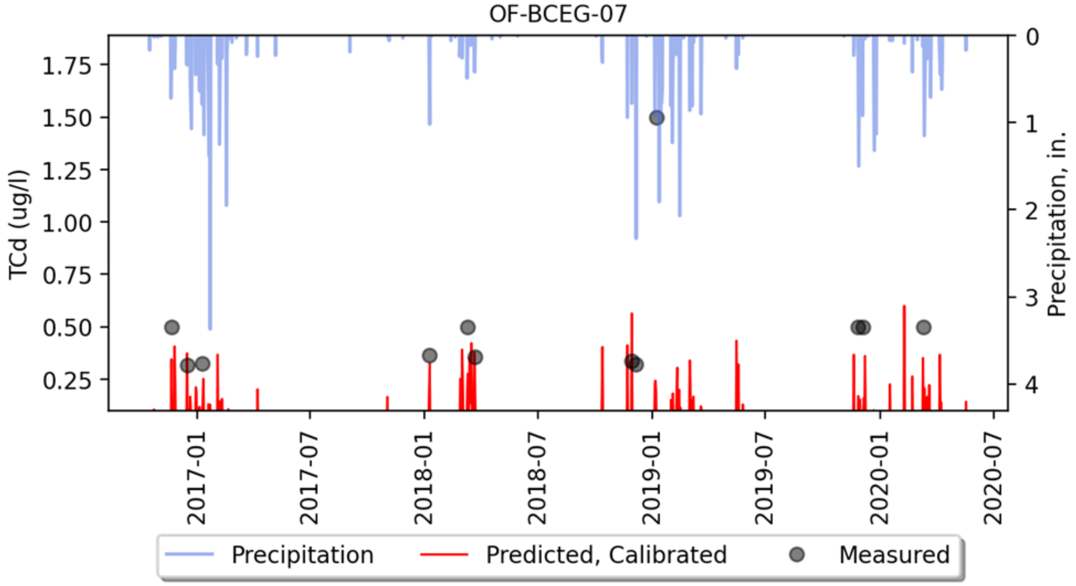




Water Quality Calibration

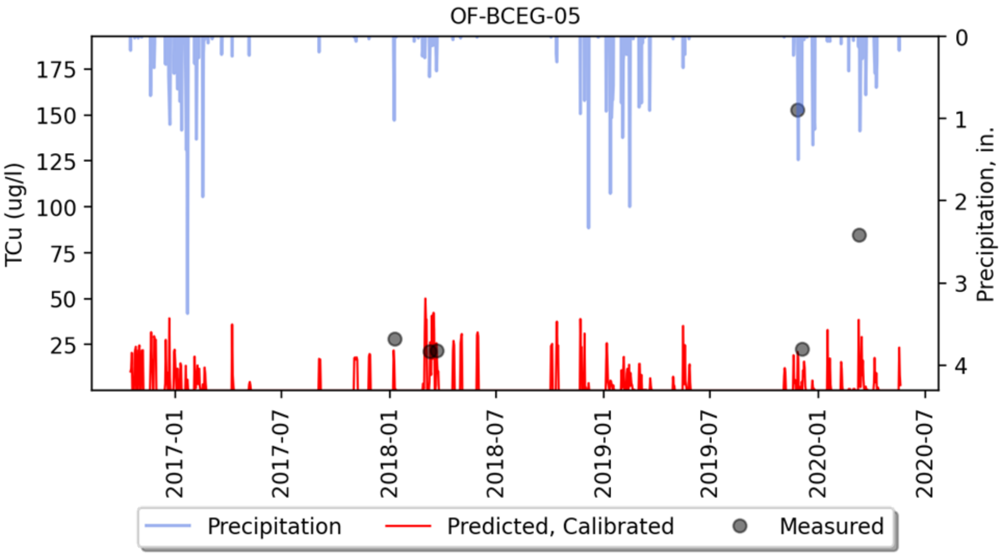
Total Cadmium

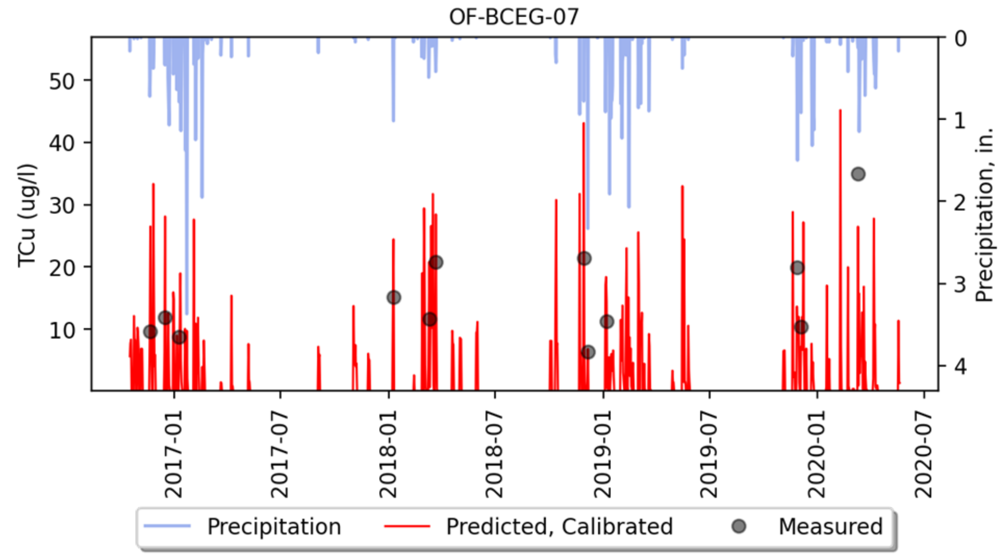




Water Quality Calibration

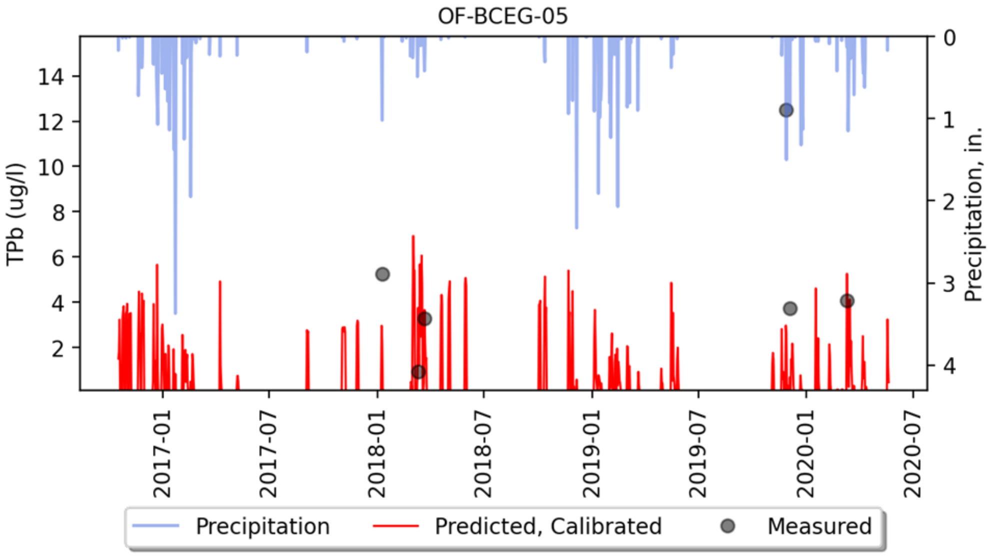
Total Copper

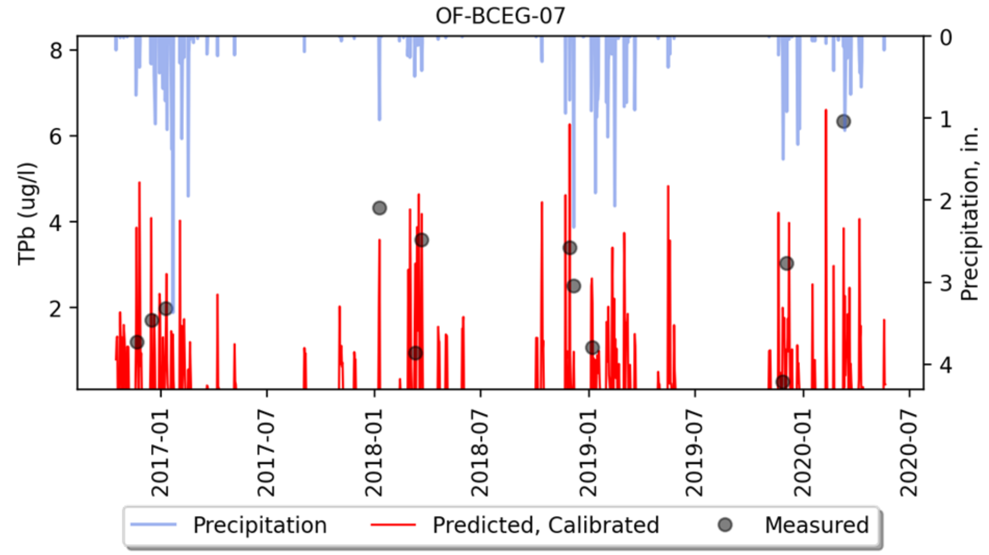




Water Quality Calibration

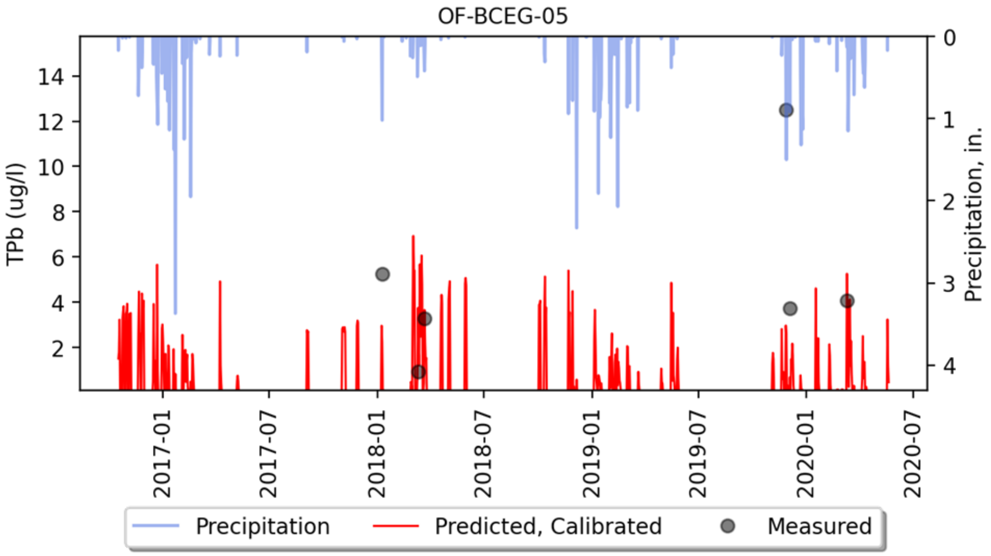
Total Lead

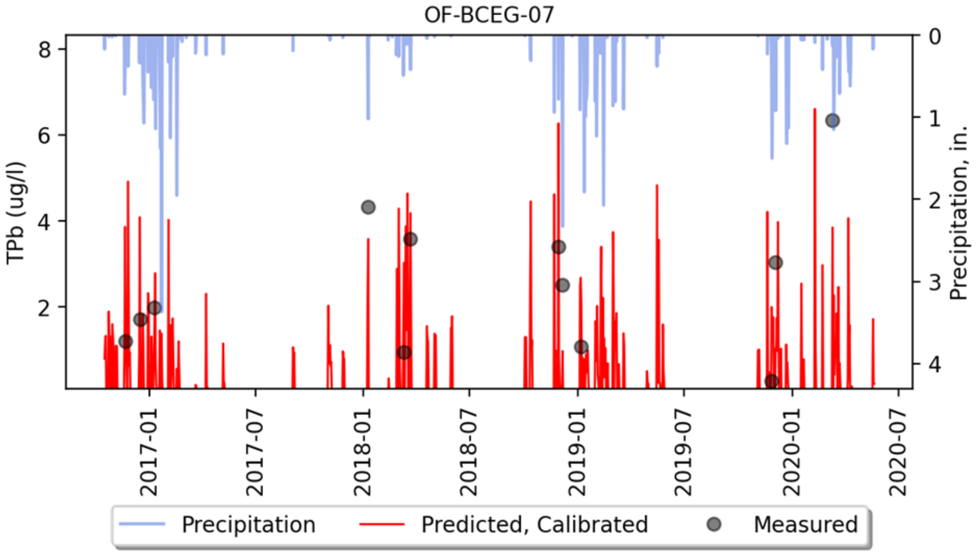


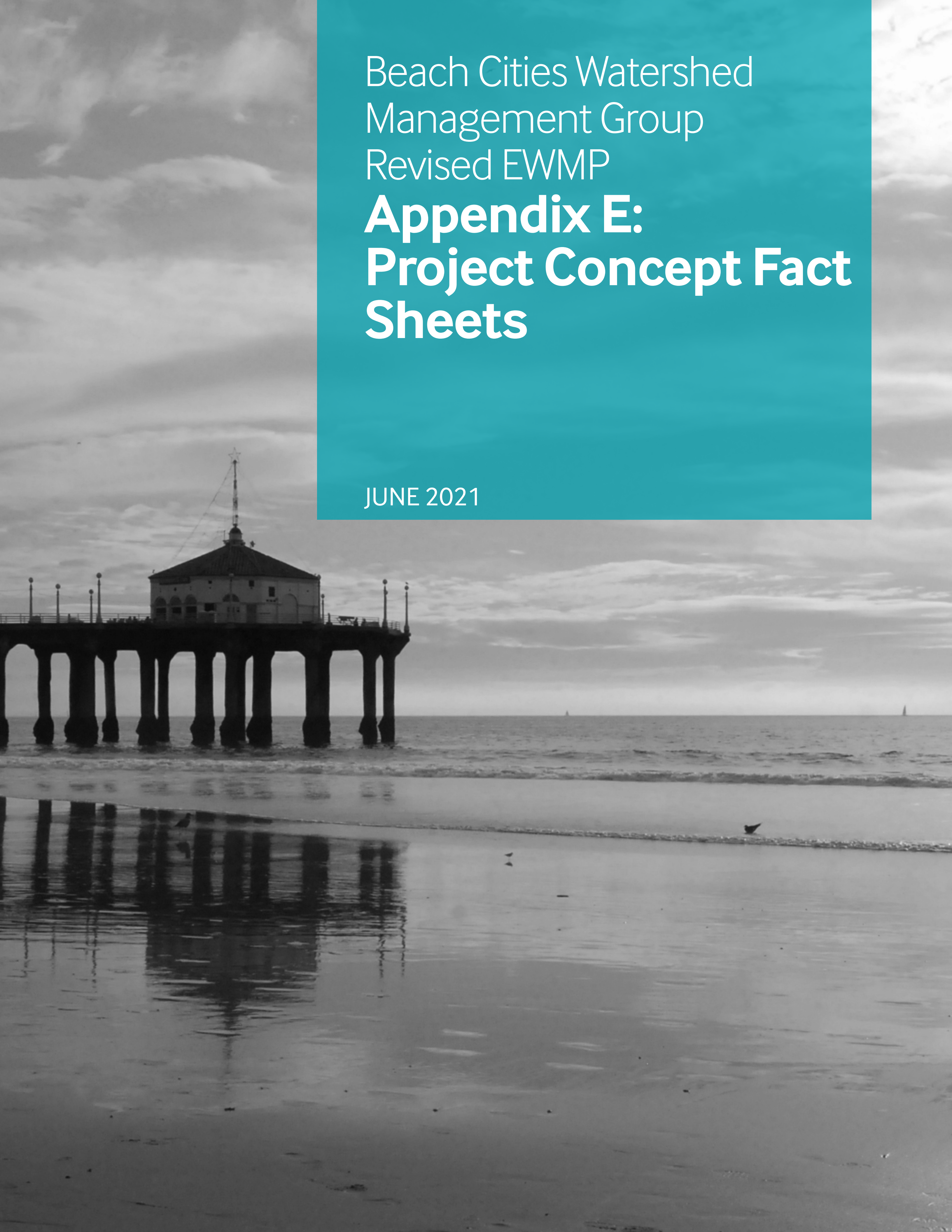


Water Quality Calibration

Total Copper







Beach Cities Watershed Management Group Revised EWMP

Appendix E: Project Concept Fact Sheets

JUNE 2021

28th Street Storm Drain Infiltration Project

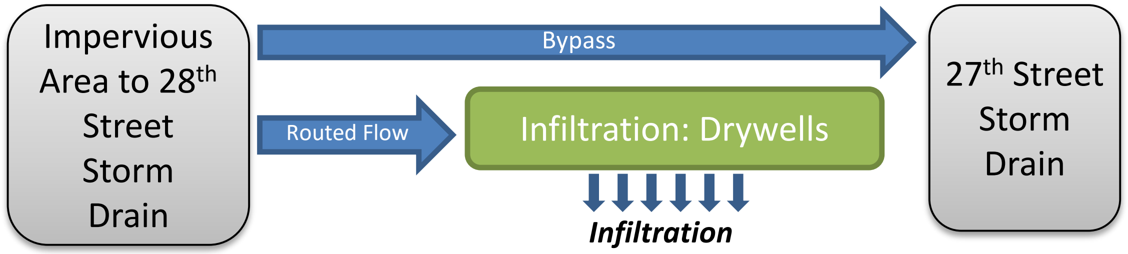
Existing Site Conditions

The 26th Street Parking Facility is one block East of Manhattan Beach and bounded by 26th Street, 27th Street, Manhattan Avenue, and Ocean Drive. Surface runoff from the tributary area enters the storm drain network and discharges to Santa Monica Bay.

Proposed BMP Project

The City of Manhattan Beach (City) is implementing the 28th Street Storm Drain Infiltration Project (Project) to improve water quality at the beach and in Santa Monica Bay by reducing discharges from the storm drain system. The Project will capture and infiltrate runoff and is split into two phases. Phase 1 includes approximately 48 drywells at the 26th Street Parking Facility and Phase 2 includes an infiltration system on the beach.

Phase 1 BMP Treatment Process



Impervious Area to 28th Street Storm Drain

Bypass

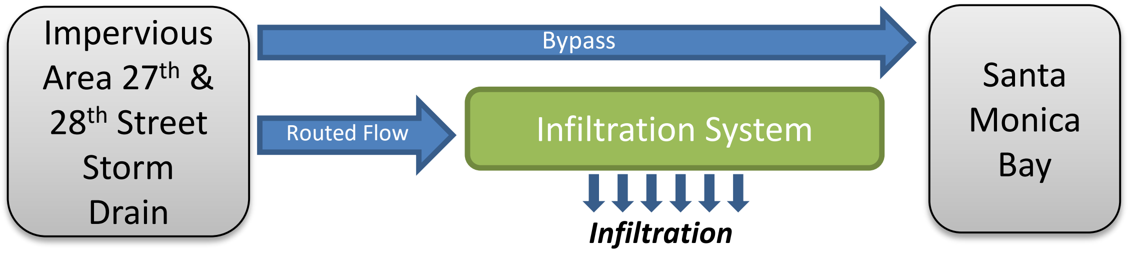
Routed Flow

Infiltration: Drywells

Infiltration

27th Street Storm Drain

Phase 2 BMP Treatment Process



Impervious Area 27th & 28th Street Storm Drain

Bypass

Routed Flow

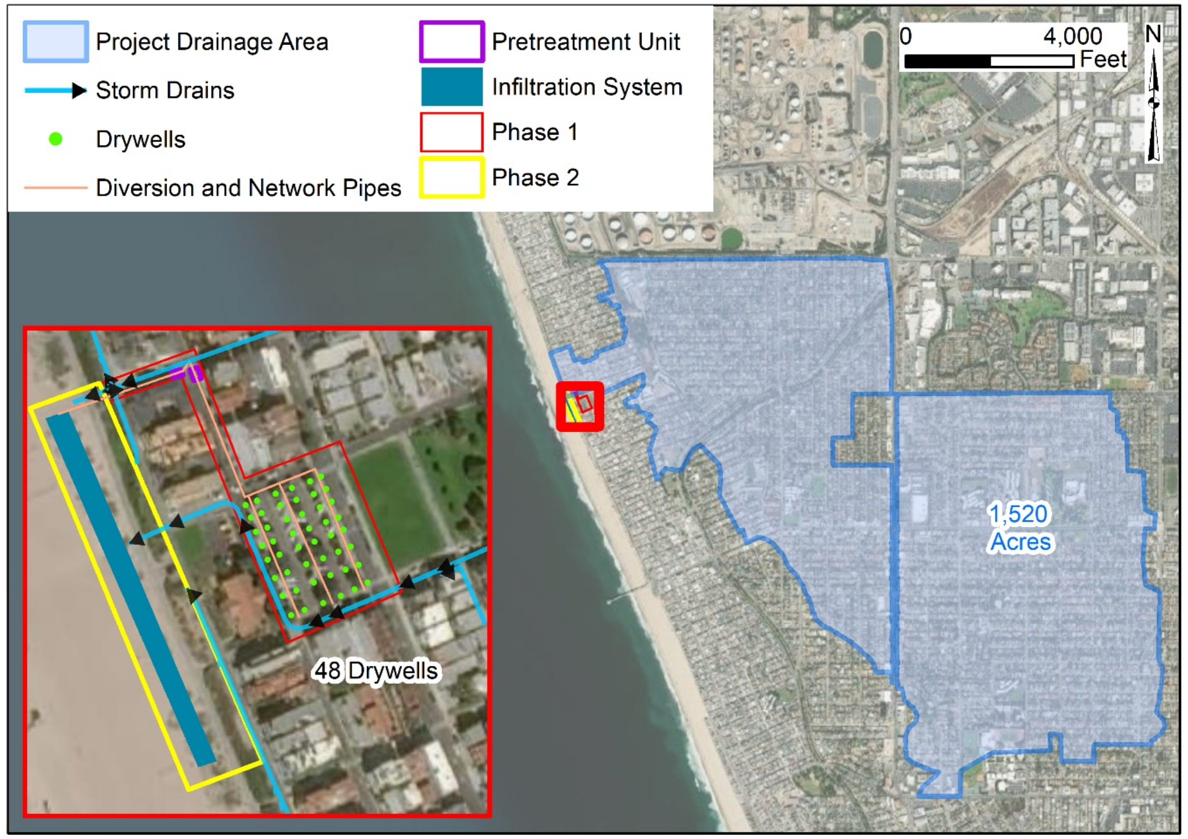
Infiltration System

Infiltration

Santa Monica Bay

City: Manhattan Beach Latitude: 33.894050 Longitude: -118.416294

Site Configuration



Model Design & Performance

Tributary Area (ac)	1,520	**24-Hour Treatment Volume (ac-ft)**	81.9[1]
No. of Proposed Drywells	48		
Bacteria Load Reduction During Critical Condition	7.2 x 10^{13} MPN/year (64% of Baseline Bacteria Load)		

[1] Phase 1 only

Multiple Benefits

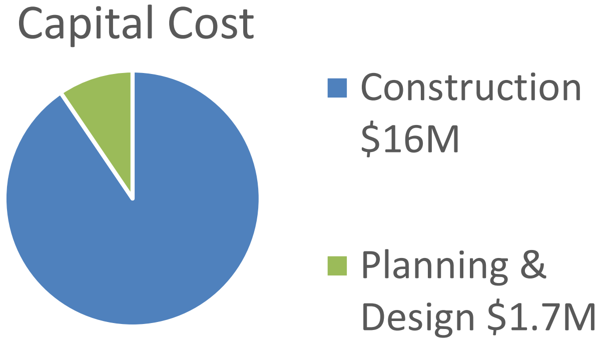
Community Investment Benefits

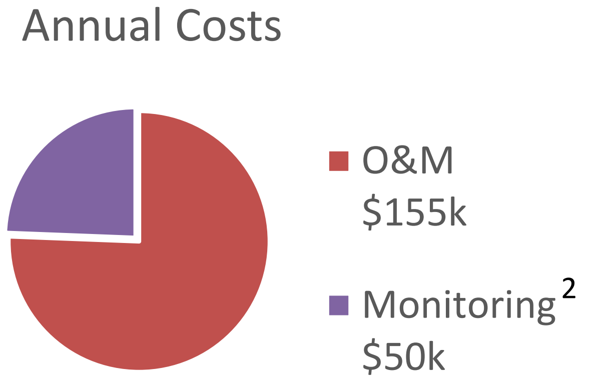
- Improved flood management and water quality
- Enhanced beach conditions
- Reduced potential for beach closures
- Create opportunities for education and outreach in local communities

Nature-Based Solutions

- Provide an enhanced environment for marine life
- Improve 26th Street Parking with native landscaping and permeable pavement
- Reduce impermeable area flowing to existing drainage system

Planning-Level Cost Estimate[1]

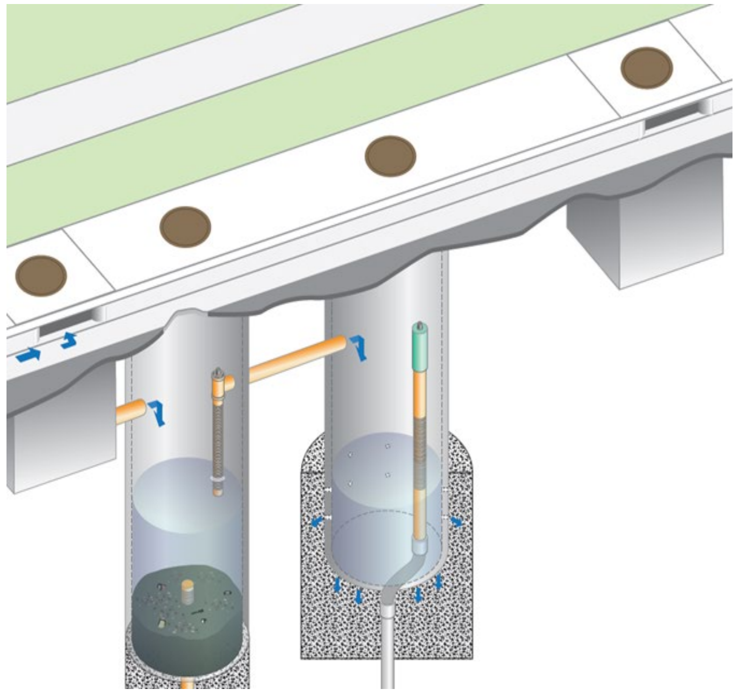




[1] Estimates based on drywells.

[2] Monitoring is only required for 3 years.

Dry Well Typical Details



28th Street Storm Drain Infiltration Project	
June 2021	Geosyntec consultants

*Products shown above were used as examples for sizing and cost analyses; other equivalent treatment systems may be used.

Torrance Basins Enhancement & Expansion Project

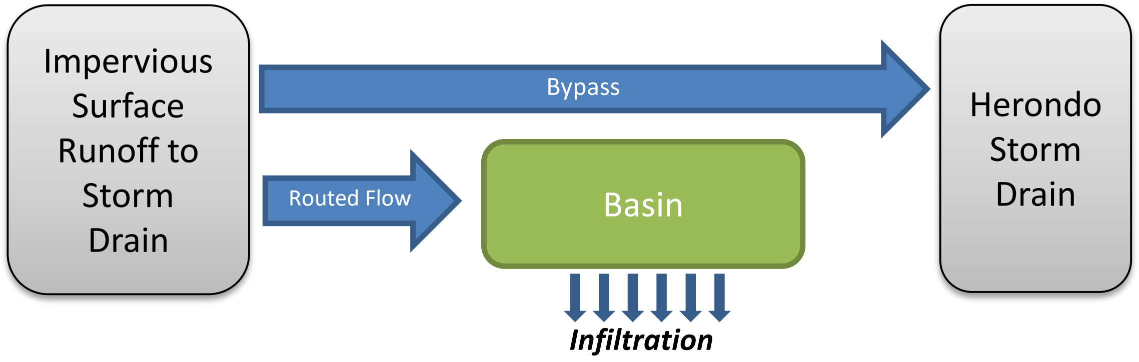
Existing Site Conditions

Herondo Drain collects stormwater from portions of the cities of Torrance, Redondo Beach, Hermosa Beach, and Manhattan Beach. Three basins within Torrance that are connected to the Herondo Drain including Amie, Henrietta, and Entradero Basins.

Proposed BMP Project

This project will improve the three flood control basins to reduce bacteria levels in receiving waters during the dry season and to capture the 85th percentile storm event. The project deepens the Henreitta and Entradero Basins to provide additional detention capacity, adds passive wetland treatment and drywells at all basins to increase the runoff management capacity. The project also includes a variety of efforts to improve the recreational opportunities and aesthetics of the parks.

BMP Treatment Process



Impervious Surface Runoff to Storm Drain

Bypass

Routed Flow

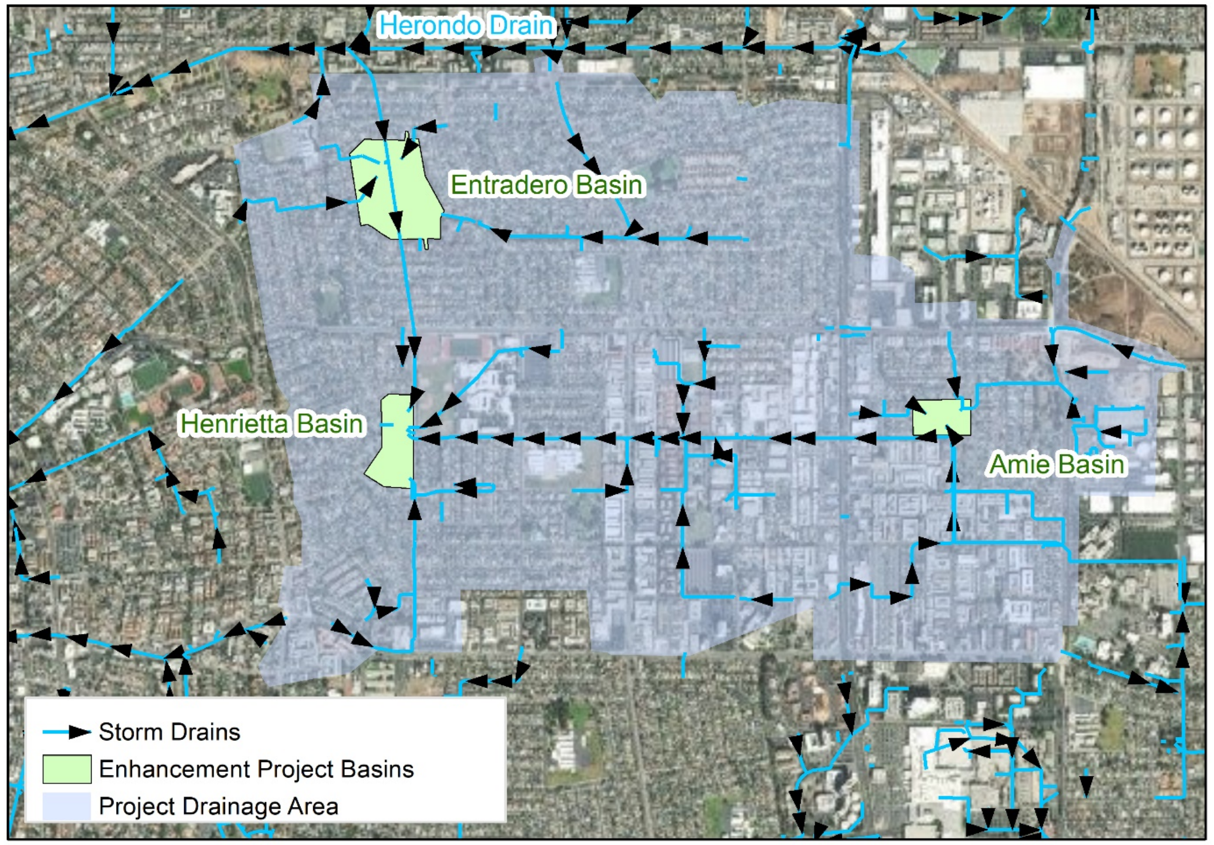
Basin

Infiltration

Herondo Storm Drain

City: Torrance Latitude: 33.853378 Longitude: -118.371828

Site Configuration



Model Design & Performance

Total Tributary Area (ac)	1,407	24-Hour Capture Volume (ac-ft)	46.5*
Basin Footprint (ac)	4.3 (Amie) 6.9 (Henrietta) 24 (Entradero)	Effective Drawdown Rate (in/hr)	0.8

*Equivalent to the 85th percentile, 24-hour design storm runoff from the entire drainage area.

Multiple Benefits

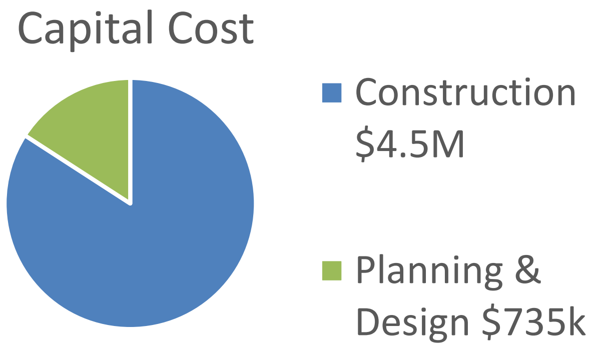
Community Investment Benefits

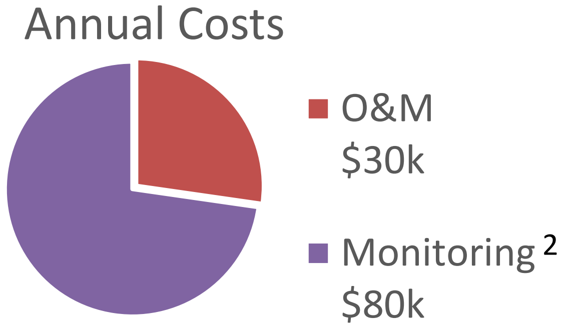
- Improved flood management and water quality
- Enhanced park space via multi-purpose recreational area.
- Create new recreational opportunities via walking trail

Nature-Based Solutions

- Implements natural processes to slow, detain, capture, and infiltrate water
- Utilize natural vegetation
- Reduce directly connected impermeable area flowing to existing drainage system

Planning-Level Cost Estimate[1]

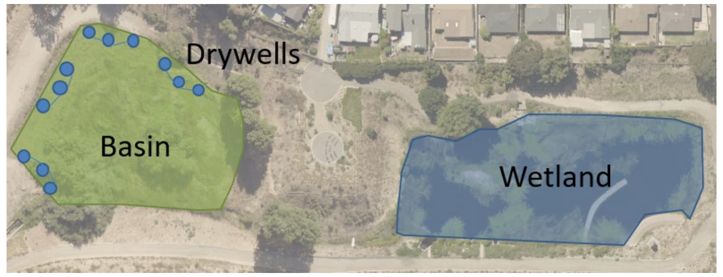


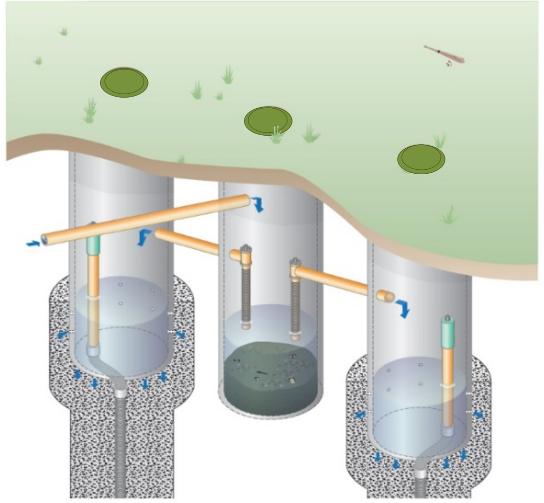


[1] Costs from SCW application

[2] Monitoring is only required for 3 years.

Typical Details





Torrance Basins Enhancement & Expansion Project	
June 2021	Geosyntec consultants

*Products shown above were used as examples for sizing and cost analyses; other equivalent treatment systems or products may be used.

Fulton Playfield Infiltration Project

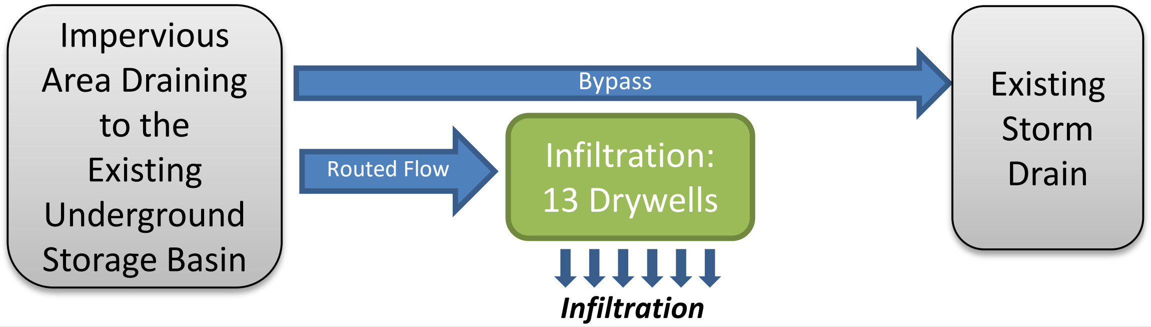
Existing Site Conditions

The site is an open green space in the City of Redondo Beach. The park includes a 1.25-acre recreational field with an existing underground storage basin that has 280,000 gallons of passive storage beneath the western half of the park.

Proposed BMP Project

The Fulton Playfield Infiltration Project proposes to add infiltration elements to the existing flood control basin to transform it into a multi-benefit regional project. This will enhance the flood control capacity of the existing basin while adding significant water quality benefits through volume loss via infiltration. Infiltration will be accomplished using drywells. The project will provide full capture of dry weather volume and controlled wet weather releases with improved inlet-outlet control structures to manage and optimize the storage and infiltration capacity of the project. Park enhancements including outdoor exercise and playground equipment are also planned. Adding features that can better capture runoff from the adjacent school along with green water quality features such as bioretention and ocean friendly gardens in the park and along Rindge Lane will provide additional benefits to the community.

BMP Treatment Process



Impervious Area Draining to the Existing Underground Storage Basin

Bypass

Routed Flow

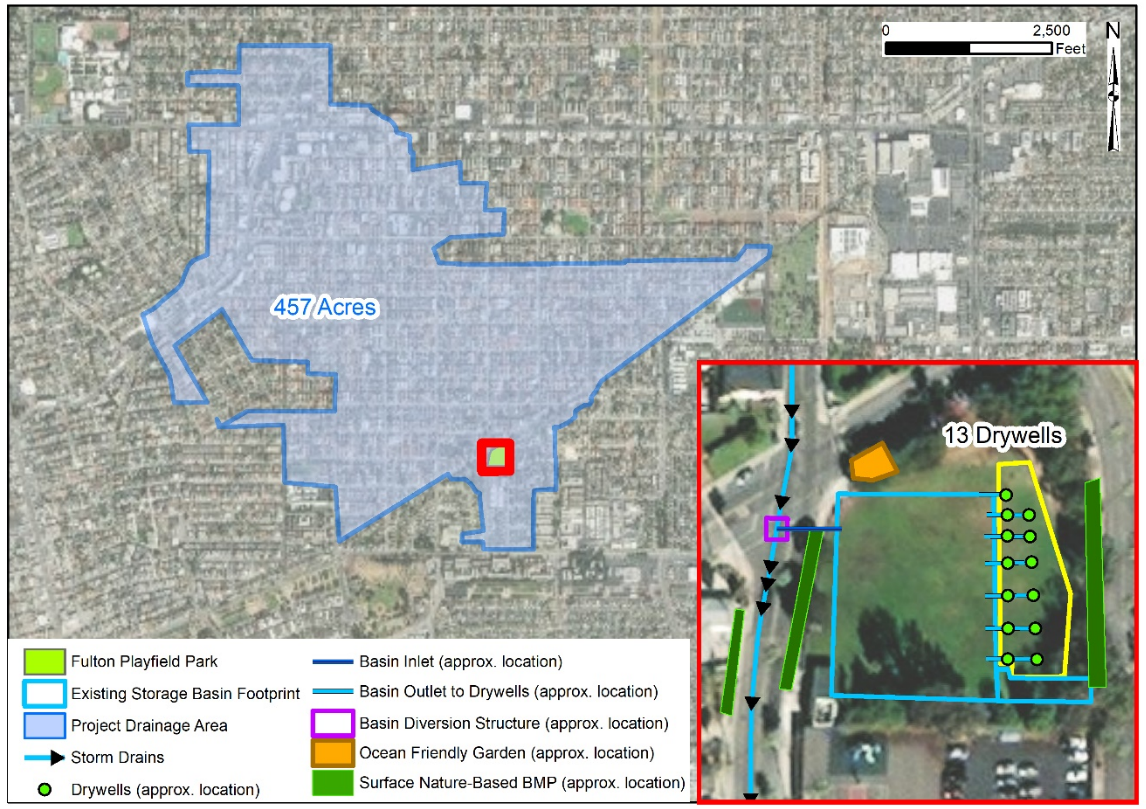
Infiltration: 13 Drywells

Existing Storm Drain

Infiltration

City: Redondo Beach Latitude: 33.861774 Longitude: -118.372308

Site Configuration



🟩	Fulton Playfield Park	—	Basin Inlet (approx. location)
☐	Existing Storage Basin Footprint	—	Basin Outlet to Drywells (approx. location)
▨	Project Drainage Area	☐	Basin Diversion Structure (approx. location)
→	Storm Drains	🟧	Ocean Friendly Garden (approx. location)
●	Drywells (approx. location)	🟩	Surface Nature-Based BMP (approx. location)

* Nature-based BMPs may include bioretention, pervious pavement, and biofilters.

Model Design & Performance

Tributary Area (ac)	457	**24-Hour Treatment Volume (ac-ft)**	26
No. of Proposed Equivalent Drywells	13	**Treatment Rate (cfs)**	13
Bacteria Load Reduction During Critical Condition	28×10^{12} MPN/year (25% of Baseline Bacteria Load)		

Multiple Benefits

Community Investment Benefits

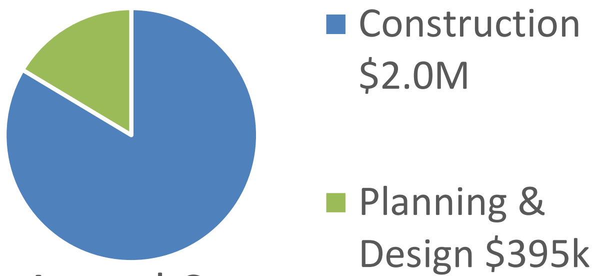
- Improved flood management
- Enhanced park via playground
- Cooperation with greening of Valor Christian Academy
- Potential for recreational workout stations per community preferences

Nature-Based Solutions

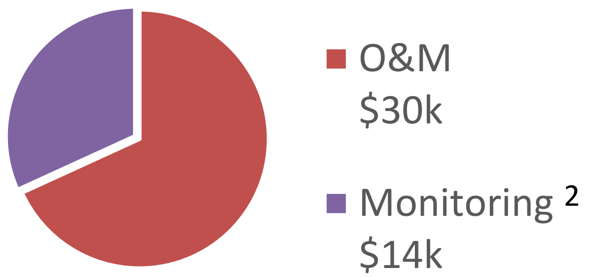
- Utilize natural vegetation and other nature-based processes such as ocean friendly gardens to capture, slow, and filter runoff
- Reduce directly connected impermeable area flowing to existing drainage system

Planning-Level Cost Estimate[1]

Capital Cost

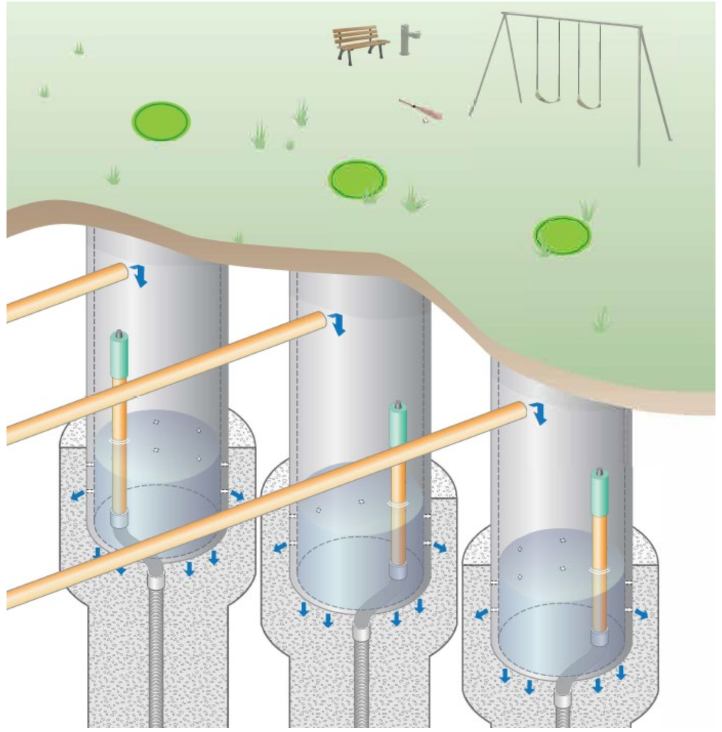


Annual Costs



[1]Estimates based on representative drywells and previous project estimates for piping.
[2]Monitoring is only required for 3 years.

Typical Details



Fulton Playfield Infiltration Project	
June 2021	Geosyntec consultants

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*Drywells were used for sizing and cost analyses; other equivalent products or treatment systems may be used but have not been included in costs.

Redondo Beach Herondo Distributed Infiltration Project

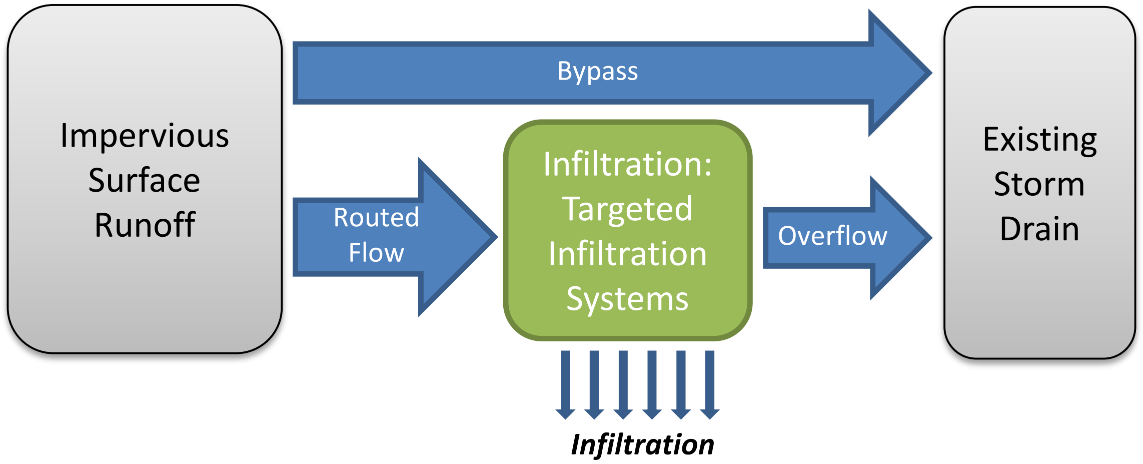
Existing Site Conditions

Surface runoff enters the storm drain network through various catch basins, as seen below on Armour Lane. The drainage area is mostly residential, with limited commercial development.

Proposed BMP Project

The City of Redondo Beach is planning to implement a series of targeted infiltration BMPs to collect surface runoff from a 342-acre area of Redondo Beach within the Herondo Storm Drain watershed (SMB-6-1). The infiltration BMPs will be placed strategically upstream of existing catch basins to maximize infiltration; see site configuration map for potential infiltration areas. Drywells are one example of a potential infiltration BMP.

BMP Treatment Process



Impervious Surface Runoff

Bypass

Routed Flow

Infiltration: Targeted Infiltration Systems

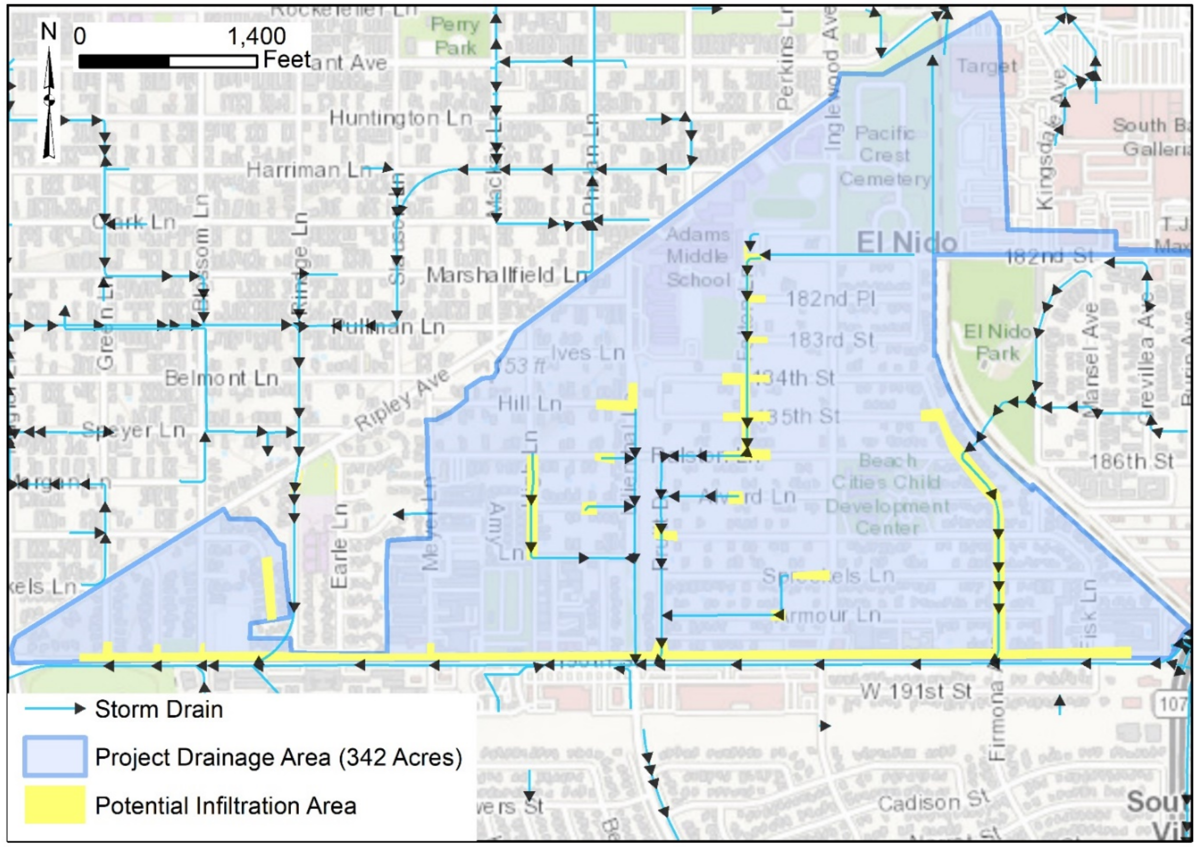
Overflow

Existing Storm Drain

Infiltration

City: Redondo Beach Latitude: Various Longitude: Various

Site Configuration



Model Design & Performance

Tributary Area (ac)	342	**24-Hour Treatment Volume (ac-ft)**	17.6
No. of Proposed Infiltration BMPs	22	**Treatment Rate (cfs)**	22
Pollutant Load Reduction	Bacteria	19 x 10^{12} MPN/year (17% of Baseline Bacteria Load)	

Multiple Benefits

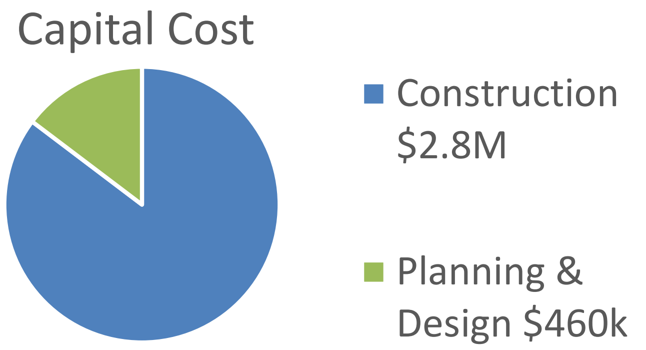
Community Investment Benefits

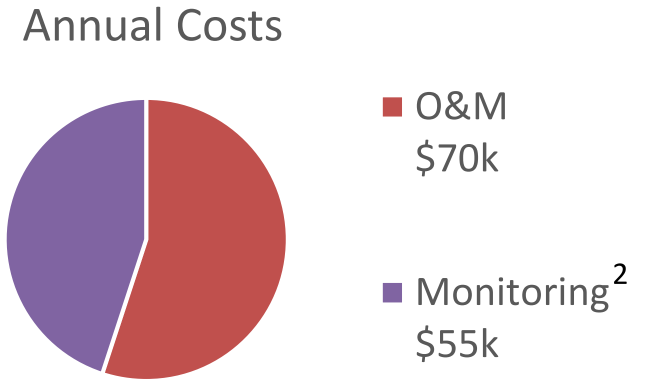
- Improved flood management

Nature-Based Solutions

- Utilize natural vegetation and other nature-based processes to slow, detain, capture, and filter water
- Reduce directly connected impermeable area flowing to existing drainage system

Planning-Level Cost Estimate[1]

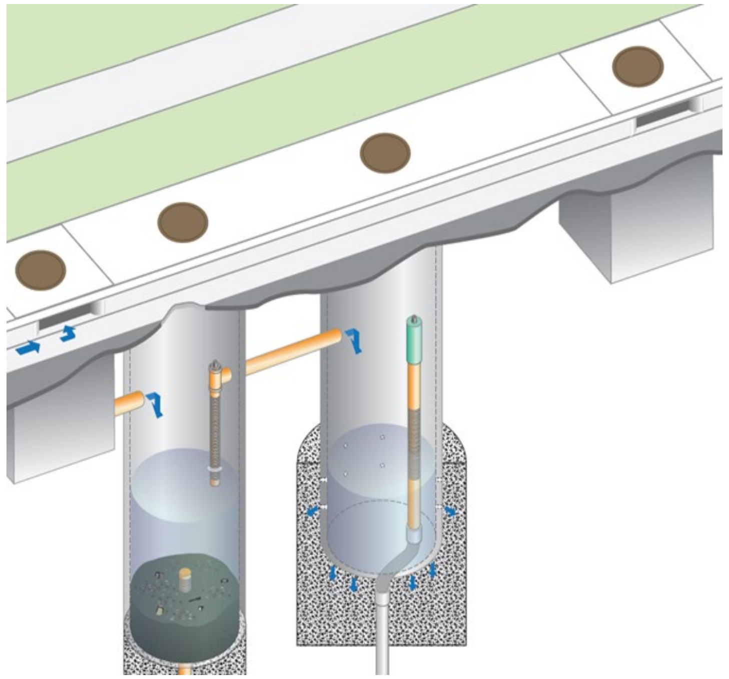




[1] Estimates based on drywells.

[2] Monitoring only required for 3 years.

Typical Detail



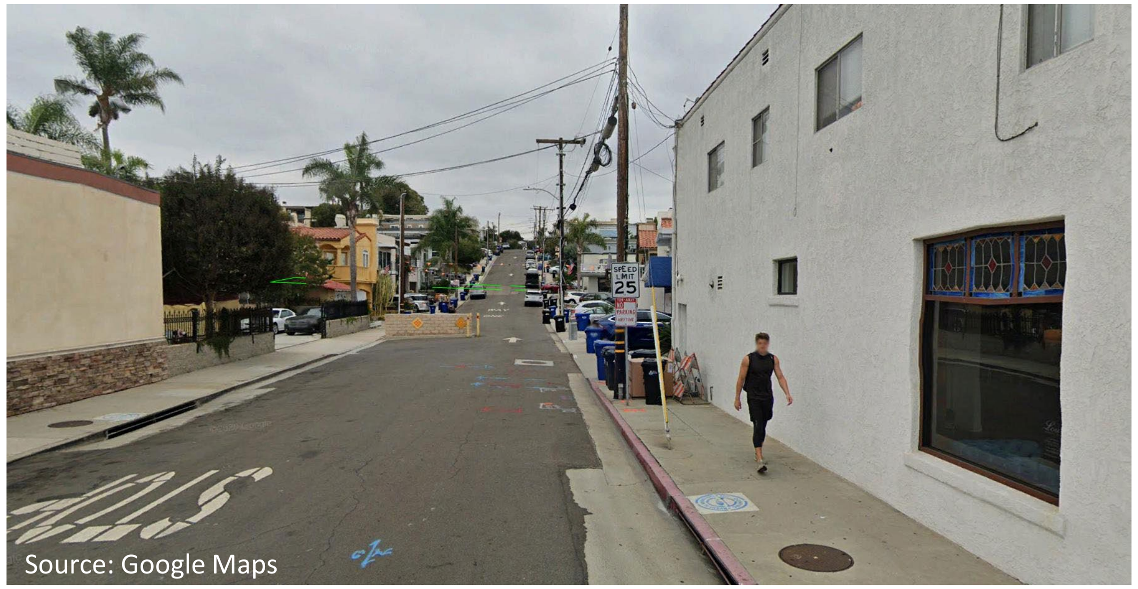
Redondo Beach Herondo Distributed Infiltration Project	
June 2021	Geosyntec consultants

*Products shown above were used as examples for sizing and cost analyses; other equivalent infiltration systems may be used.

Hermosa Beach Distributed Drywells

Existing Site Conditions

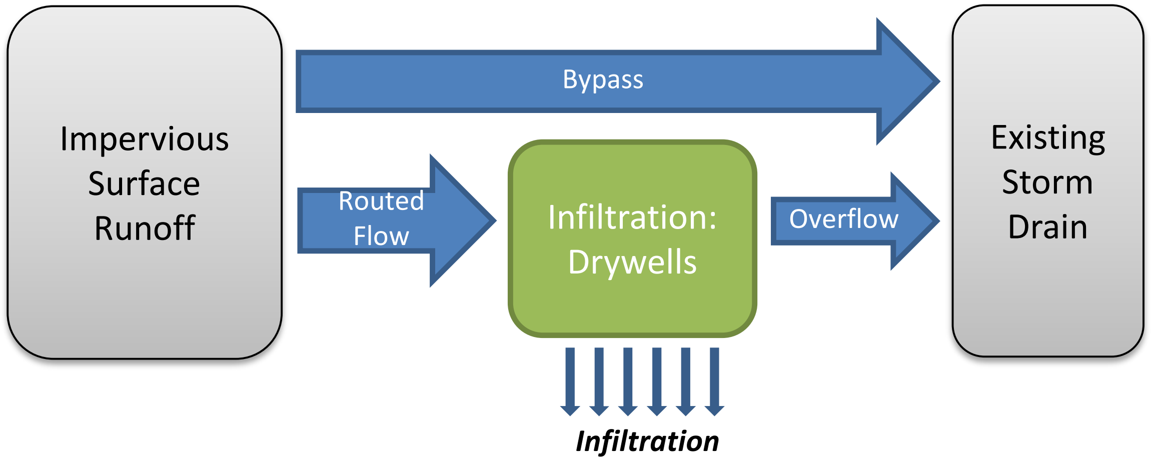
Untreated surface runoff enters the storm drain network through surface catch basins in this area as the neighborhood transitions from residential in the higher areas to commercial areas near the Pacific Coast Highway (PCH). A typical example is shown on 3rd Street, east of PCH.


Source: Google Maps

Proposed BMP Project

The City of Hermosa Beach is planning to implement a series of drywells east of PCH between 1st Street and 10th Street to capture stormwater and dry weather flows within 118 acres of the Herondo Drain (SMB-6-1) watershed. The drywells will be placed strategically upstream of existing catch basins to maximize infiltration.

BMP Treatment Process


Impervious Surface Runoff

Bypass

Routed Flow

Infiltration: Drywells

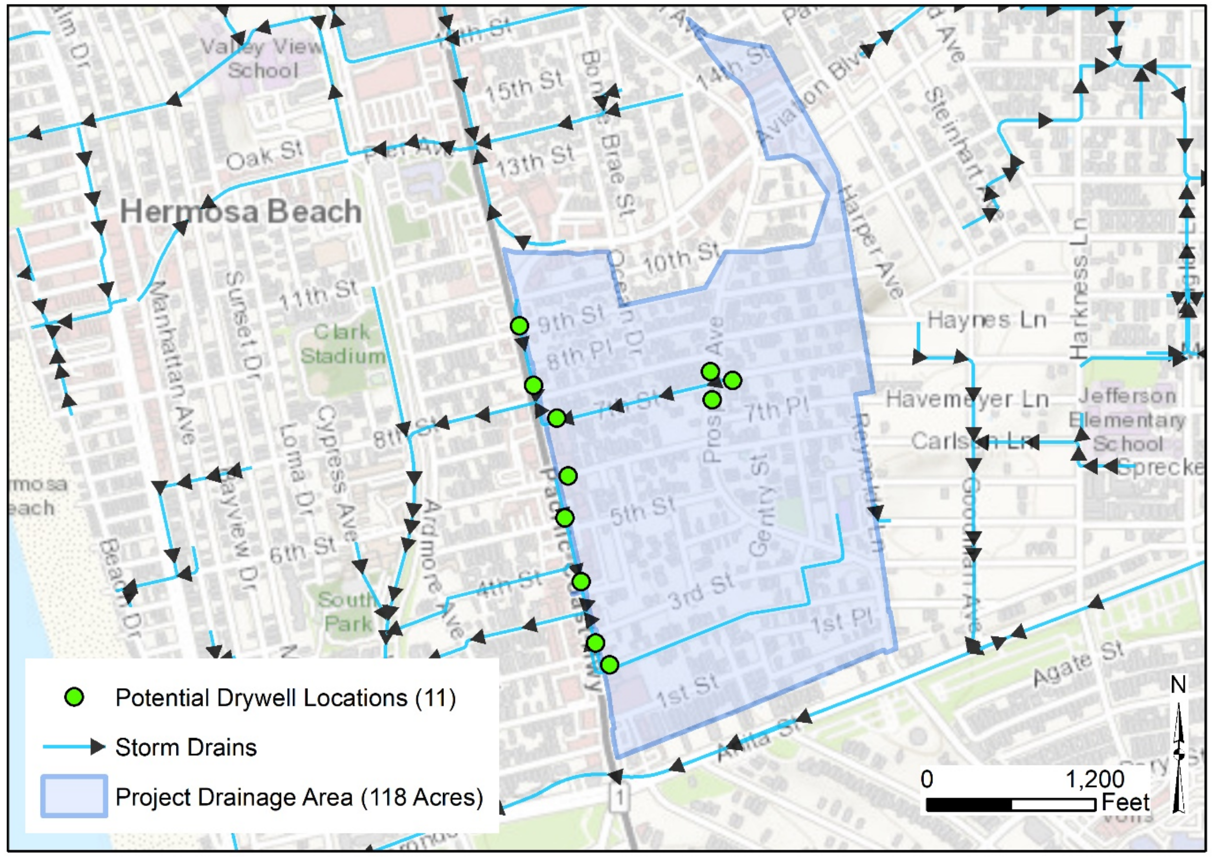
Overflow

Existing Storm Drain

Infiltration

City: Hermosa Beach Latitude: 33.857054 Longitude: -118.390251

Site Configuration



Model Design & Performance

Tributary Area (ac)	118	**24-Hour Treatment Volume (ac-ft)**	7.7
No. of Proposed Drywells	11	**Treatment Rate (cfs)**	11
Pollutant Load Reduction	Bacteria	8.2×10^{12} MPN/year (7% of Baseline Bacteria Load)	

Multiple Benefits

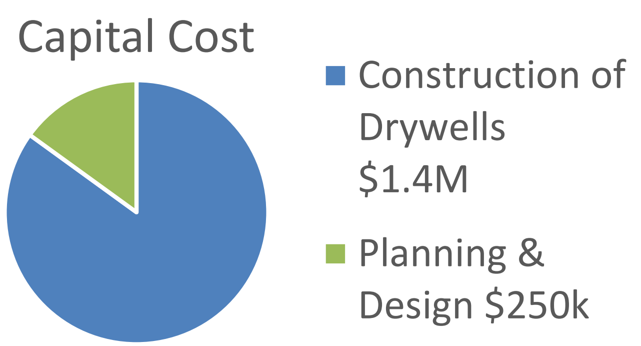
Community Investment Benefits

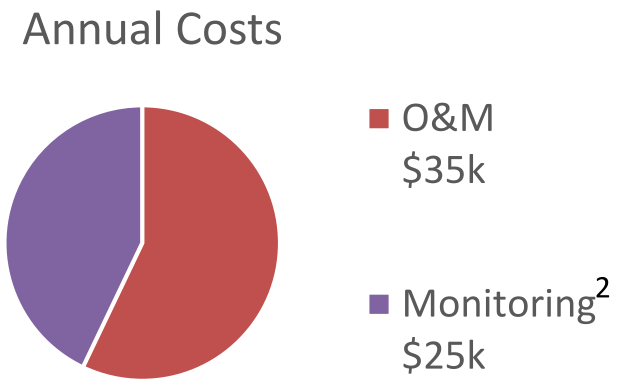
- Improved flood management

Nature-Based Solutions

- Utilize natural vegetation and other nature-based processes to slow, detain, capture, and filter water
- Reduce directly connected impermeable area flowing to existing drainage system

Planning-Level Cost Estimate[1]

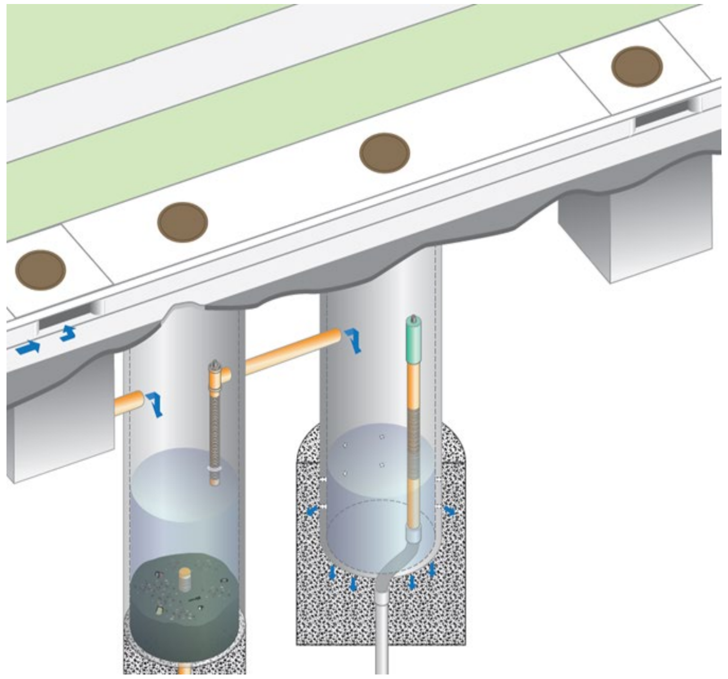




[1] Estimates based on drywells.

[2] Monitoring only required for 3 years.

Typical Detail



Hermosa Beach Distributed Drywells	
June 2021	Geosyntec consultants

*Products shown above were used as examples for sizing and cost analyses; other equivalent products or treatment systems may be used.

Manhattan Beach Dominguez Channel Distributed Infiltration Project

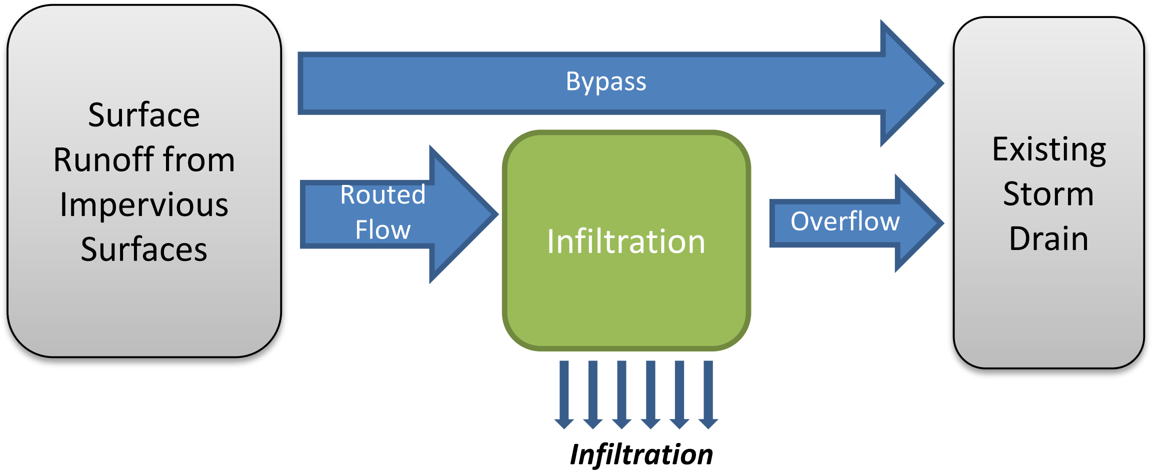
Existing Site Conditions

The majority of Manhattan Beach's tributary area within the Dominguez Channel Watershed flows through a 27-inch storm drain under 33rd St before turning south down Aviation Blvd. The storm drain is downstream of a detention pond at a nearby golf course.

Proposed BMP Project

The City of Manhattan Beach is planning to implement infiltration practices along 33rd Street and/or Aviation Blvd to capture and infiltrate stormwater flows from a 255-acre mixed-use area of Manhattan Beach and within the Dominguez Channel watershed. Multiple types of BMPs are under consideration to provide required treatment.

BMP Treatment Process



Surface Runoff from Impervious Surfaces

Bypass

Routed Flow

Infiltration

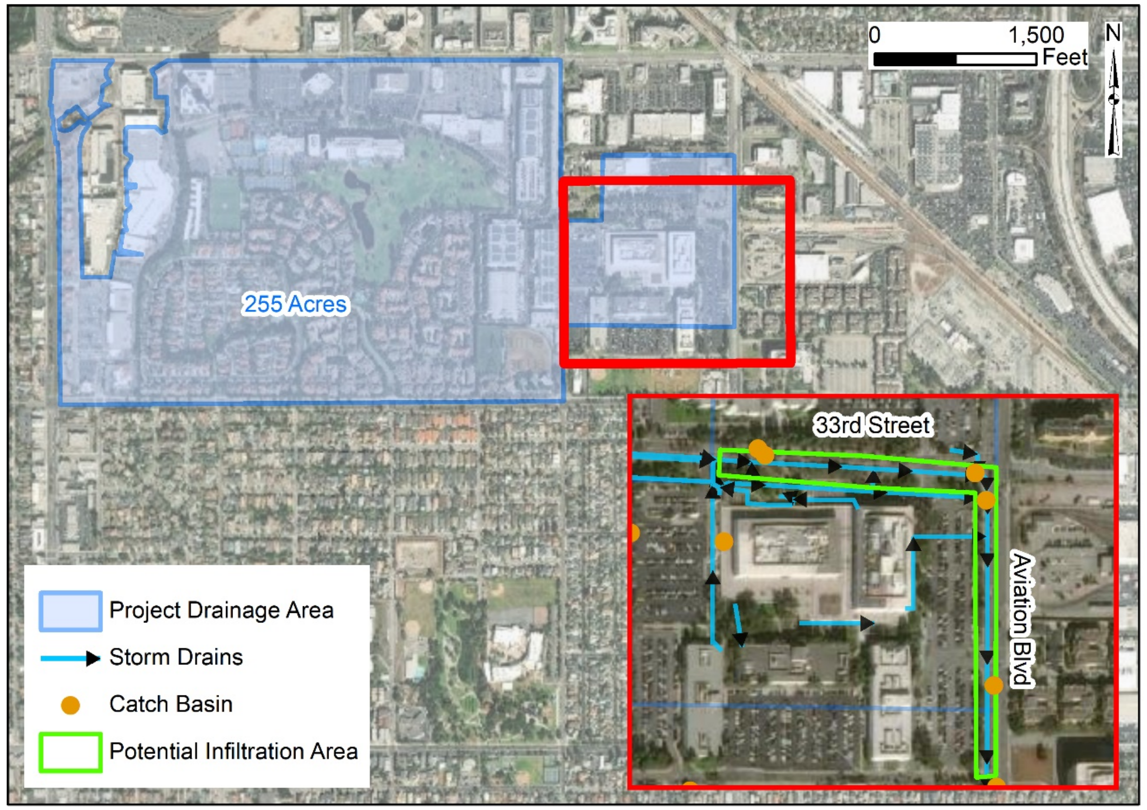
Overflow

Existing Storm Drain

Infiltration

City: Manhattan Beach Latitude: 33.898811 Longitude: -118.381272

Site Configuration



Model Design & Performance

Tributary Area (ac)	225	**24-Hour Treatment Volume (ac-ft)***	5.2
Pollutant Load Reduction Range (% of Baseline Load)	Copper	83%	
	Zinc	77%	
	Bacteria	43%	
	Benzo [a] pyrene	71%	

*Includes static storage capacity and 24-hour infiltration capacity

Multiple Benefits

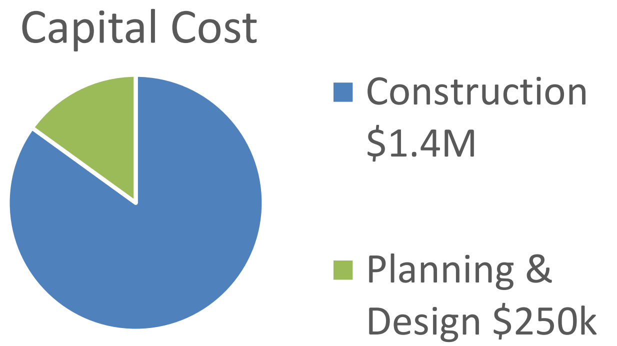
Community Investment Benefits

- Improved flood management

Nature-Based Solutions

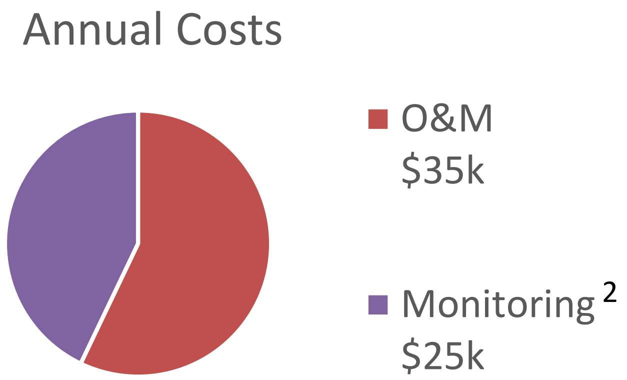
- Utilize natural vegetation and other nature-based processes to slow, detain, capture, and filter water
- Reduce directly connected impermeable areas flowing to existing drainage system

Planning-Level Cost Estimate[1]



Capital Cost

- Construction $1.4M
- Planning & Design $250k



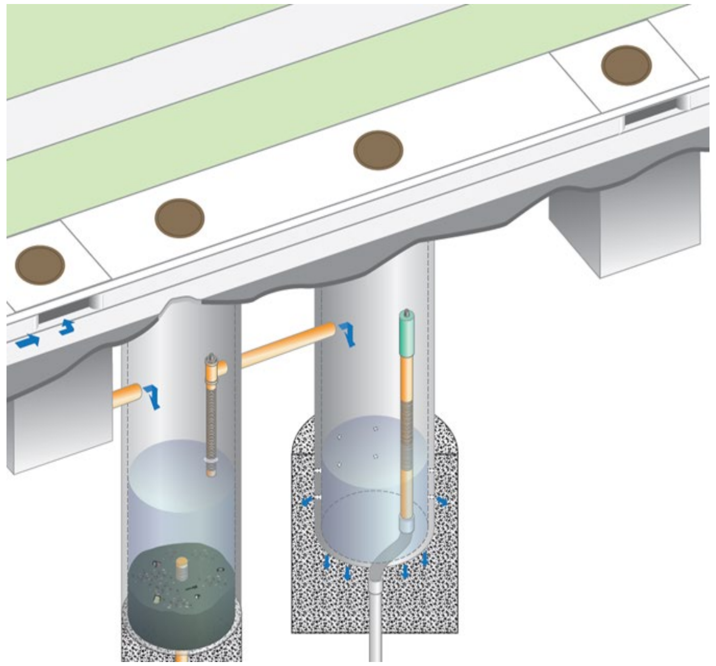
Annual Costs

- O&M $35k
- Monitoring[2] $25k

[1] Estimates based on representative drywells.

[2] Monitoring only required for 3 years.

Typical Detail



Manhattan Beach Dominguez Channel Distributed Infiltration Project

June 2021

Geosyntec consultants

*Products shown above are referenced as examples for sizing and cost analyses; other equivalent products or treatment systems may be used.

Glen Anderson Park Regional Infiltration Project

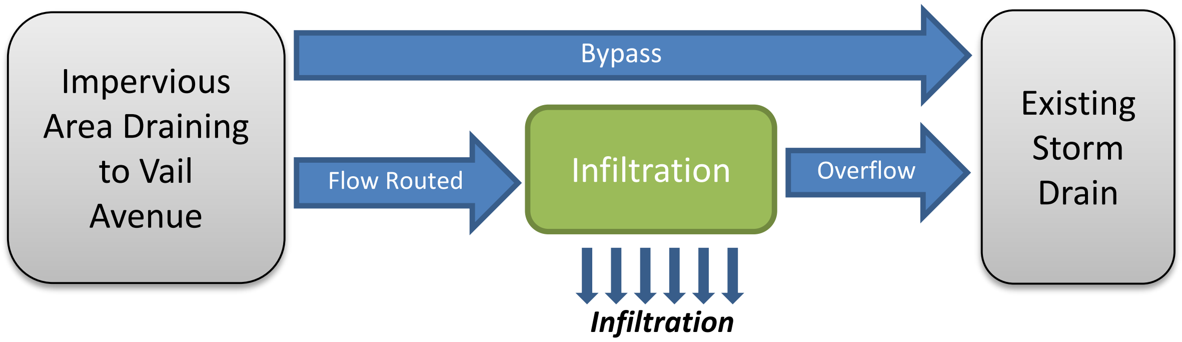
Existing Site Conditions

Glen Anderson Park is a 12.4-acre multi-use park in the City of Redondo Beach, located adjacent to Lincoln Elementary School between Rindge Lane, Farrell Avenue, and Vail Avenue. The park has significant green space in addition to baseball fields, tennis courts, basketball courts, and a playground.

Proposed BMP Project

The Glen Anderson Park Regional Infiltration Project will provide infiltration via a single underground infiltration basin, a series of drywells, or a combination of both. Wet and dry weather runoff from City of Redondo Beach travels north in the 78-inch reinforced concrete pipe storm drain (LACFCD BI 0729) that runs under Vail Ave. The Project will divert runoff from this storm drain into a pretreatment system, before flows continue into the infiltration-based BMP.

BMP Treatment Process



Impervious Area Draining to Vail Avenue

Bypass

Flow Routed

Infiltration

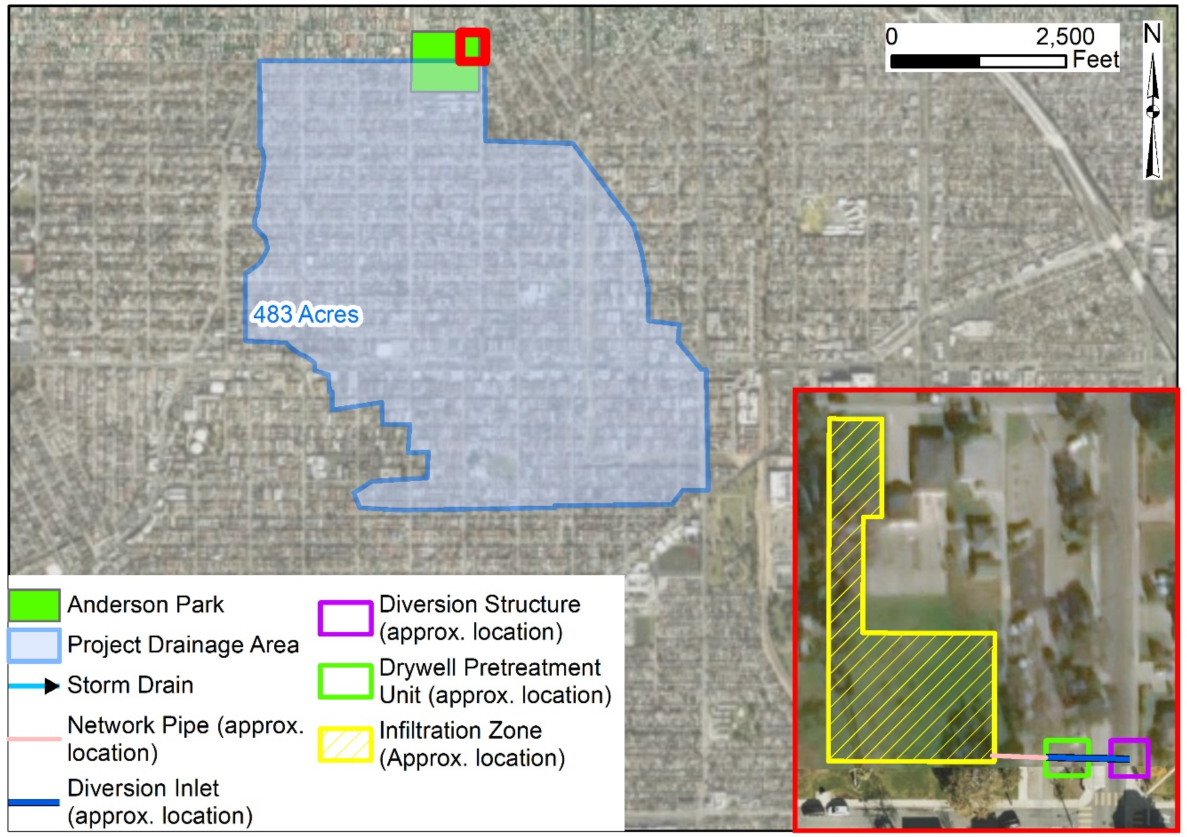
Overflow

Existing Storm Drain

Infiltration

City: Redondo Beach Latitude: 33.882775 Longitude: -118.370948

Site Configuration



🟩 Anderson Park

▭ Project Drainage Area

→ Storm Drain

— Network Pipe (approx. location)

— Diversion Inlet (approx. location)

▭ Diversion Structure (approx. location)

▭ Drywell Pretreatment Unit (approx. location)

▨ Infiltration Zone (Approx. location)

Model Design & Performance

Tributary Area (ac)	483	**24-Hour Treatment Volume (ac-ft)**	9.4
Potential Footprint for Infiltration (ac)	0.45	**Design Treatment Rate (cfs)**	20
Pollutant Load Reduction Range (% of Baseline Load)	Copper	81%	
	Zinc	74%	
	Bacteria	44%	
	Benzo [a] pyrene	67%	

Multiple Benefits

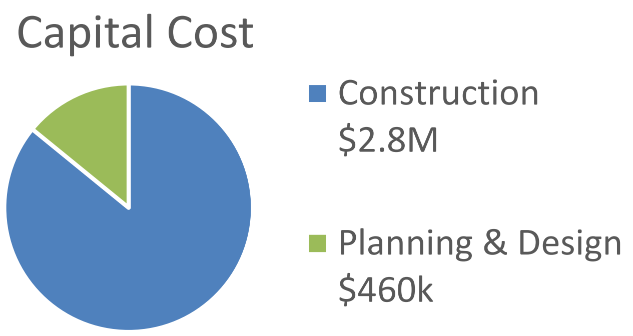
Community Investment Benefits

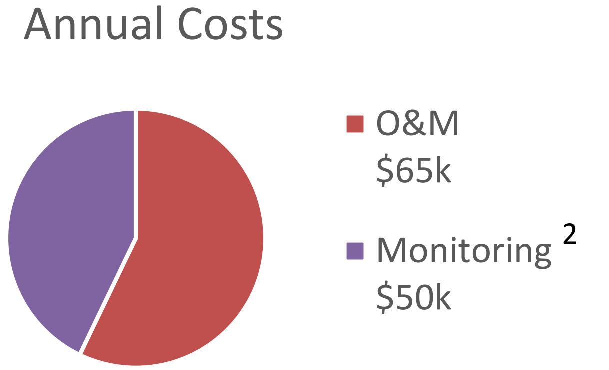
- Improved flood management
- Enhanced park

Nature-Based Solutions

- Utilize natural vegetation and other nature-based processes to slow, detain, capture, and filter water
- Reduce directly connected impermeable area flowing to existing drainage system

Planning-Level Cost Estimate[1]

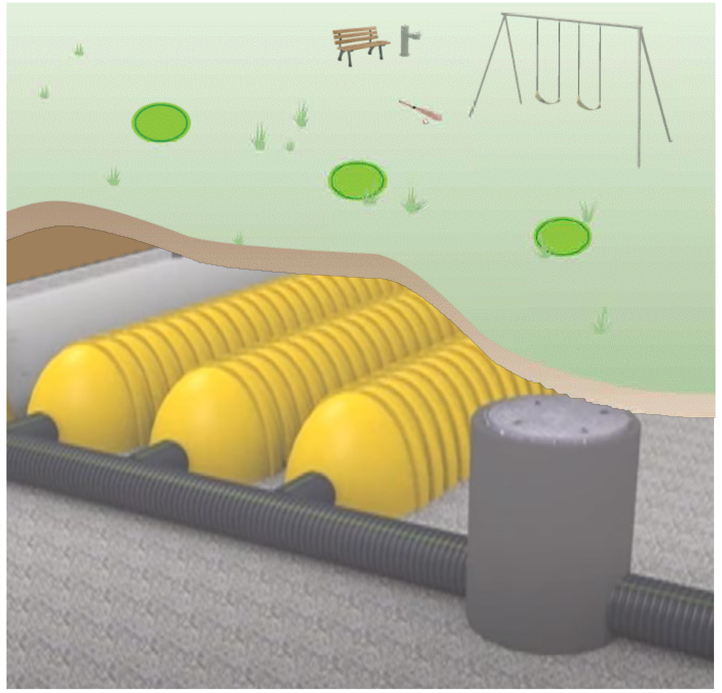




[1] Estimates based on representative drywells and previous project estimates for piping.

[2] Monitoring only required for 3 years.

Typical Details



Glen Anderson Park Regional Infiltration Project
June 2021
Geosyntec consultants

*Products shown above were used as examples for sizing and cost analyses; other equivalent products or treatment systems may be used.

Redondo Beach Dominguez Channel Distributed Infiltration Project

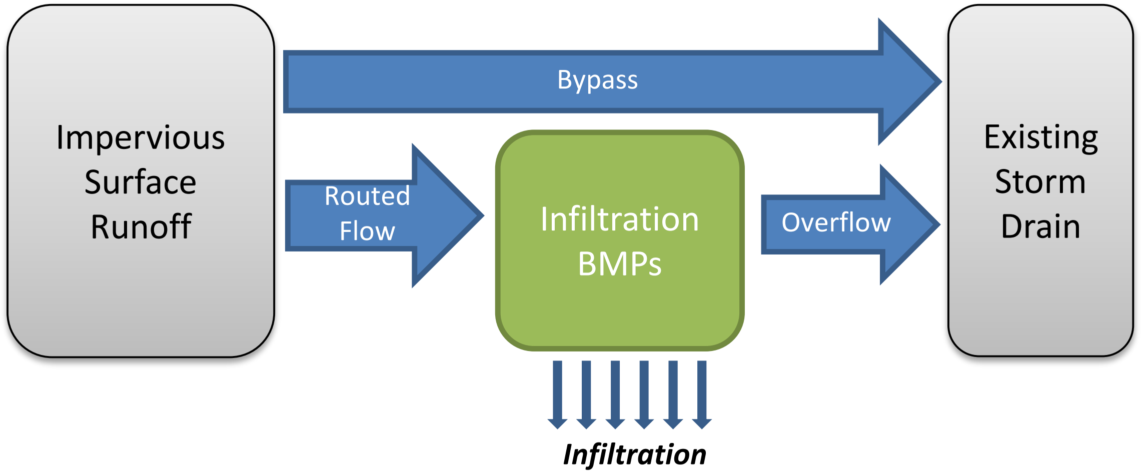
Existing Site Conditions

Surface runoff enters the storm drain network through a variety of surface catch basins, as seen below on Redondo Beach Blvd within the drainage area.

Proposed BMP Project

The City of Redondo Beach is planning to implement a series of targeted and distributed infiltration BMPs to collect surface runoff from a portion of a 292-acre industrial area within the Dominguez Channel watershed. Implementation of targeted infiltration BMPs will fully capture dry weather flows in addition to treating stormwater flows from the tributary areas. The infiltration BMPs will be placed strategically upstream of existing catch basins; see site configuration map for potential infiltration areas. Drywells are one example of a potential infiltration BMP.

BMP Treatment Process



Impervious Surface Runoff

Routed Flow

Bypass

Infiltration BMPs

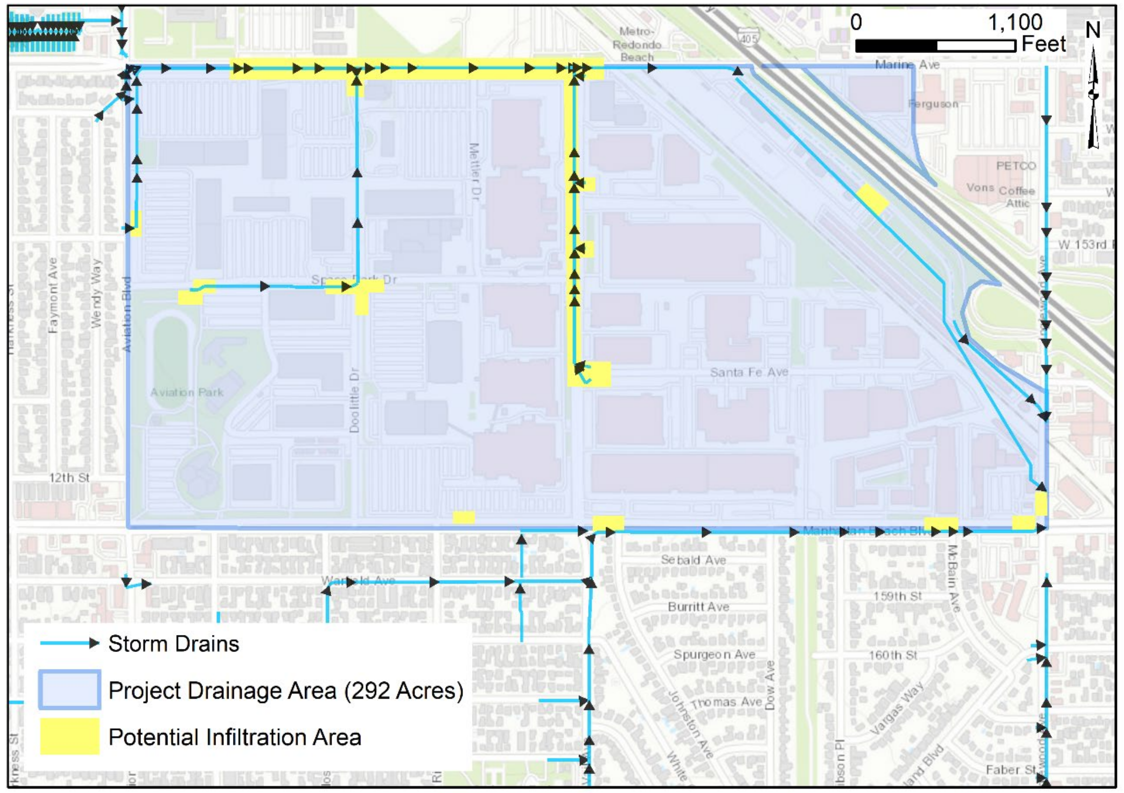
Overflow

Existing Storm Drain

Infiltration

City: Redondo Beach Latitude: 33.882775 Longitude: -118.370948

Site Configuration



Model Design & Performance

Tributary Area (ac)	292	**24-Hour Treatment Volume (ac-ft)**	8.3
No. of Proposed Infiltration BMPs*	14	**Treatment Rate (cfs)**	14
Pollutant Load Reduction Range (% of Baseline Load)	Copper	81%	
	Zinc	74%	
	Bacteria	44%	
	Benzo [a] pyrene	67%	

Multiple Benefits

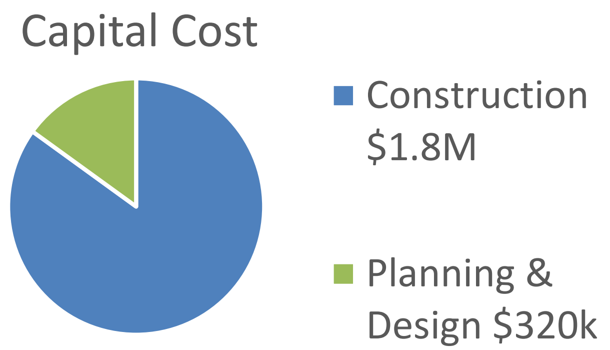
Community Investment Benefits

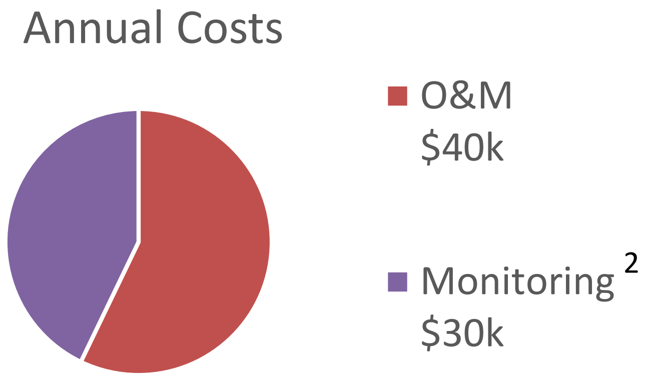
- Improved flood management

Nature-Based Solutions

- Utilize natural vegetation and other nature-based processes to slow, detain, capture, and filter water
- Reduce directly connected impermeable area flowing to existing drainage system

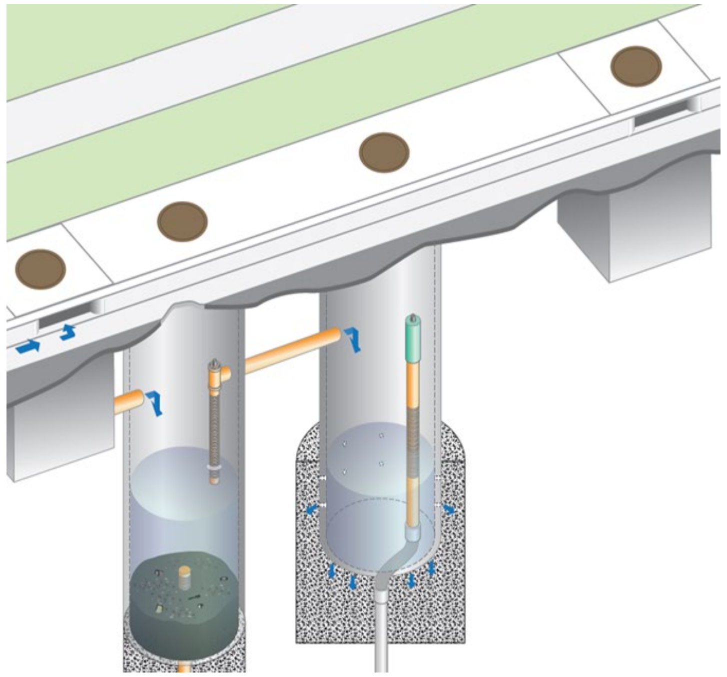
Planning-Level Cost Estimate[1]





[1] Estimates based on drywells.
[2] Monitoring only required for 3 years.

Typical Detail



Redondo Beach Dominguez Channel Distributed Infiltration Project	
June 2021	Geosyntec consultants

*Products shown above were used as examples for sizing and cost analyses; other equivalent products may be used.

Torrance Parkway BMPs

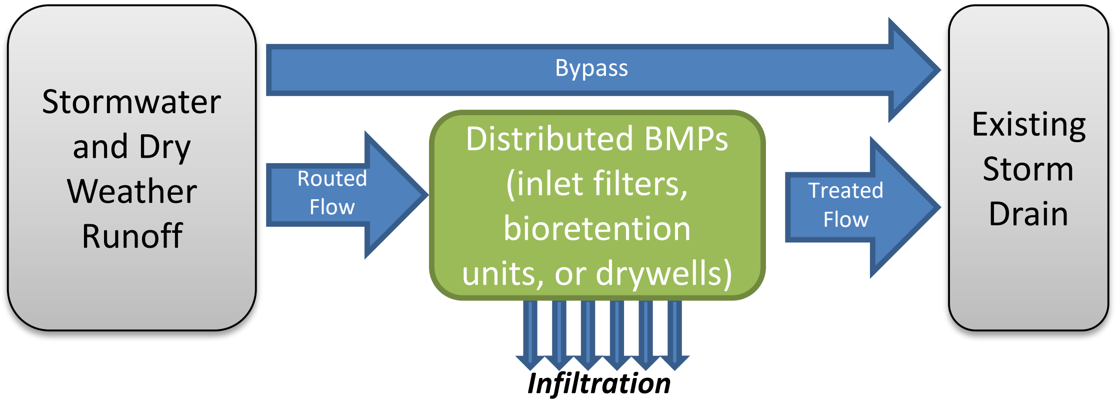
Proposed BMP Project

The City of Torrance is committed to implementing distributed parkway BMPs within the Dominguez Channel watershed management area (analysis regions Dominguez Chanel – South [DC-S] and the Torrance Lateral draining to the Dominguez Chanel [DC-TL]) to meet the RAA requirements. Specific BMP technologies are currently being evaluated to best address pollutants of concern, but may include catch basin inlet filters, bioretention units, or drywells, where deemed feasible. The City of Torrance has applied for Safe Clean Water funding under the Technical Resources Program to prioritize catch basins for implementation. Collectively, the Torrance Parkway BMPs will be implemented by the City of Torrance at a level that meets the EWMP compliance requirements.

Design Criteria for EWMP Compliance

Analysis Region	24-Hour Management Volume (ac-ft)	Pollutant Load Reduction (% of Baseline Load)			
		Copper	Zinc	*E.coli*	Benzo [a]pyrene
DC-S	21.9	36%	64%	45%	54%
DC-TL	35.4	51%	87%	48%	66%

BMP Treatment Process



Stormwater and Dry Weather Runoff

Bypass

Routed Flow

Distributed BMPs (inlet filters, bioretention units, or drywells)

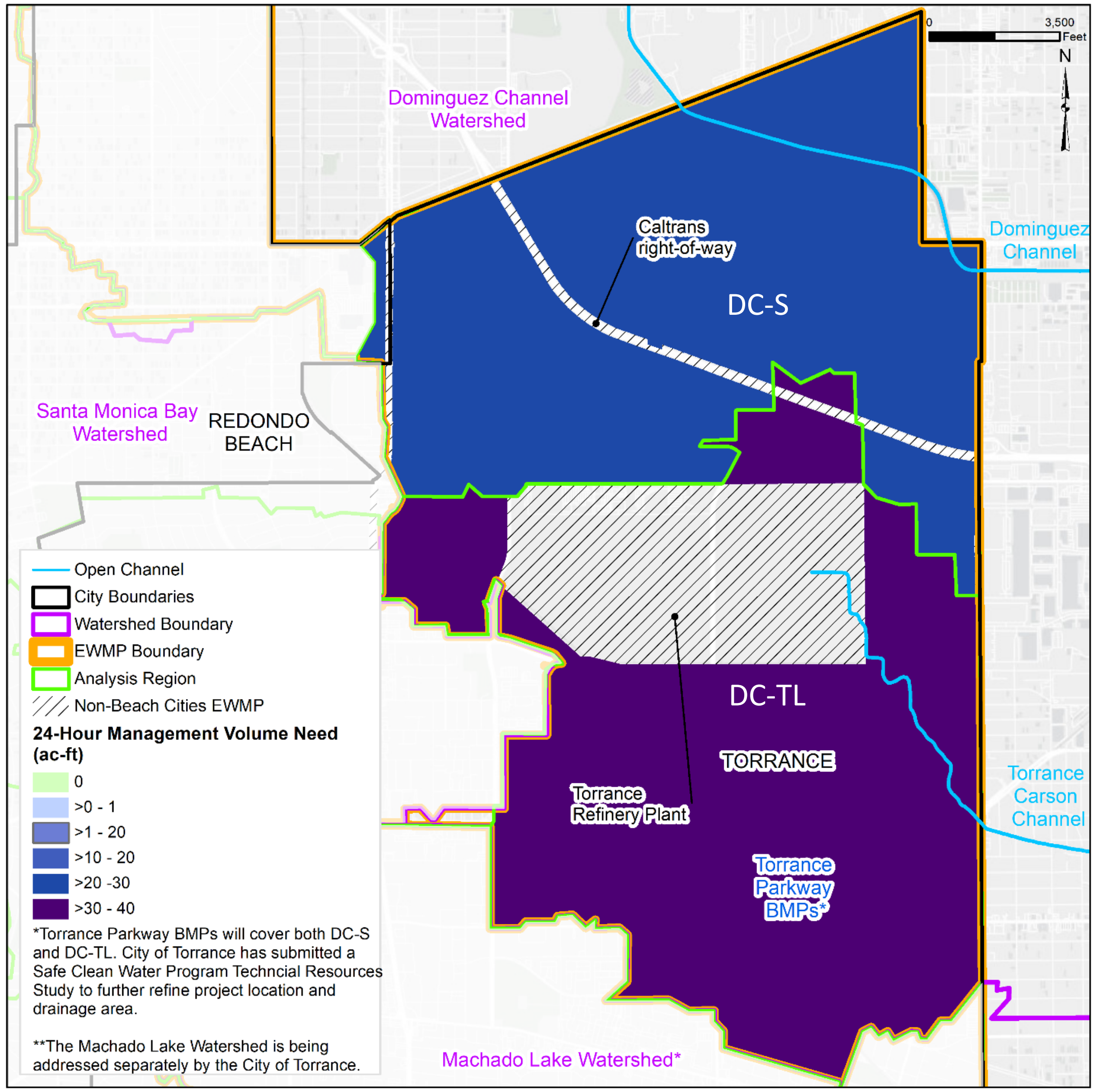
Treated Flow

Existing Storm Drain

Infiltration

City: Torrance Latitude: Various Longitude: Various

BMP Coverage Overview



—	Open Channel
☐	City Boundaries
☐	Watershed Boundary
☐	EWMP Boundary
☐	Analysis Region
▨	Non-Beach Cities EWMP

24-Hour Management Volume Need (ac-ft)

■	0
■	>0 - 1
■	>1 - 20
■	>10 - 20
■	>20 -30
■	>30 - 40

*Torrance Parkway BMPs will cover both DC-S and DC-TL. City of Torrance has submitted a Safe Clean Water Program Techncial Resources Study to further refine project location and drainage area.

**The Machado Lake Watershed is being addressed separately by the City of Torrance.

Multiple Benefits

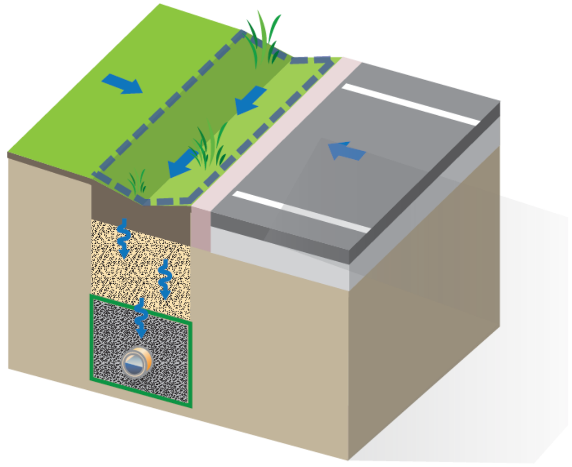
Community Investment Benefits

- Improved flood management and water quality
- Reducing local heat island effect and increasing shade
- Increasing vegetation at site locations to increase carbon reduction and improve air quality

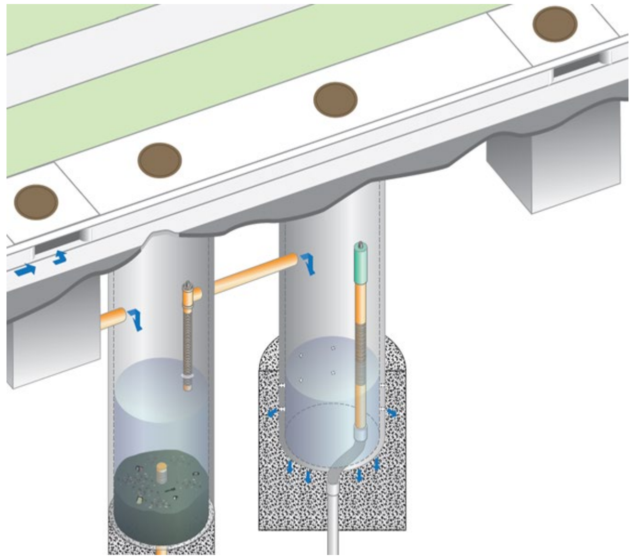
Nature-Based Solutions

- Implement natural processes to slow detain, capture, and infiltrate runoff
- Utilize natural vegetation
- Reduce impermeable area flowing to existing drainage system

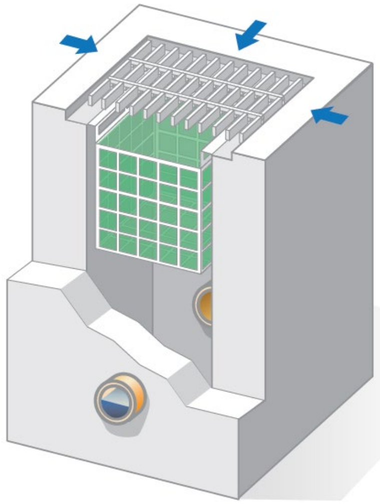
Typical Details



Bioretention



Drywell



Catch Basin Inlet Filter

Torrance Parkway BMPs

June 2021

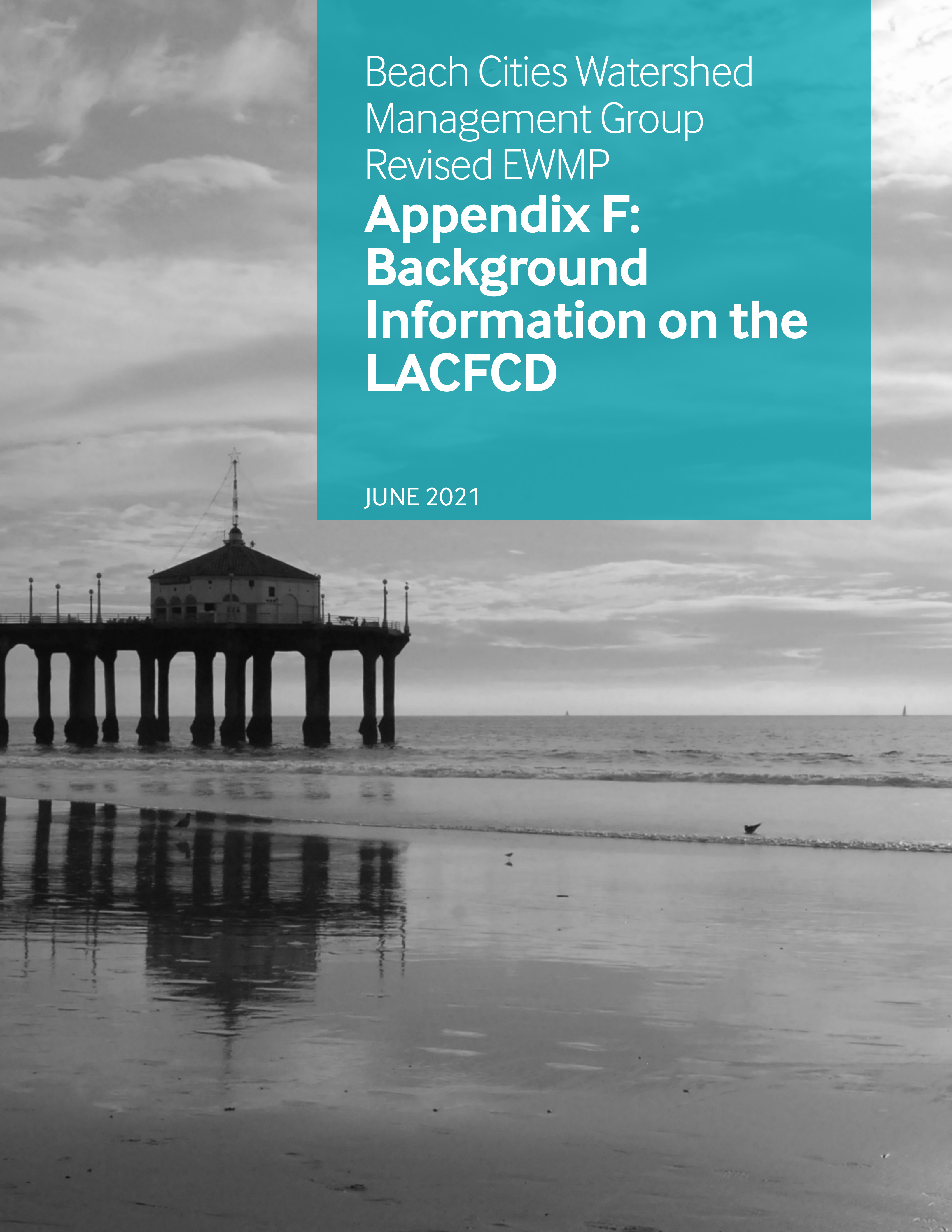
Geosyntec consultants

*Products shown above were used as examples for sizing and cost analyses; other equivalent treatment systems may be used.

Beach Cities Watershed
Management Group
Revised EWMP

Appendix F: Background Information on the LACFCD

JUNE 2021



BACKGROUND INFORMATION ON THE LACFCD

This attachment provides background information pertaining to the Los Angeles County Flood Control District (LACFCD), and their involvement in the Beach Cities Enhanced Watershed Management Program (EWMP) Plan.

In 1915, the Los Angeles County Flood Control Act established the LACFCD and empowered it to manage flood risk and conserve stormwater for groundwater recharge. In coordination with the United States Army Corps of Engineers, the LACFCD developed and constructed a comprehensive system that provides 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 stormwater 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. For the Beach Cities EWMP, 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 MS4 Permit for inspecting and controlling pollutants from industrial and commercial facilities, development projects, and development construction sites. (MS4 Permit, Part II.E, page 14.)

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." (MS4 Permit, Part II.F, page 15).

Consistent with the role and responsibilities of the LACFCD under the MS4 Permit, the EWMPs and Coordinated Integrated Monitoring Programs (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.

In some instances, in recognition of the increased efficiency of implementing certain programs regionally, the LACFCD has committed to responsibilities above and beyond its obligations under the 2012 MS4 Permit. For example, although under the 2012 MS4 Permit the Public Information and Participation Program (PIPP) is a responsibility of each Permittee, the LACFCD is committed to implementing certain regional elements of the PIPP on behalf of all Permittees at no cost to the Permittees. These regional elements include:

- Maintaining a countywide hotline (888-CLEAN-LA) and website (www.888cleanla.com) for public reporting and general stormwater management information. Each Permittee can utilize this hotline and website for public reporting within its jurisdiction.
- Broadcasting public service announcements and conducting regional advertising campaigns.
- Facilitating the dissemination of public education and activity specific stormwater pollution prevention materials.
- Maintaining a stormwater website.

The LACFCD will continue to implement these elements on behalf of all Permittees during the current MS4 Permit term. With the LACFCD handling these elements regionally, Permittees can better focus on implementing local or watershed-specific programs, including student education and community events, to fully satisfy the PIPP requirements of the 2012 MS4 Permit.

Similarly, although water quality monitoring is a responsibility of each Permittee under the 2012 MS4 Permit, the LACFCD is committed to implementing certain regional elements of the monitoring program to help increase the efficiency and effectiveness of this program. These efforts include:

- Conducting monitoring at the seven existing mass emissions stations required under the previous Permit. This is in addition to the LACFCD's contribution to individual CIMP groups.
- Participating in the Southern California Stormwater Monitoring Coalition's Regional Bioassessment Program on behalf of all Permittees.

In addition, the LACFCD is committed to developing tools and programs that benefit all Permittees in Los Angeles County. Some of these efforts include the following:

- The development and maintenance of Watershed Reporting Adaptive Management & Planning System (WRAMPS), which assists permittees in preparing their MS4 annual report.
- The development and maintenance of Watershed Management Modeling System (WMMS), which is the primary model being used by watershed groups to meet reasonable assurance analysis (RAA) requirements or watershed modeling requirements in the development of their Watershed Management Program (WMP) or Enhanced Watershed Management Program (EWMP).
- The management/administration of Safe, Clean Water (SCW) Program, which provides a dedicated revenue source for all municipalities, including MS4 permittees, to implement multi-benefit stormwater projects and programs that improve water quality and either increase water supply through augmenting local groundwater and recycled water use or enhance communities.

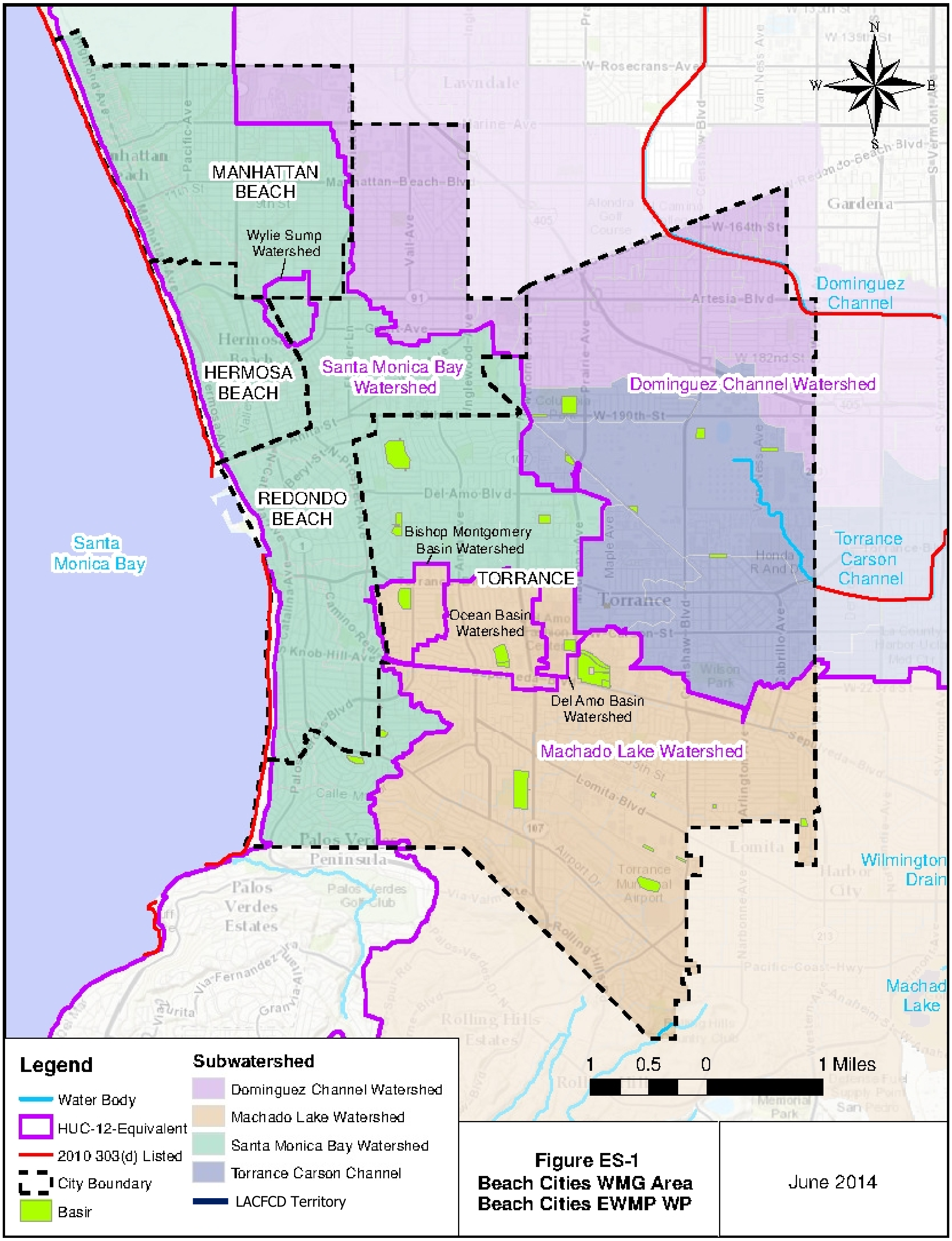
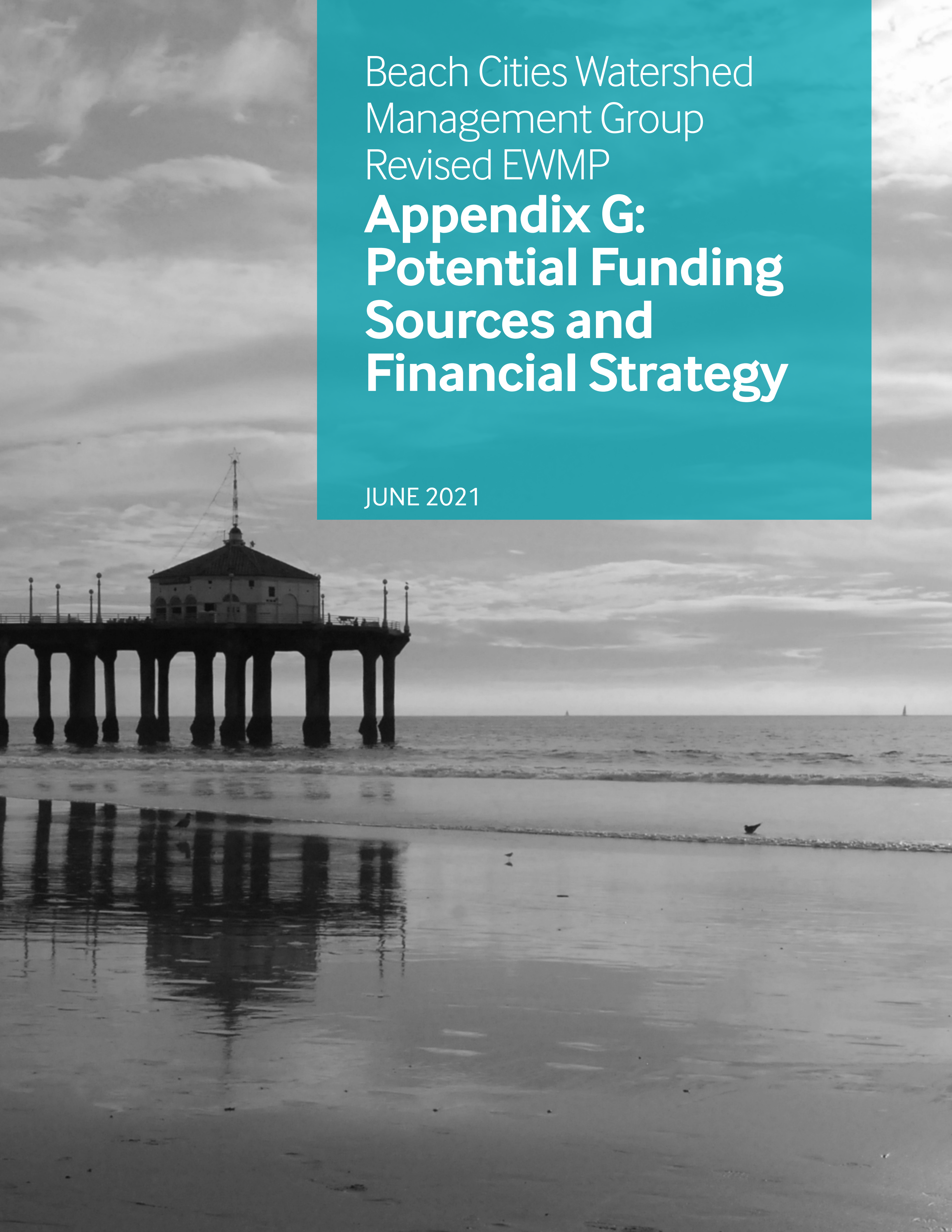


Figure ES-1
Beach Cities WMG Area
Beach Cities EWMP WP

June 2014



Beach Cities Watershed Management Group Revised EWMP

Appendix G: Potential Funding Sources and Financial Strategy

JUNE 2021

POTENTIAL FUNDING SOURCES AND FINANCIAL STRATEGY

The availability of funds is critical for the successful implementation of the Enhanced Watershed Management Plan (EWMP). This appendix provides an overview of potentially available funding sources for programs and projects proposed in the EWMP. The funding sources included in this section for consideration are Measure W (Safe, Clean Water Program), grants, interagency partnerships, bonds, State Revolving Funds, local funding opportunities, and public private partnerships. A summary of potential financial approaches for the Beach Cities Watershed Management Group (WMG) is provided in Table G-1, with additional details and discussion provided in the sections following.

Table G-1. Funding Approach Summary

Approach	Funding Type	Limitations	Potential Significance (with Respect to Overall Funding)
Safe, Clean Water Regional Program	New Revenue	• Highly Competitive • Application preparation requires significant effort/cost	High
Grants	New Revenue	• Highly Competitive • No guarantee of funding accessibility • Infrastructure projects only • Application preparation/submission requires significant effort/cost • Can only be used to pay for infrastructure-related projects • O&M costs are typically excluded	Medium
Project-Specific Interagency Partnerships	New Revenue	• Requires coordination between agencies • Varying project implementation schedules between agencies limit the viability of such an option	High
Local Bond Issuance	Financing	• GO bonds require approval by voters. • Revenue bond requires to be backed by a revenue stream • There is a financing cost • Infrastructure projects only • O&M costs are typically excluded	Low
State Revolving Funds	Financing	• Revenue stream is needed to obtain loans • There is a financing cost • Infrastructure projects only • O&M costs are typically excluded	High
Local Public Funding Opportunities	New Revenue	• Requires voter approval • Infrastructure projects only (except for stormwater fee)	High

Approach	Funding Type	Limitations	Potential Significance (with Respect to Overall Funding)
		• O&M costs are typically excluded (except for stormwater fee)	
Public Private Partnership	Financing	• Revenue stream is needed to allow the private partner to recover their cost as well as provide return on investment	High
	Direct Subsidies / Cost-Sharing	• Funding source is needed to fund a subsidy program • Some projects may underperform due to poor project implementation, O&M, and monitoring	Low

RECENT FUNDING EXAMPLES WITHIN THE BEACH CITIES

The Beach Cities WMG has been working cooperatively to pursue funding for projects identified in the EWMP by leveraging multiple sources of funding. In 2018, the Beach Cities WMG secured $2M in Prop 12 Santa Monica Bay Restoration Grant funding by the California Coastal Conservancy and the Santa Monica Bay Restoration Commission to fund the design and construction of the joint Beach Cities Green Street Project. The Prop 12 grant funding provides approximately 39% of the total estimated Beach Cities Green Street Project cost of $5.1M with the balance to be matched by the Beach Cities WMG agencies through other sources. With the City of Torrance serving as lead agency for this project, Beach Cities WMG has executed a cost sharing MOU to jointly fund the matching design and construction costs not covered by the grant funding. The MOU details each city's share of the project's preliminary engineering and final design cost and will be amended following final design to apportion construction costs. This joint project has also been submitted for FY2122 Safe Clean Water Regional Program Infrastructure funding for construction.

The Beach Cities WMG members are committed to developing feasibility studies and project concepts for regional projects to be eligible for SCW infrastructure funding and to be competitive for grant funding. The City of Torrance has funded the design of the Torrance Basins Expansion Regional Project with a completed preliminary engineering and feasibility study and final design now underway. The City of Manhattan Beach has funded the preliminary engineering and feasibility study of the Manhattan Beach 28th Street Storm Drain Infiltration Project. The Beach Cities WMG members also plan to leverage the SCW Regional funding with the Municipal Returns to construct and maintain capital projects. The County of Los Angeles is leading the Alondra Park Multi-Benefit Stormwater Capture Project and has completed a preliminary design report and feasibility study for the project and was awarded $30 million in SCW Infrastructure funding and $2.1 million in Prop 1 Stormwater Grant funding for design and construction, while Caltrans is proposing to contribute $15 million. The remaining $13 million in capital costs needed for the project is being provided by the County of Los Angeles. However, financial contributions and partnerships are being solicited from the tributary agencies including the Cities of Manhattan Beach and Redondo Beach, if they should desire to obtain additional capture volume credits above their baseline allocation.

In addition, each City in the Beach Cities WMG is committed to the pursuit of funding for individual distributed EWMP implementation projects and programs related to water quality improvement within their respective cities, as demonstrated by the following examples:

- The City of Hermosa Beach has committed financial support for identifying and implementing strategies for the establishment of sustainable revenue sources to manage stormwater programs and implement water quality improvement projects. In June 2015, the City of Hermosa Beach passed a sanitary sewer fee for residents and commercial property owners to fund maintenance and rehabilitation of its aging sewer infrastructure that had previously been funded from the City's general fund. This dedicated fee for sanitary sewers will allow the City to redirect part of those general fund dollars for capital improvements and maintenance of the City's storm drain system, including green street projects. The City won multiple awards for its Pier Avenue green street project and the City recently was awarded funding by the Coastal Conservancy to reconstruct a municipal parking lot to include a suite of storm water BMPs. Additionally, the City recently completed the Hermosa Beach 8th Street Improvement Project, which includes multi-benefit improvements along 8th Street between Valley Drive and Hermosa Avenue.

- The City of Manhattan Beach is committed to implementing its Green Street Policy for capital improvement projects in the public right-of-way, has established a minimum runoff capture design goal for such projects, and will also use the EWMP to identify opportunities for green street BMP retrofits in high priority areas. The City is also currently in the process of updating its Storm Drain Master Plan, which will identify locations for multi-benefit projects to facilitate compliance with the MS4 Permit. City staff has an excellent track record and appreciates the support of its Council in the pursuit of funding for and implementation of green infrastructure as evidenced by two previous example projects: a 130,000 square feet porous concrete paving project on seven municipal parking lots, and the Greenbelt Infiltration Project installed within the linear greenbelt parkland. The City is currently pursuing regional project funding for the Manhattan Beach Infiltration Project at 28th Street via the Safe, Clean Water Regional Program.

- The City of Redondo Beach's green streets policy requires green street BMPs to be integrated with capital improvement projects (CIPs), thereby ensuring that BMPs be funded as part of ongoing and future CIPs. An example of this policy is the Redondo Beach Street Rehabilitation Project, which includes several street rehabilitation projects that include green street features such as porous gutters and crosswalks and drywells. Four of these street rehabilitation projects were completed during the 2019-2020 reporting year, addressing a combined 22 acres of green street target land use area within the Beach Cities WMG's high priority Herondo watershed (SMB 6-1 analysis region). The City also incorporates the required addition of catch basin trash screening devices into street resurfacing projects such as the Esplanade Street Resurfacing Project. In addition, the City has a successful track record of pursuing and implementing water quality improvements grant funding such as the Alta Vista Diversion and Re-use Project and the Sapphire Storm Drain Diversion and Infiltration Project.

- The City of Torrance has appropriated funding for retrofit of 3% of catch basin BMPs in the Dominguez Channel Watershed and appropriated annual funding to complete their trash management and reporting plan (TMRP) implementation by the end of 2016 (four years ahead of the total maximum daily load [TMDL] compliance deadline). In addition, the City's green streets policy requires green street BMPs to be integrated with street improvement CIPs. The City of Torrance has an established record for pursuing grant funds for Storm Water Quality Projects. Completed projects include Bioswales for City Yard ($150,000 State grant funds), Machado Lake Trash TMDL Project ($1,000,000 State grant funds), and the Stormwater Basin Enhancement Project ($3,300,000 State grant funds and $300,000 Federal grant funds). The City is currently pursuing multiple project funding awards via the Safe, Clean Water Regional Program.

The foregoing examples illustrate the willingness of Beach Cities' staff and elected officials to pursue funding for EWMP implementation projects. Additional sources of funding will also continue to be investigated, as described below.

MEASURE W (SAFE, CLEAN WATER PROGRAM)

Measure W was successfully passed by Los Angeles County voters in November 2018, creating the Safe, Clean Water Program to provide local, dedicated funding for stormwater and urban runoff to increase local water supply, improve water quality, and protect public health within the Los Angeles Basin. The program currently generates approximately $285 million per year. The majority of this funding goes directly back to the cities via two programs:

- **The Municipal Program** - 40% of the annual revenue goes directly to cities via the Municipal Program, with city-specific revenue proportional to the revenues generated within its boundaries. The Municipal Program funding can be used for eligible activities such as project development, design, construction, effectiveness monitoring, operations and maintenance (including operation and maintenance of projects built to comply with the MS4 Permit), as well as for other programs and studies related to protecting and improving water quality in lakes, rivers, and the ocean. The total annual municipal revenue projected for the Beach Cities WMG is approximately $3.4M.

- **The Regional Program** – 50% of the annual revenue is divided across nine watershed areas (including the South Santa Monica Bay Watershed Area, which includes the Beach Cities Area), and is devoted to funding regional watershed-based projects, project concepts, and scientific studies. The South Santa Monica Bay Watershed Area is estimated to receive up to $18.4 million annually to fund regional projects and programs. Funding for multi-benefit regional projects includes design, permits, CEQA compliance, grant-writing, right-of-way and land acquisition, construction, and long-term operations and maintenance of the facilities.

To apply for regional infrastructure funds, a Safe, Clean Water Feasibility Study is required to be submitted to the local Watershed Area Steering Committee (WASC) for evaluation. The WASC, comprised of representatives from cities, agencies, and community stakeholders, reviews proposed projects and develops an annual Stormwater Investment Plan (SIP) for their Watershed Area that identifies recommendations for funding. Recommended projects included in SIPs will also be reviewed by a Scoring Committee and ultimately a Regional Oversight Committee for recommendation to the Board of Supervisors.

The process to receive regional funding is competitive, as numerous projects across entire watershed areas are considered. However, funding is significant, consistent, and flexible to be spent on all phases of qualifying stormwater infrastructure projects. The Safe, Clean Water Program is therefore the primary funding mechanism the Beach Cities WMG will pursue to fund their various projects.

GRANT OPPORTUNITIES

Grants have historically been a backbone for financing stormwater projects. The majority of water-related grants are designated for flood control, drinking water, and watershed protection and most recent grants have preferences for projects that benefit underserved communities; very few grants are made available for the sole purpose of stormwater permit compliance. In order to increase the likelihood of successful grant funding, a stormwater project might need to be added to a larger project or program that serves different purposes and has different objectives rather than just for stormwater management. Thus, collaboration and coordination between stormwater agencies and other public agencies is important to increase accessible grant funding opportunities for stormwater projects.

Recent Federal infrastructure funding may expand the opportunities for grants and debt forgiveness loans. H.R. 1319 entitled "The American Rescue Plan Act of 2021" is primarily a COVID relief bill, but includes funding for water, sewer, and broadband infrastructure. This legislation does not distinguish stormwater as separate from water. This bill has been passed by both houses and signed into law by the President. The funds have been both authorized and appropriated and are currently being transferred to municipal governments. The funds can also be used by special districts, such as water and sewer districts.

S. 914 entitled "Drinking Water and Wastewater Infrastructure Act of 2021" reauthorizes both the Drinking Water SRF and Clean Water SRF programs at current levels with annual increases through 2026. It also reauthorizes the WIFIA funding at current levels through 2026. This bill has passed the Senate and appears to have sufficient support to pass the House and be signed into law by the President. While this bill authorizes the funding through 2026, it does not appropriate the funds. The funds will be appropriated on an annual basis through the regular annual federal budget appropriations.

Many grant funds do not cover 100% of the project costs, but instead, cost sharing from local governments (as much as 50%) is required under grant provisions. Furthermore, grants typically cover only project capital costs, but do not provide funding to cover ongoing operations and maintenance, and replacement costs of the infrastructure. Thus, alternative funding sources would be needed to provide stable O&M revenues as well as costs for replacement for implemented projects. Table G-2 presents some potential grant opportunities available that the Beach Cities can apply to fund the EWMP projects.[1]

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[1] Some information in Table G-2 has not been updated due to a lack of update to relevant websites. This is not surprising in light of the global COVID-19 pandemic that is still ongoing. All the information presented in Table G-2 is subject to change.

The Beach Cities WMG has expressed commitment to pursue grant opportunities. Numerous grants have been sought in the past by the Group, including multiple Prop 1 Coastal Conservancy grants, a Prop 68 Urban Flood Protection grant, Prop 12 Coastal Santa Monica Bay Restoration Grant funding by the California Coastal Conservancy, and multiple rounds of Prop 1 Stormwater Grant funding.

Since SB-985-Stormwater Resource Planning became effective in 2014, local governments have been required to develop a stormwater resource plan and be in compliance with provisions of SB-985 in order to receive grants for stormwater and dry-weather runoff capture projects from a bond act approved by the voters after January 1, 2014. In 2017, the Group received approval that the Beach Cities EWMP serves as a functionally equivalent stormwater resources plan. See Appendix H for related details.

Table G-2. Relevant Grant Opportunities

Program	Department	Purpose	Ineligible Uses	Funding Limits
WaterSMART: Water and Energy Efficiency Grants	US Bureau of Reclamation	Projects should seek to conserve and use water more efficiently, increase the use of renewable energy, mitigate conflict risk in areas at a high risk of future water conflict, facilitate water markets, or carry out other activities to address climate related impacts on water or prevent any water-related crisis or conflict.	Normal operations, maintenance, and replacement (OM&R). OM&R is described as system improvements that replace or repair existing infrastructure or function without providing increased efficiency or effectiveness of water distribution over the expected life of the improvement. Construction of a building.	FY 2021 Funding is awarded at one of two levels: Funding Group I: Up to $500,000 per agreement for a project up to 2 years. Funding Group II: Up to $2,000,000 for an agreement for up to 3 years for a small number of projects.
WaterSMART: Cooperative Water Management Program (CWMP) Grants	US Bureau of Reclamation	The purpose is to improve water quality and ecological resilience and to reduce conflicts over water through collaborative conservation efforts in the management of local watersheds. CWMP provides funding to watershed groups to encourage diverse stakeholders to form local solutions to address their water management needs. Funding is provided on a competitive basis for: 1) watershed group development and watershed restoration planning, and 2) implementation of watershed management projects.	Please visit the following website for evaluation criteria: http://www.usbr.gov/WaterSMART/cwmp/docs/CWMPEvaluationCriteria.pdf	Phase I funds shall be used to establish or enlarge a watershed group, to develop a mission statement for the watershed group, to develop project concepts, and to develop a restoration plan. Phase II funds shall be used to plan and carry out watershed management projects. Phase III funds shall be used to plan and carry out at least one watershed management project.
IRWM Implementation Program Proposition 84 (Chapter 2, §75026)	Department of Water Resources	Award funds for implementation of projects consistent with IRWM Plans to assist local public agencies in meeting long-term water management and resilience needs of the state, including the delivery of safe drinking water, and protection of water quality and the environment.	Operation and maintenance activities	Bond funding allocation for entire program is $1 billion. Prop 84 allots grant funding to 11 funding areas defined by the hydrologic regions of the state.

Program	Department	Purpose	Ineligible Uses	Funding Limits
Flood Corridor Program Propositions 1E, 84 and 13	Department of Water Resources	Flood risk reduction through non-structural projects that include wildlife habitat enhancement and/or agricultural land preservation components	Flood protection projects that do not include wildlife habitat enhancement or agricultural land preservation benefits	$5 million per eligible project. 10% non-state, non-federal cost share required; may be reduced to 5% or no-cost share if serving disadvantaged or severely disadvantaged community
Flood Control Subventions Program Propositions 1E and 84	Department of Water Resources	Implementation of federally authorized flood control projects (minor or major) and Watershed Protection Flood Prevention Projects	Flood control projects without federal authorization	Variable state cost-share percentage based on multipurpose objectives for projects, ranging from a minimum of 50% to a maximum of 70%
Statewide Flood Emergency Response Program Proposition 84	Department of Water Resources	Preparing or updating local emergency plan; Coordinating flood emergency planning and preparedness (including training & exercise); Developing communication & coordination response process; Collecting & exchange of flood information; Purchase & installing equipment for interoperable emergency communication.	Projects not included in guidelines. Projects in the Legal Delta.	$10 million for Statewide (outside the legal Delta) for Prop 84.
California Coastal Conservancy, Prop 1 ($100.5 million allocated)	California Coastal Conservancy	Funding for multi-benefit water quality, water supply, and watershed protection and restoration projects.	Projects that do not comply with the Proposition 1 Grant Program Guidelines. Projects that use potable water for irrigation. O&M projects are not eligible.	$10 million per year grants will be made available over the next 10 years.
Storm Water Grant Program, Prop 1 ($200 million), approved as part of the Water Quality, Supply and Infrastructure Improvement Act (2014).	State Water Resources Control Board and Regional Water Quality Control Boards	Funding for multi-benefit storm water management projects which will improve regional water self-reliance, security, and adapt to the effects on water supply arising from climate change.	Projects that 1) must seek eminent domain as part of their project implementation timeline; 2) do not meet the requirements of the Prop 1 Storm Water Grant Program Guidelines, the Storm Water Resources Plan Guidelines, Water Code, and Prop 1; 3) consist of only education and outreach activities.	Planning projects: min. $50K and max. $500K; Implementation projections: min. $250K and max. $10M.

PROJECT-SPECIFIC INTERAGENCY PARTNERSHIPS

Stormwater management projects often overlap with the jurisdiction of other public agencies, including water and transportation agencies, as well as parks and schools. Interagency partnerships would not only allow agencies involved to leverage one another's available funding resources to make cost intensive projects possible but would also improve local government funding efficiency. These types of interagency partnership projects could also optimize the potential social, environmental, and economic benefits provided to the community. An interagency partnership also provides an alternative avenue for stormwater agencies to access to grant funding that would otherwise not be available to them. In addition to the above benefits, a partnership with public utility agencies, such as water and refuse collection services, might also provide a mechanism for cost transfer from stormwater agencies to these agencies. For example, the use of stormwater for non-potable water may conserve drinking water. The cost for providing the infrastructure and the ongoing O&M could be partly funded through fees charged by water agencies as part of their cost for water conservation. Table G-3 provides a list of potentially viable partnerships and the benefits derived from management of stormwater runoff.

Table G-3. Added Benefits of Interagency Partnership for Stormwater Management

Potential Partners	Benefits Derived from Stormwater Management
Flood control district	• Flood protection • Climate change mitigation
Caltrans	• Surface water pollution prevention • Increased project siting opportunities in transportation corridors
Water agencies	• Potable water conservation through stormwater use for non-potable water purposes • Surface water pollution prevention • Increase non-potable water storage through installation of underground cisterns
Parks, Coastal Commission	• Terrestrial and marine habitat protection by reducing trash from entering the ocean and other terrestrial habitats • Water pollution prevention • Erosion reduction

LOCAL BOND ISSUANCE

Bonds have been utilized by local governments to provide funding for stormwater projects. There are two types of bonds that can be utilized. One of them is GO bonds. GO bonds are issued by local governments, which are repaid through a tax surcharge (e.g., property). The City of Los Angeles, for example, has used GO bonds to fund their stormwater projects. The City sold $440 million GO bonds under Proposition O Clean Water Bonds. The bond proceeds were used for implementation of 39 projects but could not be used for ongoing maintenance, operations, and replacement of these facilities (Farfsing and Watson, 2014). The challenge of utilizing GO bonds is that GO bond issuance and the amount to be issued must be approved by two-third of the voters. The main drawback of election approval requirement is that the cost of holding an election can be high and the chance of success is often unpredictable.

The last decade has seen the emergence of a new category of bonds generically called "green" bonds. A green bond is a type of fixed-income instrument that is specifically earmarked to raise money for climate and environmental projects. These bonds are typically asset-linked and backed by the issuing entity's balance sheet, so they usually carry the same credit rating as their issuers' other debt obligations. Green bonds are designated bonds intended to encourage sustainability and to support climate-related or other types of special environmental projects. More specifically, green bonds finance projects aimed at energy efficiency, pollution prevention, sustainable agriculture, fishery and forestry, the protection of aquatic and terrestrial ecosystems, clean transportation, clean water, and sustainable water management. They also finance the cultivation of environmentally friendly technologies and the mitigation of climate change.

Green bonds come with tax incentives such as tax exemption and tax credits, making them a more attractive investment compared to a comparable taxable bond. These tax advantages provide a monetary incentive to tackle prominent social issues such as climate change and a movement to renewable sources of energy. To qualify for green bond status, they are often verified by a third party such as the Climate Bond Standard Board, which certifies that the bond will fund projects that include benefits to the environment.

Another type of bonds that can be used at the local level is revenue bonds. Revenue bonds are tax-exempt securitized bonds that are issued by utility agencies, such as water agencies. These bonds are repaid through utility rate increases charged directly to customers. Recent enactment of AB-850-Public Capital Facilities: Water Quality allows local publicly owned water agencies to finance water quality and water conservation related projects by issuance of revenue bonds through a Joint Powers Authority (JPA). Under the provisions of AB-850, water agencies are allowed to use the bond proceeds to pay for construction, repair, maintenance, and operations of eligible projects. Both stormwater capture and water quality compliance projects are considered as eligible projects that can be financed through bond issuance under the AB-850 mechanism. Additionally, AB-850 authorizes water agencies to repay these bonds through water utility rate increases – the same way as other revenue bonds not issued under the SB-850 mechanism by water agencies. Such rate increases are also subject to Proposition 218 approval under the exempt category (i.e., only a public hearing is required).

SB-628–Enhanced Infrastructure Financing Districts (EIFD) will allow issuance of general obligation bonds within the EIFD inside a city or a county. The Bill authorizes a legislative body to establish an enhanced infrastructure financing district, adopt an infrastructure financing plan, and issue bonds upon approval by 55% of the voters to finance public capital facilities such as collection and treatment of water for urban uses and flood control projects. Under the provisions of SB-628, a City or a County can establish an EIFD of any size. If a defined EIFD has fewer than 12 registered voters, only a protest hearing is required to be conducted for landowners. The number of votes that each landowner gets will depend on the size of the land they own. The ballot will specify a vote per acre or a portion of an acre. The bonds issued under this bill will be repaid through property tax increase (i.e. tax increment financing). The district will cease to exist in no more than 45 years from the date on which bond issuance is approved.

STATE REVOLVING FUNDS

The Clean Water Act (CWA) provided for the creation of Clean Water State Revolving Fund (CWSRF) program capitalized by federal and state funds which in turn provides municipalities with a permanent source of low-cost financing for a range of water quality infrastructure projects. The California CWSRF program is administered by the State Water Resource Control Board, Division of Financial Assistance.[2] The "Policy for Implementing the Clean Water State Revolving Fund,"[3] amended in 2019, provides guidance for applying for financial assistance from the CWSRF program and each year an "Intended Use Plan"[4] is drafted to provide information about the current financing terms and fund availability.

The CWSRF finances water quality projects similar to those proposed in the EWMP, including nonpoint source, watershed protection or restoration, and estuary management projects (USEPA, 2014). The main advantage of CWSRF is that their interest rates are typically much lower than market rates (e.g. 3% for a 20-year loan instead of 6%). The loans are project-specific and can serve as a good financial resource for funding project design and construction.

The CWSRF program loans carry an interest rate set at one-half of the most recent state GO bond rate at time of funding approval and repayment begins one year after completion of construction with a term of up to 30 years or the useful life of the project. There is no maximum funding limit, but partial funding may be applied based on funds availability and the applicant's ability to repay. Loan forgiveness is available via subsidy of up to 50% of eligible capital costs and 75% of eligible planning costs, up to a total cap of $4 million, through the Green Project Reserve (GPR). Congress' intent in enacting the GPR is to direct State investment practices in the water sector to guide funding toward projects that utilize green or soft-path practices to address green infrastructure, water or energy efficiency improvements, or other environmentally innovative activities.[5] The GPR sets a new precedent for the SRFs by targeting funding towards green infrastructure and water quality projects that states may not have funded in prior years. Any project eligible for GPR funding must also qualify for the CWSRF program.

Access to the State Revolving Funds is limited by the agencies' ability to borrow due to repayment of other debt obligations (e.g. lease burden). It has been reported that a typical median net lease burden for a California county is 1.7% of general fund revenues while the total burden of lease and General Fund obligations is 1.9% (Moody, 2012). Loan repayment will require alternative funding sources if reliance on general fund resources is not an option.

A CWSRF program loan application consists of four packages - the General Information Package, the Technical Package, the Environmental Package, and the Financial Security Package. The application packages are submitted online via the Financial Assistance Application Submittal Tool (FAAST).[6] When the General Information Package is submitted, a project manager will contact and support the

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[2] https://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/
[3] https://www.waterboards.ca.gov/drinking_water/services/funding/documents/srf/dwsrf_policy/final_policy_1219.pdf
[4] https://www.waterboards.ca.gov/water_issues/programs/grants_loans/docs/cwsrf_iup_sfy2020_21_final.pdf
[5] https://www.epa.gov/sites/production/files/2015-04/documents/green_project_reserve_eligibility_guidance.pdf
[6] https://faast.waterboards.ca.gov

applicant through the remaining steps of the application process. All submitted projects are evaluated annually to identify eligibility and receive a priority score for placement on the Fundable List.

LOCAL PUBLIC FUNDING OPPORTUNITIES AND APPROVAL PROCEDURES

Stormwater charges are potentially the most critical local funding source to finance stormwater programs in California. These charges include stormwater fees and taxes, as well as other funds generated through general obligation and revenue bond issuance. Table G-4 provides an overview of potential local funding sources that may be utilized to provide funds to finance stormwater programs. An important factor to consider when utilizing these funding mechanisms is the respective approval mechanisms as discussed below.

Table G-4. Local Funding Opportunities

Fees	Taxes	Bonds
• Fixed and volumetric service fees • Property assessments or fees • Developer fees or connection fees (a one-time fee) • Permitting fees	**General taxes** • Property, sales, and other activities **Special taxes** • Parcel taxes to pay for flood protection, stormwater management, watershed protection • Sales tax add-ons • Transient Occupancy Tax to pay for creeks restoration and water quality improvement projects	**General bonds** • Repaid through a property tax surcharge **Revenue bonds** • Issued by local utilities (e.g. water) • Repaid by service fees, developer fees, plus occasional special taxes

Local funding opportunities presented in Table G-4 are subject to approval mechanisms that can vary from holding a written protest hearing to an election, depending on the type of funding sought after (Table G-5). The types of charges that are deemed to be most suitable for stormwater-related services are property-related fees. For a property-based, flood control-related stormwater management fee, an election is required to be conducted under the provisions of Proposition 218. However, there are two categories under Proposition 218 that are exempt from the election approval requirements. They are water-related and refuse collection services. Although there are differing legal opinions on the matter, the approval of AB2403 has extended the definition of water in Proposition 218 to include stormwater capture projects for infiltration and direct non-potable uses, which means that these projects may be exempt from the election requirement under Proposition 218.

Even with the extended definition of water in the California Constitution, the existing form of Proposition 218 still requires voter approval for stormwater fees which has limited stormwater agencies' ability to generate sufficient revenue to support stormwater projects related to permit compliance.

Given the existing unique regulatory framework and limitation of Proposition 218, some local governments have broken down the stormwater revenue requirements by functions instead of a single property-related fee. Some of them have utilized the exempt category under Proposition 218 to fund stormwater projects with success. The Cities of Signal Hill, Poway, and Solana Beach, for example, have utilized a surcharge on trash collection fees to cover the some of the cost for stormwater-related trash collection and management. A surcharge on water utility fees has also been used by the Cities of Del Mar, Oceanside, and Solana Beach to provide funding to fund stormwater operation as part of the drinking water pollution prevention effort (Farfsing and Watson, 2014).

Pollution prevention is an important component in stormwater management. Given that majority of the pollutants in stormwater runoff originate from vehicles, some local governments have used other non-property-related surcharges to provide funding for stormwater programs. For example, the Orange County Transportation Authority has used the County's sales tax to provide some funding for a water quality improvement and environmental cleanup program. The San Mateo County has also added a surcharge on the vehicle license fee to provide funding for their stormwater pollution management program. It is also foreseeable that pollutant specific, such as a TMDL-related fee could be established to provide funding for TMDL compliance related programs in the future.

In addition to fees that provide steady revenue, another possible revenue source would be to charge fines to property owners that violate discharge limits (volumetric- or TMDL-based). Fines are not considered as a stable financial income; however, they discourage behavior or practices that will lead to non-compliance. Furthermore, fines are exempt from election requirements under Proposition 26 and have been commonly used by water agencies to discourage excessive water consumption behavior. The use of fines under Proposition 26 as a financial instrument to management stormwater discharge in urban areas is still uncommon but might worth exploring.

Table G-5. Local Funding Approval Mechanisms

	Proposition 13 (1978)	Proposition 218 (1996)	Proposition 26 (2010)
General taxes	Flexible	Simple majority for cities and counties, not available to special districts	*(rules from the earlier proposition remain in place)*
General Obligation Bonds	Two-thirds of local voters	Two-thirds of local voters	Two-thirds of local voters
Special taxes	Two-thirds of local voters	*(rules from the earlier proposition remain in place)*	*(rules from the earlier proposition remain in place)*
Property taxes	1% of purchase price + 2% annual increases	*(rules from the earlier proposition remain in place)*	*(rules from the earlier proposition remain in place)*
Property-related fees and assessments	Flexible	1. All water-related and refuse collection services: strict cost-of-service requirements 2. All water-related and refuse collection services: property-owner protest hearing 3. Floods and stormwater: 50% of property owners or two-third popular vote	*(rules from the earlier proposition remain in place)*
Non-property-related fees	Flexible	Flexible	Stricter requirements (more likely to be a tax)
Wholesale fees	Flexible	Flexible	Stricter cost-of-service requirements

PUBLIC PRIVATE PARTNERSHIPS

Public private partnerships (P3) can be achieved through two approaches. The conventional approach will involve having the private partner to undertake design and construction, and sometimes even operation and maintenance of the facilities. The private partner will recover the cost plus their return-on-investment through a guaranteed revenue stream (e.g. a user fee) over a long period (e.g. 30- 40 years). The main advantage of such an approach is that the upfront financing costs are provided through the private partner while the project performance is guaranteed by the private partner. Also, P3 can be utilized when agencies have restrictions on the amount of debt that they can carry (e.g. agencies want to maintain low lease burden or have high lease burden). Potential cost saving can be achieved through higher financial efficiency during project implementation phase. P3 can also expedite project implementation by simplifying administrative procedures for financing as well as eliminating the need for tendering. The main challenge for implementation of P3 is to get voters to approve a longer revenue stream to repay the private partner. The amendment of Proposition 218 is expected to lower such hurdle for providing such a revenue stream.

The second P3 approach is through direct financial subsidies to local projects that do not contribute to cash revenue generation. However, subsidies can create a financial incentive to encourage local participation without providing the full cost for project implementation. Such an approach can increase financial efficiency by leveraging financial input from communities. A list of cities that utilize financial subsidies to maximize their local stormwater capture capacity is provided in Table G-6. Based on these examples presented in Table G-6, subsidies can be given out in forms of 1) rebates per project with caps for stormwater runoff reduction projects, 2) rebate per rain barrel or cistern, 3) rebate per parcel, 4) stormwater fee reduction, and 5) cost sharing.

Among all the runoff capture subsidy programs listed in Table G-6, the approach adopted by the City and County of San Francisco is considered as the most progressive. The City and County adopted the onsite Water Reuse for Commercial, Multi-family, and Mixed-Use Development Ordinance which amended the San Francisco Health Code to allow for the collection, treatment, and use of alternative water sources (including stormwater runoff) for non-potable applications. The City and County has since developed a Non-potable Water Program that allows commercial, mixed use, and multifamily residential property owners to collect, treat and reuse water from various sources onsite, including stormwater runoff. The Program also allows the property owners to act as local non-potable water suppliers to provide non-potable water to buildings in the vicinity. Property owners or developers are required to comply with stringent monitoring and reporting requirements for 10 years in order to maintain such privilege. The San Francisco Public Utilities Commission (SFPUC) has created a grant assistant program that provides up to $250,000 for single building projects and up to $500,000 for district-scale projects meeting specific eligibility criteria to encourage participation.

Table G-6. Select Cities that Subsidize Private Stormwater Infrastructure

Reference	Runoff Reduction	Runoff Capture and Use
San Francisco, CA (SFPUC, 2015)	**Grants** • Up to $30,000 with 35% match requirement • Up to $100,000 with 25% match requirement	**Grants (treatment is required)** • Up to $250,000 for single building projects • Up to $500,000 for district-scale projects
Palo Alto, CA (City of Palo Alto, 2015)	**Rebates** • Permeable pavement, ≤ $1,000 at $1.5/sq. ft. • Green roofs, ≤ $1,000 at $1.5/sq. ft.	**Rebates (roof runoff)** • Rain barrel $50 each • Cisterns ≤ $1,000 at $1.50/sq. ft.
Seattle, WA (Seattle Public Utilities, 2015)	• Rebates for onsite facility installation, e.g. rain garden • Stormwater drainage fee reduction	• Rebates for onsite facility installation, e.g. cistern (Roof runoff) • Stormwater drainage fee reduction
Montgomery County, MD (County of Montgomery, 2015)	**Rebates** • Residential, ≤ $2,500 per parcel • Commercial, ≤ $10,000 per parcel	**Rebates (roof runoff)** • Residential, ≤ $2,500 per parcel • Commercial, ≤ $10,000 per parcel
Washington, D.C. (Washington D.C., 2015)	**Residential rebates** Trees, ≤ $50 or $100 per tree Pervious surface, ≤ $2,500 at $1.25/sq. ft. All customers: Provide ≤55% stormwater fee discount	**Residential rebates (roof runoff)** Cisterns, ≤ $500 at $1/gallons All customers: Provide ≤55% stormwater fee discount

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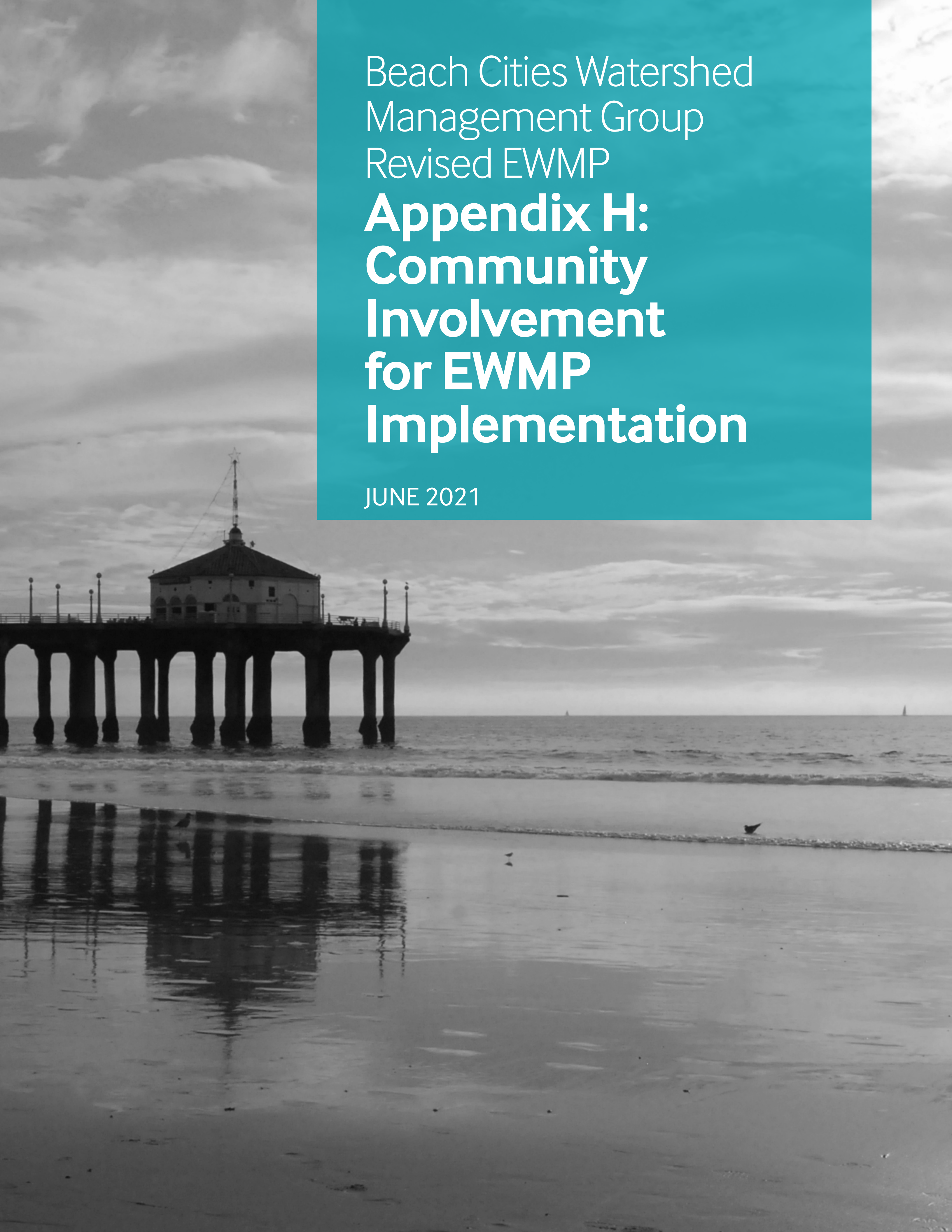

Beach Cities Watershed Management Group Revised EWMP

Appendix H: Community Involvement for EWMP Implementation

JUNE 2021

COMMUNITY PARTICIPATION IN IMPLEMENTATION OF THE BEACH CITIES EWMP

INTRODUCTION

As part of a previous Prop 1 Stormwater Implementation Grant application, the Beach Cities Watershed Management Group (Beach Cities WMG) submitted the required checklist and self-certification to the State Water Resources Control Board Department of Financial Assistance (SWRCB DFA) staff to demonstrate that the Beach Cities EWMP, in combination with several other existing documents, is functionally equivalent to a Storm Water Resource Plan (SWRP) consistent with the SWRP Guidelines.[1] The original checklist and self-certification is attached herein. SWRCB DFA staff reviewed the checklist and identified one item in the checklist, Item #44, that required further revision in order for the Beach Cities SWRP to receive approval as functionally equivalent. Item #44 of the checklist addresses the Water Code Section 10562(b)(4) requirement to include community participation during plan implementation. The SWRP Guidelines provide the following guidance statement with respect to the mandatory statutory requirement to provide for community participation in plan development and implementation [California Water Code 10562(b)(4)]:

> *To maximize community-based benefits, key stakeholders and the public should be involved in all appropriate implementation steps of the Storm Water Resource Plan. Public education and opportunities for public participation in actions, decisions, and projects implemented through watershed-based storm water management should be provided.*

SWRCB DFA staff requested the Beach Cities checklist and SWRP be revised to incorporate its plan for community participation during implementation of the SWRP. Accordingly, this memorandum was drafted to provide additional documentation on that element of the Beach Cities SWRP. As described in more detail below, the Beach Cities SWRP includes community participation on both the regional and local scale.

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

The Greater Los Angeles County Integrated Regional Water Management Plan (GLAC IRWMP) is a collaborative effort to identify and implement water management solutions on a regional scale that increase regional self-reliance, reduce conflict, and manage water to concurrently achieve social, environmental, and economic objectives on a regional scale. The GLAC IRWMP crosses jurisdictional, watershed and political boundaries; involves many agencies, stakeholders, individuals and groups; and attempts to address the issues and differing perspectives of all the entities involved through mutually beneficial solutions. The GLAC IRWMP is a multi-year effort among water retailers,

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[1] SWRCB, 2015. Storm Water Resource Plan Guidelines, December 15, 2015.

wastewater agencies, stormwater and flood managers, watershed groups, the business community, tribes, agriculture and non-profit stakeholders. The GLAC IRWMP provides a mechanism for: 1) coordinating, refining, and integrating existing planning efforts within a comprehensive, regional context; 2) identifying specific regional and watershed-based priorities for implementation projects; and 3) providing funding support for the plans, programs, projects, and priorities of existing agencies and stakeholders.

There are twelve (12) EWMPs and seven (7) individual Watershed Management Programs (WMPs) developed under the LA MS4 Permit that lie within the GLAC IRWM region. These EWMPs and WMPs have been incorporated into the GLAC IRWM and as such the GLAC IRWM provides a successful framework for reaching stakeholders and the public in implementing the programs and projects in the EWMPs and WMPs. By including the EWMPs and WMPs under the umbrella of the GLAC IRWMP, the region enjoys a unified approach in engaging the public in developing water projects for water quality, supply, habitat and recreation. The EWMP prepared by the Beach Cities WMG and approved by the Los Angeles Regional Water Quality Control Board is one of the EWMPs incorporated into the GLAC IRWMP. In addition, regional projects identified in the Beach Cities' EWMP have been incorporated into the GLAC IRWMP. The GLAC IRWM Governance Structure creates a platform for water agencies, municipalities, environmental organizations and other stakeholder groups to discuss and share stormwater issues and ideas. The GLAC IRWMP meets periodically with stakeholders to discuss regional collaborative efforts, such as those included in the EWMPs. There are also five Subregional Steering Committees which coordinate local outreach efforts and planning, and the Beach Cities EWMP participates in the South Bay Steering Committee. GLAC IRWM outreach activities are posted on the LA Water Plan website (LAWaterPlan.org).

The GLAC IRWM includes a Steering Committee dedicated to facilitating and supporting efforts to provide outreach activities to disadvantaged communities. A Disadvantaged Community Coordinator position was created to lead outreach efforts within the GLAC Region. In 2015, the Disadvantaged Community Coordinator led a Water Dialogue speaker series across Los Angeles to initiate discussions on water issues and to educate the public on water policy. The Disadvantaged Community Coordinator also played an active role in shaping legislation and the development of IRWM-related grant programs to maximize disadvantaged community priorities. In 2016, the Department of Water Resources (DWR) released the Final Request for Proposals for the Disadvantaged Community Involvement Program (DACIP). DWR designated $9.8 million of Proposition 1 grant funding for the Los Angeles – Ventura Funding Area. The Purpose of the DACIP is to involve disadvantaged communities and economically distressed areas in the IRWM planning process. The Program seeks to increase understanding of water needs in these areas and develop long-term solutions to address these needs, including developing projects. In 2018, two contracts were awarded to develop community outreach public education materials and broad-based public education campaigns for the Program.

MEASURE W (SAFE, CLEAN WATER PROGRAM)

The Measure W parcel tax on the impermeable area of private parcels throughout Los Angeles County was successfully passed by Los Angeles County voters in November 2018, creating the Safe, Clean Water Program to provide local, dedicated funding for stormwater and urban runoff to increase local water supply, improve water quality, and protect public health within the Los Angeles Basin. The program currently generates approximately $285 million per year. The majority of this funding goes directly back to the cities via two programs:

- **The Municipal Program** - 40% of the annual revenue goes directly to cities via the Municipal Program, with city-specific revenue proportional to the revenues generated within its boundaries. The Municipal Program funding can be used for eligible activities such as project development, design, construction, effectiveness monitoring, operations and maintenance (including operation and maintenance of projects built to comply with the MS4 Permit), as well as for other programs and studies related to protecting and improving water quality in lakes, rivers, and the ocean. The total annual municipal revenue projected for the Beach Cities WMG is approximately $3.4M.
- **The Regional Program** – 50% of the annual revenue is divided across nine watershed areas (including the South Santa Monica Bay Watershed Area, which includes the Beach Cities Area), and is devoted to funding regional watershed-based projects, project concepts, and scientific studies. The South Santa Monica Bay Watershed Area is estimated to receive up to $18.4 million annually to fund regional projects and programs. Funding for multi-benefit regional projects includes design, permits, CEQA compliance, grant-writing, right-of-way and land acquisition, construction, and long-term operations and maintenance of the facilities.

The application process for regional program funds requires both local and regional outreach efforts. First, project development requires significant buy-in from the local community, with a demonstration of outreach efforts and community support as a critical part of the project application score. Second, project applications are submitted to the local Watershed Area Steering Committee (WASC) for evaluation. The WASC, comprised of representatives from cities, agencies, and community stakeholders, reviews proposed projects and develops an annual Stormwater Investment Plan (SIP) for their Watershed Area that identifies recommendations for funding. The review process is a public process, with the general public able to attend meetings and provide comments on considered projects. Recommended projects included in SIPs are also reviewed by a Regional Oversight Committee consisting of LA County Board of Supervisor-appointed subject matter experts for recommendation to the Board of Supervisors. In addition, the WASC includes a Watershed Coordinator who assists the WASC with community and stakeholder education and engagement. Therefore, projects are required to receive region-wide support for successful funding.

In addition to the programs listed above, ten percent of the total annual revenue generated from the Safe, Clean Water Program is allocated to the Los Angeles County Flood Control District. The District will oversee capacity building programs including a public education program, local workforce job training, and school education programs:

- **Public Education Program** – LA County's Water for LA initiative is a trusted resource on all things water to educate the public and foster more sustainable behavior to help ensure the future of the region. Water for LA envisions an LA County where residents understand and nurture their relationship with water – where it comes from, its connection to the rivers and lakes upstream, and how their actions impact their neighbors, region, ocean, and planet.

- **Workforce Training Program** – The District will implement a Workforce Training Program that will provide certification classes and vocational training at the community level for the construction, inspection, operation, and maintenance of stormwater management and multi-benefit projects.
- **School Education** Program - The District will develop and implement a School Education Program about the LA County region and its relationship with stormwater.

LOCAL COMMUNITY PARTICIPATION AND PUBLIC ENGAGEMENT

In addition to the outreach efforts related to the GLAC IRWM and Safe, Clean Water Program, the Beach Cities WMG conducts several local outreach programs as part of the SWRP implementation. The Beach Cities have established a Memorandum of Understanding for the Administration and Cost Sharing for Coordination and Implementation of the Coordinated Integrated Monitoring Program (CIMP Implementation MOU), which supports the Beach Cities EWMP and drives the EWMP adaptive management process. The CIMP Implementation MOU became effective on April 14, 2016 and was unanimously extended by the Beach Cities WMG for two, 1-year terms. In December 2020, the CIMP MOU was amended to add additional services to the Scope of Services, authorize increased costs, and extend the term through December 31, 2023 with the option to further extend the term by unanimous written concurrence. The CIMP MOU includes funding and scope for watershed coordination activities including a number of tasks that facilitate public education and opportunities for public participation. The watershed coordination scope of work is adjusted annually to best address the watershed needs. The scope for reporting year 2020-2021, for example, included the following relevant tasks that support public education and participation:

- Development and implementation of watershed-specific stormwater outreach materials in the form of digital content and print materials for public dissemination.
- Coordination and management of monthly WMG meetings.
- Representation at Los Angeles Regional Water Board meetings and workshops.
- Participation in Regional EWMP and CIMP Coordination meetings on behalf of the WMG.
- Assistance with the Adaptive Management Process and updating of the Beach Cities EWMP, which includes public outreach.
- Assistance aligning joint projects for funding opportunities such as Safe, Clean Water Regional funding and GLAC IRWMP Prop 1 funding.
- Preparation of Watershed Joint Annual Reports to the Los Angeles Regional Water Quality Control Board evaluating progress toward achievement of the EWMP targets and milestones.

PUBLIC PARTICIPATION DURING EWMP DEVELOPMENT

The Beach Cities WMG has conducted outreach to engage the public, Los Angeles Regional Water Quality Control Board staff, and other interested parties to support EWMP development. Input has been incorporated, as appropriate. These efforts are described in more detail below.

Public Workshops – Original EWMP. For development of the original EWMP, public workshops were held on May 21, 2014 at the Joslyn Center in Manhattan Beach and on May 27, 2015 at the Redondo Beach Public Library. An informational presentation was provided followed by a question and answer period to encourage stakeholder input. Concerns were noted and considered during EWMP development by the Beach Cities WMG.

Technical Advisory Committee (TAC). The Beach Cities WMG actively participated in the Los Angeles region TAC and applicable subcommittees throughout the EWMP process.

LARWQCB Presentations. The Beach Cities WMG presented the proposed RAA approach to LARWQCB staff on April 9 and June 6, 2014. LARWQCB staff provided feedback during these meetings and in general they were supportive of the proposed approach. One additional meeting was held on July 31, 2014 to discuss Torrance-specific matters. In addition, the Beach Cities WMG presented the EWMP and progress on implementation to the LARWQCB in July 2018.

Public Website – Revised EWMP. As part of the revision process for the Beach Cities EWMP in 2021, the Beach Cities WMG created a website that highlighted the EWMP update process; provided details for each proposed project; and allowed for public comment to be submitted. The website was launched in May 2021.

Public Virtual Webinar – Revised EWMP. The Beach Cities WMG held a public virtual webinar on May 19, 2021 to present the draft Revised EWMP to the Beach Cities communities and receive public input. The webinar was publicized in advance by each of the four Beach Cities.

City Council Review and Adoption. The cities of Hermosa Beach, Manhattan Beach, Redondo Beach, and Torrance each brought the draft Beach Cities EWMP (2015) and draft revised Beach Cities EWMP (2021) to their respective city councils for consideration and approval to submit to the Regional Board. This process is open to the public, and residents are encouraged and invited to share comments related to the EWMP at these council meetings. Voiced concerns and recommendations were noted and considered for inclusion in the final EWMP and final Revised EWMP.

PUBLIC PARTICIPATION DURING PROJECT IMPLEMENTATION

Separate MOUs will be developed as needed for each joint regional project undertaken by the Beach Cities WMG. These MOUs for cost-sharing of design and construction of regional projects will incorporate public engagement and participation at key points in the project design and construction including:

- City Council consideration and approval authorizing implementation of each regional project at award of design contract—City Council meetings are public and also can be viewed through public media feeds;
- Development of a CEQA-compliant evaluation of the project;

- Public workshops at the preliminary design phase to share project design concepts and solicit public input and participation;
- Public groundbreaking event at the start of construction which are publicized via press release
- Coordination and outreach to the local community immediately adjacent and others that may be affected during construction of the project
- Ribbon cutting at the conclusion of construction which are publicized via press release

Currently, multiple regional projects are being planned or developed by the Beach Cities WMG. Many of these projects involve more than one agency. In these cases, the relevant agencies have been coordinating outreach and community engagement efforts. For example, the Beach Cities Green Street Project involves all four Beach Cities. The four cities are coordinating outreach efforts, partnering with a local outreach firm to engage the community via both online and in-person events during project design.

In the case of individually implemented EWMP regional projects or distributed projects that do not require an MOU among the EWMP WMG members, the individual agency implementing the project will carry out appropriate public engagement elements for each project. One such multi-benefit regional project underway in the City of Torrance is highlighted below.

Torrance Stormwater Basins Enhancement and Expansion Project

Following initial enhancements to the Amie, Henrietta, and Entradero Flood Control Basin network completed in 2015, the City of Torrance is moving forward with further improvements to expand the capacity of these basins to fully retain the 85th percentile, 24-hour design storm from their combined 1,407-acre tributary area, comprising approximately one half of the tributary area to the Herondo Storm Drain system. The scope of this basin expansion project includes:

- Deepening of the existing Henrietta and Entradero Basins to increase storage capacity;
- Installation of drywells at Henrietta Basin to improve infiltration; and
- Adjustment of pumping levels at Amie Basin to ensure retention of the 85th percentile design storm.

The project, which includes additional benefits such as walking trails and educational material, was recently submitted for funding under the Safe Clean Water Program. Preliminary design of the project is currently in process, with an estimated construction completion in 2024 (City of Torrance, 2020a).

For the first enhancement project, a community meeting was held prior to design of the project. The project design approach was also presented at the California Storm Water Quality Association conference in September 2014. At the completion of the project, an open house was held for the community on November 7, 2015. Ongoing outreach occurs through monthly docent-led tours of the Henrietta Basin.

For the current expansion project, the City of Torrance held its first community outreach meeting at Entradero Park on October 10, 2020. Due to COVD-19-related restrictions and concerns, the meeting was safely held outdoors, with mask requirements and social distancing observed. 44 residents were registered as attendants at the meeting, and 23 comment cards were submitted by attendees. Additionally, the City maintains a project-specific website that provides residents with project information and provides direction on how to provide feedback on the project.

PUBLIC ENGAGEMENT AND EDUCATION IN STORMWATER POLLUTION PREVENTION

The Beach Cities WMG has been implementing a customized, collaborative Public Information and Participation Program (PIPP) consistent with Regional Board staff's approval of this approach through adaptive management in March 2019. The PIPP has been adapted to address the Beach Cities WMG's highest water quality priorities and to allow for more effective and targeted distribution of education and outreach materials to Beach Cities residents and businesses. This customized strategy includes the ongoing development of outreach materials promoting behavioral change in the DIY residential community that is a source of targeted pollutants of concern to the Beach Cities WMG and distribution of these materials using multiple methods, such as distribution of print materials at public offices and community events and the use of internet-based platforms. This customized strategy includes a variety of outreach efforts. Examples of the types of outreach methods which have been implemented to engage the public by the Beach Cities WMG members or in partnership with other local agencies are provided below.

Environmentally Friendly Landscaping, Gardening and Pest Control webpages

The Beach Cities WMG along with the Peninsula WMG, has established and collaboratively maintains and periodically updates Sustainable Gardening and Landscaping and Integrated Pest Management (IPM) webpages to disseminate information on CA friendly landscaping, responsible irrigation, integrated pest management and the proper use and disposal of pesticides and fertilizers. The Beach Cities and Peninsula WMGs contract with the South Bay Environmental Services Center (SBESC) to host these pages on their website: http://www.southbaycities.org/programs/environmentally-friendly-landscaping-gardening-and-pest-control. The South Bay Environmental Services Center (SBESC), a clearinghouse for energy efficiency, water conservation and environmental information. The SBESC is a program of the South Bay Cities Council of Governments, a joint powers authority of 16 cities in the South Bay of Los Angeles along with the County of Los Angeles. The SBESC website is the central place for residents to explore information regarding environmental topics, and their E-newsletter has a circulation of nearly 15,500. The website also promotes visitation of the Beach Cities WMG's several water-efficient demonstration gardens by listing their location and showcasing photos.

Residential Rainwater Harvesting Guide

The Beach Cities WMG in partnership with the Peninsula WMG developed the South Bay Homeowner's Guide to Rainwater Harvesting. The concept and design for the guide were adapted from the City of Los Angeles Rainwater Harvesting Program – A Homeowner's How-To Guide November 2009 1st Edition, and a similar guide prepared by the Santa Monica Bay Restoration Foundation for Culver City. The guide provides an introduction to residential rainwater harvesting and covers the topics of downspout disconnection and redirection to permeable surfaces, rain garden design and installation, selection of appropriate CA friendly plants, and rain barrel installation. The guide also provides a wealth of additional resources for homeowners looking to implement additional rainwater harvesting methods or seeking supplemental information. Multiple stakeholders were engaged in the development of this rainwater harvesting program with multiple city staffs, particularly building officials, as well as Los Angeles County Building & Safety staff involved in reviewing and commenting on the Guide to ensure that it would be consistent with local ordinances and policies. Several opportunities for input were provided and this constructive stakeholder feedback has improved the utility of the Guide. The Guide includes a section on maintenance and incorporates advice on periodic inspection and measures or adjustments to correct common problems.

Business Assistance Program for Food Service Establishments and Mobile Businesses

The Beach Cities WMG conducts annual inspections of food service establishments during which onsite managers are educated about stormwater and non-stormwater pollution prevention requirements. The managers are advised of opportunities to become certified in one of several environmental certification programs (Bay Foundation Clean Bay Restaurant Certification, Surfrider Ocean Friendly Restaurant Certification, Green Business Certification).

The Beach Cities WMG also developed a “Flow on the Go” tip card to distribute to targeted mobile businesses that generate wastewater such as auto detailers, window washers, and pet groomers as potential sources of non-stormwater discharges containing pollutants of concern. The tip card covers site preparation and cleanup, spill prevention and response, storm drain inlet protection, and proper disposal of wastewater. The tip card also encourages the use of dry-cleaning methods and environmentally friendly cleaning products. While this outreach targets the mobile business sector, it will also reach residents and businesses that use these services and educate them on proper BMPs and the importance of proper waste disposal. The tip card was developed for both digital posting to agency websites as well as distribution through code enforcement interactions and at public counters.

Ocean Friendly Landscape Workshops

West Basin Municipal Water District, in partnership with Surfrider Foundation, provides free Ocean Friendly Landscape workshops for residents within the Beach Cities WMG to help them manage their landscapes more efficiently. The program consists of a classroom presentation along with a hands-on-workshop at a demonstration garden location. Topics covered in the workshops have addressed both stormwater and non-stormwater pollutant source reduction. Residents learn about permeable pavement, drought-tolerant and native plants, proper use of mulch and smart irrigation control equipment. The objective of these workshops is to teach participants to apply methods that will reduce water consumption, runoff, and ocean pollution. As part of the Ocean Friendly Landscape program, West Basin periodically holds weather-based irrigation controller exchange events where customers can attend a 30-minute training on how to install and operate the weather-based irrigation controllers and then trade in their old, inefficient controllers for a new free controller. This program is typically promoted by each of the Beach Cities agencies through their websites and e-distribution channels.

Rain Barrel Distribution

Rain barrel distribution or rebate programs engage and educate the community through active participation in stormwater capture and may serve as a stepping-stone to more significant residential stormwater capture retrofit projects such as downspout disconnection into cisterns or rain gardens. The West Basin Municipal Water District program has distributed free rain barrels to residents within its service district; the program has included a 50-gallon capacity barrel equipped with overflow spout, built-in mosquito screen, and a rain gutter downspout flex arm hose connector. In a separate program, the Metropolitan Water District of Southern California (MWD) has provided $75 rebates to residents within its service district who purchased their own barrels. To date, an estimated total of 1,986 residences have been retrofit with rain barrels in the Beach Cities WMG area.

Irrigation Reduction Incentives

West Basin Municipal Water District offers a Landscape Irrigation Efficiency Program for large landscape water users (residents and businesses) within its service area, including the Beach Cities WMG members. The program provides outdoor water evaluations which identify leaks, broken sprinklers and pipes, unnecessary runoff, sprinkler controller issues, and other water wasting problems in landscapes. The program includes sprinkler nozzle retrofits and an outdoor water use report complete with recommendations on more efficient outdoor watering habits.

The Beach Cities agencies also maintain a number of California Friendly gardens and landscapes located throughout the Beach Cities WMG area that demonstrate to residents the beauty, utility and economy of native and drought-tolerant plants which require less water, fertilizer and pesticides than traditional landscape plantings. Most of these demonstration gardens are also equipped with interpretive signage. The Environmentally Friendly Landscaping, Gardening and Pest Control webpages hosted by the South Bay Environmental Services Center include a page dedicated to highlighting these demonstration gardens.

Community Events

Each of the Beach Cities typically hosts an annual Coastal Cleanup Day event on its respective beach in partnership with Heal the Bay, the Ocean Conservancy, and the California Coastal Commission. Each agency also hosts at least one other public outreach event each year, such as a household hazardous waste roundup, an Earth Day event or Safety Fair, which provide opportunities to disseminate information about stormwater and urban runoff pollution.

Pet Waste Management Outreach

The Beach Cities WMG agencies maintain pet waste collection and clean-up stations in each of their respective municipal parks. In addition, the linear greenbelts that serve as jogging/walking paths through the cities of Hermosa Beach, Manhattan Beach and Redondo Beach are also equipped with pet waste collection stations, as are The Strands in Hermosa and Manhattan Beach and the Esplanade in Redondo Beach. These pet waste stations serve as a catalyst and reminder for behavior change by pet owners as well as a means of reducing pollutant loading.

Small Construction Site BMP Brochure

In order to enhance the effectiveness of the Beach Cities WMG agency's individual construction programs and to provide a comprehensive and uniform set of expectations for building contractors across the EWMP area, the Beach Cities WMG developed a Small Site Construction brochure targeted at contractors working on construction sites less than 1-acre in disturbed area. The brochure is available in both English and Spanish and describes the BMPs required by the MS4 Permit, including an illustration of where and how to deploy these BMPs on a residential construction site. The brochure also includes information regarding material storage and handling as well as spill prevention, clean-up and disposal.

Regional Residential and Business Outreach

In addition to the development and distribution of outreach materials targeted at the local residential community, the Beach Cities WMG leverages successful existing statewide and regional outreach programs such as the CalRecycle Used Oil and Household Hazardous Waste Program (Used Oil Program) and many additional programs coordinated by the South Bay Environmental Services Center (SBESC) and promoted through SBESC via e-mail blasts to residents and businesses regarding opportunities to learn and become actively involved in water conservation and stormwater pollution prevention. These include Metropolitan Water District California Friendly Landscaping and Turf Removal workshops, Water Replenishment District's Eco-Friendly Gardener Series, and West Basin water conservation workshops and classes.

ATTACHMENT 1 – CHECKLIST AND SELF-CERTIFICATION

Beach Cities WMG: Checklist and Self-Certification

Checklist Instructions:

For each element listed below, review the applicable section in the Storm Water Resource Plan Guidelines and enter ALL of the following information.

- **A. Mark the box if the Storm Water Resource Plan, or a functional equivalent Plan, meets the provision**
- **B. In the provided space labeled References, enter:**
  1. **Title of document(s) that contain the information;**
  2. **The chapter/section, and page number(s) where the information is located within the document(s);**
  3. **The entity(ies) that prepared the document(s);**
  4. **The date the document(s) was prepared, and subsequent updates; and**
  5. **Where each document can be accessed[1] (website address or attached).**

STORM WATER RESOURCE PLAN CHECKLIST AND SELF-CERTIFICATION		
Mandatory Required Elements per California Water Code are Shaded		
Yes/ No	**Plan Element**	**Water Code Section**

WATERSHED IDENTIFICATION (GUIDELINES SECTION VI.A)		

Yes	Plan identifies watershed and subwatershed(s) for storm water resource planning.	10565(c)
		10562(b)(1)
		10565(c)

References: Beach Cities Enhancement Watershed Management Plan (EWMP), Beach Cities Watershed Management Group, February 2016. Herein referred to as "Beach Cities EWMP." <http://www.swrcb.ca.gov/losangeles/water_issues/programs/stormwater/municipal/watershed_management/beach_cities/BeachCities_EWMP_February2016.pdf>, Section 2.1, Page 2-1 through 2-3; Section 3.1, Page 3-1 through 3-3		
Yes	Plan is developed on a watershed basis, using boundaries as delineated by USGS, CalWater, USGS Hydrologic Unit designations, or an applicable integrated regional water management group, and includes a description and boundary map of each watershed and sub-watershed applicable to the Plan.	
References: Beach Cities EWMP, Figure 1-1, Page 1-5; Section 2.1, Page 2-1 through 2-3; Figure 2-5, Page 2-25; Section 3.1, Page 3-1 through 3-3; Figure 3-3, Page 3-23.		

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[1] All documents referenced must include a website address. If a document is not accessible to the public electronically, the document must be attached in the form of an electronic file (e.g. pdf or Word 2013) on a compact disk or other electronic transmittal tool.

WATERSHED IDENTIFICATION
(GUIDELINES SECTION VI.A)

Yes	Plan includes an explanation of why the watershed(s) and sub-watershed(s) are appropriate for storm water management with a multiple-benefit watershed approach;

References:
Beach Cities EWMP, Section 2.1, Page 2-1 through 2-3; Section 3.1, Page 3-1 through 3-3.

Yes	Plan describes the internal boundaries within the watershed (boundaries of municipalities; service areas of individual water, wastewater, and land use agencies, including those not involved in the Plan; groundwater basin boundaries, etc.; preferably provided in a geographic information system shape file);

References:
Beach Cities EWMP, Section 2.1, Page 2-1 through 2-3; Figure 2-5, Page 2-25; Section 3.1, Page 3-1 through 3-3; Figure 3-3, Page 3-23

City of Torrance 2010 Urban Water Management Plan (UWMP). SA Associates. July 2011. Herein referred to as "City of Torrance UWMP." <http://www.water.ca.gov/urbanwatermanagement/2010uwmps/Torrance,%20City%20of/00%20Final%20Torrance%202010%20UWMP_07-28-11.pdf> Section 1.5, pg. 1-4; Figure 1.4, pg. 1-8.

City of Manhattan Beach 2010 UWMP. Stetson Engineers, Inc. December 2011. Herein referred to as "City of Manhattan Beach UWMP." <http://www.water.ca.gov/urbanwatermanagement/2010uwmps/Manhattan%20Beach,%20City%20of/Manhattan_Beach_2010_UWMP_final_Dec2011.pdf> Section 2.2, pg. 2-4; Figure 2-1, pg. 2-2

2010 UWMP Dominguez District. California Water Service Company. June 2011. Herein referred to as "City of Dominguez District UWMP." <http://www.water.ca.gov/urbanwatermanagement/2010uwmps/CA%20Water%20Service%20Co%20-%20Dominguez%20District/_DOM_UWMP_2010.pdf> Section 2, pg. 18-20
Dominguez District UWMP, Appendix B <http://www.water.ca.gov/urbanwatermanagement/2010uwmps/CA%20Water%20Service%20Co%20-%20Dominguez%20District/Appendix%20B%20-%20SAM_4.pdf>

2010 UWMP Hermosa-Redondo District. California Water Service Company. June 2011. Herein referred to as "Hermosa-Redondo District UWMP." <http://www.water.ca.gov/urbanwatermanagement/2010uwmps/CA%20Water%20Service%20Co%20-%20Hermosa%20Redondo%20District/_HR_UWMP_2010.pdf> Section 2, pg. 17-19;
Hermosa-Redondo District UWMP, Appendix B. http://www.water.ca.gov/urbanwatermanagement/2010uwmps/CA%20Water%20Service%20Co%20-%20Hermosa%20Redondo%20District/Appendix%20B%20-%20SAM_5.pdf.

An Introduction to the Central and West Coast Groundwater Basins, Water Replenishment District (WRD) Technical Bulletin Volume 4, Summer 2005. <http://www.wrd.org/engineering/introduction-groundwater-basins-los-angeles.php>

Yes	Plan describes the water quality priorities within the watershed based on, at a minimum, applicable TMDLs and consideration of water body-pollutant combinations listed on the State's Clean Water Act Section 303(d) list of water quality limited segments (a.k.a. impaired waters list);

References:
Beach Cities EWMP, Section 2.2, Page 2-4 through 2-17; Section 3.2; Page 3-4 through 3-19

Yes Plan describes the general quality and identification of surface and ground water resources within the watershed (preferably provided in a geographic information system shape file);

References:
Beach Cities EWMP, Figure 2-1, Page 2-2; Section 2.2.2 through Section 2.2.3, Page 2-6 through 2-17; Figure 3-1, Page 3-2; Section 3.2.2 through 3.2.3; Page 3-5 through 3-19

Yes Plan describes the local entity or entities that provide potable water supplies and the estimated volume of potable water provided by the water suppliers;

References:

City of Torrance UWMP, Section 2.2, pg. 2-9 – 2-14.

City of Manhattan Beach UWMP, Section 4.1, pg. 4-1 – 4-3.

Dominguez District UWMP, Section 4.1, pg.43 –.44.

Dominguez District UWMP, Appendix J, pg. V-1.
<http://www.water.ca.gov/urbanwatermanagement/2010uwmps/CA%20Water%20Service%20Co%20-%20Dominguez%20District/Appendix%20J%20-%20WRD%20Strategic%20Plan.pdf>

Hermosa-Redondo District UWMP, Section 4.1, pg. 47 - 48.

Robert W. Goldsworthy Desalter Expansion Project. Prepared for WRD of Southern California. CH2MHill. February 2013. <http://www.wrd.org/Goldsworthy-IS.pdf>

Yes Plan includes map(s) showing location of native habitats, creeks, lakes, rivers, parks, and other natural or open space within the sub-watershed boundaries; and

References:
Beach Cities EWMP, Figure 1-1, Page 1-5; Figure 2-2, Page 2-2. Figure 3-2, Page 3-3.
Beach Cities CIMP, Figure 3, Page 10

Yes Plan identifies (quantitative, if possible) the natural watershed processes that occur within the sub-watershed and a description of how those natural watershed processes have been disrupted within the sub-watershed (e.g., high levels of imperviousness convert the watershed processes of infiltration and interflow to surface runoff increasing runoff volumes; development commonly covers natural surfaces and often introduces non-native vegetation, preventing the natural supply of sediment from reaching receiving waters).

References:
Beach Cities EWMP, Section 1.1, Page 1-1 through 1-4; Section 1.3, Page 1-7 through 1-10; Section 2.2.3, Page 2-14 through 2-17; Section 3.2.3, Page 3-16 through 3-19

WATER QUALITY COMPLIANCE
(GUIDELINES SECTION V)

Yes	Plan identifies activities that generate or contribute to the pollution of stormwater or dry weather runoff, or that impair the effective beneficial use of storm water or dry weather runoff.	10562(d)(7)

References:
Beach Cities EWMP, Section 2.2.3, Page 2-14 through 2-17; Section 3.2.3, Page 3-16 through 3-19

Yes	Plan describes how it is consistent with and assists in, compliance with total maximum daily load implementation plans and applicable national pollutant discharge elimination system permits.	10562(b)(5)

References:
Beach Cities EWMP, Section 1.1, Page 1-1 through 1-4; Section 2.2, Page 2-4 through 2-17; Section 2.3.3, Page 2-19 through 2-23; Section 2.4 through Section 2.7, Page 2-23 through 2-71; Section 3.2, Page 3-4 through 3-20; Section 3.4 through 3.7, Page 3-21 through 3-53

Yes	Plan identifies applicable permits and describes how it meets all applicable waste discharge permit requirements.	10562(b)(6)

References
Beach Cities EWMP, Section 1.1, Page 1-1 through 1-4; Section 2.7, Page 2-68 through 2-71; Section 3.7, Page 3-48 through 3-52; and Section 4.1, Page 4-1 through 4-6.

ORGANIZATION, COORDINATION, COLLABORATION
(GUIDELINES SECTION VI.B)

Yes	Local agencies and nongovernmental organizations were consulted in Plan development.	10565(a)

References:
Beach Cities EWMP, Section 1.3, Page 1-7 through 1-10

Yes	Community participation was provided for in Plan development.	10562(b)(4)

References:
Beach Cities EWMP, Section 1.3, Page 1-7 through 1-10

Yes	Plan includes description of the existing integrated regional water management group(s) implementing an integrated regional water management plan.

References:
Beach Cities EWMP, Section 1.2 through 1.3, Page 1-4 through 1-10

ORGANIZATION, COORDINATION, COLLABORATION
(GUIDELINES SECTION VI.B)

Yes	Plan includes identification of and coordination with agencies and organizations (including, but not limited to public agencies, nonprofit organizations, and privately-owned water utilities) that need to participate and implement their own authorities and mandates in order to address the storm water and dry weather runoff management objectives of the Plan for the targeted watershed.

References:
Beach Cities EWMP, Section 1.3, Page 1-7 through 1-10; Section 7.1 through 7.2, Page 7- 1 through 7-7.

Yes	Plan includes identification of nonprofit organizations working on storm water and dry weather resource planning or management in the watershed.

References:
Beach Cities EWMP, Section 1.3, Page 1-7 through 1-10; Table 2-8, Page 3-42 through 2-47

Yes	Plan includes identification and discussion of public engagement efforts and community participation in Plan development.

References:
Beach Cities EWMP, Section 1.3, Page 1-7 through 1-10; Table 2-8, Page 3-42 through 2-47

Yes	Plan includes identification of required decisions that must be made by local, state or federal regulatory agencies for Plan implementation and coordinated watershed-based or regional monitoring and visualization

References:
Beach Cities EWMP, Section 5, Page 5-1 through 5-3
Beach Cities Coordinated Integrated Monitoring Program (CIMP), Beach Cities Watershed Management Group; September 2015. Herein referred to as "Beach Cities CIMP." <http://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/watershed_management/beach_cities/Beach_Cities_CIMP.pdf>, Section 2, Page 17 through 25

Yes	Plan describes planning and coordination of existing local governmental agencies, including where necessary new or altered governance structures to support collaboration among two or more lead local agencies responsible for plan implementation.

References:
Beach Cities EWMP, Section 1.2 through 1.3, Page 1-4 through 1-10, Section 7, Pages 7-1 through 7-17

Yes	Plan describes the relationship of the Plan to other existing planning documents, ordinances, and programs established by local agencies.

References:
Beach Cities EWMP, Section 1.3, Page 1-8 through 1-10

Yes	(If applicable)Plan explains why individual agency participation in various isolated efforts is appropriate.

References:
Beach Cities EWMP, Section 1.2, Page 1-4, Section 1.2.1, Page 1-6 through 1-7, Section 2.2.2, Page 2-8 Section 2.3.3, Page 2-19 through Page 2-22

QUANTITATIVE METHODS
(GUIDELINES SECTION VI.C)

Yes	**For all analyses:** Plan includes an integrated metrics-based analysis to demonstrate that the Plan's proposed storm water and dry weather capture projects and programs will satisfy the Plan's identified water management objectives and multiple benefits.
References: Beach Cities EWMP Section 2.4 through Section 2.7, Page 2-23 through 2-71; Section 3.4 through 3.7, Page 3-21 through 3-53	
Yes	**For water quality project analysis (section VI.C.2.a)** Plan includes an analysis of how each project and program complies with or is consistent with an applicable NPDES permit. The analysis should simulate the proposed watershed-based outcomes using modeling, calculations, pollutant mass balances, water volume balances, and/or other methods of analysis. Describes how each project or program will contribute to the preservation, restoration, or enhancement of watershed processes (as described in Guidelines section VI.C.2.a)
References: Beach Cities EWMP Section 2.4 through Section 2.7, Page 2-23 through 2-71; Section 3.4 through 3.7, Page 3-21 through 3-53	
Yes	**For storm water capture and use project analysis (section VI.C.2.b):** Plan includes an analysis of how collectively the projects and programs in the watershed will capture and use the proposed amount of storm water and dry weather runoff.
References: Beach Cities EWMP, Section 2.6.4, Page 2-52 through 2-68; Section 2.8.2 through 2.8.3, Page 2-71 through 2-72; Section 3.6.4, Page 3-39 through 3-48	
Yes	**For water supply and flood management project analysis (section VI.C.2.c):** Plan includes an analysis of how each project and program will maximize and/or augment water supply.
References: Beach Cities EWMP, Section 2.6.4, Page 2-52 through 2-68; Section 2.8.2 through 2.8.4 and 2.8.6, Page 2-71 through 2-72; Section 3.6.4, Page 3-39 through 3-48	
Yes	**For environmental and community benefit analysis (section VI.C.2.d):** Plan includes a narrative of how each project and program will benefit the environment and/or community, with some type of quantitative measurement.
References: Beach Cities EWMP, Section 2.6.4, Page 2-52 through 2-68; Section 2.8.1 and 2.8.4, Page 2-71 through 2-72; Section 3.6.4, Page 3-39 through 3-48	
Yes	**Data management (section VI.C.3):** Plan describes data collection and management, including: a) mechanisms by which data will be managed and stored; b) how data will be accessed by stakeholders and the public; c) how existing water quality and water quality monitoring will be assessed; d) frequency at which data will be updated; and e) how data gaps will be identified.
References: Beach Cities EWMP, Section 5, Page 5-1 through 5-3 Beach Cities CIMP, Section 2.3, Page 26 through 28; Section 3.2 through 3.3, Page 30 through 31; Section 4.3, Page 50; Section 11, Page 69 through 71; Appendix D	

IDENTIFICATION AND PRIORITIZATION OF PROJECTS
(GUIDELINES SECTION VI.D)

Yes	Plan identifies opportunities to augment local water supply through groundwater recharge or storage for beneficial use of storm water and dry weather runoff.	10562(d)(1)
References: Beach Cities EWMP, Section 2.6.4, Page 2-52 through 2-68; Section 2.8, Page 2-71 through 2-72; Section 3.6.4, Page 3-39 through 3-48		
Yes	Plan identifies opportunities for source control for both pollution and dry weather runoff volume, onsite and local infiltration, and use of storm water and dry weather runoff.	10562(d)(2)
References: Beach Cities EWMP, Section 2.6, Page 2-39 through 2-68; Section 2.8, Page 2-71 through 2-72 ; Section 3.6, Page 3-35 through 3-48		
Yes	Plan identifies projects that reestablish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible.	10562(d)(3)
References: Beach Cities EWMP, Section 2.6.4, Page 2-52 through 2-68; Section 2.8, Page 2-71 through 2-72; Section 3.6.4, Page 3-39 through 3-48		
Yes	Plan identifies opportunities to develop, restore, or enhance habitat and open space through storm water and dry weather runoff management, including wetlands, riverside habitats, parkways, and parks.	10562(d)(4)
References: Beach Cities EWMP, Section 2.6.4, Page 2-52 through 2-68; Section 2.8, Page 2-71 through 2-72 ; Section 3.6.4, Page 3-39 through 3-48		
Yes	Plan identifies opportunities to use existing publicly owned lands and easements, including, but not limited to, parks, public open space, community gardens, farm and agricultural preserves, school sites, and government office buildings and complexes, to capture, clean, store, and use storm water and dry weather runoff either onsite or offsite.	10562(d)(5), 10562(b)(8)
References: Beach Cities EWMP, Section 2.6.4, Page 2-52 through 2-68; Section 3.6.4, Page 3-39 through 3-48		

IDENTIFICATION AND PRIORITIZATION OF PROJECTS
(GUIDELINES SECTION VI.D)

Yes	For new development and redevelopments (if applicable): Plan identifies design criteria and best management practices to prevent storm water and dry weather runoff pollution and increase effective storm water and dry weather runoff management for new and upgraded infrastructure and residential, commercial, industrial, and public development.	10562(d)(6)
References: Beach Cities EWMP, Section 2.6.3, Page 2-48 through 2-52; Section 3.6.3, Page 3-36 through 3-39		
Yes	Plan uses appropriate quantitative methods for prioritization of projects. (This should be accomplished by using a metrics-based and integrated evaluation and analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and other community benefits within the watershed.)	10562(b)(2)
References: Beach Cities EWMP, Section 2.3 through 2.4, Page 2-18 through 2-34; Section 2.6.1, Page 2-39; Section 3.3 through 3.4, Page 3-19 through 3-31; Section 3.6.1, Page 3-35; Section 4, Page 4-1 through 4-7		
Yes	*Overall:* Plan prioritizes projects and programs using a metric-driven approach and a geospatial analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and community benefits within the watershed.	
References: Beach Cities EWMP, Section 2.4 through 2.7, Page 2-22 through 2-71; Section 3.4 through 3.7, Page 3-21 through 3-51		
Yes	*Multiple benefits:* Each project in accordance with the Plan contributes to at least two or more **Main Benefits** and the maximum number of **Additional Benefits** as listed in Table 4 of the Guidelines. (Benefits are not counted twice if they apply to more than one category.)	
References: Beach Cities EWMP, Section 2.6 and 2.8, Page 2-39 through 2-68, and Page 2-71 through 2-72, respectively; Section 3.6 and 3.8, Page 3-35 through 3-48, and page 3-52, respectively		

IMPLEMENTATION STRATEGIES AND SCHEDULE
(GUIDELINES SECTION VI.E)

Yes	Plan identifies resources for Plan implementation, including: 1) projection of additional funding needs and sources for administration and implementation needs; and 2) schedule for arranging and securing Plan implementation financing.	

References:
Beach Cities EWMP, Section 7, Page 7-1 through 7-17

Yes	Plan projects and programs are identified to ensure the effective implementation of the storm water resource plan pursuant to this part and achieve multiple benefits.	10562(d)(8)

References:
Beach Cities EWMP, Section 2.6, Page 2-39 through 2-68; Section 3.6, Page 3-36 through 3-48

Yes	The Plan identifies the development of appropriate decision support tools and the data necessary to use the decision support tools.	10562(d)(8)

References:
Beach Cities EWMP, Section 2.4, 2.5, and 2.7, Page 2-23 through 2-38, and Page 2-68 through 2-71; Section 3.4, 3.5, and 3.7, Page 3-21 through 3-35, and Page 3-48 through 3-52
Beach Cities CIMP, Section 2 through 6, Page 18 through 63

Yes	Plan describes implementation strategy, including: a) Timeline for submitting Plan into existing plans, as applicable; b) Specific actions by which Plan will be implemented; c) All entities responsible for project implementation; d) Description of community participation strategy; e) Procedures to track status of each project; f) Timelines for all active or planned projects; g) Procedures for ongoing review, updates, and adaptive management of the Plan; and h) A strategy and timeline for obtaining necessary federal, state, and local permits.	

References:
Beach Cities EWMP, Section 4, Page 4-1 through 4-7

Yes	Applicable IRWM plan: The Plan will be submitted, upon development, to the applicable integrated regional water management (IRWM) group for incorporation into the IRWM plan.	10562(b)(7)

References:
In Progress.

IMPLEMENTATION STRATEGIES AND SCHEDULE
(GUIDELINES SECTION VI.E)

Yes	Plan describes how implementation performance measures will be tracked.

References:
Beach Cities EWMP, Section 5, Page 5-1 through 5-3

EDUCATION, OUTREACH, PUBLIC PARTICIPATION
(GUIDELINES SECTION VI.F)

Yes Outreach and Scoping: 10562(b)(4)
Community participation is provided for in Plan implementation.

References:
Beach Cities EWMP, , Section 1.3, Page 1-7 through 1-10; Table 2-8, Page 2-42 through 2-47; Section 2.8.4, Page 2-72; Section 7, Pages 7-1 through 7-17; Appendix L
Beach Cities Watershed Management Group, July 2017. Functionally Equivalent Stormwater Resources Plan – Community Participation in Implementation.
Greater Los Angeles County Integrated Regional Water Management Plan.
http://www.ladpw.org/wmd/irwmp/index.cfm?fuseaction=documents
LACFCD Functionally Equivalent Storm Water Resource Plan Framework.
MOU between Beach Cities WMG for Implementation of the CIMP, April 12, 2016.
Beach Cities CIMP, September 2015.
City of Torrance, 2015. Stormwater Basin Enhancement Project – Final Project Report. July 9, 2015, pages 3-4.

Yes Plan describes public education and public participation opportunities to engage the public when considering major technical and policy issues related to the development and implementation

References:
Beach Cities EWMP, Section 1.3, Page 1-7 through 1-10; Table 2-8, Page 2-42 through 2-47

Yes Plan describes mechanisms, processes, and milestones that have been or will be used to facilitate public participation and communication during development and implementation of the Plan.

References:
Beach Cities EWMP, Section 1.3, Page 1-7 through 1-10; Table 2-8, Page 2-42 through 2-47

Yes Plan describes mechanisms to engage communities in project design and implementation.

References:
Beach Cities EWMP, Section 1.3, Page 1-7 through 1-10; Section 5, Page 5-1 through 5-3; Table 2-8, Page 2-42 through 2-47.

Yes Plan identifies specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nonprofit organizations, and the general public.

References:
Beach Cities EWMP, Section 1.3, Page 1-7 through 1-10; Table 2-8, Page 2-42 through 2-47

EDUCATION, OUTREACH, PUBLIC PARTICIPATION
(GUIDELINES SECTION VI.F)

Yes	Plan describes strategies to engage disadvantaged and climate vulnerable communities within the Plan boundaries and ongoing tracking of their involvement in the planning process.

References:
Beach Cities EWMP, Section 1.1.3, Page 1-3, Section 1.3, Page 1-7 through 1-10; Section 5, Page 5-1 through 5-3; Table 2-8, Page 2-42 through 2-47

Yes	Plan describes efforts to identify and address environmental injustice needs and issues within the watershed.

References:
Beach Cities EWMP, Section 1.3, Page 1-7 through 1-10; Section 5, Page 5-1 through 5-3.

Yes	Plan includes a schedule for initial public engagement and education.

References:
Beach Cities EWMP, Section 1.3, Page 1-7 through 1-10; Section 5, Page 5-1 through 5-3.

DECLARATION AND SIGNATURE

I declare under penalty of perjury that all information provided is true and correct to the best of my knowledge and belief.

Signature	Title	Date
	PUBLIC WORKS DIRECTOR	8-17-17
	City Manager	8-17-17