

## 5.9 Hydrology and Water Quality

This section describes the applicable laws and policies relating to hydrology and water quality, discusses the existing (baseline) conditions relating to hydrology and water quality and presents an assessment of the potential impacts from Project implementation. Baseline hydrologic and water quality conditions relevant to the proposed Project include consideration of terrestrial surface waters, the offshore ocean environment in Santa Monica Bay, and groundwater underlying the Project. Note that impacts to marine biological resources are evaluated in Section 5.11, *Marine Biological Resources*. **Appendix 10, Ocean Plan Amendment Siting and Intake and Discharge Method Considerations**, includes a discussion of how West Basin considered the California Ocean Plan Amendment (Ocean Plan Amendment, or OPA) for Project site and the intake and discharge method selection.

### 5.9.1 Regulatory Framework

#### Federal Regulations

##### ***Clean Water Act***

Regulatory authorities exist on both the state and federal levels for the control of water quality in California. The United States Environmental Protection Agency (USEPA) is the federal agency responsible for water quality management pursuant to the Clean Water Act (CWA) of 1977. The purpose of the CWA is to protect and maintain the quality and integrity of the Nation's waters by requiring states to develop and implement state water plans and policies. The relevant sections of the CWA are summarized below.

##### **CWA Section 303: Water Quality Standards and Implementation Plans**

Section 303 of the CWA requires states to designate beneficial uses for water bodies or segments of water bodies and to establish water quality standards to protect those uses for all waters of the United States. Under Section 303(d) of the CWA, states, territories, and authorized tribes are required to develop lists of impaired waters. Impaired waters are waters that do not meet water quality standards established by the state. The law requires that these jurisdictions establish a priority ranking for listed waters and develop action plans to improve water quality. Inclusion of a water body on the Section 303(d) List of Impaired Water Bodies triggers development of a Total Maximum Daily Load (TMDL) for that water body and a plan to control the associated pollutant/stressor on the list. The TMDL is the maximum amount of a pollutant/stressor that a water body can assimilate and still meet the water quality standards. Typically, a TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. Section 303(d) is described as part of the regulatory framework because the Los Angeles Regional Water Quality Control Board (LARWQCB) identifies impaired waters that intersect proposed Project components as follows:

- Santa Monica Bay, where outfall and intake facilities are proposed, is listed as impaired for debris, sediment toxicity, dichlorodiphenyltrichloroethane (DDT), and polychlorinated biphenyls (PCBs).

- Dominguez Channel (lined portion above Vermont Avenue), which crosses proposed conveyance pipeline routes, is listed as impaired for copper, ammonia, diazinon, bacteria, lead, zinc, and toxicity.
- Marina Del Rey and the Ballona Creek Estuary, where off-site staging is proposed at Marina Del Rey for offshore activities, are listed as impaired waterways for a wide range of constituents and is under multiple TMDLs.

#### **CWA Section 401: Water Quality Certification**

Section 401 of the CWA (33 U.S.C. Section 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into navigable waters, including the crossing of rivers or streams during road, pipeline, or transmission line construction, to obtain a certification from the state in which the discharge originates. The certification ensures that the discharge will comply with the applicable effluent limitations and water quality standards. The state agency responsible for implementing Section 401 of the CWA in California is the California State Water Resources Control Board (SWRCB).

#### **CWA Section 402: National Pollutant Discharge Elimination System**

The National Pollutant Discharge Elimination System (NPDES) permit program under Section 402 of the CWA is one of the primary mechanisms for controlling water pollution through the regulation of sources that discharge pollutants into waters of the United States. USEPA has delegated authority of issuing NPDES permits in California to the SWRCB, which has nine Regional Water Quality Control Boards (RWQCBs). The LARWQCB regulates water quality in the Project area. The NPDES permit program is discussed in detail in Section 5.9.1, *State Regulations*.

#### **NPDES General Permit for Vessel Incidental Discharges**

Under Section 402 of the CWA, USEPA regulates discharges incidental to the normal operation of a commercial (i.e., non-military, non-recreational) vessel. This includes a broad range of incidental discharges, such as ballast water, bilgewater, graywater (e.g., water from sinks and showers), and deck washdown and runoff. USEPA controls these incidental discharges primarily through two NPDES general permits: the Vessel General Permit (VGP), covering vessels greater than 79 feet in length and ballast water from commercial vessels of all sizes, and; the Small Vessel General Permit (sVGP), for the control of incidental discharges for vessels less than 79 feet in length. The VGP and sVGP contain numeric ballast water discharge limits for most vessels. The VGP also contains stringent requirements for oil-to-sea interfaces and exhaust gas scrubber washwater for the protection of U.S. waters. USEPA is responsible for implementing the VGP and sVGP, and all vessels associated with the Project in marine waters would be required to adhere to the conditions of the relevant permit.

#### **CWA Section 404: Discharge of Dredged or Fill Material**

Section 404 of the CWA (33 U.S.C. Section 1344) authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into the waters of the United States at specified disposal sites (33 Code of Federal Regulations [CFR] Part 323). The selection and use of disposal sites will be in accordance with guidelines developed

by the Administrator of USEPA in conjunction with the Secretary of the Army and published in 40 CFR Part 230 (the “guidelines”). 40 CFR Part 230 subpart C includes water quality aspects of dredge-and-fill activities. Among other topics, these guidelines address discharges that alter substrate elevation or contours, suspended particulates, water clarity, nutrients and chemical content, current patterns and water circulation, water fluctuations, and salinity gradients.

### ***Coastal Zone Management Act***

The Coastal Zone Management Act (CZMA) of 1972 provides for management of the Nation’s coastal resources and balances economic development with environmental conservation. In 1990, Congress passed the Coastal Zone Act Reauthorization Amendments (CZARA) to address nonpoint source pollution problems in coastal waters. The California Coastal Commission (CCC) has jurisdiction for CZMA implementation throughout the state.

Section 6217 of CZARA and Section 319 of the CWA require California and 28 other states to develop coastal nonpoint source pollution control programs that incorporate required management measures to reduce or prevent polluted runoff to coastal waters from specific sources. Management measures are defined in Section 6217 of the CZARA as economically achievable measures to control the addition of pollutants to coastal waters that reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives. These management measures are incorporated by states into their coastal nonpoint source pollution programs and coastal management programs.

The CCC, through the California Coastal Act, applies the water quality policies of the CZARA when reviewing federally licensed and permitted activities to ensure they are consistent with the State’s coastal management program in accordance with the CZMA federal consistency provision. The California Coastal Act contains numerous enforceable policies that are directed at protecting and, where feasible, restoring coastal water quality. See Section 5.9.1 for discussion of how the CZMA is regulated at the state level.

### ***Rivers and Harbors Appropriations Act of 1899***

The Rivers and Harbors Appropriations Act of 1899 authorizes the U.S. Army Corps of Engineers (USACE) to exercise control over all construction projects that occur within navigable waters of the United States. The Rivers and Harbors Act was intended for the protection of navigation and navigable capacity and was later amended to include protection of the environment. Section 10 of the Act regulates work and structures occurring in, over, and under navigable waters that affect the course, location, condition, or capacity of navigable waters of the United States, including dredging, wharf improvements, overwater cranes, and artificial islands and installations on the outer continental shelf. Under Section 13 of the Act, discharge of refuse into any navigable water is prohibited without approval of the USACE.

### ***Marine Protection, Research, and Sanctuaries Act of 1972***

The Marine Protection, Research, and Sanctuaries Act (MPRSA) (33 U.S.C. Section 1401, ff) authorizes USEPA to designate areas for ocean dredge material disposal and requires sites selected in locations that mitigate adverse impacts to the greatest extent practicable. The U.S.

Army Corps of Engineers (USACE) is the permitting agency for ocean disposal of dredged material. The transportation of dredged material for disposal into ocean waters is permitted by USACE only after environmental criteria established by USEPA are applied. USEPA and USACE issued a joint guidance document in February 1996 for the development of ocean dredged material disposal site management plans (USEPA/USACE 1996). USEPA manages three ocean disposal sites off Southern California that qualify under this criterion: LA-2 off the ports of Los Angeles and Long Beach, LA-3 off Newport Beach, and LA-5 off San Diego Bay. All sites are restricted to the disposal of suitable (clean) dredged material only. Dredge disposal for the Project has the potential to occur only at LA-2.

Disposal at LA-2 is coordinated jointly by the offices of USEPA (Region IX) and USACE (Los Angeles District) and the requirements of the Site Management and Monitoring Plan, required for all ocean dredged material disposal sites, as well as the compliance and enforcement provisions of the MPRSA regulations themselves, apply to all projects using LA-2, including projects which have received an “ocean dumping permit” issued by USACE under Section 103 of the MPRSA, as well as federal projects conducted by or for USACE. The LA-2 disposal site is located on the outer continental shelf margin, at the upper southern wall of San Pedro Sea Valley, at depths from 380 to 1,060 feet (110 to 320 meters), about 6.8 miles (11 kilometers [km]) south-southwest of the Queens Gate entrance to the Los Angeles/Long Beach Harbor. A comprehensive description of physical, chemical, and biological characteristics of the sediments and water column at LA-2 can be found in the LA-2/LA-3 FEIS (USEPA 2005).

The objectives for management of all the southern California ocean disposal sites include:

- Protection of the marine environment
- Beneficial use of dredged material whenever practical
- Documentation of disposal activities at the ocean dredged material disposal sites

USEPA and USACE Los Angeles District personnel achieve these objectives by jointly administering the following activities: regulation and administration of ocean disposal permits; ensuring suitability of dredged material for ocean discharge; pre-dredge sediment evaluations; project-specific compliance tracking of disposal operations; evaluation of permit compliance and monitoring results; implementation of a site monitoring program, and periodic review of the Site Management and Monitoring Plan. Management decisions about the suitability of dredged material for ocean disposal are guided by criteria in the MPRSA and USEPA’s Ocean Dumping Regulations; guidance on specific aspects of these regulations is provided in Ecological Evaluation of Proposed Discharge of Dredged Material into Ocean Waters (the “Ocean Testing Manual”; USEPA/USACE 1991), or subsequent national updates.

The Ocean Testing Manual requires identification of contaminants of concern prior to disposal (Section 4.2). Specifically, USACE requires:

*Identifying specific contaminants, if any, that are of concern in a particular dredged material is dependent on the information collected for Tier I, which provides a preliminary basis for determining potential contamination of the dredged material. In some instances, it may be sufficient to perform confirmatory*

*analyses for specific contaminants of concern. In other cases, where the initial evaluation indicates that a variety of contaminants of concern may be present, chemical analysis of the dredged material could provide a useful inventory, and a bulk-chemical analysis conducted according to the guidance in Section 9.3 may be appropriate and, in fact, would be necessary to conduct Tier II.*

USEPA Region IX in coordination with USACE Los Angeles District may also develop additional regional guidance in the future for sediment testing, which should be used in conjunction with the Ocean Testing Manual.

Regulatory decisions about dredged material proposed for ocean disposal are based on the following:

- Compliance with applicable criteria defined in USEPA's Ocean Dumping Regulations at 40 CFR Part 227.
- Requirements imposed on the permittee under the USACE Permitting Regulations at 33 CFR Parts 320-330 and 335-338.
- The potential for significant adverse environmental impacts at either LA-2 from disposal of the proposed dredged material.

Mandatory approval from USEPA and USACE would be required prior to transport and disposal of dredge material, and such approval would be contingent on ensuring the suitability of dredged material for ocean discharge through pre-dredge sediment evaluation and would also include project-specific compliance tracking of disposal operations.

#### **California Toxics Rule, 40 CFR 131.38**

On May 18, 2000, USEPA promulgated numeric water quality criteria for priority toxic pollutants and other provisions for water quality standards to be applied to waters within California. USEPA promulgated this rule based on the USEPA Administrator's determination that the numeric criteria are necessary in California to protect human health and the environment. The rule fills a gap in California water quality standards that was created in 1994 when a state court overturned the state's water quality control plans containing water quality criteria for priority toxic pollutants. Thus, the state of California has been without numeric water quality criteria (which is required by the CWA) for many priority toxic pollutants, necessitating this action by USEPA. These federal criteria are legally applicable in the state of California for inland surface waters, enclosed bays, and estuaries for all purposes and programs under the CWA. USEPA and the SWRCB have the authority to enforce these standards, which are incorporated into the NPDES permits that regulate existing discharges in the Project Area. The NPDES permit program is discussed in detail in Section 5.9.1, *State Regulations*.

#### **Executive Order 11988 and National Flood Insurance Program**

Under Executive Order 11988, the Federal Emergency Management Agency (FEMA) is responsible for management of floodplain areas, defined as the lowland and relatively flat areas adjoining inland and coastal waters subject to a 1 percent or greater chance of flooding in any given year (representing the 100-year flood hazard zone). Also, FEMA administers the National Flood Insurance Program (NFIP), which requires that local governments covered by federal flood

insurance enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year flood zone. To facilitate identifying areas with flood potential, FEMA has developed Flood Insurance Rate Maps that can be used for planning purposes, including floodplain management, flood insurance, and enforcement of mandatory flood insurance purchase requirements.

Specifically, the NFIP requires that participating communities adopt certain minimum floodplain management standards, including restrictions on new development in designated floodways, a requirement that new structures in the 100-year floodplain be elevated to or above the 100-year flood level (known as base flood elevation), and a requirement that subdivisions be designed to minimize exposure to flood hazards. Participating communities agree to adopt and enforce ordinances that meet or exceed FEMA requirements to reduce the risk of flooding. Los Angeles County is a participating jurisdiction in the NFIP and the City of El Segundo is a participating community. Therefore, all new development must comply with the minimum requirements of the NFIP. As described in Section 5.9.2, the Project would be located outside of any identified Special Flood Hazard Area.

## **State Regulations**

### ***Porter-Cologne Water Quality Control Act***

The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) provides the basis for water quality regulation within California. The Act establishes the authority of the SWRCB and the nine RWQCBs. The SWRCB administers water rights, sets state policy for water pollution control, and implements various water quality functions throughout the state, while the RWQCBs conduct planning, permitting, and most enforcement activities. The proposed Project is within jurisdiction of the LARWQCB.

The Porter-Cologne Water Quality Control Act requires the SWRCB and/or the RWQCBs to adopt statewide and/or regional water quality control plans, the purpose of which is to establish water quality objectives for specific water bodies. In the Los Angeles region, the Water Quality Control Plan for the Los Angeles Region (Basin Plan) serves as the legal, technical, and programmatic basis of water quality regulation in the region and along the coast. The Act also authorizes the SWRCB and RWQCBs to implement the NPDES program, which establishes discharge limitations and receiving water quality requirements for discharges to waters of the United States. The Act also authorizes the NPDES program under the CWA, which establishes effluent limitations and water quality requirements for discharges to waters of the state. The Basin Plan and the NPDES permits relevant to the proposed Project are discussed further below.

### ***Water Quality Control Plan for the Los Angeles Region (Basin Plan)***

The LARWQCB's Basin Plan is designed to preserve and enhance water quality and protect the beneficial uses of all regional terrestrial surface water bodies (e.g., creeks, rivers, streams, and lakes), groundwaters, coastal drainages, estuaries, coastal lagoons, and enclosed bays within the LARWQCB's jurisdictional area. The preparation and adoption of Basin Plans are required by California Water Code Section 13240. According to Water Code Section 13050, Basin Plans establish the beneficial uses to be protected for the waters within a specified area, water quality

objectives to protect those uses, and an implementation program for achieving the objectives. Because beneficial uses, together with their corresponding water quality objectives, can be defined per federal regulations as water quality standards, the Basin Plans are regulatory references for meeting the state and federal requirements for water quality control. The water quality objectives are thus incorporated into NPDES permits (discussed in detail below).

The Basin Plan is designed to preserve and enhance water quality and protect beneficial uses of all waters. Specifically, it:

1. Designates beneficial uses for surface and ground waters.
2. Sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state’s anti-degradation policy.
3. Describes implementation programs for achieving objectives to protect all waters in the region.

In addition, the Basin Plan incorporates all applicable SWRCB and RWQCB plans and policies and other pertinent water quality policies and regulations (LARWQCB 1994). **Table 5.9-1** lists the water bodies relevant to the proposed Project along with beneficial uses identified by the LARWQCB.

**TABLE 5.9-1  
DESIGNATED BENEFICIAL USES OF SURFACE WATER BODIES IN THE PROJECT VICINITY**

Water Bodies	Beneficial Uses																			
	MUN	AGR	GWR	IND	COMM	SHELL	COLD	EST	MIGR	RARE	SPWN	BIOL	WARM	WILD	REC-1	REC-2	NAV	MAR	FRSH	ASBS
Nearshore Zone <sup>a</sup>				X	X	X			X	X	X	X		X			X	X		
Offshore Zone				X	X	X			X	X	X			X			X	X		
Dominguez Channel	X									X			X	X						
Dominguez Channel Estuary					X			X	X	X	X			X			X	X		
Marina Del Rey Harbor					X	X								X			X	X		
Public Beach Area					X					X				X			X	X		
All Other Areas					X	X				X				X			X	X		
Entrance Channel					X	X				X				X			X	X		
Ballona Creek Estuary					X	X		X	X	X	X			X			X	X		
Manhattan Beach						X	X				X			X			X	X		
Redondo Beach						X	X		X	X	X			X			X	X		

ACRONYMS:

MUN – Municipal and Domestic Supply  
 AGR – Agricultural Supply  
 GWR – Groundwater Recharge  
 IND – Industrial Service Supply  
 COMM – Ocean, Commercial, and Sport Fishing  
 SHELL – Shellfish Harvesting  
 COLD – Cold Freshwater Habitat  
 EST – Estuarine Habitat  
 MIGR – Migration of Aquatic Organisms

SPWN – Spawning, Reproduction, and/or Early Development  
 BIOL – Preservation of biological Habitats of Special Significance  
 WARM – Warm Freshwater Habitat  
 WILD – Wildlife Habitat  
 REC-1 – Water Contact Recreation  
 REC-2 – Non-Contact Water Recreation  
 NAV – Navigation  
 MAR – Marine Habitat  
 FRSH – Freshwater Replenishment

RARE – Preservation of Rare and Endangered Species

ASBS – Areas of Special Biological Significance

NOTES:

<sup>a</sup> Nearshore Zone is defined as the zone bounded by the shoreline and a line 1000 feet from the shoreline or the 30-foot depth contours, whichever is further from the shoreline.

SOURCE: LARWQCB 1994

### **Water Quality Control Plan for Ocean Waters of California**

The *Water Quality Control Plan for Ocean Waters of California* (California Ocean Plan) (SWRCB 2015), adopted by the SWRCB in May 2015 and effective January 2016, establishes water quality requirements and objectives for California’s ocean waters and provides the basis for regulation of wastes discharged into the state’s coastal waters. The plan applies to point and nonpoint source discharges. Both SWRCB and the six coastal RWQCBs implement and interpret the California Ocean Plan. The California Ocean Plan identifies the applicable beneficial uses of marine waters. These beneficial uses include preservation and enhancement of designated Areas of Special Biological Significance (ASBS), rare and endangered species, marine habitat, fish migration, fish spawning, shellfish harvesting, recreation, commercial and sport fishing, mariculture, industrial water supply, aesthetic enjoyment, and navigation. The water quality requirements and objectives of the California Ocean Plan are incorporated into NPDES permits for ocean discharges. The California Ocean Plan requirements do not apply to vessel wastes or to the control of dredge-material disposal or discharge (see federal regulations, above, for regulations related to vessel wastes and dredge-material disposal).

### **California Ocean Plan Water Quality Objectives**

The California Ocean Plan establishes a set of narrative and numerical water quality objectives to protect beneficial uses. These objectives are based on bacterial, physical, chemical, and biological characteristics as well as radioactivity. **Table 5.9-2** presents the numeric water quality objectives for water quality constituents established in the California Ocean Plan. The water quality objectives in the California Ocean Plan apply to all receiving waters under the jurisdiction of the plan and are established for the protection of aquatic life and for the protection of human health from both carcinogens and noncarcinogens. The water quality objectives detail 21 objectives for protecting aquatic life, 20 for protecting human health from noncarcinogens, and 42 for protecting human health from exposure to carcinogens. The California Ocean Plan also includes an implementation program for achieving water quality objectives. Effluent limitations are established for the protection of marine waters.

**TABLE 5.9-2  
WATER QUALITY OBJECTIVES IN THE 2016 CALIFORNIA OCEAN PLAN**

	Units of Measurement	Limiting Concentrations		
		6-month Median	Daily Maximum	Instantaneous Maximum
<b>Water Quality Objectives for Protection of Marine Life</b>				
Arsenic	µg/L	8	32	80
Cadmium	µg/L	1	4	10
Chromium (Hexavalent)	µg/L	2	8	20
Copper	µg/L	3	12	30
Lead	µg/L	2	8	20
Mercury	µg/L	0.04	0.16	0.4
Nickel	µg/L	5	20	50
Selenium	µg/L	15	60	150.



	Units of Measurement	Limiting Concentrations		
		6-month Median	Daily Maximum	Instantaneous Maximum
Silver	µg/L	0.7	2.8	7
Zinc	µg/L	20	80	200
Cyanide	µg/L	1	4	10
Total Chlorine Residual	µg/L	2	8.0	60
Ammonia (expressed as Nitrogen)	µg/L	600	2400	6000
Acute Toxicity	TUa	N/A	0.3	N/A
Chronic Toxicity	TUc	N/A	1	N/A
Phenolic Compounds (non-chlorinated)	µg/L	30	120	300
Chlorinated Phenolics	µg/L	1	4	10
Endosulfan	µg/L	0.009	0.018	0.027
Endrin	µg/L	0.002	0.004	0.006
HCH	µg/L	0.004	0.008	0.012
Radioactivity	Not to exceed limits specified in Title 17, Division 1, Chapter 5, Subchapter 4, Group 3, Article 3, Section 30253 of the California Code of Regulations.			

Chemical	30-day Average (micrograms per liter or µg/L)
acrolein	220
antimony	1,200
bis(2-chloroethoxy) methane	4.4
bis(2-chloroisopropyl) ether	1,200
chlorobenzene	570
chromium (III)	190,000
di-n-butyl phthalate	3,500
dichlorobenzenes	5,100
diethyl phthalate	33,000
dimethyl phthalate	820,000
4,6-dinitro-2-methylphenol	220
2,4-dinitrophenol	4.0
ethylbenzene	4,100
fluoranthene	15
hexachlorocyclopentadiene	58
nitrobenzene	4.9
thallium	2
toluene	85,000
tributyltin	0.0014
1,1,1-trichloroethane	540,000
acrylonitrile	0.10
aldrin	0.000022

<b>Chemical</b>	<b>30-day Average (micrograms per liter or µg/L)</b>
benzene	5.9
benzidine	0.000069
beryllium	0.033
bis(2-chloroethyl) ether	0.045
bis(2-ethylhexyl) phthalate	3.5
carbon tetrachloride	0.90
chlordane	0.000023
chlorodibromomethane	8.6
chloroform	130
DDT	0.00017
1,4-dichlorobenzene	18
3,3'-dichlorobenzidine	0.0081
1,2-dichloroethane	28
1,1-dichloroethylene	0.9
dichlorobromomethane	6.2
dichloromethane	450
1,3-dichloropropene	8.9
dieldrin	0.00004
2,4-dinitrotoluene	2.6
1,2-diphenylhydrazine	0.16
halomethanes	130
heptachlor	0.00005
heptachlor epoxide	0.00002
hexachlorobenzene	0.00021
hexachlorobutadiene	14
hexachloroethane	2.5
isophorone	730
N-nitrosodimethylamine	7.3
N-nitrosodi-N-propylamine	0.38
N-nitrosodiphenylamine	2.5
Polyaromatic hydrocarbons (PAHs)	0.0088
Polychlorinated biphenyls (PCBs)	0.000019
2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) equivalents	0.0000000039
1,1,2,2-tetrachloroethane	2.3
tetrachloroethylene	2.0
toxaphene	0.00021
trichloroethylene	27
1,1,2-trichloroethane	9.4

Chemical	30-day Average (micrograms per liter or µg/L)
2,4,6-trichlorophenol	0.29
vinyl chloride	36

The California Ocean Plan water quality objectives are to be met after the initial dilution of a discharge into the ocean. The California Ocean Plan defines initial dilution as the process that results in the rapid and irreversible turbulent mixing of wastewater with ocean water around the point of discharge. Initial dilution occurs in an area known as the zone of initial dilution (ZID), within which the density of the discharge is substantially different from that of the receiving water. Typically, constituent concentrations are permitted to exceed water quality objectives within the ZID, which is limited in size. Thus, in the case of the proposed Project, the California Ocean Plan water quality objectives would apply at the edge or boundary of the ZID. Dilution occurring within the ZID from an operational discharge is conservatively calculated as the minimum probable initial dilution (Dm). The water quality objectives established in the California Ocean Plan are considered in the context of the calculated Dm to derive the NPDES effluent limits for a wastewater discharge in-pipe (i.e., prior to ocean dilution).

For typical wastewater discharges, the ZID is the zone adjacent to the discharge point where momentum and buoyancy-driven mixing produces rapid dilution of the discharged effluent. Municipal wastewater effluent, being effectively freshwater, is lighter than seawater and thus rises (due to buoyancy) while it mixes with ocean water, whereas desalination brine, when discharged directly, is denser than seawater and thus sinks while it mixes with ocean water. The mixing and dilution are also affected by the density of the effluent being discharged. As effluent travels away from the discharge port, it entrains ambient seawater, which increases the diameter of the plume and decreases the plume concentration. Thus, the edge of the ZID depends, in part, on the discharge plume density. If the effluent density is greater than the ambient salinity, as occurs for desalination brine, it produces a negatively buoyant plume that sinks toward the seabed. In this case, the edge of the ZID is located at the point where the discharge plume contacts the seafloor.

In addition to establishing water quality objectives, the California Ocean Plan lays out the implementation provisions with an equation to derive constituent concentrations that are compared with the water quality objectives. The constituent concentrations are calculated using the background concentrations of the constituents as one of the factors.<sup>1</sup> The background concentrations are provided for only five constituents: arsenic, copper, mercury, silver, and zinc; for other constituents it is assumed to be zero (SWRCB 2015).

<sup>1</sup> The calculation also uses the constituent concentrations and dilution factor estimated for the discharge that is studied.

As discussed in Section 5.9.1, Santa Monica Bay is currently impaired for sediment toxicity, DDT, and PCBs. Additionally, as discussed in detail in Section 5.9.2, the baseline concentrations of several water quality constituents detected in Santa Monica Bay currently exceed the California Ocean Plan water quality objectives.

### ***Desalination Amendment to the California Ocean Plan***

In 2015, the California Ocean Plan was amended to address effects associated with the construction and operation of seawater desalination facilities and to clarify the SWRCB's authority over desalination facility intakes and discharges (the California Ocean Plan Amendment). The California Ocean Plan Amendment provides a uniform, consistent process for permitting of seawater desalination facilities statewide, allowing for the use of ocean water as a reliable supplement to traditional water supplies while protecting marine life and water quality. The California Ocean Plan now also provides direction for regional water boards when permitting new or expanded facilities and provides specific implementation and monitoring and reporting requirements. The California Ocean Plan Amendment includes the following provisions that are applicable to the proposed Project:

- Implementation procedures for conducting Water Code Section 13142.5, subdivision (b) (hereafter 13142.5(b)) evaluations of the best available site, design, technology, and mitigation measures feasible to minimize the intake and mortality of all forms of marine life at new or expanded desalination facilities.<sup>2</sup>
- A narrative receiving water limitation for salinity applicable to all desalination facilities to ensure that brine discharges to ocean waters do not cause adverse effects to aquatic life beneficial uses.
- Procedures for applying for regional water board approval of an alternative intake screening technologies, brine disposal methods, or receiving water limitation for salinity.
- Monitoring and reporting requirements that include effluent monitoring, as well as monitoring of the water column bottom sediments and benthic community health to ensure that the effluent plume is not harming aquatic life beyond the brine mixing zone (BMZ)<sup>3</sup>.
- Requirements that waste management systems that discharge into the ocean be designed and operated in a manner which provides sufficient initial dilution to minimize the concentrations of substances not removed in treatment so as to maintain indigenous marine life and a healthy and diverse marine community.
- Requirements that waste discharged to the ocean be essentially free of substances that will accumulate to toxic levels in marine waters, sediments, or biota.

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<sup>2</sup> California Water Code Section 13142.5(b) was adopted as part of the California Coastal Act of 1976, requires that any "new or expanded coastal power plant or other industrial installation using seawater for cooling, heating or industrial processing" must use "the best available site, design, technology and mitigation measures feasible . . . to minimize the intake and mortality of all forms of marine life." This determination is to be made by RWQCBs, and is known as a "Water Code Section 13142.5(b) determination."

<sup>3</sup> As discussed in more detail below, the Brine Mixing Zone (BMZ) is defined as "the area where salinity may exceed 2.0 parts per thousand above natural background salinity or the concentration of salinity approved as part of an alternative receiving water limitation. The standard brine mixing zone shall not exceed 100 meters (328 feet) laterally from the points of discharge and throughout the water column."

- Waste effluents must be discharged in a manner that provides sufficient initial dilution to minimize the concentrations of substances not removed in treatment.

The California Ocean Plan requires new or expanded seawater desalination plants to use the best available site, design, technology, and mitigation measures feasible to minimize intake and mortality of all forms of marine life. Based on the best available science, the California Ocean Plan identifies preferred technologies; however, alternative intake and disposal methods can be used if demonstrated to be as protective of marine life as the preferred technologies. Additionally, mitigation measures are required to address harmful impacts on marine life that occur after a desalination facility uses the best available site, design, and technology feasible. Feasibility considerations regarding site, design, technology, and mitigation measures consider economic, environmental, social, and technological factors.

The SWRCB defines subsurface intakes as the preferred technology for desalination facility water intake design. However, surface water intakes are allowed where subsurface intakes are found infeasible (SWRCB 2015). Concerning brine discharge from a desalination plant, the California Ocean Plan requires an owner or operator to first evaluate the availability and feasibility of diluting brine by commingling it with wastewater. If wastewater is unavailable, then multiport diffusers are considered to be the preferred method for discharging brine (SWRCB 2015). Multiport diffusers are installed as an end-of-pipe system on submerged marine outfalls, allowing effluent to be discharged through various ports or openings. Pressure is increased through the ports at the discharge and allows for the brine to rapidly mix and disperse brine in receiving water bodies, facilitating rapid dilution and a reduction of salinity. The use of multiport diffusers requires a relatively limited area to enable rapid turbulent mixing that disperses and dilutes brine.

The use of subsurface intakes was investigated for feasibility as part of Project design. Subsurface intakes were assessed as part of the West Basin Ocean Water Desalination Program Master Plan (Arcadis 2013) for the El Segundo Generating Station (ESGS) and Redondo Beach sites, but found to be infeasible for the proposed Project. In-depth technical and geological analyses and groundwater modeling for the ESGS site were also conducted as part of the Subsurface Intake Feasibility Study presented in **Appendix 2A, Feasibility Assessment of Subsurface Seawater Intakes**.

### **California Ocean Plan Salinity Requirements**

The California Ocean Plan Amendment includes new requirements to address brine discharges from desalination facilities along the California coast. The most relevant of these to the proposed Project is contained in Section III.M.3, “Receiving Water Limitation for Salinity.” The receiving water limitation for salinity requires that discharges not exceed a daily maximum of 2 parts per thousand (ppt) above natural background salinity measured no further than 100 meters (328 feet) horizontally from each discharge point, representing the BMZ. The value of 2 ppt represents the maximum incremental increase above natural background salinity allowed at the edge of the BMZ. The California Ocean Plan specifies a methodology for assessing brine discharges to determine that such discharges meet the receiving water limitation. The methodology involves calculating the minimum dilution of the proposed discharges using applicable water quality models that have been approved by the RWQCBs in consultation with SWRCB staff. The

minimum dilution is then applied to a specified formula to determine the incremental increase in salinity above natural background salinity (a detailed discussion of the methodology for determining compliance with the California Ocean Plan salinity requirement and the application of this method to the assessment of the proposed Project is presented in Section 5.9.4, *Impacts and Mitigation Measures*).

### **California Ocean Plan Monitoring Requirements**

The California Ocean Plan Amendment requires that desalination facilities implement a Monitoring and Reporting Program that has been reviewed and approved by the RWQCB prior to construction (Section III.M.4, Monitoring and Reporting Program; SWRCB 2015). The Monitoring and Reporting Program must include provisions for facility-specific monitoring of effluent and receiving water characteristics to demonstrate compliance with the receiving water limitation for salinity (described above), and to evaluate the potential effects of the discharge within the water column, in bottom sediments, and on benthic communities and other forms of marine life. Specifically, operators must evaluate the potential effects of the discharge on benthic community health, aquatic life toxicity, hypoxia, and receiving water characteristics. Further, the Monitoring and Reporting Program must be consistent with monitoring procedures detailed in Appendix III of the California Ocean Plan, which specifies methodological design and provides details for determining compliance with the receiving water limitation in Chapter III.M.3. For example, the California Ocean Plan Amendment requires that receiving water monitoring for salinity compliance be conducted at times when the monitoring locations detailed in the Monitoring and Reporting Program are most likely affected by the discharge (i.e., worst-case scenario). Additionally, the owner or operator is required to conduct biological surveys to establish baseline biological conditions at the discharge location as well as at a reference location outside the influence of the discharge prior to commencement of construction and then to evaluate differences between biological communities at the reference site and at the discharge location (e.g., Before-After Control-Impact studies) after discharges commence. The pertinent RWQCB uses the data and results from the surveys and any other applicable monitoring data for evaluating and renewing the requirements set forth in a facility's NPDES permit. Such monitoring is required to continue until the RWQCB determines that a regional monitoring program is adequate to ensure compliance with the receiving water limitation. The Monitoring and Reporting Program would require review and approval by the RWQCB prior to implementation of the Project, and would be revised if necessary, as part of the NPDES permit process.

### **NPDES Waste Discharge Program**

The federal CWA established the NPDES program to protect the water quality of receiving waters of the United States. Under CWA Section 402, discharging pollutants to receiving waters of the United States is prohibited unless the discharge is in compliance with an NPDES permit. In California, administration of the NPDES program has been delegated by USEPA to the SWRCB. The SWRCB administers water rights, water pollution control, and water quality functions throughout the state, while the RWQCBs conduct planning, permitting, and enforcement activities. Through the nine RWQCBs, point source dischargers are required to obtain NPDES permits (or, in California under authority of Porter-Cologne, Waste Discharge Requirements). Point sources include municipal and industrial wastewater facilities and stormwater discharges.

Effluent limitations serve as the primary mechanism in NPDES permits for controlling discharges of pollutants to receiving waters. When developing effluent limitations for an NPDES permit, a permit applicant must consider limits based on both the technology available to control the pollutants (i.e., technology-based effluent limits) and limits that are protective of the water quality standards of the receiving water (i.e., water quality-based effluent limits<sup>4</sup> if technology-based limits are not sufficient to protect the water body). For inland surface waters and enclosed bays and estuaries, the water-quality-based effluent limitations are based on criteria in the National Toxics Rule and the California Toxics Rule, and objectives and beneficial uses defined in the applicable Basin Plan. For ocean discharges, such as desalination brine under the proposed Project, the California Ocean Plan contains beneficial uses, water quality objectives, and effluent limitations (described in detail above). There are two types of NPDES permits: individual permits tailored to an individual facility and general permits that cover multiple facilities or activities within a specific category. The NPDES permits relevant to construction and operation of the proposed Project are described below.

Prior to issuance of any NPDES permits for construction activities or operational discharges, or issuance of licenses, a review and authorization process by the LARWQCB is required to ensure such permits and licenses are protective of designated beneficial uses and water quality and that TMDL requirements are incorporated as permit conditions in a manner consistent with relevant plans, policies, and guidelines.

### **NPDES Construction General Permit**

The State of California adopted a Construction General Permit on September 2, 2009 (Order No. 2009-0009-DWQ as amended by 2010-0014-DWQ and 2012-0006-DWQ) (General Construction NPDES Permit, or CGP). The General Construction NPDES Permit regulates construction site stormwater management. Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the general permit for discharges of stormwater associated with construction activity. The proposed Project would be required to comply with the permit requirements to control stormwater discharges from the construction sites. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation, as well as construction of buildings and linear underground projects, including installation of water pipelines and other utility lines.

In the Project Area, the Construction General Permit is implemented and enforced by the LARWQCB, which administers the stormwater permitting program. To obtain coverage under this permit, project operators must electronically file Permit Registration Documents, which include a Notice of Intent, a Stormwater Pollution Prevention Plan (SWPPP), and other compliance-related documents. An appropriate permit fee must also be mailed to SWRCB. The SWPPP identifies best management practices (BMPs) that must be implemented to reduce construction effects on receiving water quality based on potential pollutants. The BMPs identified are directed at implementing both sediment and erosion control measures as well as other measures to control potential chemical contaminants. Examples of typical construction BMPs

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<sup>4</sup> Water quality-based effluent limits specify the level of pollutant (or pollutant parameter), generally expressed as a concentration, that is allowable.

include scheduling or limiting certain activities to dry periods, installing sediment barriers such as silt fence and fiber rolls, and maintaining equipment and vehicles used for construction. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, and vehicle and equipment washing and fueling. The SWPPP also includes descriptions of the BMPs to reduce pollutants in stormwater discharges after all construction phases have been completed at the site (post-construction BMPs).

The Construction General permit includes several new requirements (as compared to the previous Construction General Permit, 99-08-DWQ), including risk-level assessment<sup>5</sup> for construction sites, an active stormwater effluent monitoring and reporting program during construction (for Risk Level II and III sites), rain event action plans for certain higher risk sites,<sup>6</sup> and numeric effluent limitations for pH and turbidity as well as requirements for qualified professionals that prepare and implement the plan. The risk assessment and SWPPP must be prepared by a State-qualified SWPPP Developer and implementation of the SWPPP must be overseen by a State-qualified SWPPP Practitioner. Project construction activities would be consistent with the Construction General Permit; compliance is required by law and the provisions of the permit and BMPs for construction and post-construction phases have proven effective in protecting water quality at construction sites and downgradient receiving waters.

### **LARWQCB Groundwater Dewatering General Permit**

The LARWQCB General NPDES Permit No. CAG994004 (R4-2003-0111) covers discharges of treated and untreated groundwater generated from permanent or temporary dewatering operations, including groundwater generated from construction dewatering activity. In addition, this permit covers discharge from cleanup of contaminated sites where other project-specific General Permits may not be appropriate, such as groundwater impacted by metals and/or other toxic compounds. This permit regulates the discharge of groundwater that may or may not be impacted by toxic compounds and/or conventional pollutants and ensures the pollutant concentrations in the discharge will not violate any water quality objectives for receiving waters, including discharge prohibitions. Required groundwater samples taken prior to discharging operations determine whether the water must be treated prior to being discharged. Various biological, chemical, physical, and thermal treatment systems may be employed to remove these toxic or conventional pollutants in groundwater to applicable permit limits.

Dischargers must submit a Report of Waste Discharge prior to permit authorization, including a feasibility study on reuse/alternative disposal methods and a description of treatment, collection, and discharge system. An ongoing monitoring and reporting program is also required under this permit. When treatment is required prior to discharge, dischargers are required to submit schematics of treatment flow diagrams with descriptions of the treatment system, including

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<sup>5</sup> The Construction General Permit defines three levels of risk (Risk Levels I, II, and III) that may be assessed for a construction site. Risk is calculated based on the “project sediment risk,” which determines the relative amount of sediment that can be discharged given the project and location details, and the “receiving water risk” (the risk sediment discharges pose to the receiving waters).

<sup>6</sup> Those sites that have a high potential for mobilizing sediment in stormwater and drain to a sediment-sensitive water body.



statements on the effectiveness of the system to achieve the applicable permit limits during the permit process.

### **Los Angeles County Municipal Separate Storm Sewer System Permit**

The Municipal Stormwater Permitting Program regulates stormwater discharges from municipal separate storm sewer (drain) systems (MS4s). Stormwater runoff and authorized non-storm flows (conditionally exempt discharges) are regulated under NPDES stormwater permits. Phase I NPDES permits require medium and large cities, or certain counties with populations of 100,000 or more, to obtain NPDES permit coverage for their stormwater discharges. Phase II permits require regulated small MS4s in urbanized areas, as well as small MS4s outside the urbanized areas that are designated by the permitting authority, to obtain NPDES permit coverage for their stormwater discharges. The MS4 permits require the discharger to develop and implement a Stormwater Management Plan/Program with the goal of reducing the discharge of pollutants to the maximum extent practicable, the performance standard specified in CWA Section 402(p), typically through the application of BMPs. The management programs specify what BMPs will be used to address certain program areas. The program areas include public education and outreach; illicit discharge detection and elimination; construction and post-construction; and good housekeeping for municipal operations.

The current Los Angeles County MS4 Permit (Order No. R4-2012-0175) became effective on December 28, 2012. Stormwater runoff and authorized non-storm flows (conditionally exempt discharges) from unincorporated areas of Los Angeles County under County jurisdiction, and 84 cities within the Los Angeles County Flood Control District (the Permittees), including the City of El Segundo, are regulated under the MS4 NPDES permit. The MS4 permit contains minimum standards that the Permittees must enforce when construction activities disturb an area greater than 1 acre, such as the Project would (see also requirements for the statewide construction permit discussed above, which is a permit that the construction contractor must apply for and adhere to). Compliance with MS4 construction requirements includes implementation of worksite BMPs similar to those described for the Construction General Permit for erosion, sediment, non-stormwater management, and waste management.

During operation of the Project, non-stormwater discharges from facility sites would be prohibited (with some conditional exceptions). Stormwater discharges must meet water-quality-based effluent limitations, or water quality standards for discharges leaving the site, and must not cause or contribute to the exceedance of receiving water limitations (water quality standards for receiving waters). The MS4 permit requires implementation of a Planning and Land Development Program for all “New Development” and “Redevelopment” projects subject to the Order to accomplish the following objectives:

- Lessen the water quality impacts of development by using smart growth practices such as compact development, directing development toward existing communities via infill or redevelopment, and safeguarding of environmentally sensitive areas.
- Minimize the adverse impacts from stormwater runoff on the biological integrity of Natural Drainage Systems and the beneficial uses of water bodies in accordance with requirements under the California Environmental Quality Act (CEQA).

- Minimize the percentage of impervious surfaces on land developments by minimizing soil compaction during construction, designing projects to minimize the impervious area footprint, and employing low-impact development (LID) design principles to mimic predevelopment water balance hydrology through infiltration, evapotranspiration, and rainfall harvest and use.
- Maintain existing riparian buffers and enhance riparian buffers when possible.
- Minimize pollutant loadings from impervious surfaces such as rooftops, parking lots, and roadways through the use of properly designed, technically appropriate BMPs (including Source Control BMPs such as good housekeeping practices), LID Strategies, and Treatment Control BMPs.
- Properly select, design, and maintain LID and Hydromodification Control BMPs to address pollutants that are likely to be generated, reduce changes to predevelopment hydrology, ensure long-term function, and avoid the breeding of vectors.
- Prioritize the selection of BMPs to remove stormwater pollutants, reduce stormwater runoff volume, and beneficially use stormwater to support an integrated approach to protecting water quality and managing water resources.

The MS4 permit order specifies the criteria or thresholds for determining projects that are classified as “New Development” and “Redevelopment Projects” subject to the requirements above. Redevelopment projects subject to approval for the design and implementation of post-construction controls to mitigate stormwater pollution, before completion of a project, include the following:

- Land-disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area on an already developed site.
- Where redevelopment results in an alteration to more than 50 percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, the entire project must be mitigated.
- Where redevelopment results in an alteration of less than 50 percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction stormwater quality control requirements, only the alteration must be mitigated, and not the entire development.

The Municipal NPDES permit provisions require that proposed projects include a Standard Urban Stormwater Mitigation Plan (SUSMP), or functional equivalent document, to address potential water quality impacts on-site using LID, and that the potential impact on downstream water bodies (i.e., hydromodification) is evaluated. BMPs are required in all drainage areas to be developed. Additionally, the NPDES permit requires owners or operators to implement BMPs to retain the 0.75-inch, 24-hour rain event, or the 85th percentile, 24-hour storm event, whichever is greater, and achieve applicable water quality-based effluent limitations and/or receiving water limitations established pursuant to TMDLs. The discharger would be required to prepare a Monitoring and Reporting Program documenting outfall-based stormwater monitoring data (where stormwater exits the facility), wet and dry weather receiving water monitoring data, outfall-based non-stormwater monitoring data, and other relevant regional studies. The frequency of required monitoring and sampling activities is determined by a number of factors, including the types of receiving water body. In case of exceedance, the discharger would be required to

submit an Integrated Monitoring and Compliance Report. This report would be used to determine additional measures to prevent or reduce pollutants contributing to the exceedance of receiving water limitations.

The proposed Project would be required to comply with the MS4 permit as administered by the City of El Segundo (see below), in addition to statewide water quality program administered by the RWQCB including the Porter-Cologne Water Quality Control Act and the California Ocean Plan, as described above. As such, discharges of the Project covered under the MS4 permit requirements would be required to adhere with the Waste Load Allocations assigned to MS4 discharges for applicable TMDLs, including the TMDLs in the Dominguez Channel and Los Angeles/Long Beach Harbors Watershed Management Area.

### **Statewide NPDES General Permit for Drinking Water System Discharges**

The SWRCB is responsible for issuance of NPDES permits for discharges from drinking water systems to surface waters in California (Order No. WQ 2014-0194, NPDES No. CAG140001) (RWQCB 2014). Drinking water systems with 1,000 connections or greater that are regulated by the SWRCB Division of Drinking Water or a local county department of public health, with the primary purpose of transmitting, treating, or distributing safe drinking water, are subject to the permit requirements. The Order provides regulatory coverage for short-term or seasonal planned and emergency (unplanned) discharges resulting from a water purveyor's essential operations and maintenance activities undertaken to comply with the federal Safe Drinking Water Act, the California Health and Safety Code, and the SWRCB's Division of Drinking Water permitting requirements for providing reliable delivery of safe drinking water. Such discharges include, but are not limited to, discharges from supply wells, transmission systems, water treatment facilities, water distribution systems, and storage facilities.

Planned discharges include regularly scheduled, automated, or non-regularly scheduled activities that must take place to comply with regulations and that the water purveyor knows in advance will result in a discharge to surface water. Emergency discharges include unplanned discharges that occur due to facility leaks, system failures, operational errors, or catastrophic events for which the water purveyor is not aware of the discharge until after the discharge has commenced. Planned and emergency discharges may occur directly, through a constructed storm drain or through another conveyance system, to waters of the United States. Discharges of a pollutant from a drinking water system, regardless of the size of the system, are required to be regulated by an NPDES permit if the discharges flow into a water of the United States.

Discharges authorized under the permit are determined to not adversely affect or impact beneficial uses of the receiving waters when properly managed through BMPs. Any discharges that are likely to cause or contribute to an exceedance of a water quality objective, other than those granted an exception under the SWRCB Resolution 2014-0067, are not authorized under the permit. Requirements of this general permit implement the California Ocean Plan water quality objectives and TMDL requirements and are applicable to discharges directly into the Ocean or indirectly via a stormwater system that drains into the Ocean. All discharges regulated under this permit must implement BMPs for the treatment or control of pollutants from pipeline disinfection discharges to protect beneficial uses of the receiving waters.

### ***Waiver of Waste Discharge Requirements***

California Water Code Section 13269 authorizes the RWQCB to waive Waste Discharge Requirements for specific discharges or specific types of discharges where such a waiver is consistent with any applicable state or regional water quality control plan and is in the public interest. Waivers may be granted for discharges to land and may not be granted for discharges to surface waters or conveyances thereto that are subject to the federal CWA requirements for NPDES permits.

### ***Thermal Plan***

The Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (or Thermal Plan) adopted by the SWRCB in 1995 establishes temperature requirements for existing and new discharges in California coastal waters, interstate waters, enclosed bays, and estuaries. Water quality objectives for existing discharges into coastal waters require that wastes with elevated temperature comply with limitations necessary to assure protection of designated beneficial uses. The Thermal Plan defines new discharges as “discharges that are not presently taking place” and elevated-temperature wastes as “liquid, solid, or gaseous material including thermal waste<sup>7</sup> discharged at a temperature higher than the natural temperature of receiving water”. The Thermal Plan establishes the following standards for all new discharges (SWRCB 1995):

- The maximum temperature of thermal waste discharges shall not exceed the natural temperature of receiving waters by more than 20°F.
- The discharge of elevated temperature wastes shall not result in increases in the natural water temperature exceeding 4°F at the shoreline, the surface of any ocean substrate, or the ocean surface beyond 1,000 feet from the discharge system. The surface temperature limitation shall be maintained at least 50 percent of the duration of any complete tidal cycle.

### ***Anti-Degradation Policy***

The SWRCB Anti-Degradation Policy, formally known as the Statement of Policy with Respect to Maintaining High Quality Water in California (SWRCB Resolution No. 68-16), restricts degradation of surface and ground waters. Specifically, this policy protects water bodies where existing quality is higher than necessary for the protection of beneficial uses and requires that existing high quality be maintained to the maximum extent possible.

Under the Anti-Degradation Policy, any actions that can adversely affect water quality in all surface and ground waters must: (1) be consistent with maximum benefit to the people of California; (2) not unreasonably affect present and anticipated beneficial use of the water; and (3) not result in water quality less than that prescribed in water quality plans and policies. Furthermore, any actions that can adversely affect surface waters are also subject to the federal Anti-Degradation Policy (40 CFR Section 131.12) developed under the CWA. Discharges from the proposed Project that could affect surface water quality would be required to comply with the

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<sup>7</sup> Cooling water and industrial process water used for the purpose of transporting waste heat.

Anti-Degradation Policy, which is included as part of the NPDES permit requirements for point discharges (discussed above).

### ***Nonpoint Source Pollution Control Program***

Nonpoint source pollution does not originate from regulated point sources and comes from many diffuse sources. Nonpoint source pollution occurs when rainfall flows off the land, roads, buildings, and other features of the landscape. This diffuse runoff carries pollutants into drainage ditches, lakes, rivers, wetlands, bays, and aquifers. The Nonpoint Source Pollution Control Program (NPS Program) aims to minimize nonpoint source pollution from land use activities in agriculture, urban development, forestry, recreational boating and marinas, hydromodification and wetlands as these activities are the leading cause of water pollution in California waters. The NPS Program Plan addresses California's nonpoint source pollution by assessing the state's nonpoint pollution problems/causes and implementing management programs. The NPS Program goal is to achieve water quality goals and maintain beneficial uses.

The federal CWA requires states to develop a program to protect the quality of water resources from the adverse effects of nonpoint water pollution. CZARA requires California and other states to ensure that management practices which reduce or prevent polluted runoff are implemented. The Porter-Cologne Act designates the SWRCB and RWQCBs as the state agencies with primary responsibility for water quality control in California and obligates them to address all discharges of waste that could affect the quality of the waters of the state, including potential nonpoint sources of pollution. In accordance with Section 319 of the CWA and Section 6217 of the CZARA (described above), SWRCB and the CCC jointly submitted the Plan for the NPS Program to USEPA and the National Oceanic and Atmospheric Administration (NOAA) on February 4, 2000. The NPS Program provides a single, unified, coordinated statewide approach to address nonpoint source pollution. The SWRCB and CCC are the lead agencies for implementing California's NPS Program, in partnership with the nine RWQCBs. A total of 28 state agencies are working collaboratively through the Interagency Coordinating Committee to implement the NPS Program.

The Coastal Nonpoint Pollution Control Program, established in 1990 by the Coastal Zone Act Reauthorization Amendments, is jointly administered by the NOAA and USEPA. The program's goal is to reduce nonpoint polluted runoff to coastal waters. California's Critical Coastal Areas (CCAs) Program is a non-regulatory planning tool to foster collaboration among local stakeholders and government agencies, to better coordinate resources and focus efforts on coastal-zone watershed areas in critical need of protection from polluted runoff. A coastal area is designated as a CCA if it: has a 1998 303(d)-listed impaired coastal waterbody that flows into a Marine Managed Areas; flows into a Wildlife Refuge or Waterfront Park/Beach; flows into an Area of Special Biological Significance;<sup>8</sup> or was on the original 1995 CCA list, which is composed of watersheds that flow into a 1994 303(d)-listed impaired bay or estuary. Relevant to the Project area is the Ballona Creek CCA (CCC 2017).

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<sup>8</sup> There are 34 ASBS ocean areas along the California coast monitored and maintained for water quality under the regulatory authority of the SWRCB.

In obligating the SWRCB and RWQCBs to address all discharges of waste that can affect water quality, including nonpoint sources, the legislature provided the SWRCB and RWQCBs with administrative permitting authority in the form of administrative tools (i.e., Waste Discharge Requirements, waivers of Waste Discharge Requirements, and Basin Plan prohibitions) to address ongoing and proposed waste discharges. Hence, all current and proposed nonpoint discharges must be regulated under Waste Discharge Requirements, waivers of Waste Discharge Requirements, or a basin plan prohibition, or some combination of these administrative tools.

### **California Coastal Act**

The California Coastal Act (Public Resources Code [PRC]) Section 30000 et seq.) provides for the long-term management of lands within California's coastal zone boundary. The coastal zone is an area in which the CCC plans and regulates the use of land and water. On land the coastal zone varies in width from several hundred feet in highly urbanized areas up to 5 miles in certain rural areas, and offshore the coastal zone includes a 3-mile-wide band of ocean. Implementation of Coastal Act policies is accomplished primarily through the preparation of local coastal programs (LCPs) that are required to be completed by each of the coastal zone counties and cities. Development within the coastal zone may not commence until a Coastal Development Permit (CDP) has been issued by either the CCC or the local government that has a CCC-certified LCP. Development activities are broadly defined by the Coastal Act to include (among others) construction of buildings, divisions of land, and activities that change the intensity of use of land or public access to coastal waters.

Project components on the ESGS site are located within the coastal zone; development of these components would require a CDP. The City of El Segundo has a certified and adopted LCP and therefore has jurisdiction to issue a CDP (see *City of El Segundo Local Coastal Program* under Section 5.9.1). Additionally, because the CCC retains CDP jurisdiction over development proposed on the immediate shoreline, tidelands, submerged lands, and public trust lands (Coastal Act Section 30601), construction of the proposed screened ocean intake and concentrate discharge facilities would require a CDP from the CCC.

The Coastal Act includes specific policies for management of natural resources and public access within the coastal zone. Of primary relevance to surface water hydrology and water quality are Coastal Act policies concerning protection of the biological productivity and quality of coastal waters. For example, Article 4 of the Act details policies specific to the marine environment, such as biological productivity and water quality. Specifically, the Act requires the quality of coastal waters, streams, wetlands, estuaries appropriate to maintain optimum populations of marine organisms and for the protection of human health to be maintained and, where feasible, restored through (among other means) minimizing adverse effects of wastewater discharges, controlling runoff, and substantial interference with surface water flow, encouraging wastewater reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams (PRC Section 30231).

The CCC applies the Coastal Act's water quality policies when reviewing applications for CDPs in state waters. The CCC also applies the water quality policies when reviewing federally licensed and permitted activities to ensure they are consistent with the state's coastal management

program in accordance with the CZMA federal consistency provision (discussed in Section 5.9.1).

### **California State Lands Commission**

The California State Lands Commission (SLC) provides stewardship of California's public trust lands, waterways, and resources through economic development, protection, preservation, and restoration. The SLC is tasked with public land management and resource protection to ensure the future quality of the environment and balanced use of the lands and resources entrusted to its care. The state's public trust lands include tidelands, navigable waterways, and submerged coastal lands extending to a distance of three nautical miles, as well as the waters and underlying beds of more than 120 rivers, lakes, streams, and sloughs.

The California SLC regulates the use of tidelands and submerged lands under its jurisdiction to ensure that proposed uses of these lands are consistent with the Public Trust Doctrine principle that certain resources are preserved for public use. Generally, the SLC has jurisdiction over land below mean high tide. Public and private entities may apply to the SLC for land leases or permits on state lands for many purposes including dredging among others. The narrow beach west of the ESGS is publicly owned by the SLC and is maintained by the County of Los Angeles (*City of El Segundo General Plan 1992*).

### **California Coastal Commission Sea-Level Rise Policy Guidance**

The CCC has developed Sea-Level Rise Policy Guidance intended to help local governments, permit applicants, and other interested parties address the challenges presented by sea-level rise in California's coastal zone. The CCC's adopted 2015 Sea-Level Rise Policy Guidance (CCC 2015) outlines the types of information, analysis, and design considerations that the agency's staff requires to determine whether shoreline projects conform to the above-listed Coastal Act policies. Specifically, the Sea-Level Rise Policy Guidance provides step-by-step guidance on how to address sea-level rise in new and updated Local Coastal Programs (LCPs) and Coastal Development Permits (CDPs) according to the policies of the California Coastal Act. LCPs and the CDP processes are the fundamental land use planning and regulatory governing mechanisms in the coastal zone. While it is advisory, the data requirements, resource considerations, projections for sea-level rise, alternatives analyses, and monitoring requirements outlined in detail in the CCC's Sea-Level Rise Policy Guidance represent information the District would likely be required to produce as part of the CCC's evaluation of Project conformity with Sections 30235 and 30253 for shoreline development. Specifically, to comply with Coastal Act Section 30253, the Sea-Level Rise Policy Guidance outlines that projects will need to be planned, located, designed, and engineered for the changing water levels and associated impacts that might occur over the life of the development. In addition, project planning should anticipate the migration and natural adaptation of coastal resources (beaches, access, etc.) due to future sea-level rise conditions in order to avoid future impacts to those resources from the new development.

## **Regional and Local Plans and Policies**

State agencies acting in their sovereign capacity are not subject to local regulations unless the California Constitution says they are or the Legislature has consented to such regulations.

However, local regulations are described here because some may apply to a state agency or because local plans and policies help inform the analysis of impacts and consistency of the Project with regulatory requirements related to hydrology and water quality.

### ***West Basin Municipal Water District 2015 Urban Water Management Plan (Adopted June 27, 2016)***

In compliance with legislative requirements, West Basin prepared the West Basin Municipal Water District 2015 Urban Water Management Plan (2015 UWMP). The 2015 UWMP details how West Basin manages their water supplies and demands under all hydrologic conditions. The 2015 UWMP also provides a framework for how West Basin proposes to meet their service area's retail demands over the next 25 years and provide long-term water reliability. According to West Basin 2015 UWMP Table 3-5 (Wholesale: Demands for Potable and Raw Water-Projected (AF)), the total water demands of the West Basin service area are anticipated to remain relatively stable through Year 2040. With implementation of the Local Project, West Basin anticipates that the risks of shortages can be minimized. West Basin's UWMP concludes that, with the added local supply using ocean water desalination, West Basin does not anticipate any shortages and will be able to provide reliable water supplies under both single dry year and multiple dry year conditions. Refer to Section 2.3, *Need for the Project*, for an expanded discussion pertaining to the 2015 UWMP.

### ***City of El Segundo Municipal Code***

Pursuant to the El Segundo Municipal Code (ESMC) Section 5-4-9, Construction Activity Stormwater Measures, each person applying to the City for a Grading or Building Permit<sup>9</sup> for projects for which compliance with regulations governing general construction activity stormwater permits (GCASPs) must submit satisfactory proof to the City that: (1) a Notice of Intent to comply with the GCASP was filed, and (2) an SWPPP was prepared, before the City can issue any grading or building permit on the construction project. A copy of the Notice of Intent and SWPPP must be maintained on-site during grading and construction and be made available for inspection, review, and copying upon the request of any city inspector. Further, it is unlawful for any person who, or entity that, is required under federal or state law to comply with the requirements for a GCASP for construction activity in the city to conduct, authorize, or permit construction activities in the city at any facility that discharges to the city's MS4 system without complying with all applicable requirements for a GCASP. See above for a discussion of state construction activity stormwater permits.

### ***City of El Segundo Multi-Hazard Mitigation Plan***

The City of El Segundo Multi-Hazard Mitigation Plan includes resources and information to assist city residents, public and private sector organizations, and others interested in participating in planning for natural, man-made, and technological hazards. The Mitigation Plan provides a list of activities that may assist the city in reducing risk and preventing loss from future hazard

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<sup>9</sup> Note that California Government Code Section 53091(d) and (e) provide that building and zoning ordinances of a county or city "shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water . . ." However, the construction and operation of the Ocean Water Desalination Project would strive to comply with all appropriate building and zoning ordinances, as well as policies set forth in the City of El Segundo General Plan.



events. The action items address multi-hazard issues, as well as activities for earthquake, flood, windstorm, tsunami, and technological and human-caused hazards. The city's risk to flooding and tsunami are among the hazards addressed in the Mitigation Plan that are relevant to the Project.

## 5.9.2 Environmental Setting

### Study Area

To characterize baseline conditions and analyze potential impacts associated with the terrestrial components of the proposed Project and Alternatives, the onshore study area consists of the physical footprint of all Project components (Figure 3-5). Also considered are proposed temporary staging and use areas associated with short term construction activities (Figure 3-21). Consideration is given to surface waters adjacent to or crossed by proposed Project features (such as pipelines) or those immediately down gradient that would be potentially affected by runoff or drainage. Specific to the offshore marine environment, the marine study area relevant to construction and operation of the Project comprises a 2-mile by 1.5-mile area of marine waters and seafloor extending 1.5 miles offshore and 1 mile up-coast and down-coast of the proposed desalination discharge and seawater intake facilities (**Figure 5.9-1**). For groundwater, the study area consists of the Coastal Subbasin of the West Coast Basin.

### Regional Environmental Setting

The Project is located along the coastal plains within Los Angeles County, which is within the South Coast Hydrologic Region (DWR 2013). The coastline between Point Conception and the Mexican border is generally oriented from northwest to southeast. Over time, the continental margin has been slowly emerging, causing a predominantly shear coastline broken by plains around the cities of Oxnard-Ventura, Los Angeles, and San Diego. The SWRCB divides surface watersheds in California into management areas based on political and physiographic boundaries. The proposed Project is located within the Santa Monica Bay-San Pedro Bay subarea of the Los Angeles-San Gabriel hydrologic unit (LARWQCB 1994). Water quality in the Project Area is regulated by the LARWQCB.

The coastal plains within this region have a Mediterranean climate with mild rainy winters and warm dry summers, while the inland slopes and basins have more extreme temperatures and less precipitation. These variations of climate within the region can be attributed to variable topography. Prevailing winds from the west and northwest carry moist air from the Pacific Ocean over 35 miles inland until it is forced upward by the San Gabriel Mountains, which are located north of the Project Area. The resulting rainfall occurs mostly between November and March, followed by dry summer months. Average annual precipitation along the coast is estimated at 37.6 centimeters (cm) (14.8 inches), approximately 90 percent of which falls between the late fall and early spring (MBC 2017a). The majority of the coastal region drains via short streams, which support flows during precipitation events; however, only a limited portion of stormwater runoff actually reaches the ocean directly. More than 95 percent of the annual runoff volume to the Santa Monica Bay is discharged during major rainstorms, mostly between October and April (Rogowski et al. 2014). The majority of runoff is impounded by dams or diverted for other uses.

## Surface Water Hydrology

The Project onshore study area overlaps with two major watersheds or hydrologic units of the South Coast Hydrologic Region Los Angeles Planning Area: The Santa Monica Bay Watershed and the Dominguez Channel Watershed (DWR 2009) (**Figure 5.9-2**). The Project marine study area also extends into Santa Monica Bay (Figure 5.9-1). The hydrology, drainage, and characteristics of the watersheds and Santa Monica Bay are described below.

### ***The Santa Monica Bay Watershed***

The Santa Monica Bay Watershed as shown on Figure 5.9-2 contains 55 miles of coastline and beaches and encompasses an area of 414 square miles (LARWQCB 2017). The topography of the Santa Monica Bay Watershed consists of steep mountains, coastal sand dunes, and several broad, gently sloping alluvial valleys. Its borders reach from the crest of the Santa Monica Mountains on the north and from the Ventura-Los Angeles County line to downtown Los Angeles. From there it extends south and west across the Los Angeles plain to include the area east of Ballona Creek and north of the Baldwin Hills. South of Ballona Creek in the vicinity of the proposed Project, the natural drainage area is a narrow strip between Playa del Rey and Palos Verdes.

The Santa Monica Bay Watershed is diverse and much of the terrain in the northern portion is rugged open space and contains many canyons that carry runoff directly to Santa Monica Bay. The mid- and southern portions of the Santa Monica Bay Watershed, relevant to the Project onshore study area, are highly urbanized and contain portions of Los Angeles, Santa Monica, El Segundo, Manhattan Beach, Redondo Beach, the Palos Verdes Estates, and Rancho Palos Verdes. This highly developed area is characterized by a network of storm drains carrying flows to the Santa Monica Bay. The entire Santa Monica Bay Watershed has approximately 200 separate storm drain outlets that convey over 30 billion gallons of runoff to Santa Monica Bay each year (City of Los Angeles 2017).

### ***The Dominguez Channel Watershed***

The Dominguez Channel Watershed (Figure 5.9-2) has an area of 133 square miles. The Dominguez Channel extends from the Los Angeles International Airport to the Los Angeles Harbor and drains a large portion of the cities of Inglewood, Hawthorne, El Segundo, Gardena, Lawndale, Redondo Beach, Torrance, Carson and Los Angeles. Rather than being defined by the natural topography of its drainage area, the Dominguez Channel Watershed boundary is defined by a complex network of storm drains and smaller flood control channels that are within or pass through Inglewood (on the north), Compton (on the east), Torrance (on the west), and, on the south, the federal breakwaters of Los Angeles and Long Beach Harbors (LA/LB Harbors) (DWR 2009). The Dominguez Channel Watershed is also termed a “management area” that includes some land with storm drains that do not empty into Dominguez Channel, but is geographically connected with the land that does drain into the channel. This area includes the communities of San Pedro and Wilmington. There are five subwatersheds: two of these, relevant to the Project onshore study area (the Upper Dominguez Channel and the Lower Dominguez Channel), drain directly into the Dominguez Channel, which flows to the ocean in the LA/LB Harbors area. Most land in the watershed is developed (93 percent). Approximately 62 percent of stormwater runoff from these lands drains to the Dominguez Channel (LARWQCB 2010).

### **Onshore Study Area Drainage**

The proposed desalination facility would be sited at the existing 33-acre ESGS property on one of two proposed sites: one located at the northern portion of the ESGS site (North Site), and the other at the southern portion (South Site). Existing ground elevations at the ESGS site slope from east to west from 90 feet to 20 feet above mean sea level (amsl). The ESGS property currently has developed facilities for the collection, treatment, and discharge of stormwater runoff. All stormwater from the ESGS site is collected in yard drains that route stormwater to an oil/water separator prior to discharge into the Pacific Ocean via Outfall 002 (CEC 2015). A storm drain outlet is located at the ESGS's southwest corner and within the property line; a bio-swale area<sup>10</sup> is located on the South Site to retain and clean surface water. Existing city main storm drain systems serving the ESGS site have adequate capacity; no reports of flooding incidents or significant drainage concerns have recently been reported in the vicinity of the ESGS site.

The North Site is an approximate 8-acre area which was the previous site for ESGS Units 3 and 4 (decommissioned). The North Site is bounded on the east by Vista Del Mar, on the west by the Marvin Braude Coastal Bike Trail, on the north by newly commissioned Units 5, 6, 7, and 8, and on the south by the South Site (Figures 3-3 and 3-9). Units 3 and 4, which are now out of service, remain on the North Site.

The South Site is an approximate 13-acre area that is used for temporary storage and parking purposes. The South Site is bounded on the east by an existing cutter oil tank, on the west by the Marvin Braude Coastal Bike Trail, on the north by the northern edge of an elevated level pad that is at approximate elevation 41 feet amsl that was the site of the previous fuel-oil tanks, and on the south by 45<sup>th</sup> Street (Figure 3-10). From the elevated pad, a vegetated slope falls away to the west to the existing bike trail below. A landscaped berm is present along the South Site southern boundary, adjacent to 45<sup>th</sup> Street.

Stormwater runoff in the onshore study area primarily flows from inland areas toward the Pacific Ocean. The proposed pipeline conveyance facilities would extend from the ESGS site and would be constructed within the public right-of-way (ROW) along the identified alignments. Existing hydrologic and drainage conditions along the potential water conveyance system alignments vary within the affected communities. However, as the conveyance facility alignments are within existing road ROW, conditions are generally that of paved surfaces with existing public storm drain systems for collection and conveyance or pervious surfaces allowing for runoff to infiltrate into the ground surface. Runoff flows into an existing water collection system that is operated by the Los Angeles County Flood Control District and the cities of Los Angeles and El Segundo.

Stormwater in the city of El Segundo is collected and conveyed via the city's existing stormwater collection and drainage system. This system consists of catch basins, drainage basins, pumping stations, and force mains. The city maintains four pump stations, three fore bays, and numerous catch basins connected by approximately 12 miles of storm drain mains. Within El Segundo, stormwater runoff in the Project Area typically flows to one of the following separate drainage systems:

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<sup>10</sup> A bio-swale is a vegetated ditch that functions to collect, filter, and infiltrate stormwater.

- The area located west of Sepulveda Boulevard and north of El Segundo Boulevard, which discharges to Santa Monica Bay without treatment.
- The system located east of Sepulveda Boulevard, which is connected to the Dominguez Channel and discharges to San Pedro Bay.
- The Chevron Refinery located south of El Segundo Boulevard and west of Sepulveda Boulevard.

Stormwater from several isolated areas west of Sepulveda Boulevard drains via discharge to the city's sanitary sewer system and is then transported to the City of Los Angeles Hyperion Treatment Plant, for treatment and ultimate discharge into Santa Monica Bay. In addition, the Los Angeles County Public Works Department owns and maintains approximately 11 miles of storm drains, one large pump station (on Center Street), and one pump station (at Standard Street and El Segundo Boulevard) within the city of El Segundo's boundaries (City of El Segundo 2015).

### ***Santa Monica Bay***

Santa Monica Bay is a bight<sup>11</sup> of the Pacific Ocean west of Los Angeles. The bay extends from Point Dume in the north to the tip of the Palos Verdes Peninsula in the south. Santa Monica Bay extends seaward approximately 11 miles. The onshore portion of the coast bordering Santa Monica Bay varies significantly in its topography, with a mountainous northern area, a central region dominated by flat, sandy beaches, and the rocky cliffs of the Palos Verdes Peninsula to the south. Santa Monica Bay is bordered (north to south) by the cities of Malibu, Santa Monica, Venice, Marina del Rey, Playa del Rey, El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, Torrance, Palos Verdes Estates, and Rancho Palos Verdes.

Freshwater inflow to the Santa Monica Bay comes from municipal and industrial wastewater discharges, surface runoff, creeks, and rivers, as well as ephemeral streambeds that terminate in the Bay. Major freshwater sources include Malibu Creek, Topanga Creek, and Ballona Creek to the north of the onshore study area. Overall, an area of approximately 414 square miles (1,072 square kilometers [km<sup>2</sup>]) drains into the Bay (LARWQCB 2017). However, only a small part of seasonal storm drainage reaches the ocean directly; most is impounded by dams or diverted for other uses (MBC 2017a). Rainfall, and the associated freshwater inflow to the Bay, are episodic within any given year, and can vary substantially among years.

### **Depth and Bathymetry**

Oceanographic conditions in the area are influenced by local conditions, particularly submarine topography. Santa Monica Bay near and around the marine study area is characterized by a gently sloping (approximately 0.5°) continental shelf (Figure 5.9-1). The width of the shallow sloping continental shelf within the Santa Monica Bay ranges from a few hundred meters to approximately 19 km (12 miles), and forms a large central plateau that is dissected by submarine canyons to the north and south of the marine study area. The width of the shelf is broadest in the vicinity of the marine study area. The water depth at the end of the existing discharge structure pipe is 28 to 34 feet. Located farther seaward, the depth at the end of the existing proposed intake

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<sup>11</sup> A "bight" is a curve or recess in a coastline.

structure pipe is 31 to 37 feet. At water depths of about 262 feet, the shelf gradient steepens substantially seaward (MBC 2017a).

Submarine canyons can result in anomalies in the direction and velocity of currents<sup>12</sup> and may further enhance transport of bottom water or serve as migratory corridors for fish and invertebrates (discussed in Section 5.11, *Marine Biological Resources*). The Santa Monica Submarine Canyon, located approximately 5 miles north of the marine study area and at the seaward edge of the continental shelf, extends within approximately 11 km (6.8 mi) of the shoreline, offshore of Ballona Creek. The head of Redondo Submarine Canyon extends within a few hundred meters of King Harbor in Redondo Beach.

### **Ocean Tides, Currents, and Circulation**

Water in the northern Pacific Ocean is moved eastward by prevailing westerly winds until it reaches the western coast of North America, where it is diverted both to the north and south. The California Current, a diffuse and meandering water mass which generally flows to the southeast, makes up the southern component, and flows without having a defined western boundary; however, greater than 90 percent of the water transport occurs within 725 kilometers (km) of the California coastline. The California Current diverges south of Point Conception, with flows turning to the north and flows inshore of the Channel Islands as the southern California Countercurrent. The Channel Islands are located offshore of Southern California and affect water circulation patterns and oceanographic characteristics along the coastline. Within the Countercurrent, surface speeds range from 5 to 10 cm/s (0.16 to 0.32 fps) (MBC 2017a). Small eddies that fluctuate seasonally, and are well developed during summer and autumn and weak or even absent in winter, occur near the Channel Islands and affect flows. Currents near the Southern California coast are strongly influenced by wind, tide, and topography. Wind-driven currents that are superimposed on the tidal motion cause a strong diurnal component that is generally apparent. As such, currents near the coast may vary considerably in both direction and speed over the short-term.

In the eastern North Pacific Ocean where the California coast is located, the tidal currents follow a counter-clockwise direction. Resulting flood tide currents flow up the coast, while ebb tide currents flow down the coast (MBC 2017a). Tides occurring along the California coastline are defined as mixed semi-diurnal, having two unequal highs and two unequal lows over a 24-hour period. In general, water enters Santa Monica Bay from the south and flows in a counterclockwise eddy. During the winter months, a clockwise gyre may occur, with longshore flow of 2 cm/s (0.06 fps). Studies indicate that the clockwise gyre may be the dominant pattern on the shelf, and that such flows reverse for several days at a time as the result of tidal action. Tidal currents occurring in Santa Monica Bay have been observed to be the slowest at the head of Redondo Submarine Canyon and the greatest over the central portions of the broad shelf in the vicinity of the marine study area (MBC 2017a).

Large-scale upwelling along the California coastline is largely the result of northwesterly winds. Between the months of February to October, such winds induce offshore movement (Ekman

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<sup>12</sup> As measured in 1969, the predominant flow in Redondo Submarine Canyon was up-canyon, at an average speed of approximately 2.5 cm/s (0.1 fps) (MBC, 2017a).

transport) of surface water, causing an upward movement of deeper ocean waters near the coast. The upwelled water is colder, denser, and has higher salinity concentrations, less oxygen, and greater nutrient concentrations than surface waters. Upwelling therefore alters the physical properties of the surface waters, with the nutrients enhancing biological productivity (see Section 5.11, *Marine Biological Resources*).

### **Sediment and Sediment Transport**

Currently, approximately 50 percent of the shoreline is comprised of sandy beaches. Dikes, groins, and jetties have been constructed in the area to restrict littoral drift in order to aid in sand retention along area beaches. Beach nourishment, whereby sand is transported or pumped onto the beach, is also undertaken. El Segundo Beach was nourished with 620,000 cubic yards of sand in 1984, concurrent with construction of the El Segundo Marine Terminal Groin, a 915-foot-long rubble-mound structure just up-coast of the ESGS. To prevent future erosion, 570,00 cubic yards of sand were placed up-coast of the groin and 50,000 cubic yards of sand were placed down-coast of the groin. Most of the sand for this nourishment project came from an offshore borrow area in 25 to 45 feet of water depth (Patsch 2007). Runoff from the Santa Monica Mountains and the Santa Clara River continues to provide some sand to the coast, though most of the sand added to the coast in recent decades has been through beach nourishment managed by the USACE and local jurisdictions. Ocean currents transport sediment down the coast, from Malibu to the southern portion of Santa Monica Bay.

Offshore, the seafloor is composed largely of unconsolidated sediments that are generally finer as distance from the shore increases. The majority of nearshore sediments in the marine study area are comprised of finer sands that form an elongated bed off of Manhattan Beach and a large patch on the central plateau. Sediments in the marine study area are typically coarsest nearshore where greater turbulence near the surf zone suspends finer particles which are deposited further offshore in calmer water. During the summer months, reduced wave activity allows sand and finer materials to accumulate nearshore. In the winter, storms transport these finer materials offshore to deeper water. The intense storms associated with strong El Niño events generate large waves that impinge on the bay shoreline and cause significant shoreline erosion. During the particularly severe El Niño event that started in 1982, severe beach erosion occurring immediately north of the existing intake and outfall pipelines within the marine study area led to the construction of the El Segundo rock groin to protect the Chevron Marine Terminal and its cross-shore pipelines (SLC 2010; Figure 5.9-1). Nearshore sands typically move parallel to shore by longshore drift and may be transported into the heads of submarine canyons. Sand from the marine study area is transported southward into Redondo Submarine Canyon.

### **Surface Water Quality**

The quality of surface water is primarily a function of land uses in the Project Area. Pollutants and sediments are transported in watersheds by stormwater runoff that reaches streams, rivers, storm drains, and reservoirs. Local land uses influence the quality of the surface water in Santa Monica Bay through point source discharges (i.e., discrete discharge from a wastewater treatment plant) and nonpoint source discharges (e.g., storm runoff). Surface water quality relevant to the onshore and marine study area is described below.

### ***The Santa Monica Bay and Dominguez Channel Watershed***

As described in Section 5.9.2, stormwater runoff from the urbanized onshore study area is the primary factor relevant to terrestrial water quality. Urbanization can increase pollutant export as compared to naturally occurring conditions due to increased stormwater runoff from impervious surfaces. Stormwater runoff within the onshore study area primarily flows into Santa Monica Bay.

The 1994 Water Quality Control Plan (or Basin Plan) for the Los Angeles Region lists current beneficial uses for the key surface water features in the onshore study area (Table 5.9-1). As described in Section 5.9.1, the Basin Plan specifies water quality objectives for all surface waters within the Los Angeles region (LARWQCB 1994). Additionally, the Basin Plan lists site specific water quality objectives for some surface waters in the region to protect a specific beneficial use or based on antidegradation policies. The Dominguez Channel Watershed has no site-specific objectives but is listed on the 303(d) list as being impaired for copper, ammonia, diazinon, bacteria, lead, zinc, and toxicity (see Section 5.9.1). The type and concentration of substances in urban stormwater can vary considerably, both during a storm event and from event to event at any given area (depending on the intensity of rainfall), as well as from site to site within a given urban area (based on land use characteristics). Typical nonpoint source pollutants associated with urbanized areas are described below by major categories:

- **Sediment:** composed of tiny soil particles that are washed (or blown) into surface waters. Sediment represents the major pollutant by volume in surface water and construction sites are the largest source of sediment for urban areas under development. As such, sediment is a primary pollutant regulated under the Construction General Permit (described in Section 5.9.1). Fine sediment may be suspended in water, increasing turbidity.
- **Nutrients:** Nutrients can cause algal blooms and excessive vegetative growth, especially phosphorous and nitrogen. Nutrient export is typically greatest from development sites with the most impervious areas.
- **Trace Metals:** Trace metals can cause toxic effects on aquatic life and can contaminate drinking water supplies. The most common trace metals found in urban runoff are lead, zinc, and copper. A large fraction of the trace metals in urban runoff are attached to sediment; this effectively reduces the level, which is immediately available for biological uptake and subsequent bioaccumulation. Metals associated with sediment settle out rapidly and accumulate in the soils.
- **Oxygen-demanding Substances:** Aquatic life is dependent on the concentration of dissolved oxygen in the water. When organic matter is consumed by microorganisms, dissolved oxygen is consumed in the process. A rainfall event can deposit large quantities of oxygen demanding substance in lakes and streams. Low dissolved oxygen levels result when the rate of oxygen-demanding material exceeds the rate of replenishment.
- **Bacteria:** Bacteria levels in undiluted urban runoff exceed public health standards for water contact recreation almost without exception. The coliform bacteria that are detected may not be a health risk by themselves, but are often associated with human pathogens.
- **Oil and Grease:** Oil and grease contain a wide variety of hydrocarbons, some of which could be toxic to aquatic life in low concentrations. Hydrocarbons have a strong affinity for sediment and quickly become adsorbed to it. The major source of hydrocarbons in urban

runoff is through leakage of oil and other lubricating agents from automobiles. Hydrocarbon levels are highest in the runoff from parking lots, roads, and service stations.

- **Other Toxic Pollutants:** Priority pollutants are generally related to hazardous wastes or toxic chemicals and can be sometimes detected in stormwater.

### ***Santa Monica Bay***

This section characterizes baseline water quality conditions in Santa Monica Bay with a focus on salinity and temperature (which can affect ocean water density and receiving water mixing and dilution dynamics). Urban runoff, described above, has the potential to directly affect water quality in Santa Monica Bay as a nonpoint source discharge. As such, baseline water quality constituent concentrations that are regulated by the SWRCB and the LARWQCB are described (see Section 5.9.1 for additional information regarding water quality regulations). The beneficial uses of the ocean waters of the State and coastal features in the Los Angeles Region are outlined in the California Ocean Plan and the Basin Plan (see Section 5.9.1). Beneficial uses of ocean waters and coastal features in the vicinity are summarized in Table 5.9-1. Physical water quality parameters (e.g., salinity, temperature, and dissolved oxygen) within the Santa Monica Bay exhibit distinct seasonal variations and spatial distributions (such as with depth). Such variation is a result of interactions among bathymetry, vertical mixing, freshwater discharge, and biological processes. The seasonal cycles correspond to oceanic patterns such as water masses transported by the California Current from the northwest and the Southern California Countercurrent from the south and freshwater discharges from major surface water bodies.

### **Salinity, Temperature, and Density**

Salinity is measured by the concentration of salts in water and is expressed as a weight of salts dissolved in a volume of water. The concentration of salt in ocean waters is typically on average around 35 grams per kilogram of water, commonly reported as parts per thousand (e.g., 35 ppt). Salinity levels are generally constant in ocean waters; however, such levels fluctuate within coastal zones due to introduction of freshwater sources from storm runoff. Within Santa Monica Bay, salinity levels are generally uniform and vary from 33 ppt to 34 ppt (MBC 2017a). The lowest salinities are located along the coast near the mouth of Ballona Creek due to the influence of fresh water inputs. However, the influence of Ballona Creek to local salinity variations is intermittent and associated with winter rainstorm events that produce high flows of freshwater into the Santa Monica Bay.

Water temperatures fluctuate year-round as a result of seasonal and diurnal variations in currents, meteorological conditions (i.e., wind, air temperature, relative humidity, and cloud cover), and other conditions, such as ocean waves and turbulence. Natural surface water temperatures may be expected to vary a few degrees on a daily basis depending on the weather. Weak winds, clear skies, and warm air temperatures contribute to rapid daytime warming of the sea surface; overcast skies, moderate air temperatures, and the mixing of surface waters by winds and waves generally limit the potential for daily warming. The density of seawater in the Santa Monica Bay corresponds to temperature. As a result, density depth gradients are most pronounced when thermoclines are present during the spring and summer months. Regionally, nearshore densities in



the upper 100 meters of the water column range from about 24 to 25 sigma-t ( $\sigma_T$ )<sup>13</sup> throughout the year (see Appendix 4C for details).

### Dissolved Oxygen and pH

In combination with nutrients, dissolved oxygen is necessary for a healthy marine ecosystem. Factors such as physical, chemical, and biological variables may affect the dissolved oxygen concentration of seawater. High dissolved oxygen concentrations are typically associated with cool water temperatures (solubility of oxygen in water increases as temperature decreases), active photosynthesis, and/or mixing at the air-water interface. Conversely, lower concentrations may occur with high water temperatures, high rates of organic decomposition, and/or extensive mixing of surface waters with oxygen-poor subsurface waters. Pollutants high in organic constituents can locally deplete dissolved oxygen levels and deleteriously affect marine organisms. Oxygen depletion arises from the bacterial degradation of oxidizable components in organic wastes. In extreme cases, this additional oxygen demand can reduce dissolved oxygen levels to below those necessary to support biological processes. Because of this, the California Ocean Plan (see Section 5.9.1) limits the discharge of oxygen-demanding constituents within wastewater so that the resulting depression in dissolved oxygen concentrations does not exceed 10 percent from natural conditions. Anoxic conditions can occur in the water column as well as in seafloor sediments, although such an occurrence in the well-flushed open ocean is rare. Nevertheless, anoxic conditions can occur naturally at the water-sediment interface in many of the deep basins within the region (MBC 2017a).

Dissolved oxygen concentration typically varies in the nearshore temperate environment around 7.5 milligrams per liter (mg/l) (parts per million [ppm]). The threshold of biological concern for dissolved oxygen concentration is 5 mg/l, representing a minimal desirable level below which stress and/or mortality can occur in aquatic wildlife. Within Santa Monica Bay, dissolved oxygen concentrations in the surface waters vary from approximately 5 to 13 mg/l, averaging 8.49 mg/l in winter and 7.95 mg/l in summer. Although dissolved oxygen varies within the water column, bottom dissolved oxygen concentrations are typically lower than surface values. Dissolved oxygen concentrations near the bottom of the bay average 7.60 mg/l in winter and 7.96 mg/l in summer, with minimum values not lower than 5.06 mg/l (MBC 2017a).

The hydrogen ion concentration (pH) of marine waters in the region is similar to that of seawater in most other oceans of the world. It is slightly alkaline, with a pH ranging between 7.5 and 8.5. Within Santa Monica Bay, typical pH values in the surface waters vary between 7.9 and 8.2, decreasing slightly with depth (MBC 2017a). However, values can approach 8.6 during phytoplankton blooms, which rapidly metabolize carbonates in the surface waters. Also, values can decrease to below 7.9, although this condition generally occurs in waters below 100 meters (328 feet), or in confined water ways (i.e., harbors) where organic decomposition and reduced circulation can cause accumulation of acidic byproducts.

<sup>13</sup> Sigma-t ( $\sigma_T$ ) is used in oceanography as a measure of seawater density at a given temperature and salinity.  $\sigma_T$  is defined as  $\rho(S,T)-1000 \text{ kg m}^{-3}$ , where  $\rho(S,T)$  is the density of a sample of seawater at temperature T and salinity S, measured in  $\text{kg m}^{-3}$ , at standard atmospheric pressure.

### **Other Constituents**

Pollutants enter Santa Monica Bay through river drainages, municipal and industrial wastewater discharges, dumping, air emissions, chemical spills, vessel discharges, and surface runoff. Increasing urbanization of the adjacent watershed in the early and middle part of the 20th century resulted in numerous environmental stressors on the Bay (SMBRC 2008). Pollutant discharges to the Santa Monica Bay stabilized and began to decline after passage of the CWA in 1972. Since then, the predominant source of pollutant loading has shifted from point-source wastewater discharges to nonpoint-source urban runoff (described above). However, the legacy of pollutant discharge has left contamination in much of the Santa Monica Bay's sediments, often at levels of potential biological concern, as reflected in the 303(d) listing for the Santa Monica Bay (see Section 5.9.1). Reflecting historic pollutant levels, the California Ocean Plan identifies background seawater concentrations for five constituents, which include arsenic, copper, mercury, silver, and zinc (see Section 5.9.1).

The Santa Monica Bay Restoration Plan (SMBRC 2008) identifies 19 pollutants of concern for Santa Monica Bay: DDT, PCBs, polycyclic aromatic hydrocarbon (PAHs), Chlordane, Tributyltin (TBT), cadmium, chromium, copper, lead, nickel, silver, zinc, pathogens, TSS (sediment), nutrients, trash and debris, chlorine, oxygen demands, and oil and grease. The implications of these pollutants vary. Some, such as DDT and PCBs have bioaccumulated, contaminating seafood. USEPA's TMDL for Santa Monica Bay is focused on PCB and DDT contamination of fish (see Section 5.9.1). Ongoing inputs of these legacy contaminants are very small; most fish contamination is due to existing sediment contamination, a result of legacy discharges of contamination from wastewater outfalls and other sources (Wang and Protopapadakis 2015). Pathogens may cause potential health risks if their concentration is elevated above the level of concern. The sources or pathways of pathogen pollutants vary as well. Pathogens found in stormwater and urban runoff are the primary contaminants of concern at swimming and surf zones along Santa Monica Bay beaches. Heavy metals are found in both wastewater treatment plant and storm drain discharges while on the other hand, contaminated sediments are the only major source for pollutants such as DDT, PCBs, and TBT that have been banned or restricted. Atmospheric deposition, boating activities, and on-site wastewater treatment (septic) systems have also been known to contribute loading of various pollutants to the Santa Monica Bay. Pollutants entering the Santa Monica Bay bind with marine sediments and are transported or buried throughout the Santa Monica Bay shelf as a result of sediment movement (described below).

### **Sediment Contaminants**

Sediments and sediment transport in Santa Monica Bay is described in Section 5.9.2, *Surface Water Hydrology*. Water quality can be affected by sediments and sediment transport. When turbulence associated with ocean currents or surface waves exceed the threshold required for initiating motion of seabed materials, the resuspension of bottom sediments, which occurs naturally, can affect water quality by producing short-term and localized increases in suspended sediment concentrations and turbidity levels in near bottom waters. Suspended sediments also occur in surface waters following storm events that result in discharges from coastal rivers. As described above, sediment particles also act as a vehicle to transport other pollutants, including nutrients, trace metals, and hydrocarbons. Ocean currents may transport these river-derived

sediments substantial distances alongshore or offshore from the origin. In addition, the mechanical disturbance of sediments on the ocean floor, such as from construction activities, can mobilize other contaminants associated with sediments, potentially affecting water quality.

Ocean water quality and marine habitats (see Section 5.11, *Marine Biological Resources*) can be affected by sediment contamination and the release of contaminants from sediments (through natural fluctuations or through disturbance of the sediment) into the food chain. Organic compounds such as DDT, PCBs, PAHs, and chlordane are found in sediments in concentrations that are harmful to marine organisms at various locations in Santa Monica Bay (MBC 2017a). Also found in sediments relevant to the marine study area are heavy metals such as cadmium, copper, chromium, nickel, silver, zinc, and lead (Schiff et al. 2000). The major historic sources of sediment contamination have been wastewater treatment facilities; thus, the accumulations are highest near treatment plant outfalls off of Palos Verdes and Playa del Rey (LARWQCB 2017; Schiff et al. 2000).

## **Groundwater and Groundwater Quality**

The West Coast Groundwater Basin (Basin) underlies much of the West Basin service area, including El Segundo. The Basin covers approximately 140 square miles and is bounded by the Newport-Inglewood Uplift on the northeast, by the Santa Monica Basin on the north, and by the Pacific Ocean and Palos Verdes Hills on the west and south. Natural recharge primarily comes from subsurface inflow from adjacent basins and limited surface inflow into the upper aquifers from rainfall and irrigation. Before the 20th century, groundwater flowed from the Basin south and westward and discharged into Santa Monica Bay. Since then, discharge has been dominated by pumping from wells. Groundwater generally flows from west to east towards inland pumping depressions under current conditions and very little groundwater discharges or leaves the Basin as subsurface outflow. By the 1920s, as a result of the development of groundwater resources, water levels were below sea level in much of the Basin, resulting in seawater intrusion along the coastal areas in multiple aquifers (Land et al. 2004).

The Basin is under adjudication, limiting the allowable annual extraction of groundwater with assigned water rights to Basin pumpers (i.e., the amount to be extracted each year has been determined by a court decision). The West Basin service area overlies nearly all the adjudicated Basin, which had an average production of approximately 28,700 acre-feet (AF) in 2015. Since the adjudicated groundwater production is substantially higher than the Basin's natural recharge, the Water Replenishment District of Southern California (WRD) manages, regulates, and replenishes the Basin, and annually determines the amount of supplemental recharge that is needed. The Basin's artificial replenishment, which is the responsibility of WRD, occurs through a mix of imported water and recycled water.

Additionally, the Los Angeles County Department of Public Works (LACDPW) owns and maintains a seawater barrier system. Along with the WRD, LACDPW determines how much barrier injection water is required to maintain protective levels to protect the aquifer from seawater intrusion. Significant Managed Aquifer Recharge occurs at two seawater intrusion barriers to address the problem and minimize any additional seawater intrusion: The West Coast Basin Barrier Project and Dominquez Gap Barrier Project are located along the Santa Monica

Bay and the San Pedro Bay coastlines, respectively. The retail agencies that operate within West Basin's service area rely on groundwater production to meet approximately 18 percent of retail demand and this is expected to remain constant through the year 2040. WRD determines how much water is needed to replenish the Basin to support pumping and orders this amount of water from West Basin who then delivers a combination of recycled and imported water. In 2014, West Basin retailers extracted 31,288 AF of groundwater from the Basin, and 18,198 AF and 3,460 AF was replenished into the West Coast Barrier and Dominguez Gap Barrier, respectively.

Groundwater pumping trends have decreased in recent years due to MWD and WRD in-lieu incentive programs, which were enacted to reduce Basin pumping, lower annual Basin overdraft, and decrease the Basin's artificial replenishment needs. These programs encourage Basin pumpers to purchase available imported water supplies instead of groundwater supplies by offering discounted imported water supply rates. In addition, many of the private water retailers within the West Basin service area have historically preferred purchasing imported water supplies over groundwater supplies. Such a preference is partly a result of the presence of legacy seawater plumes and groundwater contamination, which make such a water source not useable without the use of advanced treatment. Adjudication of the Basin to limit pumping and initiation of Managed Aquifer Recharge have resulted in increased groundwater levels and reduced inland flow of seawater. Water levels have risen about 30 feet below ground surface from levels measured before adjudication of the Basin in 1961 (DWR 2004). Current groundwater levels in the city of El Segundo are at approximately 20 feet below ground surface or greater.

Water quality issues have further decreased trends in Basin pumping. The local groundwater supplies are not only limited due to seawater intrusion, but also due to other localized areas of groundwater contamination. There are many contaminated sites in the Basin, including leaking underground storage tank sites, and many have contaminated groundwater with localized plumes of petroleum fuels, solvents, and other hazardous substances. These plumes are typically found in shallow groundwater. Groundwater quality in the Basin also reflects current and historical land uses. As a highly urban area, commercial and industrial activities have resulted in environmental releases due to leaking aboveground and underground storage tanks, leaking sewer and oil pipelines, spills, and illegal discharges (see Section 5.8, *Hazards and Hazardous Materials*, for a description of sites of contamination).

## **Flood Hazards**

### ***FEMA Flood Hazards***

FEMA identifies areas throughout the United States that are at risk for flooding. The FEMA Flood Insurance Rate Map (FIRM) identifies areas that have a 1 percent or greater risk (100-year flood area) of being inundated by a flood event in a given year. The entire city of El Segundo, including all proposed Project components, is located outside of the 100-year flood hazard zone pursuant to FEMA FIRM Panel 1770F, Map No. 06037C1770F (September 8, 2015). Because the key surface waters in the onshore study area, such as Dominguez Channel, are channelized and concrete-lined, the corresponding flood zones are narrow and contained. The proposed onshore Project components are located in FEMA flood hazard Zone X, representing areas of minimal

flood hazard not subject to NFIP requirements outside of an identified Special Flood Hazard Area.

### ***Coastal Flooding and Sea-Level Rise***

During the winter months (generally November to February), offshore storms occurring over the Pacific Ocean, combined with high tides and strong winds, have the potential to cause coastal flooding as a result of wave run-up.<sup>14</sup> The Base Flood Elevations mapped on the FIRMs are based on the 100-year elevations (e.g., extreme high tide), as well as surge components (atmospheric pressure, wind setup, El Niño sea-level effects) and wave components (wave setup and swell from the Pacific Ocean). A limited portion of the City of El Segundo located along the coastline has been identified by FEMA as being located in a Special Flood Hazard Area Zone A (i.e., within the 100-year flood zone) for coastal flood hazards. However, flooding would primarily occur in natural depressions located along the beach. None of the proposed Project components are located within this zone.

Rising sea levels will increase the potential for coastal flooding, and the issue of sea-level rise is important in land use planning and hazard analysis in coastal areas. California Executive Order S-13-08, signed by the governor on November 14, 2008, specifies that all state agencies planning construction projects in areas that are vulnerable to future sea-level rise must consider a range of scenarios for 2050 and 2100 to assess project vulnerability, and, to the extent feasible, must reduce expected risks and increase resiliency with respect to sea-level rise. Until the year 2050, most of the climate models predict a similar degree of sea-level rise; however, after 2050, projections of sea-level rise become less certain because of divergent modeling results and differences in various estimates of the degree to which the international community will decrease greenhouse gas emissions (California Climate Action Team 2010).

The Intergovernmental Panel on Climate Change (IPCC) has indicated that globally, sea level rose at an average annual rate of approximately 1.5 millimeters from 1901 to 1990 and at an average annual rate of approximately 3.2 millimeters from 1993 to 2010 (IPCC 2013). By year 2100, sea levels may rise up to 55 inches (1.4-meter), causing a 45 percent increase in land in Los Angeles County to become more vulnerable to the 100-year flood event (CCC 2015). Based on mapping completed by the Pacific Institute, much of the Pacific Coast could be subject to flooding associated with a 100-year flood event with a sea-level rise of 55 inches (Herberger 2009). Based on the Pacific Institute estimate for a scenario of 55-inch sea-level rise by 2100, the ESGS North and South Sites would be located in an area at risk of potential coastal flooding.

### ***Tsunamis, Seiche, and Dam Inundation***

Coastal areas can be at risk of flooding from a tsunami. A tsunami is a wave or series of waves generated by an earthquake, landslide, volcanic eruption, or even large meteor hitting the ocean (California Dept. of Conservation 2018).

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<sup>14</sup> Wave run-up is the uprush of water from wave action on a shore barrier, such as a beach or other coastline feature. The extent of run-up can vary greatly from wave to wave in storm conditions.

Typically, a magnitude 8 or higher submarine earthquake creates a significant upward movement of the sea floor resulting in a rise or mounding of water at the ocean surface. This mound of water moves away from this center in all directions as a tsunami. A tsunami can travel across the open ocean at speeds of approximately 500 mph (the speed of a jet plane). As the wave approaches land and as the ocean shallows, the speed of the wave slows to about 30 mph and grows significantly in height (amplitude). On shore run-up of a tsunami can cause substantial damage and property loss.

Three notable tsunamis have affected the Los Angeles area in the 20th century. On May 22, 1960, a far-field (distant) tsunami originating in Chile, South America, from an 8.7 magnitude earthquake reached the Los Angeles coastline 14 hours later with a height of 2.6 feet (California Dept. of Conservation 2018). An 8.9 magnitude earthquake in Anchorage, Alaska, occurred on March 3, 1964, and resulted in run-up heights of 2 feet along the Los Angeles County shoreline (California Dept. of Conservation 2018). Following the tsunami in Japan on March 11, 2011, the maximum wave height in the Los Angeles Harbor area was 1.6 feet, resulting in minor damage to docks and marine infrastructure (Wilson et al. 2012).

Additionally, Santa Monica Bay is susceptible to the effects of near-field (near-vicinity) tsunamis from sources such as a submarine (underwater) landslide and/or a large earthquake on any of the nearby faults. These faults include the Palos Verdes fault zone, which trends northwest off the Long Beach and Santa Ana coast, the San Pedro Basin fault zone, and Santa Cruz-Santa Catalina Ridge fault zones (see Section 5.6, *Geology, Soils, and Seismicity*, for additional details). The California Emergency Management Agency (CalEMA) has identified the tsunami inundation hazard zone for coastal areas of the State, including the County of Los Angeles (State of California 2009). The ESGS site is immediately adjacent to, but is located outside of, the tsunami inundation hazard zone, which extends along a narrow band of the coastline in the vicinity of proposed Project facilities (**Figure 5.9-3**).

Flooding as a result of a seiche or dam inundation can also be a consideration for assessing flood hazards. A seiche is caused by oscillation of the surface of a large enclosed or semi-enclosed body of water due to an earthquake or large wind event. Seiches can result in long-period waves that cause run-up or overtopping of adjacent landmasses, similar to tsunami run-up. Flooding from dam failure can result from both natural and human causes, including earthquakes, erosion, improper siting and/or design, and rapidly rising floodwater during heavy storms. The type of failure, ranging from instantaneous to gradual, is dependent on the building material of the dam. Dam failure can potentially cause loss of life and property damage, displacement of persons residing in the inundation path, and damage to infrastructure. All proposed Project components would be located outside of mapped dam inundation hazard area and would not be in close proximity to any large enclosed or semi-enclosed body of water. The closest dam inundation hazard area is associated with the Lower Franklin Reservoir dam and the Mulholland dam to the north of the onshore study area in the Ballona Creek Watershed.

### 5.9.3 Significance Thresholds and Criteria

The criteria used to determine the significance of impacts related to hydrology and water quality are based on Appendix G of the CEQA Guidelines. The proposed Project would result in a significant impact to surface water hydrology or water quality if it would:

- Violate any water quality standards or Waste Discharge Requirements (refer to Impacts HYDRO 5.9-1 and HYDRO 5.9-2).
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted) (refer to Impact HYDRO 5.9-3).
- Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river in a manner that would result in substantial erosion or siltation on- or off-site (refer to Impact HYDRO 5.9-4).
- Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site (refer to Impact HYDRO 5.9-5).
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff (refer to Impact HYDRO 5.9-5).
- Otherwise substantially degrade water quality (refer to Impacts HYDRO 5.9-1 and HYDRO 5.9-2).
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map (No Impact, see below).
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows (No Impact, see below).
- Expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow (refer to Impact HYDRO-5.9-6).
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam, or coastal flooding due to sea-level rise (refer to Impact HYDRO-5.9-6).

Based on the nature of the proposed Project, there would be no impacts related to the following evaluation criteria for the reasons described below:

***Place Housing within a 100-Year Flood Hazard Zone.*** The proposed Project would not involve construction of new housing or structures for human occupancy within a 100-year flood hazard zone. Therefore, the evaluation criterion related to the placement of housing within a 100-year flood hazard zone is not applicable to the proposed Project and is not discussed further.

***Place Structures within a 100-Year Flood Hazard Zone:*** The proposed Project is not located within a 100-year flood zone, as indicated in maps compiled by FEMA. The site is already developed and would not increase flood flows or place within a 100-year flood hazard area structures that would impede or redirect flood flows. Therefore, based on Project plans and site location, there would be no impact related to placement of structures in a 100-year flood hazard area.

***Expose People or Structures to Inundation by Seiche or Mudflow.*** The proposed Project would have no effect on the frequency or probability of seiches (i.e., earthquake-induced oscillating waves in an enclosed water body) because the proposed Project would not create new enclosed water bodies or affect the frequency of earthquakes. Further, as the proposed Project would not include construction of habitable structures, there would be no impacts related to property loss, injury, or death from a seiche. Because of the relatively flat topography of the Project area, Project implementation would not expose people or property to increased mudflow hazards. Therefore, no impact related to inundation by seiche or mudflow would result, and these criteria are not discussed further.

***Expose People or Structures to a Significant Risk of Loss, Injury, or Death Involving Flooding, Including Flooding as a Result of the Failure of a Levee or Dam.*** There are no dams or levees adjacent to the Project area. None of the proposed facilities would lie within a predicted dam inundation zone. Implementation of the proposed Project would not affect reservoir operations. Therefore, the proposed Project would not expose people or structures to flooding damages due to failure of a dam or levee. There would be no impact associated with potential flooding from levee or dam failure and these criteria are not discussed further.

## 5.9.4 Impacts and Mitigation Measures

### **Construction-Related Violation of Water Quality Standards, Polluted Runoff or Otherwise Degraded Water Quality**

**Impact HYDRO 5.9-1: Would construction of the Project violate water quality standards and/or Waste Discharge Requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade water quality?**

The following analysis evaluates potential impacts associated with constructing each of the three primary elements of the Project, including offshore, coastal, and inland Project components for both the Local and Regional Projects. **Table 5.9-3** summarizes the impact significance conclusions. Potential impacts on water quality could result from construction at the desalination plant site from construction dewatering, at the screened ocean intake and brine discharge systems from dredging and other in-water activities, and from construction of the desalinated water conveyance components.



**TABLE 5.9-3  
SUMMARY OF IMPACT HYDRO 5.9-1 CONSTRUCTION-RELATED VIOLATION OF WATER QUALITY STANDARDS,  
POLLUTED RUNOFF, AND DEGRADATION OF WATER QUALITY**

	Ocean Water Desalination Facility	Offshore Intake and Discharge Facilities	Inland Conveyance Facilities
<b>Impact HYDRO 5.9-1: Impacts on construction-related violation of water quality standards, polluted runoff, and degradation of water quality.</b>			
<b>Local Project</b>			
Construction	LTS	LTSM	LTS
<b>Regional Project</b>			
Construction	LTS	LTS	LTS
NOTES: LTS = Less than Significant, no mitigation proposed LTSM = Less than Significant impact with mitigation			

**Local Project**

Construction-Related Impacts Ocean Water Desalination Facility – ESGS North and South Sites

*General Construction Activities*

Project construction activities at either the ESGS North or South Sites would include site clearing, grading, soil stockpiling, excavation, backfilling, and facility construction. For the North site, part of the site preparation activities would include demolition of existing structures and facilities. These general construction activities can result in pollutants being mobilized and transported off-site by stormwater, potentially degrading the water quality of receiving waters. Soil-disturbing activities, such as excavation and site clearing, could result in soil erosion and the migration of soil and sediment in stormwater runoff to downgradient water bodies and storm drains. If not properly managed, stockpiled spoils could migrate off-site during precipitation events and could result in increased sedimentation in downstream receiving water bodies. Construction activities could also result in the accidental release of hazardous construction chemicals such as adhesives, solvents, fuels, and petroleum lubricants that, if not managed appropriately, could adhere to soil particles, become mobilized by rain or runoff, and degrade water quality.

Project construction activities associated with the proposed Local Project, which includes all construction activities proposed at the ESGS North and South Sites, would disturb more than 1 acre of soil, and would therefore, be subject to the requirements of the NPDES Construction General Permit. Under the Construction General Permit, an SWPPP would be prepared, including specific measures and conditions to reduce or eliminate stormwater flow carrying any pollutants or sediment from the construction activities (see Section 5.9.1 for details). The SWPPP is required to include specific elements such as erosion and stormwater control measures that would be implemented on-site. Examples of typical construction BMPs include installing sediment barriers such as silt fencing and fiber rolls, maintaining equipment and vehicles used for construction, and tracking controls such as stabilization of construction access points. The development and implementation of BMPs such as overflow structures designed to capture and

contain any materials that are inadvertently released from the storage containers on the construction site is also required. In accordance with the CGP, a Rain Event Action Plan would be required to ensure that active construction sites have adequate erosion and sediment controls in place prior to the onset of a storm event, even if construction is planned only during the dry season. The SWPPP is also required to include a monitoring program, which would require inspections of the construction site to be conducted prior to anticipated storm events and after the actual storm events. The inspections would be conducted to: identify areas contributing to stormwater discharge; evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate, were properly installed, and are functioning in accordance with the CGP; and determine whether additional control practices or corrective measures are needed.

Compliance with the CGP is required by law and has proven effective in protecting water quality at construction sites as well as off-site for downgradient receiving waters. Mandatory compliance with the CGP requirements would prevent significant construction-related impacts on water quality during general construction activities at the ESGS North and South Sites.

#### *Construction Excavation Dewatering Activities*

During construction of the desalination facility at the ESGS North Site or South Site, excavations could intercept shallow or perched groundwater and require temporary localized dewatering to create a dry work area and facilitate construction with such a possibility being higher at the North Site given its low ground elevation relative to the South site. Dewatering typically involves the extraction of shallow groundwater and subsequent discharge into nearby storm drains or into temporary storage tanks or lined surface storage ponds where storm drains are not available. Dewatering effluent may contain pollutants (e.g., sediment, residual petroleum hydrocarbons and elevated heavy metals) that require removal prior to discharge to avoid potential water quality impacts. As described in detail in Section 5.8, *Hazards and Hazardous Materials*, sites with known soil and/or groundwater contamination are located close to or extend into the proposed construction area. Liquid hydrocarbons are documented to be on the shallow groundwater surface beneath the ESGS site as a result of leaking gasoline tanks on the Chevron Refinery adjacent to the ESGS. Considering the location of the Project, the contaminants that could be encountered during construction activities include petroleum hydrocarbons, volatile organic compounds, PAHs, and metals. The dewatering of contaminated groundwater during construction excavation activities would be considered a significant impact if the contaminated groundwater (i.e., dewatering effluent) were not managed properly and were released untreated into stormwater drains that discharge to surface or groundwaters. Such a release would violate water quality standards and Waste Discharge Requirements and degrade the water quality of receiving waters.

Prior to dewatering the local groundwater, West Basin would be required to obtain coverage under the General Dewatering NPDES Permit No. CAG994004 (R4-2003-0111) (Dewatering Permit). The Dewatering Permit would require West Basin to test extracted groundwater for the presence of pollutants prior to discharge. If testing demonstrates that treatment is required, West Basin would be required to implement appropriate treatment to reduce pollutants to applicable permit limits protective of defined beneficial uses for receiving water bodies and water quality standards. Options considered for disposal of dewatering discharge include: (a) on-site treatment, then discharge to sanitary sewer, (b) discharge to mobile storage tanks (e.g., Baker Tanks™), then haul off-site, or (c) on-site treatment, then discharge to groundwater (recharge wells and

trenches). An ongoing monitoring and reporting program, with LARWQCB review and approval, is also required under this permit to ensure on-site treatment and/or disposal adheres to the conditions of the Dewatering Permit.

Mandatory compliance with the water quality protection requirements of the Dewatering Permit would ensure that Project dewatering discharges would not result in exceedances of water quality standards or otherwise degrade water quality or deleteriously affect beneficial uses of receiving waters. Therefore, impacts relating to the violation of water quality standards, Waste Discharge Requirements, and/or creating additional sources of polluted runoff or otherwise degrading water quality from excavation dewatering during construction at the ESGS North and South Sites would be less than significant.

It should be noted that in addition to the requirements described in this chapter, Section 5.8, *Hazards and Hazardous Materials*, provides details of a mitigation measure developed for all construction groundwater dewatering effluent. Mitigation Measure HAZ-1 (Waste Management Plan), requires West Basin or its contractor(s) to develop a groundwater dewatering control and disposal plan that identifies likely groundwater dewatering locations, the method to analyze groundwater for hazardous materials, and appropriate treatment and/or disposal methods. While this mitigation measure is not required to reduce or avoid a significant impact to water quality due to mandatory regulatory requirements as described above, it is mentioned here because implementation of the measure would further reduce, avoid and/or minimize the potential for hazardous contaminants to be present in dewatering discharges. Impacts would be less than significant.

#### Screened Ocean Intake and Concentrate Discharge Structures

The Local Project would use existing ESGS cooling water tunnels, thereby reducing potential construction impacts on marine resources. Offshore construction of the proposed seawater intake and brine discharge structures would involve activities on the ocean surface (such as the assembly of components and staging equipment on anchored barges) as well as underwater within the water column and on the ocean floor (in-water construction). In-water construction activities would include dredging of the ocean bottom, the insertion of new pipelines within the existing ESGS cooling water tunnels, underwater concrete demolition and cutting, the placement of foundation materials prior to placement of structures, pile driving, diver-assisted placement and connection of precast structures, attaching and sealing new structures to existing structures, and towing or transporting precast concrete elements into place via barge and either sinking them into position or lowering via a barge-mounted crane.

In-water construction activities would extend over a 12-month period. Direct construction impacts (i.e., physical footprint) would be localized to approximately 8 acres (see Figure 3-15) in the vicinity of the terminus of both the existing intake and discharge tunnels. Dredging activities would involve the collection, removal, reuse/replacement, and/or the transport and disposal of dredge-material via barge. Diver-assisted construction activities on the seafloor would involve the physical installation of Project components, such as pipeline risers and intake screens, and multi-port diffusers. Additionally, the use of support craft at the water surface, such as barges and cranes, would require anchoring to the seafloor.

Impacts on water quality could occur from dredging, underwater demolition, installation of pipelines, diver-assisted installation of pre-fabricated structures, anchoring, and potential construction-related spills. Water quality impacts would primarily result from the resuspension<sup>15</sup> of sediments and/or the introduction of contaminants associated with sediment to the water column. As such, the following potential impacts to water quality associated with in-water construction activities (direct effects) and in the larger offshore study area (indirect effects) from construction activities could occur:

- Increased turbidity (sediment resuspension resulting in reduced water clarity and light transmittance).
- Increased dissolved or particulate contaminants (that were previously bound to dredged sediments or contained in pore water).
- Reduced dissolved oxygen (from suspension of sediments with low oxygen).
- Water quality degradation from dredge material stockpiling, transport, and disposal.
- Accidental release of hazardous materials associated with standard construction activities (such as fuels, oils, solvents, etc.).

The potential water quality effects from in-water construction activities are described below for each of these issues. The biological effects on marine biota from potential water quality impacts are discussed in Section 5.11, *Marine Biological Resources*.

Note that prior to implementing the Project, West Basin would be required to obtain a Section 10 permit from the USACE and RWQCB water quality certification for the in-water construction, as well as a Section 404 permit from USACE for disposal of dredge material.

#### *Turbidity*

Dredging would resuspend some bottom sediments and create temporary turbidity plumes near the dredge operations. The extent of increased turbidity from dredging depends on the composition of the sediments, method of dredging, and duration of operations. Sediments in the offshore study area consist primarily of sand (83 to 98 percent), with smaller amounts of silt (1 to 16 percent) and clay ( $\leq 1$  percent) (MBC 2017b). During dredging operations, elevated turbidity would occur in the immediate vicinity of the dredge and would generally be confined to within a few hundred yards of the activity. After initially increased turbidity levels, sediments would settle and disperse rapidly once dredging ceases (due to the high sand content and ocean mixing from tides and currents) and background levels would be restored.

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<sup>15</sup> Resuspension is the dislodgement and dispersal of sediment into the water column (where finer sediments are subject to transport and dispersion by currents). Sediment resuspension can also result in the short-term release of contaminants in the water column through release of pore water (water between individual sediment particles) and by separation from suspended particles.

As part of the proposed Project and as required by the USACE Section 10 permit conditions, dredge BMPs such as silt curtains,<sup>16</sup> gunderbooms,<sup>17</sup> operational controls, and in-water work-windows would be employed to minimize turbidity and suspended sediment. Silt curtains and gunderbooms reduce dispersal of suspended sediment and increased turbidity beyond the dredge site. Operational controls would be specific to the dredging method and would represent protocols that minimize bottom disturbance and the potential for resuspending sediment. Work windows are periods of time when special-status or listed species are not present in the area (see Section 5.11, *Marine Biological Resources*). The BMPs would be incorporated into Section 10 permit conditions.

The anchoring of support craft could also produce a temporary and highly localized disturbance to the seafloor. As described above, resuspended sediments would settle rapidly due to the high sand component and water quality would rapidly return to ambient conditions. Installation of the Project components via diver activity would not result in substantial increases in turbidity and any increases would be of short duration and highly localized. Compliance with Section 10 permit conditions during construction and the implementation of BMPs would ensure that impacts to water quality from temporary turbidity would be less than significant.

#### *Sediment Contaminants and Mobilization into the Water Column*

Suspended sediments could release contaminants such as metals and organics into the water column during the dredging, anchoring, and diver-assisted pipeline installation. The transport of suspended particles by tides and currents could redistribute contaminants beyond the active in-water disturbance area. The potential for contaminant release and transport is primarily related to the sediment particle sizes,<sup>18</sup> sediment organic content, and contaminant concentrations associated with the disturbed sediments. Sediments from eight locations representative of the offshore study area were collected and analyzed for concentrations of metals, sulfides, pesticides, PAHs, and PCBs (MBC 2017a). Concentrations of all contaminants were below concentrations considered a “possible effects range” within which effects to biota could occur. Additionally, the sediments within the offshore study area are composed mainly of sand with very low fractions of fine particulates and organic content. Any increase in contaminant levels in the water is expected to be localized and of short duration. The amount of contaminants redistributed in this manner would likely be small, and the distribution would be limited to the work area. Therefore, contaminant concentrations associated with resuspended sediments are not expected to result in degraded water quality near the Project site. Impacts to water quality due to the suspension or redistribution of sediment contaminants would be less than significant.

#### *Dissolved Oxygen*

Within areas of dredging, dissolved oxygen may be reduced as a result of anoxic sediment becoming resuspended into the overlying water column. Substantially depressed oxygen levels (i.e., below 5 milligrams per liter [mg/L]) can cause respiratory stress to aquatic life, and levels

<sup>16</sup> Floating impermeable barrier intended to allow suspended sediment at a dredging site to settle out of the water column in a controlled area, minimizing the area that is affected by the increased suspended sediment.

<sup>17</sup> Similar to silt curtains but constructed of permeable geotextile fabrics. Designed to extend from the water surface to the project bottom and allow water to flow through the curtain while filtering suspended dredged sediment from the flow.

<sup>18</sup> Sediment grain size affects the binding capacity of contaminants.

below 3 mg/L can cause mortality. Reductions in dissolved oxygen concentrations would likely be minimal due to the low organic matter content of the sediments. If anoxic (oxygen-poor) sediments are resuspended, reduced dissolved oxygen would likely persist for relatively short periods in a highly localized manner because of the rapid settling of suspended sediment (described for turbidity, above). As such, should dissolved oxygen be reduced, such conditions are not expected to persist or cause detrimental effects to biological resources. In addition, tidal flushing and dynamic mixing from wind and wave action would improve depressed oxygen levels by introducing oxygenated water into the Project area. The potential for reduced dissolved oxygen levels during construction would be of short duration and highly localized within the work area. Construction activities would be subject to the water quality objectives in the California Ocean Plan and approved through the LARWQCB 401 Certification. Impacts to water quality due to reduced dissolved oxygen would be less than significant.

#### *Dredge-Material Stockpiling, Transport, and Disposal*

Excavated dredge materials would be either temporarily stockpiled beside the excavation on the seafloor or collected and disposed of via barges at the open ocean disposal site LA-2 with the former being the preferred option. Side-casting of the dredge spoils would result in temporary turbidity, as described above. Re-using the dredge material to cover the installed pipelines on the ocean floor would also create temporary turbidity. These episodes of turbidity would be of short duration and as discussed above would result in less than significant water quality impacts.

Alternatively, the dredge material may be transported to the LA-2 Ocean Dredged Material Disposal Site adjacent to the POLA/POLB, if the material is properly tested and determined to be compatible. Effects from dredge material transport and disposal at designated offshore disposal sites such as LA-2 (see Section 5.9.1) were evaluated during the site designation process (USEPA 1988) and subsequently evaluated in consideration of higher maximum annual disposal volumes (USEPA and USACE 2005). Mandatory compliance with Section 10 permit requirements, RWQCB water quality certification, and Waste Discharge Requirements as well as disposal of dredged materials would ensure the Project is consistent with relevant regulations, plans, and policies. Water quality impacts relating to dredge-material transport and disposal would be less than significant.

#### *Accidental Spills*

Accidental spills of fuel, lubricants, or hydraulic fluid from equipment used during offshore construction could occur. As described in Section 5.8, a Marine Oil Spill Response Plan (OSRP) will be prepared and implemented prior to the start of dredging and other in-water construction activities associated with the proposed Project (Mitigation Measure HAZ-5). The OSRP will specifically identify methods of in-water containment, such as through the use of floating booms to contain spilled fuel or oil and spill management in the event of an accidental spill. The plan would require that emergency cleanup equipment be available on-site to respond to such accidental spills.

Section 10 permit conditions would include the use of BMPs to minimize the potential for spills including the provision of spill containment and cleanup equipment to control potential accidental spills. With implementation of Mitigation Measure HAZ-5, impacts to water quality from the

accidental release of hazardous materials during offshore construction would be less than significant.

#### Desalinated Water Conveyance Components

As part of Project construction for the Local Project, pipeline segments would be installed using conventional open-trench construction methods, although trenchless construction methods would also be used for some pipeline locations. All construction activities for the desalinated water conveyance components would be subject to mandatory compliance with the CGP for stormwater discharges. Mandatory compliance with the CGP would ensure that construction of the desalinated water conveyance components is conducted in a manner consistent with the governing regulatory requirements, plans, and policies described in Section 5.9.1. Adherence to such requirements ensures that necessary controls to minimize soil erosion, manage runoff, and protect water quality from the mobilization and transport of pollutants in stormwater or construction-related discharges are in place during construction activities. Therefore, impacts relating to the violation of water quality standards or Waste Discharge Requirements and/or creating additional sources of polluted runoff or otherwise degrading water quality as a result of construction of the desalinated water conveyance components would be less than significant.

Prior to constructing the connections between existing and new pipelines, segments of existing pipelines would need to be drained and disinfected before being returned to service. Newly installed pipelines would also be disinfected before being put into service. All discharges associated with operating drinking water systems would be covered under the Statewide NPDES Permit for Drinking Water System Discharges to Waters of the United States (Permit No. CAG140001). Requirements of this general permit implement the California Ocean Plan water quality objectives and are applicable to those discharges directly into the ocean or indirectly via a stormwater system that drains into the ocean. Under this general permit, West Basin would be required to implement BMPs proven to be effective for the treatment or control of pollutants associated with pipeline disinfection discharges to ensure proper management, and to route discharges to control the pollutants of concern and to protect beneficial uses of the receiving waters. Compliance with permit requirements would ensure that initiation of the new potable water conveyance system would not impact surface water quality.

#### Mitigation Measures:

Implement Mitigation Measure HAZ-5 for impacts to the screened ocean intake and concentrate discharge facilities. No mitigation measures are required for other facilities.

#### Local Project Significance Determination:

Less than Significant with Mitigation Incorporated.

### ***Regional Project***

#### **Construction-Related Impacts**

##### **Ocean Water Desalination Facility – ESGs North and South Sites**

Like the Local Project, the Regional Project would exceed 1 acre in size and, as such, all construction activities would be subject to mandatory compliance with the CGP NPDES permit for stormwater discharges. Excavation dewatering discharges would be subject to the conditions

of the LARWQCB General Dewatering Permit (NPDES Permit No. CAG994004). Mandatory compliance would ensure the construction of the Regional Project desalination facility is consistent with regulations, plans, and policies described in Section 5.9.1. The impact on water quality associated with construction of the proposed Regional Project desalination facility at ESGS North or South Site would be less than significant for the reasons described under the Local Project, above; no mitigation is necessary.

#### Screened Ocean Intake and Concentrate Discharge Structures

Offshore construction activities associated with expanding the Local Project intake and discharge structures to accommodate the Regional Project 60 MGD desalination facility would involve the installation of 8 additional wedgewire screens (12 total for Regional Project as compared to 4 for the Local Project) on to preinstalled risers at the Local Project intake structure as described in Section 3.5.2. Additionally, the outfall multiport diffuser system would be modified through the removal of the four duckbill diffuser ports that were installed for the Local Project and the installation of eight duckbill diffusers inclined upward at a 26° angle from the horizontal. Offshore construction would involve activities on the ocean surface, such as the assembly of components and staging equipment on anchored barges, and diver-assisted placement and connection of precast structures at the ocean floor.

Potential impacts to water quality from all proposed in-water construction activities are described in detail for the Local Project, above. Potential impacts on water quality within the marine study area from construction of the Regional Project would be substantially reduced in terms of magnitude, duration, and intensity as compared to the Local Project since no additional dredging or dredge-material disposal would be required. Additionally, offshore construction would be subject to the regulatory requirements described for the Local Project (with the exception of those involving dredging and dredge-material disposal); therefore, mandatory compliance would ensure the construction of the Regional Project intake and discharge structures are consistent with regulations, plans, and policies described in Section 5.9.1. As such, impacts to water quality from in-water construction activities associated with the Regional Project would be less than significant.

#### Desalinated Water Conveyance Components

Construction of the Regional Project water conveyance components would be subject to mandatory compliance with the requirements of the CGP NPDES permit for stormwater discharges, LARWQCB General Dewatering Permit (NPDES Permit No. CAG994004), and Statewide General Permit (NPDES Permit No. CAG140001) for Drinking Water System Discharges. Mandatory compliance would ensure the construction of the Regional Project water conveyance components is consistent with regulations, plans, and policies described in Section 5.9.1. The impact on water quality associated with construction of the Regional Project water conveyance components would be less than significant for the reasons described under the Local Project, above; no mitigation is necessary.

#### Mitigation Measures:

None Required.



Regional Project Significance Determination:  
Less than Significant Impact.

## Operation-Related Violation of Water Quality Standards, Polluted Runoff, or Otherwise Degraded Water Quality

**Impact HYDRO 5.9-2: Would Project operation violate water quality standards and/or Waste Discharge Requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade water quality?**

The following analysis evaluates potential impacts associated with operating each of the three primary elements of the Project, including offshore, coastal, and inland Project components for both the Local and Regional Projects. **Table 5.9-4** summarizes the impact significance conclusions. Potential operations-related impacts on water quality could result from the surface water runoff at the desalination plant, the increased concentration of salinity and other constituents in the brine discharge, the dissolution of copper ions from the copper-nickel wedgewire intake screens, and the operation of the desalinated water conveyance components.

**TABLE 5.9-4  
SUMMARY OF IMPACT HYDRO 5.9-2 OPERATION-RELATED VIOLATION OF WATER QUALITY STANDARDS, POLLUTED RUNOFF, AND DEGRADATION OF WATER QUALITY**

	Ocean Water Desalination Facility	Offshore Intake and Discharge Facilities	Inland Conveyance Facilities
<b>Impact HYDRO 5.9-2: Impacts on operation-related violation of water quality standards, polluted runoff, and degradation of water quality.</b>			
<b>Local Project</b>			
Operation	LTS	LTS	LTS
<b>Regional Project</b>			
Operation	LTS	LTS	LTS

NOTES:

LTS = Less than Significant, no mitigation proposed

### **Local Project**

#### **Operation-Related Impacts**

##### **Ocean Water Desalination Facility – ESGS North and South Sites**

The onshore areas proposed for development, including the proposed sites for the desalination facility, are currently developed and/or disturbed and are largely covered with impervious surfaces, are generally flat, and are served by existing stormwater collection and conveyance systems. Development of the desalination facility would not substantially increase impervious surface area as compared to existing conditions.

The desalination facility at either of the proposed ESGS sites would be designed, as required, with new on-site stormwater drainage collection and conveyance systems as well as stormwater quality BMPs pursuant to applicable regulatory requirements, including compliance with the

County's MS4 permit (described in detail in Section 5.9.1). West Basin would be required to prepare and implement a SUSMP demonstrating compliance with the City's MS4 permit. In accordance with the NPDES Municipal Stormwater Permit for MS4s, the Local Project would be required to implement post-construction stormwater BMPs, such as the use of pervious surfaces (i.e., concrete or pavement), bio-swales, vegetated buffers, and/or retention basins. A post-construction SWPPP would be prepared to ensure appropriate maintenance measures for the BMPs. Compliance with the post-construction stormwater requirements would ensure that stormwater does not transport pollutants that impair or degrade the beneficial uses of receiving water bodies. Mandatory compliance with post-construction MS4 permit requirements would ensure the desalination facility site is developed in a manner consistent with regulations, plans, and policies described in Section 5.9.1. Impacts to water quality would be less than significant.

Adherence to NPDES permit requirements for discharges from drinking water systems to surface waters in California (Order No. WQ 2014-0194, NPDES No. CAG140001), as described under Impact HYDRO 5.9-1, would ensure any discharges conducted as part of routine maintenance or repair would not degrade the water quality or impair designated beneficial uses of receiving waters. As such, Local Project ocean water desalination facility operations would not violate any water quality standards. Impacts to water quality would be less than significant.

#### Screened Ocean Intake and Concentrate Discharge Structures

Operational discharges from the Local Project would be discharged through the existing ESGS tunnel and the proposed brine discharge structure (diffuser), described in Section 3.4.1. The diffuser, representing the brine discharge point, is designed to disperse the brine stream rapidly, thereby minimizing differences in the concentrations of salinity and other water quality constituents between the discharged brine and the surrounding seawater. Operational discharges from the Local Project would increase salinity levels near the brine discharge structure that could exceed California Ocean Plan salinity requirements or reduce dissolved oxygen concentrations, resulting in areas of hypoxia. Additionally, the brine could contain increased concentrations of constituents that originated in the Ocean and that are regulated under the California Ocean Plan.

The impact analysis presented below first assesses salinity increases from Local Project operational discharges and whether such increases comply with California Ocean Plan numeric salinity standards. Second, an assessment is presented for other regulated water quality constituents, including dissolved oxygen. The assessment methodology incorporates consideration of baseline conditions in Santa Monica Bay as well as the California Ocean Plan's receiving water salinity limitations and numeric water quality objectives as significance thresholds (described below) and uses the methods prescribed in the California Ocean Plan for assessing discharges from the operation of desalination plants. Following the assessment of operational discharges, an assessment of potential water quality impacts is presented for the operation of the proposed screened ocean intake structure.

#### *Salinity*

A multiport diffuser system typically consists of a series of nozzles that create relatively high-velocity jets to increase brine mixing through enhanced entrainment of ambient seawater and maintain a reasonable water jet velocity within the seawater column. The area where the mixing

takes place is called the BMZ.<sup>19</sup> In an open ocean environment with dynamic mixing from ocean currents, tidal and wave actions such as Santa Monica Bay, the use of a multiport diffuser system is effective in preventing dense, high-salinity water from accumulating on the seafloor.

The size and shape of the mixing zone depends upon the discharge rate, diffuser system design, initial salinity concentrations of the brine stream and the receiving water, and prevailing marine currents. The proposed multiport diffuser nozzles would be arranged in a “rosette” pattern (Figure 3-18c). Brine from the Local Project desalination facility would be conveyed to the proposed diffuser via the existing ESGS concrete tunnel, as described in Section 3.4.1. Water depth at 2,078 feet offshore at the proposed diffuser location ranges from 28 to 34 feet. The diffuser has been designed with multiple ports inclined upward at a 46° angle<sup>20</sup> from the horizontal. This orientation is intended to reduce jet exit velocity, to meet California Ocean Plan salinity requirements, to reduce shear stress and turbulence-induced mortality of organisms that may be entrained into the diffuser jets (see Section 5.11, *Marine Biological Resources*), and to ensure the discharge plume does not reach the ocean surface.

As described in Section 5.9.1, the California Ocean Plan limits the increase of salinity of receiving water from desalination plant discharges to a daily maximum of 2 parts per thousand (ppt) above natural background salinity. The owner or operator of a desalination facility must meet the salinity standard at the boundary of the BMZ, defined as the horizontal distance of 100 meters (328 feet) from the point of discharge. A significant impact related to water quality, water quality standards or Waste Discharge Requirements would occur if operational discharges from the Local Project resulted in a salinity level of 2 ppt above ambient salinity levels beyond the BMZ.

To determine whether the proposed discharge would comply with the California Ocean Plan BMZ salinity requirements, a brine plume mixing model that is consistent with the method approved by the SWRCB was conducted (Appendix 4C). **Table 5.9-5** summarizes two scenarios based on the conceptual design described in Section 3, which were evaluated using the mixing model. A detailed description of the mixing model methodology and results are included in **Appendix 4C**. The model analysis assumes an ambient ocean water flow velocity of zero (i.e., conservatively assumes an absolutely still ocean environment where ocean currents and tides are absent and mixing of the discharge plume with the surrounding water occurs as a direct result of the use of the diffusers).

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<sup>19</sup> BBMZ is the area where salinity may exceed 2.0 ppt above natural background salinity, or the concentration of salinity approved as part of an alternative receiving water limitation. The standard brine mixing zone shall not exceed 100 meters (328 feet) laterally from the points of discharge and throughout the water column.

<sup>20</sup> Because the water depth at the structure is relatively shallow, the nozzles are proposed to be oriented less steeply than normally employed for concentrate diffusers (diffuser jets are typically inclined at a 60° angle to maximize dilution), to avoid impacting the water surface.

**TABLE 5.9-5.  
PROPERTIES OF EFFLUENT CONSTITUENTS FOR LOCAL PROJECT DISCHARGE SCENARIOS**

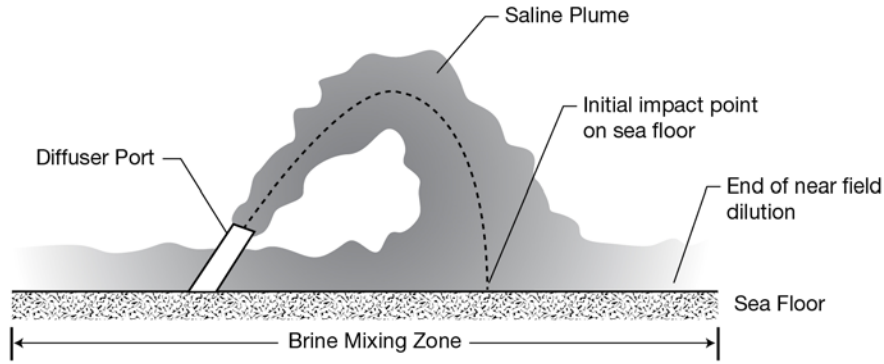
Project	Case ID	Brine			Washwater			Combined effluent			
		Flow (mgd)	Temp. (°C)	Salinity (ppt)	Flow (mgd)	Temp. (°C)	Salinity (ppt)	Flow (mgd)	Temp. (°C)	Salinity (ppt)	Density (kg/m <sup>3</sup> )
Local	L1	20.9	17.6	68.0	4.5	17.6	34.0	25.4	17.6	62.0	1046.2
	L2	20.9	17.6	68.0	0.1	17.6	34.0	21.0	17.6	67.8	1050.8

SOURCE: Roberts 2018; Appendix 4C.

The size of a discharge plume and the extent of dilution depends, in part, on whether the plume is positively buoyant (light or rising), as occurs with typical wastewater discharges that have lower salinity and hence lower density than the ambient ocean water; or negatively buoyant (dense or sinking), as occurs for desalination brine discharges that have a higher salinity and hence higher density than the receiving ocean water. The latter represents the case applicable to this Project. Denser discharges are dispersed via an upward inclined jet result in a plume that rises upward and then sinks down, making contact with the seafloor at some distance away from the diffuser nozzles (**Figure 5.9-4**). As the discharge plume ascends, the jet entrains ambient water, and the brine becomes diluted. Because the plume is denser than the receiving water, it reaches a terminal rise height and then falls back to the seafloor. Entrainment of seawater into the plume continues in the descending plume phase, promoting more mixing and dilution. After contacting the seafloor, the brine plume continues traveling horizontally and further entrains ambient seawater resulting in greater dilution. The brine discharge model analysis estimated dilution ratios at where the plume contacts the seafloor as well as at where the plume momentum from the nozzle becomes zero (**Figure 5.9-4**). Given that the model assumes no additional mixing or dilution from ocean currents or tides, the model would not be able to predict additional dilution beyond where the plume momentum reaches zero.

#### *Salinity Results and Discussion*

The model analysis (Appendix 4C) demonstrates that operational discharges from the Local Project would not exceed 2 ppt above ambient conditions at the BMZ boundary. In fact, the model analysis indicates that the 2 ppt salinity threshold would be met at a distance of 11.6 m (38 feet) from the point of discharge (**Table 5.9-6**). Such a distance is well within the 100 meters (328 feet) from the point of discharge as prescribed in the California Ocean Plan and would translate to a circular area of approximately 0.1 acres around the diffuser. The terminal height would reach a maximum of 19.5 feet above the seafloor for both scenarios and after descending and making contact with the seafloor, the model analysis indicates that the brine plume would continue entraining ambient seawater and further diluting until the plume momentum reaches zero (i.e., edge of the near field) at 119 feet from the point of discharge. The salinity at edge of the near field would decrease to 1.9 ppt above ambient. The total seafloor area from the diffuser to the edge of the near field would be a circular area of approximately 1 acre (Appendix 4C). Thus, brine discharges from the Local Project would not exceed or violate the California Ocean Plan salinity standards or degrade water quality in terms of salinity; impacts related to salinity would be less than significant.



West Basin Ocean Water Desalination Project  
SOURCE: Roberts 2018; Appendix 4C.

**Figure 5.9-4**  
Characteristics of an Inclined Dense Jet

**TABLE 5.9-6.**  
**OPTIMUM PORT CONFIGURATIONS FOR EACH FLOW SCENARIO ASSUMING PORT DEPTH OF 20 FEET AND SALINITY INCREMENT LESS THAN 2 PPT AT THE JET IMPACT POINT**

Project	Case ID	Effluent			Nozzle conditions					Dilution		Salinity Increment		Impact Point Length (ft)	Near Field Length (ft)
		Flow (mgd)	Salinity (ppt)	Density (kg/m <sup>3</sup> )	No.	Diam. (in)	Angle (deg)	Flow (cfs)	Velocity (ft/s)	At Impact Point, S <sub>i</sub>	At Near Field, S <sub>n</sub>	At Impact Point, S <sub>i</sub>	At Near Field, S <sub>n</sub>		
Local	L1	25.4	62.0	1046.2	4	15.0	46	9.8	8.0	14.3	14.9	2.0	1.9	38	119
	L2	21.0	67.8	1050.8	4	12.4	46	8.1	9.7	17.3	18.0	2.0	1.9	38	119

NOTES:  
S<sub>i</sub> and S<sub>n</sub> refer to salinity and dilution at the point the plume contacts the seafloor (impact point) and at the edge of the near field, respectively (Figure 5.9-4).  
SOURCE: Roberts 2018; Appendix 4C.

### Other Water Quality Objectives

As part of desalination facility operations, ocean water would be processed through the RO treatment process to separate fresh water from salts and other impurities. Screened source water would enter the desalination facility and approximately half the water volume would be desalinated as product water and the remaining half would be discharged via the proposed diffuser as brine. The RO brine would have approximately double the concentration of constituents (including salts) as compared to the source water. As described for salinity above, the diffuser would facilitate the rapid dispersion and dilution of the brine by entraining seawater into the brine stream, thereby minimizing differences in water quality between the discharged brine and the receiving seawater within a relatively short distance from the point of discharge. The following analysis would evaluate whether discharge from the Project could result in significant adverse impacts on dissolved oxygen and water quality objectives as specified in the California Ocean Plan and/or NPDES effluent limitations.

Dissolved oxygen concentration varies per many factors, including hydrodynamic conditions, photosynthesis, and biological and chemical oxygen demands associated with the decomposition

of organic material. Hypoxic conditions can form when dissolved oxygen levels drop to below 2 mg/L in stagnant waters and/or in waters with high degradable organics concentration exerting high oxygen demands. Santa Monica Bay is a dynamic environment with average ambient dissolved oxygen levels in the nearshore temperate environment of 7.5 mg/L (see Section 5.9.2) and these receiving waters would be rapidly entrained into the brine plume as it is discharged. Under these conditions, the amount of dissolved oxygen supplied to a discharged dense brine plume by entrained ambient seawater would ensure that dissolved oxygen levels would not be substantially reduced in receiving waters as compared to baseline conditions. Furthermore, as noted above, the treatment process would involve concentrating source ocean water and hence would not alter the mass loading of organics or oxygen demands. As a result, hypoxia would not occur. Impacts relating to decreased dissolved oxygen, therefore, would be less than significant.

As described in Section 5.9.2, the waters of Santa Monica Bay are already impaired; the presence of various legacy pesticides as well as chemical products in current use—such as organophosphate pesticides, PAHs, and PCBs—have been documented. Water quality sampling which occurred as part of West Basin’s Pilot Project located in El Segundo (at the proposed Project site) and Demonstration Project located in Redondo Beach, identified eight constituents in Santa Monica Bay (copper, ammonia, cyanide, beta/photon emitters, PAHs, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) equivalents, benzidine, and bis(2-ethylhexyl) phthalate) that at times exceeded the California Ocean Plan water quality objectives under baseline conditions (SPI 2017; SPI 2018). The sampling programs also indicate that water quality conditions in Santa Monica Bay are highly variable over time. Given the predominant current flow direction (from north to south) and its proximity to Ballona Creek and Marina Del Rey (impaired water bodies located ~5 miles north of the ESGS site), ambient water quality at the ESGS in the nearshore area could also be affected by the water quality of these major discharge points, particularly during storm events.

Operational discharges of brine would be regulated through a Project-specific NPDES Permit (see Section 5.9.1) and would be subject to the permit requirements prescribed by the LARWQCB. Such requirements, defined in the NPDES permit, would be designed to ensure that operation of the proposed Project would not violate water quality standards or Waste Discharge Requirements, which incorporate the California Ocean Plan and Basin Plan water quality objectives as effluent limitations. Effluent limitations are determined by the Regional Water Board using a statistical method that accounts for the averaging period of the water quality objectives, and also accounts for and captures the long-term variability of a given pollutant in the effluent. Such an assessment enables the Regional Water Board to determine if a discharge could cause, or has the reasonable potential to cause, or contribute to an exceedance of the water quality objectives summarized in Table 5.9-2.

Compliance with the California Ocean Plan water quality objectives is required at the point where initial dilution of the discharge into the ocean is completed and this occurs in an area known as the “zone of initial dilution,” or ZID. The ZID is defined as the area where buoyancy- and momentum-driven mixing produces rapid dilution of the discharge. As prescribed in the California Ocean Plan, the discharge must meet water quality objectives at the outer boundary of the ZID. Discharge limitations for the NPDES permit are based on and obtained by quantifying the degree of dilution

that would occur within the ZID, referred to as the minimum probable initial dilution ( $D_m$ ), adjusted to derive the NPDES permit limits on in-pipe constituent concentrations prior to ocean dilution. To calculate effluent limitations for the objectives listed in Table 5.9-2, the California Ocean Plan specifies the following equation:

$$C_e = C_o + D_m (C_o - C_s)$$

where:

$C_e$  = The in-pipe effluent concentration limit (ug/L) to achieve compliance with water quality objectives.

$C_o$  = The water quality objective to be met at the edge of the ZID (ug/L).

$C_s$  = The background seawater concentration (ug/L).

$D_m$  = Minimum probable initial dilution, expressed as parts seawater per part brine.

Since the ambient water quality within Santa Monica Bay may, at times, exceeds California Ocean Plan water quality objectives for some constituents under existing conditions, the brine concentrations at the outer boundary of the ZID may not result in constituent concentrations above baseline conditions, but still may exceed water quality objectives for certain constituents. However, prior to implementing operational discharges, West Basin would be required to complete a water quality assessment that thoroughly characterizes the discharge using protocols defined in Appendix II “Minimum Levels” of the California Ocean Plan and approved by the LARWQCB, to demonstrate compliance with the California Ocean Plan water quality objectives. A complete characterization of the proposed discharge would include, but is not limited to, design and actual flows, a list of constituents and the discharge concentration of each constituent, a list of other appropriate waste discharge characteristics, a description and schematic drawing of all treatment processes, and a description of disposal methods (such as via diffuser).

Further, pursuant to Water Code Sections 13267 and 13383, West Basin would be required to comply with the Monitoring and Reporting Program requirements of the NPDES Permit and would also be subject to the monitoring and reporting requirements of the California Ocean Plan (described in Section 5.9.1). Implementation of a Monitoring and Reporting Program would ensure technical and monitoring data are provided to the LARWQCB to determine West Basin’s compliance with NPDES effluent limitations, to assess the need for further investigation or enforcement action, and to protect public health and safety and the environment. The Monitoring and Reporting Program, consistent with California Ocean Plan requirements, must also include provisions for monitoring of effluent and receiving water characteristics and impacts on all forms of marine life, including monitoring for benthic community health, aquatic life toxicity, hypoxia, and receiving water characteristics. If information submitted under the Monitoring and Reporting Program establishes that operational discharges cause, or have the reasonable potential to cause, or contribute to an excursion above a California Ocean Plan water quality objective, the NPDES Permit could be re-opened for modification to include a revised effluent limitation.

Discharges would not be allowed if they do not conform to the NPDES effluent limitations that are prescribed for the protection of receiving water quality and beneficial uses. Adherence to mandatory effluent limitations and regulatory requirements and implementation of a monitoring

and reporting plan to confirm compliance would ensure that operational discharges do not degrade the quality of receiving waters in Santa Monica Bay or impair designated beneficial uses. Given that the proposed operational discharge would not increase the total load of constituents in Santa Monica Bay receiving waters as compared to ambient conditions, nor violate NPDES effluent limits, the water quality impact associated with the discharge of brine would be less than significant.<sup>21</sup>

*Ocean Intake: Copper leaching from intake screen structure*

The Local Project ocean intake structure would include up to 4 wedgewire screens composed of either 90:10 or 70:30 copper-nickel alloy (see Section 3.4.1). The use of a copper-nickel alloy is proposed to minimize micro-biofouling and prevent macro-biofouling of the intake structure, which could impede intake capacity and/or reduce screen efficacy for maintaining the prescribed below 0.5 fps requirement in the California Ocean Plan for preventing and minimizing entrainment and impingement of marine organisms (see Section 5.11, *Marine Biological Resources*). Metals submerged in seawater are subject to corrosion and trace amounts of metal ions dissolve in seawater over time. Similarly, copper alloys are subject to corrosion in marine environment. Under certain conditions over time, dissolution of copper alloy could result in the release copper ions into the surrounding waters.

The release of copper ions is a complex process influenced by hydrodynamic conditions, temperatures, pH, compositions of seawater, and surficial microbial activities. Copper alloys will stabilize in the marine environment and form a protective copper oxide layer. This copper oxide layer minimizes dissolution of copper. As such, the corrosion rate of copper alloys typically decreases rapidly after submerged in clean seawater after the formation of this copper oxide layer as discussed in Appendix 4B. Generally, copper corrosion is a slow process in seawater with an estimated corrosion rate of 2.5 micrometer per year (or 0.1 mil per year) (Appendix 4B).

Copper dissolution in marine environment and its direct impact on water quality have not been extensively evaluated (CSLC 2017) because copper alloys corroding in natural environment occurs at such a slow rate. Therefore, direct measurement of this corrosion is technically challenging and impracticable. However, based on corrosion rates published in literature, it is possible to estimate the amount of copper potentially released by the copper alloy wedgewire screens from operation of the Local Project intake screen structure. In fact, a desktop study was conducted to evaluate the long-term corrosion and biofouling resistance of copper nickel alloys for marine applications as presented in Appendix 4B. The study also estimated, on an order of magnitude basis, the amount of copper ions that would potentially be released as a result the corrosion of wedgewire screens over time (Appendix 4B). Instantaneous maximum and daily average copper concentrations were calculated based on the published corrosion rates of the alloys, metal density, exposed area, exposure time, and the daily volumetric flow rates of the

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<sup>21</sup> While temperature is also a commonly studied parameter due to the commingling of the brine streams from desalination plants with power plant discharges of cooling water that have high temperatures (see Roberts et al., 2010; Dawoud and Al Mulla, 2012), because the proposed Local and Regional Project would not operate in combination with a power plant or other facility that uses ocean waters for cooling purposes, there would be no heating mechanism or any process that would increase the temperature of the source water as it passes through the treatment units. Therefore, the desalination process would not substantially increase the temperature of the discharged effluent, and thermal impacts on receiving waters are not discussed further.



proposed Project. It is noted that this estimate conservatively assumed that 100% of the copper dissolved would become free copper ions [Cu<sup>2+</sup>] and did not account for copper speciation<sup>22</sup> or precipitation of copper ions as cupric hydroxyl-chloride [Cu<sub>2</sub>(OH)<sub>3</sub>Cl].

Overall, the analysis determined that dissolution of copper into seawater would not result in exceedances of the California Ocean Plan water quality objectives for copper due to the slow rate of corrosion (AMS 2018). For the Local Project, the mean concentrations of copper-nickel alloy loss were calculated to be 0.03 micrograms per liter (µg/L) for the 90:10 and 0.05 µg/L for the 70:30 copper-nickel alloy wedgewire screens; see Table 5.11-10 in Section 5.11, *Marine Biological Resources*. In comparison to the 6-month median of 3 micrograms per liter (µg/L), daily maximum of 12 µg/L, and instantaneous maximum of 30 µg/L identified as the California Ocean Plan Water Quality Objectives for Protection of Marine Life thresholds (see Section 5.9.1), the estimated daily and instantaneous copper concentrations resulting from corrosion of the copper-nickel alloy would be orders of magnitude smaller. Also, once the protective layer is established, corrosion of copper-nickel alloys is typically a slow and steady chemical reaction (as indicated by their measurement in micrometers or mils per year), it is unlikely that the instantaneous copper objective would be exceeded. Therefore, operation of the proposed wedgewire screens would not result in an exceedance of water quality standards or the degradation of water quality in a manner that would impair beneficial uses. As such, impacts of copper dissolution from the intake screen would be less than significant.<sup>23</sup>

#### Desalinated Water Conveyance Components

The Local Project desalinated water conveyance components would be located within the ROW of identified roadway alignments within the city of El Segundo and other affected communities and would serve to transport treated potable water within the designated service area for distribution. Once constructed, the proposed pipelines would be located underground and the surface along the pipeline alignments would be restored to pre-construction conditions. No long-term changes in drainage patterns would result from implementation of the proposed pipelines and, as such, operation of the desalinated water conveyance pipelines would not result in substantial polluted runoff or otherwise substantially degrade water quality. Adherence to NPDES permit requirements for discharges from drinking water systems to surface waters in California (Order No. WQ 2014-0194, NPDES No. CAG140001), as described under Impact HYDRO 5.9-1, would ensure any discharges conducted as part of routine maintenance or repair would not

<sup>22</sup> “Numerous studies testing the response of phytoplankton growth to increasing copper concentrations have demonstrated that the inhibition of growth due to toxicity is proportional to the concentration of free or hydrated Cu<sup>2+</sup>, and not the total dissolved copper concentration.” Bruland, KW, EL Rue, JR Donat, SA Skrabal, JW Moffett, 2000. *Intercomparison of voltammetric techniques to determine the chemical speciation of dissolved copper in coastal seawater sample*.

<sup>23</sup> Poseidon recently proposed to use stainless steel wedgewire screens for the Seawater Desalination Project at Huntington Beach in response to the draft Supplemental EIR prepared by State Lands Commission which found that “[i]n the absence of an available suitable standard to assess copper releases from solid copper-nickel screens, the impact to ocean water quality from wedgewire screen leaching cannot be quantified or assessed, and could be potentially significant.” See Part III - Final Supplemental EIR at p. 4-54, <http://www.slc.ca.gov/Info/Reports/Seawater/PartIII.pdf>, accessed February 22, 2018. Poseidon had not done any testing of the copper screens. West Basin, however, has adequately quantified the potential impacts of copper leaching to reach its conclusion of less than significant.

degrade the water quality or impair designated beneficial uses of receiving waters. Therefore, the impact would be less than significant.

**Mitigation Measures:**

None Required.

**Local Project Significance Determination:**

Less than Significant Impact.

**Regional Project Operation Related Impacts**

**Ocean Water Desalination Facility – ESGs North and South Sites**

Refer to Impact HYDRO 5.9-1 above for detailed discussion related to post-construction water quality impacts resulting from facility siting and operation. Facility siting for the Regional Project desalination facility would be as described for the Local Project, above, with some additional buildout within the already developed industrial facility site. Operation would not alter the amount, rate, or quality of stormwater as compared to that described for the Local Project. Mandatory compliance with post-construction MS4 permit requirements for stormwater treatment and management would ensure the desalination facility site is developed in a manner consistent with regulations, plans, and policies described in Section 5.9.1. Impacts to water quality would be less than significant.

**Screened Ocean Intake and Concentrate Discharge Structures**

As described in Section 3.4.1, expansion of the Local Project to the Regional Project would involve expanding the Local Project intake and discharge structures to accommodate the 60 MGD Regional Project desalination facility. The intake structure would be modified through the installation of 8 additional wedgewire screens to pre-installed risers (comprising 12 total for the Regional Project), as described in Section 3.4.1. The Local Project diffuser structure would be modified through the removal of the existing four duckbill diffusers and the installation of eight smaller-diameter duckbill diffusers (Section 3.4.1). The eight duckbill diffusers would be inclined upwards at a 26° angle from the horizontal (reduced as compared to the Local Project) to meet California Ocean Plan salinity requirements and to maintain a submerged discharge plume.

**Salinity**

As described for the Local Project, a significant impact related to water quality, water quality standards or Waste Discharge Requirements would occur if operational discharges from the Regional Project resulted in salinity concentrations greater than 2 ppt above ambient salinity levels at the edge of the BMZ. The methodology and assumptions for assessing Regional Project salinity impacts are the same as described for the Local Project and are presented in detail, with the results, in Appendix 4C. **Table 5.9-7** summarizes two Regional Project scenarios which were used in the mixing model to evaluate compliance. The model analysis assumes a port depth of 20 feet below sea surface, eight discharge ports at a 26° angle. Additionally, zero water flow or movement from ocean current and tides is assumed, consistent with the California Ocean Plan methodology for assessing salinity increases from desalination facilities.

**TABLE 5.9-7.  
PROPERTIES OF EFFLUENT CONSTITUENTS FOR REGIONAL PROJECT DISCHARGE SCENARIOS**

Project	Case ID	Brine			Washwater			Combined effluent			
		Flow (mgd)	Temp. (°C)	Salinity (ppt)	Flow (mgd)	Temp. (°C)	Salinity (ppt)	Flow (mgd)	Temp. (°C)	Salinity (ppt)	Density (kg/m <sup>3</sup> )
Regional	R1	62.7	17.6	68.0	13.5	17.6	34.0	76.2	17.6	62.0	1046.2
	R2	62.7	17.6	68.0	0.3	17.6	34.0	63.0	17.6	67.8	1050.8

SOURCE: Roberts 2018; Appendix 4C.

*Salinity Results and Discussion*

Assuming the most conservative scenario, the model analysis (Appendix 4C) demonstrates that operational discharges from the Regional Project would meet the California Ocean Plan salinity standard (Table 5.9-8). Also, the operational discharges would remain below the water surface (i.e., the plume would remain submerged), consistent with California Ocean Plan requirements. The California Ocean Plan salinity limit of 2 ppt above ambient would be met at the point of initial dilution, located 66 feet from the diffuser (representing a circular area of approximately 0.3 acres around the diffuser) for the assessed operational discharge scenarios. Meeting the 2 ppt salinity requirement at 66 feet from the diffuser would be well within the California Ocean Plan allowable distance of 328 feet or 100 meters (the maximum allowable BMZ). As the discharge plume continues to entrain ambient seawater and further dilute within the near field, salinity would be reduced to 1.7 ppt (Table 5.9-8) above ambient. The edge of the near field would be located 203 feet from the diffuser, representing a circular area of approximately 3 acres around the diffuser. Furthermore, as described for the Local Project, the computed salinities would occur only along the seabed. Salinities would decrease with height in the water column and would be above ambient salinity concentrations only near the seabed (Appendix 4C).

**TABLE 5.9-8.  
OPTIMUM PORT CONFIGURATIONS FOR EACH FLOW SCENARIO ASSUMING PORT DEPTH OF 20 FEET AND SALINITY INCREMENT LESS THAN 2 PPT AT THE JET IMPACT POINT**

Project	Case ID	Effluent			Nozzle conditions					Dilution		Salinity Increment		Impact Point Length (ft)	Near Field Length (ft)
		Flow (mgd)	Salinity (ppt)	Density (kg/m <sup>3</sup> )	No.	Diam. (in)	Angle (deg)	Flow (cfs)	Velocity (ft/s)	At Impact Point, S <sub>i</sub>	At Near Field, S <sub>n</sub>	At Impact Point, S <sub>i</sub>	At Near Field, S <sub>n</sub>		
Regional	R1	76.2	62.0	1046.2	8	13.4	26	14.7	15.0	14.3	16.9	2.0	1.7	66	203
	R2	63.0	67.8	1050.8	8	11.1	26	12.2	18.1	17.2	20.3	2.0	1.7	66	203

SOURCE: Roberts 2018; Appendix 4C.

The incremental salinity increase from operational discharges would meet the 2 ppt threshold at the impact point, 66 feet from the diffuser for both Scenario R1 and R2. Therefore, the area where salinity concentration would be greater than 2 ppt would be restricted to a small area (less than

0.3 acre) around the diffuser and above the seafloor, which would attenuate rapidly with distance from the nozzle.

The analysis of the proposed Regional Project operational discharges indicates that, for both scenarios modeled, the discharge of brine would meet California Ocean Plan salinity standards. The Regional Project would therefore, not exceed or violate the California Ocean Plan salinity standards or degrade water quality in terms of salinity; impacts related to salinity would be less than significant.

#### *Other Water Quality Considerations*

Refer to the Local Project discussion in Impact HYDRO 5.9-2 above for a discussion of dissolved oxygen. As summarized in Table 5.9-8, the minimum initial dilution ratios for the proposed operational discharges for the Regional Project would be 14.3 and 17.2 for scenarios R1 and R2, respectively. These dilution ratios are almost identical to those calculated for the Local Project (14.3 and 17.3 for scenarios L1 and L2, respectively). As such, the assessed concentrations of water quality constituents at the edge of the ZID (the point of compliance) would be similar to those reported for the Local Project. The main difference for the Regional Project would be that, as discussed in detail under salinity, above, the boundary of the ZID would be 66 feet from the diffuser, as compared to 38 feet for the Local Project. This would represent a larger mixing area.

As with the Local Project, the brine discharge would not contribute contaminants or increase their concentration significantly over ambient levels beyond the mixing area. Discharges would not be allowed if they do not conform to the NPDES effluent limitations that are prescribed for the protection of receiving water quality and beneficial uses. Adherence to regulatory requirements and implementation of a monitoring and reporting plan to confirm compliance would ensure that operational discharges do not degrade the quality of receiving waters in Santa Monica Bay or impair designated beneficial uses. Therefore, impacts to ocean water quality would be less than significant.

#### *Ocean Intake: Copper leaching from intake screen structure*

As described for the Local Project, West Basin conducted an assessment to estimate the amount of copper ions that would potentially be released as a result the corrosion of copper alloy wedgewire screens over time (Appendix 4B). The analysis assessed both the 90:10 and 70:30 copper-nickel alloys commonly used for marine environment. Instantaneous maximum and daily average copper concentrations were calculated for the 12 intake screens proposed for the Regional Project (compared to 4 for the Local Project) based on the reported corrosion rates of the alloys, metal density, exposed area, exposure time, and daily volumetric flow rates of the proposed Project. It is noted that this estimate conservatively assumed that 100% of the copper dissolved would become free copper ions [Cu<sup>2+</sup>] and did not account for copper speciation<sup>24</sup> or precipitation of copper ions as cupric hydroxyl-chloride [Cu<sub>2</sub>(OH)<sub>3</sub>Cl].

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<sup>24</sup> “Numerous studies testing the response of phytoplankton growth to increasing copper concentrations have demonstrated that the inhibition of growth due to toxicity is proportional to the concentration of free or hydrated Cu<sup>2+</sup>, and not the total dissolved copper concentration.” Bruland, KW, EL Rue, JR Donat, SA Skrabal, JW Moffett, 2000. *Intercomparison of voltammetric techniques to determine the chemical speciation of dissolved copper in coastal seawater sample.*

As was concluded for the Local Project, dissolution of copper into the environment would be unlikely to result in exceedances of the California Ocean Plan water quality objectives for copper during operation of the Regional Project due to the slow and steady rate of corrosion. For the Regional Project, the mean concentrations of copper were 0.03 µg/L for the 90:10 and 0.05 µg/L for the 70:30 copper-nickel alloy; see Table 5.11-10 in Section 5.11, *Marine Biological Resources*. In comparison to the daily maximum of 12 µg/L California Ocean Plan threshold, the estimated daily and instantaneous concentration loss through corrosion would not result in an exceedance of water quality standards or the degradation of water quality in a manner that would impair beneficial uses and impacts would be less than significant.

#### Desalinated Water Conveyance Components

Similar to the Local Project, the Regional Project desalinated water conveyance components would be installed underground within existing roadway ROW and the surface along the pipeline alignments would be restored to pre-construction conditions. Mandatory compliance with post-construction MS4 permit requirements for stormwater treatment and management as well as NPDES permit requirements for discharges from drinking water systems to surface waters in California would ensure the desalinated water conveyance components are sited and operated in a manner consistent with regulations, plans, and policies described in Section 5.9.1. Impacts to water quality would be less than significant.

#### Mitigation Measures:

None Required.

#### Regional Project Significance Determination:

Less than Significant Impact.

### Groundwater Supplies and Recharge

#### **Impact HYDRO 5.9-3: Would the Project deplete groundwater supplies or interfere substantially with groundwater recharge?**

The following analysis evaluates potential impacts associated with constructing and operating each of the three primary elements of the Project, including offshore, coastal, and inland Project components for both the Local and Regional Projects. **Table 5.9-9** summarizes the impact significance conclusions. Potential impacts on groundwater supply could result from construction and operations at the desalination plant site, from construction and operations of the screened ocean intake and brine discharge systems, and from construction and operation of the desalinated water conveyance components.

**TABLE 5.9-9  
SUMMARY OF IMPACT HYDRO 5.9-3 GROUNDWATER SUPPLIES AND RECHARGE**

	Ocean Water Desalination Facility	Offshore Intake and Discharge Facilities	Inland Conveyance Facilities
<b>Impact HYDRO 5.9-3: Impacts on groundwater supplies and recharge.</b>			
<b>Local Project</b>			
Construction	LTS	LTS	LTS
Operation	LTS	LTS	LTS
<b>Regional Project</b>			
Construction	LTS	NI	LTS
Operation	LTS	NI	LTS

NOTES:

NI = No Impact, no mitigation proposed  
LTS = Less than Significant, no mitigation proposed

**Local Project**

**Construction-Related Impacts**

**Ocean Water Desalination Facility – ESGS North and South Sites**

Public water sources would be utilized during construction of the desalination facility. Existing utility service connections for public water service would be utilized at the ESGS North Site or would be extended from the ESGS North Site to the ESGS South Site. The volume of water needed for construction would be minimal and only required temporarily for the duration of construction. As such, water use would not deplete groundwater supplies available within the West Coast Groundwater Basin.

As discussed in Section 5.9.2, groundwater levels in the city of El Segundo vary, but are typically 20 feet below ground surface. Project construction may require dewatering where deep excavations encounter shallow groundwater. Any such dewatering activities would be in the shallow coastal aquifer, in an area designated by the RWQCB as a “no pump zone” due to contaminated groundwater. Construction dewatering would not involve substantial groundwater extraction from aquifers used for municipal or industrial water supply. Dewatering for construction would be temporary, highly localized, and would involve the extraction of low volumes of shallow groundwater. As such, dewatering activities conducted during construction would not result in significant long-term effects to local groundwater supplies. Additionally, as described under Impact HYDRO 5.9-1, any dewatering would be subject to LARWQCB approval for withdrawal and disposal and discharges would be conducted in adherence with LARWQCB General Dewatering Permit (NPDES Permit No. CAG994004), which testing and treatment of all dewatering discharges. The ESGS site is located within a developed area generally covered with impervious surface and the ESGS North and South Sites have historically been used for industrial facilities which do not contribute significant recharge to local aquifers used for water supply. Therefore, impacts resulting from Local Project desalination facility construction-related activities on groundwater supplies and local groundwater recharge would be less than significant.

### Screened Ocean Intake and Concentrate Discharge Structures

Local Project screened ocean intake and concentrate discharge system construction would occur primarily offshore underwater and would not intersect groundwater or interfere with groundwater recharge. Therefore, impacts resulting from Local Project intake and brine discharge structure construction-related activities on groundwater supplies and local groundwater recharge would be less than significant.

### Desalinated Water Conveyance Components

Construction of the Local Project desalinated water conveyance components would require excavation/trenching and/or demolition activities (i.e., removal of pavement) for installation. The Local Project would use municipal water supply during construction for activities such as dust control and maintenance of construction vehicles and equipment. Such water use would not result in development of new wells or extraction of additional groundwater, as described above for the desalination facility. All ground surfaces disturbed during construction would be returned to their original condition once construction is completed; therefore, the Local Project would not increase the amount of impervious surface area within the conveyance corridor or alter conditions relating to groundwater recharge. Thus, impacts resulting from Local Project water conveyance construction-related activities on groundwater supplies and local groundwater recharge would be less than significant.

### Mitigation Measures:

None Required.

### Local Project Significance Determination:

Less than Significant Impact.

## Operational Impacts

### Ocean Water Desalination Facility – ESGS North and South Sites

Operation of the Local Project would provide additional water supplies and lessen potential adverse effects on currently available sources. Local Project operations would require a total staff of approximately 20 full-time personnel, with the facility being fully staffed 8 hours per day, 5 days per week, and partially staffed at other times. This would not represent a substantial increase in the number of permanent workers within the study area, and no substantial long-term increase in water demand or demand on public water sources. As potable water would be provided via connection to the public water system, demands on groundwater supplies would not occur with Local Project ocean water desalination facility operations. Additionally, the Local Project onshore areas proposed for development are currently developed/disturbed and are largely covered with impervious surfaces and are not located within a local groundwater recharge area, as described above for construction. The onshore Local Project ocean water desalination facility operations would generally result in comparable amounts of impervious surfaces as under existing conditions, with only a slight increase in impervious surface area overall. Therefore, impacts resulting from Local Project desalination facility operation on groundwater supplies and local groundwater recharge would be less than significant.

### Screened Ocean Intake and Concentrate Discharge Structures

The screened ocean intake and discharge structures would not interfere with the hydrogeological flow in the study area and would not require use of any local water supply. Therefore, potential impacts relating to groundwater supply and recharge would be less than significant.

### Desalinated Water Conveyance Components

The Local Project desalinated water conveyance component operations would result in a minor water demand related to maintenance and repair requirements (i.e., for dust control if ground excavation and repairs are needed) that would be conducted as needed. As potable water would be provided via connection to the public water system, demands on groundwater supplies would not occur with Local Project desalinated water conveyance component operations. Following construction, all ground surfaces would be returned to their original condition; therefore, the Local Project would not increase the amount of impervious surface area within the conveyance corridor or alter conditions relating to groundwater recharge. Further, given the confined nature of the West Coast Basin (see Section 5.9.2), groundwater recharge does not naturally occur within the areas proposed for pipeline installation. Therefore, impacts resulting from Local Project water conveyance operation on groundwater supplies and local groundwater recharge would be less than significant.

### Mitigation Measures:

None Required.

### Local Project Significance Determination:

Less than Significant Impact.

## ***Regional Project***

### **Construction-Related Impacts**

#### Ocean Water Desalination Facility – ESGS North and South Sites

Construction activities, including water use and dewatering activities, would be reduced in terms of magnitude, duration, and intensity as compared to the construction of the Local Project, described and assessed in detail above. Therefore, potential impacts relating to groundwater supply and recharge would be less than significant.

### Screened Ocean Intake and Concentrate Discharge Structures

Due to the nature and location of upgrading the ocean intake and brine discharge components to accommodate the Regional Project, which would involve installing additional outfall diffusers and intake screens onto existing risers located on the ocean floor, no impacts relating to groundwater supply and recharge would occur.

### Desalinated Water Conveyance Components

Construction activities, including water use and dewatering activities, for installation of Regional Project conveyance components would be reduced in terms of magnitude, duration, and intensity as compared to the construction of the Local Project, described and assessed in detail above. Therefore, potential impacts relating to groundwater supply and recharge would be less than significant.



Mitigation Measures:

None Required.

Regional Project Significance Determination

Less than Significant Impact.

**Operational Impacts**

**Ocean Water Desalination Facility – ESGs North and South Sites**

For discussion of ocean water desalination facility operational impacts to groundwater, see the assessment presented for the Local Project, above. The onshore Regional Project ocean water desalination facility would generally involve comparable amounts of impervious surfaces as described for the Local Project. Similarly, the West Coast Groundwater Basin is overlain by a thick semi-pervious aquitard, preventing any direct surface recharge through infiltration. Regional Project implementation would produce a locally-sourced, drought-proof potable water source and would help decrease area demand on local and regional water resources. Potable water for operation of the desalination facility would be provided via connection to the public water system, as described for the Local Project ocean water desalination facility operations. Therefore, potential impacts relating to groundwater supply and recharge would be less than significant.

**Screened Ocean Intake and Concentrate Discharge Structures**

For discussion of operational impacts associated with screened ocean intake and concentrate discharge on groundwater, see the assessment presented for the Local Project, above. For the reasons described for the Local Project, demands on groundwater supplies and interference with groundwater recharge would not occur with operation of the Regional Project screened ocean intake and discharge operations; no impacts relating to groundwater supply and recharge would occur.

**Desalinated Water Conveyance Components**

For discussion of desalinated water conveyance components operational impacts associated with groundwater, see the assessment presented for the Local Project, above. For the reasons described for the Local Project, potential impacts from operation of conveyance pipelines relating to groundwater supply and recharge would be less than significant.

Mitigation Measures:

None Required.

Regional Project Significance Determination

Less than Significant Impact.

**Drainage Patterns and Erosion**

**Impact HYDRO 5.9-4: Would the Project facilities substantially alter the existing drainage patterns in a manner which would result in substantial erosion or siltation on- or off-site?**

The following analysis evaluates potential impacts associated with constructing and operating each of the three primary elements of the Project, including offshore, coastal, and inland Project

components for both the Local and Regional Projects. **Table 5.9-10** summarizes the impact significance conclusions.

**TABLE 5.9-10  
 SUMMARY OF IMPACT HYDRO 5.9-4 DRAINAGE PATTERNS AND EROSION**

	Ocean Water Desalination Facility	Offshore Intake and Discharge Facilities	Inland Conveyance Facilities
<b>Impact HYDRO 5.9-4: Impacts on drainage patterns.</b>			
<b>Local Project</b>			
Construction	LTS	LTS	LTS
Operation	LTS	LTS	LTS
<b>Regional Project</b>			
Construction	LTS	LTS	LTS
Operation	LTS	LTS	LTS
NOTES: LTS = Less than Significant, no mitigation proposed			

**Local Project**

**Construction-Related Impacts**

**Ocean Water Desalination Facility – ESGS North and South Sites**

As described under Impact HYDRO 5.9-1, ocean water desalination facility construction would not substantially alter the existing on-site drainage patterns or the slope/gradient of the ESGS North or South Site. Therefore, the Local Project would not involve construction activities which would substantially alter the existing drainage pattern of the site or area. Additionally, as described in detail under Impact 5.9-1, Local Project construction would adhere to the requirements of the CGP. The CGP requires that non-stormwater discharges from construction sites be eliminated or reduced to the maximum extent practicable; a SWPPP that governs construction activities for the Project would be developed and implemented, and routine inspections would be performed for all stormwater pollution prevention BMPs and control practices being used at the site, including inspections before and after storm events. These requirements are standard construction practice and have been proven effective at preventing erosion and/or siltation both on- and off-site during construction activities and are specifically designed to manage stormwater within construction zones. West Basin would also demonstrate compliance with all applicable regulatory standards for construction activities to ensure that Project construction does not result in substantial erosion or siltation on- or off-site.

Mandatory compliance with the requirements of the CGP and other regulatory requirements would ensure the construction of the Local Project is consistent with the regulations, plans, and policies described in Section 5.9.1. Impacts relating to erosion, siltation or increased stormwater runoff on- and off-site due to altered drainage patterns resulting from construction activities associated with the Local Project would be less than significant.

### Screened Ocean Intake and Concentrate Discharge Structures

Construction of the offshore components associated with the seawater intake and brine discharge structures would be constructed underwater and hence would not alter drainage patterns onshore that could result in erosion or siltation. Impacts would be less than significant.

### Desalinated Water Conveyance Components

Construction of the Local Project desalinated water conveyance components would occur within public rights of way. Once installed, the surface drainage patterns would be similar to the existing condition. Impacts would be less than significant.

### Mitigation Measures:

None Required.

### Local Project Significance Determination

Less than Significant Impact.

## **Operational Impacts**

### Ocean Water Desalination Facility – ESGS North and South Sites

The ESGS site is currently entirely developed or disturbed, and as a result, surface areas are generally impervious or are compacted earth with low permeability. The site's pre-existing drainage patterns would not be altered significantly compared to existing conditions. The site would continue to be serviced by the existing stormwater system, and the rate, volume, and character of stormwater generated on-site would not be substantially different. The existing stormwater drainage facilities are sized to service previous operations on-site. The storm drain outlet located at the ESGS's southwest corner and within the property line may require minor modifications.

In accordance with the NPDES Municipal Stormwater Permit for MS4s, the Local Project would be required to implement post-construction stormwater BMPs that may include the use of pervious surfaces (i.e., concrete or pavement), bio-swales, vegetated buffers, and/or retention ponds.

Compliance with post-construction MS4 permit stormwater requirements would ensure that on-site drainage patterns are not altered such that there is a substantial increase in stormwater runoff compared to existing conditions. Further, adherence to the existing local, state, and federal laws, ordinances, and regulations would ensure that stormwater does not transport pollutants such that the beneficial uses of receiving water bodies are impaired or degraded, including as a result of erosion and siltation.

Mandatory compliance with post-construction MS4 permit requirements would ensure the operation of the Local Project is consistent with regulations, plans, and policies described in Section 5.9.1. Impacts to water quality would be less than significant.

### Screened Ocean Intake and Concentrate Discharge Structures

Operation of the offshore components associated with the seawater intake and brine discharge structures would not alter drainage patterns that could result in erosion or siltation. Impacts would be less than significant.

### Desalinated Water Conveyance Components

The Local Project desalinated water conveyance components would occur within public rights of way. Once installed, the surface drainage patterns would be similar to the existing condition. Impacts would be less than significant.

### Mitigation Measures:

None Required.

### Local Project Significance Determination

Less than Significant Impact.

## ***Regional Project***

### **Construction-Related Impacts**

#### Ocean Water Desalination Facility – ESGS North and South Sites

Similar to the Local Project, construction activities associated with the Regional Project would be less in terms of magnitude, duration, and intensity as compared to the Local Project.

The Regional Project would exceed 1 acre in size and, as such, all construction activities for onshore components would be subject to mandatory compliance with CGP requirements for stormwater management. These requirements are standard construction practice and have been proven effective at preventing erosion and/or siltation both on- and off-site during construction activities and are specifically designed to manage stormwater within construction zones.

Mandatory compliance with the requirements of the CGP and other regulatory requirements would ensure the construction of the Regional Project is consistent with the regulations, plans, and policies described in Section 5.9.1. Impacts relating to erosion, siltation or increased stormwater runoff on- and off-site due to altered drainage patterns resulting from construction activities associated with the Regional Project would be less than significant.

### Screened Ocean Intake and Concentrate Discharge Structures

Construction of the offshore components associated with the seawater intake and brine discharge structures would not alter drainage patterns that could result in erosion or siltation. Impacts would be less than significant.

### Desalinated Water Conveyance Components

Construction of the Local Project desalinated water conveyance components would occur within public rights of way. Once installed, the surface drainage patterns would be similar to the existing condition. Impacts would be less than significant.

Mitigation Measures:

None Required.

Regional Project Significance Determination

Less than Significant Impact.

**Operational Impacts**

**Ocean Water Desalination Facility – ESGS North and South Sites**

Similar to the Local Project, operation of the desalination facility would not substantially alter the pre-existing drainage patterns on-site as compared to existing conditions. The site would continue to be serviced by the local stormwater system. The rate, volume, and character of stormwater generated on-site would not be substantially different.

The Regional Project would be subject to post-construction MS4 permit stormwater requirements that would ensure on-site drainage patterns are sufficient to ensure that stormwater does not transport pollutants such that the beneficial uses of receiving water bodies are impaired or degraded, including as a result of erosion and siltation.

Mandatory compliance with post-construction MS4 permit requirements would ensure the operation of the Regional Project is consistent with regulations, plans, and policies described in Section 5.9.1. Impacts to water quality would be less than significant.

**Screened Ocean Intake and Concentrate Discharge Structures**

Operation of the offshore components associated with the seawater intake and brine discharge structures would not alter drainage patterns that could result in erosion or siltation. Impacts would be less than significant.

**Desalinated Water Conveyance Components**

The Local Project desalinated water conveyance components would occur within public rights of way. Once installed, the surface drainage patterns would be similar to the existing condition. Impacts would be less than significant.

Mitigation Measures:

None Required.

Regional Project Significance Determination

Less than Significant Impact.

**Drainage Patterns and Flooding**

**Impact HYDRO 5.9-5: Would the Project substantially alter the existing drainage patterns or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?**

The following analysis evaluates potential impacts associated with constructing and operating each of the three primary elements of the Project, including offshore, coastal, and inland Project

components for both the Local and Regional Projects. **Table 5.9-11** summarizes the impact significance conclusions.

**TABLE 5.9-11  
SUMMARY OF IMPACT HYDRO 5.9-5 DRAINAGE PATTERNS AND FLOODING**

	Ocean Water Desalination Facility	Offshore Intake and Discharge Facilities	Inland Conveyance Facilities
<b>Impact HYDRO 5.9-5: Impacts on drainage patterns and flooding.</b>			
<b>Local Project</b>			
Construction	LTS	NI	LTS
Operation	LTS	NI	NI
<b>Regional Project</b>			
Construction	LTS	NI	LTS
Operation	LTS	NI	NI
NOTES: NI = No Impact, no mitigation proposed LTS = Less than Significant, no mitigation proposed			

### **Local Project**

#### **Construction-Related Impacts**

##### **Ocean Water Desalination Facility – ESGS North and South Sites**

Local Project ocean water desalination facility construction would occur on a developed stretch of land within ESGS boundaries. Construction of the ocean water desalination facility would not substantially alter the existing on-site drainage patterns or the slope/gradient of the ESGS North Site or South Site. As such, the site’s pre-existing drainage patterns would not be altered as compared to existing conditions. The Local Project would not involve construction activities which would substantially alter the existing drainage pattern of the site or area such that flooding occurs on- or off-site or that stormwater collection and conveyance capacity is exceeded; impacts would be less than significant.

##### **Screened Ocean Intake and Concentrate Discharge Structures**

Construction of the offshore components associated with the seawater intake and brine discharge structures would not alter drainage patterns or influence runoff rate and/or volume; no impact would occur.

##### **Desalinated Water Conveyance Components**

The Local Project desalinated water conveyance components would be located underground within the ROW of identified roadway alignments. No long-term changes in drainage patterns would result from implementation of the proposed pipelines that could result in flooding. Impacts would be less than significant.

#### **Mitigation Measures:**

None Required.

Local Project Significance Determination:

Less than Significant Impact.

**Operational Impacts**

**Ocean Water Desalination Facility – ESGS North and South Sites**

Ocean water desalination facility operation would occur on a developed stretch of land within ESGS boundaries serviced by existing facilities for collecting, treating, and discharging stormwater runoff. Compliance with post-construction MS4 permit stormwater requirements would ensure that on-site drainage patterns are not altered such that flooding could occur on- or off-site. Impacts would be less than significant.

**Screened Ocean Intake and Concentrate Discharge Structures**

Operation of the offshore components associated with the seawater intake and brine discharge structures would not alter drainage patterns or influence runoff rate and/or volume; no impact would occur.

**Desalinated Water Conveyance Components**

Once constructed, the desalinated water conveyance facilities be located within city streets and would not contribute to an increase in flooding. No impact would occur.

**Mitigation Measures:**

None Required.

Local Project Significance Determination:

Less than Significant Impact.

***Regional Project***

**Construction-Related Impacts**

**Ocean Water Desalination Facility – ESGS North and South Sites**

Similar to the Local Project construction activities associated with expansion of the Local Project desalination facility to the Regional Project would not alter drainage patterns such that flooding occurs on- or off-site or stormwater collection and conveyance capacity is exceeded. Impacts would be less than significant.

**Screened Ocean Intake and Concentrate Discharge Structures**

Construction of the Regional Project components offshore associated with the seawater intake and brine discharge structures would not alter drainage patterns or influence runoff rate and/or volume; no impact would occur.

**Desalinated Water Conveyance Components**

Construction of the Regional Project desalinated water conveyance components would be located underground within the ROW of identified roadway alignments and would not result flooding on- or off-site. Impacts would be less than significant.

**Mitigation Measures:**

None Required.

**Regional Project Significance Determination:**

Less than Significant Impact.

**Operational Impacts**

**Ocean Water Desalination Facility – ESGs North and South Sites**

Similar to the Local Project, the Regional Project ocean water desalination facility operation would be serviced by the on-site stormwater collection system. Compliance with post-construction MS4 permit stormwater requirements would ensure that on-site drainage patterns are not altered such that flooding could occur on- or off-site. Impacts would be less than significant.

**Screened Ocean Intake and Concentrate Discharge Structures**

Operation of the offshore components associated with the seawater intake and brine discharge structures would not alter drainage patterns or influence runoff rate and/or volume; no impact would occur.

**Desalinated Water Conveyance Components**

Once constructed, the desalinated water conveyance facilities be located within city streets and would not contribute to an increase in flooding. No impact would occur.

**Mitigation Measures:**

None Required.

**Regional Project Significance Determination:**

Less than Significant Impact.

**Coastal Flooding and Tsunami Impacts**

**Impact HYDRO 5.9-6: Would the Project expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of tsunami or coastal flooding due to sea-level rise?**

Coastal flooding impacts may be short-term (from storm driven wave run up and storm tides or as a result of tsunami) and long-term (from sea-level rise and associated increased risk of flooding from storm tides or tsunami). Sea level rise and the risk of tsunamis are existing environmental conditions, and unless the Project will exacerbate these conditions, they are not considered potentially significant impacts under CEQA. The analyses presented here are provided for informational purposes and West Basin will implement design measures to protect the Project from potential effects of sea level rise and tsunamis.<sup>25</sup>

Short-term impacts from coastal flooding could occur during 100-year storm events or tsunami and cause flooding in areas associated with the 100-year flood hazard area or tsunami inundation hazard

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<sup>25</sup> See *California Building Industry Assn. v. Bay Area Air Quality Management Dist.*, 62 Cal. 4th 369 (2015) and *Ballona Wetlands Land Trust v. City of Los Angeles*, 201 Cal. App. 4th 455 (2011).



zone (Figure 5.9-3). Impacts from coastal flooding associated with 100-year storm events could include coastal erosion.

The following analysis evaluates potential impacts associated with constructing and operating each of the three primary elements of the Project, including offshore, coastal, and inland Project components for both the Local and Regional Projects. **Table 5.9-12** summarizes the impact significance conclusions.

**TABLE 5.9-12  
SUMMARY OF IMPACT HYDRO 5.9-6 COASTAL FLOODING AND TSUNAMI IMPACTS**

	Ocean Water Desalination Facility	Offshore Intake and Discharge Facilities	Inland Conveyance Facilities
<b>Impact HYDRO 5.9-6: Coastal flooding and tsunami impacts.</b>			
<b>Local Project</b>			
Construction	LTS	LTS	NI
Operation	LTSM	NI	NI
<b>Regional Project</b>			
Construction	LTS	LTS	NI
Operation	LTSM	NI	NI
NOTES: NI = No Impact, no mitigation proposed LTS = Less than Significant, no mitigation proposed LTSM = Less than Significant impact with mitigation			

### **Local Project**

#### **Construction-Related Impacts**

##### **Ocean Water Desalination Facility – ESGS North and South Sites**

Coastal flooding from wave run-up and tsunami damage is typically confined to low-lying coastal areas. As shown in Figure 5.9-3, the near-shore margins of Santa Monica Bay are subject to flooding from wave run-up and storm tides associated with a 100-year storm (1 percent annual flood risk) and in the event of a tsunami. The ESGS North and South Sites are located outside of designated risk areas associated with the FEMA-designated 100-year flood hazard zone and the tsunami inundation zone (Figure 5.9-3). Construction of the proposed Project would occur in the near future and, as such, future flood hazards would not be substantially different to the existing conditions at the ESGS North and South Sites (i.e., a minor increase in sea level coinciding with a tsunami or wave run-up associated with a 100-year storm would not increase baseline coastal flood risks). Therefore, Local Project ocean water desalination facility construction activities would not expose people or structures to risk from flooding and flood hazards, including flooding due to sea-level rise. Construction activities would not exacerbate existing flooding and/or flood hazards.

##### **Screened Ocean Intake and Concentrate Discharge Structures**

As described in Section 5.9.2, the potential for a tsunami event is considered remote. During construction of the offshore components, a limited number of personnel would be present on a

daily basis (approximately 20). As such, a limited number of persons would be temporarily subject to a low-potential exposure to hazards in the event of a tsunami. Further, construction activities would be relatively short-term; therefore, the potential for a tsunami to occur during the anticipated construction period is further reduced. In the event of a major storm event, construction would be temporarily halted to ensure the safety of personnel. Further, the Local Project screened ocean intake and concentrate discharge structures would be constructed under the ocean surface and would be designed to withstand the effects of inundation and submersion. Therefore, Local Project construction of the screened ocean intake and concentrate discharge structures would not expose people or structures to risk from flooding and flood hazards, including flooding due to sea-level rise. Construction activities would not exacerbate existing flooding and/or flood hazards.

#### **Desalinated Water Conveyance Components**

The Local Project desalinated water conveyance components would be located inland and would be buried underground. As such, these components would not be located in areas subject to flooding, tsunami, or the effects of sea-level rise during construction. No impact would occur in this regard.

#### **Operational Impacts**

##### **Ocean Water Desalination Facility – ESGS North and South Sites**

As described for construction, above, the ESGS North and South Sites are located outside of designated risk areas associated with the FEMA-designated 100-year flood hazard zone and the tsunami inundation zone (Figure 5.9-3). Impacts relating to flooding and flood hazards at the ESGS North and South Sites would be less than significant under existing conditions.

Rising sea levels will increase the potential for coastal flooding and flood hazards in the future (see Section 5.9.2), and the issue of sea-level rise is a critical component of land use planning and hazard analysis in coastal areas. Until the year 2050, most of the climate models predict a similar degree of sea-level rise; however, after 2050, projections of sea-level rise become less certain because of divergent modeling results and differences in various estimates of greenhouse gas emissions (California Climate Action Team 2010). Based on coastal flood hazard mapping for the Project area, the ESGS North and South Sites would become more vulnerable to flooding associated with a 100-year flood event based on sea-level rise estimates for years 2050 and beyond compared to existing conditions. The ESGS North and South Sites would also be subject to coastal erosion and shoreline retreat under future conditions that incorporate consideration of projected sea-level rise estimates.

The potential for coastal flooding from storm surge and tsunami wave run-up and overtopping due to the future effects of sea-level rise was analyzed in a site-specific Coastal Hazards Analysis completed for the proposed desalination facility at the ESGS North and South Sites (Appendix 5A). The Coastal Hazards Analysis includes the following:

- 1) Quantification of the magnitude and extent to which the proposed desalination facility and associated shore zone structures could be subject to sea-level rise, erosion, wave

- attack, or run-up due to wave refraction/diffraction over local nearshore and shelf bathymetry over the Project's lifespan.
- 2) Quantification of the frequency of such events.
  - 3) Evaluation of the consequences of such events and propose remedial options for such consequences.
  - 4) Evaluation of potential impacts to the adjacent shoreline due to sea-level rise, erosion, or wave refraction/diffraction from the Project components.

The Coastal Hazards Analysis' findings analyze a conservative scenario and are the result of hand calculations and computer-driven process-based numerical modeling (Coastal Evolution Model). The analysis concludes that the existing improvements along the coast, including riprap and a concrete wall along the coastal edge of the ESGS North Site and the increased topography along the coastal edge of the ESGS South Site, would continue to protect the proposed desalination plant locations through 2100, assuming the most extreme coastal erosion projections. The Coastal Hazard Analysis also concludes that the proposed new structures would not influence sediment transport, wave shoaling, or run-up processes. Therefore, the proposed project would not exacerbate potential future effects of sea level rise along the coast. Impacts to the adjacent shoreline due to sea-level rise, or wave-induced erosion from wave diffraction and reflection from the major components of the desalination project and associated structures would be less than significant. However, the analysis concludes that portions of the ESGS Site would be vulnerable to flooding from future coastal flood hazards, including from strong wave surge and tsunami inundation under future sea-level flood hazard conditions (Appendix 5A).

According to the Coastal Hazards Analysis, the Marvin Braude Coastal Bike Trail, which runs parallel to the western extent of the ocean water desalination facility, has a crest elevation such that overtopping of approximately 0.4 feet to 1.4 feet would occur due to wave and tsunami run-up and overtopping under the most extreme future sea-level rise conditions for 2065 (future flood risks from wave run-up were assessed for a high and low sea-level rise scenario for year 2065). Modeling indicates that any future overtopping of the Marvin Braude Coastal Bike Trail would be blocked by the existing eight-foot-tall seawall at the ESGS North Site (to remain with Project implementation), which possesses a crest elevation ranging from +28 feet to +29 feet above the Mean Lower Low Water (MLLW).<sup>26</sup> However, where the ESGS seawall ends, there is a chain link access gate adjacent to Marvin Braude Coastal Bike Trail, which would expose the southern limits of the ESGS North Site to flooding as a result of wave or tsunami run up and overtopping under the most extreme future sea-level rise scenario for year 2065.

Proposed grading for the ESGS South Site would lower the westerly pad elevations to be roughly the same as the Marvin Braude Coastal Bike Trail, exposing the ESGS South Site to coastal hazards from wave and tsunami run-up and overtopping under the extreme sea-level rise scenario

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<sup>26</sup> Elevations are provided in Mean Lower Low Water in compliance with National Oceanic Administration and California Coastal Commission requirements. MLLW corresponds with the average height of the lowest tide recorded and can be defined as  $MLLW = \text{Mean Sea Level} + 2.62 \text{ feet}$ .

for 2065. Although the existing southern berm along 45<sup>th</sup> Street would be retained, in order to reduce visual impacts, the entire ESGS South Site behind the 45<sup>th</sup> Street berm would be lowered to roughly at grade with the bike trail and would require coastal hazard protection similar to that provided by the existing ESGS seawall.

Further, projections of future coastal erosion rates and patterns predict that approximately 10 to 40 feet of the coastal edge of both the ESGS North and South Sites could be within the erosion zone by the year 2100 when the most extreme projections are assumed. The retreat of the shoreline to a point that encroaches onto the ESGS sites, which was not assumed as part of the Coastal Hazard Analysis, would further increase the future flood risks described above, as well as cause potentially direct impacts to Project facilities from an eroding shoreline. Therefore, operation of the Project on either the ESGS North Site or South Site would result in potentially exposing people or structures to risk of loss, injury or death involving flooding, including coastal flooding from tsunami or wave run-up due to sea-level rise. Implementation of **Mitigation Measure HYDRO-1** requires West Basin to complete a Project-specific Coastal Hazards Resiliency Plan for the final Local and Regional Project design. Incorporation of the recommendations of the study would ensure that the Local Project (and Regional Project) substantially avoid coastal erosion and flooding that could result from future sea-level rise and that proposed Project structures in the coastal zone would not be subject to structural failure caused by future flooding or flood hazards as a result of wave or tsunami run-up and would not cause or increase erosion off-site due to impeding or redirecting flood flows. Mitigation Measure HYDRO-1 would ensure that the Project would not exacerbate existing flooding and/or flood hazards.

The CCC's 2015 Sea-Level Rise Policy Guidance outlines the types of information, analysis, and design considerations the CCC's staff requires to determine whether shoreline projects conform to the Coastal Act policies. Implementation of Mitigation Measure HYDRO-1 would require the final Project engineering design to minimize conflicts with the applicable Coastal Act requirements that new development: (1) be designed to eliminate or mitigate adverse effects on local shoreline sand supply and (2) ensure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along the coast (California Coastal Act Sections 30235 and 30253). Mitigation Measure HYDRO-1 requires the District to complete a Project-specific coastal engineering study for the final Project design, consistent with the CCC's 2015 Sea-Level Rise Policy Guidance and implement study recommendations in the Project's final design and construction, operation, and maintenance. With implementation of Mitigation Measure HYDRO-1, impacts on the Project due to coastal erosion associated with projected sea-level rise would be less than significant.

#### *Screened Ocean Intake and Concentrate Discharge Structures*

The screened ocean intake and concentrate discharge structures would be designed to withstand significant stresses from wave action and ocean currents in conformance with applicable state and local design regulations relative to the coastal location of the facilities. Operation of the screened ocean intake and concentrate discharge structures would not be affected by coastal flooding,

including from tsunami, under existing conditions or conditions associated with future sea-level rise. No impact would occur.

#### Desalinated Water Conveyance Components

Operation of the underground conveyance system would not be affected by coastal flooding, including from tsunami, under existing conditions or conditions associated with future sea-level rise. No impact would occur.

#### Mitigation Measures:

**HYDRO-1:** West Basin shall contract a California licensed engineer to prepare a Coastal Hazard Resiliency Study focused on the ESGS site, consistent with the methods for assessing sea-level rise in the CCC's Sea Level Rise Policy Guidance (CCC 2015), over the Project planning horizon. Recommendations in the Study shall be incorporated into the design and construction specifications of the Project as applicable. At a minimum, the study shall:

- a) Incorporate, and update as necessary, information concerning baseline conditions at the desalination plant, and future projections (both with and without sea-level rise) concerning:
  - i) Erosion rates and patterns, including scour
  - ii) Sand supply sequestering or loss as a result of Project design
  - iii) Wave impacts and wave runup, including wave runup from a 100-year storm, and based on tides, other water level changes, and future beach erosion
  - iv) Flooding from extreme events such as storms with intervals greater than 100 years or tsunamis
  - v) Potential for exposure of Project infrastructure over the Project lifetime
  - vi) Potential cumulative effects of the Project on the identified coastal process elements with applicable existing or future projects

#### Local Project Significance Determination:

Less than Significant with Mitigation Incorporated.

### ***Regional Project***

#### **Construction-Related Impacts**

##### Ocean Water Desalination Facility – ESGS North and South Sites

The Local and Regional Projects would involve generally similar development at either the ESGS North or South Site; therefore, the potential risk of flooding and flood hazards would be as described for the Local Project. Construction activities would not exacerbate existing flooding and/or flood hazards.

#### Screened Ocean Intake and Concentrate Discharge Structures

Refer to the Impact HYDRO 5.9-6 Local Project discussion above.

### Desalinated Water Conveyance Components

Refer to the Impact HYDRO 5.9-6 Local Project discussion above.

### Operational Impacts

#### Ocean Water Desalination Facility – ESGS North and South Sites

The Local and Regional Projects would involve generally similar operational requirements at either the ESGS North Site or South Site, within the ESGS boundaries, and would be subject to similar risk of flooding and flood hazards. As with the Local Project, the Regional Project would require implementation of Mitigation Measure HYDRO-1 in order to provide adequate coastal hazard protection. Therefore, impacts resulting from exposure of people or structures to a significant risk of loss, injury or death involving flooding, including from sea-level rise, during ocean water desalination facility (ESGS North and South Sites) operations would be less than significant.

#### Screened Ocean Intake and Concentrate Discharge Structures

Refer to the Impact HYDRO 5.9-6 Local Project discussion above.

### Desalinated Water Conveyance Components

Refer to the Impact HYDRO 5.9-6 Local Project discussion above.

#### Mitigation Measures:

Implement Mitigation Measure HYDRO-1 for impacts to the ocean water desalination facility to ensure that the Project would not exacerbate existing flooding and/or flood hazards. No mitigation measures are required for the screened ocean intake and concentrate discharge or conveyance facilities.

#### Regional Project Significance Determination:

Less than Significant with Mitigation Incorporated.

## 5.9.5 Cumulative Impacts

The geographic scope for potential cumulative hydrology and water quality impacts consists of the Project area and surrounding watershed lands as well as marine waters in Santa Monica Bay. The analysis of potential cumulative impacts on hydrology and water quality considers those cumulative projects listed in Table 4-1 (onshore) and Table 4-2 (offshore) and shown in Figure 4-1. The analysis focuses on cumulative adverse effects on water quality associated with construction and operations.

All future development with the potential to impact hydrology and water quality would be required to demonstrate compliance with applicable federal and state regulatory requirements, including General Plan goals and policies of the affected jurisdiction, intended to reduce and/or avoid potential adverse environmental effects. As such, cumulative impacts to hydrology and water quality would be mitigated on a project-by-project level, and in accordance with the established regulatory framework, through the established regulatory review process.

Construction activities associated with the Project could result in the degradation of water quality from increased soil erosion and associated sedimentation of water bodies due to stormwater runoff, as well as accidental releases of hazardous materials. In addition, discharges of dewatering effluent from excavated areas and disinfectant from pipelines could adversely affect water quality (see Impact 5.9-1). Nearly all the cumulative projects identified in Table 4-1 involve excavation and use of heavy equipment during construction. Therefore, the cumulative projects have the potential to degrade surface water quality as a result of construction-related soil erosion or accidental discharges of hazardous construction chemicals. A number of the cumulative projects could also require construction dewatering. As described in Impact 5.9-1, compliance with the CGP and MS4 requirements would protect surface water quality from impacts resulting from cumulative development in the region. With adherence to the described regulatory requirements, the effects of the Project would not combine with those of cumulative projects to cause a cumulatively significant water quality impact from increased soil erosion and sedimentation, or inadvertent releases of toxic chemicals during general construction activities. Therefore, no overall cumulatively significant effect would occur to surface water or groundwater quality; the Project would not have a cumulatively considerable contribution to a significant cumulative effect (less than significant).

The geographic area associated with the assessment of cumulative water quality impacts from operation of the Project seawater intake and brine discharge structures is Santa Monica Bay. The cumulative projects whose water quality impacts could combine with those of the Project are included in Table 4-2. The cumulative discharges to the Santa Monica Bay include cooling water discharges from the operating units of the ESGS Site, the 5-mile ocean outfall from the City of Los Angeles Hyperion Treatment Plant, the County of Los Angeles Joint Pollution Control Plant outfall off Palos Verdes, and numerous stormwater drainages along the coastline including major contribution from Ballona Creek.

As discussed under Impact 5.9-2, modeling of the Project brine discharge from the outfall indicates that the brine effluent would be below the 2 ppt salinity significance threshold under the worst-case scenario well within the maximum allowable BMZ of 328 feet from the discharge structure. The 2 ppt standard is met between 38 feet and 119 feet for the Local Project and Regional Project, respectively. All existing and proposed outfalls associated with the cumulative projects are located at greater distances than the BMZ. Therefore, the likelihood of discharge plumes from different outfalls or intersecting or merging and resulting in exceedances of the California Ocean Plan defined water quality objectives or receiving water salinity limitations and adversely affecting beneficial uses of receiving waters (Santa Monica Bay) is very low.

The SWRCB administers regulations through the RWQCBs (the LARWQCB in the Project area) to regulate the water quality of the waters of the United States. The most recent amendment to the California Ocean Plan (SWRCB 2015) reflects the SWRCB's process of adapting to the need to regulate discharges from desalination projects. The California Ocean Plan objectives are incorporated into the NPDES permits issued to the dischargers by RWQCBs in the form of specific water quality requirements. Brine discharge from the operation of the proposed Project desalination plant would be subject to water quality limitations under a NPDES Permit for the discharge through the diffuser (Impact 5.9-2). Similarly, the operational discharges of projects

considered in the cumulative scenario (Table 4-2) are subject to the water quality requirements of the NPDES permit system, administered by the LARWQCB. Mandatory water quality testing and analysis, required as part of the NPDES permit process, would ensure operational discharges comply with Basin Plan and California Ocean Plan water quality objectives and effluent limitations. The cumulative impact from the discharges to the Santa Monica Bay would be considered less than significant.

Portions of the desalination facility would be located in areas subject to future flooding and flood risks from wave and tsunami run-up and overtopping as a result of sea-level rise. With implementation of Mitigation Measure HYDRO-1, the new facilities would be protected from future flooding and flood hazards due to sea-level rise flooding and the Project would not exacerbate coastal erosion. The proposed Project therefore would not result in a cumulatively considerable contribution to any cumulative impact (less than significant).

### 5.9.6 Significant Unavoidable Impacts

Impacts to hydrology and water quality associated with Project implementation would be less than significant with adherence to the established regulatory framework and recommended mitigation measures. No significant unavoidable impacts would occur.

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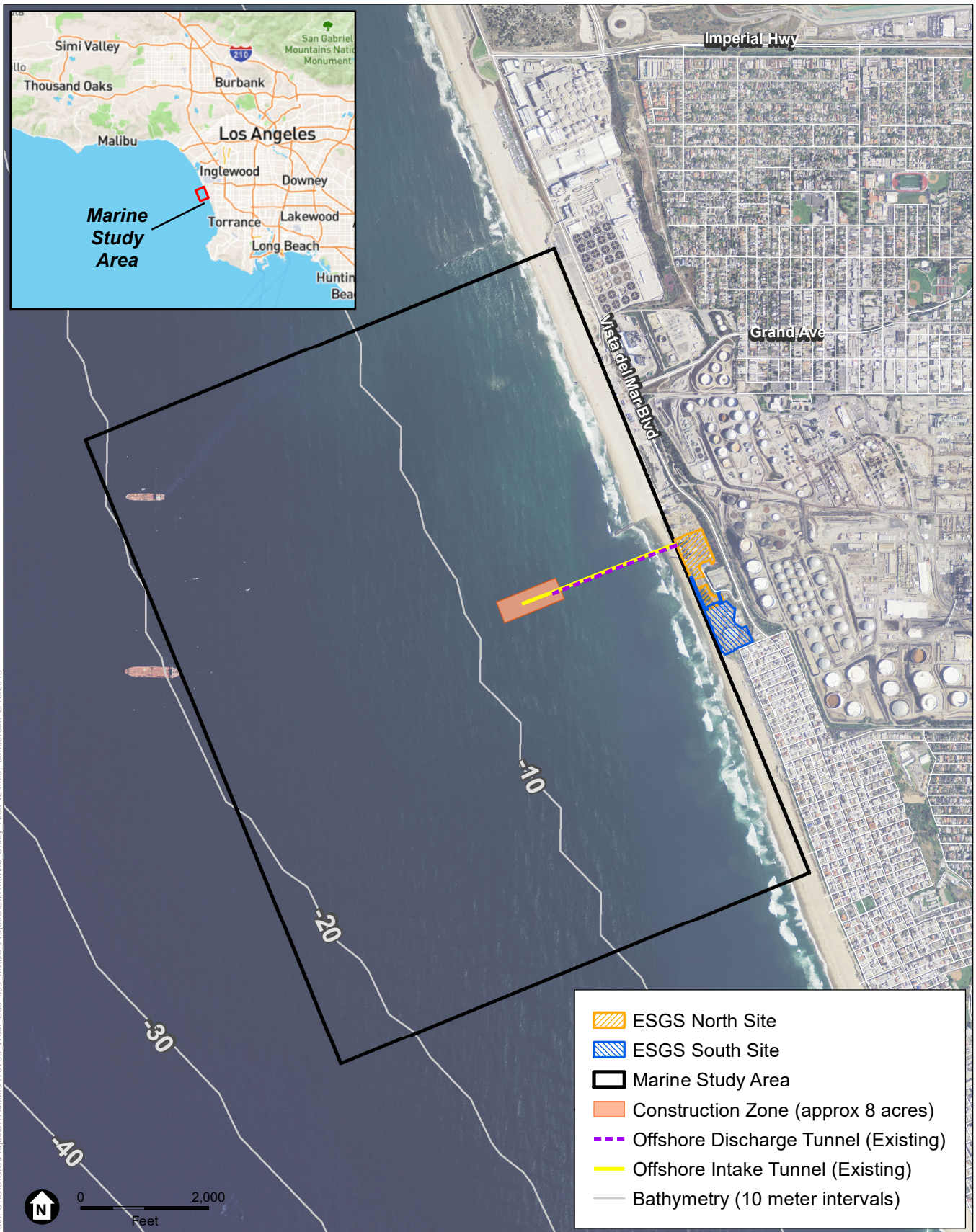
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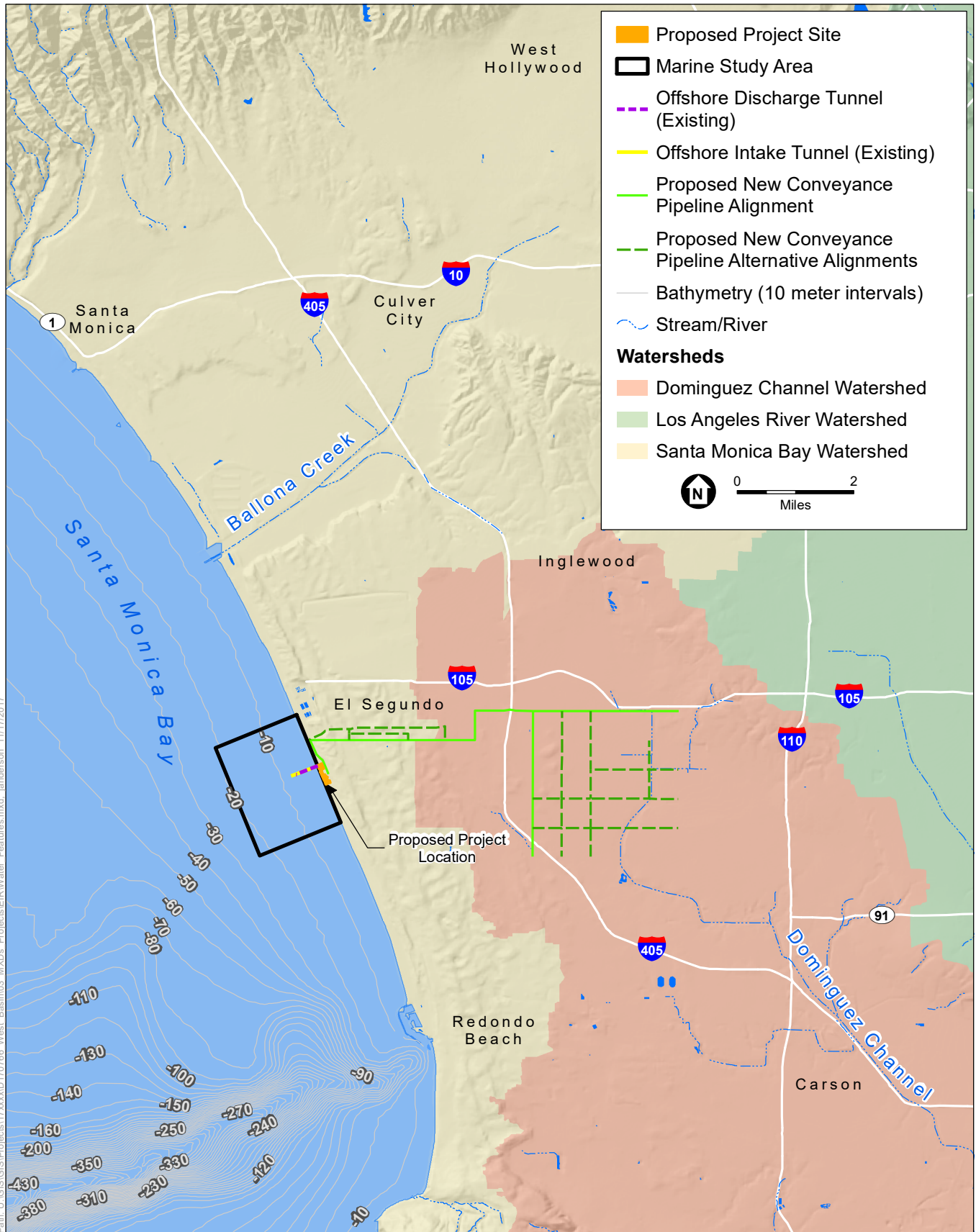
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SOURCE: ESRI

Chevron Marine Terminal 2010 EIR

**Figure 5.9-1**  
Marine Study Area

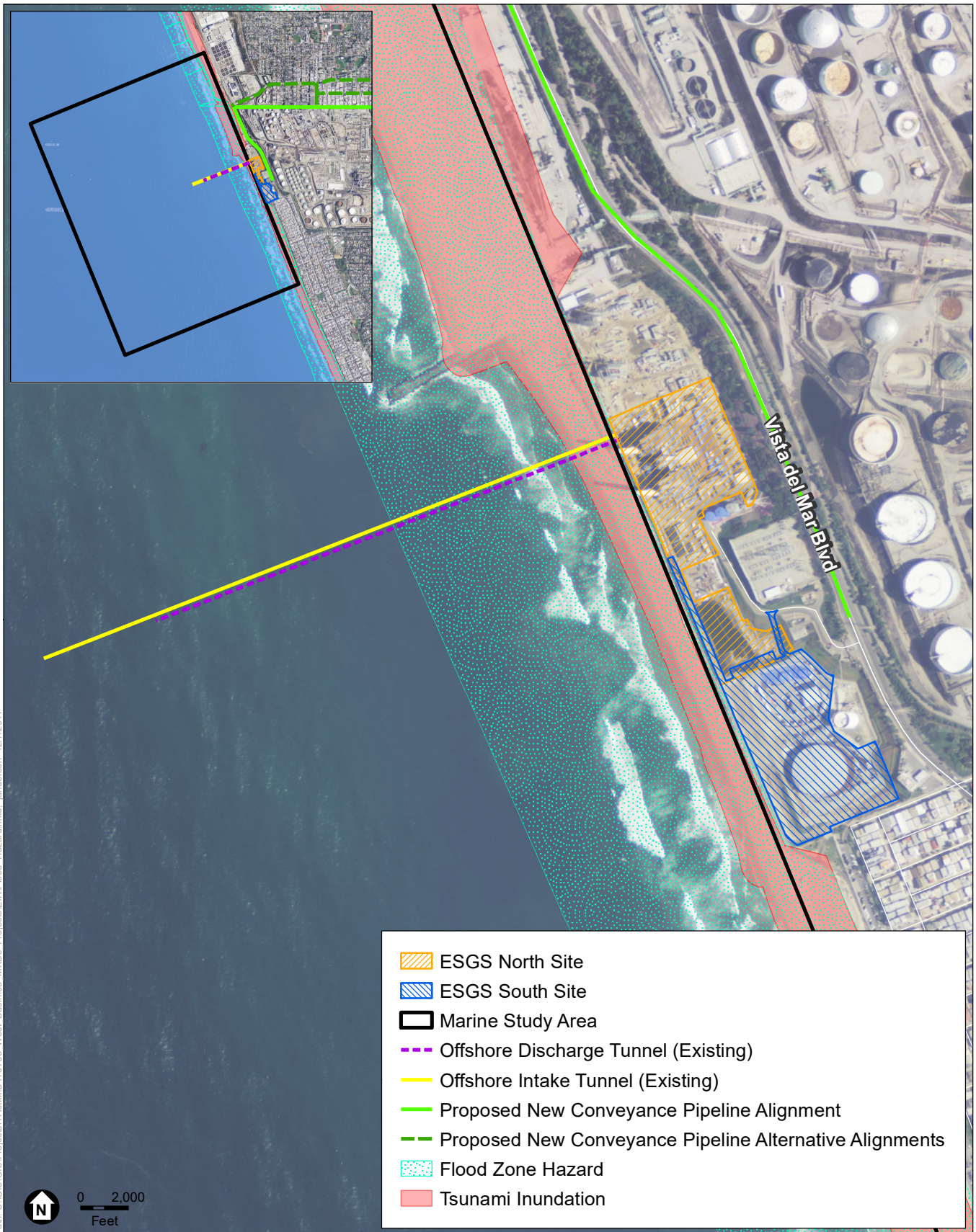




SOURCE: CalWater

West Basin Ocean Water Desalination Project

**Figure 5.9-2**  
Surface Water Resources in the Project Area



SOURCE: ESRI; FEMA; California Department of Conservation

West Basin Ocean Water Desalination Project

**Figure 5.9-3**  
Flood Hazards