CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION

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ORDER R8-2021-0011
NPDES NO. CA8000403

WASTE DISCHARGE REQUIREMENTS FOR POSEIDON RESOURCES (SURFSIDE) L.L.C. HUNTINGTON BEACH DESALINATION FACILITY ORANGE COUNTY

The following Discharger is subject to waste discharge requirements (WDRs) set forth in this Order:

Table 1. Discharger Information

Discharger	Poseidon Resources (Surfside) L.L.C.
Name of Facility	Huntington Beach Desalination Facility
Facility Address	21730 Newland Street
	Huntington Beach, CA 92646
	Orange County
Facility Design Flow	56.69 MGD 12-Month Average Flow 62.5 MGD Maximum Daily Flow

Table 2. Discharge Location

Discharge Point	Effluent Description	Discharge Point Latitude (North)	Discharge Point Longitude (West)	Receiving Water
001	Reverse Osmosis (RO) concentrate, filter backwash, RO subsequent rinse wastewater, stormwater runoff	33.64389º	-117.97890º	Pacific Ocean

Table 3. Administrative Information

This Order was adopted on:	**April 29, 2021**
This Order shall become effective on:	**May 1, 2021**
This Order shall expire on:	**April 30, 2026**
The Discharger shall file a Report of Waste Discharge as an application for reissuance of WDRs in accordance with California Code of Regulations, title 23, chapter 9 and an application for reissuance of a National Pollutant Discharge Elimination System (NPDES) permit no later than:	**180 days prior to the Order expiration date**
The U.S. Environmental Protection Agency (U.S. EPA) and the California Regional Water Quality Control Board, Santa Ana Region have classified this discharge as follows:	**Major**

I, Hope A. Smythe, Executive Officer, do hereby certify that this Order. R8-2021-0011 with all attachments is a full, true, and correct copy of the Order adopted by the California Regional Water Quality Control Board, Santa Ana Region, on April 29, 2021.

Hope Smythe Digitally signed by Hope Smythe
Date: 2021.07.09 10:17:54 -07'00'
Water Boards

Hope A. Smythe, Executive Officer

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TABLES

ATTACHMENTS

I. FACILITY INFORMATION

The Huntington Beach Desalination Facility (Facility) will be located at 21730 Newland Street, adjacent to the AES Huntington Beach Generating Station (AES HBGS), in Huntington Beach, CA. The Facility will produce an annual average of approximately 50 million gallons per day (MGD) of potable drinking water. Poseidon Resources (Surfside) LLC (Discharger) will be the owner and operator of the Facility.

The Facility will discharge into the Pacific Ocean via the existing AES HBGS discharge pipeline. AES HBGS discharges into the same pipe as the Facility will but is regulated separately under Order R8-2014-0076, NPDES No. CA0001163. The Discharger plans to use the AES HBGS intake and discharge systems for the Facility's intake and discharge, but the Discharger must modify these systems to reduce intake and mortality to all forms of marine life before beginning operation. AES HBGS is anticipated to terminate the use of once-through cooling water on or before December 31, 2023, and as such the Facility will not operate in a co-located mode or commingle its discharge with AES HBSG. The Facility will operate in a permanent stand-alone mode after AES HBGS ceases their use of once-through cooling water. This Order applies to operations of the Facility in a stand-alone mode and does not authorize the discharge of waste or intake of seawater for operations in a co-located mode.

Additional information describing the Facility is summarized in Table 1 and in sections I and II of the Fact Sheet (Attachment F). Section I of the Fact Sheet also includes information regarding the Facility's permit application.

II. FINDINGS

The California Regional Water Quality Control Board, Santa Ana Region (Santa Ana Water Board), finds:

A. Legal Authorities. This Order serves as waste discharge requirements (WDRs) pursuant to article 4, chapter 4, division 7 of the California Water Code (Water Code) (commencing with section 13260). This Order is also issued pursuant to section 402 of the federal Clean Water Act (CWA) and implements regulations adopted by the United States Environmental Protection Agency (U.S. EPA) and chapter 5.5, division 7 of the Water Code (commencing with section 13370). It shall serve as a National Pollutant Discharge Elimination System (NPDES) permit authorizing the Discharger to discharge into waters of the U.S. at the discharge location described in Table 2 subject to the WDRs in this Order. This Order includes the Water Code section 13142.5, subdivision (b) (section 13142.5(b)) determination for the Facility. Attachments A through K (inclusive of Attachments G.1 to G.5) are incorporated into this Order. References to the Order include the Order and its attachments.

B. Background and Rationale for Requirements. The Santa Ana Water Board developed the requirements in this Order based on information submitted as part of the application, through monitoring and reporting programs, and other available information. The Fact Sheet (Attachment F), which contains background information and the rationale for the requirements in this Order, is incorporated into and constitutes the findings for this Order.

C. Provisions and Requirements Implementing State Law. The provisions/requirements in subsections II.E, IV.B, and VI.A.2, VI.C.2-5 are included to implement state law only. These provisions/requirements are not required or authorized under the federal CWA; consequently, violations of these provisions/requirements are not subject to the enforcement remedies that are available for NPDES violations.

D. Notification of Interested Parties. The Santa Ana Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe WDRs for the discharge and of its intent to make a Water Code section 13142.5(b) determination with conditions and has provided them with an opportunity to submit their written comments and recommendations. Details of the notification are provided in the Fact Sheet (Attachment F).

E. Water Code Section 13142.5(b) Conditional Determination. Water Code section 13142.5(b) requires that for each new or expanded coastal power plant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life. Chapter III.M.2 of the Water Quality Control Plan for the Ocean Waters of California (Ocean Plan) provides the framework that regional water boards must use to evaluate whether a desalination facility complies with Water Code section 13142.5(b). The Santa Ana Water Board is required to analyze a range of feasible alternatives for best available site, design, technology, and mitigation measures feasible to minimize intake and mortality of all forms of marine life.

The Order implements the Water Code section 13142.5(b) determination set forth in Attachment G for the Facility in accordance with Ocean Plan requirements. In making the Water Code section 13142.5(b) determination, the Santa Ana Water Board evaluated a range of alternatives proposed by the Discharger for the best available site, design, technology, and mitigation measures to minimize intake and mortality of all forms of marine life and then determined the best combination of feasible alternatives to minimize intake and mortality of all forms of marine life.

The Water Code section 13142.5(b) conditional determination is based upon available information and conditioned on the Discharger satisfying the requirements of the Marine Life Mitigation Plan Schedule (MLMP Schedule) in Attachment K. If the Discharger does not satisfy the requirements of the MLMP Schedule, a new Water Code section 13142.5(b) determination to select an appropriate mitigation project for the Facility will be required consistent with the Ocean Plan chapter III.M.2.a.(5). (See Attachment G, Finding 5.) In addition, any potential future expansion, including any design change or operational change to the Facility that could increase the intake or mortality of marine life beyond that which is approved under this Order will require a Water Code 13142.5(b) determination in accordance with the Ocean Plan requirements.

In its analysis for the Water Code section 13142.5(b) determination, the Santa Ana Water Board considered the impacts to public trust resources and minimized those impacts by requiring the Discharger to use the best available site, design, technology, and mitigation measures feasible. The Order also implements the Ocean Plan's applicable water quality objectives and prohibitions and includes requirements that protect public trust uses (including recreation, navigation, fishing, and marine habitat).

F. California Environmental Quality Act (CEQA). The action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act (Public Resources Code section 21100 et seq.) pursuant to Water Code section 13389. The Water Code section 13142.5(b) determination set forth in Attachment G to this Order is issued under state law authority only and is a discretionary approval subject to compliance with CEQA. The Santa Ana Water Board is a responsible agency for purposes of CEQA.

The City of Huntington Beach, acting as the lead agency, prepared a Final Subsequent Environmental Impact Report (2010 FSEIR) (State Clearinghouse No. 2001051092) for the Facility and certified it on September 7, 2010. On October 19, 2017 the California State Lands Commission, acting as a responsible agency, certified a Final Supplemental Environmental Impact Report (2017 FSEIR) (State Clearinghouse No. 200051092).

To comply with Water Code section 13142.5(b) and the Ocean Plan, the Discharger made modifications to the diffuser design that was evaluated in the 2017 FSEIR. The Santa Ana Water Board prepared an Addendum to the 2010 FSEIR and the 2017 FSEIR to address the changes to the diffuser design. The Santa Ana Water Board finds that the changes to the diffuser design, as described in the Addendum, do not involve new significant environmental effects or a substantial increase in the severity of previously identified significant effects that would require the preparation of a subsequent or supplemental environmental impact report under CEQA Guidelines sections 15162 or 15163.

The Santa Ana Water Board independently considered the environmental effects of the Facility as described in the 2010 FSEIR, the 2017 FSEIR, and the Addendum. The Santa Ana Water Board also considered the environmental effects of the Ocean Plan requirements described in the State Water Resources Control Board's Final Substitute Environmental Documentation for the Amendment to the Water Quality Control Plan for Ocean Waters of California Addressing Desalination Facility Intakes, Brine Discharges, and the Incorporation of Other Non-Substantive Changes (May 6, 2015).

An action challenging the 2017 FSEIR was initiated. On April 8, 2021, the California Court of Appeal issued a decision upholding the 2017 FSEIR. The time to challenge the appellate decision has not run, so the 2017 FSEIR may be subject to further review. The Santa Ana Water Board assumes that the 2017 FSEIR complies with the provisions of CEQA, and this Order constitutes permission for the Discharger to proceed at its own risk pending final determination of the action. (Pub. Resources Code, § 21167.3, subd. (b); CEQA Guidelines, § 15233, subd. (b).)

Further details of CEQA compliance are set forth in the Fact Sheet (Attachment F).

G. Executive Officer Delegation of Authority. The Santa Ana Water Board by prior resolution has delegated all matters that may be legally delegated to its Executive Officer to act on its behalf pursuant to Water Code section 13223. (Resolution R8-2019-0056.) Consistent with the delegation, the Executive Officer is authorized to act on the Santa Ana Water Board's behalf on any matter within this Order unless such delegation is unlawful under Water Code section 13223 or this Order explicitly states otherwise.

H. Consideration of Public Comment. The Santa Ana Water Board, in a public meeting, heard and considered all comments pertaining to the discharge and the conditional Water Code section 13142.5(b) determination. Details of the Public Hearing are provided in the Fact Sheet (Attachment F).

I. Human Right to Water. It is the "established policy of the state that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes." (Water Code, § 106.3, subd. (a).) All relevant state agencies shall consider this state policy when revising, adopting, or establishing policies, regulations, and grant criteria when they are pertinent to these uses. (*Id*., § 106.3, subd. (b).) This state policy does not directly apply to this Order as this is a permitting action. The Santa Ana Water Board, however, has adopted the human right to water as a core value and resolved that it will continue to consider the human right to water in all activities that could affect existing or potential sources of drinking water, including permitting actions. (Santa Ana Water Board Resolution R8-2019-0078.) In adopting this Order, the Santa Ana Water Board has considered the human right to water policy. (See Fact Sheet (Attachment F), § III.E.3.)

THEREFORE, IT IS HEREBY ORDERED, that this Order supersedes and rescinds Order R8-2012-0007, except for purposes of enforcement of the previous order, and, in order to meet the provisions contained in division 7 of the Water Code (commencing with section 13000) and regulations adopted thereunder, and the provisions of the CWA and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order. This action in no way prevents the Santa Ana Water Board from taking enforcement action for violations of the previous order.

III. DISCHARGE PROHIBITIONS

A. Discharge of waste from any point other than Discharge Point 001 (M-001), unless specifically authorized by this order or separate WDRs, is prohibited.

B. The discharge of waste other than concentrated seawater, filter backwash, reverse osmosis (RO) membrane subsequent rinse wastewater, and stormwater runoff from the Facility, except for filtered pretreated water, dechlorinated off-spec product water, and/or dechlorinated final product water during startup and maintenance operations, is prohibited.

C. The final effluent discharge from the Facility through Discharge Point 001 in excess of a 12-Month Average Flow of 56.69 MGD or a maximum daily peak flow of 62.5[1] MGD is prohibited. During initial start-up operations and/or temporary onsite maintenance operations the total Facility discharge flows through Discharge Point 001, (M-001), including temporary discharges of filtered pretreated water, discharges of off-spec dechlorinated product water, dechlorinated final product water and/or seawater, in excess of a daily peak flow of 126.7 MGD are prohibited.

D. The discharge of waste sludge or other solids generated as the result of Facility operations directly to the ocean, or into a waste stream that discharges to the ocean, is prohibited.

E. The discharge of any radiological, chemical, or biological warfare agent or high-level radioactive waste into the ocean is prohibited.

F. The discharge of any substances in concentrations toxic to animal or plant life in the receiving water after initial dilution is prohibited.

[1] Listed discharge flows are for non-storm conditions. Onsite storm event of 1.67 MGD may occur during storm periods in addition to the discharge flows.

G. The discharge of waste prior to the installation and operation of a multiport linear diffuser in accordance with the requirements of this Order and the construction schedule in the Addendum is prohibited. (See Attachment G, Finding 28)

H. The discharge of waste is only authorized for stand-alone operations. The discharge of waste for co-located operations is prohibited.

I. The discharge of waste under this Order is prohibited unless and until (1) the Discharger has submitted the supplemental plans for the Final MLMP in accordance with the MLMP Schedule (Attachment K); (2) the Santa Ana Water Board has approved the Discharger's supplemental plans; (3) the Discharger has obtained all permits and other governmental approvals necessary to implement all components of the approved mitigation project (including the components included in supplemental plans required under the MLMP Schedule (Attachment K)); and (4) the Discharger has begun dredging the Bolsa Chica inlet in accordance with the schedule approved by the Board (Attachment K, Table K-1, Task 1.A.viii).

IV. EFFLUENT LIMITATIONS, INTAKE SPECIFICATIONS, AND DISCHARGE SPECIFICATIONS

A. Effluent Limitations – Discharge Point 001 (M-001)

1. Final Effluent Limitations – Discharge Point 001 (M-001)

a. The Discharger shall maintain compliance with the following effluent limitations at Discharge Point 001, with compliance measured at Monitoring Location M-001, as described in the Monitoring and Reporting Program (MRP), Attachment E.

Table 4. Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Instantaneous Maximum	Daily Maximum	6-Month Median
Oil and Grease	mg/L	25	40	75	--	--
Oil and Grease	lbs/day	13,000	20,900	--	--	--
Total Suspended Solids	mg/L	60	--	--	--	--
Total Suspended Solids	lbs/day	31,300	--	--	--	--
Settleable Solids	ml/L	1.0	1.5	3.0	--	--
Turbidity	NTU	75	100	225	--	--
Arsenic	µg/L	--	--	1,200	470	83
Arsenic	lbs/day	--	--	--	240	43
Cadmium	µg/L	--	--	160	64	16
Cadmium	lbs/day	--	--	--	33	8.3
Chromium (Hexavalent)	µg/L	--	--	320	130	32
Chromium (Hexavalent)	lbs/day	--	--	--	67	17
Copper	µg/L	--	--	450	160	18
Copper	lbs/day	--	--	--	84	9.4

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Instantaneous Maximum	Daily Maximum	6-Month Median
Lead	µg/L	--	--	320	130	32
	lbs/day	--	--	--	67	17
Mercury	µg/L	--	--	6.4	2.6	0.63
	lbs/day	--	--	--	1.3	0.33
Nickel	µg/L	--	--	800	320	80
	lbs/day	--	--	--	170	42
Silver	µg/L	--	--	110	42	8.8
	lbs/day	--	--	--	22	4.6
Zinc	µg/L	--	--	3,100	1,200	200
	lbs/day	--	--	--	600	100
Cyanide	µg/L	--	--	160	64	16
	lbs/day	--	--	--	33	8.3
Total Chlorine Residual	µg/L	--	--	960	130	32
	lbs/day	--	--	--	67	17
Chronic Toxicity	TST Pass or Fail	--	--	--	Pass	---
Ammonia Nitrogen	µg/L	--	--	96,000	38,000	9,600
	lbs/day	--	--	--	20,000	5,000
PCBs	µg/L	3.0E-04	--	--	--	--
	lbs/day	1.6E-04	--	--	--	--
Phenolic Compounds (non-chlorinated)[1]	µg/L	--	--	4,800	1,900	480
	lbs/day	--	--	--	1,000	250
Chlorinated Phenolics[2]	µg/L	--	--	160	64	16
	lbs/day	--	--	--	--	8.3

1. Non-chlorinated phenolic compounds represent the sum of 2,4-dimethylphenol, 4,6-dinitro-2- methylphenol,2,4-dinitrophenol, 2-methylphenol, 4-methylphenol, 2-nitrophenol, 4-nitrophenol, and phenol.
2. Chlorinated phenolic compounds represent the sum of 4-chloro-3-methylphenol, 2-chlorophenol, pentachlorophenol, 2,4,5-trichlorophenol, and 2,4,6-trichlorophenol.

b. Chronic Toxicity. The chronic toxicity limitation is expressed as a null hypothesis (H_0) and regulatory management decision (*b* value) of 0.75 for the chronic toxicity methods in Attachment E – MRP. The null hypothesis for the effluent discharge from the Facility is:

H_0: Mean response (6.25% effluent) ≤ 0.75 mean response (control)

Results obtained from a single-concentration chronic toxicity test shall be analyzed using the Test of Significant Toxicity hypothesis testing approach (EPA 833-R-10-003, 2010) in Attachment E – MRP. Compliance with this chronic toxicity limitation is demonstrated by rejecting the null hypothesis, resulting in a “Pass” or “P”, as described in section V.A. of Attachment E.

c. Salinity. The salinity of the effluent discharged from the Facility shall not exceed an average daily concentration of 65.5 parts per thousand (ppt).

d. **pH.** The pH of the wastes discharged shall be within the range of 6.0 to 9.0 pH units at all times.

e. **Temperature.** The temperature of wastes discharged shall not exceed the natural temperature of the receiving waters, as measured by the ocean intake water temperature, by more than 20°F.

2. Performance Goals – Discharge Point 001 (M- 001)

a. Parameters that do not have reasonable potential to cause or contribute to an exceedance of water quality objectives, or for which reasonable potential to cause or contribute to an exceedance of water quality objectives cannot be determined, are assigned performance goals. Performance goal parameters shall be monitored at Monitoring Location M-001. The performance goals in Table 5 below are not water quality-based effluent limitations (WQBELs) and are not enforceable.

Table 5. Performance Goals

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Instantaneous Maximum	Daily Maximum	6-Month Median
Selenium	µg/L	--	--	2.4E+03	9.6E+02	2.4E+02
	lbs/day	--	--	1.3E+03	5.0E+02	1.3E+02
Endosulfan	µg/L	--	--	4.3E-01	2.9E-01	1.4E-01
	lbs/day	--	--	2.3E-01	1.5E-01	7.5E-02
Endrin	µg/L	--	--	9.6E-02	6.4E-02	3.2E-02
	lbs/day	--	--	5.0E-02	3.3E-02	1.7E-02
HCH	µg/L	--	--	1.9E-01	1.3E-01	6.4E-02
	lbs/day	--	--	1.0E-01	6.7E-02	3.3E-02
Acrolein	µg/L	3.5E+03	--	--	--	--
	lbs/day	1.8E+03	--	--	--	--
Antimony	µg/L	1.9E+04	--	--	--	--
	lbs/day	1.0E+04	--	--	--	--
Bis(2-chloroethoxy) Methane	µg/L	7.0E+01	--	--	--	--
	lbs/day	3.7E+01	--	--	--	--
Bis(2-chloroisopropyl) ether	µg/L	1.9E+04	--	--	--	--
	lbs/day	1.0E+04	--	--	--	--
Chlorobenzene	µg/L	9.1E+03	--	--	--	--
	lbs/day	4.8E+03	--	--	--	--
Chromium (III)	µg/L	3.0E+06	--	--	--	--
	lbs/day	1.6E+06	--	--	--	--
Di-n-butyl Phthalate	µg/L	5.6E+04	--	--	--	--
	lbs/day	2.9E+04	--	--	--	--
Dichlorobenzenes	µg/L	8.2E+04	--	--	--	--
	lbs/day	4.3E+04	--	--	--	--
Diethyl Phthalate	µg/L	5.3E+05	--	--	--	--
	lbs/day	2.8E+05	--	--	--	--
Dimethyl Phthalate	µg/L	1.3E+07	--	--	--	--

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Instantaneous Maximum	Daily Maximum	6-Month Median
	lbs/day	6.8E+06	--	--	--	--
4,6-dinitro-2-methylphenol	µg/L	3.5E+03	--	--	--	--
	lbs/day	1.8E+03	--	--	--	--
2,4-dinitrophenol	µg/L	6.4E+01	--	--	--	--
	lbs/day	3.3E+01	--	--	--	--
Ethylbenzene	µg/L	6.6E+04	--	--	--	--
	lbs/day	3.4E+04	--	--	--	--
Fluoranthene	µg/L	2.4E+02	--	--	--	--
	lbs/day	1.3E+02	--	--	--	--
Hexachlorocyclopentadiene	µg/L	9.3E+02	--	--	--	--
	lbs/day	4.8E+02	--	--	--	--
Nitrobenzene	µg/L	7.8E+01	--	--	--	--
	lbs/day	4.1E+01	--	--	--	--
Thallium	µg/L	3.2E+01	--	--	--	--
	lbs/day	1.7E+01	--	--	--	--
Toluene	µg/L	1.4E+06	--	--	--	--
	lbs/day	7.1E+05	--	--	--	--
Tributyltin	µg/L	2.2E-02	--	--	--	--
	lbs/day	1.2E-02	--	--	--	--
1,1,1-trichloroethane	µg/L	8.6E+06	--	--	--	--
	lbs/day	4.5E+06	--	--	--	--
Acrylonitrile	µg/L	1.6E+00	--	--	--	--
	lbs/day	8.3E-01	--	--	--	--
Aldrin	µg/L	3.5E-04	--	--	--	--
	lbs/day	1.8E-04	--	--	--	--
Benzene	µg/L	9.4E+01	--	--	--	--
	lbs/day	4.9E+01	--	--	--	--
Benzidine	µg/L	1.1E-03	--	--	--	--
	lbs/day	5.8E-04	--	--	--	--
Beryllium	µg/L	5.3E-01	--	--	--	--
	lbs/day	2.8E-01	--	--	--	--
Bis(2-chloroethyl) Ether	µg/L	7.2E-01	--	--	--	--
	lbs/day	3.8E-01	--	--	--	--
Bis(2-ethlyhexyl) Phthalate	µg/L	5.6E+01	--	--	--	--
	lbs/day	2.9E+01	--	--	--	--
Carbon Tetrachloride	µg/L	1.4E+01	--	--	--	--
	lbs/day	7.5E+00	--	--	--	--
Chlordane	µg/L	3.7E-04	--	--	--	--
	lbs/day	1.9E-04	--	--	--	--
Chlorodibromomethane	µg/L	1.4E+02	--	--	--	--
	lbs/day	7.2E+01	--	--	--	--
Chloroform	µg/L	2.1E+03	--	--	--	--

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Instantaneous Maximum	Daily Maximum	6-Month Median
	lbs/day	1.1E+03	--	--	--	--
DDT	µg/L	2.7E-03	--	--	--	--
	lbs/day	1.4E-03	--	--	--	--
1,4-dichlorobenzene	µg/L	2.9E+02	--	--	--	--
	lbs/day	1.5E+02	--	--	--	--
3,3'-dichlorobenzidine	µg/L	1.3E-01	--	--	--	--
	lbs/day	6.8E-02	--	--	--	--
1,2-dichloroethane	µg/L	4.5E+02	--	--	--	--
	lbs/day	2.3E+02	--	--	--	--
1,1-dichloroethylene	µg/L	1.4E+01	--	--	--	--
	lbs/day	7.5E+00	--	--	--	--
Dichlorobromomethane	µg/L	9.9E+01	--	--	--	--
	lbs/day	5.2E+01	--	--	--	--
Dichloromethane	µg/L	7.2E+03	--	--	--	--
	lbs/day	3.8E+03	--	--	--	--
1,3-dichloropropene	µg/L	1.4E+02	--	--	--	--
	lbs/day	7.4E+01	--	--	--	--
Dieldrin	µg/L	6.4E-04	--	--	--	--
	lbs/day	3.3E-04	--	--	--	--
2,4-dinitrotoluene	µg/L	4.2E+01	--	--	--	--
	lbs/day	2.2E+01	--	--	--	--
1,2-diphenylhydrazine	µg/L	2.6E+00	--	--	--	--
	lbs/day	1.3E+00	--	--	--	--
Halomethanes	µg/L	2.1E+03	--	--	--	--
	lbs/day	1.1E+03	--	--	--	--
Heptachlor	µg/L	8.0E-04	--	--	--	--
	lbs/day	4.2E-04	--	--	--	--
Heptachlor Epoxide	µg/L	3.2E-04	--	--	--	--
	lbs/day	1.7E-04	--	--	--	--
Hexachlorobenzene	µg/L	3.4E-03	--	--	--	--
	lbs/day	1.8E-03	--	--	--	--
Hexachlorobutadiene	µg/L	2.2E+02	--	--	--	--
	lbs/day	1.2E+02	--	--	--	--
Hexachloroethane	µg/L	4.0E+01	--	--	--	--
	lbs/day	2.1E+01	--	--	--	--
Isophorone	µg/L	1.2E+04	--	--	--	--
	lbs/day	6.1E+03	--	--	--	--
N-nitrosodimethylamine	µg/L	1.2E+02	--	--	--	--
	lbs/day	6.1E+01	--	--	--	--
N-nitrosodi-N-propylamine	µg/L	6.1E+00	--	--	--	--
	lbs/day	3.2E+00	--	--	--	--
N-nitrosodiphenylamine	µg/L	4.0E+01	--	--	--	--

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Instantaneous Maximum	Daily Maximum	6-Month Median
	lbs/day	2.1E+01	--	--	--	--
PAHs	µg/L	1.4E-01	--	--	--	--
	lbs/day	7.3E-02	--	--	--	--
TCDD equivalents	µg/L	6.2E-08	--	--	--	--
	lbs/day	3.3E-08	--	--	--	--
1,1,2,2-tetrachloroethane	µg/L	3.7E+01	--	--	--	--
	lbs/day	1.9E+01	--	--	--	--
Tetrachloroethylene	µg/L	3.2E+01	--	--	--	--
	lbs/day	1.7E+01	--	--	--	--
Toxaphene	µg/L	3.4E-03	--	--	--	--
	lbs/day	1.8E-03	--	--	--	--
Trichloroethylene	µg/L	4.3E+02	--	--	--	--
	lbs/day	2.3E+02	--	--	--	--
1,1,2-trichloroethane	µg/L	1.5E+02	--	--	--	--
	lbs/day	7.8E+01	--	--	--	--
2,4,6-trichlorophenol	µg/L	4.6E+00	--	--	--	--
	lbs/day	2.4E+00	--	--	--	--
Vinyl Chloride	µg/L	5.8E+02	--	--	--	--
	lbs/day	3.0E+02	--	--	--	--

B. Intake Specifications

The intake of seawater shall comply with the following specifications:

1. The new intake structure shall be completely constructed and operable in accordance with the requirements of this Order and the construction schedule described in the Addendum before Discharger begins intaking seawater;

2. The intake of seawater must not exceed 106.7 MGD as a 12-month average;

3. Surface water intakes must be screened at the onset of the intake of seawater. Screens must be functional while the Facility is withdrawing seawater;

4. To reduce entrainment, all surface water intakes must be screened with a 1.0 mm (0.04 in.) or smaller slot size wedgewire screen when the Facility is withdrawing seawater. The wedgewire screens must be rotating brush-cleaned screens composed of stainless steel;

5. To minimize impingement, the through-screen velocity at the onset of the surface water intake must not exceed 0.15 meters per second (0.5 feet per second) at any time;

6. The intake of seawater shall be reduced to the minimum volume necessary to maintain Facility operations;

7. To the maximum extent practicable, in-plant recycling of waste streams shall be maximized before intaking additional seawater;

8. The Discharger shall cease intake of seawater except when intake of seawater is necessary to maintain Facility operations or to comply with this Order;

9. Chemical (i.e., chlorine) and heat treatment of the offshore intake is prohibited; and

10. Pump operations for intake of seawater shall minimize abrupt changes in flow velocity.

11. The intake of seawater is only authorized for stand-alone operations. The intake of seawater for co-located operations is prohibited.

12. The intake of seawater authorized in this Order is prohibited unless and until (1) the Discharger has submitted the supplemental plans for the final MLMP in accordance with the MLMP Schedule (Attachment K); (2) the Santa Ana Water Board has approved the Discharger's supplemental plans; (3) the Discharger has obtained all permits and other governmental approvals necessary to implement all components of the approved mitigation project (including the components included in supplemental plans required under the MLMP Schedule (Attachment K)); and (4) the Discharger has begun dredging of the Bolsa Chica inlet in accordance with the schedule approved by the Board (Attachment K, Table K-1, Task 1.A.viii).

C. Recycling Specifications – Not Applicable

D. Discharge Specifications

The discharge of effluent from the Facility shall comply with the following:

1. Wastewater from the Facility must be discharged in a manner that provides sufficient initial dilution to comply with the limitations and specifications contained in sections IV and V of this Order and in compliance with the discharge prohibitions contained in section III of this Order.

2. Waste management systems that discharge to the Pacific Ocean must be designed and operated in a manner that will maintain the indigenous marine life and a healthy and diverse marine community.

3. Waste discharged to the Pacific Ocean must be essentially free of:

- **a.** Material that is floatable or will become floatable upon discharge;
- **b.** Settleable materials or substances that may form sediments which will degrade benthic communities or other aquatic life;
- **c.** Substances which will accumulate to toxic levels in marine waters, sediments, or biota;
- **d.** Substances that significantly decrease the natural light to benthic communities and other marine life; and,
- **e.** Materials that result in aesthetically undesirable discoloration of the ocean surface.

E. Stormwater Discharge Specifications

The Discharger shall provide certification to the Santa Ana Water Board that industrial stormwater is managed by internal drainage systems at the Facility, where storm water is captured, treated, and discharged with the treated wastewater regulated under this Order. The certification shall be included in the Stormwater Management Plan required below:

1. **Stormwater Management Plan**

The Discharger shall file with the Santa Ana Water Board, within 180 days prior to the start of construction, a Stormwater Management Plan for discharges of stormwater associated with industrial activities excluding construction activities at its Facility.

V. RECEIVING WATER LIMITATIONS

A. Surface Water Limitations

The receiving water limitations set forth below for ocean waters are based on water quality objectives contained in the Ocean Plan and are a required part of this Order. The discharge of waste from the Facility shall not cause or contribute to a violation of these limitations in the Pacific Ocean.

1. **Salinity**

The discharge shall not cause or contribute to an exceedance of a daily maximum of 2.0 parts per thousand (ppt) above natural background salinity throughout the water column with no vertical limit, measured no further than 100 meters (328 feet) horizontally from the Discharge Point 001 (M-001). Natural background salinity, as measured at a reference location that is representative of the salinity resulting from natural processes without human influence at the discharge location, will be used to evaluate compliance with the salinity receiving water limitation. The reference location shall be without human influence including wastewater outfalls and brine discharges. Within 90 days of the effective date of this Order, the Discharger shall submit for the Santa Ana Water Board's review and acceptance a proposed reference location representative of natural background salinity.

2. **Chemical, Physical, and Biological Limitations**

Discharges from the Facility to the receiving water shall not cause or significantly contribute to a violation of the following water quality objectives established by the Ocean Plan. Compliance with these objectives shall be determined by samples collected at stations representative of the area within the waste field (as described in the MRP, Attachment E), where initial dilution is completed.

a. Bacterial Characteristics

i. Water-Contact Standards:

(a) Within a zone bounded by the shoreline and a distance of 1,000 feet from the shoreline or the 30-foot depth contour, whichever is farther from the shoreline, and in areas outside this zone used for water-contact sports, as determined by the Santa Ana Water Board, but including all kelp beds, the following bacterial objectives shall be maintained throughout the water column.

(1) Fecal Coliform

(i) A 30-day geometric mean, calculated based on the five most recent samples from each site, shall not exceed 200 colony forming units (cfu) per 100 mL; and

(ii) A single sample maximum shall not exceed 400 cfu per 100 mL.

(2) Enterococci

(i) A 6-week rolling geometric mean shall not exceed 30 cfu per 100 mL, calculated weekly; and

(ii) A statistical threshold value of 110 cfu per 100 mL shall not be exceeded by more than 10 percent of the samples collected in a calendar month, calculated in a static manner.

(b) The “Initial Dilution Zone” of wastewater outfalls shall be excluded from designation as kelp beds for purposes of bacterial standards. Adventitious assemblages of kelp plants on waste discharge structures (e.g., outfall pipes and diffusers) do not constitute kelp beds for purposes of bacterial standards.

ii. Shellfish Harvesting Standards:

At all areas where shellfish may be harvested for human consumption, as determined by the Santa Ana Water Board, the median total coliform density shall not exceed 70 cfu per 100 mL throughout the water column, and not more than 10 percent of the samples shall exceed 230 cfu per 100 mL.

b. Physical Characteristics

i. Floating particulates and grease and oil shall not be visible.

ii. The discharge of waste shall not cause aesthetically undesirable discoloration of the ocean surface.

iii. Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste.

iv. The rate of deposition of inert solids and the characteristics of inert solids in ocean sediments shall not be changed such that benthic communities are degraded.

v. Trash from the discharge shall not be present in ocean waters, along shorelines, or adjacent areas in amounts that adversely affect beneficial uses or cause nuisance.

c. Chemical Characteristics

i. The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from that which occurs naturally, as the result of the discharge of oxygen demanding waste materials.

ii. The pH shall not be changed at any time more than 0.2 units from that which occurs naturally.

iii. The dissolved sulfide concentration of waters in and near sediments shall not be significantly increased above that present under natural conditions.

iv. The concentration of substances set forth in Table 3 of the Ocean Plan shall not be increased in marine sediments to levels that would degrade indigenous biota.

v. The concentration of organic materials in marine sediments shall not be increased to levels that would degrade marine life.

vi. Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota.

vii. Numerical water quality objectives established in Table 3 of the Ocean Plan shall not be exceeded as a result of discharges from the Facility through Discharge Point 001 (as computed using an applicable Dm).

d. Biological Characteristics

i. Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded.

ii. The natural taste, odor, and, color of fish, shellfish, or other marine resources used for human consumption shall not be altered.

iii. The concentration of organic materials in fish, shellfish, or other marine resources used for human consumption shall not bioaccumulate to levels that are harmful to human health.

e. Radioactivity

i. Discharge of radioactive waste, which meets the definition of “pollutant” at 40 CFR 122.2, shall not degrade marine life.

ii. The radioactivity in the receiving waters shall not exceed limits specified in title 17, Division 1, Chapter 5, Subchapter 4, Group 3, Article 3, section 30253 of the California Code of Regulations (CCR). The reference to section

30253 is prospective, including future changes to any incorporated provisions of federal law, as the changes take effect.

B. Groundwater Limitations – Not Applicable

VI. PROVISIONS

A. Standard Provisions

1. The Discharger shall comply with all Standard Provisions included in Attachment D.

2. The Facility shall be evaluated to ensure it can be designed and built to reduce infrastructure vulnerability to extreme wet weather events, flooding, storm surges, and projected sea level rise resulting from current and future impacts associated with climate change.

3. Upon the consent of the Discharger, the Executive Officer may modify the Permit to make the corrections or allowances for changes in the permitted activity listed under 40 CFR 122.63(a) through (g), without following the procedures of 40 CFR 124. Any permit modification not processed as a minor modification under 40 CFR 122.63 must be made for cause and comply with public participation requirements set forth in 40 CFR 124, including circulation of a draft permit and public notice as required in 40 CFR 122.62. (40 CFR 122.63)

4. This Order expires on April 30, 2026, after which, the terms and conditions of this Order are automatically continued pending issuance of a new Order, provided that all requirements of U.S. EPA's NPDES regulations at 40 CFR 122.6 and the State's regulations at CCR title 23, section 2235.4 regarding the continuation of expired permits and waste discharge requirements are met.

5. The Water Code section 13142.5(b) determination does not expire and shall remain in effect unless (1) the Discharger fails to satisfy the requirements of the MLMP Schedule in Attachment K and thus triggers the condition in Finding 5 of Attachment G, or (2) the Discharger proposes a change in design or operation of the Facility in a manner that could increase intake or mortality of marine life, consistent with the Ocean Plan definition of an expanded facility. If the former occurs, the Discharger would need to submit a request for a new Water Code section 13142.5(b) determination for mitigation under Ocean Plan, chapter III.M.2.a.(5); if the latter occurs, the Discharger would need to submit a request for a new Water Code section 13142.5(b) determination for an expanded facility as required by the Ocean Plan chapter III.M.1.b.(2) and III.M.2.a.(1).

6. The Discharger shall comply with the following provisions. In the event that there is any conflict, duplication, or overlap between provisions specified by this Order, the more stringent provision shall apply:

   a. Failure to comply with provisions or requirements of this Order, or violation of other applicable laws or regulations governing discharges from this facility, may subject the Discharger to administrative or civil liabilities, criminal penalties, and/or other enforcement remedies to ensure compliance. Additionally, certain violations may subject the Discharger to civil or criminal enforcement from appropriate local, state, or federal law enforcement entities.

b. In the event the Discharger does not comply or will be unable to comply for any reason, with any prohibition, effluent limitation, or receiving water limitation of this Order, which may endanger health or the environment, the Discharger shall notify the Santa Ana Water Board by telephone at (951) 782-4130 within 24 hours of having knowledge of such noncompliance and shall confirm this notification in writing within five days, unless the Santa Ana Water Board waives written confirmation. The written notification shall state the nature, time, duration, and cause of noncompliance and shall describe the measures being taken to remedy the current noncompliance and prevent recurrence, including, where applicable, a schedule of implementation. Other noncompliance requires written notification as above at the time of the normal monitoring report.

c. Neither the treatment nor the discharge of pollutants shall create a pollution, contamination, or nuisance as defined by Water Code section 13050.

d. The Discharger shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this Order, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the noncomplying discharge.

e. This Order may be modified, revoked and reissued, or terminated for causes including, but not limited to, the following:

i. Violation of any term or condition of this Order;

ii. Obtaining this Order by misrepresentation or failure to disclose fully all relevant facts; or

iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.

f. If an effluent standard or discharge prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the CWA for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for that pollutant in this Order, this Order may be modified or revoked and reissued to conform to the effluent standard or discharge prohibition.

g. The provisions of this Order are severable, and if any provisions of this Order or the application of any provision of this Order to any circumstances is held invalid, the application of such provision to other circumstances and the remainder of this Order shall not be affected thereby.

h. The Discharger shall maintain a full and complete copy of this Order at the Facility so that it is available to site operating personnel, Santa Ana Water Board, and the State Water Resources Control Board (State Water Board) at all times. Key operating personnel shall be familiar with its content.

i. Collected screenings, sludge, and other solids removed from liquid wastes shall be disposed of in a manner approved by the Santa Ana Water Board's Executive Officer.

j. In the event of any change in control or ownership of land or waste discharge facility presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be forwarded to the Santa Ana Water Board.

B. Monitoring and Reporting Program (MRP) Requirements

The Discharger shall comply with the MRP, and future revisions thereto, in Attachment E of this Order. This MRP may be modified by the Executive Officer at any time during the term of this Order and may include an increase in the number of parameters to be monitored, the frequency of the monitoring, or the number and size of samples to be collected. Any increase in the number of parameters to be monitored, the frequency of the monitoring, or the number and size of samples to be collected may be reduced back to the levels specified in the original MRP at the discretion of the Executive Officer.

C. Special Provisions

1. Reopener Provisions

a. This Order may be reopened to modify provisions governing compliance with Water Code section 13142.5(b) and the Ocean Plan if the Discharger fails to satisfy the requirements of the MLMP Schedule in Attachment K and thus triggers the condition in Finding 5 of Attachment G or if the Discharger proposes a change in design or operation of the Facility in a manner that could increase intake or mortality of marine life, consistent with the Ocean Plan definition of an expanded facility, beyond that which is approved in this Water Code section 13142.5(b) determination. This Order may be reopened at any time for modification of provisions governing compliance with the receiving water limitation for salinity as set forth in Ocean Plan, chapter III.M.3.

b. This Order will be reopened to address any changes in state or federal statutes, plans, policies, or regulations that would affect the water quality requirements for the discharges.

c. This Order may be reopened for modification to include an effluent limitation, if monitoring establishes that the discharge causes, has the reasonable potential to cause, or contributes to an exceedance of any water quality objective in Table 3 of the Ocean Plan.

d. This Order may be reopened and modified in accordance with the requirements set forth at 40 CFR 122 and 124 to include the appropriate conditions or limits to address demonstrated effluent toxicity based on newly available information or to implement any EPA-approved new state water quality standards applicable to effluent toxicity.

e. This Order may be reopened for modification or revocation and reissuance as a result of the detection of a reportable priority pollutant generated by special conditions included in this Order. These special conditions may be, but are not limited to, fish tissue sampling, whole effluent toxicity, monitoring requirements on internal waste stream(s), and monitoring for surrogate parameters. Additional requirements may be added to this Order as a result of the special condition monitoring data.

f. This Order will be reopened to address physical or operational alterations to the permitted facility that would affect the requirements for discharges from the facility.

g. The MRP (Attachment E) may be modified by the Executive Officer to enable the Discharger to participate in comprehensive regional monitoring activities conducted in the Southern California Bight during the term of this permit. The intent of regional monitoring activities is to maximize the efforts of all monitoring partners using a cost-effective monitoring design and to best utilize the pooled scientific resources of the region.

During these coordinated monitoring efforts, the Discharger's sampling and analytical effort may be reallocated to provide a regional assessment of the impact of wastewater discharges to the Southern California Bight. In that event, the Santa Ana Water Board shall notify the Discharger in writing that the request to perform the receiving water sampling and analytical effort defined in section IV of this MRP is suspended for the duration of the reallocation. Anticipated modifications to the monitoring program will be coordinated so as to provide a comprehensive picture of the ecological and statistical significance of monitoring results and to determine cumulative impacts of various pollutant sources. If predictable relationships among the biological, water quality and effluent monitoring variables can be demonstrated, it may be appropriate to decrease the Discharger's monitoring effort. The level of resources in terms of sampling and analytical effort redirected from the receiving water monitoring program required under section IV of the MRP shall approximately equal the level of resources provided to implement the regional monitoring and assessment program, unless the Santa Ana Water Board and the Discharger agree otherwise. The specific scope and duration of the receiving water monitoring program reallocation and redirection shall be determined in writing by the Santa Ana Water Board in consultation with the Discharger. These changes will improve the overall effectiveness of monitoring in the Southern California Bight. Minor changes may be made without further public notice.

h. If the Discharger complies with the following conditions to the satisfaction of the Santa Ana Water Board, this Order will be reopened to consider the removal of the discharge and intake prohibitions in sections III.I and IV.B.12, respectively:

i. The Discharger must submit all supplemental plans beginning with the Communication and Coordination Plans and up through and including the 60% design plans for each of the mitigation projects in accordance with Tasks 1)A-B, 2)A-B and D-E, 3)A-B, 4)A-B, and 5)A-B in Table K-1 of Attachment K, in consultation with Santa Ana Water Board staff and staff of the agencies responsible for issuing permits for the mitigation projects. These supplemental plans are necessary prerequisites for the Discharger to develop more reliable timelines and cost estimates for the mitigation projects. The Discharger must receive Executive Officer approval of the supplemental plans up through and including the 60% design plans

ii. The Discharger must develop estimated timelines based on the approved 60% design plan for each of the mitigation projects that includes all major steps in the planning, permitting, construction, implementation, operation and maintenance, and monitoring and reporting for the operational life of the Facility, plus the period of time that the mitigation projects will be required to extend beyond the operational life of the Facility. The Discharger must develop the estimated timelines in consultation with Santa Ana Water Board staff and staff of the agencies responsible for issuing permits for the mitigation projects.

iii. The Discharger must develop cost estimates based on the approved 60% design plan for the planning, permitting, construction, implementation, operation and maintenance, and monitoring and reporting for the operational life of the Facility of each of the mitigation projects.

iv. Upon the approval of the cost estimates by the neutral third party used for the Discharger's financing, the Discharger must submit the estimated timelines, cost estimates, the neutral third party's approval letter, and proposals for stipulated penalties and financial assurances to the Santa Ana Water Board for approval.

(a) The proposal for stipulated penalties must include an agreement by the Discharger to pay a daily penalty for each missed deadline remaining in Attachment K after the conditions above have been satisfied. The amounts of the stipulated penalties must approximate the Discharger's corresponding estimated costs of meeting missed deadlines. To minimize transaction costs associated with implementing the stipulated penalty, the proposal must include a mechanism to efficiently resolve any disputes between the Santa Ana Water Board and the Discharger regarding the applicability of the stipulated penalty.

(b) The proposal for financial assurances must include (1) the cost estimates for all outstanding planning, permitting, construction, operation and maintenance, and monitoring and reporting of the mitigation projects, including operation and maintenance of the mitigation projects for the period of time after the Facility ceases operations that is necessary to satisfy the Discharger's mitigation credit obligations, (2) a substantial contingency amount for future mitigation project design refinements and changes and cost overruns, and (3) a substantial additional incentive equal to 2.5% of Facility construction and operation and maintenance costs to be returned to the Discharger once the Santa Ana Water Board determines that all of the mitigation projects are meeting their approved performance standards and success criteria. The financial assurances must be available to the Santa Ana Water Board.

v. The Santa Ana Water Board will consider the estimated timelines, cost estimates, proposed stipulated penalties, and proposed financial assurances. If the Santa Ana Water Board approves these items, with or without any modifications, the Santa Ana Water Board will remove the intake and discharge prohibitions and replace the prohibitions with permit requirements that implement the following:

(a) Enforceable deadlines for planning, permitting, construction, and implementation of each of the mitigation projects based on the Discharger's approved estimated timelines;

(b) Daily stipulated penalties for each missed deadline in accordance with the approved proposal for stipulated penalties;

(c) Financial assurances available to the Santa Ana Water Board in accordance with the approved proposal for financial assurances; and

(d) The Discharger's commencement of the dredging of the Bolsa Chica inlet within 12 months of the date at which the Facility debt is closed and the proceeds are issued to the Discharger to construct the Facility.

2. Special Studies, Technical Reports, and Additional Monitoring Requirements

a. Toxicity Reduction Requirements

i. The Discharger shall conduct chronic toxicity monitoring of discharges as specified in the MRP (Attachment E).

ii. The Discharger shall develop and submit to the Santa Ana Water Board an Initial Investigation Toxicity Reduction Evaluation (IITRE) work plan within 90 days of the effective date of this permit. This work plan shall describe the steps the Discharger intends to follow if required. The work plan shall include at a minimum:

(a) A description of the investigation and evaluation techniques that will be used to identify potential causes/sources of the exceedance, effluent variability, and/or efficiency of the treatment system in removing toxic substances. This shall include a description of an accelerated chronic toxicity testing program.

(b) A description of the methods to be used for investigating and maximizing in-house treatment efficiency and good housekeeping practices.

(c) A description of the evaluation process to be used to determine if implementation of a more detailed Toxicity Reduction Evaluation and Toxicity Identification Evaluation (TRE/TIE) is necessary.

(d) The Discharger shall implement the IITRE work plan whenever the chronic toxicity effluent limitation is exceeded.

(e) The Discharger shall develop a detailed TRE/TIE work plan that shall describe the steps the Discharger intends to follow if the implemented IITRE fails to identify the cause of, or rectify, the toxicity.

(f) The Discharger shall use as guidance, at a minimum, EPA manuals EPA/600/2-88/070 (industrial), EPA/600/4-89-001A (municipal), EPA/600/6-91/005F (Phase I), EPA/600/R-92/080 (Phase II), and EPA-600/R-92/081 (Phase III) to identify the cause(s) of toxicity. If during the life of this Order, the aforementioned EPA manuals are revised or updated, the revised/updated manuals may also be used as guidance. The detailed TRE/TIE work plan shall include:

(i) Further actions to investigate and identify the cause of toxicity;

(ii) Actions the Discharger will take to mitigate the impact of the discharge and to prevent the recurrence of toxicity; and

(iii) A schedule for these actions.

(g) The Discharger shall implement the TRE/TIE work plan if the IITRE fails to identify the cause of, or rectify, the toxicity, or if in the opinion of the Executive Officer, the IITRE does not adequately address an identified toxicity problem.

(h) The Discharger shall assure that adequate resources are available to implement the required TRE/TIE.

b. Biological Surveys

Baseline biological conditions shall be established at the discharge location and at a reference location prior to commencement of construction. The Discharger is required to conduct biological surveys (Before-After Control-Impact Study) that will evaluate the differences between biological communities at a reference site and at the discharge location before and after the discharge commences. The Santa Ana Water Board will use the data and results from the surveys and any other applicable data for evaluating the requirements specified in this Order. See section VIII.D. of Attachment E for details.

c. Marine Life Mitigation Plan Schedule

The Water Code section 13142.5(b) determination is conditioned on the Discharger’s satisfaction of the requirements set forth in the Marine Life Mitigation Plan Schedule (MLMP Schedule) in Attachment K. Pursuant to the MLMP Schedule, the Discharger shall submit a final MLMP that consists of a Coordination and Communication Plan, a Final Restoration Plan for the Fieldstone Property, a Final Restoration Plan for the Oil Pads and Road project, a Final Restoration Plan for the Intertidal Shelf Cordgrass Marsh project, a Final Creation Plan for the Palos Verdes Artificial Reef, a Final Adaptive Management Plan for the Bolsa Chica mitigation projects, and a Final Adaptive Management Plan for the Palos Verdes Artificial Reef mitigation project in accordance with the established schedule. The plans must undergo any environmental review required under CEQA prior to the Board’s final approval. The Discharger shall implement the final MLMP, as revised by the supplemental plans, upon approval by the Santa Ana Water Board in consultation with the State Water Board and other agencies that have authority to condition the approval of the project and require mitigation.

Based on calculations of the mitigation acreage available for the mitigation project components, the Santa Ana Water Board expects that the mitigation projects will provide sufficient mitigation acreage to meet the acreage requirements under chapter III.M.2.e.(3)(b)vi of the Ocean Plan, as adjusted by the mitigation ratios in chapter III.M.2.e.(3)(b)vi. This finding is conditioned on, and the awarding of all mitigation acreage is contingent upon, the Discharger's successful completion of each of the mitigation components specified in Attachment K and any environmental review required under CEQA. (See Attachment G, Finding 5.)

d. Mitigation Monitoring

After the updated MLMP is approved in accordance with the MLMP Schedule (Section IV.C.2.c), the Discharger shall implement the approved MLMP and comply with the performance standards and monitoring and reporting requirements as specified in Attachment E and the approved MLMP in Section VI.C.2.c and Attachment K of this Order. The Discharger shall provide for the long-term operation and maintenance of the mitigation projects in the approved MLMP, including financial assurances, for the operational life of the Facility. If the approved mitigation does not meet the established performance standards for the operational lifetime of the Facility, the Discharger will be required to propose and implement additional mitigation to comply with Water Code section 13142.5(b) and the Ocean Plan.

3. Best Management Practices and Pollution Prevention

The Discharger shall implement best management practices (BMPs) to control the discharge of pollutants in stormwater discharges associated with industrial activities.

a. Pollutant Minimization Program (PMP). Reporting protocols in the MRP (Attachment E) section X.B.4 describe sample results that are to be reported as detected but not quantified (DNQ) or not detected (ND). Definitions for a reported minimum level (ML) and method detection limit (MDL) are provided in Attachment A. These reporting protocols and definitions are used in determining the need to conduct a PMP as follows:

The Discharger shall develop and conduct a PMP as further described below when there is evidence (e.g., sample results reported as DNQ when the effluent limitation is less than the MDL, sample results from analytical methods more sensitive than those methods required by this Order, presence of whole effluent toxicity, health advisories for fish consumption, results of benthic or aquatic organism tissue sampling) that a pollutant is present in the effluent above an effluent limitation and either:

i. The concentration of the pollutant is reported as DNQ and the effluent limitation is less than the reported ML, using definitions described in Attachment A and reporting protocols described in MRP section X.B.4;

ii. The concentration of the pollutant is reported as ND and the effluent limitation is less than the MDL, using definitions described in Attachment A and reporting protocols described in MRP section X.B.4.

The goal of the PMP shall be to reduce all potential sources of a pollutant through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants, where there is evidence that beneficial uses are being impacted. The Santa Ana Water Board may consider cost-effectiveness when establishing the requirements of a PMP. The completion and implementation of a pollution prevention plan, if required pursuant to Water Code section 13263.3, subdivision (d), shall be considered to fulfill the PMP requirements.

The PMP shall include, but not be limited to, the following actions and submittals acceptable to the Santa Ana Water Board:

i. An annual review and semi-annual monitoring of potential sources of the reportable pollutant(s), which may include fish tissue monitoring and other bio-reportable pollutant(s), which may include fish tissue monitoring and other bio-uptake sampling;

ii. Quarterly monitoring for the reportable pollutant(s) in the influent;

iii. Submittal of a control strategy designed to proceed toward the goal of maintaining concentrations of the reportable pollutant(s) in the effluent at or below the effluent limitation;

iv. Implementation of appropriate cost-effective control measures for the reportable pollutant(s), consistent with the control strategy; and

v. An annual status report that shall be sent to the Santa Ana Water Board including:

   (a) All PMP monitoring results for the previous year;

   (b) A list of potential sources of the reportable pollutant(s);

   (c) A summary of all actions undertaken pursuant to the control strategy; and

   (d) A description of actions to be taken in the following year.

4. Climate Change Action Plan

Changing climate conditions may fundamentally alter the way desalination plants are designed and operated. Climate change research indicates the overarching driver of change is increased atmospheric carbon dioxide (CO_2) from human activity. The increased CO_2 emissions trigger changes to climatic patterns, which increase the intensity of sea level rise and coastal storm surges (Changes in Sea Level), lead to more erratic rainfall and local weather patterns (Changes in Weather Patterns), trigger a gradual warming of freshwater and ocean temperatures (Changes in Water Temperature) and trigger changes to ocean water chemistry (Changes in Water pH).

The Discharger shall prepare and submit a Climate Change Action Plan (CCAP) within 18 months of the effective date of this Order. The CCAP shall identify the following:

a. Projected regional impacts on the Facility and operations due to climate change if current trends continue.

b. Steps being taken or planned to address:

   i. Greenhouse gas emissions, directly and indirectly, attributable to the Facility operations and effluent discharge process;

   ii. Flooding and sea level rise risks that may affect the operations including discharges at the Facility;

   iii. Volatile rain period impacts (both dry and wet weather);

   iv. Impacts on process design parameters due to changes caused by climate change;

   v. Impacts on the Facility's operations and effluent water quality; and

   vi. Impacts to the mitigation site(s) approved by the Santa Ana Water Board.

c. Potential need to adjust the conditions of this Order.

d. Financing needed to pay for planned actions;

e. Conformity with plans and requirements by other agencies, including but not limited to the California Air Resources Board, the Air Pollution Control District, and the California Coastal Commission.

f. Schedules to update the CCAP as more information on climate change and its effects become available.

g. Any other factors as appropriate.

The Santa Ana Water Board will consult with other state agencies with regulatory authority over the Facility in its review of the CCAP. The Discharger shall implement the CCAP upon approval by the Santa Ana Water Board.

5. Construction, Operation, and Maintenance Specifications

The Discharger shall develop an Operation and Maintenance Manual (O&M Manual). If an O&M Manual has been developed, the Discharger shall update it as necessary to conform to latest plant changes and requirements. The O&M Manual shall be readily available to operating personnel onsite. The O&M Manual shall include the following:

a. Detailed description of safe and effective operation and maintenance of treatment processes, process control instrumentation, and equipment.

b. Description of laboratory and quality assurance procedures.

c. Process and equipment inspection and maintenance schedules,

d. Description of safeguards to assure that, should there be reduction, loss, or failure of electric power, the Discharger will be able to comply with the terms and conditions of this Order.

e. Description of preventive (fail-safe) and contingency (cleanup) plans for controlling accidental discharges and for minimizing the effect of such events. These plans shall identify the possible sources (such as loading and storage areas, power outage, waste treatment unit failure, process equipment failure, tank and piping failure) of accidental discharges, untreated or partially treated waste bypass, and polluted drainage.

f. **Asset Management.** The Discharger shall develop an asset management program (AMP) to cover the Facility and intake and outfall structures. The Discharger shall:

   i. Prior to operations, procure, populate, and utilize asset management and/or work order management software. This software shall: Inventory all critical assets valued over $40,000 into a single database (assets may include, but are not limited to pipelines, manholes, outfalls, pump stations, force mains, catch basins, and wastewater treatment facility assets); automate work order production and tracking; and prioritize system maintenance and rehabilitation projects. Each entry shall include: Name and identification number; location (GPS coordinate or equivalent identifier); current performance/condition; purchase and installation date; purchase price; replacement cost; quantitative consequence of failure; and quantitative likelihood of failure.

   ii. Prior to operations, create and submit to the Santa Ana Water Board an Asset Management Plan (AMP). The AMP shall be updated and re-evaluated every five years. The AMP shall include the following components: A Rehabilitation and Replacement Plan identifying and prioritizing upcoming asset rehabilitation and replacement projects costing greater than $40,000 and outline a proposed schedule for completion of each project; a Maintenance Plan that identifies categories of, maintenance activities and frequency performed.

g. **Notice of Shutdown for Preventative or Corrective Maintenance.** The Discharger shall notify the Santa Water Board of any preventative maintenance that will result in the complete or partial shutdown of the Facility. The Discharger shall provide written notice to the Santa Ana Water Board a minimum of 30 days prior to the complete or partial shutdown of the Facility for preventative maintenance. The written notice shall explain:

   a. The dates the preventative maintenance is expected to occur;
   b. The purpose of the preventative maintenance;
   c. What preventative maintenance activities will occur;
   d. How the preventative maintenance may impact influent and effluent flows; and
   e. How the preventative maintenance may impact water quality and compliance with permit conditions.

The Discharger shall also notify the Santa Water Board of any corrective maintenance that will or did result in the complete or partial shutdown of the Facility. In the event of a complete or partial shutdown of the Facility for corrective maintenance that will or did have a significant impact on influent or effluent flow, the Discharger shall send email notice to and verbally notify the Santa Ana Water Board within 24 hours of becoming aware that corrective maintenance will or did result in a partial or complete shutdown that is or was necessary. Within 5 days of providing verbal notification, the Discharger shall provide written notification and shall explain:

i. The dates the corrective maintenance is expected to/did occur;
ii. Why corrective maintenance is/was necessary;
iii. What corrective maintenance activities will be or have been performed;
iv. How the corrective maintenance has or may impact influent and effluent flows; and
v. How the corrective maintenance has or may impact water quality and compliance with permit conditions.

During the next monthly reporting period following the preventative or corrective maintenance, the Discharger shall provide notification to the Santa Ana Water Board that the maintenance activities have been completed or provide any necessary updates to the previously submitted information. As used in this section, a partial Facility shutdown means reducing the authorized operating flows to or below 50%.

6. Other Special Provisions – Not Applicable

7. Compliance Schedules – Not Applicable

VII. COMPLIANCE DETERMINATION

Compliance with the effluent limitations contained in section IV. of this Order will be determined as specified below:

A. General. Compliance with effluent limitations for reportable pollutants shall be determined using sample reporting protocols defined in the MRP (Attachment E) and Attachment A of this Order. For purposes of reporting and administrative enforcement by the Santa Ana Water Board and State Water Board, the Discharger shall be deemed out of compliance with effluent limitations if the concentration of the reportable pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reported reporting level (RL).

B. Multiple Sample Data. When determining compliance with a measure of central tendency (arithmetic mean, geometric mean, median, etc.) of multiple sample analyses and the data set contains one or more reported determinations of DNQ or ND, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

1. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

2. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the

middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

C. Average Monthly Effluent Limitation (AMEL). If the average (or when applicable, the median determined by subsection B above for multiple sample data) of daily discharges over a calendar month exceeds the AMEL for a given parameter, this will represent a single violation, though the Discharger will be considered out of compliance for each day of that month for that parameter (e.g., resulting in 31 days of non-compliance in a 31-day month). If only a single sample is taken during the calendar month and the analytical result for that sample exceeds the AMEL, the Discharger will be considered out of compliance for that calendar month. The Discharger will only be considered out of compliance for days when the discharge occurs. For any one calendar month during which no sample (daily discharge) is taken, no compliance determination can be made for that calendar month.

D. Compliance with Average Weekly Effluent Limitation (AWEL). If the average of daily discharge monitoring results over a calendar week (Sunday through Saturday) exceeds the AWEL for a given parameter, an alleged violation will be flagged and the Discharger is out of compliance for each day of that week for that parameter, resulting in seven days of noncompliance. The average of daily discharge monitoring results over the calendar week that exceeds the AWEL for a parameter will be considered out of compliance for that week only. If only a single sample is taken during the calendar week and the analytical result for that sample exceeds the AWEL, the Discharger is out of compliance for that calendar week. For any one calendar week during which no sample is taken, no compliance determination can be made for that calendar week.

E. Maximum Daily Effluent Limitation (MDEL). If a daily discharge or when applicable, the median determined by subsection B above for multiple sample data of a daily discharge exceeds the MDEL for a given parameter, the Discharger will be considered out of compliance for that parameter for that 1 day only within the reporting period. For any 1 day during which no sample is taken, no compliance determination can be made for that day.

F. Instantaneous Minimum Effluent Limitation. If the analytical result of a single grab sample is lower than the instantaneous minimum effluent limitation for a parameter, the Discharger will be considered out of compliance for that parameter for that single sample. Non-compliance for each sample will be considered separately (e.g., the results of two grab samples taken within a calendar day that both are lower than the instantaneous minimum effluent limitation would result in two instances of non-compliance with the instantaneous minimum effluent limitation).

G. Instantaneous Maximum Effluent Limitation. If the analytical result of a single grab sample is higher than the instantaneous maximum effluent limitation for a parameter, the Discharger will be considered out of compliance for that parameter for that single sample. Non-compliance for each sample will be considered separately (e.g., the results of two grab samples taken within a calendar day that both exceed the instantaneous maximum effluent limitation would result in two instances of non-compliance with the instantaneous maximum effluent limitation).

H. Six-month Median Effluent Limitation. If the median of daily discharges over any 180-day period exceeds the six-month median effluent concentration limitation for a given parameter, the Discharger will be considered out of compliance for each day of that 180-day period for that parameter. The next assessment of compliance will occur after the next sample is taken. If only a single sample is taken during a given 180-day period and the analytical result for that sample exceeds the six-month median, the Discharger will be considered out of compliance for the 180-day period. For any 180-period during which no sample is taken, no compliance determination can be made for the six-month median limitation.

Similarly, compliance with the six-month median mass emissions limit shall be determined by comparing the calculated mass limit with calculated mass discharges. If mass discharges exceed the allowed mass discharges, the Discharger is not in compliance. The calculated mass discharges shall be determined by using the same equation in calculating the mass emission limit and using the allowable six-month median effluent concentration and the observed flow rate in millions of gallons per day.

I. Mass and Concentration Limitations. Compliance with mass and concentration effluent limitations for the same parameter shall be determined separately with their respective limitations. When the concentration of a constituent in an effluent sample is determined to be “ND” or “DNQ”, the corresponding Mass Emission Rate (MER) determined from that sample concentration shall also be reported as "ND" or "DNQ".

J. Ocean Plan Provisions for Table 3 Constituents.

1. Sampling Reporting Protocols

a. The Discharger shall report with each sample result the reported ML and the laboratory's current MDL.

b. The Discharger shall also report results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

i. Sample results greater than or equal to the reported ML must be reported "as measured" by the laboratory (i.e., the measured chemical concentration in the sample).

ii. Sample results less than the reported ML, but greater than or equal to the laboratory's MDL, must be reported as "Detected, but Not Quantified", or DNQ. The laboratory must write the estimated chemical concentration of the sample next to DNQ as well as the words "Estimated Concentration" (may be shorted to Est. Conc.").

iii. Sample results less than the laboratory's MDL must be reported as "Not Detected", or ND.

2. Compliance Determination

Sufficient sampling and analysis shall be required to determine compliance with the effluent limitation.

a. Compliance with Single-Constituent Effluent Limitations. The Discharger shall be deemed out of compliance with an effluent limitation or discharge specification if, based on reliable data, the concentration of the constituent in the monitoring sample is greater than the effluent limitation or discharge specification and greater than or equal to the ML.

b. **Compliance with Effluent Limitations Expressed as a Sum of Constituents.** The Discharger shall be deemed out of compliance with an effluent limitation that applies to the sum of a group of chemicals (e.g., chlorinated phenolics) if, based on reliable data, the sum of the individual pollutant concentrations is greater than the effluent limitation. Individual pollutants of the group will be considered to have a concentration of zero if the constituent is reported as ND or DNQ.

c. **MERate.** The MER, in pounds per day, shall be obtained from the following calculation for any calendar day:

$$\text{MERate (lbs/day)} = 8.34 \times Q \times C$$

In which Q and C are the flow rate in million gallons per day and the constituent concentration in mg/L, respectively, and 8.34 is a conversion factor (lbs/gallon of water). If a composite sample is taken, then C is the concentration measured in the composite sample and Q is the average flow rate occurring during the period over which the samples are composited.

d. **Salinity.** Compliance with the salinity receiving water limitation established in section V.A.1 of the Order shall be evaluated by comparing reference background salinity from the reference location (per section V.A.1. of the Order) to receiving water salinity at the edge of the brine mixing zone at monitoring locations RSW-007, RSW-008, RSW-009, and RSW-010.

Each monitoring station located along the 100-meter limit of the brine mixing zone (RSW-007, RSW-008, RSW-009, and RSW-010) shall be evaluated separately at each depth profile. Receiving water salinity greater than 2.0 ppt outside of the 100-meter limit of the brine mixing zone of the corresponding reference background salinity shall constitute an exceedance of the salinity receiving water limitation.

ATTACHMENT A – DEFINITIONS

Acute Toxicity

a. Acute Toxicity (TUa)
   Expressed in Toxic Units Acute (TUa)

$$TUa = \frac{100}{\text{96-hr LC 50\%}}$$

b. Lethal Concentration 50% (LC 50)
   LC 50 (percent waste giving 50% survival of test organisms) shall be determined by static or continuous flow bioassay techniques using standard marine test species as specified in Ocean Plan Appendix III. If specific identifiable substances in wastewater can be demonstrated by the discharger as being rapidly rendered harmless upon discharge to the marine environment, but not as a result of dilution, the LC 50 may be determined after the test samples are adjusted to remove the influence of those substances.

   When it is not possible to measure the 96-hour LC 50 due to greater than 50 percent survival of the test species in 100 percent waste, the toxicity concentration shall be calculated by the expression:

$$TUa = \frac{\log (100 - S)}{1.7}$$

   where:

   S = percentage survival in 100% waste. If S > 99, TUa shall be reported as zero.

Areas of Special Biological Significance (ASBS)
Those areas designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable. All ASBSs are also classified as a subset of STATE WATER QUALITY PROTECTION AREAS.

AREA PRODUCTION FOREGONE (APF)
Also known as habitat production foregone, is an estimate of the area that is required to produce (replace) the same amount of larvae or propagules that are removed via entrainment at a desalination facilities intakes. APF is calculated by multiplying the proportional mortality by the source water body, which are both determined using an empirical transport model.

Average Monthly Effluent Limitation (AMEL)
The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Effluent Limitation (AWEL)
The highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Brine
Byproduct of desalinated water having a salinity concentration greater than a desalination facility’s intake source water.

Brine Mixing Zone (BMZ)
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. An alternative brine mixing zone, if approved as described in chapter III.M.3.d of the 2015 Ocean Plan, shall not exceed 200 meters (656 feet) laterally from the points of discharge and throughout the water column. The brine mixing zone is an allocated impact zone where there may be toxic effects on marine life due to elevated salinity.

Chlordane
Shall mean the sum of chlordane-alpha, chlordane-gamma, chlordane-alpha, chlordane-gamma, nonachlor-alpha, nonachlor-gamma, and oxychlordane.

Chronic Toxicity
This parameter shall be used to measure the acceptability of waters for supporting a healthy marine biota until improved methods are developed to evaluate biological response.

a. Chronic Toxicity (TUc)
   Expressed as Toxic Units Chronic (TUc)

$$TUc = \frac{100}{NOEL}$$

b. No Observed Effect Level (NOEL)

The NOEL is expressed as the maximum percent effluent or receiving water that causes no observable effect on a test organism, as determined by the result of a critical life stage toxicity test listed in Ocean Plan Appendix III, Table III-1.

Daily Discharge
Daily Discharge is defined as either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

The daily discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day or other 24-hour period defined as a day) or by the arithmetic mean of analytical results from one or more grab samples taken over the course of the day.

For composite sampling, if one day is defined as a 24-hour period other than a calendar day, the analytical result for the 24-hour period will be considered as the result for the calendar day in which the 24-hour period ends.

DDT
Shall mean the sum of 4,4’DDT, 2,4’DDT, 4,4’DDE, 2,4’DDE, 4,4’DDD, and 2,4’DDD.

Degrade
Degradation shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species. Degradation occurs if there are significant differences in any of three major biotic groups: namely demersal fish, benthic

invertebrates, or attached algae. Other groups may be evaluated where benthic species are not affected, or are not the only ones affected.

Desalination Facility
Industrial facility that processes water to remove salts and other components from the source water to produce water that is less saline than the source water.

Detected, but Not Quantified (DNQ)
Sample results that are less than the reported ML, but greater than or equal to the laboratory's MDL. Sample results reported as DNQ are estimated concentrations.

Dichlorobenzenes
Shall mean the sum of 1,2- and 1,3-dichlorobenzene.

Downstream Ocean Waters
Waters downstream with respect to ocean currents.

Dredged Material
Any material excavated or dredged from the navigable waters of the United States, including material otherwise referred to as "spoil."

Eelgrass Beds
Aggregations of aquatic plant species of the genus *Zostera*.

Empirical Transport Model (ETM)
Methodology for determining the spatial area known as the source water body that contains the source water population, which are the organisms that are at risk of entrainment as determined by factors that may include but are not limited to biological, hydrodynamic, and oceanographic data. ETM can also be used to estimate proportional mortality, P_m

Enclosed Bays
Indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. This definition includes but is not limited to: Humboldt Bay, Bodega Harbor, Tomales Bay, Drakes Estero, San Francisco Bay, Morro Bay, Los Angeles Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay.

Endosulfan
The sum of endosulfan-alpha and -beta and endosulfan sulfate.

Estuaries and Coastal Lagoons
Waters at the mouths of streams that serve as mixing zones for fresh and ocean waters during a major portion of the year. Mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters will generally be considered to extend from a bay or the open ocean to the upstream limit of tidal action but may be considered to extend seaward if significant mixing of fresh and salt water occurs in the open coastal waters. The waters described by this definition include but are not limited to the Sacramento-San Joaquin Delta as defined by section 12220 of the California Water Code, Suisun Bay, Carquinez Strait downstream to Carquinez Bridge, and appropriate areas of the Smith, Klamath, Mad, Eel, Noyo, and Russian Rivers.

Feasible

For the purposes of chapter III.M, shall mean capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors.

Flow Augmentation Type of in-plant dilution and occurs when a desalination facility withdraws additional source water for the specific purpose of diluting brine prior to discharge.

Halomethanes Sum of bromoform, bromomethane (methyl bromide) and chloromethane (methyl chloride).

HCH
Sum of the alpha, beta, gamma (lindane) and delta isomers of hexachlorocyclohexane.

In-Kind Mitigation
When the habitat or species lost is the same as what is replaced through mitigation.

Initial Dilution
The process that results in the rapid and irreversible turbulent mixing of wastewater with ocean water around the point of discharge.

For a submerged buoyant discharge, characteristic of most municipal and industrial wastes that are released from the submarine outfalls, the momentum of the discharge and its initial buoyancy act together to produce turbulent mixing. Initial dilution in this case is completed when the diluting wastewater ceases to rise in the water column and first begins to spread horizontally.

For shallow water submerged discharges, surface discharges, and non-buoyant discharges, characteristic of cooling water wastes and some individual discharges, turbulent mixing results primarily from the momentum of discharge. Initial dilution, in these cases, is considered to be completed when the momentum induced velocity of the discharge ceases to produce significant mixing of the waste, or the diluting plume reaches a fixed distance from the discharge to be specified by the Regional Water Board, whichever results in the lower estimate for initial dilution.

Instantaneous Maximum Effluent Limitation
The highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

Instantaneous Minimum Effluent Limitation
The lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

Kelp Beds
For purposes of the bacteriological standards of the Ocean Plan, are significant aggregations of marine algae of the genera *Macrocystis* and *Nereocystis*. Kelp beds include the total foliage canopy of *Macrocystis* and *Nereocystis* plants throughout the water column.

LOEC
Lowest observed effect concentration or the lowest concentration of effluent that causes observable adverse effects in exposed test organisms.

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

Material

(a) In common usage: (1) the substance or substances of which a thing is made or composed (2) substantial; (b) For purposes of the Ocean Plan relating to waste disposal, dredging and the disposal of dredged material and fill, MATERIAL means matter of any kind or description which is subject to regulation as waste, or any material dredged from the navigable waters of the United States. See also, DREDGED MATERIAL.

Maximum Daily Effluent Limitation (MDEL)
The highest allowable daily discharge of a pollutant.

Method Detection Limit (MDL)
The minimum concentration of a substance that can be reported with 99 percent confidence that the measured concentration is distinguishable from method blank results, as defined in 40 CFR part 136 Appendix B.

Minimum Level (ML)
The concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method-specified sample weights, volumes, and processing steps have been followed.

Multiport Diffusers
Linear structures consisting of spaced ports or nozzles that are installed on submerged marine outfalls. For the purposes of chapter III.M of the Ocean Plan, multiport diffusers discharge brine waste into an ambient receiving water body and enable rapid mixing, dispersal, and dilution of brine within a relatively small area.

Natural Light
Reduction of natural light may be determined by the Regional Water Board by measurement of light transmissivity or total irradiance, or both, according to the monitoring needs of the Regional Water Board.

Not Detected (ND)
Those sample results less than the laboratory's MDL.

Ocean Waters
The territorial marine waters of the state as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. If a discharge outside the territorial waters of the state could affect the quality of the waters of the state, the discharge may be regulated to assure no violation of the Ocean Plan will occur in ocean waters.

Out-of-Kind Mitigation
When the habitat or species lost is different than what is replaced through mitigation.

Polynuclear Aromatic Hydrocarbons (PAHs)
The sum of acenaphthylene, anthracene, 1,2-benzanthracene, 3,4-benzofluoranthene, benzo[k]fluoranthene, 1,12-benzoperylene, benzo[a]pyrene, chrysene, dibenzo[ah]anthracene, fluorene, indeno[1,2,3-cd]pyrene, phenanthrene and pyrene.

Polychlorinated Biphenyls (PCBs)
The sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254 and Aroclor-1260.

Pollutant Minimization Program (PMP)

PMP means waste minimization and pollution prevention actions that include, but are not limited to, product substitution, waste stream recycling, alternative waste management methods, and education of the public and businesses. The goal of the PMP shall be to reduce all potential sources of Ocean Plan Table 1 pollutants through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the water quality-based effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants, where there is evidence that beneficial uses are being impacted. The Regional Water Board may consider cost effectiveness when establishing the requirements of a PMP. The completion and implementation of a Pollution Prevention Plan, if required pursuant to Water Code section 13263.3(d), shall be considered to fulfill the PMP requirements.

Practical Quantitation Level (PQL)
PQL is the lowest concentration of a substance that can be determined within ± 20 percent of the true concentration by 75 percent of the analytical laboratories tested in a performance evaluation study. Alternatively, if performance data are not available, the PQL is the method detection limit (MDL) x 5 for carcinogens and MDL x 10 for noncarcinogens.

Propagules
Structures that are capable of propagating an organism to the next stage in its life cycle via dispersal. Dispersal is the movement of individuals from their birth site to their reproductive grounds.

Proportional Mortality, P_m
Percentage of larval organisms or propagules in the source water body that is expected to be entrained at a desalination facility's intake. It is assumed that all entrained larvae or propagules die as a result of entrainment.

Reported Minimum Level
The reported ML (also known as the Reporting Level or RL) is the ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order, including an additional factor if applicable as discussed herein. The MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the Regional Water Board either from Appendix II of the Ocean Plan in accordance with section III.C.5.a. of the Ocean Plan or established in accordance with section III.C.5.b. of the Ocean Plan. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the reported ML.

Salinity
Measure of the dissolved salts in a volume of water. Salinity shall be measured using a standard method approved by the Regional Water Board (e.g. Standard Method 2520 B, EPA Method 120.1, EPA Method 160.1) and reported in parts per thousand (ppt). For historical salinity data not recorded in parts per thousand (ppt), the Regional Water Board may accept converted data at their discretion.

Sensitive Habitats
Include kelp beds, rocky substrate, surfgrass beds, eelgrass beds, oyster beds, spawning grounds for state or federally managed species, market squid nurseries, or other habitats in need of special protection as determined by the Water Boards.
Shellfish

Organisms identified by the California Department of Health Services as shellfish for public health purposes (i.e., mussels, clams, and oysters).

Significant Difference
Defined as a statistically significant difference in the means of two distributions of sampling results at the 95 percent confidence level.

Six-Month Median Effluent Limitation
The highest allowable moving median of all daily discharges for any 180-day period.

Source Water Body
Spatial area that contains the organisms that are at risk of entrainment at a desalination facility as determined by factors that may include, but are not limited to, biological, hydrodynamic, and oceanographic data.

State Water Quality Protection Areas (SWQPAs)
Non-terrestrial marine or estuarine areas designated to protect marine species or biological communities from an undesirable alteration in natural water quality. All AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE (ASBS) that were previously designated by the State Water Board in Resolutions 74-28, 74-32, and 75-61 are now also classified as a subset of State Water Quality Protection Areas and require special protections afforded by the Ocean Plan.

Subsurface Intake
For the purposes of chapter III.M, is an intake withdrawing seawater from the area beneath the ocean floor or beneath the surface of the earth inland from the ocean.

Surfgrass Beds
Are aggregations of marine flowering plants of the genus *Phyllospadix*.

TCDD Equivalents
The sum of the concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown in the table below.

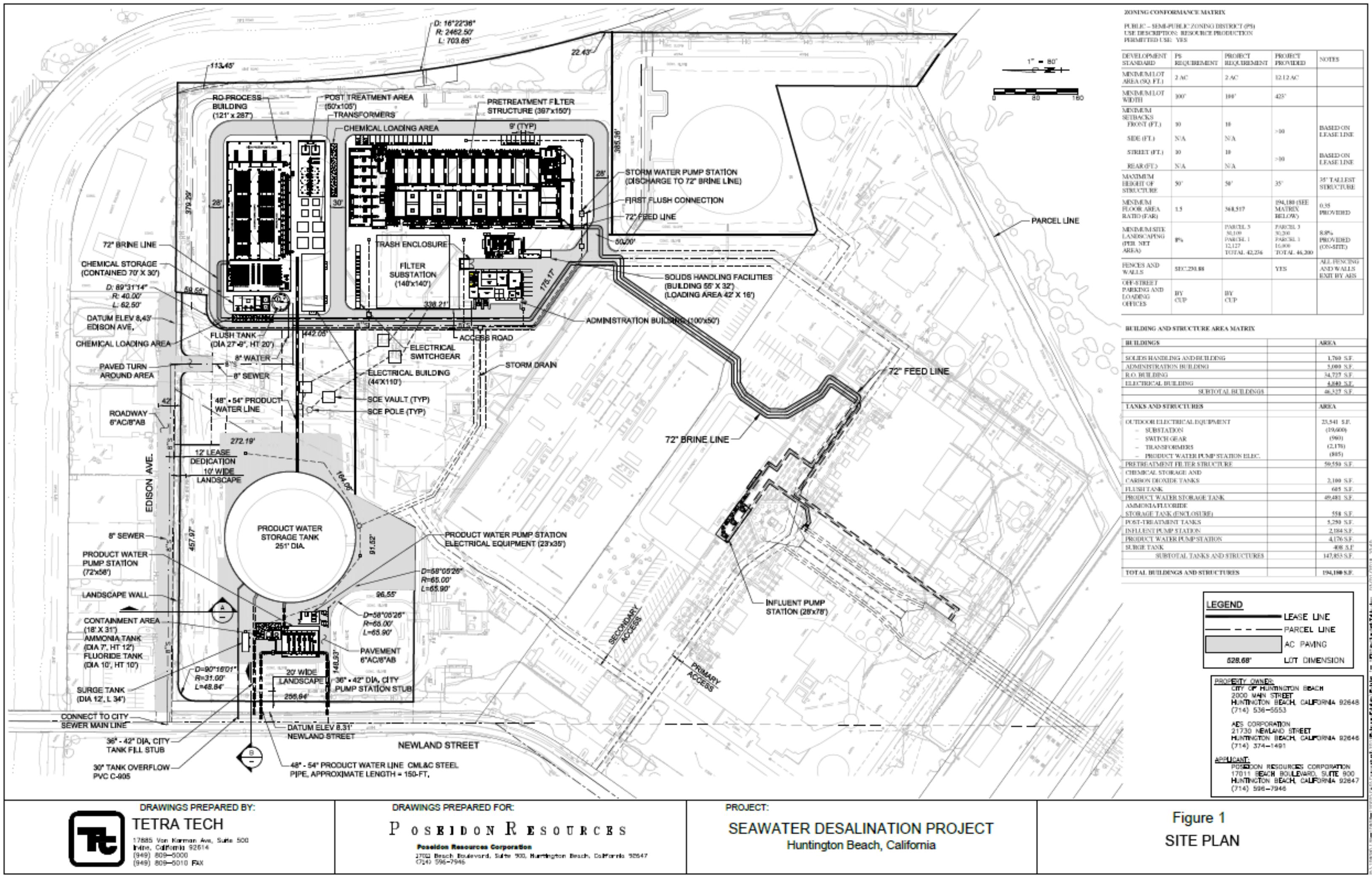
Isomer Group	Toxicity Equivalence Factor
2,3,7,8-tetra CDD	1.0
2,3,7,8-penta CDD	0.5
2,3,7,8-hexa CDDs	0.1
2,3,7,8-hepta CDD	0.01
octa CDD	0.001
2,3,7,8 tetra CDF	0.1
1,2,3,7,8 penta CDF	0.05
2,3,4,7,8 penta CDF	0.5
2,3,7,8 hexa CDFs	0.1
2,3,7,8 hepta CDFs	0.01
octa CDF	0.001

Toxicity Reduction Evaluation (TRE)
A study conducted in a stepwise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. (A TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed using aquatic organism toxicity tests in three phases: characterization, identification, and confirmation.)

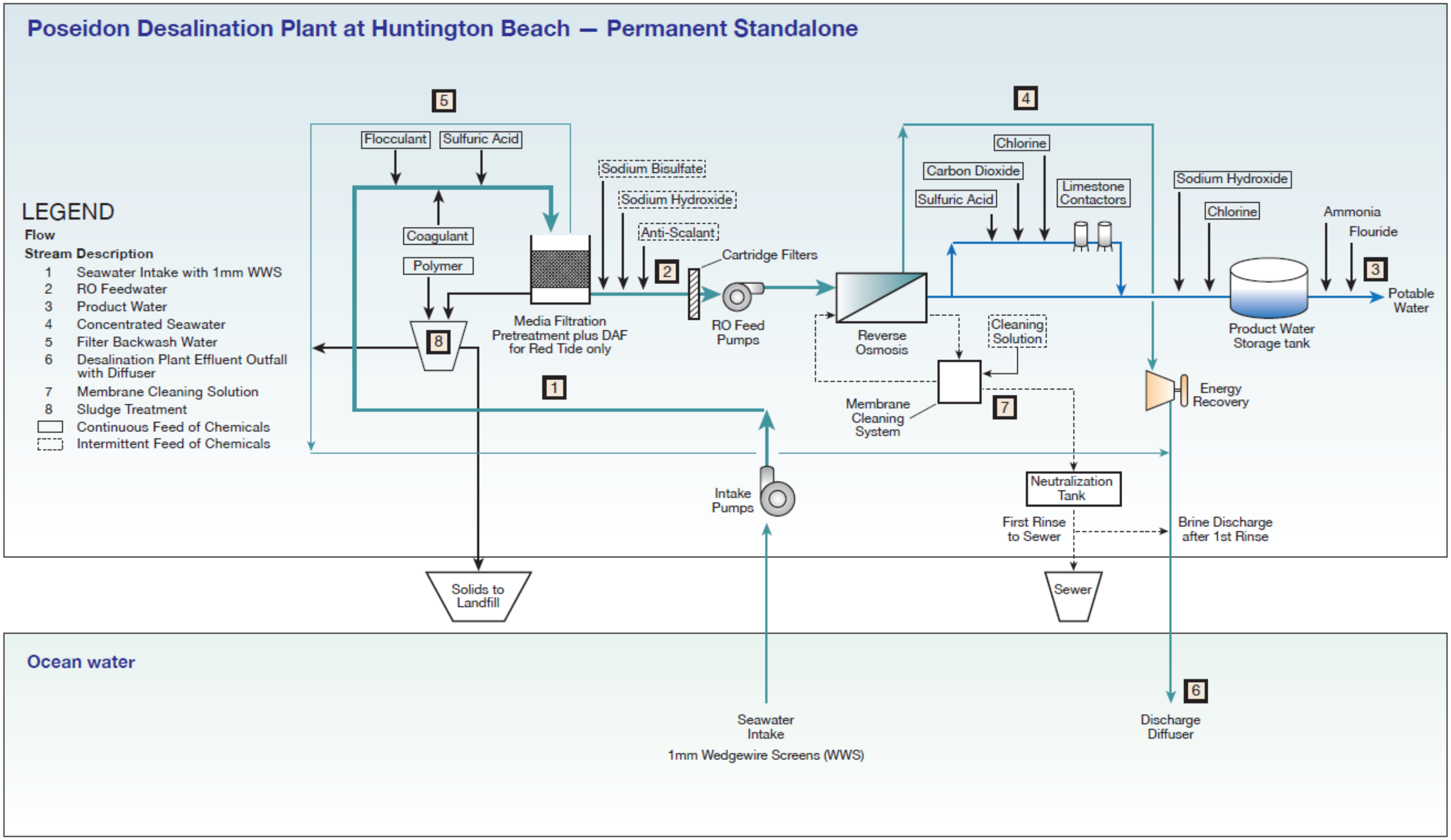
Waste
As used in the Ocean Plan, waste includes a Discharger's total discharge, of whatever origin (i.e., gross, not net, discharge).

Water Recycling
The treatment of wastewater to render it suitable for reuse, the transportation of treated wastewater to the place of use, and the actual use of treated wastewater for a direct beneficial use or controlled use that would not otherwise occur.

ATTACHMENT B – MAP



ATTACHMENT C – FLOW SCHEMATIC



ATTACHMENT D – STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger must comply with all of the terms, requirements, and conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code (Water Code) and is grounds for enforcement action; permit termination, revocation and reissuance, or modification; denial of a permit renewal application; or a combination thereof. (40 CFR § 122.41(a); Water. Code, §§ 13261, 13263, 13265, 13268, 13000, 13001, 13304, 13350, 13385.)
2. The Discharger shall comply with effluent standards or prohibitions established under section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 CFR § 122.41(a)(1).)

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 CFR § 122.41(c).)

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 CFR § 122.41(d).)

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order. (40 CFR § 122.41(e).)

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 CFR § 122.41(g).)
2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations. (40 CFR § 122.5(c).)

F. Inspection and Entry

The Discharger shall allow the Regional Water Board, State Water Board, U.S. EPA, and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (33 U.S.C. § 1318(a)(4)(b); 40 CFR § 122.41(i); Wat. Code, §§ 13267, 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (33 U.S.C. § 1318(a)(4)(b)(i); 40 CFR § 122.41(i)(1); Wat. Code, §§ 13267, 13383);

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (33 U.S.C. § 1318(a)(4)(b)(ii); 40 CFR § 122.41(i)(2); Wat. Code, §§ 13267, 13383);

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (33 U.S.C. § 1318(a)(4)(b)(ii); 40 CFR § 122.41(i)(3); Wat. Code, §§ 13267, 13383); and

4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location. (33 U.S.C. § 1318(a)(4)(b); 40 CFR § 122.41(i)(4); Wat. Code, §§ 13267, 13383.)

G. Bypass

1. Definitions

a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. (40 CFR § 122.41(m)(1)(i).)

b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. (40 CFR § 122.41(m)(1)(ii).)

2. Bypass not exceeding limitations. The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3, I.G.4, and I.G.5 below. (40 CFR § 122.41(m)(2).)

3. Prohibition of bypass. Bypass is prohibited, and the Regional Water Board may take enforcement action against a Discharger for bypass, unless (40 CFR § 122.41(m)(4)(i)):

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage (40 CFR § 122.41(m)(4)(i)(A));

b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance (40 CFR § 122.41(m)(4)(i)(B)); and

c. The Discharger submitted notice to the Regional Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 CFR § 122.41(m)(4)(i)(C).)

4. The Regional Water Board may approve an anticipated bypass, after considering its adverse effects, if the Regional Water Board determines that it will meet the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above. (40 CFR § 122.41(m)(4)(ii).)

5. Notice

a. Anticipated bypass. If the Discharger knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass. The notice shall be sent to the Regional Water Board. As of December 21, 2020, all notices must be submitted electronically to the initial recipient defined in Standard Provisions – Reporting V.J below. Notices shall comply with 40 CFR part 3, 40 CFR section 122.22, and 40 CFR part 127. (40 CFR § 122.41(m)(3)(i).)

b. Unanticipated bypass. The Discharger shall submit a notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). The notice shall be sent to the Regional Water Board. As of December 21, 2020, all notices must be submitted electronically to the initial recipient defined in Standard Provisions – Reporting V.J below. Notices shall comply with 40 CFR part 3, 40 CFR section 122.22, and 40 CFR part 127. (40 CFR § 122.41(m)(3)(ii).)

H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
(40 CFR § 122.41(n)(1).)

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2 below are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. (40 CFR § 122.41(n)(2).)

2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that (40 CFR § 122.41(n)(3)):

a. An upset occurred and that the Discharger can identify the cause(s) of the upset (40 CFR § 122.41(n)(3)(i));

b. The permitted facility was, at the time, being properly operated (40 CFR § 122.41(n)(3)(ii));

c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b below (24-hour notice) (40 CFR § 122.41(n)(3)(iii)); and

d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above. (40 CFR § 122.41(n)(3)(iv).)

3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 CFR § 122.41(n)(4).)

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition. (40 CFR § 122.41(f).)

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit. (40 CFR § 122.41(b).)

C. Transfers

This Order is not transferable to any person except after notice to the Regional Water Board. The Regional Water Board may require modification or revocation and reissuance of the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the Water Code. (40 CFR §§ 122.41(l)(3), 122.61.)

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 CFR § 122.41(j)(1).)

B. Monitoring must be conducted according to test procedures approved under 40 CFR part 136 for the analyses of pollutants unless another method is required under 40 CFR chapter 1, subchapter N. Monitoring must be conducted according to sufficiently sensitive test methods approved under 40 CFR part 136 for the analysis of pollutants or pollutant parameters or as required under 40 CFR chapter 1, subchapter N. For the purposes of this paragraph, a method is sufficiently sensitive when:

1. The method minimum level (ML) is at or below the level of the most stringent effluent limitation established in the permit for the measured pollutant or pollutant parameter, and either the method ML is at or below the level of the most stringent applicable water quality criterion for the measured pollutant or pollutant parameter or the method ML is above the applicable water quality criterion but the amount of the pollutant or pollutant parameter in the facility’s discharge is high enough that the method detects and quantifies the level of the pollutant or pollutant parameter in the discharge; or

2. The method has the lowest ML of the analytical methods approved under 40 CFR part 136 or required under 40 CFR chapter 1, subchapter N for the measured pollutant or pollutant parameter.

In the case of pollutants or pollutant parameters for which there are no approved methods under 40 CFR part 136 or otherwise required under 40 CFR chapter 1, subchapter N, monitoring must be conducted according to a test procedure specified in this Order for such pollutants or pollutant parameters. (40 CFR §§ 122.21(e)(3),122.41(j)(4), 122.44(i)(1)(iv).)

IV. STANDARD PROVISIONS – RECORDS

A. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Water Board Executive Officer at any time. (40 CFR § 122.41(j)(2).)

B. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements (40 CFR § 122.41(j)(3)(i));
2. The individual(s) who performed the sampling or measurements (40 CFR § 122.41(j)(3)(ii));
3. The date(s) analyses were performed (40 CFR § 122.41(j)(3)(iii));
4. The individual(s) who performed the analyses (40 CFR § 122.41(j)(3)(iv));
5. The analytical techniques or methods used (40 CFR § 122.41(j)(3)(v)); and
6. The results of such analyses. (40 CFR § 122.41(j)(3)(vi).)

C. Claims of confidentiality for the following information will be denied (40 CFR § 122.7(b)):

1. The name and address of any permit applicant or Discharger (40 CFR § 122.7(b)(1)); and
2. Permit applications and attachments, permits and effluent data. (40 CFR § 122.7(b)(2).)

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Regional Water Board, State Water Board, or U.S. EPA within a reasonable time, any information which the Regional Water Board, State Water Board, or U.S. EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Regional Water Board, State Water Board, or U.S. EPA copies of records required to be kept by this Order. (40 CFR § 122.41(h); Wat. Code, §§ 13267, 13383.)

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Regional Water Board, State Water Board, and/or U.S. EPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, V.B.5, and V.B.6 below. (40 CFR § 122.41(k).)

2. All permit applications shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility, including having the explicit or implicit duty of making major capital investment recommendations and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
(40 CFR § 122.22(a)(1).)

3. All reports required by this Order and other information requested by the Regional Water Board, State Water Board, or U.S. EPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above (40 CFR § 122.22(b)(1));

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)
   (40 CFR § 122.22(b)(2)); and

   c. The written authorization is submitted to the Regional Water Board and State Water Board. (40 CFR § 122.22(b)(3).)

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above must be submitted to the Regional Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 CFR § 122.22(c).)

5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." (40 CFR § 122.22(d).)

6. Any person providing the electronic signature for documents described in Standard Provisions – V.B.1, V.B.2, or V.B.3 that are submitted electronically shall meet all relevant requirements of Standard Provisions – Reporting V.B, and shall ensure that all relevant requirements of 40 CFR part 3 (Cross-Media Electronic Reporting) and 40 CFR part 127 (NPDES Electronic Reporting Requirements) are met for that submission. (40 C.F.R § 122.22(e).)

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment E) in this Order. (40 CFR § 122.41(l)(4).)

2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the Regional Water Board or State Water Board. As of December 21, 2016, all reports and forms must be submitted electronically to the initial recipient defined in Standard Provisions – Reporting V.J and comply with 40 CFR part 3, 40 CFR section 122.22, and 40 CFR part 127. (40 CFR § 122.41(l)(4)(i).)

3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 CFR part 136, or another method required for an industry-specific waste stream under 40 CFR chapter 1, subchapter N, the results of such monitoring shall be included in the calculation and reporting of the data submitted in the DMR or reporting form specified by the Regional Water Board or State Water Board. (40 CFR § 122.41(l)(4)(ii).)

4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 CFR § 122.41(l)(4)(iii).)

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date. (40 CFR § 122.41(l)(5).)

E. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A report shall also be provided within five (5) days of the time the Discharger becomes aware of the circumstances. The report shall contain a description of the

noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

For noncompliance events related to combined sewer overflows, sanitary sewer overflows, or bypass events, these reports must include the data described above (with the exception of time of discovery) as well as the type of event (i.e., combined sewer overflow, sanitary sewer overflow, or bypass event), type of overflow structure (e.g., manhole, combined sewer overflow outfall), discharge volume untreated by the treatment works treating domestic sewage, types of human health and environmental impacts of the event, and whether the noncompliance was related to wet weather.

As of December 21, 2020, all reports related to combined sewer overflows, sanitary sewer overflows, or bypass events must be submitted electronically to the initial recipient defined in Standard Provisions – Reporting V.J. The reports shall comply with 40 CFR part 3, 40 CFR section 122.22, and 40 CFR part 127. The Regional Water Board may also require the Discharger to electronically submit reports not related to combined sewer overflows, sanitary sewer overflows, or bypass events under this section. (40 CFR § 122.41(l)(6)(i).)

2. The following shall be included as information that must be reported within 24 hours:

a. Any unanticipated bypass that exceeds any effluent limitation in this Order. (40 CFR § 122.41(l)(6)(ii)(A).)

b. Any upset that exceeds any effluent limitation in this Order. (40 CFR § 122.41(l)(6)(ii)(B).)

3. The Regional Water Board may waive the above required written report on a case-by-case basis if an oral report has been received within 24 hours. (40 CFR § 122.41(l)(6)(ii)(B).)

F. Planned Changes

The Discharger shall give notice to the Regional Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when (40 CFR § 122.41(l)(1)):

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in section 122.29(b) (40 CFR § 122.41(l)(1)(i)); or

2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are subject neither to effluent limitations in this Order nor to notification requirements under section 122.42(a)(1) (see Additional Provisions—Notification Levels VII.A.1). (40 CFR § 122.41(l)(1)(ii).)

3. The alteration or addition results in a significant change in the Discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan. (40 CFR § 122.41(1)(1)(iii).)

G. Anticipated Noncompliance

The Discharger shall give advance notice to the Regional Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with this Order's requirements. (40 CFR § 122.41(l)(2).)

H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E above. For noncompliance events related to combined sewer overflows, sanitary sewer overflows, or bypass events, these reports shall contain the information described in Standard Provision - Reporting V.E and the applicable required data in appendix A to 40 CFR part 127. The Regional Water Board may also require the Discharger to electronically submit reports not related to combined sewer overflows, sanitary sewer overflows, or bypass events under this section. (40 CFR § 122.41(l)(7).)

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Water Board, or U.S. EPA, the Discharger shall promptly submit such facts or information. (40 CFR § 122.41(l)(8).)

J. Initial Recipient for Electronic Reporting Data

The owner, operator, or the duly authorized representative is required to electronically submit NPDES information specified in appendix A to 40 CFR part 127 to the initial recipient defined in 40 CFR section 127.2(b). U.S. EPA will identify and publish the list of initial recipients on its website and in the Federal Register, by state and by NPDES data group [see 40 CFR section 127.2(c)]. U.S. EPA will update and maintain this listing. (40 CFR § 122.41(l)(9).)

VI. STANDARD PROVISIONS – ENFORCEMENT

A. The Regional Water Board is authorized to enforce the terms of this permit under several provisions of the Water Code, including, but not limited to, sections 13268, 13385, 13386, and 13387.

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS

A. Non-Municipal Facilities

Existing manufacturing, commercial, mining, and silvicultural dischargers shall notify the Regional Water Board as soon as they know or have reason to believe (40 CFR § 122.42(a)):

1. That any activity has occurred or will occur that would result in the discharge, on a routine or frequent basis, of any toxic pollutant that is not limited in this Order, if that discharge will exceed the highest of the following "notification levels" (40 CFR § 122.42(a)(1)):

a. 100 micrograms per liter (μg/L) (40 CFR § 122.42(a)(1)(i));

b. 200 μg/L for acrolein and acrylonitrile; 500 μg/L for 2,4-dinitrophenol and 2-methyl-4,6-dinitrophenol; and 1 milligram per liter (mg/L) for antimony (40 CFR § 122.42(a)(1)(ii));

c. Five (5) times the maximum concentration value reported for that pollutant in the Report of Waste Discharge (40 CFR § 122.42(a)(1)(iii)); or

d. The level established by the Regional Water Board in accordance with section 122.44(f). (40 CFR § 122.42(a)(1)(iv).)

2. That any activity has occurred or will occur that would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant that is not limited in this Order, if that discharge will exceed the highest of the following “notification levels" (40 CFR § 122.42(a)(2)):

a. 500 micrograms per liter (μg/L) (40 CFR § 122.42(a)(2)(i));

b. 1 milligram per liter (mg/L) for antimony (40 CFR § 122.42(a)(2)(ii));

c. Ten (10) times the maximum concentration value reported for that pollutant in the Report of Waste Discharge (40 CFR § 122.42(a)(2)(iii)); or

d. The level established by the Regional Water Board in accordance with section 122.44(f). (40 CFR § 122.42(a)(2)(iv).)

B. Publicly-Owned Treatment Works (POTWs)

All POTWs shall provide adequate notice to the Regional Water Board of the following (40 CFR § 122.42(b)):

1. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to sections 301 or 306 of the CWA if it were directly discharging those pollutants (40 CFR § 122.42(b)(1)); and

2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of adoption of the Order. (40 CFR § 122.42(b)(2).)

Adequate notice shall include information on the quality and quantity of effluent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW. (40 CFR § 122.42(b)(3).

ATTACHMENT E – MONITORING AND REPORTING PROGRAM

CONTENTS

TABLES

ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

Section 308 of the federal Clean Water Act (CWA) and sections 122.41(h), (j)-(l), 122.44(i), and 122.48 of title 40 of the Code of Federal Regulations (CFR) require that all National Pollutant Discharge Elimination System (NPDES) permits specify monitoring and reporting requirements. Water Code sections 13267 and 13383 also authorize the Santa Ana Water Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements. This MRP establishes monitoring, reporting, and recordkeeping requirements pursuant to the authority of these federal and California laws and regulations.

The purpose of this MRP is to determine and ensure Discharger's compliance with effluent limitations and other requirements established in the Order, assess treatment efficiency, characterize effluents, characterize the receiving water and the effects of the discharge on the receiving water, and assess the impacts to all forms of marine life. This MRP also specifies requirements concerning the proper use, maintenance, and installation of monitoring equipment and methods, and the monitoring type intervals and frequency necessary to yield data that are representative of the activities and discharges regulated under this Order.

Monitoring and Reporting Program Components. This MRP is guided, in part, by the principles, framework, and recommended design for discharge and receiving water monitoring presented in *Model Monitoring Program for Large Ocean Dischargers in Southern California* (SCCWRP Tech. Rep. #357. Southern California Coastal Water Research Project, Westminster, CA. 101 pp.). The SCCWRP model monitoring program is consistent with the basic framework for the design of an ocean discharger monitoring program included in Appendix III, Standard Monitoring Procedures, of the Ocean Plan. This monitoring program has three components that comprise a range of spatial and temporal scales: (1) core monitoring, (2) regional monitoring, and (3) strategic process studies.

Core Monitoring. Core monitoring is local in nature and focuses on monitoring trends in quality and effects of the point source discharge. This includes facility-specific, discharge monitoring, as well as some aspects of receiving water monitoring. Core monitoring results for the discharge shall be submitted in monthly Discharge Monitoring Reports/Self-Monitoring Reports and summarized in the annual receiving water monitoring report. Core monitoring results for receiving water, including annotated QA/QC findings, shall be described and summarized in the annual receiving water monitoring report, due by March 15, for the previous fiscal year (July 1 through June 30). The annual receiving water monitoring report shall include the specified parameters for each station along with more detailed statistical comparisons, including analyses to elucidate spatial and temporal trends in the data, and in relation to the wastewater plume. Methods shall include, but are not limited to, various multivariate techniques such as cluster analysis, ordination, and regression.

Regional Monitoring. Regional monitoring is focused on questions best answered by a region-wide approach that incorporates coordinated survey design and sampling techniques. Key components of regional monitoring include elements to address pollutant mass emission estimates, public health concerns, monitoring trends in natural resources, assessment of regional impacts from all contaminant sources, and beneficial use protection. The final designs of regional monitoring programs are developed by means of steering and technical committees comprised of participating agencies. For each component of regional monitoring, this Order specifies the required degree and nature of participation by the Discharger, based upon its past participation in regional monitoring programs. The degree and nature of the Discharger's participation in regional monitoring programs shall be briefly described and summarized in the annual receiving water monitoring report. Each year, at a Spring Regulatory Meeting, the Discharger shall provide an informational report summarizing to date its contributing activities towards coordinated implementation of regional monitoring programs. Although participation in regional monitoring programs is required under this Order, revisions to Attachment E, at the direction of the Regional Water Board, may be necessary to accomplish the goals of regional monitoring. Revisions may include a reduction or increase in the number or parameters to be monitored, the frequency of monitoring, or the number and size of samples to be collected. Such changes may be authorized by the Santa Ana Water Board's Executive Officer, upon written notification to the Discharger.

Strategic Process Studies. Strategic process studies are focused on refined questions regarding specific effects or development of monitoring techniques and are anticipated to be of short duration and/or small scale, although multi-year studies may be needed. Questions regarding discharge or receiving water quality, discharge impacts, ocean processes in the area of the discharge, or development of techniques for monitoring the same, arising out of the results of core, regional monitoring, or other relevant studies shall be pursued through these special studies. These studies are by nature ad hoc and, typically, cannot be anticipated in advance of the five-year permit cycle. Monitoring efforts, status of in-progress studies, and summary results for completed strategic process studies shall be briefly described and summarized in the annual receiving water monitoring report.

In the spring, at the beginning of the second year of operations and continuing every-other year during the term of this Order, the Discharger and the Santa Ana Water Board shall consult to determine the need for strategic process studies. By October 1, the Discharger shall submit proposals to the Santa Ana Water Board for the following year's (July 1 through June 30) monitoring effort, or a letter explaining why no special studies are proposed. Final scopes of work, including reporting schedules, shall be presented by the Discharger at a spring Santa Ana Water Board meeting to obtain Santa Ana Water Board approval and inform the public. Upon approval by the Santa Ana Water Board, the Discharger shall implement its strategic process studies.

I. GENERAL MONITORING PROVISIONS

A. General Monitoring Provisions

1. All sampling and sample preservation shall be in accordance with the current edition of "*Standard Methods for the Examination of Water and Wastewater*" (American Public Health Association) or 40 CFR 136 "*Guidelines Establishing Test Procedures for the Analysis of Pollutants*," promulgated by the United States Environmental Protection Agency (U.S. EPA).

2. All laboratory analyses shall be performed in accordance with test procedures under 40 CFR 136 (revised as of September 18, 2014) "*Guidelines Establishing Test Procedures for the Analysis of Pollutants*," promulgated by the U.S. EPA, unless otherwise specified in this MRP. In addition, the Santa Ana Water Board and/or U.S. EPA, at their discretion, may specify test methods that are different or more sensitive than those specified in 40 CFR 136. For priority pollutants, the test methods must meet the lowest minimum levels (MLs) specified in Attachment H of this Order and achievable by an Environmental Laboratory Accreditation Program (ELAP) certified commercial laboratory (or laboratories); where no methods/MLs are specified in Attachment I, then monitoring is to be conducted in accordance with methods/MLs approved by the Santa Ana Water Board or the State Water Resources Control Board (State Water Board) consistent with the State Water Board's Quality Assurance (QA) Program.

3. Chemical, bacteriological, and bioassay analyses shall be conducted at a laboratory certified for such analyses by the State Water Board’s Division of Drinking Water in accordance with the provision of Water Code section 13176, or conducted at a laboratory certified for such analyses by the U.S. EPA or at laboratories approved by the Santa Ana Water Board's Executive Officer.

4. Whenever the Discharger monitors any pollutant more frequently than is required by this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the discharge monitoring report specified by the Executive Officer.

5. In conformance with federal regulations 40 CFR 122.45(c), analyses to determine compliance with the effluent limitations for metals shall be conducted using the total recoverable method. For chromium (VI), the dissolved method in conformance with 40 CFR 136 may be used to measure compliance with chromium (VI) monitoring requirements.

6. For effluent and ambient receiving water monitoring:

a. The Discharger shall require its testing laboratory to calibrate the analytical system down to the ML[1] specified in Attachment H for pollutants with effluent limitations in this Order, unless an alternative ML is approved by the Santa Ana Water Board’s Executive Officer. When there is more than one ML value for a given substance, the Discharger shall use the ML values, and their associated analytical methods, listed in Attachment H that are below the calculated effluent limitation. The Discharger may select any one of those cited analytical methods for compliance determination. If no ML value is below the effluent limitation, then the lowest ML value, and its associated analytical method listed in Attachment H shall be used. Any internal quality control data associated with the sample must be reported when requested by the Executive Officer. The Santa Ana Water Board will reject the quantified laboratory data if quality control data are unavailable or unacceptable.

b. The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

i. Sample results greater than or equal to the reported ML shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

ii. Sample results less than the reported ML, but greater than or equal to the laboratory’s current Method Detection Limit (MDL), shall be reported as

[1] Minimum level is the concentration at which the entire analytical system must give a recognizable signal and acceptable point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

"Detected, but Not Quantified," or "DNQ." The estimated chemical concentration of the sample shall also be reported.

iii. Sample results not detected above the laboratory's MDL shall be reported as "Not Detected" or "ND."

c. The Discharger shall submit to the Santa Ana Water Board reports necessary to determine compliance with effluent limitations for priority pollutants in this Order and shall follow the chemical nomenclature and sequential order of constituents shown in Table 1 of the Ocean Plan. The Discharger shall report with each sample result:

iv. The reporting level achieved by the testing laboratory; and

v. The laboratory's current MDL, as determined by the procedure found in 40 CFR part 136.

7. For receiving water monitoring and for those pollutants without effluent limitations, the Discharger shall require its testing laboratory to quantify constituent concentrations to the lowest achievable MDL as determined by the procedure found in 40 CFR part 136. In situations where the most stringent applicable receiving water objective, as specified for that pollutant in Table 1 of the Ocean Plan is below the ML value specified in Attachment H and the Discharger cannot achieve an MDL value for that pollutant below the ML value, the Discharger shall submit justification why a lower MDL value cannot be achieved. Justification shall be submitted together with monthly monitoring reports.

8. All analytical data shall be reported with identification of practical quantitation levels and with MDLs, as determined by the procedure found in 40 CFR part 136.

9. The Discharger shall have and implement an acceptable written QA plan for laboratory analyses. Duplicate chemical analyses must be conducted on a minimum of ten percent (10%) of the samples, or at least one sample per month, whichever is greater. A similar frequency shall be maintained for analyzing spiked samples. When requested by the Santa Ana Water Board or U.S. EPA, the Discharger will participate in the NPDES discharge monitoring report QA performance study.

10. For every item of monitoring data where the requirements are not met, the monitoring report shall include a statement discussing the reasons for noncompliance, the actions undertaken or proposed that will bring the discharge into full compliance with requirements at the earliest time and an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Santa Ana Water Board by letter when compliance with the time schedule has been achieved.

11. The Discharger shall assure that records of all monitoring information are maintained and accessible for a period of at least five years from the date of the sample, report, or application. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or by the request of the Santa Ana Water Board at any time. Records of monitoring information shall include:

a. The information listed in Attachment D - IV Standard Provisions - Records, subparagraph B. of this Order;

b. The laboratory which performed the analyses;

c. The date(s) analyses were performed;

d. The individual(s) who performed the analyses;

e. The modification(s) to analytical techniques or methods used;

f. All sampling and analytical results, including

   vi. Units of measurement used;

   vii. ML for the analysis;

   viii. Results less than the reporting level but above the MDL;

   ix. Data qualifiers and a description of the qualifiers;

   x. Quality control test results (and a written copy of the laboratory QA plan);

   xi. Dilution factors, if used; and

   xii. Sample matrix type.

g. All monitoring equipment calibration and maintenance records;

h. All original strip charts from continuous monitoring devices;

i. All data used to complete the application for this Order; and,

j. Copies of all reports required by this Order.

k. Electronic data and information generated by the Supervisory Control and Data Acquisition System.

12. The flow measurement system shall be calibrated in accordance with manufacture's recommendations or at least once per year, to ensure continued accuracy.

13. All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy. In the event that continuous monitoring equipment is out of service for greater than a 24-hour period, the Discharger shall obtain a representative grab sample each day the equipment is out of service. The Discharger shall correct the cause(s) of failure of the continuous monitoring equipment as soon as practicable. In its monitoring report, the Discharger shall specify the period(s) during which the equipment was out of service and, if the problem has not been corrected, shall identify the steps which the Discharger is taking or proposes to take to bring the equipment back into service and the schedule for these actions.

14. Monitoring and reporting shall be in accordance with the following:

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

b. The monitoring and reporting of influent and effluent shall be done more frequently as necessary to maintain compliance with this Order and/or as specified in this Order.

c. Whenever the Discharger monitors any pollutant more frequently than is required by this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report (DMR) specified by the Executive Officer.

d. A "grab" sample is defined as any individual sample collected in less than 15 minutes.

e. A composite sample is defined as a combination of no fewer than eight individual grab samples obtained over the specified sampling period. The volume of each individual grab sample shall be proportional to the discharge flow rate at the time of sampling. The compositing period shall equal the specific sampling period, or 24 hours, if no period is specified.

f. 24-hour composite samples shall be collected continuously during a 24-hour operation of the facility.

g. Daily samples shall be collected on each day of the week.

h. Monthly samples shall be collected on any representative day of each month.

i. Quarterly samples shall be collected on any representative day of January, April, July, and October.

j. Semi-annual samples shall be collected on any representative day in January and July.

15. Laboratory Certification. Laboratories analyzing monitoring samples shall be certified by the State Water Board's Division of Drinking Water, in accordance with the provision of Water Code section 13176, and must include quality assurance/quality control data with their reports.

The Discharger shall ensure that the results of the Discharge Monitoring Report-Quality Assurance Study or the most recent Water Pollution Performance Evaluation Study are submitted annually to the State Water Board at the following address:

State Water Resources Control Board
Quality Assurance Program Officer

Office of Information Management and Analysis
1001 I Street, Sacramento, CA 95814

II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

Table E-1. Monitoring Station Locations

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
Influent Monitoring Location		
--	M-INF	Intake to the desalination facility upstream of all treatment processes Latitude: 33.64416°, Longitude: - 117.97861°
Effluent Monitoring Locations		
001	M-001	Facility discharge to discharge pipeline to Pacific Ocean downstream of all treatment processes Latitude: 33.64388°, Longitude: - 117.97888°
Receiving Water, Benthic, and Bioaccumulation Monitoring Locations		
--	RSW-001	Located 5,280 feet northwest of the outfall tower end of the diffuser, parallel to the outfall, and 1,500 feet offshore
--	RSW-002	Located 5,280 feet southeast of the outfall tower, parallel to the outfall, and 1,500 feet offshore
--	RSW-003	Located 130 feet northeast of the nearshore end of the diffuser, parallel to the diffuser
--	RSW-004	Located 130 feet southeast of the nearshore end of the diffuser, parallel to the diffuser
--	RSW-005	Located 130 feet northwest of the offshore end of the diffuser, perpendicular to the diffuser
--	RSW-006	Located 130 feet southwest of the offshore end of the diffuser, perpendicular to the diffuser
--	RSW-007	Located 328 feet northeast of the end of the diffuser, parallel to the diffuser
--	RSW-008	Located 328 feet southeast of the end of the diffuser, parallel to the diffuser
--	RSW-009	Located 328 feet northwest of the diffuser, perpendicular to the diffuser
--	RSW-010	Located 328 feet southwest of the diffuser, perpendicular to the diffuser
--	RSW-011	Located within 80 feet southeast of the intake structure
--	RSW-012	Located 80 feet northeast from the intake screen’s riprap and from the midpoint of the intake screen structure
--	RSW-013	Located 80 feet northwest from the intake screen’s riprap and from the midpoint of the intake screen structure

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
--	RSW-014	Located 80 feet southwest from the intake structure
--	RSW-015	Located 300 feet east from the intake structure (Quarterly Regional Water Quality Monitoring)
--	RSW-016	Located 200 feet east from the diffuser structure (Quarterly Regional Water Quality Monitoring)
--	T-001	Trawl Fish Monitoring Locations (Same Location as RSW-001)
--	T-002	Located 250 feet southwest from the intake screen's riprap and from the midpoint of the intake screen structure
--	T-003	Same Location as RSW-002
--	T-004	TBD
--	T-005	TBD
--	T-006	TBD
--	R-001	Rig Fishing Area encompassing Outfall and Intake (4 Km^2)
--	R-002	Rig Fishing Reference Area near Crystal Cove

The North latitude and West longitude information in Table E-1 are approximate for administrative purposes. The map depicting the locations of the receiving water monitoring stations is Attachment J of this Order.

III. INFLUENT MONITORING REQUIREMENTS

A. Monitoring Location M-INF

16. The Discharger shall sample and monitor influent to the Facility at the influent Monitoring Location (Monitoring Location M-INF, Table E-1) as follows.

Table E-2. Influent Monitoring at M-INF

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	MGD	Recorder/Totalizer	Continuous	--
Temperature	˚F	Recorder	Continuous	See Section I.A.2 & 3, above, of this MRP
pH	pH units	Recorder	Continuous	See Section I.A.2 & 3, above, of this MRP
Salinity	ppt	Grab	Weekly	See Section I.A.2 & 3, above, of this MRP
Conductivity	Deci-siemens per meter	Recorder	Continuous	See Section I.A.2 & 3, above, of this MRP
Ammonia-Nitrogen	mg/L	Grab	Semiannually	See Section I.A.2 & 3, above, of this MRP

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Arsenic, Total Recoverable	µg/L	Grab	Semiannually	See Section I.A.2 & 3, above, of this MRP
Cadmium, Total Recoverable	µg/L	Grab	Semiannually	See Section I.A.2 & 3, above, of this MRP
Chromium (Hexavalent), Total	µg/L	Grab	Semiannually	See Section I.A.2 & 3, above, of this MRP
Copper, Total Recoverable	µg/L	Grab	Semiannually	See Section I.A.2 & 3, above, of this MRP
Lead, Total Recoverable	µg/L	Grab	Semiannually	See Section I.A.2 & 3, above, of this MRP
Mercury, Total Recoverable	µg/L	Grab	Semiannually	See Section I.A.2 & 3, above, of this MRP
Nickel, Total Recoverable	µg/L	Grab	Semiannually	See Section I.A.2 & 3, above, of this MRP
Silver, Total Recoverable	µg/L	Grab	Semiannually	See Section I.A.2 & 3, above, of this MRP
Zinc, Total Recoverable	µg/L	Grab	Semiannually	See Section I.A.2 & 3, above, of this MRP
Cyanide, Total	µg/L	Grab	Semiannually	See Section I.A.2 & 3, above, of this MRP
Iron, Total Recoverable	µg/L	Grab	Semiannually	See Section I.A.2 & 3, above, of this MRP
Phenolic Compounds (non-chlorinated)	µg/L	Grab	Semiannually	See Section I.A.3. above, of this MRP
Chlorinated Phenolics	µg/L	Grab	Semiannually	See Section I.A.2. above, of this MRP
HCH	µg/L	Grab	Semiannually	--
Domoic Acid	TBD	Grab	Weekly	TBD
Boron	mg/L	Grab	Monthly	See Section I.A.2. above, of this MRP

IV. EFFLUENT MONITORING REQUIREMENTS

A. Monitoring Location M-001

1. The Discharger shall monitor Discharge Point 001 at Monitoring Location M-001, as follows:

Table E-3. Effluent Monitoring at M-001

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method and (Minimum Level, units), respectively
Flow	MGD	Recorder /Totalizer	Continuous	--
Total Residual Chlorine	mg/L	Recorder	Continuous	See Section I.A.2 & 3, above, of this MRP
Temperature	˚F	Recorder	Continuous (See IV.A.2., below)	See Section I.A.2 & 3, above, of this MRP
pH	pH units	Recorder	Continuous	See Section I.A.2 & 3, above, of this MRP
Turbidity	NTU	Grab	Weekly	See Section I.A.2 & 3, above, of this MRP
Ammonia-Nitrogen	mg/L	Grab	Weekly	See Section I.A.2 & 3, above, of this MRP
Oil & Grease	mg/L	Grab	Weekly	See Section I.A.2 & 3, above, of this MRP
Total suspended solids	mg/L	Grab	Weekly	See Section I.A.2 & 3, above, of this MRP
Settleable Solids	ml/L	Grab	Weekly	See Section I.A.2 & 3, above, of this MRP
Salinity	ppt	Recorder	Continuous	See Section I.A.2 & 3, above, of this MRP
Conductivity	Deci-siemens meter	Recorder	Continuous	See Section I.A.2 & 3, above, of this MRP
Arsenic, Total Recoverable	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Cadmium, Total Recoverable	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Chromium (Hexavalent), Total	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Copper, Total Recoverable	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Lead, Total Recoverable	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Mercury, Total Recoverable	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Nickel, Total Recoverable	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Silver, Total Recoverable	µg/L	Grab	Quarterly	See Section I.A.2 & 3,

				above, of this MRP
Zinc, Total Recoverable	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Cyanide, Total	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Iron, Total Recoverable	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Phenolic Compounds (non-chlorinated)	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Chlorinated Phenolics	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Acute Toxicity	Pass/ Fail	(See Section V below)	(See Section V below)	See Section I.A.2 & 3, above, of this MRP
Chronic Toxicity	Pass/ Fail	(See Section V below)	(See Section V below)	See Section I.A.2 & 3, above, of this MRP
Remaining Ocean Plan Table 1 Pollutants	µg/L	Grab	Quarterly	See Section I.A.2 & 3, above, of this MRP
Domoic Acid	TBD	Grab	Weekly	TBD
Boron	mg/L	Grab	Monthly	See Section I.A.2 & 3, above, of this MRP

1. Temperature in degrees Fahrenheit (°F) of the waste discharged shall be monitored and recorded continuously. Any increase or changes in temperature shall be recorded in addition to the maximum and minimum temperatures of each 24-hour day.
2. At any time a parameter is detected above the maximum daily effluent limitations of the Order, the Discharger shall accelerate the monitoring frequency of that parameter to monthly. If two successive accelerated monitoring results do not indicate the presence of the specific parameter at levels above the maximum daily effluent limitations, the Discharger may return to the regular monitoring frequency. However, if two successive accelerated monitoring results show concentrations of a parameter above the effluent limitations, the Discharger shall conduct/implement a pollutant minimization program and submit a report describing the measures undertaken by the Discharger to prevent the discharge of the pollutant(s) at levels of concern.

1. When there is a discharge of filter backwash water, RO subsequent rinse wastewater, and RO system concentrate, the Discharger shall take separate samples and monitor for the constituents listed in IV.A.1, above.

V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

A. Acute Toxicity

1. Test Species and Methods

The Discharger shall conduct monthly acute toxicity tests on flow-weighted 24-hour composite effluent samples. Species and short-term test methods for estimating acute toxicity shall be consistent with the fifth edition of *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA/821/R-02/012, 2002; Table IA, 40 CFR part 136). For three months of each successive 27-month period, the Discharger shall split a 24-hour composite effluent sample and conduct monthly acute toxicity screening with a fish and an invertebrate species. The Discharger shall conduct 96-hour static renewal toxicity test with the vertebrate species: topsmelt, *Antherinops affinis*; and with the invertebrate species; Mysid, *Americanmysis bahia*. The Discharger shall conduct the monthly acute toxicity test using only the most sensitive species of the two species used in the first three months. The first screening shall be conducted at the start of plant operation. If the most sensitive test species is/are not available during the testing period, the presence of acute toxicity shall be estimated using the second test species. Such changes shall be noted on the DMR. Note that a 27-month period is used so that the three-month testing period rotates throughout the year over time.

2. The Discharger shall use EPA's approach of Test of Significant Toxicity (TST) hypothesis testing approach in *National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document* (EPA 833-R-10-003, 2010) to evaluate toxicity data. The Discharger shall report "Pass" or "P" if the TST's null hypothesis for chronic toxicity is rejected. The null hypothesis is:

H_0: Mean response (In-stream Waste Concentration in % effluent) ≤ 0.80 mean response (control)

The Discharger shall use an in-stream waste concentration (IWC) of 6.25 percent effluent for evaluating toxicity.

3. Quality Assurance

a. Quality assurance measures, instructions, and other recommendations and requirements are found in the test methods manuals previously referenced. Additional requirements are specified below.

b. An acute dilution is authorized such that the critical acute instream waste concentration (IWC) is set at a percent effluent value lower than 100 percent effluent. The acute IWC for Discharge Point No. 001 is 6.25 percent effluent. 6.25 percent effluent and a control shall be tested.

c. Effluent dilution water and control water should be prepared and used as specified in the test methods manual for the test species. If the dilution water is different from test organism culture water, then a second control using culture water shall also be used. If the use of artificial sea salts is considered provisional in the test method, then artificial sea salts shall not be used to increase the salinity of the effluent sample prior to toxicity testing without written approval by the Santa Ana Water Board.

d. If organisms are not cultured in-house, then concurrent testing with a reference toxicant shall be conducted. If organisms are cultured in-house, then monthly reference toxicant testing is sufficient. Reference toxicant tests and effluent toxicity tests shall be conducted using the same test conditions (e.g., same test duration, etc.).

e. If either the reference toxicant or effluent toxicity tests do not meet all test acceptability criteria in the test methods manual, then the Discharger must resample and retest within 14 days.

f. If the discharged effluent is disinfected using chlorine, then total chlorine residual shall not be removed from the effluent sample prior to toxicity testing.

B. Chronic Toxicity Test Species and Methods

1. Test Species and Methods

The Discharger shall conduct monthly chronic toxicity tests on flow-weighted 24-hour composite effluent samples. The presence of chronic toxicity shall be estimated as specified in *Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (EPA/600/R-95/136, 1995). Test Organisms specified in Table III-1 of the Ocean Plan shall be used in conducting the tests. If test organisms specified in the West Coast chronic test methods manual are not available, the presence of chronic toxicity shall be estimated as specified in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms* (EPA 821-R-02-014, 2002).

For the first three months of each successive 27-month period, the Discharger shall split a 24-hour composite effluent sample and conduct monthly chronic toxicity test screening with a marine vertebrate species, a marine invertebrate species, and a marine alga species. For the remaining 24 months of each 27-month period, the discharger shall conduct the monthly chronic toxicity test using only the most sensitive of the three-species used in the first three months. The first screening shall be conducted at the start of plant operation. If the most sensitive test species is/are not available during the testing period, the presence of chronic toxicity shall be estimated using the second most sensitive test species from the toxicity test screening conducted for the current 24-month period. Such changes shall be noted on the DMR. Note that a 27-month period is used so that the three-month testing period rotates throughout the year over time.

2. The Discharger shall use EPA's approach of Test of Significant Toxicity (TST) hypothesis testing approach in *National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document* (EPA 833-R-10-003, 2010) to evaluate toxicity data. The Discharger shall report "Pass" or "P" if the TST's null hypothesis for chronic toxicity is rejected. The null hypothesis is:

H_0: Mean response (In-stream Waste Concentration in % effluent) ≤ 0.75 mean response (control)

The Discharger shall use an in-stream waste concentration (IWC) of 6.25 percent effluent for evaluating toxicity.

3. Quality Assurance

a. Quality assurance measures, instructions, and other recommendations and requirements are found in the chronic test methods manuals previously referenced. Additional requirements are specified below.

b. A series of five dilutions and a control shall be tested. The series shall include the instream waste concentration (IWC), two dilutions below the IWC, and two dilutions above the IWC (e.g., 1.5, 3.0, 6.25, 12.5, and 100 percent effluent, where IWC = 1/(15+1). The chronic IWC for this discharge is 6.25 percent effluent. All chronic toxicity test results from multi-concentration tests required by this Order must be reviewed and reported according to guidance on the evaluation of concentration-response relationships found in Method *Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing* (40 CFR 136) (EPA/821/B-00-004, 2000).

c. If test organisms are not cultured in-house, concurrent testing with reference toxicants shall be conducted. If organisms are cultured in-house, monthly testing with reference toxicants shall be conducted. Reference toxicant tests shall be conducted using the same test conditions as effluent toxicity tests (i.e., same test duration, etc.).

d. If either the reference toxicant test or the effluent test does not meet all test acceptability criteria as specified in the test methods manual, then the Discharger must re-sample and re-test within approximately 14 days.

e. Control and dilution water should be receiving water or lab water, as described in the test methods manual. If dilution water is different from culture water, then a second control using culture water shall also be tested. Effluent dilution water and control water should be prepared and used as specified in the test methods manual *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving waters to West Coast Marine and Estuarine Organisms* (EPA/600/R-95/139, 1995) and/or *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms* (EPA/821/R-02/014, 2002). If the dilution water is different from test organism culture water, then a second control using culture water shall also be used. If the use of artificial sea salts is considered provisional in the test method, then artificial sea salts shall not be used to increase the salinity of the effluent sample prior to toxicity testing without written approval by the permitting authority.

f. Chronic effluent and reference toxicant tests must meet the upper and lower bounds on test sensitivity, as determined by calculating the Percent Minimum Significant Difference (PMSD) for each test result. Test sensitivity bounds are specified in Table 3-6 of *Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System Program* (EPA/833-R-00-003, June 2000). There are five possible outcomes based on the PMSD result:

   i. <u>Unqualified Pass:</u> The test's PMSD is within the bounds in Table 3-6 above listed and there is no significant difference between the means for the control and the IWC treatment. The regulatory authority would conclude that there is no toxicity at the IWC concentration.

   ii. <u>Unqualified Fail:</u> The test's PMSD is larger than the lower bound (but not greater than the upper bound) in Table 3-6 and there is a significant difference between the means for the control and the IWC treatment. The regulatory authority would conclude that there is toxicity at the IWC concentration.

iii. <u>Lacks Test Sensitivity:</u> The test's PMSD exceeds the upper bound in Table 3-6 and there is no significant difference between the means for the control and the IWC treatment. The test is considered invalid. The Discharger must re-sample and re-test within approximately 14 days.

iv. <u>Lacks Test Sensitivity:</u> The test's PMSD exceeds the upper bound in Table 3-6 and there is a significant difference between the means for the control and the IWC treatment. The test is considered valid. The regulatory authority would conclude that there is toxicity at the IWC concentration.

v. <u>Very Small but Significant Difference:</u> The relative difference (see Section 6.4.2 of EPA/833-R-00-003) between the means for the control and the IWC treatment is smaller than the lower bound in Table 3-6 and this difference is statistically significant. The test is acceptable. The No Observed Effect Concentration is determined as described in sections 6.4.2 and 6.4.3 of EPA/833-R-00-003.

C. Additional (Accelerated) Toxicity Testing

1. If toxicity (not "Pass" or "P") is detected, the Discharger shall increase the frequency of chronic toxicity testing to every two weeks. The first test under the accelerated schedule shall be conducted within two weeks of receiving notice of the test that exceeds the applicable effluent limit ("Pass" or "P"), and every two weeks thereafter. The Discharger may resume the regular test schedule when two consecutive toxicity tests result in "Pass", or when the results of the Initial Investigation Toxicity Reduction Evaluation (TRE) conducted by the Discharger have adequately addressed the identified toxicity problem.

2. However, if implementation of the initial investigation TRE work plan indicates the source of toxicity (e.g., a temporary plant upset), then the Discharger shall conduct only the first accelerated test required above. If toxicity (as defined) is not detected in this first test, the Discharger may return to the normal sampling frequency required herein.

3. If toxicity (as defined) is not detected in the first test required above, then the Discharger may return to the normal sampling frequency required in herein.

D. Toxicity Reduction Evaluation/Toxicity Identification Evaluation (TRE /TIE)

1. If toxicity (as defined) is detected in any of the accelerated monitoring, then, based on an evaluation of the test results and additional available information, the Executive Officer may determine that the Discharger shall initiate a TRE, in accordance with the Discharger's Initial Investigation TRE work plan and EPA/600/2-88/070 *Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations* (TRE's); April 1989). Moreover, the Discharger shall expeditiously develop a detailed TRE work plan which includes:

a. Further actions to investigate/identify the cause(s) of toxicity;

b. Actions the Discharger has taken/will take to mitigate the impact of the discharge, to correct the noncompliance, and to prevent the recurrence of toxicity;

c. An expeditious schedule under which these actions will be implemented.

2. As part of this TRE process, the Discharger may initiate a TIE using the test methods manuals and TIE Phase I (EPA/600/R-96/054, 1996), Phase II (EPA/600/R-92/080, 1993), and Phase III (EPA/600/R-92/081, 1993) manuals to identify the cause(s) of toxicity.

3. If a TRE/TIE is initiated prior to completion of the accelerated testing schedule required by Toxicity Requirement, then the accelerated testing schedule may be terminated, or used as necessary in performing the TRE/TIE.

E. Reporting Requirements:

1. Results of all toxicity testing shall be submitted within the month following the monitoring period in accordance with *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency 2002, Cincinnati, Ohio (October 2002, EPA-821-R-02-013). The report shall include a determination of the median value of all chronic toxicity testing results conducted during the two latest monitoring periods.

2. The Discharger shall submit a full report of all toxicity test results, including any toxicity testing required by Toxicity Requirements with the DMR for the month in which the toxicity tests are conducted. A full report shall consist of: (1) toxicity test results; (2) dates of sample collection and initiation of each toxicity test; and (3) chronic toxicity effluent limitations. Toxicity test results shall be reported according to the test methods manual chapter on Report Preparation. It is suggested that the Discharger submit the data on an electronic disk in the Toxicity Standardized Electronic Reporting Form (Standardized Electronic Reporting Format for Monitoring Effluent Toxicity: October 1994 Format, State Water Board, 1995).

   If the Initial Investigation TRE work plan is used to determine that additional (accelerated) toxicity testing is unnecessary, these results shall be submitted with the DMR for the month in which investigations conducted under the TRE work plan occurred to the Santa Ana Water Board, State Water Board, and U.S. EPA.

3. Within approximately 14 days of receipt of test results exceeding a chronic toxicity effluent limitation, the Discharger shall provide written notification to the Santa Ana Water Board of:

   a. Findings of the TRE or other investigation to identify the cause(s) of toxicity;

   b. Actions the Discharger has taken/will take, to mitigate the impact of the discharge and to prevent the recurrence of toxicity;

   c. When corrective actions, including a TRE, have not been completed, an expeditious schedule under which corrective actions will be implemented; or

   d. The reason for not taking corrective action, if no action has been taken.

VI. LAND DISCHARGE MONITORING REQUIREMENTS – NOT APPLICABLE

VII. RECYCLING MONITORING REQUIREMENTS – NOT APPLICABLE

VIII. RECEIVING WATER CORE MONITORING REQUIREMENTS

Receiving water monitoring in the vicinity of the outfall shall be conducted as specified in Table E-1, above. Reference conditions shall be confirmed for each survey. Water column profiling protocols and analytical methods shall follow those described in the Discharger's – *Ocean Monitoring Program's Quality Assurance and Project Plan (MRP QAPP) and Laboratory Operating Procedures Manual* (Laboratory QAP). The receiving water monitoring program may be conducted jointly with other dischargers. During monitoring events, sample stations shall be located, if possible, using a land-based microwave positioning system or a satellite positioning system, such as global positioning. If an alternate navigation system is proposed, its accuracy should be compared to that of microwave and satellite-based systems, and any compromises in accuracy shall be justified.

A. Water Quality Monitoring

1. **Monitoring Locations.** The Discharger shall monitor ambient and receiving water as specified below.

   Receiving water monitoring for water quality shall be performed quarterly at monitoring stations RSW-001 through RSW-016 as follows:

Table E-4. Receiving Water Monitoring at RSW-001 through RSW-016

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method and (Minimum Level, units), respectively
Surface Observations[1]	--	Visual	1/Quarter	--
Salinity	ppt	Profile	1/Quarter	[2]
Conductivity	S/m	Profile	1/Quarter	[2]
Temperature	˚F	Profile	1/Quarter	[2]
pH	pH units	Profile	1/Quarter	[2]
Dissolved Oxygen	mg/L	Profile	1/Quarter	[2]
Light Transmittance	%	Profile	1/Quarter	[2]
Photosynthetically active radiation (PAR)	µEinsteins sec^{-1} cm^{-2}	Profile	1/Quarter	[2]
Chlorophyll-*a* fluorescence	µg/L	Profile	1/Quarter	[2]

1 Wind direction and speed, weather, and sea and tidal condition shall be recorded, with the source(s) of the data documented. Observations of unusual water color, turbidity, odor, oil and grease, or other physical evidence of waste discharge in the water shall be noted on the log sheet prepared at the time of sample collection. These observations shall be recorded whenever a station is sampled.

2 As specified in 40 CFR part 136 or as specified in the MRP QAPP and Laboratory QAP. Temperature, depth, salinity, dissolved oxygen, light transmittance, Chlorophyll-a fluorescence, PAR, and pH profile data shall be measured throughout the entire water column using a conductivity, temperature, and depth (CTD) profiler during the quarterly sampling events. Depth profile measurements shall be obtained using multiple sensors to measure parameters through the entire water column (from the surface to as close to the bottom as practicable).

B. Sediment Monitoring. Sediment samples collected for chemistry analyses shall be separate from sediment samples collected for benthic infauna community analyses or whole sediment toxicity testing. Sediment samples for chemistry analyses shall be collected at monitoring stations RSW-001 through RSW-016 using the top 2 cm of undisturbed surface material in 0.1 m^2 grab samples (Van Veen). Chemical analysis of sediment, as per Table E-5, shall be conducted using USEPA approved methods, methods developed by the National Oceanic and Atmospheric Administration's (NOAA's) National Status and Trends for Marine Environmental Quality, or methods developed in conjunction with the Southern California Bight Regional Monitoring Program. For chemical analysis of sediment, samples shall be reported on a dry weight basis. For developing a sediment monitoring workplan refer to SCCWRP's latest version of their Sediment Quality Assessment Workplan (Bight'18). For sediment domoic acid (DA) assessment refer to the SCCWRP's Bight '18 Harmful Algal Bloom workplan.

1. Monitoring Locations – Semi-annual Benthic Monitoring Stations (RWS-001 through RWS-010) and Annual Benthic Monitoring Stations (RWS-011 through RWS-016). Semiannual benthic monitoring stations are monitored in summer and winter and annual benthic monitoring stations are monitored in summer. Winter means January, February and March and Summer means July, August and September. Monitoring shall commence semi-annually and annually 2 years before startup of the discharge and semi-annually and annually thereafter. A summary of current monitoring results and historic monitoring results shall be provided for each receiving water station.

Table E-5. Sediment Chemistry Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency
Acid Volatile Sulfides	mg/kg	Grab	Semi-annual & Annual
Total Chlorinated Hydrocarbons	mg/kg	Grab	“”
Sediment Grain Size	--	Grab	“”
Total Organic Carbon	%	Grab	“”
Total Nitrogen	mg/kg	Grab	“”
Arsenic, Total Recoverable	mg/kg	Grab	“”
Cadmium, Total Recoverable	mg/kg	Grab	“”
Chromium, Total Recoverable	mg/kg	Grab	“”
Copper, Total Recoverable	mg/kg	Grab	“”
Lead, Total Recoverable	mg/kg	Grab	“”
Mercury, Total Recoverable	mg/kg	Grab	“”
Nickel, Total Recoverable	mg/kg	Grab	“”
Silver, Total Recoverable	mg/kg	Grab	“”
Zinc, Total Recoverable	mg/kg	Grab	“”
Cyanide, Total	mg/kg	Grab	“”
Phenolic Compounds	mg/kg	Grab	“”
PCB Congeners[1]	ng/kg	Grab	“”
2,4-DDD	ng/kg	Grab	“”
4,4-DDD	ng/kg	Grab	“”

2,4-DDE	ng/kg	Grab	“”
4,4-DDE	ng/kg	Grab	“”
2,4-DDT	ng/kg	Grab	“”
4,4-DDT	ng/kg	Grab	“”
Aldrin	ng/kg	Grab	“”
Alpha-Chlordane	ng/kg	Grab	“”
Dieldrin	ng/kg	Grab	“”
Endosulfan	ng/kg	Grab	“”
Endrin	ng/kg	Grab	“”
Gamma-BHC	ng/kg	Grab	“”
Heptachlor	ng/kg	Grab	“”
Heptachlor Epoxide	ng/kg	Grab	“”
Hexachlorobenzene	ng/kg	Grab	“”
Mirex	ng/kg	Grab	“”
Trans-Nonachlor	ng/kg	Grab	“”
Acenapthene	µg/kg	Grab	“”
Acenaphthylene	µg/kg	Grab	“”
Anthracene	µg/kg	Grab	“”
Benzo(a)anthracene	µg/kg	Grab	“”
Benzo(o)fluoranthene	µg/kg	Grab	“”
Benzo(k)fluoranthene	µg/kg	Grab	“”
Benzo(ghi)pyrelene	µg/kg	Grab	“”
Benzo(a)pyrene	µg/kg	Grab	“”
Benzo(e)pyrene	µg/kg	Grab	“”
Biphenyl	µg/kg	Grab	“”
Chrysene	µg/kg	Grab	“”
Dibenz(ah)anthraces	µg/kg	Grab	“”
Fluoranthene	µg/kg	Grab	“”
Fluorene	µg/kg	Grab	“”
Ideno (123cd) pyrene	µg/kg	Grab	“”
Naphthalene	µg/kg	Grab	“”
1-Methylnaphthalene	µg/kg	Grab	“”
2-Methylnaphthalene	µg/kg	Grab	“”
2,6-Dimethylnaphthalene	µg/kg	Grab	“”
2,3,5-Trimethylnaphthale	µg/kg	Grab	“”
Perylene	µg/kg	Grab	“”
Phenanthrene	µg/kg	Grab	“”
1-Methylphenanthene	µg/kg	Grab	“”
Pyrene	µg/kg	Grab	“”
Domoic Acid	µg/kg	Grab	“”

1. **Individual PCB congeners.** Individual PCB congeners whose analytical characteristics resemble those of PCB-18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153/168, 156, 157, 167, 169, 170, 177, 180, 183, 187, 189, 194, 201, 206 (optional 8, 27, 29, 31, 33, 56, 60, 64, 95, 97, 141, 146, 158, 174, 198/199, 200, 203, 209) shall be individually quantified and reported.

2. **Benthic Infauna Monitoring.** The Discharger shall assess benthic infaunal community health at the locations and frequency as the semi-annual and annual benthic monitoring stations as described in Section VIII.B.1 above. Sediment samples collected for benthic infauna community analyses shall be separate from sediment samples collected for chemistry analyses or whole sediment toxicity testing. Monitoring shall consist of identification and quantification of all benthic infauna found at each monitoring station. Sediment samples for benthic infauna community analyses shall be washed and screened (1.0 mm mesh) from entire 0.1 m^2 grab samples (Van Veen) and fixed and preserved for sorting. All organisms shall be identified to as low a taxon as possible. The report shall detail the number of species per grab sample, the number of individuals per species per grab sample, a benthic response index (BRI), Shannon-Weiner's diversity index (H'), Swartz's 75% dominance index (SDI), and Pielou evenness index (J). A summary of current monitoring results and historic monitoring results shall be provided for each receiving water station.

   The Discharger shall include benthic monitoring in the MRP QAPP for Santa Ana Water Board staff review and approval prior to conducting the benthic monitoring program.

3. **Whole Sediment Toxicity.** Sediment samples collected for whole sediment toxicity testing shall be separate from sediment samples collected for chemistry analyses or benthic infauna community analyses. Sediment samples shall be taken concurrently with and adjacent to the sediment samples for physical and chemical properties, and benthic community condition.

   The Discharger shall annually monitor whole sediment toxicity at monitoring locations RWS-001 through RWS-010. Sediment samples for sediment toxicity testing shall be collected using the top 2 cm of undisturbed surface material in 0.1 m^2 grab samples (Van Veen). Analytical testing shall be consistent with EPA's 10-day static amphipod (*Eohaustorius estuarius*) survival test: *Methods for Assessing the Toxicity of Sediment-Associated Contaminants with Estuarine and Marine Amphipods* (EPA/600/R-94/025, 1994).

   Response criteria shall include mortality, emergence from sediment during exposure, and ability to rebury in clean sediment at the end of the 10-day exposure period. Results shall be reported as "pass" or "fail" and percent response. Analysis of sediment toxicity shall include a calculation of the mean control normalized response.

C. Fish and Epibenthic Invertebrate Monitoring

1. Monitoring Locations – Semi-annual Trawl Fish Monitoring Stations (T-001 through T-003) and Annual Trawl Fish Monitoring Stations (T-004 through T-006). Semiannual trawl monitoring stations are monitored in summer and winter and annual trawl monitoring stations are monitored in summer. Winter means January, February and March and Summer means July, August and September. Monitoring shall commence semi-annually and annually 2 years before startup of the discharge and semi-annually

and annually thereafter. A summary of current monitoring results and historic monitoring results shall be provided for each receiving water station.

Trawl samples collected for fish and epibenthic invertebrate community structure analyses may be the same as trawl samples collected for fish tissue chemistry analyses. Sampling and analysis protocols shall follow those described in the MRP QAPP and Laboratory QAP. At each station, a single trawl sample shall be collected using one standard semi-balloon otter trawl with 7.6-m headrope length and a 1.3 cm cod-end mesh, towed for 10 minutes at 0.8-1.0 m/s along the isobath. Samples shall be processed with all fish and epibenthic invertebrates, identified to species, counted, measured (fish only), and weighed. The presence and extent of external diseases (e.g., fin rot and tumors) and anomalies (e.g. skeletal deformities or abnormal coloration) will be recorded from fish collected in the trawls for assemblage analysis. The presence of external parasites will also be noted.

Table E-6 Fish and Epibenthic Invertebrate Community Monitoring

Parameter	Unit	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Number of species, per trawl sample		Trawl	Semi-annual & Annual	Per MRP QAPP & Lab QAP
Number of individuals per species, per trawl sample		Trawl	“	“
Number of all individuals, per trawl sample		Trawl	“	“
Wet weight of fish species, per trawl sample	mg/kg	Trawl	“	“
Cm size classes of fish species, per trawl sample	cm	Trawl	“	“
Shannon-Weiner’s diversity index (H’)		Trawl	“	“
Swartz’s 75% dominance index (SDI)		Trawl	“	“
Abnormalities and disease symptoms		Trawl	“	“

2. Monitoring Locations – Semi-annual Trawl Fish Monitoring Stations (T-001 through T-003)

Fish Tissue Chemistry. The trawl samples collected for fish tissue chemistry analyses may be the same as trawl samples collected for fish and epibenthic invertebrate community structure analyses. The Discharger shall annually monitor for fish at trawl fish monitoring Stations, T-001 through T-006. For the first year, samples shall be selected from the two most abundant fish species caught during the trawls. The two fish species selected during the first year trawls shall be used as monitoring species every year thereafter. Due to variations in size and abundance of fish species, the Discharger may propose additional or alternative fish species for monitoring subject to approval by the Santa Ana Water Board. Sampling and analysis protocols (including reporting limits) shall follow those described in the MRP QAPP and Laboratory QAP. At each station, a single trawl sample shall be collected using one standard semi-balloon otter trawl with 7.6-m headrope length and a 1.3 cm cod-end mesh, towed for 10 minutes at 0.8-1.0 m/s along the 10-m isobath. A reasonable level of effort (i.e., five trawls per station) shall be used to reach the required number of individuals. Samples shall be processed and target fish identified to species, counted, measured to the nearest millimeter, weighed, and prepared for chemical analyses (focused on 15 to 20 cm standard length individuals).

Table E-7 Fish Tissue Chemistry Monitoring

Parameter	Unit	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Cm size classes of fish species, per trawl sample	cm	Trawl	Annual	Per MRP QAPP & Lab QAP
Percent lipid	%, wet g	muscle tissue and liver tissue, at least 10 individuals of each target species	“	“
Mercury (methylmercury)	ng/wet g	“	“	“
Sum of individual PCB Congeners[1]	“	“	“	“
Individual PCB congeners	“	“	“	“
Sum of individual DDT Derivatives[2]	“	“	“	“
Individual DDT derivatives	“	“	“	“
Sum of individual Chlordane derivatives	“	“	“	“
Individual Chlordane Derivatives[3]	“	“	“	“
Dieldrin	“	“	“	“

1. **Individual PCB congeners.** Individual PCB congeners whose analytical characteristics resemble those of PCB-18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153/168, 156, 157, 167, 169, 170, 177, 180, 183, 187, 189, 194, 201, 206 (optional 8, 27, 29, 31, 33, 56, 60, 64, 95, 97, 141, 146, 158, 174, 198/199, 200, 203, 209) shall be individually quantified and reported.
2. **Individual DDT derivatives.** 2,4’- and 4,4’-isomers of DDT, DDE, and DDD, plus 4,4’-DDMU.
3. **Individual Chlordane derivatives.** Cis- and trans-chlordane, cis- and trans-chlordene, hepatachlor, heptachlor epoxide, cis- and trans-nonachlor, and oxychlordane.

3. Monitoring Locations – Semi-annual Trawl Fish Monitoring Stations (T-001 and T-002)

Fish Liver Histopathology. Annually and during the summer, histopathological analyses shall be performed on liver tissues of 40 individuals per species per station from the outfall (T-002) and farfield reference semi-annual trawl fish monitoring stations. A reasonable level of effort (i.e., five trawls per location) shall be used to reach the required number of individuals. During the first year target species shall be selected from the two most abundant species caught during the trawls. The two species identified as targets during the first year shall be targeted every year thereafter. Due to variations in size and abundance of fish species, the Discharger may propose additional or alternative fish species for monitoring subject to approval by the Santa Ana Water Board.

4. Monitoring Locations – Annual Rig Fishing Monitoring Zones (R-001 and R-002)

Sport Fish Muscle Chemistry. The Discharger shall annually target for monitoring Scorpionfish (Scorpaena guttata) and Pacific Chub Mackerel (Scomber japonicus) at the Rig Fishing Monitoring Zones, R-001 and R-002, specified in Table E-1, as follows. The Discharger may propose additional or alternative fish species for monitoring subject to approval by the Santa Ana Water Board. Sampling and analysis protocols (including reporting limits) shall follow those described in the MRP QAPP and Laboratory QAP. Samples shall be processed and target fish identified to species, counted, measured and size classed, weighed, and prepared for chemical analyses (focusing on consistent size class). The Discharger is advised to follow SCCWRP's latest version of their Sediment Quality Assessment Workplan (Bight'18) as guidelines.

Table E-8 Sport Fish Muscle Chemistry Monitoring

Parameter	Unit	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Cm size classes of fish species representing legal sport fish take, per trawl sample	cm	trawl (or other gear)	Annual	Per MRP QAPP & Lab QAP
Percent lipid	%, wet g	muscle tissue, at least 10 individuals of target specie	"	"
Arsenic, total	ng/wet g	muscle tissue, at least 10 individuals of target specie	"	"
Mercury (methylmercury)	ng/wet g	muscle tissue, at least 10 individuals of target specie	"	"
Selenium, total	ng/wet g	muscle tissue, at least 10 individuals of target specie	"	"
Sum of individual PCB Congeners[1]	ng/wet g	muscle tissue, at least 10 individuals of target specie	"	"
Individual PCB congeners[1]	ng/wet g	muscle tissue, at least 10 individuals of target specie	"	"
Sum of individual DDT Derivatives[2]	ng/wet g	muscle tissue, at least 10 individuals of target specie	"	"
Individual DDT derivatives[2]	ng/wet g	muscle tissue, at least 10 individuals of target specie	"	"

Sum of individual Chlordane Derivatives[3]	ng/wet g	muscle tissue, at least 10 individuals of target specie	"	"
Individual Chlordane Derivatives[3]	ng/wet g	muscle tissue, at least 10 individuals of target specie	"	"
Dieldrin	ng/wet g	muscle tissue, at least 10 individuals of target specie	"	"

1. **Individual PCB congeners.** Individual PCB congeners whose analytical characteristics resemble those of PCB-18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153/168, 156, 157, 167, 169, 170, 177, 180, 183, 187, 189, 194, 201, 206 (optional 8, 27, 29, 31, 33, 56, 60, 64, 95, 97, 141, 146, 158, 174, 198/199, 200, 203, 209) shall be individually quantified and reported.
2. **Individual DDT derivatives.** 2,4'- and 4,4'-isomers of DDT, DDE, and DDD, plus 4,4'-DDMU.
3. **Individual Chlordane derivatives.** Cis- and trans-chlordane, cis- and trans-chlordene, hepatachlor, heptachlor epoxide, cis- and trans-nonachlor, and oxychlordane.

D. Biological Surveys. Baseline biological conditions shall be established at the discharge location and at a reference location prior to commencement of construction. The Discharger is required to conduct biological surveys (Before-After Control-Impact Study) that will evaluate the differences between biological communities at a reference site and at the discharge location before and after the discharge commences. The Santa Ana Water Board will use the data and results from the surveys and any other applicable data for evaluating the requirements specified in this Order. For purpose of determining the before condition of the discharge location and reference location, the Discharger shall conduct the receiving water core monitoring requirements (section VIII of this MRP) for two years before construction begins in the discharge location (intake and outfall related structures) as part of the biological surveys. In addition, the Discharger shall conduct a larval density study on a section of the Southern California Bight before the Discharger begins construction activities offshore as a before condition of the receiving waters.

The section of the SCB shall be representative of regional characteristics surrounding the proposed discharge location. Specifically, the SCB section shall include larval sampling in the area ranging from 2 km offshore of the western tip of the Palos Verdes Peninsula to 2 km offshores of the western tip of Dana Point. This encompasses an area of approximately 35km north and south of the discharge location. Larval sampling shall be conducted pursuant to Chapter III.M.2.e.(1)(a) of the Ocean Plan. The sampling shall be conducted monthly at both the locations described above. The discharger may, subject to Santa Ana Water Board Executive Officer approval, include existing data in this section of the SCB to provide additional context and information in the BACI study.

2. To implement this requirement, within 90 days of permit adoption, the Discharger must submit for Executive Officer review and approval, a proposed Biological Surveys Workplan. The Discharger shall implement the Biological Surveys Workplan within 30 days of Executive Officer approval.

E. Visual Observations. Visual observations shall be made and recorded quarterly at monitoring stations RSW-001 through RSW-016. The following general observations or measurements shall be reported:

xiii. Weather at the time of monitoring.

xiv. Tidal stage and time of monitoring.

xv. General water conditions, including unusual surface conditions.

xvi. Presence or absence of aquatic organisms.

xvii. Presence or absence of surface boil.

xviii. Extent of visible turbidity or color patches.

IX. RECEIVING WATER REGIONAL MONITORING

Discharger's participation in regional monitoring programs is a required condition of this Order. The Discharger shall participate in regional monitoring activities coordinated by the Southern California Coastal Water Research Project (SCCWRP), the Southern California Coastal Ocean Observation System (SCCOOS), and other appropriate agencies approved by the Santa Ana Water Board. The Executive Officer may modify the MRP to enable the Discharger to participate in comprehensive regional monitoring activities conducted in the Southern California Bight during the term of this permit.

The regional monitoring programs which must be conducted under this Order include:

A. Southern California Bight Regional Monitoring Program. The Discharger is required to participate in the Southern California Bight Regional Monitoring Program coordinated by SCCWRP (e.g., Bight'18), or any other coordinator named by the Santa Ana Water Board, pursuant to Water Code sections 13267, 13383, and 40 CFR section 122.48. The intent of the Southern California Bight Regional Monitoring Program is to maximize the efforts of all monitoring partners using a more cost-effective monitoring design and to best utilize the pooled scientific resources of the Southern California Bight.

Participation in the Southern California Bight Regional Monitoring Program shall include aspects of the program relevant to understanding regional trends and answering regional questions related to public health (i.e., bacterial contamination), water quality, sediment geochemistry, biological communities, and seafood safety (e.g., fish tissue contamination) in the receiving waters environment. For sediment chemistry and benthic infauna communities, this effort shall include a resource exchange similar to the semi-annual winter samples. For trawls, participation shall include a minimum resource exchange equivalent to the 3 semi-annual winter samples. In both cases (i.e., the benthic and trawl programs), the 16 benthic and 6 trawl stations identified in the annual and semi-annual summer monitoring program should continue to be sampled, even during regional monitoring program events, to assess compliance and trends near the discharge.

The Discharger shall complete collection, analysis, and reporting of samples in accordance with the schedules established by the next Bight regional program development committee(s). Previous participation included method development, research, and monitoring activities involving microbiology, water quality data, marine sediments, fish/macrobenthic assemblages, fish tissue contamination, and harmful algal blooms related to point and nonpoint discharges to the marine environment. Levels of participation and areas of study are dependent upon the final study plans established by Bight regional program development committees. For monitoring resources reallocation purposes, the Santa Ana Water Board will notify the

Discharger in writing that the request to perform the receiving water sampling and analytical effort defined in section VIII.B. and VIII.C. of this MRP, for winter semi-annual monitoring locations, is suspended for the duration of the reallocation. The level of resources in terms of sampling and analytical effort redirected from the receiving water monitoring program required under section VIII of the MRP shall approximately equal the level of resources provided to implement the regional monitoring and assessment program, unless the Santa Ana Water Board and the Discharger agree otherwise. The specific scope and duration of the receiving water monitoring program reallocation and redirection will be determined in writing by the Santa Ana Water Board in consultation with the Discharger. These changes will improve the overall effectiveness of monitoring in the Southern California Bight. Minor changes may be made without further public notice.

B. Central Bight Water Quality Cooperative Program. The Central Bight Water Quality Cooperative Program is coordinated quarterly receiving water quality monitoring conducted by Orange County Sanitation District, County Sanitation Districts of Los Angeles County, the City of Los Angeles, and the City of Oxnard, through appropriate agencies for water quality monitoring. The Discharger shall submit quarterly water quality data, gathered under section VIII.A.1. above, to the Bight Water Quality Program.

C. Central Regional Kelp Survey. Commencing with the start of the discharge, the Discharger shall start participating in the Central Regional Kelp Survey Consortium, a group of private and public agencies that monitor quarterly the health and standing crop of kelp beds using aerial imaging of kelp bed canopy cover within the central Bight.

X. STRATEGIC PROCESS STUDIES

A. Final Effluent Characterization. The Discharger shall investigate Constituents of Emerging Concern (CECs) in the discharge following an approved study workplan. Within six months of the effective date of this Order, the Discharger shall submit for Executive Officer approval a Final Effluent Characterization study workplan. This workplan shall include (but is not limited to):

1. Identification of CECs for discharge monitoring, sample type, minimum sampling frequency, and analytical test method considering sensitivity, accuracy, availability, and cost. For this purpose, the Discharger is advised to consider the use of monitoring technologies for CECs such as cell assay bioscreening and non-targeted analysis or other monitoring technologies recommended by the Discharger.

2. A summary of CECs monitoring efforts and results for the previous calendar year shall be described and summarized in the annual receiving water monitoring report.

B. Plume Tracking Using Regional Oceanic Modeling System-Biogeochemical Elemental Cycling (ROMS-BEC) model. The Discharger shall develop with the guidance of SCCWRP a plume tracking model using ROMS-BEC to determine the fate of the effluent plume. Within six months of the effective date of this Order, the Discharger shall submit for Executive Officer approval a Plume Tracking study workplan.

XI. OTHER MONITORING REQUIREMENTS

A. Stormwater Monitoring and Reporting

For stormwater discharges, the Discharger shall comply with the monitoring and reporting requirements as outlined in Section IV.D. of the Order.

B. Marine Life Mitigation Plan Monitoring and Reporting –The Discharger shall implement monitoring and reporting in accordance with the MLMP to assess compliance with the performance standards in the MLMP. The Discharger shall begin implementation of the MLMP monitoring and reporting requirements when the revised MLMP is approved by the Executive Officer as required by the Marine Life Mitigation Plan Schedule in Attachment K to this Order.

C. Outfall and Diffuser System Inspection

Upon completion of the diffuser system, the Discharger shall externally inspect the diffuser a minimum of once a year for the first two years of operation, and once every five years thereafter. Inspections shall include general observations and videographic/photographic records of the outfall pipes, diffuser, and adjacent ballast material. The inspections may be conducted using remotely operated vehicles, divers, or manned submersible vessels. A summary report of the inspection findings shall be provided in the annual receiving water monitoring report.

XII. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

1. The Discharger shall comply with all Standard Provisions (Attachment D) related to monitoring, reporting, and recordkeeping.
2. All analytical data shall be reported with MDLs[2] and with identification of either reporting level or limits of quantitation (LOQs). Quality assurance/quality control data shall be submitted upon request. Test results shall be reported in either milligrams/liter (mg/L) or micrograms/liter (µg/L), or picograms/L (pg/L), as appropriate.
3. Any internal quality control data associated with the sample must be reported when requested by the Executive Officer. The Santa Ana Water Board will reject the quantified laboratory data if quality control data is unavailable or unacceptable.
4. Discharge monitoring data shall be submitted in a format acceptable by the Santa Ana Water Board. Specific reporting format may include preprinted forms and/or electronic media. The results of all monitoring required by this Order shall be reported to the Santa Ana Water Board and shall be submitted in such a format as to allow direct comparison with the limitations and requirements of this Order.
5. The Discharger shall tabulate the monitoring data to clearly illustrate compliance and/or noncompliance with the requirements of the Order.
6. The Discharger shall submit to the Santa Ana Water Board reports necessary to determine compliance with effluent limitations in this Order and shall follow the chemical nomenclature and sequential order of priority pollutant constituents shown in Attachment H for reporting the required annual priority pollutant monitoring.

[2] The standardized test procedure to be used to determine the method detection limit (MDL) is given at Appendix B, 'Definition and Procedure for the Determination of the Method Detection Limit' of 40 CFR part 136.

B. Self-Monitoring Reports (SMRs)

1. The Discharger shall electronically submit SMRs using the State Water Board's California Integrated Water Quality System (CIWQS) Program website (http://www.waterboards.ca.gov/ciwqs/index.html). The CIWQS website will provide additional information for SMR submittal in the event there will be a planned service interruption for electronic submittal.
2. The Discharger shall report in the SMR the results for all monitoring specified in this MRP under sections III through IX. Additionally, the Discharger shall report in the SMR the results of any special studies, acute and chronic toxicity testing, TRE/TIE, Pollutant Minimization Plan (PMP), and Pollution Prevention Plan required by Special Provisions section VI.C. of this Order. The Discharger shall submit monthly, quarterly, and annual SMRs including the results of all required monitoring using U.S. EPA-approved test methods or other test methods specified in this Order. SMRs are to include all new monitoring results obtained since the last SMR was submitted. If the Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the calculations and reporting of the data submitted in the SMR.
3. Monitoring periods and reporting for all required monitoring shall be completed according to the following schedule:

Table E-9. Monitoring Periods and Reporting Schedule

Sampling Frequency	Monitoring Period Begins On…	Monitoring Period	SMR Due Date
Continuous	Permit effective date	All	Submit with monthly SMR
Daily	Permit effective date	(Midnight through 11:59 PM) or any 24-hour period that reasonably represents a calendar day for purposes of sampling.	Submit with monthly SMR
Weekly	Sunday following permit effective date or on permit effective date if on a Sunday	Sunday through Saturday	Submit with monthly SMR
Monthly	First day of calendar month following permit effective date or on permit effective date if that date is first day of the month	First day of calendar month through last day of calendar month	First day of the second month following the reporting period, submit as monthly SMR
Quarterly	Closest of January 1, April 1, July 1, or October 1 following (or on) permit effective date	January 1 through March 31, samples are collected in January; April 1 through June 30, samples are collected in April; July 1 through September 30, samples are collected in	First day of the second month following the reporting period, submit with monthly SMR on May 1, August 1,

Sampling Frequency	Monitoring Period Begins On…	Monitoring Period	SMR Due Date
		July; October 1 through December 31, samples are collected in October	November 1, and February 1.
Semiannually	Closest of January 1 or July 1 following (or on) permit effective date	January 1 through June 30, samples are collected in January. July 1 through December 31, samples are collected in July.	First day of the second month following the reporting period, submit with monthly SMR
Annually[1]	Permit effective date	January 1 through December 31	First day of the second month following the reporting period, submit with monthly SMR on August 1

1. The annual receiving water monitoring report, due by March 15, for the previous fiscal year (July 1 through June 30). The annual receiving water monitoring report shall include the specified parameters for each station along with more detailed statistical comparisons, including analyses to elucidate spatial and temporal trends in the data, and in relation to the wastewater plume.

4. **Reporting Protocols.** The Discharger shall report with each sample result the applicable reported ML (reported ML is also known as the Reporting Level, or RL) and the current MDL, as determined by the procedure in 40 CFR part 136.

   The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

   a. Sample results greater than or equal to the reported ML shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

   b. Sample results less than the reported ML, but greater than or equal to the laboratory’s MDL, shall be reported as “Detected, but Not Quantified,” or DNQ. The estimated chemical concentration of the sample shall also be reported.

      For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words “Estimated Concentration” (may be shortened to “Est. Conc.”). The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (± a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

   c. Sample results less than the laboratory’s MDL shall be reported as “Not Detected,” or ND.

d. Dischargers are to instruct laboratories to establish calibration standards so that the ML value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve.

5. The Discharger shall submit SMRs in accordance with the following requirements:

a. The Discharger shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with interim and/or final effluent limitations. The Discharger is not required to duplicate the submittal of data that is entered in a tabular format within CIWQS. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, the Discharger shall electronically submit the data in a tabular format as an attachment.

b. The Discharger shall attach a cover letter to the SMR. The information contained in the cover letter shall clearly identify violations of the waste discharge requirements; discuss corrective actions taken or planned; and include the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.

C. Discharge Monitoring Reports (DMRs)

DMRs are U.S. EPA reporting requirements. The Discharger shall electronically certify and submit DMRs together with SMRs using Electronic Self-Monitoring Reports module eSMR 2.5 or any upgraded version. Electronic DMR submittal shall be in addition to electronic SMR submittal. Information about electronic DMR submittal is available at the DMR website at: http://www.waterboards.ca.gov/water_issues/programs/discharge_monitoring.

D. Other Reports

1. The Discharger shall report the results of any special studies, chronic toxicity testing, TRE/TIE, PMP, and Pollution Prevention Plan required by Special Provisions section VI.C of this Order. The Discharger shall submit reports with the first SMR scheduled to be submitted on or immediately following the report due date in compliance with SMR reporting requirements described in subsection X.B above.

2. The Discharger shall report Best Management Practices (BMPs) that are maintained or implemented at the facility, including documentation of conditions prior to implementation, a description of the BMPs, and period of implementation. The Discharger shall maintain and make available to the Santa Ana Water Board upon request a daily log of visual inspection for the parameters specified in Table 1 of Attachment L. The Discharger shall certify within the report that the log has maintained.

ATTACHMENT F - FACT SHEET

CONTENTS

TABLES

ATTACHMENT F – FACT SHEET

As described in section II.B of the Order, the Santa Ana Water Board incorporates this Fact Sheet as findings of the Santa Ana Water Board supporting the issuance of the Order. This Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of the Order.

The Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for dischargers in California. Only those sections or subsections of the Order that are specifically identified as "not applicable" have been determined not to apply to the Discharger. Sections or subsections of the Order not specifically identified as "not applicable" are fully applicable to this Discharger.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the facility.

Table F-1. Facility Information

WDID	8 303431001
Discharger	Poseidon Resources (Surfside) LLC
Name of Facility	Huntington Beach Desalination Facility
Facility Address	21730 Newland Street
	Huntington Beach, CA 92646
	Orange County
Facility Contact, Title and Phone	Scott Maloni, Vice President, (760) 655-3996
Authorized Person to Sign and Submit Reports	Same as above
Mailing Address	5780 Fleet Street, Suite 140, Carlsbad, CA 92008
Billing Address	Same as mailing address
Type of Facility	Desalination
Major or Minor Facility	Major
Threat to Water Quality	2[1]
Complexity	B[2]
Pretreatment Program	N/A
Recycling Requirements	N/A
Facility Permitted Flow[3, 4] at Monitoring Location M-001	56.69 million gallons per day (MGD) 12-Month Average Flow 62.5 MGD Maximum Daily Flow
Facility Design Flow[3, 4]	56.69 MGD 12-Month Average Flow 62.5 MGD Maximum Daily Flow
Watershed	N/A
Receiving Water	Pacific Ocean
Receiving Water Type	Ocean waters

1. Threat to Water Quality Category 2 is defined as "[t]hose discharges of waste that could impair the designated beneficial uses of the receiving water, cause short-term violations of water quality objectives, cause secondary drinking water standards to be violated, or cause a nuisance." (Cal. Code Regs., tit. 23, § 2200, subd. (a)(1).)

2. Complexity Category B is defined as “[a]ny discharger not included in Category A that has physical, chemical, or biological treatment systems (except for septic systems with subsurface disposal), or any Class 2 or Class 3 waste management unit.” (Cal. Code Regs., tit. 23, § 2200, subd. (a)(1).)
3. Listed total discharge flow is for process flows during non-storm conditions. On-site storm runoff of 1.67 MGD may occur during storm periods in addition to the facility permitted flow and facility design flow.
4. Flows up to approximately 126.7 MGD may occur during start-up operations or temporary maintenance operations when all or a portion of filtered pretreated seawater is directed back into the discharge pipeline. Additionally, dechlorinated product water would be temporarily discharged back into the discharge pipeline during start-up periods or other times when it is not feasible to delivery product water to the regional potable water system. All limits and requirements, including monitoring, specified in the Order remain applicable during these temporary discharges.

A. Poseidon Resources (Surfside) LLC (Discharger) is the owner and operator of Huntington Beach Desalination Facility (Facility).

For the purposes of this Order, references to the “discharger” or “permittee” in applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

B. The Discharger proposes to construct and operate the Facility on a 12-acre parcel on the AES Huntington Beach Generating Station (HBGS). Once constructed, the Facility will discharge wastewater to the Pacific Ocean, a water of the United States. The Discharger was initially regulated by Order No. R8-2006-0034, National Pollutant Discharge Elimination System (NPDES) Permit No. CA8000403, adopted on August 25, 2006 and expired on August 1, 2011. Order No. R8-2006-0034 was superseded and rescinded by Order No. R8-2012-0007 NPDES Permit No. CA8000403 (2012 Order), adopted on February 10, 2012 and expired on February 1, 2017. Attachment B provides a map of the area around the Facility. Attachment C provides a flow schematic of the Facility.

C. The Discharger submitted a timely application for permit renewal. The Discharger filed a report of waste discharge (ROWD) and an application for the renewal of waste discharge requirements (WDRs) and NPDES permit for the Facility on June 30, 2016. The Discharger also submitted a request for a Water Code section 13142.5, subdivision (b) (section 13142.5(b)) determination for the Facility on March 15, 2016. The Discharger submitted supplemental information in response to Santa Ana Water Board letters dated July 29, 2016, October 31, 2016, and May 23, 2017. The Santa Ana Water Board deemed the Discharger’s application complete on August 28, 2017. Based on the findings of an independent review of the diffuser design, dated April 18, 2018, Santa Ana Water Board staff informed the Discharger that the proposed diffuser design would not be recommended as the best available design or technology feasible to minimize intake and mortality of all forms of marine life. The Discharger submitted a revised diffuser design to meet the specifications in the independent review. The Santa Ana Water Board treated the revised diffuser design as a new application and deemed it complete on October 1, 2018.

D. Pursuant to federal regulations (40 CFR 122.46), the duration of NPDES permits may not exceed a fixed term of five years. Accordingly, Table 3 of the Order limits the duration of the discharge authorization to five years. However, pursuant to California Code of Regulations, title 23, section 2235.4, the terms and conditions of an expired permit are automatically continued pending reissuance of the permit if the Discharger complies with all federal NPDES requirements for continuation of expired permits.

E. Water Code section 13142.5(b) requires that for each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life. Chapter III.M.2 of the Ocean Plan provides the framework that regional water boards must use to evaluate whether a desalination facility complies with Water Code section 13142.5(b).

F. Co-located and Temporary Stand-Alone Operations (2012 Determination) – The 2012 Order included a Water Code section 13142.5(b) determination for the Facility for co-located operating conditions with HBGS and for temporary stand-alone operating conditions when HGBS's operations did not provide sufficient flows. The 2012 Order did not cover permanent stand-alone operations of the Facility and specifically stated the Discharger was required to obtain a new Water Code section 13142.5(b) determination for permanent stand-alone operations if HBGS ceased operation of its once-through cooling system. Additionally, the Facility is a new facility as defined under chapter III.M.1.b of the Ocean Plan and must obtain a Water Code section 13142.5(b) determination in compliance with chapter III.M.

G. Stand-Alone Operations (2019 Determination) – The Discharger submitted a request for Water Code section 13142.5(b) determination to cover co-located operations with HBGS, temporary stand-alone operations, and permanent stand-alone operations. However, pursuant to Order R8-2020-0040, the HBGS is scheduled to cease operation of its once-through cooling system by December 31, 2023 and the Facility will not be completed before that time to operate in a co-located mode. As such, the Water Code section 13142.5(b) determination for the Facility only covers permanent stand-alone operations.

In accordance with the Ocean Plan, the Santa Ana Water Board first analyzed separately as independent considerations, and then collectively, a range of feasible alternatives for the best available site, design, technology, and mitigation measures to minimize intake and mortality of all forms of marine life. Having done this analysis, the Santa Ana Water Board has conditionally determined that the Facility will use the best available combination of site, design, technology, and mitigation measures feasible to minimize the intake and mortality of all forms of marine life. This conditional determination is limited to the stand-alone operation of the Facility. Attachment G to this Order summarizes the Santa Ana Water Board's findings in support of its Water Code section 13142.5(b) conditional determination. Attachment K includes the Marine Life Mitigation Plan (MLMP) Schedule that sets forth the additional information the Discharger must submit for the proposed mitigation project.

H. Future Modified Operations - Any future expansions to the Facility as described in the Ocean Plan section III.M.1.b(2) will require a new Water Code section 13142.5(b) determination.

II. FACILITY DESCRIPTION

The Discharger proposes to construct and operate the Facility's water treatment process on approximately 12 acres located adjacent to the AES Huntington Beach Generating Station (HBGS) and to modify and operate the HBGS intake and discharge systems located directly west of the power plant in the Pacific Ocean. In September 2005, the Discharger entered into a 55-year option agreement with AES,[1] the owner and operator of the HBGS, for the Facility site. The Facility will produce an average annual volume of 50 MGD of potable water using the process described below and as shown in Attachment C – Flow Schematic.

The Facility meets the definition of a "new facility" in chapter III.M.1.b.(3) of the Ocean Plan and must comply with the Ocean Plan requirements for new facilities. Prior to the start of any commercial operations, the Discharger must retrofit the existing offshore intake and discharge structures to minimize intake and mortality of all forms of marine life. At the intake tower, the Discharger will install a screening system consisting of four 1.0-mm slot wedgewire screens with a through-screen velocity of 0.5 ft/sec or less. The wedgewire screens must be rotating brush-cleaned, stainless steel wedgewire screens; the Discharger may use a boat-based air burst system or deploy divers to remove debris that accumulates on the screens. At the discharge tower, the Discharger will install a multiport diffuser consisting of 14 ports equipped with Tideflex diamond-shaped nozzles (or similar) with an open area of 1.28 $ft.^2$

The Facility will permanently operate in a stand-alone mode. The following summarizes the proposed facilities and operations:

- **Permanent Stand-Alone Operations:** It is anticipated that the AES HBGS will discontinue the use of once-through cooling water by December 31, 2023 (see AES NPDES Permit, Order R8-2020-0040). The Facility will be completed after December 31, 2023 and operate as a permanent, stand-alone facility and the Discharger will be responsible for the intake of seawater and discharge of wastewater from Discharge Point 001.

  During initial start-up of permanent stand-alone operations and temporary maintenance operations, it may be necessary to temporarily return all or a portion of the filtered pretreated seawater (up to approximately 126.7 MGD) back into the AES HBGS discharge pipeline instead of routing the filtered seawater flow to the reverse osmosis (RO) units. Additionally, during such start-up periods or periods when it is not feasible to deliver product water to the regional potable water system, it may be necessary to temporarily discharge dechlorinated product water from the RO process back into the AES HBGS discharge pipeline. During these temporary periods, the maximum allowable flows returned to the ocean would not exceed 126.7 MGD and the volume and salinity of the additional discharges would be identical to the volume and salinity of the intake water. As a result, no water quality changes would occur as a result of such temporary process water diversions.

[1] Appendix I, Executed SLC Lease Amendment

Table F-2 summarizes the Facility's intake and discharge flows under co-located, temporary stand-alone, and permanent stand-alone operations.

Table F-2. Summary of Desalination Facility Intake and Discharge Flows

Parameter		Permanent Stand-Alone Operating Conditions		Start Up/ Maintenance[2]
		Annual Average Flow (MGD)	Daily Peak Flow (MGD)	(MGD)
Potable water production capacity		50	54	54
Project Intake Flows	**Intake through new 1 mm screens**	106.7	116.5	126.7[3]
Wastewater discharge components	**Granular Media Filtration or Membrane Filtration Backwash**	6.4	8.2	18.7[4]
	RO Concentrate	50	54	54
	Reverse Osmosis Rinse Water	0.29	0.3	--
	Total Wastewater Discharge Flow	56.69[1]	62.5[1]	126.7

1. Listed total discharge flow is for process flows during non-storm conditions. On-site storm water runoff of 1.67 MGD may occur during storm periods in addition to the above-listed process discharge flows.
2. Project flows may occur during start-up operations or temporary maintenance operations when all or a portion of the filtered pretreated seawater is directed back into the AES HBGS pipeline. Additionally, dechlorinated product water would be temporarily discharged back into the HBGS discharge pipe during start-up periods or other times when it is not feasible to deliver product water to the regional potable water system. Startup and maintenance periods are not expected to exceed a period of 10 days.
3. Startup/maintenance intake flow of 126.7 MGD through new 1-mm screens would occur under permanent stand-alone conditions.
4. The backwash flow includes flow to meet start up requirements associated with conditioning filters and flushing pipelines.

A. Description of Desalination Process

The RO process will use high-rejection seawater membranes. The system will be made up of 14 process trains, each train with a design capacity of approximately 4.2 MGD. The plant will be designed to produce an average of 50 MGD of potable water using only 13 of the 14 RO trains. The fourteenth RO train will be used when the Facility is producing more than 50 MGD and for standby purposes when any of the other trains requires maintenance. This arrangement provides approximately 4 percent standby capacity, which is needed to ensure continuous potable water delivery while accommodating normal membrane wear and maintenance requirements.

B. Description of Wastewater and Solids Treatment and Controls

The Facility will generate waste streams from the following treatments and controls that will be discharged to the Pacific Ocean through the Facility discharge diffuser:

1. **Chlorinated/Dechlorinated Seawater:** To prevent microbiological growth in the onshore intake system and filter media, the intake water will be chlorinated intermittently, as necessary, however the final effluent will be dechlorinated.

2. **Concentrated Seawater Resulting from the RO Treatment process (RO Concentrate)**: Approximately one gallon of concentrated seawater will be created for every gallon of potable drinking water produced; therefore, for 50 MGD of desalination product water, approximately 50 MGD of concentrated seawater will be generated. The salinity of the concentrate will be approximately 68,000 mg/L, twice the concentration of the intake ocean water (33,500 mg/L or 33.5 ppt).

3. **Granular Media or Membrane Filtration Backwash Water**: The pretreatment filters will be cleaned (backwashed) to remove the intake seawater solids that accumulate in the filtration units. The Facility will use filtered seawater for backwash. The average and maximum volumes of filter backwash water are anticipated to be 6.4 MGD and 8.2 MGD, respectively. During Facility start-up and/or maintenance operations, the filtration backwash may be as much as 18.7 MGD. The spent filter backwash water will have salinities approximately equal to the intake ocean water (34,000 mg/L).

   The type of treatment for spent filter backwash will depend upon the choice of the filtration technology to be used by the Facility. Under the media filtration option, ferric chloride or ferric sulfate coagulant and polymer will be added to the influent to enhance removal of particulate matter. The coagulant would be removed from the filter during the filter backwash cycle, collected in a sedimentation basin (solids handling facility), removed as sludge, and disposed of at a landfill. The liquid phase from the sedimentation basin will be directed to the AES HBGS discharge pipeline. The membrane filtration option does not require the use of coagulant. Under this option, the backwash water would be discharged directly to the discharge pipeline. However, the membrane filtration system would require periodic chemical cleaning. The spent cleaning solution would be collected in a separate tank, neutralized, and discharged to the sanitary sewer.

4. **Used Membrane Cleaning Solution and Rinse Water**: The accumulation of silts or scale on the RO membranes causes fouling that reduces membrane performance. The RO system membranes will be cleaned periodically to remove foulants and to extend the life of the RO membrane. Typical cleaning frequency of the RO membranes is twice per year. Typically, one RO train is taken offline at a time for cleaning and two RO trains are cleaned per month. In extreme conditions (for example, during very wet years or prolonged periods of strong winds when the silt content in the raw seawater may increase significantly), as many as four membrane trains may need to be cleaned in the same month.

   It typically takes one day to complete the cleaning of one membrane train. Since one membrane train is typically cleaned at a time and each of the 13 RO membrane trains have to be cleaned two times per year, the cleaning of all membrane trains will typically take a total of 26 days per year (13 trains x 2 cleanings/train x 1 day per cleaning). Taking into consideration that there are 52 weeks per year, an average of one membrane train will be cleaned every two weeks (i.e., typically, two membrane cleanings will occur per month). In rare situations, as many as four membrane cleanings may occur per month.

To clean the membranes, a chemical cleaning solution is circulated through the membrane train for a preset time. Chemicals typically used for cleaning the RO membranes include:

- Citric acid - (2% solution)
- Sodium hydroxide - (0.1% solution)
- Sodium tripolyphosphate - (2% solution)
- Sulfuric acid - (0.1% solution)
- Sodium dodecylbenzene sulfonate- (0.25%)
- Sodium metabisulfate (1% w/w)

After the cleaning solution circulation is completed, the spent cleaning solution waste is removed from the train to a storage tank where it may be reused or diverted for appropriate disposal. Once the spent cleaning solution is removed from the RO train, the membranes are rinsed with RO water to remove all the residual cleaning solution. The spent rinse water for membrane cleaning is stored separately in a rinse water tank prior to disposal.

The various membrane cleaning waste discharge streams are described below:

- Cleaning solution waste is the actual spent membrane-cleaning chemical. Spent cleaning wastes will be reused or discharged to the local sewer system for further treatment at the Orange County Sanitation District's regional wastewater treatment facility.

- First rinse water is the first batch of water used to rinse the membranes after the recirculation of cleaning solution is discontinued. This rinse water contains diluted residual cleaning solution and will also be discharged to the local sewer system.

- Subsequent rinse water is the water used to rinse the membranes after the first rinse. This rinse wastewater contains only trace amounts of cleaning solution and will be discharged with the concentrated seawater waste to the ocean.

The spent cleaning solution and first rinse water will be conveyed to a tank for retention and treatment prior to discharge to the local sewer system pursuant to an industrial pretreatment permit issued by the Orange County Sanitation District. The tank will have sufficient capacity to store cleaning solution from two simultaneous RO membrane train cleanings.

The subsequent rinse water will be conveyed to a 200,000-gallon rinse water tank for retention and treatment prior to discharge. Since the volume of the subsequent rinse water generated during cleaning of one membrane train is 76,000 gallons, the rinse water tank will have sufficient capacity to store cleaning solution from two simultaneous RO membrane train cleanings. The subsequent rinse water will be pumped out of the rinse water tank to the Facility effluent outfall to the HBGS discharge pipe at a rate of 200 gpm (0.29 MGD). Because the volume of the spent subsequent rinse water per one cleaning is 76,000 gallons, it will take approximately 6.5 to 7 hours to discharge the treated spent subsequent rinse water to the Facility outfall.

Under normal operating conditions, the total volume of subsequent rinse water used for membrane cleaning will be 152,000 gallons per month. These discharges will be discrete events and will continue for a total of 13 to 14 hours per month at a rate of 200 gallons per minute (gpm) (0.29 MGD). In rare situations when the number of membrane cleanings per month may need to be increased, the total volume of the discharged treated cleaning solution to the Facility outfall will be limited to 304,000 gallons per month. The typical volumes of waste streams generated during the cleaning of one RO membrane train (independent of type of cleaning solution) is summarized in Table F-3.

Table F-3. Typical RO Membrane Cleaning Solution Discharge Volumes

Type of Discharge	Gallons Per Membrane Train	Percentage of Total Volume of Discharge per-RO Train Cleaning
Cleaning Solution Waste	4,000	4.4
First Rinse Wastewater-Residual Cleaning Solution	11,000	12.1
Total Discharge to Sewer	**15,000**	**---**
Subsequent Rinse Wastewater	76,000	82.5
Total Discharge to Outfall	**76,000**	**---**
Total Discharge	**91,000**	**100**

Attachment C-1 presents a schematic of water flow at the Facility. Attachment C-2 presents a schematic of the water intake and discharge points.

5. **pH Adjustment and Dechlorination**: To reduce the potential for scale formation in the RO process, sulfuric acid may be added to the water after media or membrane filtration pretreatment. The required dosage amount will be determined based on the bicarbonate concentration of the seawater and the Stiff-Davis Index (SDI) needed in the RO concentrate. The acid also provides carbon dioxide in the RO permeate (i.e., product water), which is needed to react with the lime for product water stabilization in the permeate, post-treatment step. Dechlorination using sodium bisulfite will also be done before cartridge filtration to prevent damage to the RO membranes and to protect the RO systems.

6. **Post Treatment Process**: Product water from the RO process requires chemical conditioning prior to delivery to the distribution system to increase hardness and reduce its corrosion potential. Limestone and carbon dioxide will be used for post-treatment stabilization of the water. Approximately 2-3 times a week, 50,000 gallons of calcite bed backwash is included in the pretreatment backwash flow rates shown in Table F-2. Calcite is NSF-approved and used to stabilize the quality of the water in the distribution system. In addition, the final product water must be disinfected prior to delivery to the distribution system. Chlorine, in the form of sodium hypochlorite and ammonia, will be added as a disinfectant to meet

California Department of Public Health (CDPH) water quality standards for potable water disinfection and to control biological growth in the transmission pipeline (note, as of July 2014 the Division of Drinking Water of the State Water Resources Control Board has assumed oversight of the drinking water program). During start-up periods or other times when it is not feasible to deliver product water to the regional potable water system the product water would be dechlorinated and temporarily discharged back into the AES HBGS discharge pipe.

C. Discharge Points and Receiving Waters

The Facility will be permitted to discharge exclusively at Discharge Point 001 located at latitude 33.64389° and longitude -117.97890°. The discharge will flow to the Pacific Ocean.

This Order authorizes a minimum monthly initial dilution of 15:1 for salinity and the discharge of other pollutants (toxic, conventional, and non-conventional) at Discharge Point 001. This initial dilution ratio is based on initial dilution modeling conducted for the discharge using a computational fluid dynamic (CFD) modeling approach, conservative effluent and receiving water characteristic input values, and the revised diffuser design submitted by the Discharger on January 18, 2019 (i.e., 14-port diffuser equipped with Tideflex nozzles).

In July 2018, the Discharger submitted a technical memorandum summarizing a dilution analysis of a 14-port diffuser, designed to minimize entrainment flow and designed following the procedures described in papers developed in 2018 by Philip Roberts titled, *Brine Diffusers and Shear Mortality* and *Brine Diffusers and Shear Mortality: Application to Huntington Beach*. The diffuser design included 2 header pipes with a total of 14 ports (7 ports per header) capped with tide check valves at angles that are oriented 60 degrees upward and 45 degrees to the pipe in plan view, and spaced 20.4 feet. The reported port depth was 17.8 feet below mean lower low water. Consistent with Ocean Plan requirements, no current or waves were considered in evaluating dilution.

In the July 2018 modeling, the Discharger used the Updated Merge 3D (UM3) module of Visual Plumes developed by the United States Environmental Protection Agency (U.S. EPA). UM3 is a quasi-three-dimensional model used for simulating single and multi-port submerged discharges. The UM3 model indicated that a dilution of 14.5:1 was achieved under minimum month conditions. However, in January 2019, the Discharger submitted an additional technical memorandum as Attachment NNNNN to the ROWD in which the diffuser design was realigned. The modeling was performed using a CFD model (i.e., ANSYS-Fluent). The 2019 modeling effort indicates that a dilution of 15:1 is achieved under minimum monthly initial dilution conditions. The CFD model and UM3 model indicate similar terminal rise heights of the discharge plume under minimum initial dilution conditions. The CFD model indicates a more conservative initial dilution and zone of initial dilution throughout the plume phase of the discharge (i.e., lower dilution and larger zone of initial dilution). The more conservative CFD modeling results have been used to establish the applicable dilution for evaluating the impact of salinity and other pollutants with water quality objectives contained in the Ocean Plan, and for establishing effluent limitations necessary to protect the beneficial uses of the Pacific Ocean.

Table 3 of the Ocean Plan establishes receiving water standards that are to be achieved upon completion of initial dilution. Section III.M.3 of the Ocean Plan also establishes that salinity levels shall not exceed 2 ppt salinity beyond a brine mixing zone (BMZ) that is to extend no further than 100 meters (328 feet) beyond the discharge point. The size of the zone within which initial dilution is completed (zone of initial dilution or ZID) will vary depending on ambient ocean density conditions. The CFD and UM3 models indicate that initial dilution will always be completed within 100 meters (328 feet) of the discharge point throughout the range of anticipated ocean density conditions. Monitoring stations established 100 meters (328 feet) or more from the discharge point are thus representative of receiving waters beyond the ZID and beyond the BMZ.

D. Summary of Existing Requirements and Self-Monitoring Report Data - Not Applicable

E. Compliance Summary - Not Applicable

F. Planned Changes - Not Applicable

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in this Order are based on the requirements and authorities described in this section.

A. Legal Authorities

The Order serves as WDRs pursuant to article 4, chapter 4, division 7 of the California Water Code (Water Code) (commencing with section 13260). This Order is also issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. EPA and chapter 5.5, division 7 of the Water Code (commencing with section 13370). It shall serve as an NPDES permit authorizing the Discharger to discharge into waters of the United States at the discharge location described in Table 2 subject to the WDRs in the Order. The Order also includes the Santa Ana Water Board’s Water Code section 13142.5(b) determination.

B. California Environmental Quality Act (CEQA)

Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of chapter 3 of CEQA, (commencing with section 21100) of division 13 of the Public Resources Code. However, compliance with CEQA is required for those provisions in this Order that are based on state law only. This Order’s determination that the Facility complies with Water Code section 13142.5(b) is a determination based on consideration of state law only and is subject to CEQA compliance. The Santa Ana Water Board is a responsible agency for purposes of CEQA.

On September 7, 2010, the City of Huntington Beach (City) amended Conditional Use Permit No. 02-04 and certified a Final Subsequent Environmental Impact Report (2010 FSEIR) for the Poseidon Seawater Desalination Project at Huntington Beach. As the lead agency, the City adopted a CEQA Statement of Findings of Facts with Statement of Overriding Considerations and a Mitigation Monitoring and Reporting Program. On

September 20, 2010, the City approved Coastal Development Permit No. 10-014. On October 19, 2017, the California State Lands Commission, acting as a responsible agency, certified the Final Supplemental Environmental Impact Report (2017 FSEIR) for the Seawater Desalination Project at Huntington Beach: Outfall/Intake Modifications & General Lease – Industrial Use (PRC 1980.1) Amendment (State Clearinghouse No. 2001051092) and adopted a CEQA Statement of Findings of Facts with Statement of Overriding Considerations and Mitigation Monitoring and Reporting Program.

In 2018, the Discharger's proposed diffuser design (the diffuser design that was analyzed in the 2017 FSEIR) was reviewed by Dr. Phil Roberts, an independent reviewer. In his review, Dr. Roberts ultimately concluded that the proposed diffuser design was not the best available design or technology to minimize intake and mortality of marine life. The Discharger modified the diffuser design to address the findings of Dr. Roberts's review and to comply with Water Code section 13142.5(b) and the Ocean Plan. The modifications to the diffuser design, as described in the Addendum, do not result in new significant environmental effects or a substantial increase in the severity of previously identified significant effects that would require the preparation of a subsequent or supplemental environmental impact report under CEQA Guidelines sections 15162 or 15163. As such, the Santa Ana Water Board prepared an addendum to the 2010 FSEIR and the 2017 FSEIR to address the minor changes to the diffuser design. The 2010 FSEIR, the 2017 FSEIR, and the Addendum analyze the environmental impacts of and the mitigation measures for the Facility in detail and are incorporated herein by reference.

The Santa Ana Water Board independently reviewed and considered the environmental impacts related to the Santa Ana Water Board's review of the Facility's compliance with Water Code section 13142.5(b) as analyzed in the 2010 FSEIR, the 2017 FSEIR, the City's and the State Land Commission's Statements of Overriding Considerations, and the Addendum. The Santa Ana Water Board concurs with and incorporates the City's and the State Lands Commission's findings of no impact, less than significant impact, less than significant impact with mitigation, and significant and unavoidable impact related to the Water Code section 13142.5(b) determination in the 2010 FSEIR and the 2017 FSEIR. The Santa Ana Water Board specifically concurs with and incorporates the State Lands Commission's findings in the 2017 FSEIR that certain impacts to Ocean Water Quality and Marine Biological Resources (namely, impacts to special status species population and movement of marine mammal species as a result of underwater noise during construction related to the installation of wedgewire screens and the diffuser) and to Air Quality (namely, air emissions for construction related to the wedgewire screens and the diffuser and cumulative air emissions) are significant and unavoidable impacts. Finally, the Santa Ana Water Board concurs with and incorporates the City's and the State Land Commission's Statements of Findings and Statements of Overriding Considerations.

As a responsible agency, the Santa Ana Water Board is responsible for mitigating or avoiding the direct and indirect environmental effects of those parts of a project that it decides to approve. The Santa Ana Water Board has incorporated all feasible mitigation measures identified in the 2010 FSEIR and 2017 FSEIR within its scope of authority for the Water Code section 13142.5(b) determination. The Discharger is required to make changes or alterations to the Facility that avoid or substantially lessen the significant environmental effects that are within the Santa Ana Water Board's jurisdiction. The Order, inclusive of the Water Code section 13142.5(b) determination, requires the Discharger to modify the Facility's intake and discharge structures to minimize intake and mortality of all forms of marine life. Pursuant to this Order, and as discussed in the 2017 FSEIR, the Discharger must install wedgewire screens with a 1.0 mm or smaller slot size screen at the onset of the intake pipe which will reduce entrainment of marine life by one percent.

Additionally, to minimize impingement of marine life, the through-screen velocity at the Facility's surface water intake may not exceed 0.15 meters per second. With regard to the discharge infrastructure, the Order requires the Discharger to install a revised multiport diffuser that will result in less shearing-related mortality of marine life as compared to the diffuser design analyzed in the 2017 FSEIR. The Order also requires the Discharger to comply with the receiving water limitation for salinity (2.0 parts per thousand above natural background) in the Ocean Plan and establishes a smaller brine mixing zone, resulting in a smaller area of impact.

Finally, the Discharger is required to mitigate for the intake and mortality associated with the construction and operation of the Facility in accordance with an approved Final Marine Life Mitigation Plan (MLMP) that meets the requirements of Attachment K and the Ocean Plan. The implementation of mitigation measures will reduce effects on the environment that are within the Santa Ana Water Board's jurisdictional responsibility to less than significant. The Order requires the Discharger to comply with a monitoring and reporting program that will ensure that the mitigation measures are implemented and that the requirements of this Order are met.

The Discharger's proposed mitigation includes conceptual plans for four restoration projects within the Bolsa Chica Ecological Reserve and a conceptual plan for the creation of an artificial reef along the Palos Verdes Peninsula. The conceptual Bolsa Chica projects are the restoration of the Fieldstone Property to subtidal habitat, restoration of an area of oil pads, roads, and berms to subtidal habitat, restoration of marsh habitat on the intertidal shelf in the Full Tidal Basin, and enhancement of water circulation within the Muted Tidal Basins. The Santa Ana Water Board has conditionally approved these conceptual mitigation projects as the best available mitigation feasible; however, final approval of the mitigation projects is subject to the Discharger's completion of the tasks set forth in the MLMP Schedule (Attachment K). The conceptual mitigation projects will also need to undergo any environmental review required under CEQA prior to the Santa Ana Water Board's final approval and may be subject to changes based on environmental review. There is not sufficient information regarding these conceptual mitigation projects to complete a meaningful analysis of the potential environmental impacts at this time. Therefore, it would be premature for the Santa Ana Water Board to commit at this time to approving these proposed mitigation projects. If the CEQA review for the mitigation projects indicate that there are significant environmental effects associated with one or more of the Discharger's proposed mitigation projects, the Santa Ana Water Board may require the Discharger to propose alternative mitigation projects. In that case, the Santa Ana Water Board's Water Code section 13142.5(b) determination for those proposed mitigation projects will no longer be valid, and the Discharger must submit a new request for a Water Code section 13142.5(b) determination, limited to the alternative mitigation projects, and the Santa Ana Water Board must make a new Water Code section 13142.5(b) determination for the alternative mitigation projects.

The Discharger's proposed mitigation also includes the dredging of the Bolsa Chica ocean inlet to preserve tidal flow and connectivity between the wetlands and the Pacific Ocean, and to support the proposed Bolsa Chica conceptual restoration projects. For this component of the mitigation project, the Discharger will assume responsibility for the maintenance dredging currently carried out by the State Lands Commission. The State Lands Commission has performed the maintenance dredging intermittently since 2006 and has all necessary permits to perform the dredging, including a Clean Water Act Section 401 Water Quality Certification issued by the Santa Ana Water Board on February 28, 2018. The Discharger will perform the maintenance dredging as authorized under the State Lands Commission's current permits and must work with the State Lands Commission to obtain coverage under the existing permits. The maintenance dredging has undergone environmental review under CEQA as part of the permitting process and is not subject to further CEQA review.

C. State and Federal Laws, Regulations, Policies, and Plans

1. **Water Quality Control Plan.** The Santa Ana Water Board adopted a Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) on January 24, 1995 that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for the waters in the region. The Basin Plan specifies the beneficial uses for the nearshore and offshore zones of the Pacific Ocean that are within the jurisdiction of the Santa Ana Water Board.

   Requirements in this Order implement the Basin Plan. Beneficial uses applicable to the Pacific Ocean are as follows:

Table F-4. Basin Plan Beneficial Uses

Discharge Point	Receiving Water Name	Beneficial Use(s)
001[1]	Pacific Ocean Nearshore[2] Zone from the San Gabriel River to Poppy Street in Corona del Mar	Present or Potential Beneficial Use: Industrial service supply (IND); Navigation (NAV); Water contact recreation (REC-1); Non-contact water recreation (REC-2); Commercial and sport fishing (COMM); Wildlife habitat (WILD); Rare, threatened or endangered species (RARE); Spawning, reproduction, and development (SPWN); Marine habitat (MAR); Shellfish harvesting (SHELL). [Excepted from Municipal and Domestic supply][3]

1. This discharge is to AES-HBGS discharge pipeline to the Pacific Ocean.
2. The nearshore zone is defined by the Ocean Plan, chapter II, B.1.a., as "within a zone bounded by the shoreline and a distance of 1,000 feet from the shoreline or the 30-foot depth contour, whichever is further from the shoreline".
3. State Water Resources Control Board (State Water Board) Resolution No. 88-63 (Sources of Drinking Water Policy) requires that, with certain exceptions, the Santa Ana Water Board assign the municipal and domestic water supply use to water bodies. Based on the exception criteria specified in Resolution No. 88-63, the Santa Ana Water Board excepted the nearshore and offshore zones of the ocean from the municipal and domestic supply beneficial use.

2. **Thermal Plan.** The State Water Board adopted the *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays*

and Estuaries of California (Thermal Plan) on May 18, 1972 and amended this plan on September 18, 1975. This plan contains temperature objectives for coastal waters.

3. **California Ocean Plan.** The State Water Board adopted the *Water Quality Control Plan for Ocean Waters of California* (Ocean Plan) in 1972 and amended it in 1978, 1983, 1988, 1990, 1997, 2000, 2005, 2009, 2012, 2015, and 2018. The State Water Board adopted the latest amendment on August 7, 2018, and it became effective on March 22, 2019. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean. The Ocean Plan identifies beneficial uses of ocean waters of the state to be protected as summarized below:

Table F-5. Ocean Plan Beneficial Uses

Discharge Point	Receiving Water	Beneficial Uses
001	Pacific Ocean	Industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish spawning and shellfish harvesting

In order to protect the beneficial uses, the Ocean Plan establishes water quality objectives and a program of implementation. Requirements of the Order implement the Ocean Plan.

4. **Alaska Rule.** On March 30, 2000, U.S. EPA revised its regulation that specifies when new and revised state and tribal water quality standards (WQS) become effective for CWA purposes (40 CFR 131.21,65 FR 24641, (April 27, 2000).) Under the revised regulation (also known as the Alaska Rule), new and revised standards submitted to U.S. EPA after May 30, 2000, must be approved by U.S. EPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to U.S. EPA by May 30, 2000, may be used for CWA purposes, whether or not approved by U.S. EPA.

5. **Antidegradation Policy.** Pursuant to 40 CFR 131.12, requires that the state water quality standards must include an antidegradation policy consistent with the federal antidegradation policy. The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16 ("Statement of Policy with Respect to Maintaining High Quality of Waters in California"). Resolution 68-16 is deemed to incorporate the federal antidegradation policy where the federal policy applies under federal law. Resolution 68-16 requires that existing high quality waters be maintained unless degradation is justified based on specific findings. The Santa Ana Water Board's Basin Plan implements, and incorporates by reference, both the state and federal antidegradation policies. The permitted discharge must be consistent with the federal antidegradation provision in 40 CFR 131.12 and State Water Board Resolution 68-16.

6. **Anti-Backsliding Requirements.** Sections 402(o) and 303(d)(4) of the CWA and 40 CFR 122.44(l) restrict backsliding in NPDES permits. These anti-backsliding

provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed.

7. **Endangered Species Act Requirements.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code, sections 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the state, including protecting rare and endangered species. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

D. Impaired Water Bodies on the CWA Section 303(d) List

Under CWA section 303(d), states are required to review, make changes as necessary, and submit to U.S. EPA a list identifying waterbodies not meeting water quality standards and the water quality parameter (i.e., pollutant) not being met (303(d) List). On April 6, 2018, U.S. EPA approved California's 2014 and 2016 303(d) List prepared by the State Water Board. The Huntington Beach State Park is included in the 303(d) list for polychlorinated biphenyls (PCBs). The nearshore and offshore zones of Huntington Beach State Park are the immediately affected receiving waters of discharges from the Facility. A total maximum daily load (TMDL) for PCBs is required but has not been established yet. As such, effluent limitations for PCBs have been established for the Facility until applicable waste load allocations are assigned in a TMDL. A TMDL to address the impairment is not currently scheduled for development.

E. Other Plans, Policies, and Regulations

1. CWA Section 316(b) Applicability

Section 316(b) of the CWA requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available (BTA) for minimizing adverse environmental impact. The Facility is not subject to the requirements of section 316(b). While the HBGS is subject to the requirements of CWA section 316(b), the Facility will not use intake water for the purpose of cooling and therefore does not meet the criteria for applicability in 40 CFR 125, subparts I and J.

2. Water Code Section 13142.5(b) Applicability and Compliance

During the renewal of this Order, the Santa Ana Water Board evaluated the proposed Facility’s operations for consistency with Water Code section 13142.5(b). Water Code section 13142.5(b) requires new industrial facilities using seawater for processing to use the best available site, design, technology, and mitigation measures feasible to minimize the intake and mortality of all forms of marine life. The Santa Ana Water Board conditionally finds that the Discharger’s proposed site, design, technology, and mitigation measures are the best available feasible to minimize intake and mortality of all forms of marine life based on the information available (See Attachment G.) The Santa Ana Water Board’s determination regarding mitigation is conditioned on the Discharger's satisfaction of the requirements of the MLMP Schedule in Attachment K. The Discharger's proposed mitigation is based on currently available data and information, and further studies and data collection are required to finalize the Discharger's mitigation project. The MLMP Schedule requires the Discharger to submit supplemental information and plans and establishes deadlines for the Discharger to submit the information. Provided that the Discharger satisfies the requirements of the MLMP Schedule, the condition will be satisfied. If the Discharger does not satisfy the requirements of the MLMP Schedule, the Discharger must submit a new request for a Water Code section 13142.5(b) determination for mitigation.

3. Human Right to Water Policy

It is the "established policy of the state that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes." (Water Code, § 106.3, subd. (a).) All relevant state agencies shall consider this state policy when revising, adopting, or establishing policies, regulations, and grant criteria when they are pertinent to these uses. (*Id*., § 106.3, subd. (b).) This state policy does not directly apply to the Order as it is a permitting action. The Santa Ana Water Board, however, has adopted the human right to water as a core value and resolved that it will continue to consider the human right to water in all activities that could affect existing or potential sources of drinking water, including permitting actions. (Santa Ana Water Board Resolution R8-2019-0078.) In adopting the Order, the Santa Ana Water Board has considered the human right to water policy. The Order is consistent with and promotes the human right to water policy in that it establishes requirements for the intake of seawater and discharge of brine for a potential source of drinking water that could improve the reliability of water supply in Orange County. Though Orange County Water District (OCWD) projects an initial increase in residential water costs to improve water reliability, the desalinated water could result in cost savings in the future.

Safe and Clean Water. Municipal and Domestic Supply (MUN) is not among the beneficial uses of the Pacific Ocean, so the discharge from the Facility will not impact a drinking water supply. MUN is, however, a beneficial use of the Orange County groundwater basin. If OCWD decides to inject the desalinated water from the Facility into the Orange County groundwater basin, OCWD will need to obtain and comply with waste discharge requirements from the Santa Ana Water Board that protect the MUN use and the other beneficial uses of the groundwater. If the desalinated water is directly distributed to customers, the appropriate water agency will need to have a permit from the State Water Board's Division of Drinking Water and comply with drinking water standards. Additionally, the Facility's reverse osmosis treatment system will need to be commissioned by the Division of Drinking Water and meet safe drinking water standards. These elements are designed to ensure that water delivered to customers will not pose a threat to human health and will be of acceptable color, odor, and taste.

Affordable Water. Increasing the reliability of water supply with the addition of desalinated water will result in some increase in the cost of water: OCWD estimates that adding the desalinated water to their water supply portfolio will result in a rate increase of $3–6 per month for a typical residential water bill.

Although the desalinated water from the Facility will initially be more expensive than other water supply alternatives, OCWD projects that at some point in the future the cost of desalinated water will be cheaper than imported water, thus affording a cost savings for customers in the future. As indicated in the Department of Water Resources Disadvantaged Communities Mapping Tool, there are disadvantaged communities in Orange County. The public process for the adoption of the Order provided opportunities for stakeholders, including disadvantaged communities, to provide meaningful input on the requirements in the Order that affect their communities. Stakeholders will also have opportunities to participate in any hearings on proposed rate increases at their local water supply agencies.

The Santa Ana Water Board understands that for the water agencies to meet their objective to reduce reliance on imported water from either Northern California or the Colorado River and replace it with a drought-resistant, local source of water, there will be added costs to ratepayers, at least until such time that OCWD's projected cost savings are realized. The projected rate increase for residential water bills could affect the affordability of water for some residential customers. However, the Santa Ana Water Board does not set drinking water rates and it is not within the purview of the Board to determine whether the value of increasing the reliability of water supply by adding a drought-resistant, local source justifies an interim increase in water costs; that is a decision for the water supply agencies and they will need to answer to their ratepayers. OCWD's stated mission is to provide a reliable, high quality water supply in a cost-effective and environmentally responsible manner, and OCWD has indicated that it will need to determine whether the reliability and security benefits of the desalinated water outweigh the additional costs before entering into a water purchase agreement. (OCWD letter to Santa Ana Water Board, dated June 26, 2020.) In making its determination, the Santa Ana Water Board encourages OCWD to specifically consider the impacts the additional costs will have on disadvantaged communities.

The requirements of this Order could affect the ultimate price of the desalinated water in a water purchase agreement. However, the costs of compliance with this Order will account for a very small fraction of the total cost of the desalinated water. Moreover, the Order's requirements for the discharge of brine and intake of seawater are necessary to comply with applicable federal and state requirements. The requirements protect water quality and the marine environment and justify the costs of desalinated water that are attributable to compliance with the Order.

Accessible Water. As a local, drought-proof water supply, the desalinated water will increase the reliability of Orange County's water supply helping to ensure continued access to an adequate water supply for domestic use. OCWD has indicated that the desalinated water from the Facility will diversify OCWD's water portfolio and improve the reliability and security of the region's water supply. OCWD's water supply portfolio could be directly impacted and reduced due to effects of climate change, such as prolonged drought. The desalinated water from the Facility will be climate resilient and will help protect against shortages due to reduced supplies from other water sources. (OCWD letter to Santa Ana Water Board, dated July 16, 2020.)

IV. RATIONALE FOR EFFLUENT LIMITATIONS, DISCHARGE AND INTAKE SPECIFICATIONS

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of discharged pollutants is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in the Code of Federal Regulations: 40 CFR 122.44(a) requires that permits include applicable technology-based limitations and standards and 40 CFR 122.44(d) requires that permits include water quality-based effluent limitations (WQBELs) to attain and maintain applicable numeric and narrative water quality objectives to protect the beneficial uses of the receiving water.

A. Discharge Prohibitions

The discharge prohibitions in the Order are based on the CWA, Basin Plan, Ocean Plan, State Water Board's plans and policies, U.S. EPA guidance and regulations, and the previous prohibitions contained in Order No. R8-2012-0007. The discharge prohibitions are consistent with the discharge prohibitions set for other discharges regulated by WDRs adopted by the Santa Ana Water Board.

1. Prohibitions III.A, III.B, and III.C are based on 40 CFR 122.21(a), duty to apply, and Water Code section 13260, which requires filing a ROWD before discharges can occur. Discharges not described in the Discharger's ROWD, and subsequently also not regulated in this Order, are prohibited.
2. Prohibitions III.D, III.E, and III.F implement discharge prohibitions that are applicable under the Ocean Plan.
3. Prohibition III.I is consistent with chapter II.M.2.e of the Ocean Plan, which requires the Discharger to fully mitigate for intake and mortality of marine life for the operational lifetime of the Facility. This prohibition ensures that the Discharger will begin implementation of mitigation concurrent with the operation of the Facility, and thus avoids unmitigated operational impacts. Under this prohibition, the Discharger may not discharge unless and until (1) the Discharger has submitted the supplemental plans for the Final MLMP in accordance with the MLMP Schedule (Attachment K); (2) the Santa Ana Water Board has approved the Discharger's supplemental plans; (3) the Discharger has obtained all permits and other governmental approvals necessary to implement all components of the approved mitigation project (including the components included in supplemental plans required under the MLMP Schedule (Attachment K)); and (4) the Discharger has begun dredging of the Bolsa Chica inlet in accordance with the schedule approved by the Board (Attachment K, Table K-1, Task 1.A.viii).

B. Technology-Based Effluent Limitations

1. Scope and Authority

Section 301(b) of the CWA and 40 CFR 122.44 require that permits include conditions meeting applicable technology-based requirements, at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. The discharge authorized by the Order must meet minimum federal technology-based requirements based on Table 4 of the California Ocean Plan and/or best professional judgment (BPJ) in accordance with 40 CFR 125.3.

The CWA requires that technology-based effluent limitations be established based on several levels of controls:

a. Best practicable treatment control technology (BPT) represents the average of the best existing performance by well-operated facilities within an industrial category or subcategory. BPT standards apply to toxic, conventional, and non-conventional pollutants.

b. Best available technology economically achievable (BAT) represents the best existing performance of treatment technologies that are economically achievable within an industrial point source category. BAT standards apply to toxic and non-conventional pollutants.

c. Best conventional pollutant control technology (BCT) represents the control from existing industrial point sources of conventional pollutants including biochemical oxygen demand (BOD), total suspended solids (TSS), fecal coliform, pH, and oil and grease. The BCT standard is established after considering a two-part reasonableness test. The first test compares the relationship between the costs of attaining a reduction in effluent discharge and the resulting benefits. The second test examines the cost and level of reduction of pollutants from the discharge from publicly owned treatment works (POTWs) to the cost and level of reduction of such pollutants from a class or category of industrial sources. Effluent limitations must be reasonable under both tests.

d. New source performance standards (NSPS) represent the best available demonstrated control technology standards. The intent of NSPS guidelines is to set limitations that represent state-of-the-art treatment technology for new sources.

The CWA requires U.S. EPA to develop effluent limitations, guidelines, and standards (ELGs) representing application of BPT, BAT, BCT, and NSPS. Section 402(a)(1) of the CWA and 40 CFR 125.3 authorize the use of BPJ to derive technology-based effluent limitations on a case-by-case basis where ELGs are not available for certain industrial categories and/or pollutants of concern. Where BPJ is used, the Santa Ana Water Board must consider specific factors outlined in 40 CFR 125.3.

2. Applicable Technology-Based Effluent Limitations

Table 4 of the Ocean Plan establishes technology-based effluent limitations for POTWs and industrial discharges for which effluent limitation guidelines have not been established (including the discharge of concentrated seawater from the desalination facility). Order No. R8-2012-0007 established numeric effluent limitations at Discharge Point 001 based on Table 4 of the Ocean Plan.

Table 4 of the Ocean Plan requires dischargers to, as a monthly average, remove 75 percent of suspended solids from the influent stream before discharging wastewater to the Pacific Ocean, except that the effluent limitation to be met shall not be less than 60 mg/L. Because the seawater desalination facility is not a POTW, an effluent limitation of 60 mg/L is more appropriate and has been established for the desalination facility discharge. The technology-based effluent limitations from the Ocean Plan are summarized below in Table F-6.

Table F-6. Summary of Technology-Based Effluent Limitations

Parameter	Units[1]	Effluent Limitations			
		Monthly Average	Weekly Average	Instantaneous Minimum	Instantaneous Maximum
Oil & Grease	mg/L	25	40	--	75
	lbs/day	13,000	20,900	--	--
Total Suspended Solids (TSS)	mg/L	60[2]	--	--	--
	lbs/day	31,300	--	--	--
Settleable Solids	ml/l	1.0	1.5	--	3.0
Turbidity	NTU	75	100	--	225
pH	pH units	--	--	6.0	9.0

1. MER (lbs/day) = 8.34 x Q x C, where Q is flow rate of 62.5 MGD and C is the concentration in mg/L.
2. Table 4 of the Ocean Plan requires dischargers to, as a monthly average, remove 75% of suspended solids from the influent stream before discharging wastewater to the Pacific Ocean, except that the effluent limitation to be met shall not be less than 60 mg/L. Because this Facility is not a POTW, an effluent limitation of 60 mg/L is appropriate and established for the Facility's discharge.

C. Water Quality-Based Effluent Limitations

1. Scope and Authority

CWA section 301(b) and 40 CFR 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards.

As required by 40 CFR 122.44(d)(1)(i), permits must include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant but there is no numeric criterion or objective for the pollutant, WQBELs must be established using: (1) U.S. EPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in section 122.44(d)(1)(vi).

The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the beneficial uses of the receiving water as specified in the Basin Plan and achieve applicable water quality objectives that are contained in the Basin Plan, Ocean Plan, and other state plans and policies.

2. **Applicable Beneficial Uses and Water Quality Criteria and Objectives**

The Basin Plan and Ocean Plan designate beneficial uses, establish water quality objectives, and contain implementation programs and policies to achieve those objectives for all waters.

Basin Plan. The beneficial uses specified in the Basin Plan applicable to the Pacific Ocean are summarized in section III.C.1 of this Fact Sheet. The Basin Plan incorporates by reference the requirements of the Ocean Plan whereby it states, "*The State Board's Water Quality Control Plan for Ocean Waters of California (Ocean Plan), and the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" (Thermal Plan), and any revisions thereto shall also apply to all ocean waters of the Region.*"

Ocean Plan. As noted in section III.C of this Fact Sheet, the State Water Board adopted an Ocean Plan that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the Ocean Plan. The beneficial uses applicable to the Pacific Ocean are summarized in section III.C.1 of this Fact Sheet. The Ocean Plan includes both narrative and numeric water quality objectives applicable to the receiving water.

Table 3 of the Ocean Plan (also known as Table B in previous editions of the Ocean Plan) includes the following water quality objectives for toxic pollutants and whole effluent toxicity:

a. 6-month median, daily maximum, and instantaneous maximum objectives for 21 chemicals and chemical characteristics, including total residual chlorine and chronic toxicity, for the protection of marine aquatic life.

b. 30-day average objectives for 20 non-carcinogenic chemicals for the protection of human health.

c. 30-day average objectives for 42 carcinogenic chemicals for the protection of human health.

d. Daily maximum objectives for acute and chronic toxicity.

Additionally, the Ocean Plan establishes receiving water objectives for salinity within the receiving water and effluent for desalination facilities.

3. Determining the Need for WQBELs

Order No. R8-2012-0007 contained effluent limitations based on implementing Ocean Plan Table 3 receiving water standards for non-conventional and toxic pollutants. The Facility is not operational, so no effluent data are presently available. The Discharger submitted pilot plant effluent data developed using HBGS effluent, estimated concentrations associated with reverse osmosis concentrate, and estimated concentrations for filter backwash water in the Facility's ROWD. The data were used to develop estimated concentrations with which to perform a reasonable potential analysis (RPA).

a. RPA Methodology

The need for effluent limitations based on water quality objectives in Table 3 of the Ocean Plan was evaluated in accordance with 40 CFR 122.44(d) and guidance for statistically determining the "reasonable potential" for a discharged pollutant to exceed an objective as outlined in Appendix VI of the Ocean Plan. The statistical approach combines knowledge of effluent variability (as estimated by a coefficient of variation) with the uncertainty due to a limited amount of effluent data to estimate a maximum effluent value at a high level of confidence. This estimated maximum effluent value is based on a lognormal distribution of daily effluent values. Projected receiving water values (based on the estimated maximum effluent value or the reported maximum effluent value and minimum probable initial dilution) can then be compared to the appropriate objective to determine the potential for an exceedance of that objective and the need for an effluent limitation.

According to the Ocean Plan, the RPA can yield three endpoints:

<u>Endpoint 1</u>: An effluent limitation is required, and monitoring is required;

<u>Endpoint 2</u>: An effluent limitation is not required, and the Santa Ana Water Board may require monitoring; or

<u>Endpoint 3</u>: The RPA is inconclusive, monitoring is required, and an existing effluent limitation may be retained, or a permit reopener clause may be included to allow inclusion of an effluent limitation if future monitoring warrants the inclusion.

b. Minimum Initial Dilution

The implementation provisions for Table 3 in chapter III.C of the Ocean Plan specify that the minimum initial dilution is the lowest average initial dilution within any single month of the year. Dilution estimates are to be based on observed waste flow characteristics, observed receiving water density structure, and the assumption that no currents of sufficient strength to influence the initial dilution process flow across the discharge structure. Before establishing a dilution credit for a discharge, it must first be determined if, and how much, receiving water is available to dilute the discharge.

Appendix NNNNN to the ROWD describes results of hydrodynamic modeling under worst-case discharge conditions. In evaluating 62.5 MGD discharge flow and oceanographic conditions, the modeling simulated a dilution condition wherein the negatively buoyant plume is discharged via a 14-port diffuser and will sink to the seabed and flow down gradient over a large distance, well into the far field of the receiving water environment, without resolving initial dilution conditions. However, sufficient dilution for the Discharger to comply with water quality objectives for salinity and other pollutants is estimated at a 15:1 dilution credit. RPA procedures and WQBEL calculation documented herein were performed based on a dilution credit of 15:1.

c. RPA for Pollutants in Table 3 of the Ocean Plan

Effluent data submitted to the Santa Ana Water Board in Form 2D of the ROWD was considered in the RPA. The dilution credits applicable to the ocean outfall (15:1) were considered in order to evaluate reasonable potential in accordance with the procedures contained in the Ocean Plan.

For all of the Table 3 parameters, except PCBs, evaluation using the State Water Board's *RPcalc 2.2* software tool yielded an Endpoint 3 result, meaning the RPA was inconclusive. The Ocean Plan indicates that monitoring for the pollutant is required and also indicates that any existing effluent limitation for a pollutant contained in Order No R8-2012-0007 shall be retained in the permit. Order No. R8-2012-0007 included WQBELs for ammonia, arsenic, cadmium, chlorinated phenolic compounds, chromium (VI), chronic toxicity, copper, cyanide, lead, mercury, non-chlorinated phenolic compounds, nickel, silver, total residual chlorine, and zinc. As the RPA for these constituents resulted in Endpoint 3, this Order includes effluent limitations for the parameters in Table F-7. Additionally, as previously discussed, the receiving water is impaired for PCBs. To ensure protection of applicable water quality, this permit establishes water quality-based effluent limits based on "other information" (Step 13 of the RPA procedures in the Ocean Plan) for PCBs until an applicable waste load allocation is developed in a total maximum daily load. The Order does not include effluent limitations for other pollutants displaying Endpoint 3; instead, the Order includes performance goals and monitoring requirements for those pollutants.

A summary of the RPA results is provided below:

Table F-7. RPA Results Summary

Pollutant	Units	n[1]	MEC[2,3]	Most Stringent Criteria	Background	RPA Endpoint[4]
Arsenic, Total Recoverable	µg/L	1	5.0	8	3	Endpoint 3
Cadmium, Total Recoverable	µg/L	1	<0.5	1	0	Endpoint 3

Pollutant	Units	n[1]	MEC[2,3]	Most Stringent Criteria	Background	RPA Endpoint[4]
Chromium (Hexavalent), Total Recoverable	µg/L	[5]	[5]	2	0	Endpoint 3
Copper, Total Recoverable	µg/L	1	3.0	3	2	Endpoint 3
Lead, Total Recoverable	µg/L	1	1.0	2	0	Endpoint 3
Mercury	µg/L	1	<0.2	0.04	0.0005	Endpoint 3
Nickel, Total Recoverable	µg/L	1	19	5	0	Endpoint 3
Selenium, Total Recoverable	µg/L	1	<0.4	15	0	Endpoint 3
Silver, Total Recoverable	µg/L	1	<0.5	0.7	0.16	Endpoint 3
Zinc, Total Recoverable	µg/L	1	12	20	8	Endpoint 3
Cyanide	µg/L	1	<50	1	0	Endpoint 3
Total Chlorine Residual	µg/L	[5]	[5]	2	0	Endpoint 3
Ammonia	µg/L	[5]	[5]	600	0	Endpoint 3
Acute Toxicity	TUa	[5]	[5]	0.3	0	Endpoint 3
Chronic Toxicity	TUc	[5]	[5]	1	0	Endpoint 3
Phenolic Compounds (non-chlorinated)[6]	µg/L	[5]	[5]	30	0	Endpoint 3
Chlorinated Phenolics[7]	µg/L	[5]	[5]	1	0	Endpoint 3
Endosulfan	µg/L	1	<0.03	0.009	0	Endpoint 3
Endrin	µg/L	1	<0.1	0.002	0	Endpoint 3
HCH[8]	µg/L	1	<0.8	0.004	0	Endpoint 3
Acrolein	µg/L	1	<0.5	220	0	Endpoint 3
Antimony	µg/L	1	<5	1200	0	Endpoint 3
Bis(2-chloroethoxy) methane	µg/L	1	<5	4.4	0	Endpoint 3
Bis(2-chloroisopropyl) ether	µg/L	1	<5	1200	0	Endpoint 3
Chlorobenzene	µg/L	1	<0.5	570	0	Endpoint 3
Chromium (III)	µg/L	[5]	[5]	190,000	0	Endpoint 3

Pollutant	Units	n[1]	MEC[2,3]	Most Stringent Criteria	Background	RPA Endpoint[4]
Di-n-butyl-phthalate	µg/L	1	<5	3,500	0	Endpoint 3
Dichlorobenzenes	µg/L	[5]	[5]	5,100	0	Endpoint 3
Diethyl phthalate	µg/L	1	<5	33,000	0	Endpoint 3
Dimethyl phthalate	µg/L	1	<5	820,000	0	Endpoint 3
4,6-dinitro-2-methylphenol	µg/L	1	<10	220	0	Endpoint 3
2,4-dinitrophenol	µg/L	1	<20	4.0	0	Endpoint 3
Ethylbenzene	µg/L	1	<0.5	4,100	0	Endpoint 3
Fluoranthene	µg/L	1	<5	15	0	Endpoint 3
Hexachlorocyclopentadiene	µg/L	1	<1	58	0	Endpoint 3
Nitrobenzene	µg/L	1	<5	4.9	0	Endpoint 3
Thallium	µg/L	1	<0.5	2	0	Endpoint 3
Toluene	µg/L	1	<0.5	85,000	0	Endpoint 3
Tributyltin	µg/L	1	<5	0.0014	0	Endpoint 3
1,1,1-trichloroethane	µg/L	1	<0.5	540,000	0	Endpoint 3
Acrylonitrile	µg/L	1	<0.5	0.10	0	Endpoint 3
Aldrin	µg/L	1	<0.075	0.000022	0	Endpoint 3
Benzene	µg/L	1	<0.5	5.9	0	Endpoint 3
Benzidine	µg/L	1	<5	0.000069	0	Endpoint 3
Beryllium	µg/L	1	<0.3	0.033	0	Endpoint 3
Bis(2-chloroethyl) ether	µg/L	1	<5	0.045	0	Endpoint 3
Bis(2-ethylhexyl) phthalate	µg/L	1	<5	3.5	0	Endpoint 3
Carbon tetrachloride	µg/L	1	<0.5	0.90	0	Endpoint 3
Chlordane	µg/L	1	<2	0.000023	0	Endpoint 3
Chlorodibromomethane	µg/L	1	<0.5	8.6	0	Endpoint 3
Chloroform	µg/L	1	<0.5	130	0	Endpoint 3
DDT[9]	µg/L	1	<3.05	0.00017	0	Endpoint 3
1,4-dichlorobenzene	µg/L	1	<5	18	0	Endpoint 3
3,3'-dichlorobenzidine	µg/L	1	<5	0.0081	0	Endpoint 3
1,2-dichloroethane	µg/L	1	<0.5	28	0	Endpoint 3

Pollutant	Units	n[1]	MEC[2,3]	Most Stringent Criteria	Background	RPA Endpoint[4]
1,1-dichloroethylene	µg/L	1	<0.5	0.9	0	Endpoint 3
Dichlorobromomethane	µg/L	1	<0.5	6.2	0	Endpoint 3
Dichloromethane	µg/L	1	<0.5	450	0	Endpoint 3
1,3-dichloropropene	µg/L	1	<0.5	8.9	0	Endpoint 3
Dieldrin	µg/L	1	<0.02	0.00004	0	Endpoint 3
2,4-dinitrotoluene	µg/L	1	<5	2.6	0	Endpoint 3
1,2-diphenylhydrazine	µg/L	1	<5	0.16	0	Endpoint 3
Halomethanes[10]	µg/L	[5]	[5]	130	0	Endpoint 3
Heptachlor	µg/L	1	<0.1	0.00005	0	Endpoint 3
Heptachlor epoxide	µg/L	1	<0.1	0.00002	0	Endpoint 3
Hexachlorobenzene	µg/L	1	<0.5	0.00021	0	Endpoint 3
Hexachlorobutadiene	µg/L	1	<5	14	0	Endpoint 3
Hexachloroethane	µg/L	1	<5	2.5	0	Endpoint 3
Isophorone	µg/L	1	<5	730	0	Endpoint 3
N-nitrosodimethylamine	µg/L	1	<5	7.3	0	Endpoint 3
N-nitrosodi-N-propylamine	µg/L	1	<5	0.38	0	Endpoint 3
N-nitrosodiphenylamine	µg/L	1	<5	2.5	0	Endpoint 3
PAHs[11]	µg/L	1	<5	0.0088	0	Endpoint 3
PCBs[12]	µg/L	1	<0.1	0.000019	0	Endpoint 1
TCDD equivalents[13]	µg/L	1	ND	3.9×10^{-9}	0	Endpoint 3
1,1,2,2-tetrachloroethane	µg/L	1	<0.5	2.3	0	Endpoint 3
Tetrachloroethylene	µg/L	1	<0.5	2.0	0	Endpoint 3
Toxaphene	µg/L	1	<1	0.00021	0	Endpoint 3
Trichloroethylene	µg/L	1	<0.5	27	0	Endpoint 3
1,1,2-trichloroethane	µg/L	1	<0.5	9.4	0	Endpoint 3
2,4,6-trichlorophenol	µg/L	1	<10	0.29	0	Endpoint 3
Vinyl chloride	µg/L	1	<0.5	36	0	Endpoint 3

1. Number of data points available for the RPA.
2. If there is a detected value, the highest reported value is summarized in the table. If there are no detected values, the lowest MDL is summarized in the table.

Pollutant	Units	n[1]	MEC[2,3]	Most Stringent Criteria	Background	RPA Endpoint[4]

3. Note that the reported Maximum Effluent Concentration (MEC) does not account for dilution. The RPA does account for dilution; therefore, it is possible for a parameter with an MEC in exceedance of the most stringent criteria not to present an Endpoint 1.
4. End Point 1 – RP determined, limit required, monitoring required.
End Point 2 – Discharger determined not to have RP, monitoring may be established.
End Point 3 – RPA was inconclusive, carry over previous limitations if applicable, and establish monitoring.
5. No monitoring data or estimated pollutant concentrations were available for this pollutant.
6. Non-chlorinated phenolic compounds represent the sum of 2-nitrophenol; phenol; 2,4-dimethylphenol; 2,4-dinitrophenol; 2-methyl-4,6-dinitrophenol; and 4-nitrophenol.
7. Chlorinated phenolic compounds represent the sum of 2-chlorophenol; 2,4-dichlorophenol; 2,4,6-trichlorophenol; 4-chloro-3-methylphenol; and pentachlorophenol.
8. HCH shall mean the sum of alpha, beta, gamma (lindane), and delta isomers of hexachlorocyclohexane.
9. DDT shall mean the sum of 4,4’-DDT, 2,4’-DDT, 4,4’-DDE, 2,4’-DDE, 4,4’-DDD, and 2,4’-DDD.
10. Halomethanes shall mean the sum of bromoform, bromomethane (methyl bromide), and chloromethane (methyl chloride).
11. PAHs shall mean the sum of acenaphthylene; anthracene; 1,2-benzanthracene; 3,4-benzofluoranthene; benzo(k)fluoranthene; 1,12-benzoperylene; benzo(a)pyrene; chrysene; dibenzo(a,h)anthracene; fluorene; indeno(1,2,3-cd)pyrene; phenanthrene; and pyrene.
12. PCBs shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Arolclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, and Aroclor-1260.
13. TCDD Equivalents shall mean the sum of the concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown in the table below. U.S. EPA method 1613 may be used to analyze dioxin and furan congeners.

Dioxin-TEQ (TCDD Equivalents) = $\Sigma (C_x \times TEF_x)$

Where:

C_x = concentration of dioxin or furan congener x

TEF_x = TEF for congener x

4. WQBEL Calculations

a. Concentration Calculation

Table 3 of the Ocean Plan includes water quality objectives for the protection of marine aquatic life, and these objectives are used to establish effluent limits for discharges from this Facility.

The Ocean Plan considers the "minimum probable initial dilution" in determining effluent limitations for toxic pollutants. Initial dilution is the process that results in the rapid and irreversible turbulent mixing of wastewater with ocean water around the point of discharge. For the purposes of the Ocean Plan, minimum initial dilution is the lowest average initial dilution within any single month of the year. Dilution estimates must be based on observed waste flow characteristics, observed receiving water density structure, and the assumption that no currents of sufficient strength to influence the initial dilution process flow across the discharge structure. This Order establishes an “initial dilution” credit, applicable to Table 3 Ocean Plan parameters of 15:1.

To establish effluent limits for discharges from this Facility, a minimum probable initial dilution of 15 to 1 is used.

The following equation from chapter III.C.4.a. of the Ocean Plan was used to calculate all concentration-based effluent limitations.

$$Ce = Co + Dm\,(Co - Cs)$$

Where:

Ce = the effluent concentration limit, µg/L

Co= the concentration (water quality objective) to be met at the completion of initial dilution, µg/L

Cs = background seawater concentration, µg/L

Dm = minimum probable initial dilution expressed as parts seawater per part wastewater.

Table 5 of the Ocean Plan establishes background concentrations for some pollutants to be used when determining reasonable potential (represented as “Cs”). In accordance with Table 3 implementing procedures, Cs equals zero for all pollutants not established in Table 3. The background concentrations provided in Table 3 are summarized below:

Table F-8. Pollutants Having Background Concentrations

Pollutant	Background Seawater Concentration
Arsenic	3 µg/L
Copper	2 µg/L
Mercury	0.0005 µg/L
Silver	0.16 µg/L
Zinc	8 µg/L

As an example, effluent limitations for copper are determined as follows:

Water quality objectives from the Ocean Plan for copper are:

Table F-9. Example Parameter Water Quality Objectives

Parameter	Units	6-Month Median	Daily Maximum	Instantaneous Maximum
Copper	µg/L	3	12	30

Using the equation, Ce = Co + Dm (Co – Cs), effluent limitations/performance goals are calculated as follows:

<u>Copper</u>

Ce = 3 + 15 (3 – 2) = 18 (6-Month Median)
Ce = 12 + 15 (12 – 2) = 162 (Daily Maximum)
Ce = 30 + 15 (30 – 2) = 450 (Instantaneous Maximum)

Based on the implementing procedures described above, effluent limitations have been calculated for Table 3 pollutants from the Ocean Plan that have reasonable potential or have inconclusive results and previously had effluent limitations.

40 CFR 122.45(f)(1) requires effluent limitations be expressed in terms of mass, with some exceptions, and 40 CFR 122.45(f)(2) allows pollutants that are limited in terms of mass to additionally be limited in terms of other units of measurement. This Order includes effluent limitations expressed in terms of mass and concentration. In addition, pursuant to the exceptions to mass limitations provided in 40 CFR 122.45(f)(1), some effluent limitations are not expressed in terms of mass, such as pH and temperature, and when the applicable standards are expressed in terms of concentration (e.g., California Toxics Rule (CTR) criteria and maximum contaminant levels (MCLs)) and mass, limitations are not necessary to protect the beneficial uses of the receiving water. Mass-based effluent limitations were computed based on the maximum daily flow rate (62.5 MGD).

Mass-based effluent limitations were calculated using the following equation:

MER (lbs/day) = permitted flow (MGD) x pollutant concentration (mg/L) x 8.34

b. Whole Effluent Toxicity

Whole effluent toxicity (WET) protects the receiving water quality from the aggregate toxic effect of a mixture of pollutants in the effluent. WET tests measure the degree of response of exposed aquatic test organisms to an effluent. The WET approach allows for protection of the narrative "no toxics in toxic amounts" criterion while implementing numeric criteria for toxicity. There are two types of WET tests: acute and chronic. An acute toxicity test is conducted over a short time period and measures mortality. A chronic toxicity test is conducted over a longer period of time and may measure mortality, reproduction, and growth. This permit establishes effluent limitations for chronic toxicity to account for uncertainty associated with the estimated effluent characterization and aggregate effects of the pollutants present in the effluent. A pollutant at a low concentration could show chronic effects but no acute effects. Thus, chronic toxicity represents a more stringent compliance threshold than acute toxicity. Monitoring for acute toxicity and performance goals have been established to further evaluate potential impacts to the receiving water.

The Ocean Plan establishes a daily maximum acute toxicity objective of 0.3 TUa and a chronic toxicity objective of 1.0 TUc. In 2010, U.S. EPA endorsed the peer-reviewed Test of Significant Toxicity (TST) hypothesis testing approach in the National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document (EPA 833-R-10-003, 2010) as an improved hypothesis-testing tool to evaluate WET data. U.S. EPA concluded that the TST is a superior approach for addressing statistical uncertainty when used in combination with U.S. EPA's toxicity testing methods and is implemented in federal permits issued by U.S. EPA Region 9. This permit implements U.S. EPA's TST approach for evaluating compliance with WET.

This Order contains requirements to monitor and evaluate toxicity using U.S. EPA's TST approach at an in-stream waste concentration of 6.25 percent for acute and chronic toxicity, as described in section V of Attachment E. The IWC for toxicity is based on a minimum month initial dilution of 15:1.

c. Summary of WQBELs Discharge Point 001

The discharge of wastes shall maintain compliance with the following effluent limitations at Discharge Point 001, with compliance measured at Monitoring Location M-001 as described in the Monitoring & Reporting Program (Attachment E).

Table F-10. Summary of WQBELs on Table 3 of the Ocean Plan

Parameter	Units	Average Monthly	6-Month Median	Daily Maximum	Instantaneous Maximum
Arsenic, Total Recoverable	µg/L	--	83	470	1,200
	lbs/day	--	43	240	--
Cadmium, Total Recoverable	µg/L	--	16	64	160
	lbs/day	--	8.3	33	--
Chromium (Hexavalent), Total	µg/L	--	32	130	320
	lbs/day	--	17	67	--
Copper, Total Recoverable	µg/L	--	18	160	450
	lbs/day	--	9.4	84	--
Lead, Total Recoverable	µg/L	--	32	130	320
	lbs/day	--	17	67	--
Mercury, Total Recoverable	µg/L	--	0.63	2.6	6.4
	lbs/day	--	0.33	1.3	--
Nickel, Total Recoverable	µg/L	--	80	320	800
	lbs/day	--	42	170	--
Silver, Total Recoverable	µg/L	--	8.8	42	110
	lbs/day	--	4.6	22	--
Zinc, Total Recoverable	µg/L	--	200	1,200	3,100
	lbs/day	--	100	600	--
Cyanide, Total	µg/L	--	16	64	160
	lbs/day	--	8.3	33	--
Total Residual Chlorine	µg/L	--	32	130	960
	lbs/day	--	17	67	--
Chronic Toxicity	Pass/Fail	--	--	"Pass"[3]	--

Parameter	Units	Average Monthly	6-Month Median	Daily Maximum	Instantaneous Maximum
Ammonia (Expressed as Nitrogen)	µg/L	--	9,600	38,000	96,000
	lbs/day	--	5,000	20,000	--
PCBs	µg/L	0.0003	--	--	--
	lbs/day	0.00016	--	--	--
Phenolic Compounds (non-chlorinated)[1]	µg/L	--	480	1,900	4,800
	lbs/day	--	250	1,000	--
Chlorinated Phenolics[2]	µg/L	--	16	64	160
	lbs/day	--	8.3	33	--

1. Values rounded to two significant figures. To be conservative, 6-month median, daily maximum and instantaneous maximum mass emission values are computed using the maximum daily seawater desalination facility flow (filter backwash, concentrated seawater and rinse water) of 62.5 MGD.
2. Non-chlorinated phenolic compounds represent the sum of 2,4-dimethylphenol, 4,6-dinitro-2-methylphenol,2,4-dinitrophenol, 2-methylphenol, 4-methylphenol, 2-nitrophenol, 4-nitrophenol, and phenol
3. Chlorinated phenolic compounds represent the sum of 4-chloro-3-methylphenol, 2-chlorophenol, pentachlorophenol, 2,4,5-trichlorophenol, and 2,4,6-trichlorophenol.
4. Water quality objectives for whole effluent toxicity represent U.S. EPA's TST method, as described in section V.A. of Attachment E.
5. Compliance with this chronic toxicity limitation is demonstrated by rejecting the null hypothesis and resulting in a TST "Pass" or "P", as specified in section V.A. of Attachment E, and section IV.A.1.c of this Order.

5. **Performance Goals**

Parameters that do not have reasonable potential to cause or contribute to an exceedance of water quality objectives, or for which reasonable potential to cause or contribute to an exceedance of water quality objectives cannot be determined, are assigned performance goals. Performance goal parameters shall be monitored at Monitoring Location M-001. The performance goals in Table 6 below are not water quality-based effluent limitations (WQBELs) and are not enforceable as such.

Table F-11. Summary of Performance Standards Based on Table 3 of the Ocean Plan

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Instantaneous Maximum	Daily Maximum	6-Month Median
Selenium	µg/L	--	--	2.4E+03	9.6E+02	2.4E+02
	lbs/day	--	--	1.3E+03	5.0E+02	1.3E+02
Endosulfan	µg/L	--	--	4.3E-01	2.9E-01	1.4E-01
	lbs/day	--	--	2.3E-01	1.5E-01	7.5E-02
Endrin	µg/L	--	--	9.6E-02	6.4E-02	3.2E-02
	lbs/day	--	--	5.0E-02	3.3E-02	1.7E-02
HCH	µg/L	--	--	1.9E-01	1.3E-01	6.4E-02
	lbs/day	--	--	1.0E-01	6.7E-02	3.3E-02

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Instantaneous Maximum	Daily Maximum	6-Month Median
Acrolein	µg/L	3.5E+03	--	--	--	--
	lbs/day	1.8E+03	--	--	--	--
Antimony	µg/L	1.9E+04	--	--	--	--
	lbs/day	1.0E+04	--	--	--	--
Bis(2-chloroethoxy) Methane	µg/L	7.0E+01	--	--	--	--
	lbs/day	3.7E+01	--	--	--	--
Bis(2-chloroisopropyl) ether	µg/L	1.9E+04	--	--	--	--
	lbs/day	1.0E+04	--	--	--	--
Chlorobenzene	µg/L	9.1E+03	--	--	--	--
	lbs/day	4.8E+03	--	--	--	--
Chromium (III)	µg/L	3.0E+06	--	--	--	--
	lbs/day	1.6E+06	--	--	--	--
Di-n-butyl Phthalate	µg/L	5.6E+04	--	--	--	--
	lbs/day	2.9E+04	--	--	--	--
Dichlorobenzenes	µg/L	8.2E+04	--	--	--	--
	lbs/day	4.3E+04	--	--	--	--
Diethyl Phthalate	µg/L	5.3E+05	--	--	--	--
	lbs/day	2.8E+05	--	--	--	--
Dimethyl Phthalate	µg/L	1.3E+07	--	--	--	--
	lbs/day	6.8E+06	--	--	--	--
4,6-dinitro-2-methylphenol	µg/L	3.5E+03	--	--	--	--
	lbs/day	1.8E+03	--	--	--	--
2,4-dinitrophenol	µg/L	6.4E+01	--	--	--	--
	lbs/day	3.3E+01	--	--	--	--
Ethylbenzene	µg/L	6.6E+04	--	--	--	--
	lbs/day	3.4E+04	--	--	--	--
Fluoranthene	µg/L	2.4E+02	--	--	--	--
	lbs/day	1.3E+02	--	--	--	--
Hexachlorocyclopentadiene	µg/L	9.3E+02	--	--	--	--
	lbs/day	4.8E+02	--	--	--	--
Nitrobenzene	µg/L	7.8E+01	--	--	--	--
	lbs/day	4.1E+01	--	--	--	--
Thallium	µg/L	3.2E+01	--	--	--	--
	lbs/day	1.7E+01	--	--	--	--
Toluene	µg/L	1.4E+06	--	--	--	--
	lbs/day	7.1E+05	--	--	--	--
Tributyltin	µg/L	2.2E-02	--	--	--	--
	lbs/day	1.2E-02	--	--	--	--
1,1,1-trichloroethane	µg/L	8.6E+06	--	--	--	--
	lbs/day	4.5E+06	--	--	--	--
Acrylonitrile	µg/L	1.6E+00	--	--	--	--
	lbs/day	8.3E-01	--	--	--	--
Aldrin	µg/L	3.5E-04	--	--	--	--

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Instantaneous Maximum	Daily Maximum	6-Month Median
	lbs/day	1.8E-04	--	--	--	--
Benzene	µg/L	9.4E+01	--	--	--	--
	lbs/day	4.9E+01	--	--	--	--
Benzidine	µg/L	1.1E-03	--	--	--	--
	lbs/day	5.8E-04	--	--	--	--
Beryllium	µg/L	5.3E-01	--	--	--	--
	lbs/day	2.8E-01	--	--	--	--
Bis(2-chloroethyl) Ether	µg/L	7.2E-01	--	--	--	--
	lbs/day	3.8E-01	--	--	--	--
Bis(2-ethlyhexyl) Phthalate	µg/L	5.6E+01	--	--	--	--
	lbs/day	2.9E+01	--	--	--	--
Carbon Tetrachloride	µg/L	1.4E+01	--	--	--	--
	lbs/day	7.5E+00	--	--	--	--
Chlordane	µg/L	3.7E-04	--	--	--	--
	lbs/day	1.9E-04	--	--	--	--
Chlorodibromomethane	µg/L	1.4E+02	--	--	--	--
	lbs/day	7.2E+01	--	--	--	--
Chloroform	µg/L	2.1E+03	--	--	--	--
	lbs/day	1.1E+03	--	--	--	--
DDT	µg/L	2.7E-03	--	--	--	--
	lbs/day	1.4E-03	--	--	--	--
1,4-dichlorobenzene	µg/L	2.9E+02	--	--	--	--
	lbs/day	1.5E+02	--	--	--	--
3,3'-dichlorobenzidine	µg/L	1.3E-01	--	--	--	--
	lbs/day	6.8E-02	--	--	--	--
1,2-dichloroethane	µg/L	4.5E+02	--	--	--	--
	lbs/day	2.3E+02	--	--	--	--
1,1-dichloroethylene	µg/L	1.4E+01	--	--	--	--
	lbs/day	7.5E+00	--	--	--	--
Dichlorobromomethane	µg/L	9.9E+01	--	--	--	--
	lbs/day	5.2E+01	--	--	--	--
Dichloromethane	µg/L	7.2E+03	--	--	--	--
	lbs/day	3.8E+03	--	--	--	--
1,3-dichloropropene	µg/L	1.4E+02	--	--	--	--
	lbs/day	7.4E+01	--	--	--	--
Dieldrin	µg/L	6.4E-04	--	--	--	--
	lbs/day	3.3E-04	--	--	--	--
2,4-dinitrotoluene	µg/L	4.2E+01	--	--	--	--
	lbs/day	2.2E+01	--	--	--	--
1,2-diphenylhydrazine	µg/L	2.6E+00	--	--	--	--
	lbs/day	1.3E+00	--	--	--	--
Halomethanes	µg/L	2.1E+03	--	--	--	--
	lbs/day	1.1E+03	--	--	--	--

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Instantaneous Maximum	Daily Maximum	6-Month Median
Heptachlor	µg/L	8.0E-04	--	--	--	--
	lbs/day	4.2E-04	--	--	--	--
Heptachlor Epoxide	µg/L	3.2E-04	--	--	--	--
	lbs/day	1.7E-04	--	--	--	--
Hexachlorobenzene	µg/L	3.4E-03	--	--	--	--
	lbs/day	1.8E-03	--	--	--	--
Hexachlorobutadiene	µg/L	2.2E+02	--	--	--	--
	lbs/day	1.2E+02	--	--	--	--
Hexachloroethane	µg/L	4.0E+01	--	--	--	--
	lbs/day	2.1E+01	--	--	--	--
Isophorone	µg/L	1.2E+04	--	--	--	--
	lbs/day	6.1E+03	--	--	--	--
N-nitrosodimethylamine	µg/L	1.2E+02	--	--	--	--
	lbs/day	6.1E+01	--	--	--	--
N-nitrosodi-N-propylamine	µg/L	6.1E+00	--	--	--	--
	lbs/day	3.2E+00	--	--	--	--
N-nitrosodiphenylamine	µg/L	4.0E+01	--	--	--	--
	lbs/day	2.1E+01	--	--	--	--
PAHs	µg/L	1.4E-01	--	--	--	--
	lbs/day	7.3E-02	--	--	--	--
TCDD equivalents	µg/L	6.2E-08	--	--	--	--
	lbs/day	3.3E-08	--	--	--	--
1,1,2,2-tetrachloroethane	µg/L	3.7E+01	--	--	--	--
	lbs/day	1.9E+01	--	--	--	--
Tetrachloroethylene	µg/L	3.2E+01	--	--	--	--
	lbs/day	1.7E+01	--	--	--	--
Toxaphene	µg/L	3.4E-03	--	--	--	--
	lbs/day	1.8E-03	--	--	--	--
Trichloroethylene	µg/L	4.3E+02	--	--	--	--
	lbs/day	2.3E+02	--	--	--	--
1,1,2-trichloroethane	µg/L	1.5E+02	--	--	--	--
	lbs/day	7.8E+01	--	--	--	--
2,4,6-trichlorophenol	µg/L	4.6E+00	--	--	--	--
	lbs/day	2.4E+00	--	--	--	--
Vinyl Chloride	µg/L	5.8E+02	--	--	--	--
	lbs/day	3.0E+02	--	--	--	--

6. **Discharge Flow Limitation**

Based on the ROWD and subsequent submittals by the Discharger, specific effluent flow characteristics were considered in the development of the conditions of the Order. Operations beyond those considered in the development of this Order may result in impairments or water quality criteria exceedances. Flow limitations have been established that are consistent with the Santa Ana Water Board's understanding of Discharger operations addressed under the Order.

Except during initial start-up operations and temporary maintenance operations, the discharge of concentrated seawater, filter backwash water, and subsequent rinse wastewater from the Facility to the HBGS discharge pipeline or to Discharge Point 001 in excess of a 12-Month Average Flow of 56.69 MGD or a maximum daily peak flow of 62.5 MGD, is prohibited. Total Facility discharge flows to the HBGS discharge pipeline, including temporary discharges of filtered pretreated water or discharges of unused dechlorinated product water, in excess of a 12-Month Average Flow of 126.7 MGD are prohibited.

7. **Salinity**

Chapter III.M.3.b.(2) of the Ocean Plan requires the implementation of an effluent limitation necessary to meet the receiving water limitation of a daily maximum of 2.0 parts per thousand (ppt) above natural salinity at the edge of the BMZ, which is not to exceed 100 meters (328 feet) from each discharge point.

The Discharger submitted a mixing zone study as Appendix NNNNN to the ROWD. The study found that discharges from their proposed multiport diffuser, conservative flow, and receiving water conditions would be able to achieve rapid mixing of the discharge and would meet the salinity receiving water limitation within a distance of 100 meters (328 feet) of Discharge Point 001 as required within Section III.M.3.b.(2) of the Ocean Plan. On the basis of Appendix NNNNN to the ROWD and consistent with Section III.M.3.b of the Ocean Plan, this Order establishes a BMZ of 100 meters (328 feet).

In determining the effluent limit(s) necessary to meet the receiving salinity water limitation at the edge of the BMZ, the Ocean Plan establishes the following formula:

$$Ce = (2.0 \text{ ppt} + Cs) + Dm(2.0 \text{ ppt})$$

Where:

Ce = the effluent concentration limit in ppt
Co = the salinity concentration to be met at the BMZ
Cs = the natural background salinity (defined as a 20-year monthly mean)
Dm = minimum probably initial dilution expressed as parts seawater per part brine discharge

Natural background salinity in the receiving water, using the nearby Orange County Sanitation District outfall as a monitoring station and data from 1980 through 2004, is approximately 33.5 ppt. Using the background salinity and authorized BMZ dilution credit of 15, the following salinity effluent limitation would result:

$$Ce = (2.0 \text{ ppt} + 33.5 \text{ ppt}) + 15 \times (2.0 \text{ ppt}) = 65.5 \text{ ppt}.$$

This Order establishes a daily average salinity effluent limitation of 65.5 ppt, protective of and consistent with the receiving water limits for salinity in the Ocean Plan.

D. Final Effluent Limitation Considerations

1. Anti-Backsliding Requirements

Sections 402(o) and 303(d)(4) of the CWA and 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed.

Pursuant to the requirements of Water Code section 13142.5(b) and the Ocean Plan, the Discharger has substantially modified intake and outfall structures to minimize the intake and mortality of all forms of marine life. New effluent limits were calculated based on the modification to the outfall infrastructure and the change to a stand-alone operating mode. Given these changes, the direct comparison of the new effluent limits to the effluent limits in the previous permit is inappropriate and does not provide an accurate assessment of whether the new effluent limits are as stringent.

The previous order determined effluent limitations based on an initial dilution of 7.5:1, and a mixing zone distance of 1,000 feet. During the term of this Order, the Facility will install a new multiport diffuser capable of generating a higher level of dilution (15:1) and the discharge will be subject to a smaller mixing zone distance of 328 feet, which will result in a smaller area of impact overall. The Facility’s use of the multiport diffuser for the discharge of the brine waste results in effluent limitations based on enhanced mixing in a smaller mixing zone, resulting in the effluent limits that are as stringent as the previous permit. Although the effluent limits in this Order are numerically lower than the limits in the previous order, they are as stringent in practice.

Furthermore, even if the numeric limits were construed as less stringent, the change is justified by exceptions to anti-backsliding. The installation of the multiport diffuser is a material and substantial alteration to the facility that was proposed after the issuance of the previous permit and justifies the application of a numerically less effluent limitations. Additionally, CWA section 303(d)(4)(B) allows for effluent limitations that are less stringent if the receiving water is in attainment with water quality standards and antidegradation conditions are met: the receiving water is in attainment with water quality standards, and the discharge meets all applicable antidegradation policy conditions. The monitoring requirements in the MRP (Attachment E) are designed to obtain additional information for parameters with performance goals to determine if reasonable potential exists for these parameters in future permit renewals and/or amendments. Based on these considerations, this Order complies with all applicable anti-backsliding requirements.

2. **Antidegradation Policies**

Pursuant to 40 CFR 131.12, the state water quality standards must include an antidegradation policy that is consistent with the federal antidegradation policy. The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16. Resolution 68-16 incorporates the federal antidegradation policy, where the federal policy applies under federal law. Resolution 68-16 requires that existing water quality be maintained unless it is demonstrated that any degradation is consistent with the maximum benefit to the people of the State, will not unreasonably affect current or possible beneficial uses, and will not result in water quality less than prescribed in applicable policies.

A complete antidegradation analysis is required if the proposed activity results in a substantial increase in mass emissions of pollutants or if the activity results in significant impact to aquatic life. It is not necessary to do a complete antidegradation analysis if the reduction in water quality will be spatially localized or limited with respect to the waterbody. In such cases, a simple antidegradation analysis will suffice. A complete antidegradation analysis is not required—the impact of the Facility's discharge will be limited to the brine mixing zone and will not have a significant impact on water quality.

The Discharger conducted an Antidegradation Policy Analysis in 2006 that indicated that there would be a slight increase in salinity as the result of discharges from the Facility but that the change would be spatially localized and confined to the brine mixing zone. The design and technology used for the Facility's discharge infrastructure has been updated to comply with the Ocean Plan, and the discharge will still result in a slight increase in salinity that will be confined to brine mixing zone. This Order specifies an effluent limitation for salinity; based on this limit, the discharge will meet receiving water limitation outside of the mixing zone.

This Order allows for a small increase in the maximum daily flow (from 60.3 MGD in the 2012 Order to 62.5 MGD in this Order). This slight increase will accommodate changes to the design and operational specifications of the proposed desalination plant. During the term of the previous permit, the design was under development and discharges to the receiving water had not commenced; therefore, the permitted increase in flow rate does not provide for a lowering of water quality. Furthermore, the annual average flow of 56.69 MGD remains the same.

The final limitations in this Order hold the Discharger to performance levels that will not cause or contribute to an exceedance of the receiving water limitation or other applicable water quality objectives in the Ocean Plan. Compliance with these limitations and other requirement in the Order will protect current and future beneficial uses. Additionally, the monitoring requirements in the MRP, (Attachment E), are designed to measure compliance with the limitations and to obtain additional information for parameters with performance goals to determine if reasonable potential exists to include effluent limitations for these parameters in future permit renewals and/or amendments.

The cumulative impacts of the proposed changes to the Facility's operations, and the associated discharge flows are not anticipated to significantly impact receiving water quality, will be protective of water quality objectives and beneficial uses, will provide important economic and social development, and are consistent with the maximum benefit to the people of the State. It is anticipated that the Facility will provide a drought-proof, local water supply of 50 MGD, which will decrease regional reliance on imported water supplies. Compliance with the requirements of the Order will result in the use of best practicable treatment or control of the discharge necessary to assure that a pollution or nuisance will not occur and that the highest water quality consistent with the maximum benefit to the people of the state will be maintained. Based on these considerations, this Order is consistent with State and federal antidegradation requirements.

3. **Stringency of Requirements for Individual Pollutants**

This Order contains both TBELs and WQBELs for individual pollutants. The TBELs consist of restrictions on TSS, pH, oil and grease, settleable solids, and turbidity, which are discussed in section IV.B of this Fact Sheet. This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. These limitations are not more stringent than required by CWA. TBELs and WQBELs have been derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. The procedures for calculating the individual WQBELs are based on the Ocean Plan, which was approved by U.S. EPA on February 14, 2006 and has since been subsequently amended. All beneficial uses and water quality objectives contained in the Basin Plan were approved under state law and submitted to and approved by U.S. EPA prior to May 30, 2000. Any water quality objectives and beneficial uses submitted to U.S. EPA prior to May 30, 2000, but not approved by U.S. EPA before that date, are nonetheless "applicable water quality standards for purposes of the CWA" pursuant to 40 CFR 131.21(c)(1).

E. Interim Effluent Limitations – Not Applicable

F. Land Discharge Specifications – Not Applicable

G. Recycling Specifications – Not Applicable

H. Intake and Discharge Specifications

Sections IV.B and IV.E of the Order provide narrative requirements for the intake of seawater and the discharge of effluent from the Facility. These provisions of the Order are necessary to implement the requirements specified in the Ocean Plan. The intake specifications implement chapter III.M.2.(d)(1) of the Ocean Plan; and discharge specifications implement chapter III.A.2 of the Ocean Plan.

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

A. Surface Water

The Ocean Plan contains numeric and narrative water quality objectives applicable to the coastal waters of California. Water quality objectives include an objective to maintain the high-quality waters pursuant to federal regulations (40 CFR 131.12) and State Water Board Resolution No. 68-16. Receiving water limitations in this Order are included to ensure protection of beneficial uses of the receiving water and are based on the water quality objectives contained in the Ocean Plan. The salinity receiving water limit included in section V.A.1. of this Order implements Chapter III.M.3.b.(1) of the Ocean Plan.

The proposed mass effluent limits in section IV.C. above are based on maximum daily flow of 62.5 million gallons of total desalination facility effluent to the ocean.

B. Groundwater – Not Applicable

VI. RATIONALE FOR PROVISIONS

A. Standard Provisions

Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits, in accordance with 40 CFR 122.42, are provided in Attachment D to the Order.

Sections 122.41(a)(1) and (b) through (n) of 40 CFR establish conditions that apply to all state-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. Section 123.25(a)(12) allows the state to omit or modify conditions to impose more stringent requirements. In accordance with 40 CFR 123.25, this Order omits federal conditions that address enforcement authority specified in 40 CFR s 122.41(j)(5) and (k)(2) because the enforcement authority under the Water Code is more stringent. In lieu of these conditions, this Order incorporates by reference Water Code section 13387(e).

B. Special Provisions

1. Reopener Provisions

a. The Santa Ana Water Board may reopen this Order to modify its provisions to incorporate the promulgation of new regulations by U.S. EPA or adoption of new regulations by the State Water Board or Santa Ana Water Board, including revisions to the Basin Plan or to the Ocean Plan.

b. The Santa Ana Water Board may reopen this Order to include an effluent limitation if monitoring establishes that the discharge causes, has the reasonable potential to cause, or contributes to an excursion above a water quality objective in Table 3 of the Ocean Plan.

c. The Santa Ana Water Board may reopen this Order to modify provisions governing compliance with Water Code section 13142.5(b) and the Ocean

Plan if the Discharger proposes a change in design or operation of the Facility in a manner that could increase intake or mortality of all forms of marine life, consistent with the Ocean Plan definition of an expanded facility, beyond that which is approved in this Water Code section 13142.5(b) determination. The Santa Ana Water board may reopen this Order at any time for modification of provisions governing compliance with the receiving water limitation for salinity as set forth in chapter III.M.3 of the Ocean Plan.

d. The Santa Ana Water Board may reopen this Order to modify the mitigation provisions required under Water Code section 13142.5(b) and chapter III.M.2.e of the Ocean Plan.

e. The Santa Ana Water Board may reopen this Order to modify, revoke and reissue, or terminate the Order for cause in accordance with the provisions of the Water Code and 40 CFR parts 122, 124, and 125 at any time prior to its expiration.

f. The Santa Ana Water Board may reopen this Order to remove the discharge and intake prohibitions in sections III.I and IV.B.12, respectively.

2. **Special Studies and Additional Monitoring Requirements**

a. **Toxicity Reduction Requirements.** This Order requires the Discharger to develop procedures to conduct Toxicity Identification and Reduction Evaluations. This provision is based on chapter III.C.10 of the Ocean Plan.

3. **Best Management Practices (BMPs) and Pollution Prevention**

a. **BMPs.** Section 402 of the CWA and U.S. EPA regulations 40 CFR 122.44 (k) authorize the requirement for BMPs in NPDES permits. BMPs are measures for controlling the generation of pollutants and their release to waterways. These measures are important tools for waste minimization and pollution prevention.

The Order requires the Discharger to maintain a BMP Plan that incorporates practices to achieve the objectives and specific requirements in the permit. The BMP Plan must be revised as new practices are developed for the facility.

The BMP Plan must be designed to prevent, or minimize the potential for, the release of toxic or hazardous pollutants, including any such pollutants from ancillary activities to waters of the United States. The BMP Plan shall be consistent with the general guidance contained in the U.S. EPA Guidance Manual for Developing Best Management Practices (BMPs) (EPA 833-B-93-004). The Discharger shall maintain the BMP Plan in an up-to-date condition and shall amend the BMP Plan in accordance with 40 CFR s 125.100 - 125.104, whenever there is a change in facility design, construction, operation, or maintenance that materially affects the potential for discharge from the Facility of significant amounts of hazardous or toxic pollutants into waters of the United States.

b. **Pollutant Minimization Program.** This provision is based on requirements contained in chapter III.C.9 of the Ocean Plan and Water Code section 13263.3 (d). The goal of the Pollutant Minimization Program is to reduce all potential sources of a pollutant through pollutant minimization strategies, including pollution prevention measures, in order to maintain the effluent concentration at or below the effluent limitation.

4. **Climate Change Action Plan**

Changing climate conditions may fundamentally alter the way desalination plants are designed and operated. Climate change research indicates the overarching driver of change is increased atmospheric carbon dioxide (CO2) from human activity. The increased CO_2 emissions trigger changes to climatic patterns, which increase the intensity of sea level rise and coastal storm surges (Changes in Sea Level), lead to more erratic rainfall and local weather patterns (Changes in Weather Patterns), trigger a gradual warming of freshwater and ocean temperatures (Changes in Water Temperature) and trigger changes to ocean water chemistry (Changes in Water pH).

This permit requires the Discharger to develop and implement a Climate Change Action Plan (CCAP) within 18 months of the effective date of this Order. The purpose of the CCAP is to project potential climate change impacts on the Facility and operations, and document steps to address potential impacts on the Facility.

5. **Construction, Operation, and Maintenance Specifications**

a. **Operation and Maintenance Manual.** This Order requires the Discharger to develop an Operation and Maintenance Manual prior to start of operations and specifies its periodic updates.

6. **Special Provisions for POTWs – Not Applicable**

7. **Other Special Provisions – Not Applicable**

8. **Compliance Schedules – Not Applicable**

VII. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

CWA section 308 and 40 CFR s 122.41(h), (j)-(l), 122.44(i), and 122.48 require that all NPDES permits specify monitoring and reporting requirements. Water Code sections 13267 and 13383 also authorize the Santa Ana Water Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements. The Monitoring and Reporting Program (MRP), Attachment E of this Order, establishes monitoring, reporting, and recordkeeping requirements that implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in the MRP for this Facility.

A. Influent Monitoring

The Discharger is required to conduct influent monitoring as described in Table E-2 of Attachment E of this Order.

B. Effluent Monitoring

The Discharger is required to conduct monitoring of the permitted discharges in order to evaluate compliance with permit conditions. Monitoring requirements are set forth in the MRP (Attachment E). This provision requires compliance with the MRP and is based on 40 CFR s 122.44(i), 122.62, 122.63, and 124.5. The self-monitoring program (SMP) is a standard requirement in all NPDES permits (including this proposed Order) issued by the Santa Ana Water Board.

In addition to containing definitions of terms, the SMP specifies general sampling/analytical protocols and the requirements for reporting of spills, violations, and routine monitoring data in accordance with NPDES regulations, the Water Code, and Santa Ana Water Board's policies. The MRP also contains a sampling program specific to the Discharger's treatment facility. It defines the sampling stations, monitoring frequency, pollutants to be monitored, and additional reporting requirements. Pollutants to be monitored include all pollutants for which effluent limitations are specified.

This effluent monitoring program also includes monitoring requirements established for all Ocean Plan Table 3 parameters. This monitoring is necessary to collect sufficient information to conduct RPAs during future NPDES permit re-applications.

Although the Discharger will be discharging wastewater at one discharge point into the ocean outfall of AES, due to intermittent discharges of in-plant waste streams (RO treatment wastewater, filter backwash wastewater, RO flush wastewater), monitoring of these waste streams will be necessary to assure that discharges will meet water quality standards. The Discharger is required to conduct monitoring for certain constituents when in-plant waste streams (RO treatment wastewater, filter backwash wastewater, RO flush wastewater) are discharged.

C. WET Testing Requirements

WET is an indicator of the receiving water quality from the aggregate toxic effect of a mixture of pollutants in the effluent. An acute toxicity test is conducted over a short time period and measures mortality. A chronic toxicity test is conducted over a longer period of time and may measure mortality, reproduction, and growth. This permit establishes monitoring and reporting for chronic toxicity to evaluate compliance with effluent limitations and monitoring requirements for acute toxicity to confirm acute toxicity threshold assessments submitted by the Discharger.

Additionally, Chapter III.C.3.c.(4) of the Ocean Plan requires dischargers to conduct chronic toxicity testing if the minimum initial dilution of the effluent is below 100 to 1. The Facility has an initial dilution ratio of 15 to 1. Therefore, this Order includes monitoring requirements for chronic toxicity in the MRP (Attachment E).

D. Receiving Water Core Monitoring Requirements

The receiving water, sediment, and fish and epibenthic invertebrates' organisms monitoring requirements set forth below are designed to measure the effects of the Facility's discharge on the receiving ocean waters. The overall receiving water monitoring program is intended to answer the following questions:

- Does the receiving water meet water quality standards?
- Are the receiving water conditions getting better or worse over time?
- What are the effects of the discharge on the receiving water?
- What is the relative contribution of the Facility's discharge to pollution in the receiving water?

1. Surface Water

Monitoring is necessary to answer the following questions:

- Does the discharge cause an increase in salinity of >2.0 ppt above ambient conditions?
- Does the discharge cause a discoloration of the ocean surface?
- Is the wastewater plume adversely impacting receiving water areas used for swimming, surfing, diving, and shellfish harvesting?

This Order establishes monitoring stations RWS-001 through RWS-016 to evaluate compliance with receiving water quality standards. This Order requires measurements of temperature, salinity, pH, dissolved oxygen, Chlorophyll-a fluorescence, photosynthetically active radiation, and light transmittance to be taken throughout the water column using a CTD profiler. Continuous profiles provide a higher resolution of the conditions in the receiving water. Refer to section VIII.A. of the MRP (Attachment E) for the offshore water quality monitoring requirements.

Monitoring requirements are included in the MRP (Attachment E) to determine compliance with the receiving water limitations established in Limitations and Discharge Requirements, Receiving Water Limitations, section V.A. of this Order. Receiving water monitoring requirements included in Order R8-2012-0007 have been retained with the additional of benthic and fish and epibenthic invertebrate monitoring to evaluate impacts of the high salinity and other pollutants discharge on the benthic, fish, and epibenthic invertebrate communities.

2. Benthic Monitoring Requirements

Sediments integrate constituents that are discharged to the ocean. Most particles that come from the discharge, and any associated contaminants, will eventually settle to the seafloor where they are incorporated into the existing sediments. Sediments can accumulate these particles over the years until the point where sediment quality has degraded, and beneficial uses are impaired. The benthic community is strongly affected by sediment composition and quality and water quality. Because the benthos are dependent on its surroundings, they serve as a biological indicator that reflects the overall conditions of the aquatic environment.

Section VIII.B. of the MRP (Attachment E) requires periodic assessment of sediment quality to evaluate potential effects of the Facility discharge and compliance with narrative water quality standards specified in the Ocean Plan. The required assessment consists of the measurement and integration of three lines of evidence: 1) physical and chemical properties of seafloor sediments, 2) seafloor sediment toxicity to assess bioavailability and toxicity of sediment contaminants, and 3) ecological status of the biological communities (benthos) that live in or on the seafloor sediments.

Benthic monitoring is necessary to answer the following question:

- Is the concentration of substances, set forth in Table 3 of the Ocean Plan for protection of marine aquatic life, in marine sediments at levels which would degrade the benthic community?
- Is the concentration of organic pollutants in marine sediments at levels that would degrade the benthic community?
- Is the sediment quality changing over time?

This Order establishes benthic monitoring requirements at ocean monitoring stations RWS-001 through RWS-016. Refer to section VIII.B of the MRP (Attachment E) for the benthic monitoring requirements.

3. **Fish and Epibenthic Invertebrate Monitoring**

The purpose of fish and epibenthic invertebrate monitoring is to detect spatial and temporal trends in fish and epibenthic community structure and sport fish muscle chemistry in the area of the discharge, and to assess compliance with State water quality standards and federal criteria.

Fish and epibenthic invertebrate monitoring requirements also address the four management questions for fish and epibenthic invertebrate monitoring and seafood safety monitoring in the SCCWRP's Model Monitoring Program:

- Is the health of fish populations and communities impaired?
- Are fish populations and communities changing over time?
- Is fish tissue contamination changing over time?
- Are seafood tissue concentrations below levels that will ensure public safety?

Annual fish and epibenthic community monitoring will be carried out over a grid of 6 stations upcoast of Discharge Point 001 (M-001); of these 6 stations, the 3 stations at the outfall depth (10 meters) will be monitored semi-annually. The monitoring area is adjacent to the coastline of Huntington Beach and Newport Beach. This Order adds annual sport fish muscle chemistry monitoring at two zones.

E. Receiving Water Regional Requirements

Regional ocean water monitoring provides information about the sources, fates, and effects of anthropogenic contaminants in the coastal marine environment necessary to make assessments over large areas. The large-scale assessments provided by regional monitoring describe and evaluate cumulative effects of all anthropogenic inputs and enable better decision-making regarding protection of beneficial uses of ocean waters. Regional monitoring data assists in the interpretation of core monitoring studies by providing a more accurate and complete characterization of reference conditions and natural variability. Regional monitoring also leads to methods standardization and improved quality control through intercalibration exercise. The coalitions implementing regional monitoring enable sharing of technical resources, trained personnel and associated costs. Focusing these resources on regional issues and developing a broader understanding of pollutants effects in ocean waters enables the development of more rapid and effective response strategies. Based on all of these considerations, the Santa Ana Water Board supports regional approaches to monitoring ocean waters. The Discharger shall participate with other regulated entities, other interested parties, and the Santa Ana Water Board in development, refinement, implementation and coordination of regional monitoring and assessment programs for ocean waters in the region and discharge to those waters, so as to answer the following questions:

- Determine the status and trends of conditions in ocean waters in the region with regards to beneficial uses, e.g.,
    - Are fish and shellfish safe to eat?
    - Is water quality safe for swimming?
    - Are ecosystems healthy?
- Identify the primary stressors causing or contributing to conditions of concern;
- Identify the major sources of the stressors causing or contributing to conditions of concern; and
- Evaluate the effectiveness (i.e. environmental outcomes) of actions taken to address such stressors and sources.

During these coordinated sampling efforts, the Discharger's receiving water sampling and analytical effort, as defined in section VIII. of the MRP (Attachment E), may be reallocated to provide a regional assessment of the impact of the discharge to the ocean. In that event, the Santa Ana Water Board shall notify the Discharger in writing that the requirement to perform the receiving water sampling and analytical effort defined in section VIII.B. and VIII.C of the MRP (Attachment E) for the semi-annual winter monitoring stations are suspended for the duration of the reallocation. Anticipated modifications to the monitoring program will be coordinated so as to provide a more comprehensive picture of the ecological and statistical significance of monitoring results and to determine cumulative impacts of various pollution sources. The level of resources in terms of sampling and analytical effort redirected from the receiving water monitoring program required under section VIII.B. and VIII.C. of the MRP (Attachment E) shall equal the level of resources provided to implement the regional monitoring and assessment program, unless the Santa Ana Water Board and the Discharger agree otherwise. The specific scope and duration of the receiving water monitoring program reallocation and redirection shall be determined and set by the Santa Ana Water Board in consultation with the Discharger.

1. **Kelp Bed Canopy Monitoring Requirements**

   Kelp consists of a number of species of brown algae. Along the central and southern California coast, giant kelp (Macrocystis pyrifera) is the largest species colonizing rocky, and in some cases sandy, subtidal habitats. Giant kelp is an important component of coastal and island communities in southern California, providing food and habitat for numerous animals. Monitoring of the kelp beds is necessary to answer the following questions:

- What is the maximum areal extent of the coastal kelp bed canopies each year?
- What is the variability of the coastal kelp bed canopy over time?
- Are coastal kelp beds disappearing? If yes, what are factors that could contribute to the disappearance?
- Are new coastal kelp beds forming?

Refer to section IX.C. of the MRP (Attachment E) for the kelp bed canopy monitoring requirements.

2. **Southern California Bight Monitoring**

The Southern California Bight (Bight), defined as the concave bend of the shoreline extending from Point Conception to Punta Colonet in Mexico, is host to unique, biologically diverse marine ecosystems that have long been vulnerable to the impacts of human activity. The coastal zone of the Bight hosts nearly 22 million U.S. residents that engage in a wide variety of industrial, military, and recreational activities. Approximately 5,600 miles of watersheds, half of which is highly developed, drain into the Bight. The Southern California Bight Regional Monitoring Program brings together researchers and water-quality managers to pool their resources and work together to investigate the condition of marine ecosystems both spatially and temporally and extend greater protections to the Bight's diverse habitats and natural resources.

The Discharger is required to participate in the Southern California Bight Regional Monitoring Program coordinated by SCCWRP, or any other coordinator named by the Santa Ana Water Board, pursuant to Water Code sections 13267 and 13383, and 40 CFR 122.48. The intent of the Southern California Bight Regional Monitoring Program is to maximize the efforts of all monitoring partners using a more cost-effective monitoring design and to best utilize the pooled scientific resources of the Southern California Bight.

During these coordinated sampling efforts, the Discharger's receiving water sampling and analytical effort, as defined in section VIII.B. and VIII.C. of the MRP (Attachment E), winter semi-annual monitoring locations, may be reallocated to provide a regional assessment of the impact of the discharge of wastewater to the Southern California Bight. In that event, the Santa Ana Water Board shall notify the Discharger in writing that the requirement to perform the receiving water sampling and analytical effort defined in section VIII.B. and VIII.B of the MRP (Attachment E) is suspended for the duration of the reallocation. Anticipated modifications to the monitoring program will be coordinated so as to provide a more comprehensive picture of the ecological and statistical significance of monitoring results and to determine cumulative impacts of various pollution sources. The level of resources in terms of sampling and analytical effort redirected from the receiving water monitoring program required under sections VII.B. and VIII.C. of the MRP (Attachment E) shall approximately equal the level of resources provided to implement the regional monitoring and assessment program, unless the Santa Ana Water Board and the Discharger agree otherwise.

The specific scope and duration of the receiving water monitoring program reallocation and redirection shall be determined and set by the Santa Ana Water Board, in consultation with the Discharger. Refer to section IX.A. of the MRP (Attachment E).

3. **Central Bight Water Quality Cooperative Program**

The Central Bight Water Quality Cooperative Program is coordinated quarterly receiving water quality monitoring conducted by Orange County Sanitation District, County Sanitation Districts of Los Angeles County, the City of Los Angeles, and the City of Oxnard, through appropriate agencies for water quality monitoring. The Discharger is required to participate in this group of ocean dischargers and coordinate accordingly and monitor for the parameters as specified in section VIII.A.1. and report as instructed in section IX.B.

F. Strategic Process Studies

Discharger investigations conducted through strategic process studies is a required condition of the Order. Strategic process studies which must be conducted under the Order include the:

1. **Final Effluent Characterization.**

The Discharger is required to develop a work plan to study contaminants of emergent concern (CECs) that may be contained the final effluent discharged to the ocean environment and that may pose a toxic threat to marine organisms. The Discharger is advised to consider the use of monitoring technologies for CECs such as cell assay bioscreening and non-targeted analysis or other monitoring technologies recommended by the Discharger.

2. **Plume Tracking Using the Regional Oceanic Modeling System-Biogeochemical Elemental Cycling (ROMS-BEC) model.**

To assess the spatial extent and the temporal variability of the discharged plume the Discharger is required to seek collaboration with SCCWRP and develop an SPS that would model and provide an overall environmental assessment of the discharge using the ROMS-BEC model approach.

G. Marine Life Mitigation Plan

Water Code section 13142.5(b) requires that the best available mitigation measures feasible be used to minimize the intake and mortality of all forms of marine life. Chapter III.M.2.e of the Ocean Plan sets forth requirements to implement mitigation measures in compliance with Water Code section 13142.5(b). The Ocean Plan provisions require that the Discharger estimate the marine life mortality resulting from construction and operation of the Facility that would occur following implementation of the best available site, design, and technology measures.

Based on Santa Ana Water Board staff's estimation of marine life mortality, the mitigation required for marine life mortality impacts related to the Facility's construction and stand-alone operations is 423.0 acres before a mitigation ratio is applied to account for differences in the relative productivity of the mitigation habitat compared to the impacted habitat and 100.5 acres after the appropriate mitigation ratios are applied. (See Attachment G.3.) To fulfill the required mitigation acreage, the Discharger has chosen to complete mitigation projects pursuant to chapter III.M.2.e(3) of the Ocean Plan and has submitted a Marine Life Mitigation Plan (MLMP). The Discharger's proposed mitigation includes restoration, enhancement, and preservation projects at the Bolsa Chica Wetlands, and the creation of an artificial reef offshore of the Palos Verdes Peninsula (Palos Verdes Artificial Reef).

There are several areas within the Bolsa Chica Wetlands where restoration activities will occur: the Fieldstone Property, Cell 46 and Cell 42, and the intertidal shelf. The Fieldstone Property is approximately 12 acres of dry, barren salt pannes, with marsh and subtidal habitat. Within this property, the Discharger proposes to restore 4.5 acres of subtidal and tidal wetlands in addition to upland restoration. At several sites within Cell 46 and 42, oil pads and roads will be removed, and the areas restored to upland habitat. The individual sites for these activities are scattered throughout Cells 46 and 42 but will result in 1.2 acres of additional restoration. For each of these restoration projects to succeed, the Discharger must make improvements to the water circulation within the Muted Tidal Basins of Bolsa Chica. The circulation improvements constitute enhancement activities. The intertidal shelf area is in the Full Tidal Basin and is approximately 23 acres. This area was intended to support cordgrass, but it has remained barren due to drainage issues. The restoration of the intertidal shelf will allow the establishment of coastal salt marsh vegetation (primarily cordgrass and some pickleweed), which provides habitat to shorebirds and estuarine species, and will provide the Discharger with 10.5 acres of mitigation credit. The Discharger also proposes to dredge the inlet at Bolsa Chica to maintain full tidal flow. The dredging is a form of preservation and will provide essential tidal connectivity between the wetlands and the Pacific Ocean to help maintain the existing wetland system and support the restoration and enhancement activities. The maintenance dredging of the ocean inlet will be done as needed to meet performance standards in the MLMP. The restoration projects (inclusive of the circulation improvements) and the maintenance dredging at the Bolsa Chica Wetlands constitute restoration of coastal wetlands and is expected to provide a total of 59.2 acres of mitigation. Lastly, the Discharger is proposing to create 41.3 acres of rocky reef habitat along the Palos Verdes Peninsula by building an artificial reef on top of a buried, non-functional natural reef.

The proposed mitigation (including all proposed preservation, enhancement, restoration, and creation activities) meets the requirements of Mitigation Option 1 in the Ocean Plan and is the best available mitigation feasible to minimize intake and mortality of all forms of marine life. (See Attachment G, Findings 43–50, and Attachment G.5.) This finding is conditioned on the Discharger's satisfaction of the requirements set forth in the MLMP Schedule in Attachment K, including any environmental review required under CEQA. (See Attachment G, Finding 5.)

Section VI.C.2.c of the Order requires the Discharger to submit a Coordination and Communication Plan, a Final Restoration Plan for the Fieldstone Property, a Final Restoration Plan for the Oil Pads and Road project, a Final Restoration Plan for the Intertidal Shelf project, a Final Creation Plan for the Palos Verdes Artificial Reef, a Final Adaptive Management Plan for the Bolsa Chica mitigation projects, and a Final Adaptive Management Plan for the Palos Verdes Artificial Reef mitigation project in accordance with Attachment K to update the MLMP to ensure adequate mitigation is provided in compliance with the Ocean Plan and Water Code section 13142.5(b). The Discharger shall implement the Final MLMP after the supplemental plans and reports required by the MLMP Schedule are approved by the Santa Ana Water Board in accordance with Attachment K.

H. Discharge Monitoring Report-Quality Assurance (DMR-QA) Study Program

Under the authority of section 308 of the CWA (33 U.S.C. section 1318), U.S. EPA requires major and selected minor dischargers under the NPDES Program to participate in the annual DMR-QA Study Program. The DMR-QA Study evaluates the analytical ability of laboratories that routinely perform or support self-monitoring analyses required by NPDES permits. There are two options to satisfy the requirements of the DMR-QA Study Program: (1) The Discharger can obtain and analyze a DMR-QA sample as part of the DMR-QA Study; or (2) Per the waiver issued by U.S. EPA to the State Water Board, the Discharger can submit the results of the most recent Water Pollution Performance Evaluation Study from its own laboratories or its contract laboratories. A Water Pollution Performance Evaluation Study is similar to the DMR-QA Study. Thus, it also evaluates a laboratory's ability to analyze wastewater samples to produce quality data that ensure the integrity of the NPDES Program. The Discharger shall ensure that the results of the DMR-QA Study or the results of the most recent Water Pollution Performance Evaluation Study are submitted annually to the State Water Board. The State Water Board's Quality Assurance Program Officer will send the DMR-QA Study results or the results of the most recent Water Pollution Performance Evaluation Study to U.S. EPA's DMR-QA Coordinator and Quality Assurance Manager.

VIII. PUBLIC PARTICIPATION

The Santa Ana Water Board has considered the issuance of WDRs that will serve as an NPDES permit for the Huntington Beach Desalination Project. As a step in the WDR adoption process, Santa Ana Water Board staff has developed tentative WDRs and has encouraged public participation in the WDR adoption process.

A. Notification of Interested Parties

The Santa Ana Water Board notified the Discharger and interested agencies and persons of its intent to prescribe WDRs for the discharge and provided an opportunity to submit written comments and recommendations. Notification was provided through the posting of Notices of Public Hearing and/or Notices of Opportunity for Public Comment on the Santa Ana Water Board website. The notices were also sent out to interested persons via email to the Santa Ana Water Board's mailing list.

The public had access to the agenda and any changes in dates and locations through the Santa Ana Water Board's website at: http://www.waterboards.ca.gov/santaana/

B. Written Comments

The staff determinations are tentative. Interested persons were invited to submit written comments on the tentative WDRs and on the February 12, 2021 revisions to the tentative WDRs as provided through the notification process. Comments were due either in person or by mail to the Julio Lara, Chief of the Wastewater Section of the Santa Ana Water Board at the address on the cover page of this Order or via email to RB8-PoseidonHB.comments@Waterboards.ca.gov.

C. Public Hearing

The Santa Ana Water Board held a public hearing on the tentative WDRs during its regular Board meeting on the following dates and time and at the following location:

Date: July 30 and July 31, 2020, August 7, 2020, and April 23 and April 29
Time: 9:00 a.m.
Location: **Virtual Zoom Platform**

Interested persons were invited to attend. At the public hearings, the Santa Ana Water Board heard testimony pertinent to the discharge, WDRs, and permit.

The public can access the current agenda for changes in dates and locations on the Santa Ana Water Board's website: http://www.waterboards.ca.gov/santaana/.

D. Reconsideration of WDRs

Any person aggrieved by this action of the Santa Ana Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., within 30 calendar days of the date of adoption of this Order at the following address, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day:

State Water Resources Control Board

Office of Chief Counsel

P.O. Box 100, 1001 I Street

Sacramento, CA 95812-0100

Or by email at waterqualitypetitions@waterboards.ca.gov

For instructions on how to file a petition for review, see:

<http://www.waterboards.ca.gov/public_notices/petitions/water_quality/wqpetition_instr.shtml>

E. Information and Copying

The ROWD, other supporting documents, and comments received are on file and may be inspected at the Santa Ana Water Board's office at any time between 9:00 a.m. and 3:00 p.m., Monday through Friday. Copying of documents may be arranged through the Santa Ana Water Board by calling (951) 782-4130.

F. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Santa Ana Water Board, reference this facility, and provide a name, address, and phone number.

G. Additional Information

Requests for additional information or questions regarding this Order should be directed to Julio Lara at (951) 782-4901 or Julio.Lara@waterboards.ca.gov.

Attachment G

Water Code Section 13142.5(b) Conditional Determination and other Ocean Plan Requirements for the Huntington Beach Desalination Facility (Facility)

Introduction

Poseidon Resources (Surfside) LLC (Poseidon Water or Discharger) submitted a request to the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) for a Water Code section 13142.5, subdivision (b) (section 13142.5(b)) determination for the Huntington Beach Desalination Facility (Facility) on March 15, 2016. Water Code section 13142.5(b) states: “for each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize intake and mortality of all forms of marine life.” A seawater desalination facility qualifies as an industrial installation under Water Code section 13142.5(b). In May 2015, the State Water Resources Control Board (State Water Board) adopted an amendment that added chapter III.M. to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) to address environmental impacts associated with the construction and operation of seawater desalination facilities. The Office of Administrative Law approved the amendment on January 28, 2016, and the United States Environmental Protection Agency (U.S. EPA) approved the provisions implementing the Clean Water Act on April 7, 2016.

Chapter III.M.2 of the Ocean Plan provides direction to the regional water quality control boards for evaluating seawater desalination facilities under Water Code section 13142.5(b) to ensure a consistent statewide approach for minimizing intake and mortality of all forms of marine life. To assess whether a seawater desalination facility complies with Water Code section 13142.5(b), the Santa Ana Water Board must evaluate a range of feasible alternatives for the best available site, design, technology, and mitigation measures to minimize intake and mortality of all forms of marine life and then determine the best combination of feasible alternatives. (Ocean Plan, chap. III.M.2.a.(2).) The Santa Ana Water Board has independently (and in consultation with the State Water Board and other state agencies when required) evaluated Poseidon Water’s request for a section 13142.5(b) determination for the Facility, the documents Poseidon Water submitted in support of its request (Appendices A to AAAAAAA), the independent and neutral third-party reports evaluating the proposed diffuser design and the calculations of the area of production forgone (APF), and documents submitted by water agencies and other interested parties. Based on its evaluation, the Santa Ana Water Board has conditionally determined that the Discharger’s proposal uses the best available site, design, technology, and mitigation measures feasible for the Facility to minimize intake and mortality of all forms of marine life in compliance with Water Code section 13142.5(b). This determination is conditioned upon the Discharger satisfying the requirements of the Marine Life Mitigation Plan Schedule in Attachment K and the Santa Ana Water Board finding—subject to any environmental review of the mitigation projects required under the California Environmental Quality Act (CEQA) and any changes to the proposed projects arising therefrom—that the supplemental information submitted by the Discharger confirms the finding that the proposed mitigation measures are the best available feasible to minimize intake and mortality of all forms of marine life. It is important to note that it would be premature for the Santa Ana Water Board to commit at this time to finding that the Discharger's proposed mitigation projects, aside from the proposal to dredge the inlet at Bolsa Chica, will be ultimately approved by the Santa Ana Water Board. If the CEQA review for the mitigation projects indicate that there are significant environmental effects associated with one or more of the Discharger's proposed mitigation projects, the Santa Ana Water Board may require the Discharger to propose alternative mitigation projects. In that case, the Santa Ana Water Board's Water Code section 13142.5(b) determination for those proposed mitigation projects will no longer be valid, and the Discharger must submit a new request for a Water Code section 13142.5(b) determination, limited to the alternative mitigation projects, and the Santa Ana Water Board must make a new Water Code section 13142.5(b) determination for the alternative mitigation projects.

The findings supporting this determination are set forth in the table below and in Santa Ana Water Board staff's analyses in the following documents:

Attachment G.1: Narrowing of the Sites (Analysis in Support of Findings 6, 8-12);
Attachment G.2: Analysis in Support of Finding 7, Identified Need for Desalinated Water;
Attachment G.3: ETM/APF Analysis for a Surface Intake and Discharge at Station E (Discharger's Proposed Intake/Discharge Location);
Attachment G.4: Rationale for Determining an Appropriate Mitigation Ratio to Apply to the Area of Foregone Production (APF); and
Attachment G.5: Approach for Mitigation of the Facility.

The Santa Ana Water Board adopts the analyses and recommendations of staff in Attachments G.1 to G.5 in their entirety. Attachments G.1 to G.5 are incorporated into the Water Code section 13142.5(b) determination by reference and constitute findings of the Santa Ana Water Board.

Findings for Water Code Section 13142.5(b) and Other Ocean Plan Requirements for Desalination Facilities

The table lists each requirement of chapter III.M of the Ocean Plan starting with Water Code section 13142.5(b) applicability and general considerations, then the factors that must be considered for site, design, technology, mitigation measures, salinity limitations, and monitoring and reporting, and provides a specific finding for each requirement.

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
N/A	M.2.a.	Water Code section 13142.5(b) Determinations for New and Expanded Facilities: Site, Design, Technology, and Mitigation Measures Feasibility Considerations. General Considerations:	--	
1	M.2.a.(1)	The owner or operator shall submit a request for a Water Code section 13142.5(b) determination to the appropriate regional water board as early as practicable. This request shall include sufficient information for the regional water board to conduct the analyses described below. The regional water board in consultation with the State Water Board staff may require an owner or operator to provide additional studies or information if needed, including any information necessary to identify and assess other potential sources of mortality to all forms of marine life. All studies and models are subject to the approval of the regional water board in consultation with State Water Board staff. The regional water board may require an owner or operator to	On June 30, 2016, Poseidon Water, as owner and operator of the Facility, submitted their Report of Waste Discharge (ROWD) for the amendment and renewal of Order No. R8-2012-0007 and requested a Water Code section 13142.5(b) determination. Santa Ana Water Board staff issued three requests for additional information to the applicant (July 29, 2016, October 31, 2016, and May 23, 2017). Based on information received as of May 2017, the Santa Ana Water Board deemed the Discharger's application complete on August 27, 2017. After the application was deemed complete, Dr. Philip Roberts, an	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		hire a neutral third-party entity to review studies and models and make recommendations to the regional water board.	independent reviewer, reviewed the shear mortality calculations for Discharger's proposed diffuser and concluded that the proposed diffuser was not the best brine discharge technology or design. The Santa Ana Water Board concurred with the independent reviewer's finding and notified the Discharger of this finding; the Discharger submitted a revised diffuser design consistent with that recommended by the independent reviewer. (See Finding 28). Due to the substantial change to the diffuser design from the original application, the Santa Ana Water Board treated the submittal of the revised diffuser design as a new application. The Santa Ana Water Board deemed the new application complete on October 1, 2018. Two neutral third-party entities (one is referred to as an independent reviewer and the other as a neutral third-party reviewer) reviewed models and analyses and made recommendations to the Santa Ana Water Board. First, as noted above, Dr. Philip Roberts recommended a	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			method to design a brine diffuser that meets the salinity requirements of the Ocean Plan and minimizes discharge-related mortality of marine life in a report titled, *Brine Diffusers and Shear Mortality* dated April 18, 2018 (Roberts Diffuser Design Report). Dr. Roberts then used the recommended method to evaluate the Discharger's then-proposed three-port diffuser design and provided recommendations in a report titled, *Brine Diffusers and Shear Mortality: Applied to Huntington Beach* dated April 18, 2018 (Roberts HB Diffuser Report). (See Findings 15, 16 and 28). Second, Dr. Peter Raimondi, a well-known expert in Empirical Transport Model (ETM)/Area of Production Foregone (APF) analyses, was engaged as a neutral third-party reviewer to make recommendations to the Santa Ana Water Board. Dr. Raimondi made recommendations with respect to (1) the use of the ETM/APF method for the proposed and alternative offshore intake locations to determine the best available offshore site to minimize	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			marine life intake and mortality for the proposed Facility, and (2) the ETM/APF calculations for the proposed offshore location for mitigation purposes. Dr. Raimondi prepared a final report with his recommendations to the Santa Ana Water Board. (See Dr. Peter Raimondi, *Approaches for the Assessment of Potential Intake Locations with Respect to Entrainment, Proposed Huntington Beach Desalination Plant* dated March 5, 2019 (Raimondi Report)).	
2	M.2.a.(2)	The regional water board shall conduct a Water Code section 13142.5(b) analysis of all new and expanded desalination facilities. A Water Code section 13142.5(b) analysis may include future expansions at the facility. The regional water board shall first analyze separately as independent considerations a range of feasible alternatives for the best available site, the best available design, the best available technology, and the best available mitigation measures to minimize intake and mortality of all forms of marine life. Then, the regional water board shall consider all four factors collectively and	The Santa Ana Water Board first individually evaluated alternatives for the proposed Facility for the best available site, the best available design, the best available technology, and the best available mitigation measures to minimize intake and mortality of all forms of marine life. The results of the evaluations are included under each appropriate section in this Water Code section 13142.5 (b) determination. The Santa Ana Water Board then evaluated the four factors collectively to determine the best combination of feasible	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		determine the best combination of feasible alternatives to minimize intake and mortality of all forms of marine life. The best combination of alternatives may not always include the best alternative under each individual factor because some alternatives may be mutually exclusive, redundant, or not feasible in combination.	alternatives to minimize intake and mortality of all forms of marine life. A combination of the site, design, technology, and mitigation determined that were determined to be the best available feasible alternatives based on the individual assessment is the best available feasible combination of alternatives. This table and Attachments G.1–G.5 set forth the Santa Ana Water Board's analysis and findings for the separate and combined considerations of various feasible alternatives for the Water Code section 13142.5(b) determination.	
3	M.2.a.(3)	The regional water board's Water Code section 13142.5(b) analysis for expanded facilities may be limited to those expansions or other changes that result in the increased intake or mortality of all forms of marine life, unless the regional water board determines that additional measures that minimize intake and mortality of all forms of marine life are feasible for the existing portions of the facility.	Not applicable	
4	M.2.a.(4)	In conducting the Water Code section 13142.5(b) determination, the regional	In October 2016, the California State Lands Commission, the California	Interagency Permit Sequencing

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		water boards shall consult with other state agencies involved in the permitting of that facility, including, but not limited to: California Coastal Commission, California State Lands Commission, and California Department of Fish and Wildlife. The regional water board shall consider project-specific decisions made by other state agencies; however, the regional water board is not limited to project-specific requirements set forth by other agencies and may include additional requirements in a Water Code section 13142.5(b) determination.	Coastal Commission, and the Santa Ana Water Board entered into an Interagency Permit Sequencing Framework Agreement (Agreement). The Agreement sets forth the process and sequence of the agencies' respective actions on the proposed Facility. Santa Ana Water Board staff consulted with staff of both the State Lands Commission and the Coastal Commission throughout the development of the Water Code section 13142.5(b) determination. Santa Ana Water Board staff also consulted with the California Department of Fish and Wildlife regarding the Discharger's proposed mitigation projects. Although other agencies were consulted, such consultation did not necessarily result in an agreement on the findings, analyses, or requirements of this determination or its attachments. The Santa Ana Water Board's Water Code section 13142.5(b) determination does not bind the consulted agencies or otherwise prevent them from making different findings or imposing additional measures to comply with	Framework Agreement (10/2016)

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			their respective authorities and program requirements.	
5	M.2.a.(5) M.2.a(5)(a)	A regional water board may expressly condition a Water Code section 13142.5(b) determination based on the expectation of the occurrence of a future event. Such future events may include, but are not limited to, the permanent shutdown of a co-located power plant with intake structures shared with the desalination facility, or a reduction in the volume of wastewater available for the dilution of brine. The regional water board must make a new Water Code section 13142.5(b) determination if the foreseeable future event occurs. The owner or operator shall provide notice to the regional water board as soon as it becomes aware that the expected future event will occur and shall submit a new request for a Water Code section 13142.5(b) determination to the regional water board at least one year prior to the event occurring. If the owner or operator does not become aware that the event will occur at least one year prior to the event occurring, the owner or operator shall submit the request as soon as possible.	This Water Code section 13142.5(b) determination is conditioned on the Discharger's satisfaction of the requirements set forth in the Marine Life Mitigation Plan Schedule (MLMP Schedule) in Attachment K to the Order. The MLMP Schedule requires the Discharger to submit a Coordination and Communication Plan, a Final Restoration Plan for the Fieldstone Property, a Final Restoration Plan for the Oil Pads and Roads project, a Final Restoration Plan for the Intertidal Shelf project, a Final Creation Plan for an artificial reef along the Palos Verdes Peninsula, and a Final Adaptive Management Plan in accordance with the established schedule. The Discharger's final plans are subject to the California Environmental Quality Act (CEQA) and any review required under CEQA must be completed prior to the Santa Ana Water Board's approval of the final mitigation plans.	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			The Santa Ana Water Board expects that the Discharger's supplemental final plans will confirm the Santa Ana Water Board's finding that the proposed mitigation is the best available mitigation feasible to minimize mortality of all forms of marine life; however, the proposed mitigation projects may change during the CEQA process. Provided that the Discharger submits the plans required under the MLMP Schedule and the Santa Ana Water Board approves the Discharger's plans, the condition will be satisfied and will have no further effect. If the Discharger fails to submit satisfactory plans (that is, if the Discharger fails to submit a required plan or if the Santa Ana Water Board does not approve the Discharger's plans following an opportunity for the Discharger to submit revised plans) or if the plans do not confirm the proposed mitigation is the best available mitigation feasible, the condition will be triggered and the Santa Ana Water Board's determination for the proposed mitigation will no longer be valid. If the	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			condition is triggered, the Discharger must submit a new request for a Water Code section 13142.5(b) determination, limited to mitigation, and the Santa Ana Water Board must make a new Water Code section 13142.5(b) determination for mitigation. Changes made to the Discharger's proposed mitigation projects through the CEQA environmental review process will not trigger the condition; however, if the projects themselves change, it would trigger the condition.	
N/A	M.2.a(5)(b)	The regional water board may allow up to five years from the date of the event for the owner or operator to make modifications to the facility required by a new Water Code section 13142.5(b) determination, provided that the regional water board finds that 1) any water supply interruption resulting from the facility modifications requires additional time for water users to obtain a temporary replacement supply, or 2) such a compliance period is otherwise in the public interest and reasonably required for modification of the facility to comply with the determination.	Not applicable	

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N/A	M.2.a(5)(c)	If the regional water board makes a Water Code section 13142.5(b) determination for a desalination facility that will be co-located with a power plant, the regional water board shall condition its determination on the power plant remaining in compliance with the Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling.	Not applicable. This Water Code section 13142.5(b) determination only applies to permanent stand-alone operations; it does not apply to co-located operations.	
N/A	M.2.b.	Site is the general onshore and offshore location of a new or expanded facility. There may be multiple potential facility design configurations within any given site. The regional water board shall require that the owner or operator evaluate a reasonable range of nearby sites, including sites that would likely support subsurface intakes. For each potential site, in order to determine whether a proposed facility site is the best available site feasible to minimize intake and mortality of all forms of marine life, the regional water board shall require the owner or operator to:		
6	M.2.b.(1)	Consider whether subsurface intakes are feasible.	The Santa Ana Water Board evaluated a reasonable range of alternative sites, including sites that would likely support subsurface	Discharger's Submittals: • Appendix A3 • Appendix A6

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			intakes, to determine the best available onshore and offshore sites feasible to minimize intake and mortality of all forms of marine life. For the onshore site, the Santa Ana Water Board evaluated nine segments of the southern California coast (Segments 1 to 9) and individual sites within those segments. The Discharger's proposed onshore site is Site 1G within Segment 1. For the offshore site, the Santa Ana Water Board evaluated seven locations: Stations U2, U4, E, D2, D4, O2, and O4; the Discharger's proposed offshore site is Station E. This finding and Findings 7 to 12 are based on the Santa Ana Water Board's evaluation of these alternative sites as detailed in Attachment G.1. The Santa Ana Water Board finds that subsurface intakes are not feasible for a 50 MGD facility at the proposed site or at nearby sites. Also see Finding 20 regarding feasibility of a combination of subsurface and surface intakes.	• Appendix E • Appendix F • Appendix G • Appendix K • Appendix L • Appendix L2 • Appendix L3 • Appendix L4 • Appendix EE • Appendix LL1 • Appendix OO2 • Appendix XX • Appendix ZZ • Appendix HHH • Appendix III • Appendix BBB • Appendix XXX • Appendix YYY • Appendix QQQQ • Appendix RRRR • Appendix HHHHH • Appendix HHHHH1 • Appendix PPPPP • Appendix PPPPP-2 Other Submittals: • Residents for Responsible Desal

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			The Discharger evaluated the nine segments and conducted a hydrogeological analysis to determine if subsurface intakes are technically feasible in each of the nine segments. The hydrogeological analysis included assessment of potential impacts to inland freshwater aquifers and sensitive wetland areas. The Santa Ana Water Board reviewed the Discharger's analyses, including their supplemental hydrogeological modeling, and finds that the Discharger has demonstrated that subsurface intakes (e.g., seafloor infiltration galleries and slant wells) are technically infeasible for the proposed annual average intake volume of 106.7 million gallons per day (MGD) of seawater based on hydrogeological conditions at the proposed site and alternative sites. (See Findings 19 and 20.) After narrowing the sites based on technical feasibility, the Santa Ana Water Board considered the other feasibility factors for subsurface intakes set forth in chapter III.M.2.d.(1)(a) to make a final	– letters dated June 21, 2018, July 9, 2018 Santa Ana Water Board Staff's analysis: • Attachment G.1 – Narrowing of the Site (Analysis in Support of Findings 6, 8 – 12)

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			determination of the feasibility of subsurface intakes at the proposed site, Site 1G. (See Finding 19; Attachment G.1; pages G.1-53 to G.1-76)	
7	M.2.b.(2)	Consider whether the identified need for desalinated water is consistent with an applicable adopted urban water management plan prepared in accordance with Water Code section 10631, or if no urban water management plan is available, other water planning documents such as a county general plan or integrated regional water management plan.	The Santa Ana Water Board finds that the identified need for 56,000 AFY of desalinated water is consistent with the Municipal Water District of Orange County's 2015 Urban Water Management Plan (UWMP), the UWMPs of municipalities in the region, and other relevant water planning documents. (See Attachment G.2 for a detailed analysis.)	Discharger's Submittals: • Appendix A3 • Appendix E • Appendix F • Appendix G • Appendix K • Appendix N • Appendix P5 • Appendix EE • Appendix FF • Appendix GG • Appendix KK • Appendix LL1 • Appendix LL2 • Appendix MM • Appendix NN • Appendix O • Appendix P • Appendix P2 • Appendix P3 • Appendix P4 • Appendix WW

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
				• Appendix GGG Santa Ana Water Board Staff's analysis: • Attachment G.2 – Analysis in Support of Finding 7, Identified Need for Desalinated Water Other Submittals: • Orange County Water District – letters dated July 7, 2016, August 3, 2016, October 1, 2016, March 20, 2017. June 28, 2017, July 12, 2018, August 8, 2019 • Municipal Water District of Orange County – letter dated July 28, 2017 • California Coastkeeper Alliance (CCKA) –

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
				letter dated July 9, 2018 • Residents for Responsible Desal (R4RD) – letter dated October 15, 2018 • Environmental Organizations (CCKA, R4RD, and Orange County Coastkeeper) – joint letter dated May 6, 2019
8	M.2.b.(3)	Analyze the feasibility of placing intake, discharge, and other facility infrastructure in a location that avoid impacts to sensitive habitats and sensitive species.	The Santa Ana Water Board finds that the onshore location of the proposed Facility (Site 1G) and alternative onshore site, Site 1H, similarly avoid impacts to sensitive habitats and species. Santa Ana Water Board also finds that the proposed offshore location (Station E) avoids impacts to sensitive habitats and species to the extent feasible; similarly, the proposed discharge location near Station E	Discharger's Submittals: • Appendix E • Appendix J • Appendix Q • Appendix W • Appendix BB • Appendix CC • Appendix PP • Appendix ZZ • Appendix AAA • Appendix BBB

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			avoids impacts to sensitive habitats and species to the extent feasible. In addition, basing this finding on the proximity and information available, the two alternative offshore sites (Stations U2 and D2) equally avoid impacts to sensitive habitats and species as compared to Station E. Attachment G.1 describes the presence of sensitive species and habitats at each of the alternative sites and evaluates the potential impacts of surface and subsurface intake technologies and brine discharge methods on these resources. (Attachment G.1, pages G.1-25, and G.1-31 to G.1-35)	• Appendix CCC • Appendix EEE • Appendix FFF • Appendix KKK • Appendix OOO • Appendix OO1 • Appendix OO2 • Appendix PPP • Appendix SSS • Appendix LLLL • Appendix HHHH • Appendix NNNN • Appendix NNNN Rev 1 • Appendix NNNN Rev 2 • Appendix OOOO • Appendix QQQQ • Appendix RRRR • Appendix SSSS • Appendix XXXX • Appendix ZZZZ1 • Appendix ZZZZ2 • Appendix AAAAA • Appendix DDDDD1 • Appendix DDDDD2

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
				• Appendix DDDDD3 • Appendix EEEEE • Appendix FFFFF • Appendix JJJJJ1 • Appendix JJJJJ2 • Appendix RRRRR Santa Ana Water Board Staff's analysis: • Attachment G.1 – Narrowing of the Site (Analysis in Support of Findings 6, 8-12)
9	M.2.b.(4)	Analyze the direct and indirect effects on all forms of marine life resulting from facility construction and operation, individually and in combination with potential anthropogenic effects on all forms of marine life resulting from other past, present, and reasonably foreseeable future activities within the area affected by the facility.	The Santa Ana Water Board considered the direct and indirect effects on all forms of marine life resulting from various alternative sites under consideration for the Facility, individually, and in combination with potential anthropogenic effects on all forms of marine life resulting from past, present, and reasonably foreseeable future activities within the area affected by the Facility. The narrowing of coastal segments and onshore sites evaluated the	Discharger's Submittals • Appendix E • Appendix H • Appendix J • Appendix Q • Appendix S • Appendix T • Appendix T Errata • Appendix V • Appendix W • Appendix HH

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			proximity to sensitive habitats and sensitive species (Attachment G.1, Sections 1 and 2, pages G.1-9 to G.1-17, G.1-19, G.1-25, and G.1-31 to G.1-35), and the detailed effects on all forms of marine life by the facility was evaluated for the offshore intake locations (Attachment G.1, Section 3, pages G.1-44 to G.1-58). Past impacts in the facility area were addressed previously. In 2003-2004, the California Energy Commission required AES HBGS to perform an entrainment study to examine the effects on marine life from the operation of the generating station intake. The study included an ETM/APF analysis (MBC Applied Environmental Sciences and Tenera Environmental, 2005). While this analysis was completed prior to Ocean Plan requirements for entrainment studies it does provide context for past activities in the facility area. While the intake APFs for the AES HBGS and the proposed Facility cannot be directly compared (the selected taxa and applicable confidence intervals differed), the APF	• Appendix OO1 • Appendix OO2 • Appendix BB • Appendix PP • Appendix AAA • Appendix BBB • Appendix CCC • Appendix JJJ • Appendix KKK • Appendix LLL • Appendix OOO • Appendix PPP • Appendix QQQ • Appendix RRR • Appendix SSS • Appendix UUU • Appendix VVV • Appendix EEEE • Appendix GGGG • Appendix HHHH • Appendix IIII • Appendix JJJJ • Appendix KKKK3 • Appendix LLLL • Appendix NNNN • Appendix NNNN Rev 1

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			for the generating station intake was at least twice the APF of the proposed Facility. Pursuant to the OTC Policy, AES HBGS was required to offset their impacts by providing funding for improving and maintaining approximately 66 acres for a 10-year period at the Huntington Beach wetlands. The Santa Ana Water Board adjusted the habitat value for shallow, soft bottom substrate in the facility areas as allowed under the Ocean Plan, to account for anthropogenic effects, in particular, the loss of soft bottom, open coast habitat from the construction of the Ports of Los Angeles and Long Beach. The details of this analysis are found in Attachment G.4. Additionally, per sections VIII and IX of the Monitoring and Reporting Program (Attachment E), the Discharger is required to perform monitoring that addresses indirect and direct effects from the operation of the proposed Facility and nearby discharges (e.g., OCSD outfall) and	• Appendix NNNN Rev 2 • Appendix OOOO • Appendix PPPP • Appendix QQQQ • Appendix RRRR • Appendix TTTT • Appendix VVVV • Appendix WWWW • Appendix XXXX • Appendix YYYY • Appendix ZZZZ1 • Appendix ZZZZ2 • Appendix AAAAA • Appendix BBBBB • Appendix BBBBB2 • Appendix BBBBB3 • Appendix DDDDD2 • Appendix EEEEE • Appendix FFFFF • Appendix IIIII • Appendix IIIII2 • Appendix RRRRR • Appendix SSSSS • Appendix WWWWW Santa Ana Water Board Staff's analysis:

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			must also participate in regional monitoring programs. Section VIII of the Monitoring and Reporting Program (pages E-17 to E-25) requires monitoring of water quality, sediment, benthic infauna, whole sediment toxicity, fish and epibenthic invertebrate monitoring, fish tissue chemistry and histopathology, and the performance of biological surveys and visual observations. Section IX of the Monitoring and Reporting Program (pages E-25 and E-26) requires the Discharger to participate in regional monitoring activities coordinated by the Southern California Coastal Water Research Project (SCCWRP), the Southern California Coastal Ocean Observation System (SCCOOS), and other appropriate agencies approved by the Santa Ana Water Board. Lastly, changing climate conditions may fundamentally alter the way desalination plants are designed and operated. Therefore, the Discharger is also required in Section VI.C.4 of the Order to submit a Climate Change Action Plan (CCAP) within 18 months of the effective date of the Order.	• Attachment G.1 – Narrowing of the Site (Analysis in Support of Findings 6, 8-12) 2019 Raimondi Report

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			Section VI.C.4. sets out the minimum factors that the CCAP must address. Chapter III.M.2.e.(1)(a) requires that a Discharger proposing to use a surface seawater intake use the ETM/APF method to evaluate entrainment impacts. The ETM/APF method is a robust approach that is used to assess direct and indirect impacts as it analyzes impacts on an ecosystem-level basis. To compare the direct and indirect effects of entrainment on marine life, the Santa Ana Water Board asked the Neutral Third Party Reviewer, Dr. Peter Raimondi, to evaluate the Discharger's ETM/APF for six alternative offshore sites in addition to the proposed intake location using the existing 2003-2004 AES HBGS data. In addition, Dr. Raimondi recommended an alternative analysis of two metrics, the mean larval concentration (MLC) and the standardized larval concentration (SLC). The intent of using the ETM/APF and the MLC and SLC calculations was to see if these approaches could be used as multiple	

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			lines of evidence to point to a specific station as the best intake location. The 2019 Raimondi Report concluded that the multiple lines of evidence did not necessarily point to one station as the best intake location to avoid direct and indirect effects to marine life. Also, the report concluded that there weren't sufficient data to perform ETM/APF analyses at the six alternative intake locations. Sufficient data to perform an ETM/APF analysis only existed for the Discharger's proposed intake location. Therefore, Dr. Raimondi recommended using analysis of the dual MLC/SLC metrics. Dr. Raimondi's analysis of these dual metrics indicated that stations D2 and U2 had potentially lower or comparable total entrainment to station E, based on the data available. However, as noted above, examining total entrainment alone does not provide a complete analysis of potential mortality and impacts to the ecosystem as does a well-designed ETM/APF analysis. To compare the indirect and direct effects on marine life at Stations D2 and U2 to Station E	

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			(located near the proposed intake) would require more data to complete a reasonable ETM/APF analysis. This finding is supported by Santa Ana Water Board staff's analysis Attachment G.1, Section 3, pages G.1-42 to G.1-49, and Attachment G.3. In addition, the Discharger argues in Appendix JJJJJ-1, that there are other environmental factors that indicate that Station E (the proposed intake location) is superior to alternative Stations D2 and U2 as a result of their closer proximity to sensitive habitats and/or species and MPAs. The Santa Ana Water Board concluded however, that all three sites have similar geology, bathymetry, hydrodynamic and oceanographic characteristics and that the other environmental factors do not point to anyone of the three stations being necessarily superior to one another. This is the case especially when the assessment of each Station for proximity to sensitive habitat/species and MPAs is not simply based on linear distance	

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			but wind and current directions, seasonality of larval dispersion, and connectivity between different MPAs (Attachment G.1, Section 3, pages G.1-53 to G.1-58).	
10	M.2.b.(5)	Analyze oceanographic geologic, hydrogeologic, and seafloor topographic conditions at the site, so that the siting of a facility, including the intakes and discharges, minimizes the intake and mortality of all forms of marine life	Based on oceanographic geologic, hydrogeologic, and seafloor topographic conditions, the Santa Ana Water Board finds that siting the Facility at the proposed onshore site, Site 1G, and its intake and discharge infrastructure at the proposed offshore sites near Station E minimizes intake and mortality of all forms of marine life. This finding is supported by Santa Ana Water Board staff's analysis in Attachment G.1, sections 1 and 2, pages G.1-8 to G.1-16, G.1-23 to G.1-25, G.1-29 to G.1-35, and Finding 9.	Discharger's Submittals: • Appendix A1 • Appendix A2 • Appendix A3 • Appendix A4 • Appendix A5 • Appendix A6 • Appendix E • Appendix F • Appendix G • Appendix H • Appendix J • Appendix K • Appendix L • Appendix L2 • Appendix L3 • Appendix L4 • Appendix M • Appendix OO2 • Appendix UU • Appendix ZZ • Appendix AAA

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
				• Appendix BBB • Appendix EEE • Appendix FFF • Appendix HHH • Appendix III • Appendix MMM • Appendix UUU • Appendix VVV • Appendix YYY • Appendix HHHH • Appendix OOOO • Appendix QQQQ • Appendix AAAAA • Appendix DDDDD1 • Appendix DDDDD2 • Appendix DDDDD3 • Appendix EEEEE • Appendix HHHHH1 • Appendix HHHHH2 • Appendix JJJJJ1 • Appendix JJJJJ2 • Appendix PPPPP • Appendix PPPPP2 • Appendix RRRRR • Appendix SSSSS Santa Ana Water Board Staff's analysis:

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				• Attachment G.1 – Narrowing of the Site (Analysis in Support of Findings 6, 8-12)
11	M2.b.(6)	Analyze the presence of existing discharge infrastructure, and the availability of wastewater to dilute the facility's brine discharge.	The proposed site has existing discharge infrastructure that can be converted for use by the proposed Facility. None of the other sites that were evaluated have existing infrastructure that can be used by the proposed Facility. Wastewater is not available to dilute the proposed Facility's brine discharge at the proposed site (Site 1G) or at nearby sites. Orange County Sanitation District (OCSD) is the only wastewater agency with an ocean outfall in the area of the proposed Facility. OCSD has indicated that commingling of their wastewater with the Discharger's brine would not be compatible with their strategic plan for 100% reuse of reclaimable wastewater. (Appendices CCC and DDD.).	Discharger's Submittals: • Appendix B • Appendix C • Appendix E • Appendix K • Appendix CC • Appendix JJ • Appendix OO2 • Appendix ZZ • Appendix AAA • Appendix BBB • Appendix CCC • Appendix DDD Santa Ana Water Board Staff's analysis: • Attachment G.1 – Narrowing of the Site (Analysis in Support of Findings 6, 8-12)

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			The Discharger previously proposed to commingle brine with wastewater from the adjacent HBGS as part of a co-located operation. However, HBGS is currently scheduled to cease once-through cooling (OTC) operations by December 31, 2023 under the State's OTC Policy. HBGS is currently permitted to operate only one unit, Unit 2, at a reduced intake flow capacity, with an intake flow of about 63 MGD when not producing power and up to 127 MGD when producing power as a peak unit. The substantial reduction and eventual termination of OTC operations will significantly reduce HBGS's discharge and the available wastewater will not be sufficient to commingle with the proposed Facility's brine discharge to meet the receiving water limitations for salinity. As such, the Discharger will not be able to commingle brine discharge with wastewater from the adjacent HBGS. This finding is supported by Santa Ana Water Board staff's analysis in Section 2 of Attachment G.1.	

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12	M.2.b.(7)	Ensure that the intake and discharge structures are not located within a MPA or SWQPA with the exception of intake structures that do not have marine life mortality associated with the construction, operation, and maintenance of the intake structures (e.g. slant wells). Discharges shall be sited at a sufficient distance from a MPA or SWQPA so that the salinity within the boundaries of a MPA or SWQPA does not exceed natural background salinity. To the extent feasible, surface intakes shall be sited so as to maximize the distance from a MPA or SWQPA.	The proposed offshore sites for the proposed Facility's intake and discharge structures are not located within a MPA or SWQPA boundary. The proposed offshore site for the discharge is a sufficient distance from MPA and SWQPA so that the salinity within the boundaries of a MPA or SWQPA will not exceed natural background conditions due to the influence of the discharge. There are several MPAs in the vicinity of the Facility: Bolsa Bay State Marine Conservation Area (approximately 5 miles upcoast), Bolsa Chica Basin State Marine Conservation Area (approximately 5 miles upcoast), Upper Newport Bay State Marine Conservation Area (approximately 5 miles downcoast), and Crystal Cove Marine Protected Area (approximately 8 miles downcoast). The nearest SWQPA is the Robert E. Badham Area of Special Biological Significance, which is located approximately 8 miles south of the Facility's location.	Discharger's Submittals: • Appendix D • Appendix E • Appendix F • Appendix W • Appendix BB • Appendix CC • Appendix OO1 • Appendix OO2 • Appendix UU • Appendix ZZ • Appendix AAA • Appendix BBB • Appendix CCC • Appendix OOO • Appendix PPP • Appendix QQQ • Appendix RRR • Appendix CCCC • Appendix KKK1 • Appendix KKKK2 • Appendix KKKK3 • Appendix OOOO • Appendix RRRR • Appendix AAAAA • Appendix DDDDD1 • Appendix DDDDD2

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			Additionally, as shown in Attachment G.1 (Section 3, Table 2), the proposed intake, and alternative intake locations, are considered about equal in proximity to MPAs. The Santa Ana Water Board finds that Stations E, D2 and U2, are sited to maximize distance to the nearest MPA and SWQPA, and the discharge is located a sufficient distance from any MPA and SWQPA. This finding is supported in Santa Ana Water Board staff's analysis in Attachment G.1. Based on Findings 6 to 12 and the analyses supporting these findings in Attachments G.1 and G.2, the Santa Ana Water Board finds the onshore location at Site 1G and the offshore location at Station E are the best available sites feasible to minimize intake and mortality of all forms of marine life. The Santa Ana Water Board considered environmental, technological, economic, and social factors to determine site feasibility and a detailed analysis of these factors is set forth in Section 3 of Attachment G.1.	• Appendix DDDDD3 • Appendix EEEEE • Appendix FFFFF • Appendix WWWWW Santa Ana Water Board Staff's analysis: • Attachment G.1 – Narrowing of the Site (Analysis in Support of Findings 6, 8-12)

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N/A	M.2.c.	Design is the size, layout, form, and function of a facility, including the intake capacity and the configuration and type of infrastructure, including intake and outfall structures. The regional water board shall require that the owner or operator perform the following in determining whether a proposed facility design is the best available design feasible to minimize intake and mortality of all forms of marine life:	--	
13	M.2.c.(1)	For each potential site, analyze the potential design configurations of the intake, discharge, and other facility infrastructure to avoid impacts to sensitive habitats and sensitive species.	The Discharger provided the conceptual designs for the infrastructure at the proposed onshore and offshore locations in Appendices D, E, JJJJJ-1, JJJJJ-2, and RRRRR. The Discharger also provided conceptual plans for the infrastructure for each alternative site (Sites 1D, 1E, 1H, and 2A) in Appendix RRRR. The designs took into consideration proximity to sensitive habitats and species and avoiding impacts to sensitive habitats and sensitive species. The Santa Ana Water Board reviewed the conceptual plans and finds that the Discharger's proposed site design	Discharger's submittals: • Appendix A5 • Appendix D • Appendix E • Appendix G • Appendix F • Appendix M • Appendix R • Appendix S • Appendix AA • Appendix CC • Appendix HH • Appendix JJ • Appendix CCC • Appendix DDD • Appendix BBBB

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			is the best design available feasible to avoid impacts to sensitive habitats and sensitive species. This finding is supported by Santa Ana Water Board staff's analysis in Sections 2 and 3 of Attachment G.1.	• Appendix CCCC • Appendix DDDD • Appendix EEEE • Appendix FFFF • Appendix IIII • Appendix JJJJ • Appendix UUUU • Appendix WWWW • Appendix KKKK • Appendix KKKK2 • Appendix PPPP • Appendix QQQQ • Appendix RRRR • Appendix BBBBB • Appendix BBBBB2 • Appendix BBBBB3 • Appendix TTTTT • Appendix JJJJJ1 • Appendix JJJJJ2 • Appendix RRRRR Santa Ana Water Board Staff's analysis: • Attachment G.1 – Narrowing of the Site (Analysis in Support of Findings 6, 8 -12)

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14	M.2.c.(2)	If the regional water board determines that subsurface intakes are not feasible and surface water intakes are proposed instead, analyze potential designs for those intakes in order to minimize the intake and mortality of all forms of marine life.	Subsurface intakes are not feasible. See Findings 6, 19; Attachment G.1, pages G.1-9 to G.1-16, G.1-23 to G.1-25, and G.1-29 to G.1-35. The Discharger proposes to use surface intakes. Prior to operation of the Facility, the Discharger proposes to modify the existing HBGS intake structure with an array of four 91-inch, cylindrical wedgewire screens (WWS) with 1-mm slot widths to minimize entrainment of marine life, as required in chapter III.M.2.d.(1)(c)ii. The four WWS will be installed on a new header connected to the existing HBGS intake tower. There will be three operating WWS and one WWS for redundancy. The intake will be located approximately 1,840 feet offshore. Feedwater for the Facility would be withdrawn through the WWS with a through-screen velocity of 0.5 feet per second or less to minimize impingement, as required in chapter III.M.2.d.(1)(c)iv. The overall screen lengths would be approximately 26 feet, each with an effective screening area of	Discharger's submittals: • Appendix H • Appendix J • Appendix K • Appendix R • Appendix S • Appendix AA • Appendix EE • Appendix HH • Appendix II • Appendix JJ • Appendix LL1 • Appendix DDD • Appendix EEE • Appendix FFF • Appendix BBBB • Appendix CCCC • Appendix DDDD • Appendix IIII • Appendix HHHHH1 • Appendix HHHHH2 • Appendix IIIII • Appendix IIIII2 • Appendix JJJJJ1 • Appendix JJJJJ2 • Appendix KKKK3 • Appendix RRRRR

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			approximately 105 inches. (Appendices HH and JJ). The Santa Ana Water Board finds that the Discharger's proposed surface intake design is the best available design feasible to minimize intake and mortality of marine life and is consistent with the design parameters included in the technology requirements of chapter III.M.2.d. See also Findings 23, 24, and 26; Order section IV.B.	• Appendix TTTTT
15	M.2.c.(3)	Design the outfall so that the brine mixing zone does not encompass or otherwise adversely affect existing sensitive habitat.	The brine mixing zone for the Facility will not exceed 100 meters radially from the diffuser as required by chapter III.M.3.b.(1) and (2). The existing sensitive habitats are not in the vicinity of the brine mixing zone. See Findings 12, 28, 64, and 65. The Monitoring and Reporting Program (Attachment E) in the Order requires monitoring to verify that salinity is meeting the receiving water limits set forth in Ocean Plan chapter III.M.3. which will ensure that salinity will not impact sensitive habitats.	Discharger's Submittals: • Appendix A5 • Appendix R • Appendix S • Appendix HH • Appendix CCC • Appendix CCC • Appendix BBBB • Appendix CCCC • Appendix KKKK • Appendix KKKK2 • Appendix UUUU • Appendix BBBBB • Appendix BBBBB2

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			The Santa Ana Water Board finds that the proposed linear diffuser is designed so that the brine mixing zone does not encompass or otherwise result in adverse effects to existing sensitive habitat.	Roberts Diffuser Design Report Roberts HB Diffuser Report
16	M.2.c.(4)	Design the outfall so that discharges do not result in dense, negatively buoyant plumes that result in adverse effects due to elevated salinity or hypoxic conditions occurring outside the brine mixing zone. An owner or operator must demonstrate that the outfall meets this requirement through plume modeling and/or field studies. Modeling and field studies shall be approved by the regional water board in consultation with State Water Board staff.	The Discharger proposes to install a multiport linear diffuser at the end of the HBGS's current outfall to discharge the effluent brine, consistent with the results of Dr. Roberts's independent review. (See Finding 28.) The Discharger submitted mixing zone studies in Appendices BBBBB and NNNNN. The Discharger's studies, the Roberts Diffuser Design Report, and the Roberts HB Diffuser Report found that discharges from the proposed multiport diffuser, under conservative flow and receiving water conditions, would be able to achieve rapid mixing of the discharge and meet the 2 ppt above natural background conditions water quality standard within an average radius from the outfall of 22.4 meters (73.4	Discharger's Submittals: • Appendix F • Appendix R • Appendix HH • Appendix UU • Appendix CCC • Appendix BBBB • Appendix CCCC • Appendix DDDD • Appendix KKKK • Appendix KKKK2 • Appendix KKKK3 • Appendix UUUU • Appendix BBBBB • Appendix BBBBB2 • Appendix BBBBB3 • Appendix NNNNN • Appendix SSSSS Roberts Diffuser Design Report

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			feet) and a maximum distance of 39.6 meters (130 feet) from Discharge Point No. EEF-001. The rapid mixing of the discharge will prevent the formation of dense, negatively buoyant plumes. The Santa Ana Water Board approves the Discharger's modeling and studies and finds that the modeling for the diffuser design demonstrates that the diffuser will result in rapid mixing to prevent the formation of dense, negatively buoyant plumes that could result in adverse effects due to elevated salinity or hypoxic conditions occurring outside the brine mixing zone. (Discharger's Appendix NNNNN)	Roberts HB Diffuser Report
17	M.2.c.(5)	Design outfall structures to minimize the suspension of benthic sediments.	The Discharger performed computational fluid dynamic (CFD) modeling of the discharge from the proposed 14-port linear diffuser to determine the potential for discharge-induced suspension of benthic sediments. The CFD model indicated that a discharge jet at 60 degrees from the seabed, significantly reduces	Discharger's Submittals: • Appendix HH • Appendix BBBB • Appendix DDDD • Appendix KKKK • Appendix KKKK2 • Appendix KKKK3 • Appendix LLLL

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			the velocity of the discharge plume before it falls to the seabed that minimizes the suspension of benthic sediments. The model indicated that discharge-induced velocities on the seafloor adjacent to the outfall would temporarily remove the finest grained seabed sediment on top of the seafloor; however, the underlying coarser grained seabed sediments would remain on the seafloor and would not disperse except as a result of natural ocean currents. Also, the model concludes that the temporary suspension of finer grained benthic sediments would occur within a 65-foot radius from the diffuser and an equilibrium would be reached where only coarser benthic sediments remain. (Appendix NNNNN) The Santa Ana Water Board has evaluated the Discharger's modeling study and finds that the diffuser design will minimize the suspension of benthic sediments.	• Appendix BBBBB • Appendix BBBBB2 • Appendix NNNNN
N/A	M.2.d	Technology is the type of equipment, materials, and methods that are used to construct and operate the design components of the desalination facility.	--	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		The regional water board shall apply the following considerations in determining whether a proposed technology is the best available technology feasible to minimize intake and mortality of all forms of marine life		
18	M.2.d.(1)(a)	Subject to chapter M.2.a.(2), the regional water board in consultation with State Water Board staff shall require subsurface intakes unless it determines that subsurface intakes are not feasible based upon a comparative analysis of the factors listed below for surface and subsurface intakes. A design capacity in excess of the need for desalinated water as identified in chapter III.M.2.b.(2) shall not be used by itself to declare subsurface intakes as not feasible.	Subsurface intakes are not feasible at the proposed site or at nearby sites. (See Findings 6, 19.) The need for 56,000 AFY of desalinated water is consistent with applicable water planning documents. (See Finding 7.) The finding that subsurface intakes are not feasible was not based upon a design capacity in excess of the need for desalinated water.	Discharger's Submittals: • Appendix A1 • Appendix A2 • Appendix A3 • Appendix A5 • Appendix A6 • Appendix D • Appendix E • Appendix F • Appendix G • Appendix III • Appendix HHH • Appendix K • Appendix L • Appendix L2 • Appendix L3 • Appendix L4 • Appendix M • Appendix QQQQ • Appendix PPPPP • Appendix PPPPP2

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
19	M.2.d.(1)(a)(i)	The regional water board shall consider the following factors in determining feasibility of subsurface intakes: geotechnical data, hydrogeology, benthic topography, oceanographic conditions, presence of sensitive habitats, presence of sensitive species, energy use for the entire facility; design constraints (engineering, constructability), and project life cycle cost. Project life cycle cost shall be determined by evaluating the total cost of planning, design, land acquisition, construction, operations, maintenance, mitigation, equipment replacement and disposal over the lifetime of the facility, in addition to the cost of decommissioning the facility. Subsurface intakes shall not be determined to be economically infeasible solely because subsurface intakes may be more expensive than surface intakes. Subsurface intakes may be determined to be economically infeasible if the additional costs or lost profitability associated with subsurface intakes, as compared to surface intakes, would render the desalination facility not economically viable. In addition, the regional water board may evaluate other site- and facility-specific factors.	Based on a comparative analysis of surface and subsurface intakes that considered geotechnical data, hydrogeology, benthic topography, oceanographic conditions, presence of sensitive habitats, presence of sensitive species, energy use for the entire facility, design constraints, and project life cycle cost, the Santa Ana Water Board finds that subsurface intakes are not feasible. A detailed analysis supporting this finding is set forth in Attachment G.1. (See Attachment G.1 and Finding 6.)	Discharger's Submittals: • Appendix A1 • Appendix A2 • Appendix A3 • Appendix A5 • Appendix A6 • Appendix D • Appendix E • Appendix F • Appendix G • Appendix K • Appendix L • Appendix M • Appendix OO2 • Appendix QQ • Appendix MMM • Appendix YYY • Appendix ZZZ • Appendix AAAA • Appendix PPPP • Appendix PPPP2 • Appendix QQQQ • Appendix HHHHH1 • Appendix HHHHH2 • Appendix WWWWW

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
				Santa Ana Water Board Staff’s analysis: • Attachment G.1 – Narrowing of the Site (Analysis in Support of Findings 6, 8-12) Other Documents: • Santa Ana Water Board Letter to the Discharger dated May 17, 2019 • Final Staff Report Including the Final Substitute Environmental Documentation, Amendment to the Water Quality Control Plan for Ocean Waters of California Addressing Desalination Facility Intakes, Brine Discharges, and the Incorporation of Other Non-

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
				Substantive Changes, May 2015
20	M.2.d.(1)(a)(ii)	If the regional water board determines that subsurface intakes are not feasible for the proposed intake design capacity, it shall determine whether subsurface intakes are feasible for a reasonable range of alternative intake design capacities. The regional water board may find that a combination of subsurface and surface intakes is the best feasible alternative to minimize intake and mortality of marine life and meet the identified need for desalinated water as described in chapter III.M.2.b.(2).	After concluding that a subsurface intake system was not feasible for the proposed intake of 106.7 MGD and reviewing technical documents on subsurface feasibility that were submitted by California Coastkeeper Alliance (June 2018), the Santa Ana Water Board requested further analyses from the Discharger on the feasibility of a combined subsurface and surface intake system. Based on information provided by the Orange County Water District (OCWD) regarding potential impacts to seawater intrusion barriers and groundwater resources, the Santa Ana Water Board specifically asked the Discharger to analyze the maximum intake that could be achieved while allowing for no more than 1,000 AFY to be withdrawn from inland aquifers. (See Letter from OCWD dated May 18, 2018.) The Discharger responded to the Santa Ana Water Board's request by submitting additional hydrogeologic	Discharger's Submittals: • Appendix A5 • Appendix D • Appendix G • Appendix J • Appendix XXX • Appendix JJJJJ1 • Appendix JJJJJ2 • Appendix PPPPP • Appendix PPPPP2 Santa Ana Water Board Staff's analysis: • Regional Board Letter to the Discharger dated May 17, 2019 Other Submittals: • Orange County Water District, May 18, 2018. • California Coastkeeper

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			modeling by Geosyntec (Appendices PPPPP and PPPPP-2) in February and March 2019. Based on those modeling results, Geosyntec concluded that in order to conform with the OCWD's threshold of 1,000 AFY, the maximum pumping rate for a small-scale (three-well) system of slant wells at Huntington Beach would be approximately 3.8 MGD. This is roughly 3.5% of the design intake flow of 106.7 MGD for the proposed Huntington Beach desalination facility. The remaining 96.5 %, roughly 103 MGD, would need to be drawn in through a surface water intake system. With respect to potential impacts associated with wetlands, results of the most recent model indicated that approximately 1% to 4% of the 3.8 MGD of groundwater extracted by the small-scale slant well system would flow from the coastal margin wetlands. Thus, based on the modeling and sensitivity analyses performed by Geosyntec, it appears that the operation of the three-well extraction system would likely have minimal impacts to the wetland areas	Alliance (CCKA), June 21, 2018

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			if operated at a maximum extraction rate of 3.8. MGD. The modeling results presented by Poseidon Water, together with the hydrogeologic and geophysical data submitted to support those modeling results and the input parameters used in the models, provide an adequate assessment of potential impacts associated with operation of a combination subsurface/surface intake system for Poseidon Water's proposed Facility. The Santa Ana Water Board concurs with the findings and conclusions that Geosyntec presented, indicating that a small-scale (three-well) slant well system could produce a maximum of approximately 3.8 MGD, given the constraints set forth by the OCWD for protection of its seawater intrusion barrier wells and groundwater resources. Considering the critical need to protect the seawater barrier system, and the limited production volume that could be supplied by a small-scale slant well system, it will be necessary to utilize a	

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			surface water intake system for over 96% of the combined intake for the Facility. Given that almost all of the water would be supplied through surface intakes, the use of the small-scale slant well system in combination with a surface intake system would not result in any significant change to the intake and mortality of marine life when compared to the use of a surface water intake system alone. Requiring a combination intake system to achieve such a nominal reduction in the intake and mortality of marine life is not a feasible alternative given the costs of designing and constructing a slant well system, and the environmental and social impacts associated with the construction. Therefore, the Santa Ana Water Board finds that subsurface and combined subsurface/surface intakes are not the best feasible alternative for the proposed intake design capacity. The Santa Ana Water Board's analysis of the subsurface intake feasibility is additionally discussed in Attachment G.1. The Santa Ana Water Board finds subsurface intakes	

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			are infeasible for all reasonable intake design capacities. See also Findings 6 and 19.	
21	M.2.d.(1)(b)	Installation and maintenance of a subsurface intake shall avoid, to the maximum extent feasible, the disturbance of sensitive habitats and sensitive species.	Not applicable	
22	M.2.d.(1)(c)	If subsurface intakes are not feasible, the regional water board may approve a surface water intake subject to the following conditions:	Subsurface intakes are not feasible. (See Findings 6, 18, 19, and 20.) As such, the Santa Ana Water Board approves the use of a surface water intake for the proposed Facility, subject to the conditions in Findings 23, 24, and 26 and section IV.B of the Order. The Santa Ana Water Board finds that the proposed surface intake as conditioned in Findings 23, 24, and 26 is the best available intake technology feasible to minimize intake and mortality of all forms of marine life.	
23	M.2.d.(1)(c)i	The regional water board shall require that surface water intakes be screened. Screens must be functional while the facility is withdrawing seawater.	The Discharger must equip the surface water intake for the proposed Facility with screens installed at the end of the pipe. The screens must be functional at all times when the facility is withdrawing seawater as proposed	Discharger's submittals: • Appendix A • Appendix A5 • Appendix H • Appendix AA • Appendix EE

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			in Appendices H and JJ. (See Finding 14; Order, section IV.B.)	• Appendix HH • Appendix II • Appendix JJ • Appendix LL1 • Appendix EEE • Appendix FFF • Appendix UUU • Appendix VVV • Appendix HHHH • Appendix IIIII • Appendix IIIII2
24	M.2.d(1)(c).ii	In order to reduce entrainment, all surface water intakes must be screened with a 1.0 mm (0.04 in) or smaller slot size screen when the desalination facility is withdrawing seawater.	The Discharger must equip the surface water intake for the proposed Facility with 1.0 mm stainless steel wedgewire screens when the facility is withdrawing seawater as proposed in Appendix JJ. (See Finding 14; Order, section IV.B.) The Santa Ana Water Board finds that stainless steel is the best available feasible technology for the composition of the wedgewire screens to minimize intake and mortality of all forms of marine life. Consistent with the 2017 Final Supplemental Environmental Impact Report certified by the State Lands Commission, the stainless steel	Discharger's submittals: • Appendix A • Appendix H • Appendix AA • Appendix EE • Appendix HH • Appendix II • Appendix JJ • Appendix LL1 • Appendix EEE • Appendix FFF • Appendix UUU • Appendix VVV • Appendix HHHH • Appendix IIIII

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			wedgewire screens must be rotating brush-cleaned (self-cleaning) screens. The Discharger may use a boat-based airburst system or deploy divers to clean the wedgewire screens.	• Appendix IIIII2
25	M.2.d.(1)(c).iii	An owner or operator may use an alternative method of preventing entrainment so long as the alternative method results in intake and mortality of eggs, larvae, and juvenile organisms that is less than or equivalent to a 1.0 mm (0.04 in) slot size screen. The owner or operator must demonstrate the effectiveness of the alternative method to the regional water board. The owner or operator must conduct a study to demonstrate the effectiveness of the alternative method, and use an Empirical Transport Model (ETM)/ Area of Production Forgone (APF) approach to estimate entrainment. The study period shall be at least 12 consecutive months. Sampling for environmental studies shall be designed to account for variation in oceanographic or hydrologic conditions and larval abundance and diversity such that abundance estimates are reasonably accurate. Samples must be collected using a mesh size no larger than 335 microns and individuals collected shall be	Not applicable	

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		identified to the lowest taxonomical level practicable. The ETM/APF analysis shall evaluate entrainment for a broad range of species, species morphologies, and sizes under the environmental and operational conditions that are representative of the entrained species and the conditions at the full-scale desalination facility. At their discretion, the regional water boards may permit the use of existing entrainment data to meet this requirement.		
26	M.2.d(1)(c) iv	In order to minimize impingement, through-screen velocity at the surface water intake shall not exceed 0.15 meters per second (0.5 feet per second).	The Discharger's surface water intake shall not exceed a through-screen velocity of 0.5 feet per second. (See Order, section IV.B.)	Discharger's submittals: • Appendix A • Appendix H • Appendix AA • Appendix EE • Appendix HH • Appendix II • Appendix JJ • Appendix LL1 • Appendix EEE • Appendix FFF • Appendix UUU • Appendix VVV • Appendix HHHH • Appendix IIIII • Appendix IIIII2

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
27	M.2.d.(2)(a)	The preferred technology for minimizing intake and mortality of all forms of marine life resulting from brine discharge disposal is to commingle brine with wastewater (e.g., agricultural, municipal, industrial, power plant cooling water, etc.) that would otherwise be discharged to the ocean. The wastewater must provide adequate dilution to ensure salinity of the commingled discharge meets the receiving water limitation for salinity in chapter III.M.3. Nothing in this section shall preclude future recycling of the wastewater.	Wastewater is not available to dilute the Facility's brine discharge. (See Finding 11.) As such, the Santa Ana Water Board finds that commingling of the brine with wastewater is not feasible.	Discharger's submittals: • Appendix E • Appendix CC • Appendix DD • Appendix JJ • Appendix OO2 • Appendix CCC • Appendix DDD • Appendix WWW
28	M.2.d.(2).(b)	Multiport diffusers are the next best method for disposing of brine when the brine cannot be diluted by wastewater and when there are no live organisms in the discharge. Multiport diffusers shall be engineered to maximize dilution, minimize the size of the brine mixing zone, minimize the suspension of benthic sediments, and minimize mortality of all forms of marine life.	In the ROWD and 13142.5(b) determination request, the Discharger proposed to modify the existing HBGS cooling water discharge system for brine disposal with the installation of a 3-port, 47-degree angle diffuser. The Santa Ana Water Board hired Dr. Philip Roberts to review the then-proposed diffuser design to determine if the design was the best available feasible to minimize the intake and mortality of marine life. Dr. Roberts determined that the Discharger's proposed 3-port diffuser design was not best available technology as it would create surface boil and result in significantly greater shearing-related	Discharger's submittals: • Appendix D • Appendix JJ • Appendix OO2 • Appendix CCC • Appendix BBBB • Appendix CCCC • Appendix DDDD • Appendix IIII • Appendix JJJJ • Appendix KKKK • Appendix KKKK2 • Appendix KKKK3 • Appendix UUUU • Appendix WWWW

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			mortality (three times as much) than other feasible diffuser designs. Dr. Roberts prepared two reports with recommendations to the Santa Ana Water Board: the first report, Roberts Diffuser Design Report, provided the methodology for designing and analyzing brine diffusers, and his second report, Roberts HB Diffuser Report analyzed the best available diffuser design to minimize the shearing-related mortality associated with the brine discharge from the proposed desalination facility. The Roberts HB Diffuser Report recommended a different diffuser to ensure the design meets this Ocean Plan requirement to maximize the dilution and minimize the brine mixing zone. The Discharger revised the diffuser design using the methodology recommended by Dr. Roberts and proposed a fourteen-port linear diffuser to be installed at the end of the HBGS's current outfall to discharge the effluent brine. The Discharger's proposed linear diffuser has 14, 15.4-inch diameter	• Appendix BBBBB • Appendix BBBBB2 • Appendix BBBBB3 • Appendix NNNNN • Appendix SSSSS Roberts Diffuser Design Report Roberts HB Diffuser Report

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			duckbill ports that are inclined 60 degrees and each one is equipped with a duck-bill nozzle. The 14-port linear diffuser's configuration consists of two 7-port header sections connected on either side (shoreward and seaward) of the existing discharge tower. The entire linear diffuser would be oriented perpendicular to the shore to minimize wave loading forces on the diffuser. The diffuser is designed to handle the permitted discharge capacity and will be installed prior to operations. The Discharger submitted mixing zone studies in Appendices BBBBB and NNNNN. The studies found that under the proposed discharge conditions and receiving water conditions, discharges from the proposed subsurface multiport diffuser, would be able to achieve rapid mixing of the discharge and meet the 2 ppt above natural background conditions water quality standard within an average radius from the outfall of 22.4 meters (73.4 feet) and a maximum distance of 39.6 meters (130 feet) of Discharge Point No. EEF-001, and results in	

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			maximizing the dilution and minimizing the brine mixing zone. In addition, a computational fluid dynamics analysis presented in Appendix NNNNN of the ROWD indicates minimal benthic sediment suspension is likely to occur as a result of the discharge from the proposed diffuser. The diffuser design will also promote rapid mixing to prevent the formation of dense, negatively buoyant plumes that could result in adverse effects due to elevated salinity or hypoxic conditions occurring outside the brine mixing zone. (See Findings 16, 17.) The Santa Ana Water Board finds that the proposed diffuser design maximizes dilution, minimizes the size of the brine mixing zone (BMZ), minimizes the suspension of benthic sediments, and minimizes mortality to all forms of marine life within the receiving water, and is thus the best available technology feasible.	
29	M.2.d.(2).(c)	Brine discharge disposal technologies other than wastewater dilution and multiport diffusers, may be used if an owner or operator can demonstrate to the regional water board that the technology	Not applicable	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		provides a comparable level of intake and mortality of all forms of marine life as wastewater dilution if wastewater is available, or multiport diffusers if wastewater is unavailable. The owner or operator must evaluate all of the individual and cumulative effects of the proposed alternative discharge method on the intake and mortality of all forms of marine life, including (where applicable); intake-related entrainment, osmotic stress, turbulence that occurs during water conveyance and mixing, and shearing stress at the point of discharge. When determining the intake and mortality associated with a brine discharge disposal technology or combination of technologies, the regional water board shall require the owner or operator to use empirical studies or modeling to:		
30	M.2.d.(2).(c).i	Estimate intake entrainment impacts using an ETM/APF approach.	Not applicable	
31	M.2.d.(2).(c).ii	Estimate degradation of all forms of marine life from elevated salinity within the brine mixing zone, including osmotic stresses, the size of impacted area, and the duration that all forms of marine life are exposed to the toxic conditions. Considerations shall be given to the most	Not applicable	

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		sensitive species, and community structure and function.		
32	M.2.d.(2).(c).iii	Estimate the intake and mortality of all forms of marine life that occurs as a result of water conveyance, in-plant turbulence or mixing, and waste discharge.	Not applicable	
33	M.2.d.(2).(c).iv	Within 18 months of beginning operation, submit to the regional water board an empirical study that evaluates intake and mortality of all forms of marine life associated with flow augmentation the alternative brine discharge technology. The study must evaluate impacts caused by any augmented intake volume, intake and pump technology, water conveyance, waste brine mixing, and effluent discharge. Unless demonstrated otherwise, organisms entrained by flow augmentation the alternative brine discharge technology are assumed to have a mortality rate of 100 percent. The study period shall be at least 12 consecutive months. If the regional water board requires a study period longer than 12 months, the final report must be submitted to the regional water board within 6 months of the completion of the empirical study.	Not applicable	
34	M.2.d.(2).(c).v	If the empirical study shows that flow augmentation the alternative brine discharge disposal technology results in	Not applicable	

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		more intake and mortality of all forms of marine life than a facility using wastewater dilution or multiport diffusers, then the facility must either (1) cease using flow augmentation the alternative brine discharge technology and install and use wastewater dilution or multiport diffusers to discharge brine waste, or (2) re-design the flow augmentation the alternative brine discharge technology system to minimize intake and mortality of all forms of marine life to a level that is comparable with wastewater dilution if wastewater is available, or multiport diffusers if wastewater is unavailable, subject to regional water board approval.		
35	M.2.d.(2).(d).(i)	At facilities that use subsurface intakes to supply augmented flow water for dilution. Facilities that use subsurface intakes to supply augmented flow water for dilution are exempt from the requirements of chapter III.M.2.d.(2)(c) if the facility meets the receiving water limitations for salinity.	Not applicable	
36	M.2.d.(2).(d).(ii)	At a facility that has received a conditional Water Code section 13142.5(b) determination and is over 80 percent constructed by [the effective date of this plan]. If the An owner or operator of the facility proposes proposing to use flow augmentation as an alternative brine	Not applicable	

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		discharge technology, the facility must: Use low turbulence intakes (e.g., screw centrifugal pumps or axial flow pumps) and conveyance pipes.; convey and mix dilution water in a manner that limits thermal stress, osmotic stress, turbulent shear stress, and other factors that could cause intake and mortality of all forms of marine life; Facilities proposing to using flow augmentation must comply with chapter III.M.2.d.(1); facilities proposing to using flow augmentation through surface intakes are prohibited from and not discharging through multiport diffusers.		
N/A	M.2.e.	Mitigation for the purposes of this section is the replacement of all forms of marine life or habitat that is lost due to the construction and operation of a desalination facility after minimizing intake and mortality of all forms of marine life through best available site, design, and technology. The regional water board shall ensure an owner or operator fully mitigates for the operational lifetime of the facility and uses the best available mitigation measures feasible to minimize intake and mortality of all forms of marine life. The owner or operator may choose whether to satisfy a facility's mitigation measures	--	

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		pursuant to chapter III.M.2.e.(3) or, if available, M.2.e.(4), or a combination of the two.		
37	M.2.e.(1)	Marine Life Mortality Report. The owner or operator of a facility shall submit a report to the regional water board estimating the marine life mortality resulting from construction and operation of the facility after implementation of the facility's required site, design, and technology measures.	The Discharger submitted a Marine Life Mortality Report as part of their proposed Marine Life Mitigation Plan (MLMP) (Appendix TT4). The Marine Life Mortality Report estimates the marine life mortality resulting from the construction and operation of the proposed Facility after implementation of the required site, design, and technology measures. As explained in Findings 38 and 39 and Attachment G.3, the Discharger's estimated mortality for the Facility's intake and discharge in Table 1 of Appendix TT4 differs slightly from the Santa Ana Water Board's calculations. Where there are differences between the Discharger's and the Santa Ana Water Board's calculations, the Santa Ana Water Board's calculations are controlling.	Discharger's submittals: • Appendix A4 • Appendix D • Appendix G • Appendix H • Appendix V • Appendix HH • Appendix TT4 • Appendix YY • Appendix JJJ • Appendix LLL • Appendix NNN • Appendix CCCC • Appendix EEEE • Appendix IIII • Appendix NNNN • Appendix NNNN Rev 1 • Appendix NNNN Rev 2 • Appendix TTTT • Appendix UUUU • Appendix WWWW • Appendix XXXX • Appendix YYYY

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				• Appendix ZZZZ1 • Appendix ZZZZ2 • Appendix AAAAA • Appendix DDDDD1 • Appendix DDDDD2 • Appendix DDDDD3 • Appendix EEEEE Santa Ana Water Board Staff's analysis: • Attachment G.3 – ETM/APF Analysis for a Surface Intake and Discharge at Station E (Discharger's Proposed Intake/Discharge Location) Raimondi Report
38	M.2.e.(1).(a)	For operational mortality related to intakes, the report shall include a detailed entrainment study. The entrainment study period shall be at least 12 consecutive months and sampling shall be designed to account for variation in oceanographic or hydrologic conditions and larval	The Discharger's Marine Life Mortality Report includes a detailed entrainment study. The Discharger relied on the entrainment study for the Huntington Beach Generating Station, which was conducted in 2003-2004. The 2003-2004 data, presented in	Discharger's submittals: • Appendix A • Appendix D • Appendix Q • Appendix T • Appendix T Errata

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		abundance and diversity such that abundance estimates are reasonably accurate. At their discretion, the regional water boards may permit the use of existing entrainment data from the facility to meet this requirement. Samples must be collected using a mesh size no larger than 335 microns and individuals collected shall be identified to the lowest taxonomical level practicable. The ETM/APF analysis shall be representative of the entrained species collected using the 335 micron net. The APF shall be calculated using a one-sided, upper 95 percent confidence bound for the 95th percentile of the APF distribution. An owner or operator with subsurface intakes is not required to do an ETM/APF analysis for their intakes and is not required to mitigate for intake-related operational mortality. The regional water board may apply a one percent reduction to the APF acreage calculated in the Marine Life Mortality Report to account for the reduction in entrainment of all forms of marine life when using a 1.0 mm slot size screen.	Appendix Q, were collected pursuant to requirements of the California Energy Commission and performed in accordance with the design and sampling requirements listed in Ocean Plan chapter III.M.2.e(1)(a). (Attachment G.1, Section 3 and Attachment G.3 contain an additional discussion of this dataset.) The Santa Ana Water Board approves the Discharger's use of this existing entrainment data for their entrainment study. The Empirical Transport Model/Area of Production Foregone (ETM/APF) analysis provides a method to determine the likely indirect and direct impacts that will result from entrainment from an offshore surface intake and discharge for a desalination facility. This analysis translates the impact (APF is an estimate of the area that provides equivalent ecological value commensurate with that removed by entrainment from a desalination facility's intake) into the number of acres that will be needed to mitigate for the impact.	• Appendix V • Appendix W • Appendix AA • Appendix BB • Appendix HH • Appendix NNN • Appendix OOO • Appendix PPP • Appendix SSS • Appendix HHHH • Appendix IIII • Appendix LLLL • Appendix NNNN • Appendix NNNN Rev 1 • Appendix NNNN Rev 2 • Appendix OOOO • Appendix SSSS • Appendix TTTT • Appendix VVVV • Appendix WWWW • Appendix XXXX • Appendix YYYY • Appendix ZZZZ1 • Appendix ZZZZ2 Santa Ana Water Board Staff's analysis:

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			The Discharger conducted numerous ETM/APF analyses using a one-sided, upper 95 percent confidence bound for the 95th percentile of the APF distribution to determine the impact to all forms of marine life that could be expected to occur from entrainment by the surface intake during the 50-plus year operational life of the proposed project. The Santa Ana Water Board relied on the ETM/APF analyses conducted by Coastal Commission staff to verify the accuracy of the Discharger's analyses. The Discharger and Coastal Commission staff could not resolve the differences in their calculations. The Discharger and Coastal Commission staff's calculations were ultimately submitted for review to Dr. Peter Raimondi, a neutral third-party reviewer. The Santa Ana Water Board relied on the final APF calculations provided in the Raimondi Report. Dr. Raimondi reviewed the final calculations performed by the Discharger and Coastal Commission staff (Attachment G.3, Table 3 and Raimondi Report,	• Attachment G.1 – Narrowing of the Site (Analysis in Support of Findings 6, 8-12) • Attachment G.3 – ETM/APF Analysis for a Surface Intake and Discharge at Station E (Discharger's Proposed Intake/Discharge Location) Raimondi Report

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			Table 9). There were slight differences in the two sets of calculations due to differences in rounding and in the use of different larval durations for the mole crab (*Emerita spp.*). In addition, the APF was adjusted to account for impacts on the mitigation projects due to entrainment by the Facility as required by chapter III.M.2.e.(3)(b)ii. To do this, staff adjusted the calculations for estuarine taxa (CIQ Gobies and Diamond Turbot) found in Dr. Raimondi's 2019 report to include larvae that may be dispersed from the Bolsa Chica Ecological Reserve (Bolsa Chica Wetlands), one of the proposed mitigation sites, and entrained by the proposed intake. Santa Ana Water Board staff then used the mean of the two sets of calculations for the surface intake to recalculate APFs for estuarine taxa, which resulted in an additional 1.1 acres of APF for a total of 9 acres instead of 7.9 acres of intake-related marine mortality of estuarine taxa. Entrainment of larvae from the proposed Palos Verdes Artificial Reef, the Discharger's other	

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			mitigation project, results in an additional 0.2 acre of intake-related mortality added to the total APF (rocky reef larvae were not included in the original ETM/APF calculation because of data limitations). The total intake-related marine life mortality attributable to the Facility is as follows: Estuarine taxa = 9.0 acres Rocky reef taxa = 0.2 acres <u>Coastal taxa = 154.9 acres</u> Total acres = 164.1 acres The Santa Ana Water Board applied a one percent (**1%**) credit for using a 1.0 mm wedgewire screen on the surface intake to the acres of impact (164.1 – {164.1 x 0.01}), yielding a **final intake APF of 162.5 acres**. The Santa Ana Water Board's calculations differ slightly from Dr. Raimondi's calculations and those presented in the Discharger's Marine Life Mortality Report in Appendix TT4. Neither Dr. Raimondi's calculations nor the Discharger's calculations in	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			Appendix TT4 included rocky reef taxa. Rocky reef taxa were only added to the calculation when the Discharger proposed adding the Palos Verdes Artificial Reef as a second mitigation project after the August 7, 2020 Hearing. Dr. Raimondi reviewed and concurred with the Santa Ana Water Board staff's adjustments to the calculations. The Santa Ana Water Board's calculation for the intake APF in this finding is controlling. A final ETM/APF analysis, based on Dr. Raimondi's recommendations, for the proposed surface intake is discussed in Attachment G.3 (also see Raimondi Report).	
39	M.2.e.(1).(b)	For operational mortality related to discharges, the report shall estimate the area in which salinity exceeds 2.0 parts per thousand above natural background salinity or a facility-specific alternative receiving water limitation (see chapter III.M.3). The area in excess of the receiving water limitation for salinity shall be determined by modeling and confirmed with monitoring. The report shall use any acceptable approach approved by the	The Discharger adequately assessed the area in which salinity will exceed 2.0 parts per thousand above natural background salinity in the Marine Life Mortality Report. The estimated area in which the brine discharge from the discharge diffuser operations exceeds 2.0 ppt above the natural background salinity (i.e., the BMZ) has an average radius extending approximately 22.4 meters (Appendix NNNNN). The size	Discharger's submittals • Appendix H • Appendix R • Appendix S • Appendix T • Appendix HH • Appendix UU • Appendix JJJ • Appendix LLL

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		regional water board for evaluating mortality that occurs due to shearing stress resulting from the facility's discharge, including any incremental increase in mortality resulting from a commingled discharge.	of the area is 1.09 acres and has been determined through a hydrodynamic modeling study that is included in Appendix NNNNN. To reduce shearing-related mortality consistent with the findings of the Roberts HB Diffuser Report, the Discharger revised the design for the multiport diffuser. The modified diffuser, located approximately 1500 feet offshore, is a 14-port linear diffuser that ejects the brine into the water column at a high velocity to promote rapid diffusion and dispersion. The volume of water subjected to shearing-related mortality is approximately 168 million gallons per day (MGD) (see Finding 28). The Discharger evaluated shearing-related mortality using the methods described in Roberts HB Diffuser Report. The Santa Ana Water Board approves this approach; however, the Santa Ana Water Board's calculations under this approach differ from the Discharger's calculations. The Santa Ana Water Board's calculations in this finding are controlling.	• Appendix VVV • Appendix CCCC • Appendix JJJJ • Appendix KKKK • Appendix KKKK2 • Appendix KKKK3 • Appendix UUUU • Appendix WWWW Santa Ana Water Board staffs' analysis: • Attachment G.3 - ETM/APF Analysis for a Surface Intake and Discharge at Station E (Discharger's Proposed Intake/Discharge Location) Roberts HB Diffuser Report Raimondi Report

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			To calculate the discharge APF, the Santa Ana Water Board proportionally scaled the APF for the intake based on the volume of water exposed to shearing-related mortality and the intake volume (Attachment G.3 and Raimondi Report). The ratio of the discharge volume to the intake volume is 168 MGD/106 MGD = 1.58. This discharge scaling factor is then applied to each taxon-specific APF before the 95% confidence interval is calculated. After adjusting the taxon-specific APFs, the Santa Ana Water Board calculated the 95% APF for discharge-related mortality for both coastal and estuarine taxa. As noted in Finding 38, the APF for the estuarine taxa was increased to account for potential entrainment from the Bolsa Chica mitigation projects and the APF for rocky reef taxa was calculated to account for entrainment from the proposed Palos Verdes Artificial Reef mitigation project: Estuarine taxa = 14.2 acres + Rocky reef taxa = 0.3 acres + Coastal taxa = 244.8 acres	

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			Total Shearing-Related APF = 259.3 acres Note: Staff recalculated the discharge APFs for estuarine, rocky reef, and coastal taxa using a rounded discharge-to-intake volume ratio of 1.58, instead of 168/106 without rounding. This impacts the number of significant digits and, in some cases, leads to small differences in the calculations. As discussed in Finding 28, the design of the 14-port linear diffuser has been optimized to produce rapid mixing to maximize dilution, minimize the BMZ, and reduce the volume of seawater that would expose organisms within the entrained seawater to lethal shearing stresses. The mortality of marine life associated with the BMZ is accounted for by adding to total area of the BMZ to the discharge APF. The Discharger has calculated that **the area of the BMZ is 1.09 acres.** (Appendices BBBBB, NNNNN, and TT4). The Santa Ana Water Board reviewed and concurs with the	

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			Discharger's calculations for the area of the BMZ. The Santa Ana Water Board added the area of the BMZ to the shearing-related APF to calculate a final APF for discharge-related mortality: Shearing APF = 259.3 acres + BMZ = 1.09 acres **Total Discharge APF = 260.4 acres** A detailed analysis of the discharge APF is included in Attachment G.3.	
40	M.2.e.(1).(c)	For construction-related mortality, the report shall use any acceptable approach approved by the regional water board for evaluating the mortality that occurs within the area disturbed by the facility's construction. The regional water board may determine that the construction-related disturbance does not require mitigation because the disturbance is temporary, and the habitat is naturally restored.	Based on the information provided by the Discharger in Appendices EEEE, BBBBB-3, and SSSSS, the Santa Ana Water Board finds that there will be an estimated **0.086 acres of permanent construction-related benthic impacts** to the marine environment (*Intake*: 3848 ft^2 – 3240 ft^2 = 608 ft^2 (0.014 acres); *Diffuser*: 6375 ft^2 – 3240 ft^2 = 3185 ft^2 (0.072 acres); *Total* = 0.086 acres. Please see the Santa Ana Water Board's CEQA Addendum and State Lands Commission's 2017 FSEIR for additional information). The	Discharger's submittals: • Appendix A • Appendix H • Appendix JJ • Appendix BBBB • Appendix BBBBB • Appendix BBBBB2 • Appendix BBBBB3 • Appendix DDDD • Appendix EEEE • Appendix SSSSS

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			benthic impacts are calculated by using estimates of habitat disturbed by dredging, trenching, anchoring, or other construction methods for the placement of permanent structures (the wedgewire screen array, intake pipeline header, and the linear diffuser) and the temporary disturbance to the benthos that occurs during construction of these permanent structures. It is assumed that mortality will occur anywhere construction occurs, but it is expected that benthic organisms will reoccupy areas that are only temporarily impacted after construction ceases. These construction-related benthic impacts are only expected to affect coastal (open water, soft bottom) benthic taxa. The Santa Ana Water Board finds that the temporary disturbance to the benthic environment associated with the construction of the modifications to the intake and discharge structures do not require mitigation. Additional information is provided in the following appendices submitted by	

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			the Discharger: BBBB, BBBBB, and BBBBB-2.	
41	M.2.e.(1).(d)	Upon approval of the report by the regional water board in consultation with State Water Board staff, the calculated marine life mortality shall form the basis for the mitigation provided pursuant to this section.	The Santa Ana Water Board in consultation with State Water Board staff approves the calculated marine life mortality presented in the Marine Life Mortality Report in Appendix TT4, as adjusted by Findings 38, 39, and 40 and summarized below. These calculations form the basis for the mitigation requirements in the Order. Estimated direct and indirect impacts on marine life and habitat expected from the construction and operation of the proposed desalination facility: Impact APF (acres) Seawater intake 162.5 Brine Discharge (shearing) 259.3 Brine Mixing Zone 1.09 Intake Construction 0.014 Diffuser Construction 0.072 **Total 423.0 acres**	Discharger's submittals: • Appendix NNN • Appendix VVVV • Appendix WWWW • Appendix TTTTT • Appendix IIIIII • Appendix PPPPPP-2 • Appendix WWWWWW-2 Santa Ana Water Board Staff's analysis: • Attachment G.3 – ETM/APF Analysis for a Surface Intake and Discharge at Station E (Discharger's Proposed Intake/Discharge Location) Raimondi Report

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			The conclusions above are supported by the analysis in Attachment G.3, and the Raimondi Report.	
42	M.2.e.(2)	The owner or operator shall mitigate for the mortality of all forms of marine life determined in the report above by choosing to either complete a mitigation project as described in chapter III.M.2.e.(3) or, if an appropriate fee-based mitigation program is available, provide funding for the program as described in chapter III.M.2.e.(4). The mitigation project or the use of a fee-based mitigation program and the amount of the fee that the owner or operator must pay is subject to regional water board approval.	The discharger will mitigate for the mortality of all forms of marine life by completing a mitigation project as described in chapter III.M.2.e.(3). See Findings 43–54; Attachment G.5.	Discharger's submittals: • Appendix A5 • Appendix U • Appendix KKK • Appendix TT4 • Appendix HHHHHH • Appendix IIIIII • Appendix WWWWWW-2 Santa Ana Water Board Staff's analysis: • Attachment G.5 – Approach for Mitigation of the Facility
43	M.2.e.(3)	Mitigation Option 1: Complete a Mitigation Project. The mitigation project must satisfy the following provisions:	The Discharger proposes to mitigate for the mortality of all forms of marine life as calculated in Findings 38 through 41 by completing a mitigation project under Mitigation Option 1. The Discharger's proposed mitigation project sites are the Bolsa Chica Wetlands and the Palos Verdes Peninsula. The Discharger proposes	Santa Ana Water Board Staff's analysis: • Attachment G.5 – Approach for Mitigation of the Facility • Attachment K • Appendix TT4 • Appendix RR

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			to carry out restoration, enhancement, and preservation activities in the Bolsa Chica Wetlands, and proposes to create an artificial reef offshore of the Palos Verdes Peninsula (Palos Verdes Artificial Reef). In a memorandum dated July 2016, the Discharger reviewed ten potential mitigation sites along the Southern California coast from Ventura to San Diego County. The Discharger ranked these ten sites based on each site's ability to meet the requirements of chapters III.M.2.e.(3)(a) to III.M.2.e.(3)(b)v of the Ocean Plan. Of the ten sites reviewed, three sites were determined to have a high potential for providing sufficient mitigation for direct and indirect impacts to all forms of marine life that may occur from the construction and operation of the proposed Facility. These three sites were the Bolsa Chica Wetlands, Newland Marsh in the Huntington Beach Wetlands, and Los Cerritos Wetlands. All three sites are located within the source water body impacted by the Facility (Appendix RR.)	• Appendix HHHHHH • Appendix IIIIII • Appendix PPPPPP-2appendix VVVVVV • Appendix WWWWWW-2 • Appendix XXXXXX

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			Of the three sites, only the Bolsa Chica Wetlands had sufficient restoration opportunities available that matched the projected timing of the construction and operation of the Facility; the other two sites were not viable mitigation sites for the Facility. At the time that the Discharger was analyzing potential mitigation sites, Newland Marsh was owned by CalTrans and was considered a potential mitigation site for CalTrans projects and was therefore deemed unavailable. Additionally, the Newland Marsh hydrology was predominately controlled by a flood channel, so proposed restoration would have depended on the flood channel-controlled hydrology and would therefore have had limited success. Lastly, as noted by CCC staff, given the shape and size of the Newland Marsh area that could be utilized for potential mitigation, some of the restoration would likely occur inside the buffer zone. Restoration within the buffer zone has limited opportunities for success and is historically awarded	

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			few, if any, mitigation credits. In 2020, the California Coastal Conservancy purchased Newland Marsh and the site is no longer being considered as potential mitigation for Caltrans projects. Although a 30% conceptual plan for the marsh has been completed that includes the addition of culverts with self-regulating tide gates to the Huntington Beach Channel and the enlargement of some tidal channels within the marsh to improve site hydrology, the tidal areas within Newland Marsh will still be muted. Given uncertainties in the mitigation credits that Coastal Commission may grant for the muted tidal areas in the marsh, the Discharger has declined to pursue this project. Los Cerritos Wetlands was also eliminated from further consideration for the following reasons: (1) the proposed restoration activities are too speculative and could result in substantial delays and potentially prevent the discharger from offsetting operational impacts for several years after the project begins operating; and (2) other desalination projects	

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			(specifically, the West Basin Municipal Water District) have indicated that Los Cerritos could be used as a mitigation project. The Los Cerritos Wetlands Authority has since certified a programmatic EIR for the Los Cerritos Wetlands Complex (approximately 500 acres) and their goal is to eventually restore all of it in the future. Notwithstanding the completed EIR, the availability and timing of projects for Los Cerritos are still uncertain. Relying on the analysis in Attachment RR, the Discharger initially proposed the Bolsa Chica Wetlands as the best available mitigation site feasible to mitigate for the intake and mortality of all forms of marine life. The Discharger proposed to dredge the inlet at Bolsa Chica to maintain full tidal flow and complete two restoration projects in the Bolsa Chica Wetlands. (See Appendix TT4). The Discharger also agreed to complete water-circulation enhancement activities in the muted tidal basins as required to support the restoration projects.	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			At the August 7, 2020 hearing, the Santa Ana Water Board directed staff to revise the acres of mitigation credit for the inlet maintenance dredging in Bolsa Chica so that it accounted for no more than 25% of the acreage needed to meet the required mitigation acres. As a result of this adjustment, the Discharger's proposed mitigation projects at the Bolsa Chica Wetlands did not provide sufficient acres of credit to fully mitigate the mortality of all forms of marine life attributable to the proposed Facility. Santa Ana Water Board staff worked with staff from the California State Lands Commission, NOAA Fisheries, California Coastal Commission, and the California Department of Fish and Wildlife to identify other potential restoration projects within Bolsa Chica and within the source water body for the proposed Facility. Based on discussions with staff from these agencies, Santa Ana Water Board staff identified the following list of potential restoration, creation, and expansion projects within the Bolsa	

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			Chica Wetlands and outside of Bolsa Chica but within the source water body: <u>Mitigation Projects Within Bolsa Chica:</u> • Pocket Marsh/ESHA Area Creation • Convert Muted Pocket Marsh to Full Tidal • Convert Muted Tidal Basins to Full Tidal • Outer Bolsa Bay Wetlands Restoration <u>Mitigation Projects Outside of Bolsa Chica:</u> • Newland Marsh Restoration • Huntington Beach Artificial Reef Creation • East San Pedro Bay Restoration Project • Palos Verdes Reef Project Santa Ana Water Board staff provided the above list of potential projects to the Discharger. These projects were evaluated by the Discharger as well as Santa Ana Water Board staff. To address the shortfall of acres of	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			mitigation credit, the Discharger revised their MLMP to include the restoration of the intertidal shelf in the Bolsa Chica Wetlands and the creation of an artificial reef offshore of the Palos Verdes Peninsula (Palos Verdes Artificial Reef). Attachment G.5, Table 4, contains Santa Ana Water Board staff's evaluation of the Discharger's proposed projects and the other potential projects, including potential mitigation acres, timeline for completion, and estimated costs. The Discharger's feasibility assessment of these projects is contained in Appendix VVVVVV and Appendix XXXXXX for Newland Marsh. The Santa Ana Water Board conditionally finds that the proposed mitigation projects (including all proposed preservation, enhancement, restoration, and creation projects) meet the requirements of Mitigation Option 1 (Ocean Plan chapter M.2.e.(3)) and are the best available mitigation measures feasible to minimize intake and mortality of all forms of marine life. (See Findings	

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			44–50 and Attachment G.5.) This conditional finding is based on the information the Discharger provided to Santa Ana Water Board staff and is conditioned on the Discharger's satisfaction of the requirements set forth in the MLMP Schedule in Attachment K. (See Finding 5.) The plans and schedules required under the MLMP Schedule are subject to Santa Ana Water Board approval and must undergo any environmental review required under CEQA prior to the Board's final approval.	
44	M.2.e.(3).(a)	The owner or operator shall submit a Mitigation Plan. Mitigation Plans shall include: project objectives, site selection, site protection instrument (the legal arrangement or instrument that will be used to ensure the long-term protection of the compensatory mitigation project site), baseline site conditions, a mitigation work plan, a maintenance plan, a long-term management plan, an adaptive management plan, performance standards and success criteria, monitoring requirements, and financial assurances.	The Discharger submitted a Marine Life Mitigation Plan (MLMP) (Appendix TT4) and supplemented the MLMP with Appendices IIIIII, HHHHHH, VVVVVV, WWWWWW-2, and XXXXXX. The MLMP (inclusive of the supplemental appendices) discusses the project objectives, site selection, site protection instrument, baseline site conditions, a mitigation work plan, a maintenance plan, a long-term management plan, an adaptive management plan, performance standards and success criteria, monitoring requirements, and financial assurances. The MLMP includes	Discharger's submittals: • Appendix A5 • Appendix J • Appendix U • Appendix RR • Appendix SS • Appendix TT • Appendix TT2 • Appendix TT3 • Appendix TT4 • Appendix YY • Appendix MMMMM

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			specific performance standards that the proposed mitigation project will need to meet to satisfy the Discharger's mitigation obligation. However, the Discharger must submit additional plans to finalize the details of the MLMP in accordance with the MLMP Schedule in Attachment K. These plans and schedules required under the MLMP Schedule are subject to Santa Ana Water Board approval and must undergo any environmental review required under CEQA prior to the Board's final approval.	• Appendix HHHHHH • Appendix VVVVVV • Appendix WWWWWW-2 • Appendix XXXXXX • Letter from SLC regarding Bolsa Chica Mitigation Activities
45	M.2.e.(3)(b)i	Mitigation shall be accomplished through expansion, restoration or creation of one or more of the following: kelp beds, estuaries, coastal wetlands, natural reefs, MPAs, or other projects approved by the regional water board that will mitigate for intake and mortality of all forms of marine life associated with the facility.	The Discharger proposes to enhance, preserve, and restore coastal multiple areas within the Bolsa Chica Wetlands, and to create an artificial reef offshore of the Palos Verdes Peninsula. There are several areas within Bolsa Chica where restoration activities will occur: The Fieldstone Property, Cell 46 and Cell 42 (oil pads and roads), and the intertidal shelf located in the Full Tidal Basin. The Fieldstone Property is approximately 12 acres of dry, barren salt pans, with marsh and	Discharger's submittals: • Appendix U • Appendix TT • Appendix TT2 • Appendix TT3 • Appendix TT4 • Appendix TTTTT • Appendix HHHHHH • Appendix IIIIII • Appendix PPPPPP-2

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			subtidal habitat. Within this property, the discharger proposes to restore 4.5 acres of subtidal and tidal wetlands in addition to upland restoration. At several sites within Cell 46 and 42 (see figure 10 in the Discharger's appendix TT4) oil pads and roads will be removed, and the areas restored to upland habitat. The individual sites for these activities are scattered throughout Cells 46 and 42 but will result, in total, in 1.2 acres of additional restoration. For each of these restoration projects to succeed, the Discharger must make improvements to the water circulation within the Muted Tidal Basins of Bolsa Chica. The circulation improvements constitute enhancement activities for a total of 15 acres of mitigation credit. The Discharger has also proposed to restore cordgrass marsh and other marsh habitat to the intertidal shelf located in the Full Tidal Basin. Implementation of this project will provide another 10.5 acres of mitigation credit. Finally, the Discharger proposes to perform maintenance dredging of the ocean inlet for another 28 acres of mitigation	• Appendix WWWWWW-2 Santa Ana Water Board Staff's analysis: • Attachment G.4 – Rationale for Determining an Appropriate Mitigation Ratio to Apply to the Area of Foregone Production (APF) • Attachment G.5 – Approach for Mitigation of the Facility

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			credit. The dredging is a form of preservation that will provide essential tidal connectivity between the wetlands and the Pacific Ocean to help maintain the existing wetland system as well as support the restoration and enhancement activities. The Discharger will perform the dredging for the operational lifetime of the Facility as necessary to meet the performance metrics in Appendix TT4 and as recommended by the State Lands Commission and the Bolsa Chica Steering Committee to maintain the inlet and to meet the performance standards in the MLMP. In total, the Discharger proposals result in 59.2 acres of mitigation credit at the Bolsa Chica Wetlands. The Discharger has also proposed to create an artificial reef offshore of the Palos Verdes Peninsula. The Discharger's proposed Palos Verdes Artificial Reef will provide approximately 41.3 acres of reef and reef ecotone habitat (see Discharger's Appendix IIIIII for additional information on the purpose and conceptual design of the proposed	

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			reef). The applicable mitigation ratio and required reef size are discussed in attachments G.4 and G.5 (se also the Discharger's Appendix WWWWWW-2). Taken as a whole and if implemented according to the MLMP Schedule, the proposed mitigation projects constitute restoration of coastal wetlands and creation of an artificial reef that fully mitigates for intake and mortality of all forms of marine life associated with the construction and operation of the proposed Facility. This finding is conditioned on the Discharger's satisfaction of the requirements in the MLMP Schedule in Attachment K, including any environmental review of the mitigation projects that is required under CEQA. The mitigation projects in Bolsa Chica, as conditioned, provide 59.2 acres of mitigation credit and the creation of the Palos Verdes Artificial Reef, as conditioned, provides an additional 41.3 acres of mitigation credit. The mitigation projects fully mitigate for the impacts caused by the intake, discharge, and construction of the Facility after the	

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			appropriate mitigation ratios are applied to the total APF. (See also Findings 46-48 and 50.) Santa Ana Water Board staff's analysis of the mitigation is discussed in Attachment G.5, and the conditional determination requirements are included as in Attachment K. These Plans and Schedules are subject to Santa Ana Water Board approval and must undergo any environmental review required under CEQA prior to the Board's final approval.	
46	M.2.e.(3).(b).ii	The owner or operator shall demonstrate that the project fully mitigates for intake-related marine life mortality by including expansion, restoration, or creation of habitat based on the APF acreage calculated in the Marine Life Mortality Report above. The owner or operator using surface water intakes shall do modeling to evaluate the areal extent of the mitigation project's production area to confirm that it overlaps the facility's source water body. Impacts on the mitigation project due to entrainment by the facility must be offset by adding compensatory acreage to the mitigation project.	The Discharger has proposed mitigation measures to fully mitigate for the impacts caused by the intake for the Facility provided all mitigation components discussed in Finding 45 are approved and implemented. (See Attachment G.5.) The Santa Ana Water Board conditionally finds that the Discharger has adequately demonstrated that the proposed mitigation projects fully mitigate for intake-related marine life mortality. This finding is conditioned on the Discharger's satisfaction of the requirements in the MLMP Schedule	Discharger's submittals: • Appendix U • Appendix TT • Appendix TT2 • Appendix TT3 • Appendix TT4 • Appendix TTT • Appendix OOOO • Appendix LLLLL • Appendix TTTTT • Appendix HHHHHH • Appendix IIIIII

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			in Attachment K, including any environmental review of the mitigation projects that is required under CEQA. (See Finding 5.) The Discharger performed modeling to demonstrate the overlap of the Bolsa Chica Wetlands mitigation project production area with the facility's source water body in Appendix OOOO. The Discharger also performed modeling to demonstrate that the proposed artificial reef site is located in the source water body for the proposed Facility (Appendix PPPPPP-2). The Santa Ana Water Board finds that the Discharger has confirmed, via modeling, that the areal extent of the mitigation projects' production areas overlap with the Facility's source water body.	• Appendix PPPPPP-2 • Appendix WWWWWW-2 Santa Ana Water Board Staff's analysis: • Attachment G.3 - ETM/APF Analysis for a Surface Intake and Discharge at Station E (Discharger's Proposed Intake/Discharge Location) • Attachment G.4 – Rationale for Determining an Appropriate Mitigation Ratio to Apply to the Area of Foregone Production (APF) • Attachment G.5 – Approach for Mitigation of the Facility

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47	M.2.e.(3).(b).iii	The owner or operator shall demonstrate that the project also fully mitigates for the discharge-related marine life mortality projected in the Marine Life Mortality Report above.	The Discharger has proposed mitigation measures to mitigate for discharge-related mortality. The Santa Ana Water Board conditionally finds that the Discharger has adequately demonstrated that the proposed mitigation projects fully mitigate for discharge-related marine life mortality. (See Findings 45, 46, 47 and Attachment G.5.). This finding is conditioned on the Discharger's satisfaction of the requirements in the MLMP Schedule in Attachment K, including any environmental review of the mitigation projects that is required under CEQA. (See Finding 5.)	Discharger's submittals: • Appendix TT • Appendix TT2 • Appendix TT3 • Appendix TT4 • Appendix TTT • Appendix TTTTT • Appendix IIIIII • Appendix PPPPPP-2 • Appendix WWWWWW-2 Santa Ana Water Board Staff's analysis: • Attachment G.3 – ETM/APF Analysis for a Surface Intake and Discharge at Station E (Discharger's Proposed Intake/Discharge Location) • Attachment G.4 – Rationale for Determining an

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
				Appropriate Mitigation Ratio to Apply to the Area of Foregone Production (APF) • Attachment G.5 – Approach for Mitigation of the Facility
48	M.2.e.(3).(b).iv	The owner or operator shall demonstrate that the project also fully mitigates for the construction-related marine life mortality identified in the Marine Life Mortality Report above.	The Discharger has proposed mitigation to fully mitigate for the construction-related marine life mortality. The Santa Ana Water Board conditionally finds that the Discharger has adequately demonstrated that the proposed mitigation projects fully mitigate for construction-related marine life mortality. (See Finding 45, and Attachments G.4 and G.5 to the Tentative Order.) This finding is conditioned on the Discharger's satisfaction of the requirements in the MLMP Schedule in Attachment K, including any environmental review of the mitigation projects that is required under CEQA. (See Finding 5.)	Discharger's submittals: • Appendix TT • Appendix TT2 • Appendix TT3 • Appendix TT4 • Appendix TTTTT Santa Ana Water Board Staff's analysis: • AttachmentG.5 – Approach for Mitigation of the Facility

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49	M.2.e.(3)(b)v	The regional water board may permit out-of-kind mitigation for mitigation of open water or soft-bottom species. In-kind mitigation shall be done for all other species whenever feasible.	The Discharger's proposed mitigation includes out-of-kind mitigation for open water and/or coastal soft-bottom taxa (e.g., Northern Anchovy), and in-kind mitigation for estuarine taxa (e.g., CIQ goby) for the Bolsa Chica Wetlands mitigation project, and coastal and rocky reef taxa (e.g., sea bass) for the Palos Verdes Artificial Reef mitigation project. The Santa Ana Water Board calculated the APFs for entrainment impacts that could result to estuarine, rocky reef, and coastal taxa from the construction and operation of the proposed Facility. (See Attachment G.3 and table in Finding 41, above). The total mitigation required for marine life mortality from the construction and operation of the proposed Facility, before a mitigation ratio is applied is 423.0 acres. Of the total mitigation required, 23.1 acres results from impacts to estuarine taxa and approximately 0.5 acres results from impacts to rocky reef taxa, both of which require in-kind mitigation at no less than a 1:1 ratio.	Discharger's submittals: • Appendix TTT • Appendix QQQQQ Santa Ana Water Board Staff's analysis: • Attachment G.3 – ETM/APF Analysis for a Surface Intake and Discharge at Station E (Discharger's Proposed Intake/Discharge Location) • Attachment G.4 – Rationale for Determining an Appropriate Mitigation Ratio to Apply to the Area of Foregone Production (APF) • Attachment G.5 – Approach for Mitigation of the Facility

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			The Santa Ana Water Board finds that the proposed mitigation includes sufficient in-kind mitigation (estuarine and rocky reef taxa) and out-of-kind mitigation (coastal taxa) for the impacts caused by the operation and construction of the Facility once a mitigation ratio is applied to the coastal taxa APF as allowed under chapter III.M.2.e(3(b)(vi) of the Ocean Plan. (See Finding 50; Attachments G.4 and G.5.). This finding is conditioned on the Discharger's satisfaction of the requirements in the MLMP Schedule in Attachment K, including any environmental review of the mitigation projects that is required under CEQA. (See Finding 5.)	
50	M.2.e.(3).(b).vi	For out-of-kind mitigation, an owner or operator shall evaluate the biological productivity of the impacted open water or soft-bottom habitat calculated in the Marine Life Mortality Report and the proposed mitigation habitat. If the mitigation habitat is a more biologically productive habitat (e.g. wetlands, estuaries, rocky reefs, kelp beds, eelgrass beds, surfgrass beds), the regional water boards may apply a mitigation ratio based	The Santa Ana Water Board finds that application of mitigation ratios based on the relative biological productivity of the impacted habitat and the mitigation habitat proposed for the Bolsa Chica Wetlands and the Palos Verdes Artificial Reef is appropriate. The mitigation projects proposed for the Bolsa Chica Wetlands include both in-kind and out-of-kind mitigation.	Discharger's submittals: • Appendix T • Appendix V • Appendix YY • Appendix JJJ • Appendix TTT • Appendix LLLLL • Appendix MMMMM • Appendix QQQQQ

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		on the relative biological productivity of the impacted open water or soft-bottom habitat and the mitigation habitat. The mitigation ratio shall not be less than one acre of mitigation habitat for every ten acres of impacted open water or soft-bottom habitat.	The ratio for out-of-kind mitigation for soft-bottom, open-water species (coastal taxa) shall be 1 acre of mitigation habitat for every 4.5 acres of impacted habitat (1:4.5). The rationale supporting this ratio is set forth in Attachment G.4. The Discharger has also proposed to create an artificial reef offshore of the Palos Verdes Peninsula (Palos Verdes Artificial Reef). Because a reef system is a more biologically productive marine environment than a coastal, estuarine wetland when compared to the habitat being impacted (open water, shallow, soft bottom habitat), a different out-of-kind mitigation ratio should be applied to the remaining APF not offset by mitigation at the Bolsa Chica Wetlands. The appropriate mitigation ratio for out-of-kind mitigation for coastal taxa for the proposed Palos Verdes Artificial Reef shall be 1 acre of mitigation habitat for every 5.8 acres of impacted habitat (1:5.8). The rationale supporting these ratios is set forth in Attachment G.4.	• Appendix TTTTT • Appendix TTTTTT • Appendix IIIIII • Appendix PPPPPP-2 • Appendix WWWWWW-2 Santa Ana Water Board staff analysis: • Attachment G.4 – Rationale for Determining an Appropriate Mitigation Ratio to Apply to the Area of Foregone Production (APF)

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
51	M.2.e.(3).(b).vii	For in-kind mitigation, the mitigation ratio shall not be less than one acre of mitigation habitat for every one acre of impacted habitat.	The ratio for estuarine species where in-kind mitigation is proposed at the Bolsa Chica Wetlands shall be 1 acre of impacted habitat to 1 acre of mitigated habitat (1:1). For rocky reef taxa produced by the proposed Palos Verdes Artificial Reef that may be entrained by the proposed Facility, the appropriate mitigation ratio shall be 1 acre of impacted habitat to 1 acre of mitigated habitat (1:1). The rationale supporting this ratio is set forth in Attachment G.4	Discharger's submittals: • Appendix T • Appendix YY • Appendix LLLLL • Appendix QQQQQ Santa Ana Water Board Staff's analysis: • Attachment G.4 – Rationale for Determining an Appropriate Mitigation Ratio to Apply to the Area of Foregone Production (APF)
52	M.2.e.(3)(b)viii	For both in-kind and out-of-kind mitigation, the regional water boards may increase the required mitigation ratio for any species and impacted natural habitat calculated in the Marine Life Mortality Report when appropriate to account for imprecisions associated with mitigation, including but not limited to, the likelihood of success, temporal delays in productivity, and the difficulty of restoring or establishing the desired productivity functions.	The Santa Ana Water Board applied mitigation ratios to the impacted habitat and mitigated habitat. (See Findings 50 and 51; Attachment G.4.) For in-kind mitigation, a mitigation ratio of 1:1 was applied to the APFs for estuarine and rocky reef taxa. For out-of-kind mitigation, ratios of 1:4.5 for wetlands mitigation habitat compared to the impacted habitat and 1:5.8 for rocky reef mitigation habitat compared to impacted habitat were applied to the respective mitigation	Discharger's submittals: • Appendix LLLLL • Appendix QQQQQ • Appendix TTTTT Santa Ana Water Board Staff's analysis: • Attachment G.4 – Rationale for Determining an Appropriate

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			projects. As discussed in Attachment G.4, both mitigation ratios account for uncertainties pertaining to each project's potential success.	Mitigation Ratio to Apply to the Area of Foregone Production (APF)
53	M.2.e.(3)(b)ix	The rationale for the mitigation ratios must be documented in the administrative record for the permit action.	The rationale for the mitigation ratios applied to the total APF for the proposed Facility's impacts is documented in Attachment G.4.	Discharger's submittals: • Appendix LLLLL • Appendix QQQQQ • Appendix TTTTT • Appendix WWWWWW-2 Santa Ana Water Board Staff's analysis: • Attachment G.4 – Rationale for Determining an Appropriate Mitigation Ratio to Apply to the Area of Foregone Production (APF)
54	M.2.e.(3).(c)	The Mitigation Plan is subject to approval by the regional water board in consultation with State Water Board staff and with other agencies having authority to condition approval of the project and require mitigation.	The Santa Ana Water Board consulted with State Water Board staff and with other agencies having authority to require mitigation for the Facility, and conditionally approves the Discharger's MLMP. This approval	Discharger's submittals: • Appendix LLLLL • Appendix TTTTT

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			is conditioned on the Discharger's satisfaction of the requirements in the MLMP Schedule in Attachment K, including any environmental review of the mitigation projects that is required under CEQA. (See Finding 5.) Although the Santa Ana Water Board consulted with other agencies, the other agencies did not necessarily concur in the Board's approval of the MLMP; the Santa Ana Water Board's approval of the Discharger's MLMP does not bind the consulted agencies or prevent them from requiring additional mitigation.	Santa Ana Water Board Staff's analysis: • Attachment G.5 – Approach for Mitigation of the Facility
55	M.2.e.(4)	*Mitigation Option 2: Fee-based Mitigation Program*. If the regional water board determines that an appropriate fee-based mitigation program has been established by a public agency, and that payment of a fee to the mitigation program will result in the creation and ongoing implementation of a mitigation project that meets the requirements of chapter M.2.e.(3), the owner or operator may pay a fee to the mitigation program in lieu of completing a mitigation project.	No fee-based mitigation program currently exists within the source water body for the project that meets the Ocean Plan requirements; therefore, this option was not available to the Discharger.	Discharger's submittals: • Appendix RR
56	M.2.e.94).(a)	The agency that manages the fee-based mitigation program must have legal and	Not applicable	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		budgetary authority to accept and spend mitigation funds, a history of successful mitigation projects documented by having set and met performance standards for past projects, and stable financial backing in order to manage mitigation sites for the operational life of the facility.		
57	M.2.e.(4).(b)	The amount of the fee shall be based on the cost of the mitigation project, or if the project is designed to mitigate cumulative impacts from multiple desalination facilities or other development projects, the amount of the fee shall be based on the desalination facility’s fair share of the cost of the mitigation project.	Not applicable	
58	M.2.e.(4).(c)	The manager of the fee-based mitigation program must consult with the California Department of Fish and Wildlife, Ocean Protection Council, Coastal Commission, State Lands Commission, and State and regional water boards to develop mitigation projects that will best compensate for intake and mortality of all forms of marine life caused by the desalination facility Mitigation projects that increase or enhance the viability and sustainability of all forms of marine life in Marine Protected Areas are preferred, if feasible	Not applicable	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
59	M.2.e.(5)	California Department of Fish and Wildlife, the regional water board, and State Water Board may perform audits or site inspections of any mitigation project.	Not applicable	
60	M.2.e.(6)	An owner or operator, or a manager of a fee-based mitigation program, must submit a mitigation project performance report to the regional water board 180 days prior to the expiration date of their NPDES permit.	Not applicable	
61	M.2.e.(7)	For conditionally permitted facilities or expanded facilities, the regional water boards may:	Not applicable	
62	M.2.e.(7).(a)	Account for previously-approved mitigation associated with a facility when making a new Water Code section 13142.5(b) determination.	Not applicable	
63	M.2.e.(7).(b)	Require additional mitigation when making a new Water Code section 13142.5(b) determination for any additional mortality of all forms of marine life resulting from the occurrence of the conditional event or the expansion of the facility. The additional mitigation must be to compensate for any additional construction, discharge, or other increases in intake or impacts or an increase in intake and mortality of all forms of marine life.	Not applicable	
N/A	M.3.a.	Receiving Water Limitations for Salinity a. Chapter III.M.3 is applicable to all desalination facilities discharging brine into	--	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		ocean waters, including facilities that commingle brine and wastewater.		
64	M.3.b.(1)	Discharges shall not exceed a daily maximum of 2.0 parts per thousand (ppt) above natural background salinity measured no further than 100 meters (328 ft) horizontally from each discharge point. There is no vertical limit to this zone.	This requirement is addressed in section V.A.1. of the Order. The Discharger submitted mixing zone studies as Appendices BBBBB and NNNNN to their ROWD and the application for a Water Code section 13142.5(b) determination. The study found that discharges from the proposed subsurface multiport diffuser, and conservative flow and receiving water conditions, would be able to achieve rapid mixing of the discharge and meet the 2 ppt above natural background conditions water quality standard within an average distance of 22.4 meters (73.4 feet) from Discharge Point No. 001. Consideration of available dilution and anticipated discharge salinity indicate that the Discharger can comply with a daily maximum of 2.0 ppt above natural background salinity within 100 meters. However, due to uncertainties associated with the computational fluid dynamic modeling, the Discharger will be required in this	Discharger's submittals: • Appendix JJ • Appendix CCCC • Appendix KKKK • Appendix KKKK2 • Appendix KKKK3 • Appendix WWWW • Appendix BBBBB • Appendix BBBBB2 • Appendix NNNNN

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			Order to comply with the receiving water salinity requirement at the edge of a 100-meter BMZ as allowed under the Ocean Plan.	
65	M.3.b.(2)	In determining an effluent limit necessary to meet this receiving water limitation, permit writers shall use the formula in chapter III.C.4 that has been modified for brine discharges as follows: Equation 1: Ce= Co + Dm(2.0 ppt) Ce= (2.0 ppt + Cs) + Dm(2.0 ppt) Where: Ce= the effluent concentration limit, ppt Co= the salinity concentration to be met at the completion of initial dilution= 2.0 ppt + Cs Cs= the natural background salinity, ppt Dm= minimum probable initial dilution expressed as parts seawater per part brine discharge.	The effluent limitation necessary to meet the receiving water limitation was derived from the applicable equation. (See section IV.A.1.c. of the Order and section IV.C.6. of the Fact Sheet (Attachment F, page F-16). Appendix NNNNN of the ROWD and Water Code section 13142.5(b) determination indicates a BMZ at an average distance of 22.4 meters from the point of discharge, with a dilution of 15:1 for the discharge will result in compliance with the receiving water limitation. In determining the effluent limit necessary to meet the receiving water	Discharger’s submittals: • Appendix CCCC • Appendix KKKK • Appendix KKKK2 • Appendix KKKK3 • Appendix BBBBB • Appendix BBBBB3 • Appendix NNNNN

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			limitation at the edge of the BMZ, the Ocean Plan establishes the following formula: Ce = (2.0 ppt + Cs) + Dm (2.0 ppt) Where: Ce = the maximum daily effluent concentration limit in ppt Co = the salinity concentration to be met at the BMZ Cs = the natural background salinity (defined as a 20-year monthly mean) Dm = minimum probable initial dilution expressed as parts seawater per part brine discharge Natural background salinity in the receiving water from 1980 through 2004 is approximately 33.5 ppt. Using the background salinity and authorized BMZ dilution credit of 15, the following salinity effluent limitation would result: Ce = (2.0 ppt + 33.5 ppt) + 15 x (2.0 ppt) = 65.5 ppt This Order establishes a daily average salinity effluent limitation of 65.5 ppt	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
			protective of and consistent with the applicable salinity water quality standards contained in the Ocean Plan. This effluent limitation is representative of a dilution of 15:1 and is anticipated to be protective of water quality and beneficial uses. The proposed limit of 65.5 ppt is anticipated to be conservative and protective during all months of the year.	
66	M.3.b.(2).(a)	The fixed distance referenced in the initial dilution definition shall be no more than 100 meters (328 feet).	See discussion under Finding 65	Discharger's submittals: • Appendix JJ • Appendix VVV • Appendix CCCC • Appendix KKKK • Appendix KKKK2 • Appendix KKKK3 • Appendix WWWW • Appendix BBBBB • Appendix BBBBB2 • Appendix NNNNN
67	M.3.b.(2).(b)	In addition, the owner or operator shall develop a dilution factor (Dm) based on the distance of 100 meters (328 feet) or initial dilution, whichever is smaller. The	See discussion under Finding 65.	Discharger's submittals: • Appendix VVV • Appendix CCCC

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		dilution factor (Dm) shall be developed within the brine mixing zone using applicable water quality models that have been approved by the regional water boards in consultation with State Water Board staff.		• Appendix KKKK • Appendix KKKK2 • Appendix KKKK3 • Appendix WWWW • Appendix NNNNN
68	M.3.c	An owner or operator may submit a proposal to the regional water board for approval of an alternative (other than 2 ppt) salinity receiving water limitation to be met no further than 100 meters horizontally form the discharge. There is no vertical limit to this zone.	Not applicable	
69	M.3.d	The owner or operator of a facility that has received a conditional Water Code section 13142.5(b) determination and is over 80 percent constructed by [the effective date of this plan] that proposes flow augmentation using a surface water intake may submit a proposal to the regional water board in consultation with the State Water Board staff for approval of an alternative brine mixing zone not to exceed 200 meters laterally from the discharge point and throughout the water column. The owner or operator of such a facility must demonstrate, in accordance with chapter III.M.2.d.(2)(c), that the combination of the alternative brine mixing zone and flow augmentation using a	Not applicable	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		surface water intake provide a comparable level of intake and mortality of all forms of marine life as the combination of the standard brine mixing zone and wastewater dilution if wastewater is available, or multiport diffusers if wastewater is unavailable. In addition to the analysis of the effects required by chapter III.M.2.d.(2)(c), the owner or operator must also evaluate the individual and cumulative effects of the alternative brine mixing zone on the intake and mortality of all forms of marine life. In no case may the discharge result in hypoxic conditions outside of the alternative brine mixing zone. If an alternative brine mixing zone is approved, the alternative distance and the areal extent of the alternative brine mixing zone shall be used in lieu of the standard brine mixing zone for all purposes, including establishing an effluent limitation and a receiving water limitation for salinity, in chapter III.M.		
70	M.3.e	Existing facilities that do not meet the receiving water limitation at the edge of the brine mixing zone and throughout the water column by January 28, 2016 must either: 1) establish a facility-specific alternative receiving water limitation for salinity as described in chapter III.M.3.c;	Not applicable	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		or, 2) upgrade the facility's brine discharge method in order to meet the receiving water limitation in chapter III.M.3.b in accordance with the State Water Board's Compliance Schedule Policy, as set forth in (e) below. An owner or operator that chooses to upgrade the facility's method of brine discharge disposal:		
71	M.3.f	The regional water board may grant compliance schedules for the requirements for brine waste discharges for desalination facilities. All compliance schedules shall be in accordance with the State Water Board's Compliance Schedule Policy, except that the salinity receiving water limitation set forth in chapters III.M.3.b and III.M.3.c. shall be considered to be a "new water quality objective" as used in the Compliance Schedule Policy.	Not applicable	
72	M.3.g	The regional water board in consultation with the State Water Board staff may require an owner or operator to provide additional studies or information if needed. All studies and models are subject to the approval of the regional water board in consultation with State Water Board staff. The regional water board may require an owner or operator to hire a neutral third party entity to review studies and models	Not applicable	

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		and makes recommendations to the regional water board.		
N/A	M.4.	Monitoring and Reporting Program		
73	M.4.a	The owner or operator of a desalination facility* must submit a Monitoring and Reporting Plan to the regional water board for approval. The Monitoring and Reporting Plan shall include monitoring of effluent and receiving water characteristics and impacts to all forms of marine life.* The Monitoring and Reporting Plan shall, at a minimum, include monitoring for benthic community health, aquatic life toxicity, hypoxia, and receiving water characteristics consistent with Appendix III of this Plan and for compliance with the receiving water limitation in chapter III.M.3. Receiving water monitoring for salinity* shall be conducted at times when the monitoring locations are most likely affected by the discharge. For new or expanded facilities the following additional requirements apply:	The Santa Ana Water Board has established monitoring requirements in the Order section VI.B and in Attachment E, Monitoring and Reporting Requirements that are consistent with chapter III.M.4.a. of the Ocean Plan. The Discharger is required to submit a Monitoring and Reporting Plan that includes a quality assurance and project plan (QAPP) and a laboratory quality assurance plan (QAP).	Discharger's submittal: • Appendix Z
74	M.4.a. (1)	An owner or operator must perform facility-specific monitoring to demonstrate compliance with the receiving water limitation for salinity, and evaluate the potential effects of the discharge within the	The Monitoring and Reporting Program (MRP) is primarily site-specific and includes three major components for monitoring facility impacts on receiving water quality:	Discharger's submittal: • Appendix Z

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		water column, bottom sediments, and the benthic communities. Facility specific monitoring is required until the regional water board determines that a regional monitoring program is adequate to ensure compliance with the receiving water limitation. The monitoring and reporting plan shall be reviewed, and revised if necessary, upon NPDES permit renewal.	core monitoring, regional monitoring, and strategic process studies. (See Attachment E to the Order.) In addition to regular reporting requirements, the Discharger is required to submit a 5-year summary report that includes an evaluation of impacts related to the discharge of brine, if any, findings from the strategic process studies, and trends that have developed in the receiving waters with regard to the discharge of brine. These three receiving water quality monitoring components of the MRP are consistent with the Standard Monitoring Procedures contained in Appendix III of the Ocean Plan.	
75	M.4.a. (2)	Baseline biological conditions shall be established at the discharge location and at a reference location prior to commencement of construction. The owner or operator is required to conduct biological surveys (e.g., Before-After Control-Impact study), that will evaluate the differences between biological communities at a reference site and at the discharge location before and after the discharge commences. The regional water board will use the data and results from	The Santa Ana Water Board has established monitoring requirements in the MRP in Attachment E that are consistent with chapter III.M.4.a of the Ocean Plan. Under the MRP, the Discharger is required to conduct all the receiving water core monitoring requirements prior to the start of the discharge ("before") and will include a comprehensive larval density study encompassing a section of the SoCal Bight region that will include the	Discharger's submittal: • Appendix Z

Finding Number	Ocean Plan, Chapter III. Reference	Requirement	Finding	Supporting Documents/ References
		the surveys and any other applicable data for evaluating and renewing the requirements set forth in a facility's NPDES permit.	discharge and reference sites to establish baseline biological conditions pre-project startup. The receiving water core monitoring requirements will include monitoring at a reference site as well. The Discharger is required to implement the receiving water core monitoring requirements, regional monitoring, and strategic process studies after the commencement of the discharge to assess the "after" biological conditions of the receiving water and conduct suitable comparisons of before (baseline) and after biological conditions to ascertain if the discharge is solely or contributing in causing any significant impact to the marine environment.	

Attachment G.1 – Narrowing of the Site (Analysis in Support of Findings 6, 8–12)
SECTION 1 – Rationale for Narrowing of the Onshore Segments
SECTION 2 – Rationale for Narrowing of the Onshore Sites
SECTION 3 – Rationale for Narrowing of the Offshore Intake/Discharge Sites

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INTRODUCTION

The Discharger has proposed to locate the proposed Huntington Beach Desalination Facility (Facility) adjacent to the AES Huntington Beach Generating Station (HBGS) site and use the existing AES intake and discharge pipelines with upgrades to the terminal structures (1-mm intake screens and linear multiport diffusers). The proposed onshore site is located in Segment 1 at Site 1G, and the proposed offshore site is located at Station E. This attachment provides staff's analysis to support Findings 6 and 8 through 12 of Attachment G to the Order.

Ocean Plan Requirements

Chapter III.M.2(b) of the Water Quality Control Plan for the Ocean Waters of California (Ocean Plan) requires the owner or operator of a proposed new desalination facility to evaluate a reasonable range of alternative sites. The Ocean Plan includes siting criteria to determine the best available site feasible to minimize intake and mortality of all forms of marine life. The specific requirements are listed below:

1. Consider whether subsurface intakes are feasible [chapter III.M.2.b(1); Finding 6],
2. Consider whether the identified need for desalinated water is consistent with an applicable adopted urban water management plan prepared in accordance with Water Code section 10631, or if no urban water management plan is available, other water planning documents such as a county general plan or integrated regional water management plan. [chapter III.M.2.b(2); Attachment G.2; Finding 7].
3. Analyze the feasibility of placing intake, discharge, and other facility infrastructure in a location that avoid impacts to sensitive habitats and sensitive species [chapter III.M.2.b(3); Finding 8],
4. Analyze the direct and indirect effects on all forms of marine life resulting from facility construction and operation, individually and in combination with potential anthropogenic effects on all forms of marine life resulting from other past, present, and reasonably foreseeable future activities within the area affected by the facility. [chapter III.M.2(4); Finding 9],
5. Analyze oceanographic geologic, hydrogeologic, and seafloor topographic conditions at the site, so that the siting of a facility, including the intakes and discharges, minimizes the intake and mortality of all forms of marine life. [chapter III.M.2.b(5); Finding 10],
6. Analyze the presence of existing discharge infrastructure, and the availability of wastewater to dilute the facility's brine discharge. [chapter III.M.2.b(6); Finding 11], and
7. Ensure that the intake and discharge structures are not located within a Marine Protected Area (MPA) or State Water Quality Protection Area (SWQPA) with the

exception of intake structures that do not have marine life mortality associated with the construction, operation, and maintenance of the intake structures (e.g. slant wells). Discharges shall be sited at a sufficient distance from an MPA or SWQPA so that the salinity within the boundaries of an MPA or SWQPA does not exceed natural background salinity. To the extent feasible, surface intakes shall be sited so as to maximize the distance from an MPA or SWQPA. [chapter III.M.2.b(7); Finding 12].

Summary of Analyses Conducted

Santa Ana Water Board staff analyzed the Discharger's submittal with respect to compliance with the Ocean Plan requirements in chapter III.M.2.b. The process is outlined in Figure 1 below. This document has three sections:

- Section 1 – Rationale for Narrowing of the Onshore Segments that describes the analyses used to determine the best feasible[1] location for the proposed desalination facility in the region including a summary of the conditions and constraints of nine segments identified along the Orange County coast. This analysis included an evaluation of the feasibility for subsurface intakes;
- Section 2 – Rationale for Narrowing of the Onshore Sites that describes the analyses used to determine the best feasible onshore location for the proposed desalination facility. This analysis included an evaluation of the feasibility for subsurface intakes, and
- Section 3 – Rationale for Narrowing of the Offshore Intake/Discharge Sites that describes the analysis used to determine the best available offshore location for intake and discharge structures for the proposed desalination facility.

Summary of Conclusions

Santa Ana Water Board staff reviewed the Discharger's submittals, analyses provided by the Neutral Third Party Reviewer and documents submitted by interested parties and after evaluating the hydrogeological and biological conditions and feasibility factors of nine (9) alternative segments along the Orange County coast (Figure 2), the five (5) alternative onshore locations for the desalination treatment facility (Figure 3), and the surface intake stations (Figure 4), staff recommends that the Santa Ana Water Board find that Site 1G (the Discharger's proposed location) is the best onshore location for the desalination facility and Station E is the best available site feasible for an offshore seawater surface intake and discharge location.

[1] Feasible is defined in the Ocean Plan as follows: "FEASIBLE shall mean capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."

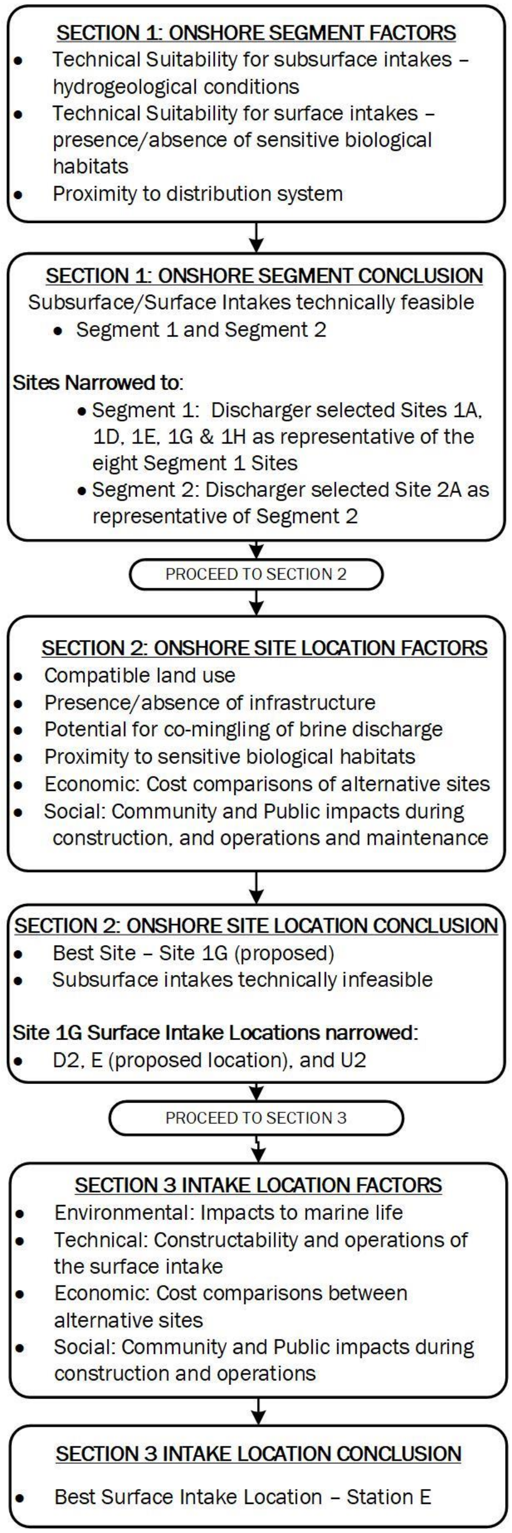


Figure 1. Santa Ana Water Board Evaluation Process for Best Site Available Feasible to Minimize Impact to Marine Life
(Source: Santa Ana Water Board)

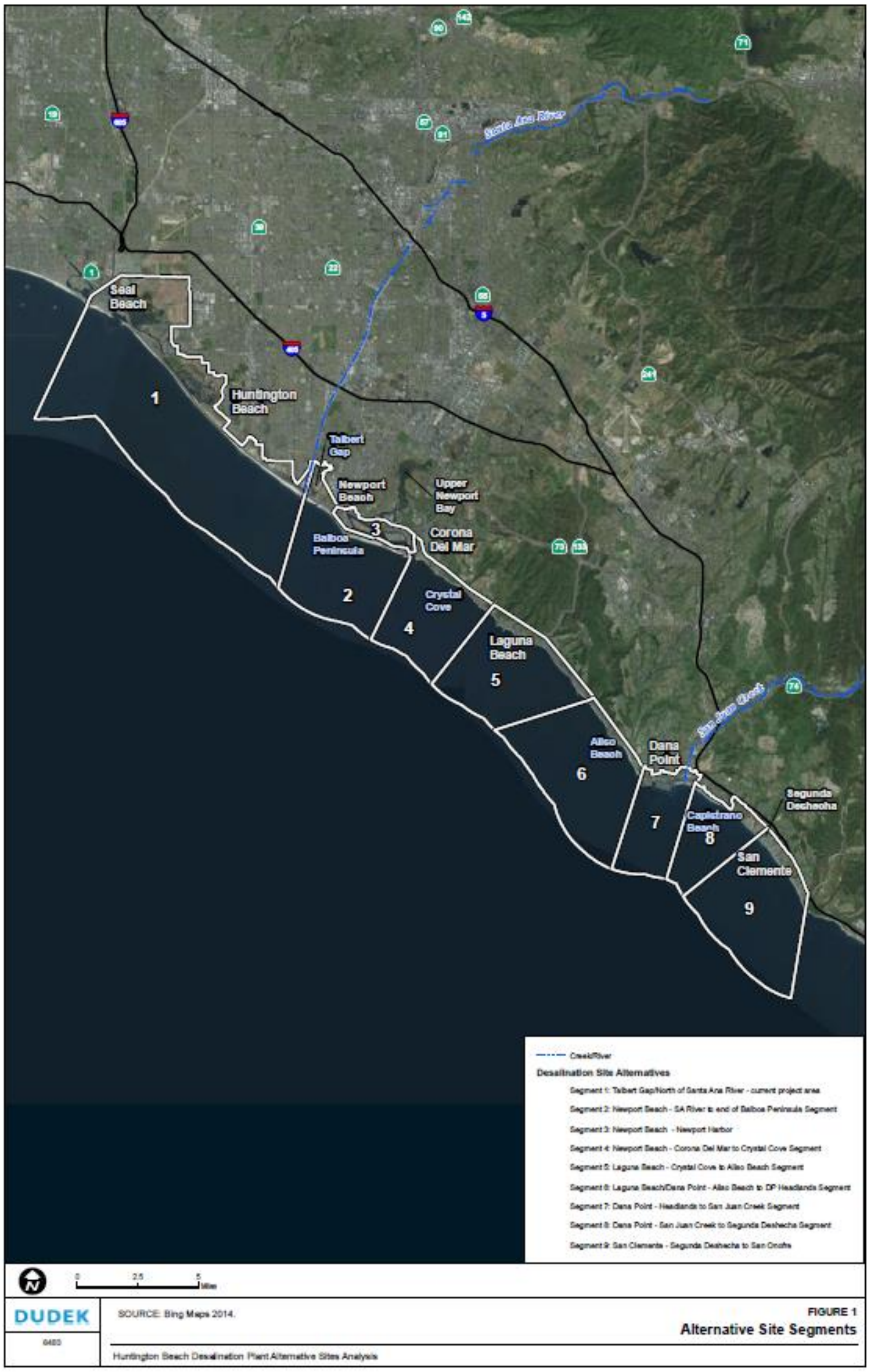


Figure 2. Geographic Locations of the Nine (9) Segments Evaluated
(Source: Discharger's Appendix E, Figure 1)

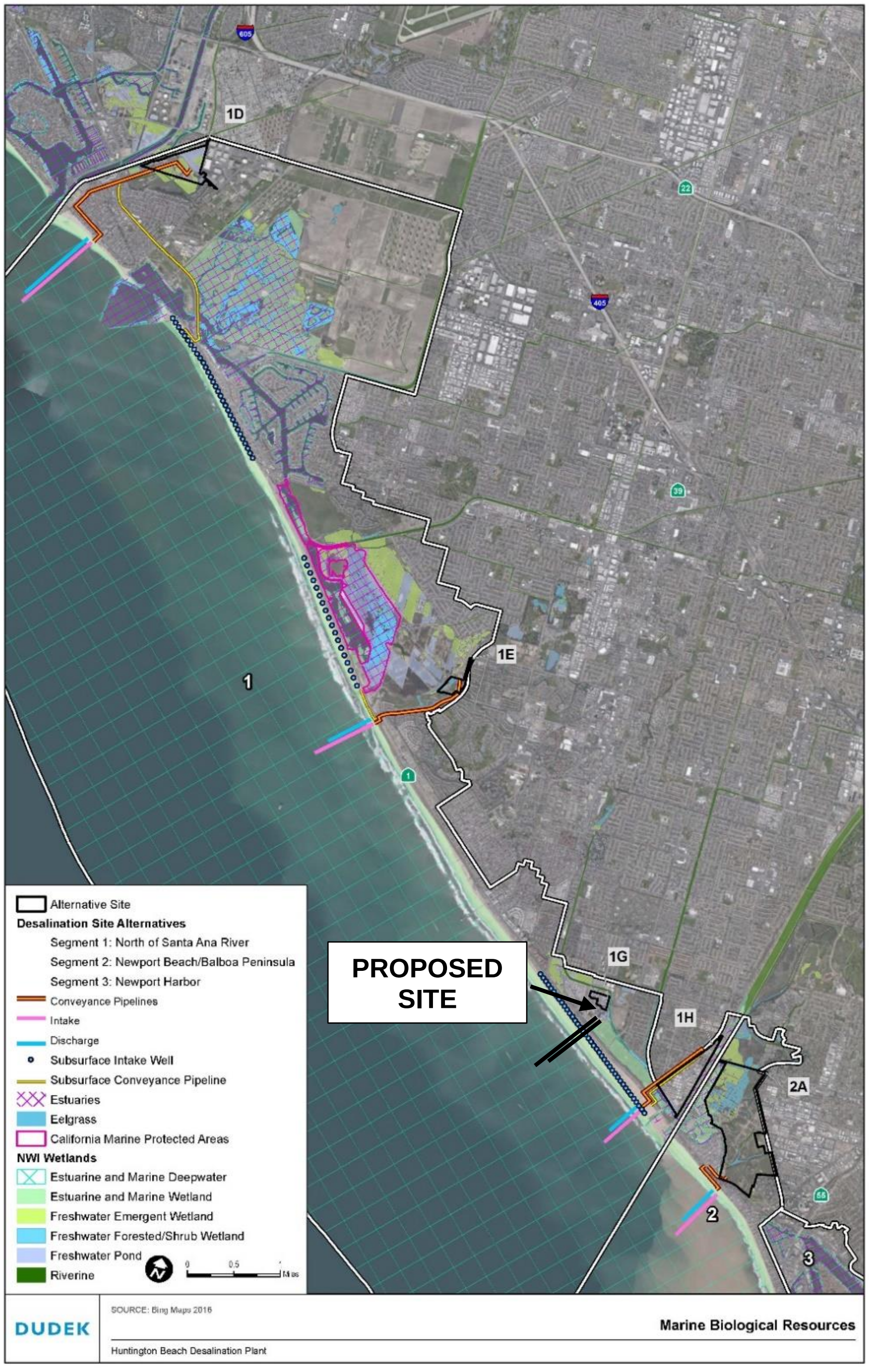


Figure 3. Alternative Onshore Locations Evaluated in Section 2 for the Desalination Treatment Facility includes Site 1G (Proposed Location with Existing Intake/Discharge Structure, and Four Alternative Locations with a Surface/Subsurface Intake Conceptual Plans at Sites 1D, 1E, 1H, and 2A (Source: Discharger's Appendix RRRR, Attachment E)

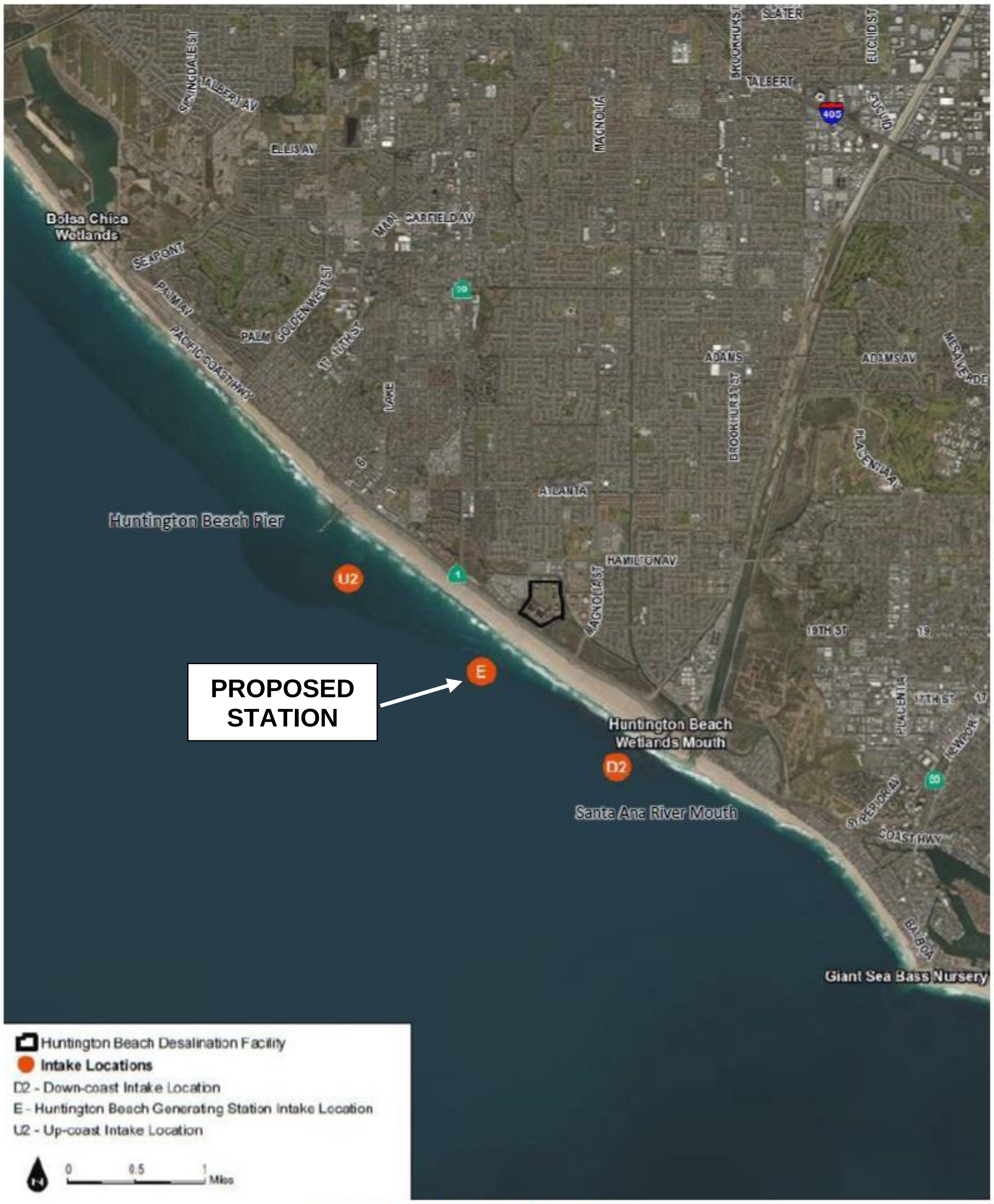


Figure 1. Alternative Intake Sites

Figure 4. Surface Intake Locations Evaluated in Section 3 for the Desalination Treatment Facility in Huntington Beach
(Source: Discharger's Appendix JJJJJ-2, Figure 1)

REQUIRED SUBMITTALS
In two submittals on March 15, 2016 and June 30,2016, the Discharger submitted an alternative sites analysis with the submission of their Report of Waste Discharge (ROWD) to renew their National Pollutant Discharge Elimination System (NPDES) permit and their request for Water Code section 13142.5(b) Determination (Discharger's Appendix E). Santa Ana Water Board staff reviewed this report and requested additional information via written correspondence in a July 29, 2016 letter to the Discharger. The Discharger provided the requested information in Appendices OO1 and OO2. Santa Ana Water Board staff asked for additional information in the October 31, 2016 letter to the Discharger, in order to allow Santa Ana Water Board staff to narrow the number of sites to be evaluated in a more focused and comprehensive analysis. Santa Ana Water Board staff worked with the Discharger to narrow the onshore sites that required further analysis to four specific locations other than the proposed Site 1G, and to narrow the offshore intake/discharge locations. The information submitted by the Discharger is included in Appendices ZZ, AAA, BBB, RRRR, JJJJJ-1, JJJJJ-2, and RRRRR.

SECTION 1 - Rationale for Narrowing of the Onshore Segments

Based on several meetings and supporting documentation that the Discharger submitted, Santa Ana Water Board staff found that Segments 3 through 9 have significant limiting factors for locating a subsurface intake, surface intake, or a combination thereof and determined that no further analysis is required based on the rationale outlined below. Staff also found that a subsurface intake in Segment 2 is infeasible, but a surface intake may be feasible in the northernmost section of Segment 2. Site 2A was identified within Segment 2 for further analysis for a surface intake and is described in Section 2. Figure 2 shows the geographic locations covered by each segment, Figure 5 indicates the location of existing intake/discharger structures in each segment, and Figure 6 shows the Marine Protected Areas (MPAs), Areas of Special Biological Significance (ASBS), and sensitive habitats in each segment.

A description of the conditions and constraints for each segment follows:

Segment 1 (Proposed Site 1G is located in Segment 1): San Gabriel River/Santa Ana River

General Segment Description:
Segment 1 extends from the mouth of the San Gabriel River in the northwest to the mouth of the Santa Ana River and is primarily within the Seal Beach watershed. Segment 1 can be characterized as a primarily developed area with flat, wide beaches augmented by beach nourishment projects, and several wetlands. Despite the built-out nature of Segment 1 and the presence of a variety of reserves, recreational areas, and residential developments, the Discharger identified several sites throughout the segment that are of a potentially sufficient size to support a desalination facility and have land uses designated for industrial or utilities land use. Four of the Segment 1 sites, 1A, 1D, 1E, 1H and the proposed onshore location

(Site 1G), were identified for further analysis as described in Section 2 of this document.

Segment 1 contains the San Gabriel and Santa Ana Rivers, both of which are major waterbodies in southern California. Although the majority of the land within this segment is urbanized, it includes several surface-water features, including Anaheim Bay, the Seal Beach National Wildlife Refuge, the Bolsa Chica Ecological Reserve, the Huntington Beach Wetlands Conservancy lands, and several drainage channels extending from the inland areas of Orange County.

Suitability for Subsurface Intakes – Hydrogeological Considerations:
The seafloor offshore of Segment 1 is characterized by a gently sloped continental shelf (the San Pedro shelf), which extends approximately 12 miles offshore to water depths of approximately 200 feet. The sediments covering the shelf are predominantly clays, silts, and sands. According to the Discharger's Appendix E, there are four coastal aquifer systems, listed from the northernmost to southernmost: Alamitos, Sunset, Bolsa, and Talbert Gaps. The shallow aquifers in these gaps are about 50 to 200 feet thick; Alamitos Gap is closer to the San Gabriel River watershed and Talbert Gap is closer to the Santa Ana River watershed. Figure 7 is a map that shows the location for the Gaps in this segment.

A subsurface infiltration gallery (SIG[2]) located within Segment 1 would be influenced by the drainage of both the San Gabriel and Santa Ana Rivers. The sediment loads of these rivers are predominantly silts and clays that are deposited in the nearshore environment, before reaching the shelf break. Transport of wave-suspended material on the shelf is limited. Due to episodic flooding events and the lack of transport offshore the silts and clays deposited by the San Gabriel and Santa Ana Rivers have the potential to adversely affect the infiltration capacity to support a SIG (Discharger's Appendix E). A SIG was deemed technically feasible because an area with a stable seafloor is present offshore of Huntington Beach that has relatively low environmental sensitivity. Since the offshore areas of Segment 1 have similar bathymetry, geology, and biological conditions, it can be assumed that a stable seafloor conducive to a SIG is present throughout many areas of Segment 1. However, the 2014 Independent Scientific Technical Advisory Panel report (ISTAP, Phase 1) (Discharger's Appendix F) concluded that a SIG would be feasible from a technical standpoint in the Segment 1 near the proposed site (Site 1G). The ISTAP, Phase 2 (Discharger's Appendix G) evaluated the feasibility of a seafloor infiltration gallery and surf zone infiltration gallery and concluded that a surf zone infiltration would be infeasible in this area. The surf zone infiltration gallery would require a significant area that would require many years to construct and put constraints on public access to the beaches, and the beach re-nourishment program could affect a surf zone infiltration gallery performance. For the purposes of this document, a SIG

[2] Discharger's Appendix E defines SIG as subsurface intake gallery, which includes both seafloor infiltration gallery and surf zone infiltration gallery. ISTAP, Phase 2 (Discharger's Appendix G) concluded a surf zone infiltration gallery was infeasible for Site 1G, and so reference to a SIG in Segment 1 is a seafloor infiltration gallery.

reference used related to Segment 1 and in Section 2 will be referring a seafloor infiltration gallery.

Suitability for Surface Intakes – Presence/Absence of Biologically Sensitive Habitats:
Segment 1 does not contain any Areas of Special Biological Significance (ASBS), kelp beds, surfgrass beds, or eelgrass beds, but does contain approximately 494 acres of Marine Protected Areas (MPA) as well as other estuaries and wetland areas. These MPAs provide habitat for marine life that could be negatively affected by a surface intake; however, these resources are not located offshore and are only present in the northern portion of Segment 1. The southern portion of Segment 1 contains an existing surface intake at the AES HBGS power plant (Site 1G, the proposed onshore location) and the Orange County Sanitation District (OCSD) wastewater outfalls.

Segment 1 – Summary Conclusions:
As subsurface intakes may be feasible and there are limited sensitive biological habitats present in this area of the San Pedro Shelf, Segment 1 is further evaluated to determine if there are sites within Segment 1 for a new seawater desalination facility. Specific sites within this segment are analyzed further in Section 2 of this document.

Segment 2: Newport Beach/Balboa Peninsula

General Segment Description:
Segment 2 consists of a small portion of Newport Beach located south of the Santa Ana River mouth, and the entire Balboa Peninsula.

Suitability for Subsurface Intakes – Hydrogeological Considerations:
The northern section of this segment is located adjacent to the Santa Ana River. There is a limited narrow area of offshore submarine shelf in the northern section, evaluated as Site 2A in Section 2 of this document. With the exception of the sediments of the Talbert Gap in the northern part of this Segment, the geologic formations that dominate Segment 2 are non-water bearing. Therefore, a technically feasible location for a subsurface intake system in Segment 2 is not evident. Most of the onshore area of this segment is underlain by low- to non-water-bearing formations. Therefore, because shallow supply wells would have extremely low yields, there appears to be no subsurface alternative for obtaining sufficient seawater supply for the desalination plant in this Segment. Wells associated with a subsurface intake system would have lower yield than a subsurface intake system in Segment 1, and deeper wells may intercept the eastern edge of the Newport Inglewood fault zone located about 0.5 miles offshore. (Discharger’s Appendix E)

Suitability for Surface Intakes – Presence/Absence of Biologically Sensitive Habitats:
There are no ASBS, or MPA, kelp, surfgrass, or eelgrass beds present in Segment 2. However, Segment 2 has other ecologically sensitive areas: a stretch of the coastline from north of Newport Pier to Newport Shores has been identified as having a historic grunion spawning area; Banning Ranch, an area of wetlands that have been historically disturbed with oil extraction activities; and Semenuik Slough, a saltwater marsh located in West Newport. Both the Banning Ranch and Semenuik Slough contain extensive open space and wildlife habitat that would be affected by the development of a desalination facility in this Segment. The presence of an available offshore submarine shelf renders surface intakes feasible at Site 2A.

Segment 2 Summary Conclusions:
Based on hydrogeological considerations, Segment 2 is not a feasible alternative site for subsurface intakes; surface intakes are possible in this Segment, specifically Site 2A, and therefore Site 2A was identified for further evaluation (see Section 2 and Figure 12) to determine if this location could support a desalination facility.

Segment 3: Newport Harbor

General Segment Description:
Newport Bay is divided into two waterbodies: Upper Newport Bay and Lower Newport Bay. Segment 3 encompasses almost all of Lower Newport Bay that is located in the coastal zone, except for the Balboa Peninsula, which is located in Segment 2. Upper Newport Bay, which is hydrologically connected to Lower Newport Bay, contains an ecological reserve and is a State Marine Conservation Area. The Newport Bay area is highly urbanized.

Suitability for Subsurface Intakes – Hydrogeological Considerations:
Newport Bay is located at the west end of the drainage area to San Diego Creek. Harbor Island protects the bay from the waves and currents of the open ocean. Sedimentary deposits in Newport Bay are dominated by clays and silts with very low permeability and most of the onshore area of this segment is underlain by non-water-bearing formations. Therefore, shallow supply wells in Segment 3 will have little to no yields. In addition, clays and silts in storm water runoff and re-suspended sediments present as a result of dredging activities are likely to clog the engineered fill for a SIG, so a SIG would require constant maintenance to remove fine-grained sediments. Furthermore, the potential for poor water quality, the need for periodic dredging of the harbor to keep it operational for sea vessels, and the presence of low permeability sediments would limit construction of a SIG Thus, conditions are not favorable for subsurface intakes in Segment 3 (Discharger's Appendix E).

Suitability for Surface Intakes – Presence/Absence of Biologically Sensitive Habitats:
While there are no ASBSs, MPAs, or kelp beds located offshore in Segment 3, this segment is hydrologically connected to the Upper Newport Bay State Marine Conservation Area, an MPA located north of this segment. As a result, construction of a desalination intake facility within Newport Harbor could indirectly affect aquatic habitat in this MPA (Discharger’s Appendix E). The Ocean Plan requires discharges to be sited at a sufficient distance from an MPA so that the salinity within the boundaries of an MPA does not exceed natural background salinity (Ocean Plan, chapter III.M.2.b(7). Also, the Ocean Plan requires that, to the extent feasible, surface intakes be sited so as to maximize distance from an MPA (Ocean Plan, chapter III.M.2.b(7). Negative effects on this MPA and other sensitive marine habitats and species (e.g., giant kelp and eelgrass beds) may occur from a surface intake due to limited space and direct connectivity to the Upper Newport Bay MPA. The Discharger’s Appendix E also describes the presence of eelgrass beds within this segment. Constructing a new surface intake and discharge outfall in Segment 3 would not comply with the Ocean Plan’s provisions regarding sensitive habitat and sensitive species (Ocean Plan chapter III.M.2.b(3)).

Segment 3 Summary Conclusions:
Construction of subsurface intakes, a new surface intake, or a combination of subsurface and surface intakes are not feasible in Segment 3 based on the presence or proximity of sensitive habitats and species, the lack of suitable hydrogeology for subsurface intakes, and likely impacts to recreational and other beneficial uses in the area.

Segment 4: Corona Del Mar to Crystal Cove

General Segment Description:
Segment 4 extends from the Newport Harbor entrance to the southern end of Crystal Cove. Portions of this Segment are located within the Newport Bay and Newport Coast watersheds and include areas that are relatively undeveloped.

Suitability for Subsurface Intakes – Hydrogeological Considerations:
The offshore shelf area of this segment is a steep, erosional environment with minimal deposition, suggesting a lack of feasibility for a SIG. The shoreline topography is also steep. Intake structures that do not result in marine life mortality, including shallow and deep subsurface wells in Segment 4 are likely to encounter low permeability sediments and basement rocks (crystalline or metamorphic rocks that are often low- or non-water bearing) (Discharger’s Appendix E). Thus, a prohibitively large number of wells would be required to meet the Project’s needs.

Suitability for Surface Intakes – Presence/Absence of Biologically Sensitive Habitats:
Segment 4 has one MPA – Crystal Cove State Marine Conservation Area, and two ASBSs – Robert E. Badham ASBS State Water Quality Protection Area (SWQPA) and Irvine Coast ASBS SWQPA. Both the MPA and the two ASBSs span the majority of the length of Segment 4. In addition, kelp beds line the majority of Segment 4’s coastline (Discharger’s Appendix E). The Ocean Plan requires owners or operators of seawater desalination facilities to ensure that intake and discharge structures associated with marine life mortality are not located within an MPA or SWQPA (Ocean Plan, chapter III.M.2.b(7).

Additionally, Crystal Cove State Park is an important onshore biological resource; it includes a variety of sensitive habitats, including coastal sage scrub as well as a historic grunion spawning area. Construction activities and operational effects could include permanent removal of habitat, nighttime lighting resulting in altered wildlife behavior, and increased runoff caused by the introduction of the impervious surfaces to a mostly pervious, naturalized area.

Segment 4 Summary Conclusions:
Based on the presence of sensitive biological habitats both onshore and offshore, constructing a new surface intake and discharge structure in Segment 4 would not be consistent with the Ocean Plan, chapter III.M.2(b)(3 and 7). Construction of a surface intake in Segment 4 would also violate this provision of the Ocean Plan and construction of a SIG or subsurface intakes is not hydrologically feasible.

Segment 5: Laguna Beach, Crystal Cove to Aliso Beach

General Segment Description:
Segment 5 extends from El Morro Elementary School to the mouth of Aliso Creek, and includes drainages from Emerald Bay Channel, Laguna Canyon Channel, and Aliso Creek. Segment 5, which is located primarily within the San Diego Water Board’s jurisdiction, is generally located within the Aliso-San Onofre Watershed.

Suitability for Subsurface Intakes – Hydrogeological Considerations:
The geological conditions in the offshore shelf in Segment 5 are very similar to those of Segment 4. This is an erosional coastal environment, and the minimal sediment cover on the shelf area would likely preclude the use of a SIG for seawater supply. Intake structures that do not result in marine life mortality, such as subsurface wells in Segment 5, are likely to encounter thin sediment cover, low permeability sediments, and basement rocks. Thus, a prohibitively large number of wells would be required to meet the Facility’s water supply needs (Discharger’s Appendix E).

Suitability for Surface Intakes – Presence/Absence of Biologically Sensitive Habitats:
Spanning the length of Segment 5 are Heisler Park ASBS SWQPA and three MPA: Crystal Cove State Marine Conservation Area, Laguna Beach State Marine Reserve, and Laguna Beach State Marine Conservation Area. The Irvine Coast ASBS SWQPA present in Segment 4 also spans portions of Segment 5. Kelp beds, which provide habitat for a variety of marine species, are scattered throughout this segment. A desalination plant with a surface intake could draw in organisms that inhabit the kelp beds; the discharge of concentrated brine into kelp beds could also negatively affect the biological resources. (Discharger's Appendix E).

Segment 5 Summary Conclusions:
Constructing a new surface intake and discharge outfall in Segment 5, would not comply with the Ocean Plan's prohibition on locating intake and discharge structures associated with marine life mortality within MPA and SWQPA (Ocean Plan, chapter III.M.2.b(7). Similarly, constructing a SIG in Segment 5 would not comply with this provision because of the marine life mortality associated with construction of this type of subsurface intake. Additionally, hydrogeologic, topographic and oceanographic conditions are not favorable for a SIG or subsurface intakes in this segment. Because of the presence of sensitive biological resources, a surface intake or combination of both subsurface and surface intakes would also not be feasible in this segment.

Segment 6: Aliso Beach to Dana Point Headlands

General Segment Description:
Segment 6, which extends from Aliso Creek to just north of the Dana Point Headlands, is located within the Aliso-San Onofre watershed. This Segment is within the San Diego Regional Board's jurisdiction.

Suitability for Subsurface Intakes – Hydrogeological Considerations:
The topographic and coastal conditions in Segment 6 are similar to those of Segments 4 and 5; the offshore shelf area extends 1.5 to 2 miles offshore. The shelf break coincides with the eastern extent of the Newport-Inglewood fault zone. The main source of sediment in the near-shore area is from erosion of the coastal cliffs, and there are no coastal aquifers. Thus, there may be a thicker mantle of sediment on the offshore shelf. Discharger's Appendix E indicates that there would be minimal access to seawater via subsurface intakes due to low permeability sediments and basement rocks in Segment 6 that are likely to result in low subsurface well yields. Intake structures that do not result in marine life mortality, such as subsurface wells, would not be capable of achieving the required volume of source water for the Facility. A SIG is also likely not feasible as a result of the high wave energy environment and mass wasting from the shoreline, which could result in erosion of the SIG or excessive sedimentation over the SIG. (Discharger's Appendix E)

Suitability for Surface Intakes – Presence/Absence of Biologically Sensitive Habitats:
Two MPAs span the length of Segment 6: Laguna Beach State Marine Conservation Area and Dana Point State Marine Conservation Area. Kelp resources also are scattered throughout the segment (Discharger's Appendix E).

Segment 6 Summary Conclusions:
Hydrogeological conditions are not favorable for a SIG or subsurface intakes. Constructing a new surface intake and discharge in Segment 6 would not comply with the Ocean Plan's prohibition on locating intake and discharge structures within MPAs, with the exception of intake structures that do not have marine life mortality associated with their construction, operation, and maintenance (e.g., slant wells) (Ocean Plan, chapter III.M.2.b(7). Because hydrogeological conditions are not favorable for subsurface intakes and this Segment contains sensitive biological resources, a combination of both subsurface and surface intakes would also not be feasible in this segment. In addition, Segment 6 is approximately 26 miles away from the distribution system for OCWD and none of the existing pipelines are of sufficient size to convey the desalinated water to OCWD's system. Construction of about 26 miles of pipeline will likely render this segment infeasible (Discharger's Appendix OO2).

Segment 7: Dana Point Headlands to San Juan Creek

General Segment Description:
Segment 7 extends south from the Dana Point Headlands and terminates immediately south of San Juan Creek. As with Segment 6, this Segment is located within the Aliso-San Onofre watershed. Dana Point Harbor is located within this Segment. This Segment is within the San Diego Regional Board's jurisdiction.

Suitability for Subsurface Intakes -– Hydrogeological Considerations:
South Coast Water District proposes to construct the Doheny Desalination Project (a.k.a. South Orange Coastal Ocean Desalination Project) in Segment 7, and that facility would use slant wells to draw in up to 15 MGD of seawater. Subsurface wells located in this area are not likely to yield higher volumes from the San Juan Valley Groundwater Basin (Basin) than what has already been proposed by the South Coast Water District. Additionally, subsurface wells drilled outside the Basin are likely to encounter thin sediment cover, low permeability sediments, and basement rocks. Thus, it appears unlikely that subsurface wells would be capable of achieving the required feedwater rates for the proposed desalination facility. It is not technically feasible to construct a SIG in Segment 7 because of mass wasting of the shoreline, the high wave energy environment, and sediment input from San Juan Creek. (Discharger's Appendix E)

Suitability for Surface Intakes – Presence/Absence of Biologically Sensitive Habitats:
The Dana Point State Marine Conservation Area is located in the northern end of Segment 7. Furthermore, there are 34 acres of scattered kelp beds in Segment 7 (see Figure 7). Because of the amount of sensitive habitat in this Segment, siting a surface intake and discharge within this segment would likely negatively affect some of the sensitive marine organisms that live or forage within these kelp areas. Therefore, constructing a new surface intake and discharge in Segment 7 would not comply with the Ocean Plan's provision to avoid placing intake and discharge infrastructure in a location that would result in impacts to sensitive habitats (e.g. kelp beds), (Ocean Plan, chapter III.M.2.b(3)). Since conditions are not favorable for subsurface intakes or a new surface intake in Segment 7, a combination of subsurface and surface intakes would also not be feasible in this segment. (Discharger's Appendix E)

Segment 7 Summary Conclusions:
Subsurface wells located in this area are not likely to yield higher volumes from the San Juan Valley Groundwater Basin than what has already been proposed by the South Coast Water District for the proposed Doheny desalination facility. Based on the presence of sensitive biological habitats, constructing a new surface intake and discharge in Segment 7 would not comply with the Ocean Plan's prohibition on locating intake and discharge structures associated with marine life mortality within MPAs. Construction of a combined surface and subsurface intakes are also not feasible for these reasons. In addition, Segment 6 is approximately 27 miles away from the distribution system for OCWD and none of the existing pipelines are of sufficient size to convey the desalinated water to OCWD's system. Construction of approximately 27 miles of pipeline will likely render this segment infeasible because of the cost for construction of the necessary infrastructure (pipeline, pump stations), the difficulty and time it would take to obtain the necessary right-of-ways, and impacts to roads and other regional infrastructure (e.g, commercial and residential areas). (Discharger's Appendix OO2)

Segment 8: San Juan Creek to Segunda Deshecha Canada

General Segment Description:
Segment 8 begins south of San Juan Creek and terminates south of the Segunda Deshecha Canada, a channelized stream that discharges to the Pacific Ocean. Segment 8 is also located within the Aliso-San Onofre watershed. This Segment is within the San Diego Regional Board's jurisdiction.

Suitability for Subsurface Intakes – Hydrogeological Considerations:
The shoreline along Segment 8 generally consists of a sandy beach extending unobstructed along the coast. The sandy beaches are relatively narrow and are backed by a developed coastal terrace that extends inland to the coastal bluffs, generally 100 feet in height. Segment 8 is located within the Oceanside Littoral Cell

and eroding sea cliffs are characteristic of this area. Because of a limited aquifer system in this Segment, subsurface well yields in Segment 8 are expected to be low, such that a prohibitively large number of wells would be required to meet the proposed desalination facility's needs. Construction of a SIG in Segment 8 is also not technically feasible because of thin sediment cover, mass wasting of the shoreline, the high wave energy environment, and presence of rocky substrate. (Discharger's Appendix E)

Suitability for Surface Intakes – Presence/Absence of Biologically Sensitive Habitats:
While there are no MPA or ASBS located in Segment 8, scattered kelp beds are located throughout the nearshore areas of the segment and generally more concentrated near the northern segment boundary. Siting a surface intake and discharge outfall here would likely negatively affect some of the sensitive marine organisms within these kelp areas. (Discharger's Appendix E)

Segment 8 Summary Conclusions:
Because of hydrogeological conditions, subsurface intakes located in Segment 8 would not be capable of achieving the required volume of source water for the proposed desalination facility. In addition, because of biological resources in this segment, constructing a new surface intake and discharge in this segment would not comply with the Ocean Plan's provision to avoid placing intake and discharge infrastructure in a location that would result in impacts to sensitive habitats (Ocean Plan, chapter III.M.2.b(3)). Since conditions are not favorable for subsurface intakes or a new surface intake in Segment 8, a combination of subsurface and surface intakes would also not be feasible in this segment. In addition, Segment 8 is approximately 30 miles away from the distribution system for OCWD and none of the existing pipelines are of sufficient size to convey the desalinated water to OCWD's system. Construction of about 30 miles of pipeline will likely render this segment infeasible due to infrastructure costs. (Discharger's Appendix OO2)

Segment 9: Segunda Deshecha Canada to San Mateo Point.

General Segment Description:
Segment 9 begins south of the Segunda Deshecha Canada channel and extends to the southern boundary of Orange County, near San Mateo Point. This Segment is located within the Aliso-San Onofre watershed and is also within the San Diego Regional Board's jurisdiction.

Suitability for Subsurface Intakes – Hydrogeological Considerations:
The shoreline along Segment 9 is similar to that of Segment 8, a generally narrow, sandy beach extends unobstructed along the coast and is backed by bluff faces extending approximately 100 feet in height. Segment 9 is located within the Oceanside Littoral Cell and eroding sea cliffs are characteristic of this area. The offshore geology in Segment 9 is similar to Segment 8. The continental shelf

extends about 3 miles offshore and is defined by the eastern extent of the Newport Inglewood fault zone. Sediment cover on the shelf ranges from less than 5 to 15 feet. No major creeks drain Segment 9 and there are no defined coastal aquifers in this segment. Subsurface well yields in Segment 9 therefore are expected to be low, such that a prohibitively large number of wells would be required to meet the identified need for the proposed desalination facility. Segment 9 is also not ideal for construction of a SIG because of thin sediment cover, mass wasting of the shoreline, the high wave energy environment, and presence of rocky substrate. Thus, it appears unlikely that subsurface intakes would be capable of achieving the required volume of source water for the Facility. (Discharger's Appendix E)

Suitability for Surface Intakes – Presence/Absence of Biologically Sensitive Habitats:
There are 278 acres of kelp beds in Segment 9 and siting a surface intake and discharge outfall here would likely negatively affect some of the sensitive marine organisms within these kelp areas. (Discharger's Appendix E)

Segment 9 Summary Conclusions:
Because of hydrogeological conditions, subsurface intakes located in Segment 9 would not be capable of achieving the required volume of source water for the proposed desalination facility. In addition, because of biological resources in this segment, constructing a new surface intake and discharge in this segment would not comply with the Ocean Plan's provision to avoid placing intake and discharge infrastructure in a location that would result in impacts to sensitive habitats (Ocean Plan, chapter III.M.2.b(3)). Since conditions are not favorable for subsurface intakes or a new surface intake in Segment 8, a combination of subsurface and surface intakes would also not be feasible in this segment. In addition, construction of a SIG in this location is not technically feasible as a result of thin sediment cover, mass wasting from shoreline cliffs, the high energy wave environment, and the presence of a rocky substrate. In addition, Segment 8 is approximately 34 miles away from the distribution system for OCWD and none of the existing pipelines are of sufficient size to convey the desalinated water to OCWD's system. Construction of about 34 miles of pipeline will likely render this segment infeasible due to infrastructure costs. (Discharger's Appendix OO2)

Summary of Section 1 – Rationale for Narrowing Onshore Segments
In summary, Segment 1 and the northern most area in Segment 2 has been determined to have the best available general location for a proposed desalination project in the Santa Ana Region. The Santa Ana Water Board's May 23, 2017 letter provided the following path forward for evaluating onshore sites for a desalination facility within Segment 1 and Segment 2.

Reasonable range of sites requiring further analysis	Evaluation
Segment 1: Sites 1A – D • Site 1D selected to represent Property 1A – D	surface and subsurface intakes
Segment 1: Property 1E – F • Site 1E selected to represent Property 1E – F	subsurface intakes
Segment 1: Site 1H	surface and subsurface intakes
Segment 2 • Site 2A selected to represent Segment 2	surface intakes

Section 2 describes the factors associated with the five locations identified for further analysis of the onshore locations, and Section 3 describes the factors associated with the offshore locations evaluated for the proposed desalination project.

Figure 5. Existing Intake and Discharges located within the Nine (9) Segments Evaluated
(Source: Discharger's Appendix E, Figure 2)

Figure 6. Sensitive Habitats located in the Nine (9) Segments Evaluated
(Source: Discharger's Appendix E, Figure 5)

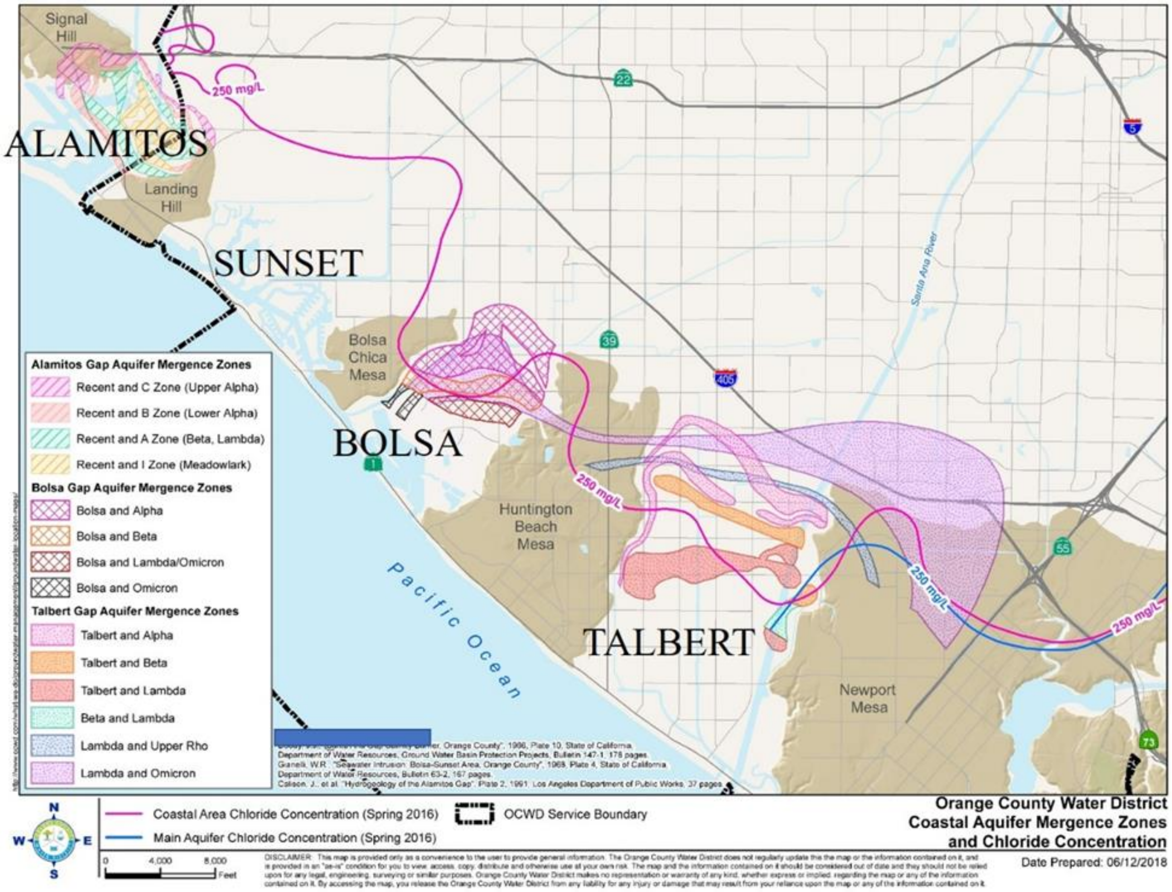


Figure 7. Coastal Aquifers Gap located in Segment 1
(Source: Orange County Water District)

SECTION 2 – Rationale for Narrowing of the Onshore Sites: Sites 1G (Proposed), 1D, 1E, 1H, and 2A

As described in Section 1, the best feasible location for the proposed desalination project has been narrowed to Segment 1 and the northernmost portion of Segment 2 (Site 2A). The Santa Ana Regional Water Board letter dated May 23, 2017 discusses the agreement between staff and the Discharger on the sites within Segment 1 and Segment 2 to undergo further evaluation. The May 23, 2017 letter allowed the Discharger to evaluate Sites 1D, 1E, and 1H as representative Sites within Segment 1 and Site 2A as representative of Segment 2.

Section 2 evaluates the following onshore locations:

- Site 1G – Located within the AES HBGS property (Proposed site)
- Site 1D – An industrial area located near Seal Beach
- Site 1E – Near Bolsa Chica
- Site 1H – Located in South Huntington Beach
- Site 2A – Located in West Newport Beach

For each location, the following factors were evaluated:

- land use considerations;
- hydrogeological considerations;
- proximity to sensitive biological habitats;
- existing infrastructure;
- potential construction impacts; and
- potential to co-mingle desalinated brine with wastewater

After the description of Site 1G (Discharger's proposed Site), the factors that are common to Sites 1D, 1E, 1H, and 2A, are described. Then Sites 1D, 1E, 1H, and 2A are described separately, highlighting factors unique to each site.

Proposed Site 1G – Located on the AES HBGS:

General Site Description/Land Use Considerations

Site 1G, the site for the proposed Facility, is located in the southern portion of the City of Huntington Beach. Figure 8 shows Site 1G, the Discharger's proposed onshore location. Specifically, the site is located within the AES Huntington Beach Generating Station (HBGS) property to the north and east of the generating station facilities. The approximately 85-acre site is designated by the Southern California Association of Governments (SCAG) for three land uses: transportation, communications, and utilities. The majority of Site 1G is developed. The southwest portion of the site consists of energy production towers, pipelines, transmission lines, paved parking lots, and roadways. The north and east portions of the property have large circular storage tanks surrounded by graded or partially cleared land. The Huntington Beach Channel separates the property in a general north to south direction. The eastern edge of the property has a landscaping buffer between the energy plant and Magnolia Street to the east. (Discharger's Appendix E)

The Huntington Beach General Plan (2013 General Plan) designates the property as public, and it is currently zoned for public/semi-public use. Typical development under these designations would include public works or services facilities. Site 1G is surrounded by a variety of land uses including the Huntington By-The-Sea RV Park and Cabrillo Mobile Home Park to the west, commercial to the north across the channel, residential to the east, and cleared land to the northeast and southeast. The Pacific Coast Highway, beaches, and the Pacific Ocean are immediately to the south and southwest of the property. Development of a desalination plant at Site 1G would be consistent with both designations of the General Plan and the Huntington Beach Zoning and Subdivision Code. Operations of a desalination facility would be similar in nature to the operation of the AES energy facilities that currently exist on the site. Therefore, development of a 50 MGD desalination plant would be consistent with the plans and policies that are in place for Site 1G. (Discharger's Appendix E)

In order to comply with the State Water Board's Once-Through Cooling (OTC) Policy, AES HBGS has proposed to demolish several of their OTC units and replace them with a natural-gas-fired electrical generating facility. These changes to the site would provide sufficient undeveloped space for the proposed Facility. Additionally, the seawater intake and discharge structures associated with the OTC system of the AES HBGS would provide existing infrastructure that will be modified by the discharger (see State Lands Commission's 2017 FSEIR, and Santa Ana Water Boards 2019 FSEIR Addendum), resulting in a reduction of both onshore and offshore construction, social, and economic impacts compared to other sites analyzed by the Discharger (Discharger's Appendix E). Santa Ana Water Board's analysis of the offshore location for the intake/discharge is described in Section 3 of this document.

For comparison purposes, the construction at the proposed site, Site 1G, would not require the installation of an intake or discharge pipelines and associated facilities (e.g. pump stations); only the retrofits associated with the existing AES HBGS's intake and discharge system would be required. The Discharger's environmental analysis for construction of the retrofits for the AES HBGS intake and discharge prepared by Dudek dated June 17, 2019 (Appendices HH, BBBBB, and 2019 FSEIR Addendum), describes the construction impacts. Construction of both the diffuser system and the wedgewire screens would be conducted via an anchored derrick barge with a barge-mounted crane, moored above the tower during construction. Personnel access will be provided by a utility boat, which would travel to and from the Port of Long Beach. Demolition of the top 6.9 feet of the existing discharge structure and installation of the diffuser system would take approximately one to two months. During installation of the new diffuser cap on the discharge tower, public access to the offshore work area (4,000 square feet) would be restricted and comply with the City's Municipal Code. Work offshore would be confined to the area directly surrounding the tower, about 1,500 feet offshore. Construction and installation of the wedgewire screens and associated infrastructure would take approximately three months. The offshore wedgewire screens would be installed on a new header connected to the existing HBGS intake tower. Work offshore would be confined to the area directly surrounding the tower. This construction will not require any heavy shoreline construction, as would be required for the alternative sites discussed below.

The proposed Facility at Site 1G (as well as the other alternative Sites) are at an elevation that would be vulnerable to sea level rise due to climate change. To address this concern, the Order, section VI.A requires the Facility to be protected from the impacts of sea level rise impacts. Section VI.B.4 of the Order requires the Discharger to prepare and submit a Climate Change Action Plan (CCAP) within three years of the effective date of the Order. Section VI.B.4.a – g of the Order specifies the needed elements of the Climate Change Action Plan.

Subsurface Intake – Hydrogeological Considerations:
Per the Ocean Plan, subsurface intakes are required unless the Santa Ana Water Board determines that they are not feasible. If subsurface intakes are found to be infeasible for the design capacity of the desalination plant, the Santa Ana Water Board must consider the feasibility of implementing a combined subsurface and surface seawater intake system. The factors used to determine whether subsurface intakes are feasible include these general areas: geotechnical data, hydrogeology, benthic topography, oceanographic conditions, presence of sensitive species and habitats, engineering, constructability, and cost.

As explained in Segment 1, the ISTAP, Phase 2 (Discharger's Appendix G) evaluated a seafloor infiltration gallery and a surf zone infiltration gallery for Facility; the ISTAP concluded the surf zone infiltration gallery was infeasible due to scale, public access constraints, and effects from the beach re-nourishment program. The ISTAP, Phase 2 concluded that a seafloor infiltration gallery (SIG) would be feasible from a technical standpoint and could be located offshore outside of the surf zone. Specifically, a SIG was deemed technically feasible because an area with a stable seafloor is present offshore in Segment 1. However, other factors affect the ability to use a SIG, such as: proximity to onshore seawater intrusion barriers, scale of the intake, and economics as discussed below.

The ISTAP, Phase 2 evaluated two construction methods for a seafloor infiltration gallery – SIG Trestle and SIG-Float in. The ISTAP, Phase 2 found that to meet the design capacity of 50 MGD of product water, the total area required for a SIG would be 25.44 acres. Because of nearly constant wave action, construction of a SIG using the Trestle method would require that all construction activities take place on temporary trestles. With the Float-in method, off-site pre-fabrication and float-in of large pre-assembled SIG elements would shift fabrication and assembly of large modular units to on-shore, thus eliminating the impacts from ocean swells. The modular units would then be transferred by a flat-deck barge for final installation. The ISTAP concludes that either construction method for a seafloor infiltration gallery were not feasible from a design constraint standpoint. (Discharger's Appendix G)

For the analyses of a slant well system at Site 1G, the Discharger provided modeling runs that predicted extraction of seawater by slant wells along Huntington Beach at an extraction rate necessary to satisfy the plant demand (i.e., 107 million gallons per day) would draw fresh water from the inland aquifers at a rate that would adversely impact the seawater intrusion barrier system of injection wells in the Talbert Gap operated by the Orange County Water District (OCWD), and would likely result in an adverse impact to nearby wetland ecosystems. Similar modeling analysis of groundwater extraction from other nearby aquifers supported a similar conclusion regarding either undesirable hydrogeologic impacts and/or a limited capacity of the aquifer to provide the necessary feed water. Based on these modeling runs and other supporting analyses, the Discharger concluded that use of subsurface intakes as the sole means of supplying water for the desalination plant is not feasible.

Water Boards staff reviewed the information provided by the Discharger and other related data and information provided by California Coastkeeper Alliance on subsurface feasibility (letters dated June 21, 2018, July 9, 2018), and requested the Discharger to conduct additional hydrogeologic evaluations to support evaluation of the feasibility of a combined surface/subsurface intake system, in accordance with the Ocean Plan chapter III.M.2.d.(1)(a)(ii). This additional evaluation included additional modeling analyses conducted by the Discharger for a combined surface and subsurface seawater intake.

The Discharger responded to Santa Ana Water Board staff's request for an additional evaluation of a combined surface and subsurface seawater intake scenario by submitting additional hydrogeologic modeling by Geosyntec as Appendices PPPPP and PPPPP-2 in February and March 2019, respectively. Based on those most recent modeling results (model run 5 and sensitivity analyses), Geosyntec concluded that in order to conform with the OCWD's threshold of no more than 1,000 AFY withdrawal of freshwater from the inland aquifer (letter from OCWD dated May 18, 2018), the maximum pumping rate for a small-scale (three well) system of slant wells at Huntington Beach would be approximately 1,000 AFY (3.8 MGD). This is roughly 3.5% of the design intake flow of 106.7 MGD for the proposed Facility. The remaining 96.5 %, roughly 103 MGD, would be drawn in through a surface water intake system.

With respect to potential impacts associated with wetlands, results of the most recent model run (model run 5) indicated that approximately 1% to 4% of the 3.8 MGD of groundwater extracted by the small-scale slant well system would flow from the coastal margin wetlands. Thus, based on the modeling and sensitivity analyses performed by Geosyntec, it appears that the operation of the three-well extraction system would likely have minimal impacts to the wetland areas if operated at a maximum extraction rate of 3.8. MGD.

The modeling results presented by the Discharger, together with the hydrogeologic and geophysical data submitted to support those modeling results and the input parameters used, provide an adequate assessment of potential impacts associated with operation of a subsurface intake system for the Discharger's proposed Facility.

Santa Ana Water Board staff concurs with the findings and conclusions that Geosyntec presented, indicating that a small-scale (three-well) slant well system could produce a maximum of approximately 3.8 MGD, given the constraints set forth by the OCWD for protection of its seawater intrusion barrier wells.

Considering the critical need to protect the seawater barrier system, and the limited production volume that could be supplied by a small-scale slant well system, it will be necessary to utilize a surface water intake system for over 96% of the combined intake for the Facility. Therefore, the Santa Ana Water Board staff recommend that the Santa Ana Water Board find that subsurface and combined subsurface/surface intakes are infeasible for the Facility design capacity. (Santa Ana Water Board letter to the Discharger dated May 17, 2019, and Discharger's Appendices K, A3, L, L2, L3, III, L4, QQQQ, PPPPP, and PPPPP-2)

Identified Need for the Desalinated Water:
The need for 56,000 AFY of desalinated water is consistent with the 2015 Urban Water Management Plan for the Municipal Water District of Orange County and other water planning documents. (See Attachment G.2)

Proximity to Sensitive Biological Habitats:
Bolsa Chica Ecological Reserve is over 3.5 miles from Site 1G. Within Segment 1 there is approximately 494 acres of MPAs. Site 1G is approximately 5.5 miles north of a coastal MPA located in Segment 3, and approximately 5.5 miles south of onshore wetland habitat areas that are also considered MPAs. Site 1G is in a location that avoids impacts to sensitive habitats and sensitive species. (Ocean Plan, chapter III.M.2.b(3))

Existing Discharge and Surface Intake Infrastructure:
The Discharger would modify the existing AES HBGS discharge and intake structures for use with the proposed Facility. The discharge outfall would be equipped with a multi-port linear diffuser with 14-ports. The surface intake would be retrofitted with cylindrical wedgewire screens with 1-mm slots. The through slot velocity is designed to be 0.5 ft/sec or less. Further evaluation of the best available intake location feasible is covered in Section 3 of this document.

Availability of Wastewater:
Wastewater is not available, so co-mingling with wastewater discharges will not be possible for Site 1G. The only wastewater treatment plant near Segment 1 is the Orange County Sanitation District (OCSD) Treatment Plant #2. In a May 27, 2016 letter from OCSD to the Discharger, OCSD addressed the potential for commingling the proposed Facility brine discharge with the existing wastewater effluent OCSD. OCSD stated that it would not be feasible to commingle part or all of the proposed Facility brine discharge due to conflicts with OCSD's Wastewater Ordinance, goals for future wastewater recycling, and lack of available wastewater to sufficiently dilute the proposed Facility's brine discharge (Discharger's Appendix CC). In addition, the

May 27, 2016 OCSD letter also discussed the potential to commingle brine with the wastewater generated by South Orange County wastewater treatment facilities. As discussed in the Memorandum, South Orange County Water Association's Coastal Treatment Plant and JB Lanthem Treatment Plant do not have sufficient wastewater flows or capacity to dilute the proposed Facility brine discharge sufficiently. Moreover, the discharge areas for these outfalls contain sensitive marine biological resources that could be affected from increased salinity in their discharge.

Energy use:
The Discharger did not provide a comparison of energy costs as part of their ROWD submittal or 13241.5(b) request. The 2010 substitute environmental documentation (SED) for the Desalination Amendments provides a comparison of energy costs for the Huntington Beach Desalination Plant for a vertical well and for open water intake. The SED states:

> "A subsurface intake feasibility assessment was conducted for the Huntington Beach Desalination facility that calculated the increase in energy requirements for the use of an intake well compared to a surface water intake. The assessment concluded that the use of a vertical intake well system would result in about a 10 percent increase in energy consumption. If a facility opted to withdraw seawater by use of a subsurface intake, total energy costs of pumping seawater would increase compared to an open ocean intake. However, the energy requirements of pretreatment (13 percent) required for a surface water intake may not be required for a subsurface intake. (Water Globe Consulting LLC 2010) This study was performed after completion of the Huntington Beach EIR."

Life Cycle Costs:
The Discharger submitted a summary of the ISTAP analyses demonstrating that the analysis was consistent with the Ocean Plan, chapter III.M.2.d(1)i. (ISTAP, Appendices ZZZ and AAAA.) The ISTAP concluded that the unit costs for water produced using a seafloor infiltration gallery (SIG) intake system are greater than that using an open ocean intake. The ISTAP based this assessment on the assumption that economic viability occurs when the projected price of the desalinated water is less than the cost to purchase imported water plus a premium that OCWD would pay. The costs of producing water using the two subsurface options considered would not be the same as the imported water price with the premium until about 2059, making the Facility economically unviable, (ISTAP, Phase 2).

Cost ranges for each intake design, as identified in the Discharger's Appendix ZZZ, are as follows (in millions of dollars):

Open Ocean Intake:	\$852 – \$899
SIG-Trestle:	\$1,936 – \$2,437
SIG- Float-in:	\$2,109 – \$2,115

Unit Cost Summary for the 2 SIG options and the proposed Open Ocean Intake in $/acre-foot) are as follows:

Open Ocean Intake:	$1,517 – $2,259
SIG-Trestle:	$2,121 – $4.995
SIG- Float-in:	$2,279 – $4,601

Based upon project life cycle/unit costs for the two intake options, including total cost of planning, design, land acquisition, construction, operations, maintenance, mitigation, equipment replacement and disposal over the lifetime of the facility, in addition to the cost of decommissioning the facility, the Santa Ana Water Board concludes that construction of a seafloor infiltration gallery would render the proposed project economically unviable.

Alternative Sites 1D,1E, 1H, and 2A

Common Factors Relative to Sites: 1D, 1E, 1H, and 2A: In the event the Santa Ana Water Board did not find that site 1G was the best site feasible and that one of the alternative sites evaluated was the best site feasible, the Discharger would need to submit a new NPDES permit application and request for Water Code section 13142.5(b) determination to the Santa Ana Water Board and would need to obtain the following new permits and approvals, which is estimated to take 5 years (Discharger's Appendix WWWWW, page 5, Response 3):

- National Environmental Policy Act and California Environmental Quality Act certifications including Section 7 Endangered Species Act consultations with US Fish and Wildlife Service for Least Tern, California Department of Fish and Wildlife for Grunion;
- California State Lands Commission lease for portion of the new intake pipeline occupying lands held in public trust;
- California Department of Parks and Recreation easement for state beach impacts;
- City of Huntington Beach easement for onshore and offshore construction;
- Other local approvals for roadway and beach construction that would temporarily and sometimes permanently restrict coastal access to the public (potentially impacting tourism), and land purchase/leases for privately held land with sufficient space for the seawater desalination treatment train infrastructure.

In addition, Sites 1D, 1E, 1H, and 2A do not have an existing intake or discharge infrastructure and therefore, construction at the alternative sites would have the following added impacts as compared to Site 1G.

- Direct and permanent removal of benthic habitat for submerged intake and discharge infrastructure.
- Potential for permanently restricted recreational beach access and disturbance in the immediate area of the footprint and access roads for the wet well/pump station.
- Seafloor excavation and disturbance would occur at the location of the surface intake on the seafloor, resulting in direct and temporary removal of benthic

habitat and increased turbidity in the construction area from disturbed sediments.

- Construction stormwater runoff, fugitive dust from construction vehicles, and potential release of drilling spoils could impact water quality of seawater or nearby wetlands. While similar impacts could be expected at site 1G, given the existing infrastructure, the impacts would be significantly less.
- Increases in airborne and underwater noise could adversely affect aquatic plants and wildlife within coastal wetlands and could result in construction limitations for biological resource protection during bird breeding season
- Increased greenhouse gas (GHG) emissions and air quality pollutants from construction equipment.
- Construction would result in temporary restricted recreational beach access as well as recreational boating in the areas immediately adjacent to the offshore wedgewire screens and diffuser, as well as onshore wet well/pump station.

Identified Need for the Desalinated Water:
The need for 56,000 AFY of desalinated water is consistent with the 2015 Urban Water Management Plan for the Municipal Water District of Orange County and other water planning documents. This same analysis applies to Sites 1D, 1E, 1H, and 2A. (See Attachment G.2)

Existing Discharge and Surface Intake Infrastructure:
Sites 1D, 1E, 1H, and 2A do not have any existing discharge or intake infrastructure that could be modified or retrofitted to support a desalination facility, whereas Site 1G has the existing intake and discharge system at AES HBGS. The Discharger included in their alternative onshore sites analyses conceptual plans to construct a 50 MGD desalination treatment plant and the intake and discharge system at each location (See Figure 2). The conceptual plans include a preliminary treatment plant layout and the surface and subsurface intake/discharge systems for each location, with the exception of Site 2A, which only includes a surface intake conceptual plan because subsurface intakes in this area are infeasible (see Segment 2 discussion in Section 1, above). In comparison with Site 1G, these sites will require significantly more onshore and offshore construction that will negatively affect the feasibility of these alternative sites. (Discharger's Appendix RRRR)

Availability of Wastewater:
As discussed for Site 1G, it is not feasible to commingle the brine with wastewater discharges at Sites 1D, 1E, 1H, or 2A.

Site-Specific Alternative Analysis: Sites 1D, 1E, 1H, and 2A, were each evaluated for feasibility of a 50 MGD desalination facility with subsurface and/or surface intakes and discharge. The unique characteristics of each site are described below and include land use constraints, the potential for subsurface intakes or surface intakes, and the proximity to sensitive species/habitats and MPAs/SWQPAs.

SITE 1D – Industrial Area near Seal Beach:

General Site Description/Land Use Considerations

Site 1D is in an industrial area located near the City of Seal Beach. At 95 acres, Site 1D currently has sufficient undeveloped land for a 50 MGD desalination plant; however, the property is privately owned and is covered under the Hellman Ranch Specific Plan (Specific Plan). Under the Specific Plan, the site is zoned as open-space natural and oil extraction; these land uses would not be compatible with a desalination plant on the site. The Specific Plan states that all oil production land use designated parcels are deed restricted by the Coastal Commission permit conditions and will be re-designated for the restoration of wetlands when oil and mineral related operations cease. As such, local land use approvals would be difficult to obtain and may not be feasible given the intended and zoned uses under the Hellman Ranch Specific Plan. Figure 9 shows Site 1D and a conceptual plan for this site.

Site 1D faces additional challenges with marine vessel navigation; insufficient beach area available with erosion caused by sea level rise (SLR); restriction of coastal access including roadways and public beach parking near the Seal Beach Pier during construction; environmental impacts from operation of the surface intake and discharge outfall near onshore wetlands, including the Seal Beach National Wildlife Refuge; and drawdown from inland aquifers and coastal wetland areas from operation of a subsurface intake. As noted above, Site 1G faces similar impacts to aquifers and wetland areas.

Offshore infrastructure associated with Site 1D would be able to avoid existing structures in the marine environment based on the conceptual design for the surface intake and discharge pipeline. However, there would be added complexity with permitting the offshore infrastructure, unlike Site 1G, through the Rivers and Harbors Act section 10 by the U.S. Army Corps of Engineers because of the site's proximity to the potential navigation routes used to access the Port of Long Beach. For Site 1D, the beach area where the offshore surface intake and discharge pipelines would connect to the onshore conveyance pipelines, and where the subsurface intake system of slant wells would be located, is expected to reduce in width with one meter of SLR during the operational life of the Facility and may not have adequate space for this infrastructure due to SLR and seasonal erosion. (Discharger's Appendix RRRR)

Subsurface Intake – Hydrogeological Considerations:

The conceptual subsurface intake system developed for Site 1D found that an intake system of 31 slant wells located in the Alamitos and Sunset Gap would be approximately 270 feet long, and be located along about 9,400 feet of Sunset Beach and Surfside Beach, and would produce an estimated 9 MGD form the subsurface. It was estimated that 78% of the source water would be sea water, 13% would be from the inland aquifers, and 9% would come from the wetlands. Because the subsurface intake system would not be able to draw 106.7 MGD in order to produce 50 MGD of product water, a combined subsurface/surface system would be needed. Subsurface intakes in this area would require engineering fortification to withstand the significant beach erosion expected as a result of SLR. This fortification would add substantial cost and complexity to the project. Subsurface intakes for Site 1D would need to be located along the coastline of the Alamitos Gap or Sunset Gap. The Alamitos Seawater Intrusion Barrier was constructed by Orange County Water District (OCWD) and the Los Angeles County Department of Public Works in the 1960s to protect the Central Basin of Los Angeles County and the Orange County Groundwater Basin from seawater intrusion through the Alamitos Gap. Since the barrier is in both Los Angeles and Orange Counties, the facilities are jointly owned by the Los Angeles County Flood Control District (LACFCD) and OCWD. The barrier is over two miles long and includes 43 injection wells and 177 active monitoring well sites. The typical total annual injection rate is 6,000 acre-feet. Performance of the Alamitos Injection Barrier is critical to protect potable aquifers. Similar to impacts of pumping beneath Huntington Beach to the Talbert Barrier, pumping from subsurface intakes along the coastline of the Alamitos Gap would draw a portion of the water from the Alamitos injection wells and reduce the effectiveness of aquifer replenishment inland of the barrier. Regardless of pumping rate, a portion of production from subsurface intake (SSI) wells along the Alamitos Gap coastline would interfere with aquifer replenishment by the Alamitos Injection Barrier.

The Sunset Gap does not have injection barriers; however due to increasing problems with sea water intrusion in this area, OCWD is conducting additional characterization and considering construction of injection barriers in this area. The Sunset Gap has extensive areas of protected coastal margin wetlands and marshlands — the Seal Beach National Wildlife Refuge. A portion of pumping from subsurface intakes in this area would come from these sensitive wetland areas.

SSIs for this site would need to be constructed northwest of the San Gabriel River beneath the Alamitos Peninsula and Belmont Shore, or southeast beneath the Surfside and Sunset Beach area adjacent to the Seal Beach National Wildlife Refuge. Surfside/Sunset Beach extends from the east jetty of Anaheim Bay to Warner Avenue for about two miles in length. Currently, this beach ranges from 200-300 feet in width, and with an anticipated one meter of SLR, the beach is expected to narrow down to between 40-200 feet in width. Due to limited production potential from the coastal aquifers beneath the Alamitos Gap, an estimated 40 to 50 wells spanning the entire two miles of the coastline would be required and would only produce 10 to 15 MGD. One meter of SLR, winter storm erosion, and a lapse in the beach nourishment program could result in complete beach loss over the operational life of the Facility.

Lastly, potentially contaminated sites may affect the viability of subsurface intakes in the Sunset Gap area. This area is impacted by contamination of coastal margin aquifers at several sites seaward and within approximately 3 miles of Site 1D including the Naval Weapons Station (chlorinated solvents, cyanide, hydrocarbons), a former Dow Chemical Facility (arsenic, lead, naphthalene, chlorinated solvents), and multiple underground storage tank sites (benzene, toluene, ethylbenzene, xylene, and gasoline). (See Discharger's Appendices BBB and RRRR)

Surface Intake Considerations:
Seal Beach West is a wide and stable beach that could be suitable for surface intake and diffuser discharge infrastructure (See Figure 9). The west side of the pier has a wider and more stable beach area and the parking lot/grass area west of the pier could accommodate some backshore infrastructure associated with the intake/discharge. Seal Beach East is a narrower and much more dynamic beach. One meter of SLR would reduce the width of this beach. In order to protect the surface intake and diffuser discharge infrastructure from winter storms including stronger storms, and increased tides as a result of SLR, berms and other flood control measures would be needed to protect the pier. Because of the need to put these flood control measures in place, the back-beach area east of the Pier would not be suitable for surface intake/discharge outfall infrastructure.

Proximity to Sensitive Biological Habitats:
Site 1D is adjacent to the Seal Beach Wildlife Refuge, Bolsa Bay Marine Conservation Area and Bolsa Chica Marine Conservation Area, which contains important wetland and riparian habitats for sensitive species (such as, spawning area of groundfish, coastal pelagics, garibaldi, halibut, seabass) that could be affected by the operation of a desalination plant on this site. The offshore surface intake and discharge outfall would also be located close to the estuary/wetland areas that could experience increased marine life mortality from the operation of the surface intake and discharge outfall in this area. (Discharger's Appendix OO1)

Site 1D Conclusion:
Site 1D has several constraints, including: proximity to potential navigation routes used to access the Port of Long Beach to support onshore and offshore construction due to SLR; restrictions on coastal access; proximity to Seal Beach National Wildlife Refuge, infeasibility of subsurface intakes; and incompatibility with the existing Hellman Ranch Specific Plan for the site. Construction of a desalination plant at Site 1D would likely not be accomplished in a reasonable period of time, and would not be feasible based on economic, environmental, and social factors.

SITE 1E: Near Bolsa Chica Ecological Reserve:

General Site Description/Land Use Considerations
Site 1E is situated in Huntington Beach, just downcoast from the Bolsa Bay State Marine Conservation Area and Bolsa Chica Basin State Marine Conservation Area (see below.) The land is currently zoned for industrial use by the Southern California Association of Governments (SCAG). At 25 acres, Site 1E currently has sufficient undeveloped land to site a 50 MGD desalination plant. However, the property is privately owned and is covered under the Holly-Seacliff Specific Plan. The Holly-Seacliff Specific Plan designated Site 1E as open space; as such, local land use approvals would require revisions to the local Holly-Seacliff Specific Plan and may not be feasible given the intended and zoned uses under that plan. Also, due to the proximity to the Bolsa Chica Ecological Reserve, Coastal Act Policy 30240, 30231,

and 30251 related to biological productivity, water quality, and scenic and visual qualities may be incompatible with the construction and operation of a desalination plant (Discharger's Appendix E). Figure 10 shows Site 1E and a conceptual plan for this site. (Discharger's Appendix RRRR)

In addition, the beach infrastructure area for Site 1E, where the offshore discharge pipeline would connect to the onshore conveyance pipelines and where the subsurface intake system would be located, is expected to experience extensive beach erosion with one meter of SLR. It is estimated that the beach will likely be completely eroded in some areas resulting in inadequate space for this infrastructure. Any beach infrastructure in this area would require engineering fortification to withstand significant beach erosion; adding increased complexity and significant cost to the project. (Discharger's Appendix RRRR)

Subsurface Intake – Hydrogeological Considerations:
The conceptual subsurface intake system for Site 1E identifies approximately 18 slant wells in the Bolsa Chica Gap Area, which would be located along about 8,000 feet of Bolsa Chica State Beach. Each well would be about 400 feet long and would produce 15 MGD from this subsurface intake system. The slant wells would not be able to produce the entire intake needs for the desalination plant and so, a combined surface and subsurface intake system would be required. Neither the Sunset Gap nor the Bolsa Gap has injection barriers; however, due to increasing problems with sea water intrusion in these areas, OCWD is conducting additional analysis and considering construction of injection barriers in these areas. The Sunset and Bolsa Gaps both have extensive areas of protected coastal margin wetlands and marshlands—the Seal Beach National Wildlife Refuge and the Bolsa Bay State Marine Conservation Area. A portion of pumping from coastal margin subsurface intakes in these areas would come from these sensitive wetland areas.

Additionally, at Bolsa Chica State Beach, SLR would reduce dry beach areas available for SSI infrastructure. A narrow sand beach coupled with storm erosion and higher water levels would be problematic for any SSI infrastructure located seaward of existing development due to engineering fortifications required to withstand beach erosion. A slant well system would be infeasible at Site 1E due to limited production potential from the coastal aquifers beneath the Bolsa Gap. An estimated 40 to 50 slant wells spanning the entire 1.5 miles of the coastline would be required to produce only 15 to 20 MGD.
(Discharger's Appendix RRRR)

Surface Intake Considerations:
The Huntington Beach mesa segment extends from Seapoint Street to Huntington Street, and is about 2.8 miles in length. The lack of sediment supply from natural sources of erosion, and potential interruption of on-going beach replenishment, could likely affect beach segments further down coast as well as make surface intake and diffuser discharge infrastructure in these areas potentially susceptible to future

hazards. Significant fortification to protect beach infrastructure from beach erosion would add substantial cost and complexity to this surface intake system.

Proximity to Sensitive Biological Habitats
Site 1E is just downcoast of Bolsa Bay State Marine Conservation Area and Bolsa Chica Basin State Marine Conservation Area, located about 0.25 miles from the approximately 494 acres of MPAs within Segment 1.

Site 1E Conclusion:
Site 1E has several constraints including existing beach erosion, which is expected to increase in severity and frequency with SLR; the beach does not have sufficient surface available to support the onshore and offshore infrastructure needed for a desalination facility; potential impacts to onshore wetlands and MPAs at the Bolsa Bay State Marine Conservation Area from a surface intake; a subsurface intake is not feasible due to the drawdown from inland aquifers and coastal wetlands; and siting of desalination plant is not compatible with the existing Holly-Seacliff Specific Plan for the site. Construction of a desalination plant at Site 1E would likely not be accomplished in a reasonable period of time, and would not be feasible based on economic, environmental, and social factors.

SITE 1H: located in South Huntington Beach:
General Site Description/Land Use Considerations
Site 1H is located on 110.4 acres in South Huntington Beach adjacent to the Santa Ana River. The property is designated for use for transportation, communications, and utilities by SCAG. Approximately 74% of the property is currently utilized by OCSD; there is only a small portion of the northern area on the site that is cleared and undeveloped. The City of Huntington Beach's General Plan has the site designated as public, so a 50 MGD plant would be compatible with the General Plan for Site 1H. However, Site 1H would have insufficient available land at the site due to current and planned future improvements and operations at OCSD's Treatment Plant 2, located on Site 1H, therefore there is not likely to be sufficient space for a 50 MGD desalination facility (Discharger's Appendix E). Figure 11 shows Site 1H and a conceptual plan for this site.

Subsurface Intake – Hydrogeological Considerations:
The conceptual plan for Site 1H would consist of about 40 slant wells that are about 425 feet long in the Talbert Gap, located along about 10,580 feet of South Huntington Beach and would produce 50 MGD. Placement of a desalination facility at Site 1H also would result in drawdown from inland aquifers and coastal wetland areas from operation of a subsurface intake. Site 1H is located near the coastline adjacent to the Santa Ana River in the southeast portion of the Talbert Gap. The hydrogeologic data and analysis for Site 1G apply to Site 1H as well. Consequently, the same limitations for subsurface intakes at Site1G apply to Site 1H. In addition, while Site 1G is in the central portion of the Talbert Gap, Site1H is near the southeastern margin of the Talbert Gap close to the Newport Mesa. Because of the close proximity to the Newport Mesa boundary (an area of less groundwater bearing potential), the

production capacity from the Talbert Aquifer in the vicinity of Site 1H is lower than at Site 1G, and drawdown of groundwater levels due to pumping from subsurface intakes located near Site 1H could be greater than from the central portion. In addition, potential impacts to wetland and marsh areas along the Santa Ana River adjacent to the Newport Mesa could be greater. (Discharger's Appendix RRRR)

Surface Intake Considerations:
The wide and stable beach areas along south Huntington Beach could be a viable location for a surface intake and discharge outfall infrastructure. Beach erosion at Site 1H is being managed with a beach replenishment program by the Army Corps of Engineers; replenishment cycles are from two to eight years. SLR could reduce the area of dry beach available for a surface intake and discharge outfall infrastructure, especially during lapses in the beach replenishment program. This could be lessened by sediment renewal from the Santa Ana River. Furthermore, reduced water quality from stormwater runoff or sewage spills could pose a problem in this area. The placement of the surface intake at Site 1H could result in feedwater contaminated from the effluent discharges from the existing wastewater and emergency outfalls of the Orange County Sanitation District (OCSD) Treatment Plant 2.

Proximity to Sensitive Biological Habitats:
Within Segment 1, there is approximately 494 acres of MPAs. Bolsa Chica Ecological Reserve is located more than 4 miles northwest of Site 1H. Site 1H is located approximately 5 miles north of a coastal MPA located in Segment 3.

Site 1H Conclusion:
Site 1H has several constraints including potential design challenges with feedwater contamination from the nearby existing wastewater outfalls; a subsurface intake is not feasible due to impacts to inland aquifers and coastal wetlands from drawdown; and insufficient available land due to current and planned future improvements and operations on the OCSD Treatment Plant 2 site. Construction of a desalination plant at Site 1H would likely not be accomplished in a reasonable period of time, and would not be feasible based on economic, environmental, and social factors.

SITE 2A: Banning Ranch:

General Site Description/Land Use Considerations
Site 2A is located on 401.1 acres on the Banning Ranch area adjacent to West Newport Beach. West Newport Beach would be the area where the offshore surface intake and discharge infrastructure would connect to the onshore conveyance pipelines for site 2A. Figure 12 shows Site 2A and a conceptual plan for this site. West Newport Beach is a beach area that is anticipated to be stable and have sufficient space for intake/discharge infrastructure even with one meter of SLR. Site 2A currently has sufficient undeveloped land to site a 50 MGD desalination plant. However, the property is privately owned and is covered under the Newport Banning Ranch development plans. These plans have proposed to develop residential,

commercial, park, and open space uses on Site 2A that would be incompatible with a 50 MGD desalination plant. (Discharger's Appendix RRRR)

Subsurface Intake – Hydrogeological Considerations:
As described in Section 1 for Segment 2 (Newport Beach/Balboa Peninsula), subsurface intakes in Site 2A were found to be infeasible.

Surface Intake Considerations:
The offshore infrastructure for the surface intake and discharge sites for Site 2A would connect to the surface intake and discharge conveyance pipelines on West Newport Beach. Historically, West Newport Beach is a wide and stable shoreline that benefits from sediment supplied by the Santa Ana River and two-way alongshore sediment transport. South of the proposed offshore surface intake and discharge locations the shoreline has been historically erosional, with a narrower beach. Various U.S. Army Corps of Engineer projects continue to stabilize and provide sediment to the narrower beach. SLR would result in an even narrower beach that is more dependent on the groin field and regular beach replenishment. Some coastal flooding during extreme storm events would be expected. Plant Operation of the surface intake and discharge just upcoast of this location could potentially adversely affect the function of the groin field. This area is also a heavily used recreational beach and supports boating access, including that for the Dory Fleet (a historic site). (Discharger's Appendix BBB, p.1-4)

Proximity to Sensitive Biological Habitats:
The surface intake and discharge would be located within 1 mile of the Brookhurst Marsh and Santa Ana River outlet that provide important wetlands and riparian habitat. A stretch of coastline near Site 2A, extending north from the Newport Pier to the coastline along Newport Shores, has been identified as a Historic Grunion Spawning Area. In addition, there are potential environmental impacts from development of this site due to the valuable biological habitat, which includes wetlands, riparian areas, and 219 acres of Environmentally Sensitive Habitat Area (ESHA) that support a variety of sensitive and endangered species.

Site 2A Conclusion:
Site 2A has several constraints including incompatibility with the existing Newport Banning Ranch development plans on the site and environmental impacts to the valuable biological habitat on the site including wetlands, riparian areas, and 219 acres of ESHA that supports a variety of sensitive and endangered species. Location and operation of the offshore surface intake and discharge infrastructure in the West Newport Beach area could potentially negatively impact the groin structure and would reduce public beach access and availability. Construction of a desalination plant at Site 2A would likely not be accomplished in a reasonable period of time, and would not be feasible based on economic, environmental, and social factors.

Summary of Section 2 – Rationale for Narrowing Onshore Sites

In summary, Site 1G has been determined to be the best available location for the proposed Facility. Section 3 describes the factors associated with identifying the best site for the offshore location of the intake and discharge infrastructure.

Source: Digitalglobe 2007, City of Huntington Beach 2010.

Figure 8. Site 1G located on AES HBGS Property and the Proposed Onshore Location for the Desalination Treatment Facility
(Source: State Lands Commission, FSEIR 2017, Figure 2-1)

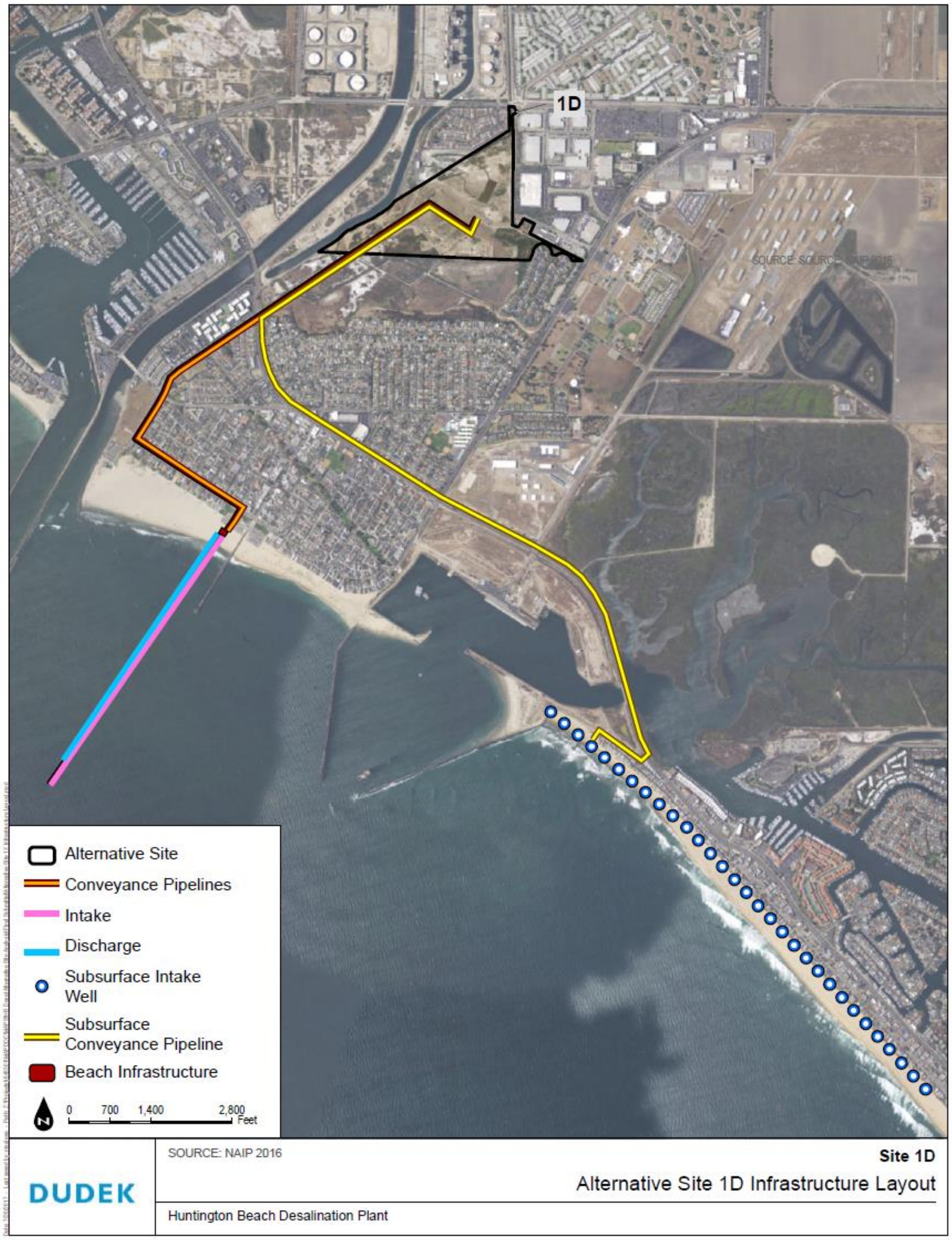


Figure 9. Alternative Site 1D Location and a Conceptual Plan for Surface and Subsurface Intakes
(Source: Discharger's Appendix RRRR, Attachment A)

Figure 10. Alternative Site 1E Location and a Conceptual Plan for Surface and Subsurface Intakes
(Source: Discharger's Appendix RRRR, Attachment B)

Figure 11. Alternative Site 1H Location and a Conceptual Plan for Surface and Subsurface Intakes
(Source: Discharger's Appendix RRRR, Attachment C)

Figure 12. Alternative Site 2A Location and a Conceptual Plan for Surface Intakes
(Source: Discharger's Appendix RRRR, Attachment D)

SECTION 3 – Rationale for Narrowing of the Offshore Intake/Discharge Sites

Sections 1 and 2 provided the basis for the best available onshore site feasible for the Facility. This section, Section 3, provides discussion on how Santa Ana Water Board staff assessed the best site feasible for an offshore surface intake and discharge. Seven alternative stations were evaluated and are discussed below.

Background

To assess potential entrainment impacts that would result from operation of the existing seawater intake for their proposed Huntington Beach Desalination Facility (Facility), the Discharger proposed that they use the 2003-2004 plankton data collected for the AES HBGS entrainment study (MBC and Tenera, 2005) for the Marine Life Mortality Report required by chapter III.M.2.e(1) of the Ocean Plan. Chapter III.M.2.e.(1)(a) lays out the sampling methods and analysis that must be used to determine the mortality of all forms of marine life related to the operation of a surface intake. However, this Ocean Plan chapter also includes an option that *"At their discretion, the regional water boards may permit the use of existing entrainment data from the facility to meet this requirement*" (chapter III.M.2.d.(1)(c)(iii)). The Discharger submitted Appendices Q and SSS to support their assertion that the 2003-2004 HBGS data met the Ocean Plan requirements in chapter III.M.2.e.(1)(a).

The Discharger's Appendix Q (Tenera Environmental, November 2015) summarizes a study that was designed to determine whether there had been any significant changes in the plankton community since the 2003-2004 data were collected. Additional plankton data were collected monthly within 100 meters (m) of the existing AES HBGS offshore surface intake structure from July 2014 – June 2015. While there were some differences in the frequency of the 2014/2015 sampling (monthly) as compared to the 2003-2004 sampling (weekly/biweekly) and a noted decline in the number of different taxa[3] collected in 2014/2015 from 2003-2004 (in keeping with declines noted during this time period elsewhere in California), the Discharger concluded that these differences were not significant and would not be expected to result in material changes in the estimates of entrainment effects using the 2003-2004 data. The Discharger's Appendix SSS (HDR, April 2017) states that the 2003-2004 plankton data represent the most robust and informative dataset available and that (1) the sampling was done in accordance with the guidelines in the Ocean Plan (chapter III.M.2.e(1)(a)); (2) the sampling was spatially and temporally robust; (3) the larval fish communities collected in 2003-2004 were consistent with more recent samples collected (2014/2015 study) but the 2003-2004 abundances were far in excess of surveys since 2008 and therefore, would provide a more conservative estimate of potential entrainment impacts; and (4) no significant, semi-permanent oceanographic changes had been documented to change the spatial distribution patterns in plankton since 2003-2004. During this early stage of project evaluation, Santa Ana Water Board staff determined that the 2003-2004 data met the requirements of the Ocean Plan.

[3] "taxa" refers to a taxonomically distinct group of species, which as larvae cannot be identified as separate species. The singular form of "taxa" is "taxon".

The entrainment study was part of a California Energy Commission Condition of Certification for the retooling and restart of Units 3 and 4 at the AES HBGS and was conducted from September 2003—August 2004. The study was designed to estimate losses of fish and shellfish as a result of the operation of the generating station's cooling water system's seawater surface intake and to characterize the source water body for the different larval taxa that would potentially be vulnerable to entrainment by the intake. (MBC and Tenera, 2005)

For the AES HBGS entrainment study, the number of fishes and target invertebrates entrained by the station's seawater intake were estimated from plankton samples collected just offshore of the intake structure. Samples were collected at the entrainment station (Station E), located near the existing surface intake, and at six other stations extending 4 km upcoast (Stations U2 and U4), downcoast (Stations D2 and D4) and 1.9 km offshore (Station O2) and 3.9 km offshore (Station O4) of the existing intake structure. The samples collected were used to estimate source water larval populations at risk of entrainment (MBC and Tenera, 2005). The locations of the AES HBGS and the plankton sampling stations (including depth and distance from shore) are shown in Figure 13.

Chapter III.M.2.e(1)(a) of the Ocean Plan requires that entrainment data be analyzed using the Empirical Transport Model/Area of Production Foregone (ETM/APF) method. ETM/APF has been the primary tool for the evaluation of entrainment impacts from surface intakes for power generating stations' cooling water systems in California for almost two decades (Raimondi 2019). The purpose of the model is to evaluate the ecological risk to a population of a species as a result of mortality caused by intake of seawater or some other source. The staff report for the desalination amendment (SWRCB 2015, page 82) states the following:

> "Combined with site-specific entrainment data, an ETM/APF approach can be used to translate the loss of organisms into the loss of biological productivity for all entrained species. The ETM/APF results compare the loss of ecosystem productivity to the amount of habitat (in acres) needed to produce the same amount of biological productivity that was removed from the ecosystem via entrainment; in other words, the APF determines the amount of acreage necessary to replace the production forgone as a result of facility operation. Although ETM/APF is based on species-specific data, the method assumes that the average ETM/APF is representative of all species in a community, not just the species that were directly measured, fish taxa, or commercially valuable species. (Marin Municipal Water District 2008)"

The Discharger used the ETM/APF method to calculate an APF for entrainment at Station E (Discharger's Appendix V, 2015). Water Boards staff requested that the Discharger apply the ETM/APF method to the plankton data from the other six stations (D2, D4, U2, U4, O2, and O4) sampled as part of the AES HBGS entrainment study to determine if one of the other stations would result in less entrainment and loss of all forms of marine life when compared to Station E, to best meet the requirements under chapter III.M.2.a(2) and III.M.2.e.

The Discharger generated several analyses for the seven alternate intake locations and concluded that the proposed site, Station E, was the best location (Appendices E, PPP, FFFF, NNNN, NNNN-Rev1, NNNN-Rev2, OOOO, SSSS, ZZZZ2, FFFFF). The Discharger's analyses included several iterations and calculations of the ETM/APF and the mean larval concentrations at each of the seven stations in the 2003-2004 study. However, California Coastal Commission staff was not able to reproduce the Discharger's results for the ETM/APF using the same set of data. In contrast to the Discharger's conclusions, following several iterations of the ETM/APF calculations and consultation with an expert in this methodology, Coastal Commission staffs' calculations indicated that Station E was not the best site for location of the surface intake but that several of the alternative sites were likely to result in less entrainment than an intake located at Station E (Coastal Commission staff technical memoranda dated February 27, 2017; April 28, 2017; August 3, 2017; and October 13, 2017). Several meetings were held with Santa Ana Water Board, State Water Board and Coastal Commission staff, and the Discharger and their consultants, and agreement could not be reached on which of the seven sites was the best site to reduce entrainment impacts. In a letter dated September 12, 2017, Santa Ana Water Board staff requested that the Discharger engage a neutral third-party reviewer (NTPR) as allowed under chapter III.M.2.a(1)[4] of the California Ocean Plan (SWRCB 2015) desalination amendment to resolve this disagreement.

Santa Ana Water Board staffs' preferred reviewer was Dr. Peter Raimondi, University of California, Santa Cruz. Dr. Raimondi possesses the education and a unique set of skills and experience to effectively review the relevant studies and models, and in particular, the use of the ETM/APF, which has been the primary tool for the assessment of entrainment impacts in California that may result from the surface intake of water used for cooling in onshore generating facilities or desalination facilities. Dr. Raimondi was contracted beginning June 21, 2018, to assess the environmental impacts to all forms of marine life from a seawater intake at the proposed location as well as the six alternative locations for the surface intake. Dr. Raimondi worked closely with Santa Ana Water Board staff, the Discharger's consultants, and Coastal Commission staff to complete his final report, which was issued on March 3, 2019.

Summary of the Neutral Third Party Reviewer Report (Raimondi 2019)

Several of the findings in Dr. Raimondi's report highlighted problems with the 2003-2004 AES Huntington Beach, LLC (AES) entrainment study data that the Discharger proposed to use to assess entrainment impacts from a surface intake located near Station E (See Finding 38 of Attachment G to the Order). The 2003-2004 study was not designed to assess intake and mortality of all forms of marine life at different intake locations.

[4] Chapter III.M.2.a(1) of the desalination amendment, states that "*The regional water board may require an owner or operator to hire a neutral third-party entity to review studies and models and make recommendations to the regional water board*."

Dr Raimondi noted that, while the study did include sampling at stations other than the intake, the sampling was designed to characterize the source water body[5] for the existing intake. Dr. Raimondi's review further concluded that, in order for the 2003-2004 study to have collected sufficient data for an ETM/APF analysis at multiple alternative intake locations, the study would have had to replicate the sampling done at station E, for all locations (i.e., bi-weekly sample collection for a period of 1 year).

Prior to Dr. Raimondi's review, the Discharger, as well as State Water Board staff, Santa Ana Water Board staff and Coastal Commission staff, were not aware of these data limitations. These data limitations were not identified in the Discharger's submittals that were used to approve the use of the 2003-2004 AES dataset to assess whether the existing surface intake (Station E) was the best site feasible to minimize intake and mortality of all forms of marine life.

The ETM/APF method to assess potential entrainment impacts is data intensive and requires the following information (Raimondi 2019):

1. Site-specific measurements of concentration of larvae that could potentially be entrained;
2. Site-specific estimates of age frequency distributions, i.e., length measurements, for representative species that may be entrained; and
3. Site-specific information concerning hindcast probabilities of larval delivery from locations in the source water body to the sampling station (usually based on ocean current information collected during larval sampling).

These three factors, when combined, provide for a complete characterization of the source water body population—the population at risk from entrainment. The age of the larvae is based on their size, which is usually determined by the length of the larvae. Generation of age frequency relies on a sufficient number of larvae being measured for length. However, the 2003-2004 sampling and entrainment study was designed to only evaluate entrainment effects at Station E, located near the existing AES HBGS intake structure. Therefore, there are little data on larval lengths for the six sampling stations other than Station E. This limits the ability to apply the ETM/APF method to the other six stations for comparison to Station E. In addition, the current meter deployed to measure ocean currents to determine the area of the larval source water bodies failed during the time period of larval collection, 2003-2004. The AES HBGS entrainment study relied on current data collected from 1999-2000 at the nearby Orange County Sanitation District (OCSD) discharge outfall. Dr. Raimondi concluded that the ETM/APF calculations performed by the Discharger and Coastal Commission staff were both inaccurate due to the lack of sufficient spatial data coverage for larval concentrations and concurrent

[5] The Ocean Plan defines "source water body" as "…the spatial area that contains the organisms that are at risk of entrainment from a desalination facility as determined by factors that may include, but are not limited to, biological, hydrodynamic, and oceanographic data."

current data, as described above, and instead recommended that a Multiple Lines of Evidence (MLE) approach be taken to assess potential impacts from a surface intake located at each of the seven stations to determine which location resulted in the least amount of mortality for all forms of marine life (Raimondi 2019). The multiple lines of evidence approach was originally conceived to determine if there was a central tendency in the conclusions from multiple analysis methods, each of which provided a piece of the information desired to arrive at a decision regarding entrainment at each of the seven stations.

In addition to his conclusions regarding the accuracy of the Discharger's and Coastal Commission staffs' ETM/APF estimates, Dr. Raimondi also concluded that the 2003-2004 dataset was insufficient for purposes of calculating an ETM/APF at any station other than the proposed intake location (Station E). Dr. Raimondi noted that a current meter *and* length data at each station would be required to constitute a robust dataset. The prior ETM/APF calculations by both the Discharger and Coastal Commission staff were not ecologically relevant because they used the same current and larval length data for each station. The Discharger was asked to investigate whether there were sufficient larval length data available to calculate a more robust ETM/APF for the six stations other than station E. The Discharger found, however, that only four taxa (diamond turbot, CIQ gobies, northern anchovy, and white croaker) had sufficient length data collected at all sampling stations for ETM/APF analyses.

In order to reconcile the different sets of APF estimates, Dr. Raimondi recommended using the four fish taxa that were common to all seven stations combined with three sets of current data: the 1999-2000 OCSD current data used in the original AES HBGS study; OCSD current data measured in 2007-2008 and used to assess entrainment impacts for the proposed Facility operating in standalone mode[6] (Tenera Environmental 2010); and site-specific estimates of ocean currents using the Regional Ocean Modeling System (ROMS) to hindcast ocean current data for the time period when the plankton data were originally collected (2003-2004).

In addition, Dr. Raimondi recommended using two other approaches: The Mean Larval Concentration (MLC) and the Standardized Larval Concentration (SLC). The MLC is a simple approach that can be used to estimate ecological impacts by calculating the total larval loss for each of the seven potential intake stations. The station with the lowest projected total entrainment, if species-specific risk is assumed to be not important, could then be considered the station with the lowest ecological risk of entrainment. This approach looks at potential impacts to overall larval abundance within the ecological system as a whole (Raimondi 2019). However, if species-specific risk is considered important, then the SLC approach should be used. The SLC is a modification of the MLC that mathematically equalizes all species. This provides an evaluation of risk, to

[6] The Discharger originally planned to comingle the brine discharge from the proposed Facility with the AES HBGS cooling water system discharge. However, the State Water Board's adoption in 2010 of the Once-Through Cooling Policy required the generating station to stop using seawater for cooling by 2020, which would require the Facility to operate without the ability to comingle their discharge (stand-alone mode).

each species relative to their abundance, in the absences of an adequate ETM/APF assessment, and it recognizes that uncommon species, which minimally contribute to the MLC, may be more at risk of entrainment as a result of their relatively low numbers than the more common species that dominate the MLC estimates (Raimondi 2019). However, while the ETM/APF method specifically evaluates ecological risk, MLC and SLC serve as proxies for different elements of risk (MLC = risk to ecosystem services; SLC = species-specific risk summed over all entrained species).

Both the Discharger and Coastal Commission staff provided Dr. Raimondi with estimates of potential entrainment impacts at each of the seven stations based on the APFs calculated using the four fish species common to all seven stations combined with the three different current datasets (1999-2000, 2007-2008, and ROMS[7]), and the MLC and SLC approaches. Dr. Raimondi's examination of the results of the multiple metrics and multiple approaches used to evaluate the metrics led to no clear indication as to which station would result in the lowest impact from entrainment. The ETM/APF method requires that the taxa used in the ETM/APF calculations represent at least 90% of the potential taxa present in the ecosystem that may be vulnerable to entrainment by a surface intake. As can be seen in Table 1, below, the four taxa that all seven stations had in common, and for which there were sufficient larval length data available, fall well short of representing 90% of the total taxa collected at each station.

Table 1. Relative percentages for each of the four taxa used in the ETM/APF calculations for each station as compared to the total number of taxa collected at that station.

Station	**CIQ Gobies**	**Diamond Turbot**	**Northern Anchovy**	**White Croaker**	**Total**
	Percent (%) of Total Taxa Collected				
E	14.1	0.5	6.6	2.6	23.8
O2	5.5	0.7	16.6	19.7	42.5
O4	1.1	0.4	12.6	10.8	24.9
D2	48.3	0.9	11.5	2.9	63.6
D4	59.2	0.3	6.1	3.2	68.8
U2	16.8	1.3	17.4	4.6	40.1
U4	12.6	0.7	9.6	3.7	26.6

[7] The site-specific current data generated by the Regional Ocean Model System (ROMS), however, was ultimately dropped from the analysis as a result of concerns as to its accuracy in the nearshore region where five of the seven sampling stations were located. Only OCSD's 1999-2000 and 2007-2008 current meter data were used in the ETM/APF analyses performed by the Discharger and Coastal Commission staff and the results from the different current datasets were averaged in the final calculations.

Dr. Raimondi concluded that as a result of the limitations of the 2003-2004 data, a robust ETM/APF assessment could not be made for the six alternative intake locations. If a more comprehensive entrainment study were conducted, the data required for the most comprehensive assessment method (ETM/APF) could be collected. However, Dr. Raimondi determined that the other two metrics, MLC and SLC, could be jointly used to evaluate which site would result in the least amount of entrainment. Dr. Raimondi's reasoning for a joint metric was that the MLC and SLC are robust to issues associated with APF for the 2003-2004 data as they provide different types of information concerning risk. He further concluded that the application of inferential statistics to the MLC and SLC is not appropriate as a result of the very high seasonal variability in larval abundance at each station compared to the larval abundance between the stations. The idea, therefore, that there could be "no statistical difference" between two station's larval abundance was incorrect. He additionally noted that to hold the combined MLC and SLC index to a p-value of 0.05 (the generally accepted value for determining "statistical significance") was not appropriate[8].

Dr. Raimondi assumed that the MLC and SLC should be counted equally, which would provide both overall ecosystem impact (via total larval abundance) and species-specific estimates of the risk of entrainment at each of the seven stations. He also used an approach based on the idea that given equal weighting of metrics, the station with the lowest impact is the one that is closest to the minimum values for both metrics. To best represent these values, Dr. Raimondi applied the Euclidean mean ($A^2 + B^2 = C^2$) to the values generated for each station using these two metrics in order to rank them. Using this method, the rank for each station for MLC and SLC is plotted in X, Y space as shown in Figure 14. In Figure 14, decreasing impact is toward the origin and increasing impact is further from it.

Figure 14 indicates that based on the ranking of the MLC and SLC values, Stations D2 and U2 are less impactful (lower potential entrainment) than Station E, and that these three stations are significantly lower than Stations D4, O2, O4, and U4.

Dr. Raimondi concluded in his 2019 report that an ETM/APF approach that was designed to compare entrainment impact among the seven stations would produce better separation of the results (i.e., show significant differences if they existed) among stations that was clearly based on ecological risk (ETM/APF) rather than proxies for elements of risk (MLC, SLC). This approach would require the Discharger to design a

[8] Despite this recommendation, Dr. Raimondi provided an example for applying inferential statistics to the joint MLC/SLC metric. Santa Ana Water Board and Coastal Commission staff agree that inferential statistics should not be applied to the joint metric because the variability in the larval data collected at each station is greater than the variability in the larval data between the seven stations. However, the Discharger disagreed with this recommendation and applied inferential statistics to the joint MLC and SLC metrics and concluded that Station E was the best site to reduce impacts from entrainment of all forms of marine life (Discharger's Appendix JJJJJ-1).

new entrainment study, which would require the collection of equivalent larval data at each of the seven stations, measuring larval lengths for each species collected at each station, and the deployment (and ensuring the operation of) several current meters during the minimum 12-month sampling period required for new entrainment data, pursuant to chapter III.M.2.e.(1)(a) of the Ocean Plan. While the Ocean Plan does not require this level of effort in determining what is the best location for a surface intake, Dr. Raimondi clearly states that use of the data intensive ETM/APF method is the best way to determine ecological risk among intake locations. However, Santa Ana Water Board staff do not recommend requiring Poseidon to develop and implement a new entrainment study that would require larval sampling and analysis at the alternative intake locations.

Based on Dr. Raimondi's report, Santa Ana Water Board staff did not find that Station E was the best available site feasible for a surface intake when considering only one of the four factors of feasibility defined in the Ocean Plan, specifically environmental feasibility. (The other factors are technological, economic, and social feasibility; see Appendix I to the 2015 Ocean Plan for the complete definition of "feasibility".) Therefore, Santa Ana Water Board staff requested that the Discharger assess the feasibility of moving the intake from Station E to Station D2 (2 km downcoast from Station E) or Station U2 (2 km upcoast from Station E). In response, the Discharger submitted appendices JJJJJ-1 and JJJJJ-2.

Discharger's Appendix JJJJJ-1: Response to Dr. Raimondi's Neutral Third-Party Review Report and Water Boards Staffs' Request for Assessment of the Feasibility of Moving the Intake to an Alternative Location at Either Station U2 or D2.

Chapter III.M.2.a (2) of the Ocean Plan states that for all new and expanded facilities "*…The regional water board shall first analyze separately as independent considerations a range of feasible alternatives for the best available site, the best available design, the best available technology, and the best available mitigation measures to minimize intake and mortality of all forms of marine life. Then, the regional water board shall consider all four factors collectively and determine the best combination of feasible alternatives to minimize intake and mortality of all forms of marine life. The best combination of alternatives may not always include the best alternative under each individual factor because some alternatives may be mutually exclusive, redundant, or not feasible in combination*."

"Feasible" is defined in Appendix I of the California Ocean Plan. The full definition is: *"FEASIBLE for the purposes of chapter III.M, shall mean capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."* Discharger's Appendix JJJJJ-1 focuses primarily on environmental factors that are required to be evaluated in order to determine the best site feasible for a surface intake that would result in the least amount of impacts to all forms of marine life. Discharger's Appendix JJJJJ-2 focuses primarily on the other three factors that must be considered in assessing feasibility (economic, social and technological).

Santa Ana Water Board Staffs' Summary of and Response to Discharger's Appendix JJJJJ-1

Discharger's Appendix JJJJJ-1 makes several arguments that Station E, the sampling location located nearest to the AES HBGS existing surface intake (the Discharger's proposed intake location), is the best site feasible based on several different environmental factors. Santa Ana Water Board staff found several erroneous statements in Discharger's Appendix JJJJJ-1 regarding the conclusions in Dr. Raimondi's 2019 final report, and in addressing the Ocean Plan requirements that the best site feasible must *"…avoid impacts to sensitive habitats and sensitive species"* (chapter III.M.2.b(3)) and "*[e]nsure that the intake and discharge structures are not located within a MPA or SWQPA with the exception of intake structures that do not have marine life mortality with the construction, operation, and maintenance of the intake structures (e.g., slant wells)..."* (chapter III.M.2.b.(7)).

As stated previously, Dr. Raimondi's 2019 final report concluded that the 2003-2004 dataset was not sufficiently robust for ETM/APF calculations at all seven sampling stations. Only Station E had sufficient numbers of species with larval length data that could be used to determine an appropriate ETM/APF. Even calculating an ETM/APF for only the four species with sufficient length data at all the sampling stations did not provide a reasonable comparison. This is because the 2003-2004 data set was specifically designed to assess the ecological risk of entrainment at Station E, not the other six sampling stations, and an ETM/APF using only 4 species is not ecologically representative[9]. As a result, Dr. Raimondi recommended that instead, the MLC and SLC be used jointly as a proxy for ETM/APF as MLC looks at the risk of entrainment to the environmental services provided by all forms of marine life, and the SLC assesses species-specific risk. In his 2019 report, Dr. Raimondi specifically states that *"…I do not think that inferential statistics are likely to be useful for the comparisons of interest, especially given the use of two metrics [MLC and SLC] and goal of producing a joint estimate."* While Dr. Raimondi does provide a method for applying inferential statistics to the joint MLC and SLC metrics, he notes that *"…such analyses are based on confidence intervals that are somewhat arbitrary"* and *that "[t]he difference between the two results using the two different confidence intervals [95% confidence interval (two-tailed) or 90% if one-tailed and the 50% confidence interval (two-tailed) or 75% if one-tailed] is due to data variability within stations being high relative to between stations."* The primary difference between the 90% confidence interval one-tailed test and the two-tailed 95% confidence interval test, is that the one-tailed test looks at whether one station is significantly greater ***or*** less than another while the two-tailed test looks at whether one station is significantly greater ***and*** significantly less than another. The

[9] ETM/APF analysis are designed to be ecologically representative. This generally means including approximately 90% of sampled species in the calculation. For the seven stations sampled in 2003-2004, 90% of sampled species is about 12 species depending on station. Therefore, including on 4 species in the ETM/APF analysis is not representative.

result of this difference is that "statistically significant" differences are less likely to occur when using the two-tailed test. However, the Ocean Plan, requires only an evaluation of which site "minimizes intake and mortality." Therefore, the one-tailed test is most appropriate for these analyses.

Appendix JJJJJ-1, however, states that *"[w]hen statistical significance testing is applied, as recommended by Dr. Raimondi throughout the NTPR process, there is no ecological difference between Stations E, D2, and U2 and therefore no scientifically justifiable rationale for re-locating the site of the proposed 1-mm screened seawater intake. Lacking any statistical differences among the three remaining sites, there is no scientific confidence that an intake at any of the three would result in less actual entrainment over the operational life of the HBDP."* This is a misleading statement regarding Dr. Raimondi's recommendations as discussed above (see pages 13-16 in Dr. Raimondi's 2019 final report). Page 13 of Dr. Raimondi's report clearly states that formal inferential statistics are <u>unlikely</u> to be useful for comparing the results of the joint MLC/SLC metric. The report proceeds to state that *"If there is a need for inferential statistics, the basis should not be the individual metrics but the joint MLC/SLC metric"*. Santa Ana Water Board staff agree with Dr. Raimondi that it is not appropriate to apply inferential statistics to the joint MLC/SLC metric due to the high variability in larval species within each station sampled compared to the variability in larval species between the different stations. The reasoning, as explained by Dr. Raimondi, is that high variability in the MLC and the SLC in this case will not lead to the statistically significant results generally required in a scientific research context.

The Discharger continues with additional arguments to support their assertion that Station E is the "best site feasible" based on environmental factors. According to the Discharger's Appendix JJJJJ-1, their "taxon-specific" analysis confirmed that *"…mole crab [Emerita sp.] dominated the overall entrainment, especially at proposed intake Station E where more than 50% of all entrainment was mole crab. Excluding mole crab, …entrainment at proposed intake Station E was superior to alternative intake Station D2 by over 15 million larvae and ranked second (by less than 6 million larvae) in total entrainment to alternative intake Station U2. These data suggest that basing an intake location on total entrainment estimates would benefit mole crab to the detriment of the remaining taxa, including taxa that support fisheries, are depressed due to anthropogenic factors, or are protected from harvest through a harvest moratorium enacted under California regulations."*

The Discharger's analysis, however, fails to account for the fact that Santa Ana Water Board staff does not approve of omitting *Emerita* (mole crab) from any analyses as *Emerita* make up 90% of the diet of barred surf perch (*Amphistichus argenteus*), which are an important sport fish species in southern California. Fisherman often use newly molted adult mole crabs as bait for barred surf perch. Other fish species, seabirds and shorebirds also feed on *Emerita*. Furthermore, the Ocean Plan explicitly requires an evaluation of the intake and mortality of *all* forms of marine life. Therefore, omitting a "form of marine life" —in this case *Emerita*—is not compliant, especially when that species accounts for up to 50% of the entrained larvae. Finally, Dr. Raimondi indicated during several meetings that mole crab should be included in any environmental analysis so that the invertebrate community was represented by more than one taxa in the analyses as well.

Chapter III.M.2.b(3) requires that a project owner or operator to *"Analyze the feasibility of placing intake, discharge, and other facility infrastructure in a location that avoid impacts to sensitive habitats and sensitive species."* and chapter III.M.2.b(4) also requires them to *"Analyze the direct and indirect effects on all forms of marine life resulting from facility construction and operation, individually and in combination with potential anthropogenic effects on all forms of marine life resulting from other past, present, and reasonably foreseeable future activities within the area affected by the facility."* While Water Boards staff agree that consideration of potential impacts to over-fished taxa is important, chapter III.M of the Ocean Plan requires assessment of impacts to "all forms of marine life", not just fished species. Appendix JJJJJ-1 appears to assume that there are no ecological benefits from non-fished species. Fished species are reliant on prey that are represented by the non-fished species that are also vulnerable to entrainment. Appendix I to the Ocean Plan desalination amendment defines "all forms of marine life" as *"…includ[ing] all life stages of all marine species*". Therefore, the amendment requires that the entire planktonic community, and the food web it supports, be protected to the maximum extent feasible from entrainment.

Despite Dr. Raimondi's recommendations based on his review of the 2003-2004 data, the Discharger's Appendix JJJJJ-1 also continues to make the argument that since there are insufficient data to provide a robust ETM/APF analysis for six of the seven stations sampled, the next best method to assess ecological risk is the standardized larval concentration (SLC), which assesses species-specific risk. The Discharger makes the claim that "large losses of an abundant taxon are much less of an impact than a smaller loss of an already depressed population. Losses of a few protected taxon's larvae pose a much greater risk to population viability than losses of several hundred larvae of a taxon with a robust and healthy population that is neither fished nor stressed from any other known anthropogenic factor."

The Ocean Plan requires facilities to minimize intake and mortality of all forms of marine life. In order to conclude which site ***minimizes*** intake and mortality, the MLC is the best metric to assess this. Using MLC only, Station E is actually ranked fifth out of seven in terms of minimizing total entrainment. Based on the 2003-2004 data, an intake at station E is likely to entrain over 10 billion more larvae than an intake at station U2. However, it is important to acknowledge that both SLC and MLC are proxies for assessing risk; one metric assesses species-specific risk (SLC), the other risk to the ecological system as a whole (MLC). For these reasons, Dr. Raimondi recommended the use of both metrics as the best proxy for an ETM/APF analysis. He notes this at the end of his review on page 16 of his 2019 report, where he states that an ETM/APF approach designed to compare entrainment impact among the seven stations would provide a better measure of true ecological risk of entrainment of plankton than "…proxies for elements of risk (MLC, SLC)." However, without sufficient data to perform an ETM/APF analysis at each of the seven stations, use of the dual metrics of MLC and

SLC provide an acceptable assessment of the risk of entrainment to all forms of marine life as required under the Ocean Plan desalination amendment (chapter III.M).

Summary of Entrainment Data Analysis

Based on input from the neutral third-party reviewer, Dr. Pete Raimondi, Santa Ana Water Board staff concludes the following:

- The 2003-2004 larval dataset was not designed to develop a robust ETM/APF analysis for any of the seven alternate intake stations other than Station E;
- An ETM/APF approach designed to compare entrainment and impact across the seven alternate intake stations would provide a better measure of true ecological risk of entrainment of plankton;
- Use of the dual MLC/SLC metrics provides a proxy for the ETM/APF analysis for all seven sampling stations. MLC assesses the risk of entrainment of all forms of marine life and the environmental services they provide, while the SLC assesses species-specific risk;
- The MLC/SLC joint metrics analysis indicated that an intake at either Station D2 or U2 would result in lower marine life mortality from entrainment than an intake at Station E.

Other Environmental Factors Considered

In addition to the above arguments, the Discharger also argues in Appendix JJJJJ-1 that Station E is the best site feasible for a surface intake based on additional environmental factors. Specifically, the Discharger states that, based on proximity to sensitive habitat, presence of sensitive species (chapter III.M.2.b.(3)), and distance from a Marine Protected Area (MPA) (chapter III.M.2.b.(7)), Station E is the best available intake location feasible. Discharger's Appendix JJJJJ-1 states that the mouth of the Santa Ana River and the hard/rocky substrate associated with armoring on OCSD's Huntington Beach wastewater outfalls and the Huntington Beach pier are sensitive habitat. The Ocean Plan (Appendix I) defines sensitive habitat as: *"…kelp beds, rocky substrate, surfgrass beds, eelgrass beds, oyster beds, spawning grounds for state or federally managed species, market squid nurseries, or other habitats in need of special protection as defined by the Water Boards."* In addition, Discharger's Appendix JJJJJ-1 also argues that Station D2 is located nearest to a known Giant Sea Bass (*Stereolepis gigas*) nursery. Giant Sea Bass are a protected species in California (Dormier 2001; Pondella and Allen, 2008) and internationally red-listed as endangered by the International Union for Conservation of Nature (Cornish 2004; Pondella and Allen, 2008). Discharger's Appendix JJJJJ-1 also concludes that Stations U2 and D2 are located closer to an MPA than Station E, the Discharger's proposed location.

Santa Ana Water Board staff do not agree with the Discharger's assertions as discussed below.

All seven of the sampling stations considered as possible intake locations for the proposed Facility (U4, U2, E, D2, S4, O2 and O4) are located on the San Pedro Shelf in the central portion of the Southern California Bight (Bight). The San Pedro Shelf is one of the broadest mainland continental shelf segments on the west coast between

Monterey, California, and the United States-Mexico border (Wong et al., 2012). The shelf extends from Palos Verdes at its northern end south to Newport Canyon. Approximately 75 to 80 percent of the San Pedro Shelf segment is composed of low-relief, sediment-covered seafloor, and the remaining 20 to 25 percent is composed of rock outcrop interspersed with boulders and cobbles. Offshore of Huntington Beach, the San Pedro shelf is wide and gently sloping out to a depth of 100 m and sediments are primarily composed of sands and silty sands (Rasmussen 2018; Wong et al., 2012).

Rasmussen, 2018 (Attachment 4 to the Discharger's Appendix JJJJJ-1), provides a summary of near- and off-shore currents and circulation patterns in the central Bight in the area of the San Pedro Shelf. Mean circulation patterns in the central Bight have been extensively studied (e., g., Los Angeles County Sanitation District (LACSD) and OCSD reports); SAIC 2004; Hamilton 2007; Noble et al., 2009). These studies used data from multiple moored current meters and Acoustic Doppler Current Profilers (ADCPs) that have been deployed for monitoring and special studies over the San Pedro Shelf (Rasmussen 2018). Large scale flow offshore of the Bight islands has generally been described as south-southeastward, part of the easternmost California Current (Figure 15). Past Point Conception, the central Bight opens up, the San Pedro shelf broadens, and a branch of this current turns eastward toward the coast, joining up with the northwestward flowing California Countercurrent to form a broad gyre circulation within the central Bight (Rasmussen 2018).

Rasmussen (2018) states that "Within the shelf, several zones are commonly distinguished due to characteristics that affect physical and biological processes (Kumar et al., 2015; Lentz & Fewings 2012; Austin & Lentz 2002). While these are not rigidly delineated, the **inner shelf** is typically defined as starting just outside the surfzone (around 5 m depth) to approximately 15 m. The **mid-shelf** occupies the zone approximately between the 15-50 m isobaths where it becomes deep enough that surface and bottom boundary layers are distinct from one another, and the **outer shelf** would encompass 50-100 m depths. Within the inner shelf some further distinguish a **nearshore** zone (less than 10 m depth) where influence of the surfzone is more prevalent." Stations U4, U2, E, D2, D4 and O2 are located on the inner shelf and nearshore zones. Because of this, the coastal dynamics are consistent across these six sites, indicating no difference in current structure between them. Station O4 is located on the mid-shelf zone at a distance of 3.4 km from the shore in 21.9 m of water (Figure 16).

Alongshore currents (parallel to the shore) in the central Bight flow dominantly northwest-to-southeast and normally have the highest velocities. Year to year, depth-averaged mean current patterns have been described as "reasonably stable with time" such that "one could determine a regional pattern for these current fields in the central SCB [Bight] even though measurements at the various locations were obtained at different times" (Nobel et al. 2009 as quoted in Rasmussen 2018). These alongshore currents have been found to be coherent along the entire length of the San Pedro Shelf. According to Rasmussen (2018) the variability of currents within the central Bight is around one week with average periods of seven to nine days on the inner shelf near

Huntington Beach. The cross-shelf currents that run perpendicular to the coast are usually much weaker compared to the dominant alongshore northwest to southeast currents and are generally observed as only slight drifts from the main current direction (Rasmussen 2018).

During summer months, currents on the inner shelf are strongly responsive to local wind stress (Noble et al., 2015; Hamilton et al., 2006). This “wind forcing” can produce very swift surface currents (50-80 cm/s with light wind speed) when conditions are strongly stratified in summer These current speeds decrease rapidly with depth, approaching zero below 15 m (Rasmussen 2018).

Linear distance-wise, Station D2 is located closest to the mouth of the Santa Ana River and the Huntington Beach wetlands, and OCSD’s Huntington Beach outfalls. Station D2 is also the closest to a Giant Sea Bass nursery (Benseman and Allen, 2018)[10] located on the inner shelf around the head of Newport Canyon. Station U2 is located closest to the Huntington Beach pier and downgradient of the Bolsa Chica wetlands and Marine Protected Area (MPA) (Figure 17). However, near shore, inner shelf and wind-forced currents in the near and alongshore direction, would likely not result in these two stations intaking more plankton from these three sources than Station E, which is located midway between the two stations. All three stations are located approximately 0.5 km offshore in 9.5 m of water, well within the inner shelf and nearshore zones (Rasmussen 2018).

Figure 18 depicts the dominant alongshore current directions at the surface, mid-depth and near bed depth in the vicinity of the Stations U2, E, and D2. As can be seen in Figure 18, the dominant alongshore currents flow in a southeasterly direction from Stations U2 to E to D2. Wind-forced currents (Figures 19A and 19B) in the same area, however, can result in surface currents moving in a more onshore direction especially during summer months, with currents moving east-southeast in the vicinity of Station U2 and northeasterly near Stations E and D2. While this wind-forced variability is relatively short-lived (usually on a time scale of seven to nine days), larvae vulnerable to entrainment may be transported southeastward during most of the year or pushed more shoreward (away from the intake station locations) during other times of the year. These shifting currents make it difficult to predict where larvae may drift, which is why

[10] Discharger’s Appendix JJJJJ-1 states that Giant Sea Bass larvae and young-of-the-year (YOY) would potentially be subject to impingement and entrainment at a surface intake located at Station D2. However, Young-of-the-Year Giant Sea Bass have been found only on the sandy soft bottom areas located within 500 m of the mouth of submarine canyons; Station D2 is located approximately 4000 m NW of the mouth of the canyon (Benseman and Allen, 2018). Larval settlement (from planktonic phase) takes place when Giant Sea Bass YOY are 10-21 mm long in total length (Benseman and Allen, 2018). Individuals of this size would be large enough to avoid entrainment through a surface intake using 1.0 mm wedgewire screens and likely would not be subject to impingement if the intake velocity is 0.5 feet per second. In addition, the growth rate for YOY GSB is 1.23 mm/d (Benseman and Allen, 2018), further supporting the case that they are not likely to be vulnerable to entrainment.

the deployment and continuous operation of current meters during plankton collection is so important when developing an ETM/APF for a proposed intake location.

Looking at Figures 18 and 19B, one can see that larvae dispersing from Bolsa Chica or the Huntington Beach pier could be subject to entrainment at Station U2, or at Stations E and D2, located further downgradient, depending on the prevailing wind and current direction at that time (see the Discharger's Appendix OOOO [Moffat & Nichol, July 2017] and video on YouTube: https://youtu.be/YNn6s6VrAUo). Larvae being dispersed from the Huntington Beach wetlands may remain close to shore, drift southeastward away from an intake at D2 or drift towards an intake at D2. A more thorough analysis of larvae dispersal in the area was not submitted by the Discharger and would likely not change any of the Santa Ana Water Board's findings. However, larvae dispersing from OCSD's Huntington Beach outfall, the mouth of the Santa Ana River, or the Giant Sea Bass nursery are unlikely to be entrained by any of the three proposed intake locations (U2, E, or D2) as the dominant current direction is to the southeast down coast from the three stations. Because all three stations are located within 2 to 4 km of each other, they all have an equal chance of entraining larvae from within the source water body along the San Pedro Shelf.

A similar argument can be made for the relative distance to Marine Protected Areas (MPA) or State Water Quality Protected Areas (SWQPA). Chapter III.M.2.b(7) requires that "…[t]o the extent feasible, surface intakes shall be sited so as to maximize the distance from a MPA or SWQPA." Taken literally, this could be interpreted as the closest linear distance to an MPA or SWQPA. California South Coast MPA include State Marine Conservation Areas (SMCA), State Marine Reserves (SMR), Federal Marine Conservation Areas (FMCA), Federal Marine Reserves (FMR), and areas of Special Closure (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=105396&inline).

However, chapter III.M.2.b(7) of the desalination amendment does not appear to take into account hydrodynamic or oceanographic conditions, or connectivity between MPA. Discharger's Appendix JJJJJ-1 states that Station E is located farthest from a MPA or SWQPA and refers to the fact that Station U2 is closest (linear distance) to the Bolsa Chica wetlands MPA and Station D2 is closest to the Upper Newport Bay MPA. As discussed above, the prevailing currents are NW-SE except for wind-forced currents (which are generally towards the shore in a N/NE direction), so it is extremely unlikely that either of the three stations would have a risk of entraining larvae from the Upper Newport Bay MPA. Larvae dispersing from the Bolsa Chica MPA may be at risk of intake from all three of the potential surface intake stations depending on wind and current directions at the time of dispersal. In addition, Discharger's Appendix JJJJJ-1 fails to assess the distance to the three stations from the other MPA in the area. Table 2 below, shows the linear distance from multiple MPAs to each of the three candidate stations:

Table 2. Distance from Stations E, U2, and D2 from Marine Protected Areas (From North to South).

MPA:	**Distance from E (in km):**	**Distance from U2 (in km):**	**Distance from D2 (in km):**
Point Vicente SMCA	39	37	41
Abalone Cove SMCA	38	36	40
Bolsa Bay SMCA	11	9	13
Bolsa Chica SMCA	8	6	10
Upper Newport Bay SMCA	10	12	8
Crystal Cove SMCA	11	13	9
Laguna Beach SMR	13	15	11
Laguna Beach SMCA	18	20	16
Dana Point SMCA	21	23	19
Cumulative distance:	**169**	**171**	**167**

SMCA = State Marine Conservation Area

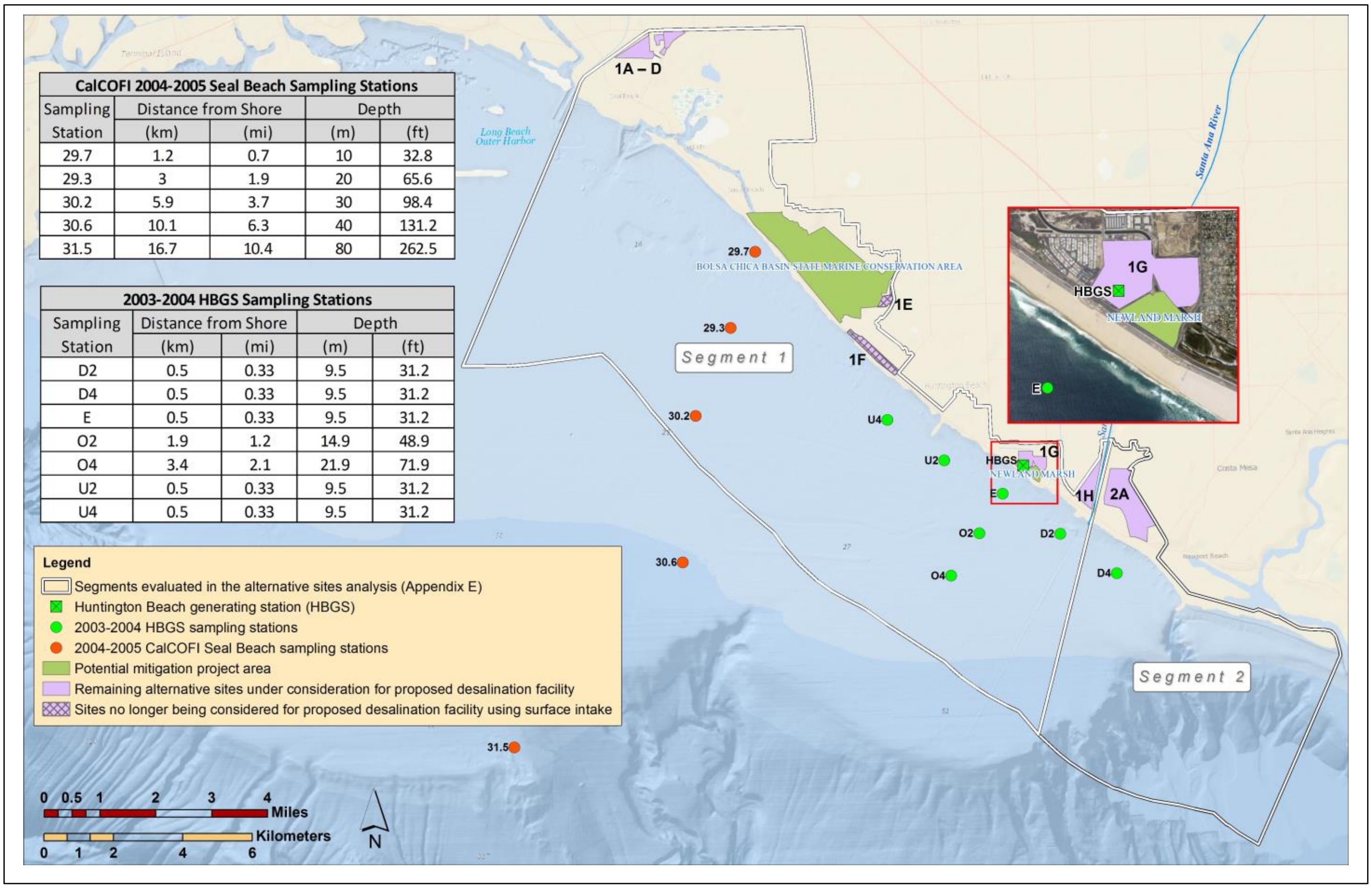
As can be seen in Table 2, there is very little difference in the cumulative distance to the different MPA for each of the three stations. This is not surprising given the close proximity of the stations to each other (2 to 4 km distance) and their similar depths (9.5 m) and distance (0.5 km) from shore. And, as stated previously, it is not linear distance but current directions and velocity that control the transport of larvae along the San Pedro Shelf and the potential effect of a surface intake on MPA connectivity that are the most important metrics.

In a letter to the California Coastal Commission dated September 9, 2016, UC Santa Barbara Marine Science Professor Bob Warner noted that analyzing the number of larvae that are entrained by an intake that originate from an MPA is not the proper scientific question to address. Instead, when analyzing potential effects to MPA, a study should look at the connectivity of the MPA in a geographical area. The MPA are designed to function as a network and enhance connectivity. Because the proposed intake and alternative intake locations are located within a 4-km area, and are the same distance offshore, all intakes are considered equally protective of MPA.

Summary of Environmental Feasibility Conclusions

Based on the above considerations, Santa Ana Water Board staff cannot agree with the Discharger’s conclusion that Station E is the best site feasible for an offshore seawater surface intake based on environmental factors. All three sites have similar geology, bathymetry, hydrodynamic and oceanographic characteristics. Dr. Raimondi’s review indicates that the best site feasible, based on the dual MLC/SLC metric, is not Station E but either U2 or D2. The other environmental factors do not point to anyone of the three stations being necessarily superior to one another when considering proximity to sensitive habitats and species when this assessment is not simply based on linear distance but wind and current directions, seasonality of larval dispersion, and connectivity between different MPAs.

Santa Ana Water Board staff acknowledges that moving the intake to either Station D2 or U2 may have environmental impacts as a result of construction of a new surface intake. There may be impacts from pipeline construction needed to connect the new intake to an onshore desalination facility located adjacent to the AES HBGS. However, these impacts are temporary in nature, especially when compared to the 30-plus year operational life of the proposed Facility. The mortality associated with the operation of an intake at Station E is higher than an intake at Station U2 or D2 (Raimondi 2019) even when temporary construction impacts are considered. Therefore, Santa Ana Water Board staff will base a recommendation of the best site feasible on the other three factors that must be considered when determining feasibility: economic, social and technological.



CalCOFI 2004-2005 Seal Beach Sampling Stations

Sampling Station	Distance from Shore (km)	(mi)	Depth (m)	(ft)
29.7	1.2	0.7	10	32.8
29.3	3	1.9	20	65.6
30.2	5.9	3.7	30	98.4
30.6	10.1	6.3	40	131.2
31.5	16.7	10.4	80	262.5

2003-2004 HBGS Sampling Stations

Sampling Station	Distance from Shore (km)	(mi)	Depth (m)	(ft)
D2	0.5	0.33	9.5	31.2
D4	0.5	0.33	9.5	31.2
E	0.5	0.33	9.5	31.2
O2	1.9	1.2	14.9	48.9
O4	3.4	2.1	21.9	71.9
U2	0.5	0.33	9.5	31.2
U4	0.5	0.33	9.5	31.2

Figure 13. Location of the seven plankton sampling stations used in 2003-2004 to assess the source water body for the surface intake (Station E) at the Huntington Beach Generating Station. [Data sources: MBC Environmental Sciences, 2016 (Poseidon Appendix OOO); Dudek, 2015 (Poseidon Appendix E)]

Figure 14. Use of Euclidean distances to assess joint metrics of impact. Arcs indicate distance from the origin (Source: Raimondi 2019).

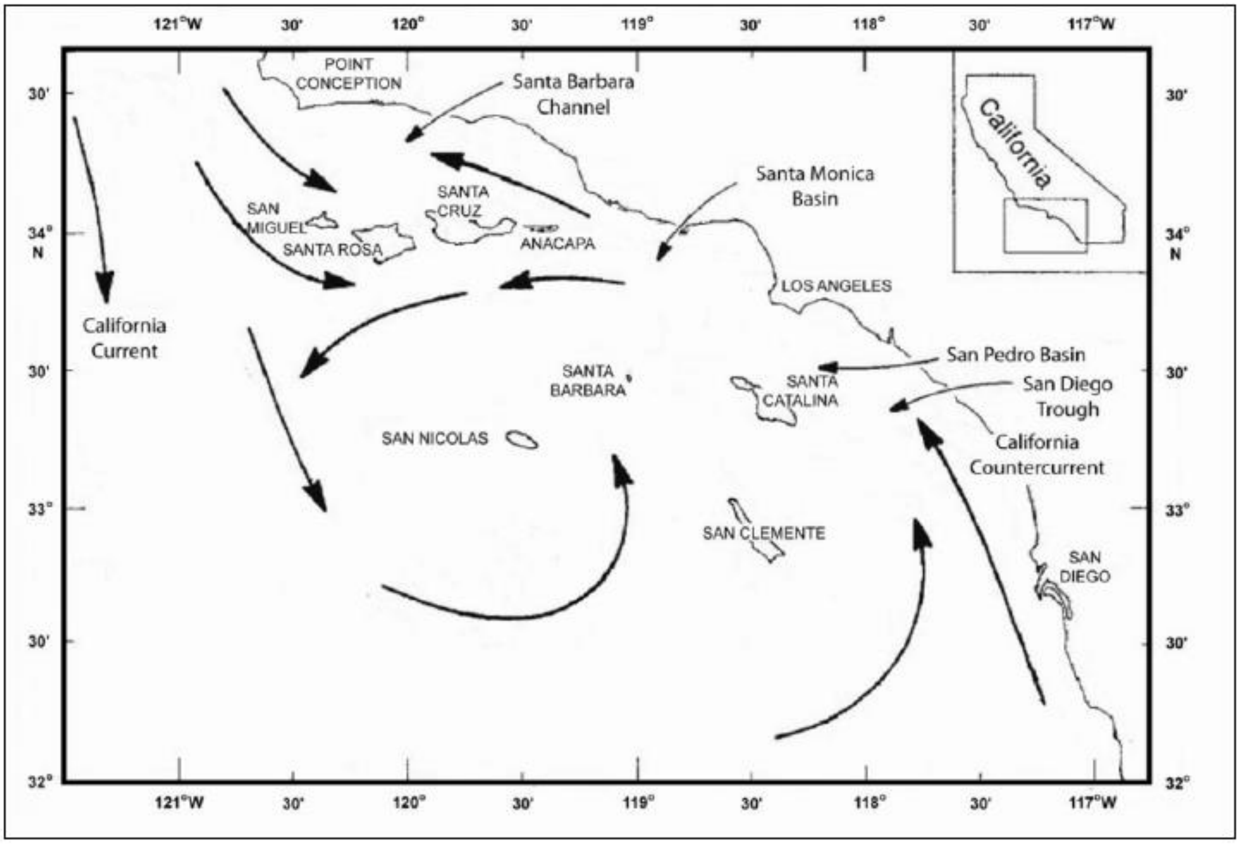


Figure 15. The large scale mid-outer shelf, depth-averaged circulation patterns in the Southern California Bight (Source: as shown in Rasmussen 2018: from Howard et al., 2012, adapted from Hickey, 1992).

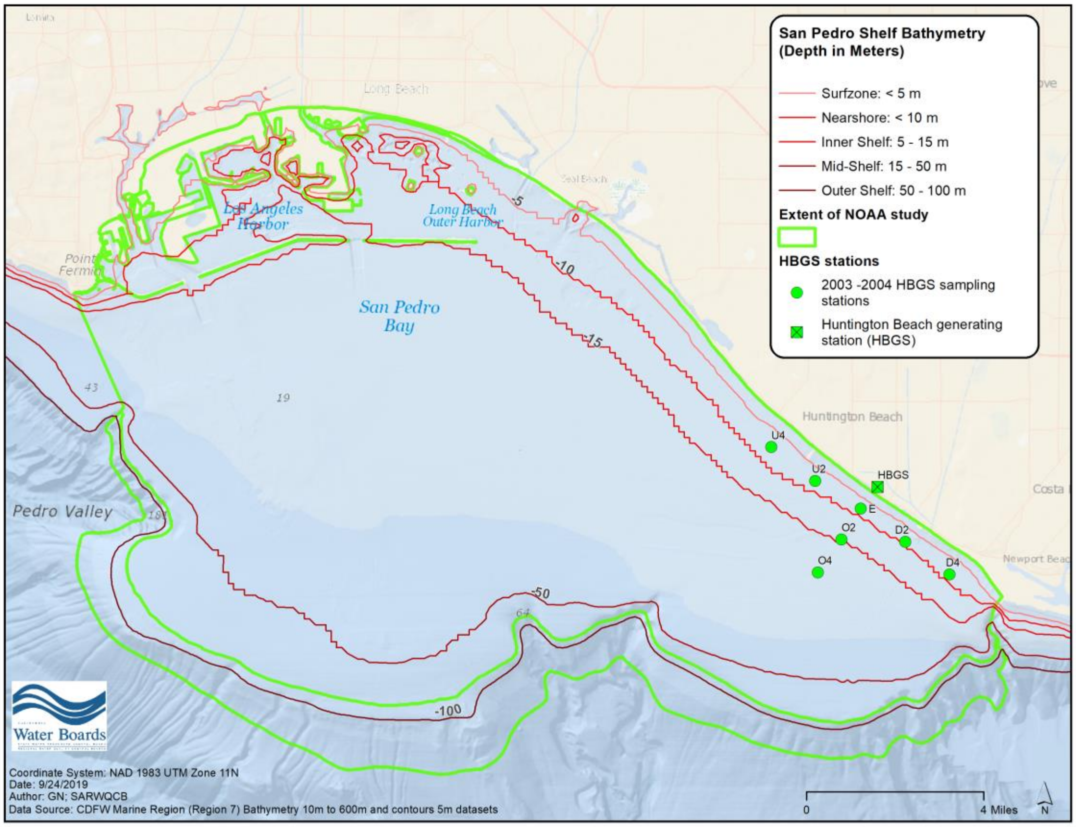


Figure 16. Locations of the HBGS sampling stations in relationship to the different depth areas across the San Pedro Shelf. Stations U4, U2, E, D2, and D4 are all located within 2-4 km of each other, in 9.5 m of water on the inner shelf within the nearshore zone.   Station O2 is located within the mid-shelf area and O4 is on the outer shelf. (Data Sources: MBC Applied Environmental Sciences, 2016 (Poseidon Appendix OOO); CUSP 2016; CDFW 2001.)

Figure 17. Locations of the proposed surface intake (Station E) and the two alternative stations (Stations D2 and U2) and their proximity to local wetlands, the mouth of the Santa Ana River, the OCSD outfalls and the Huntington Beach pier. (Source: Santa Ana Water Board staff image)

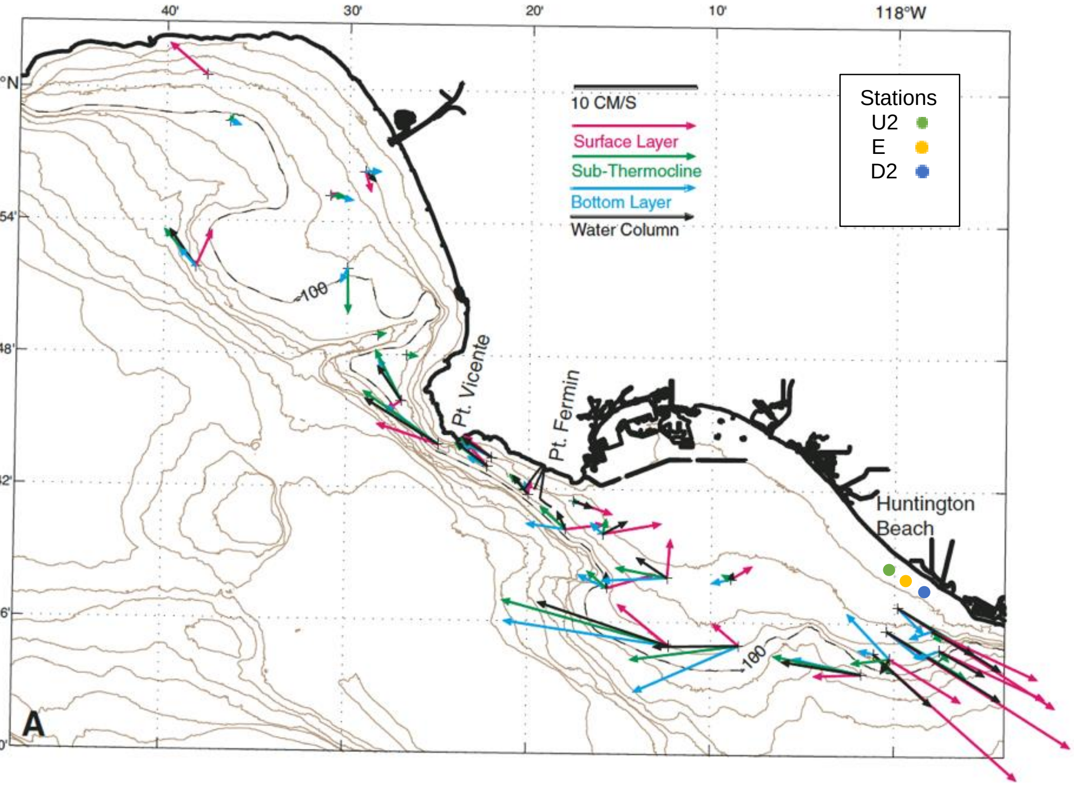


Figure 18. Mean flow patterns averaged over 4 successive summer seasons. Red, green, and blue vectors represent mean surface, mid-depth and bottom flows, while black arrows represent the depth-averaged flow. Approximate locations of stations U2, E, and D2 shown overlain on map. (Source: Adapted from Rasmussen 2018; original from Noble et al., 2009.)

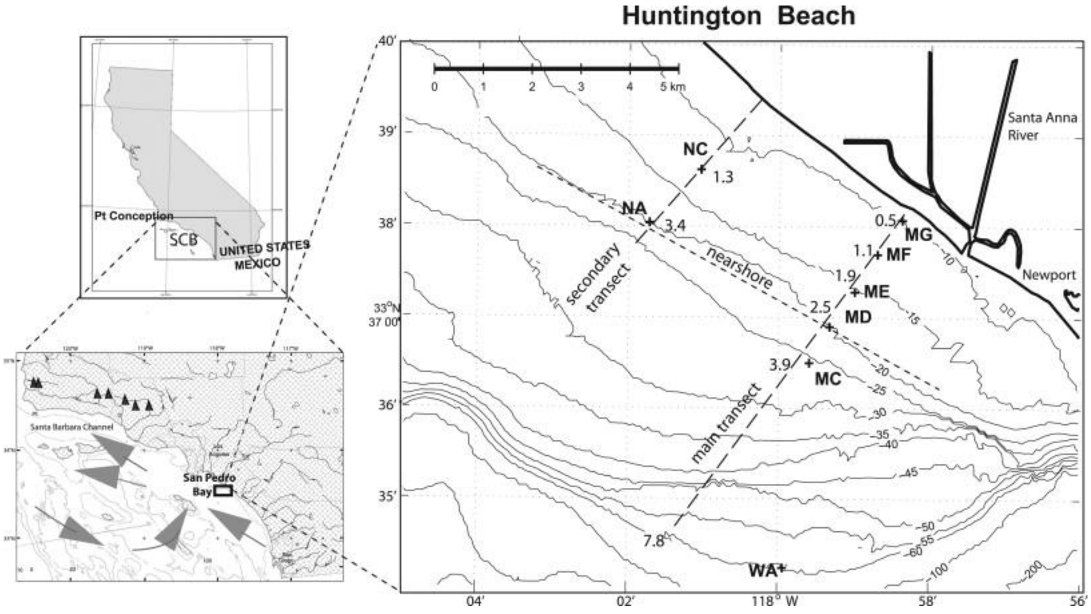


Figure 19A. Location of area shown in detail in Figure 19B, below (Source: Noble et al., 2015).

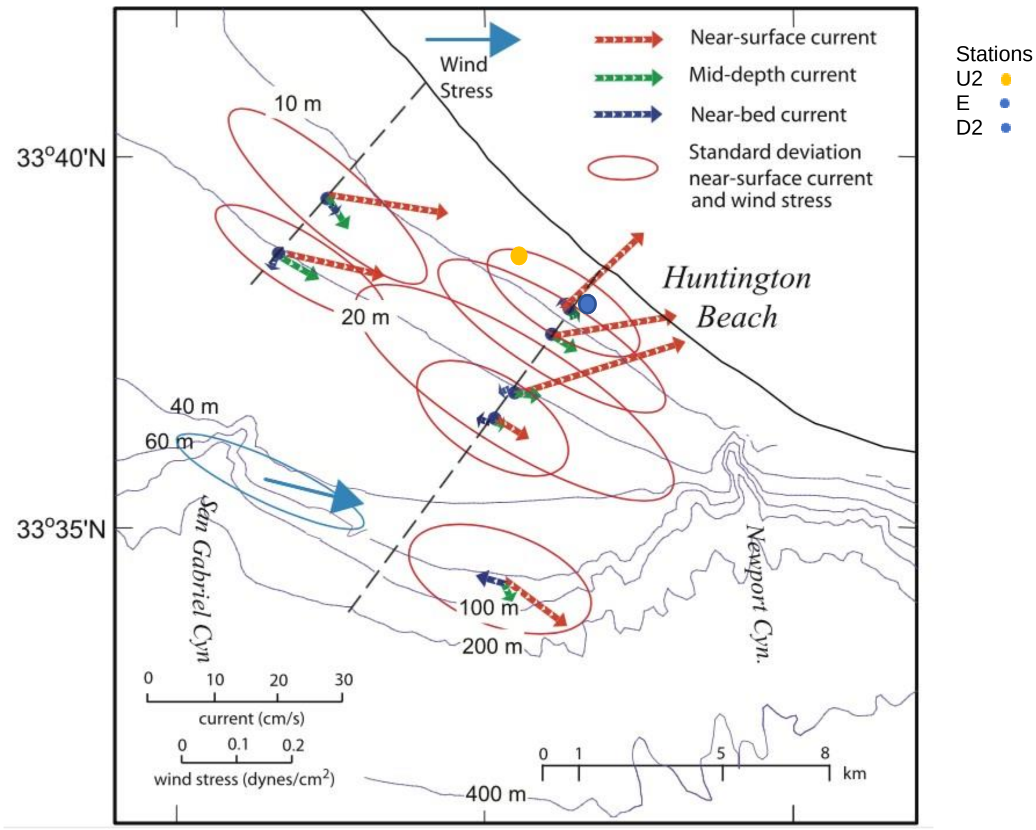


Figure 19B. The mean near-surface, mid-depth and near-bed currents and mean wind stress amplitudes off Huntington Beach. The standard deviation of near-surface currents and wind stress is also depicted. The standard deviation of mid-depth and near-bed currents (not shown) is usually larger than the mean current. Approximate locations of stations U2, E, and D2 shown overlain on map. (Source: Adapted from Figure 8 in Rasmussen, 2018. Original figure from Noble et al., 2015.)

Other Feasibility Considerations for Alternative Intake locations (Discharger's Appendices JJJJJ-1, JJJJJ-2, and RRRRR)

Background
This section summarizes the Santa Ana Water Board staff's analysis of the technological, economic, and social feasibility factors for constructing and operating the Facility intake system at either Station E, or Station U2 or Station D2.

Based on the Santa Ana Water Board staffs' analysis, and expert neutral third-party review of the environmental feasibility of the seven alternative intake locations, three sites were found to be better for the protection of marine life. The sites include Station E (proposed), Station U2, and Station D2. To further analyze the feasibility of the three surface intake locations, the Discharger provided Discharger's Appendix JJJJJ-2, 'Huntington Beach Desalination Plant D2 and U2 – Alternative 1mm Screened Seawater Intake Feasibility Analysis According to the OPA and CEQA' dated January 2019 and prepared by Dudek.

On February 4, 2019, Santa Ana Water Board staff provided the Discharger with written comments on their feasibility analysis including a request for additional information related to the technological, economic, and social factors covered in Appendix JJJJJ-2. The Discharger responded to Santa Ana Water Board staff's comments by submitting Appendix RRRRR.

To evaluate the alternative surface intake locations, the Discharger developed a conceptual design to construct a surface intake at Stations U2 and D2 for comparison with the proposed surface intake at Station E. Although Stations U2 and D2 are in different locations, they are located equidistant from the proposed Facility. Station U2 is located about 2 km upcoast from Station E and Station D2 is located about 2 km downcoast from Station E. All three stations are located the same distance offshore (0.5 km) and at the same depth (9.5 m). Therefore, the additional costs to construct a surface water intake system at either Station U2 or Station D2 are considered to be relatively the same from a planning perspective (Discharger's Appendix JJJJJ-2).

Brief descriptions of the intake system designs used for comparative purposes at Station E, and Stations U2 and D2, are described below. Further detail of the designs for the alternative sites are included in Discharger's Appendices JJJJJ-2 and RRRRR.

<u>Station E Surface Intake Design:</u>
As proposed, the Facility will use the existing AES HBGS intake system, located near Station E. The surface intake will be modified to add a manifold with four 91-inch-diameter, 1-millimeter slot cylindrical wedgewire screens (WWS). Each screen would rise approximately 13.5 feet above the sea floor and be oriented perpendicular to the shoreline. Screen lengths would be about 26 feet, each with an effective screening area of approximately 105 inches. The footprint of the intake system will be approximately 1,319 square feet, including protective riprap of 608 square feet. WWS would be spaced approximately 3.8 feet from each other to maximize the sweeping velocities between

screens to sweep debris and organisms away from the intake area. (California State Lands Commission, 2017)

An airburst system will be included in the design to reduce occlusion by free-floating debris on the WWS. The construction and installation of the wedgewire screen manifold and associated infrastructure would take approximately three (3) months. Work would be conducted from a derrick barge moored above the existing AES HBGS intake system. The system would be fabricated at an off-site location, transported to the Port of Long Beach, loaded onto a support barge, and taken to the installation site. Onshore support vehicles at the Port of Long Beach may include pick-up trucks, forklift, crane, and wheel loader. In addition, two gravity anchor blocks would be installed, to be used if the Discharger implements a boat-based air burst screen cleaning system for screen maintenance. The gravity anchors would be installed during construction of the wedgewire screen intake system using the same vessels and crew as has been proposed for the wedgewire screen installation. All screens will be operable under typical conditions, meaning the through-slot velocity will be well below 0.5 feet/sec. In the event one screen is taken out of service, the intake system is designed to maintain a through-slot velocity below 0.5 feet/sec as required by the Ocean Plan. Stations U2 and D2 would have similar wedgewire screen systems.

<u>Stations U2 and D2 Surface Intake System Design</u>:
The construction of a surface intake at Station D2 or Station U2 would require site modifications outside of the existing industrial footprint of the AES HBGS; these types of site modifications are not required for Station E. The modifications include onshore facilities and offshore facilities; these would be the same for Station D2 and Station U2 and are described below.

The onshore facilities would include a connection vault that would be constructed on the beach adjacent to the existing AES HBGS pipeline to provide access for connecting the new pipeline to the existing pipeline. The new pipeline would be 12 feet in diameter to account for occlusion of the internal surface by biofouling. A 2 km intake pipeline, with multiple manhole access points, would be installed under the beach to connect to the existing AES HBGS intake pipe and then to the junction vault where the new intake pipeline would turn 90 degrees and head offshore towards the WWS array. This junction vault would also include an aboveground building to house the air compressors and receivers for an airburst system.

The offshore facilities include the intake pipeline to either Station D2 or U2, and each would be equipped with an intake screening system. The intake screening system for Stations D2 or U2 is similar to the system described for Station E. Cylindrical wedgewire screens with 1-mm slot widths would be installed approximately 1,840 feet offshore. Passive wedgewire screens would be mounted on a common header, which would be tied into a transition structure connecting the WWSs manifold to the new intake pipeline to convey the feedwater flow to shore. The header and intake pipeline would be installed below the sea floor and would be covered by rip rap armoring.

An airburst system would be included in the design to reduce occlusion by free-floating debris on the WWSs. The air compressors and receivers would be housed in a new aboveground building above the junction vault on the new pipeline. Alternatively, the screens could be manually cleaned periodically by divers.

The onshore intake pipe segment would be installed via trench and fill. Since the excavation would be below the water table, the trench will be shored with sheetpiles and struts to complete the construction in the wet. At the end of the onshore pipe segment, a junction vault would be constructed to turn the pipeline 90 degrees to head offshore for the intake system. A temporary trestle would be constructed from the shoreline to the offshore terminus to allow construction of the offshore intake pipe segment through the surf zone. The intake pipe would be installed in an excavated trench under the trestle, backfilled, and covered with rip rap armoring.

An alternative intake located at either Stations D2 or U2 would require significant onshore and offshore construction to install conveyance pipelines and an air burst system, and would require new lease agreements for the permanent structures on the beach and permits, which would affect the length of time that it would take to complete the project.

<u>Technological Feasibility</u>
In Discharger's Appendix JJJJJ-2, the Discharger evaluated two general construction approaches for installing an intake system at the alternative Stations U2 or D2 to the proposed onshore location, Site 1G – Adjacent to the AES HBGS, including:

1. An offshore alignment connecting the new piping to the existing AES HBGS offshore intake tower and then routing the new piping up- or down-coast either on the seabed or beneath the seabed; and
2. An onshore alignment connecting the new piping to the existing AES HBGS pipeline at a location onshore and then routing the new piping up- or down-coast beneath the State Beach in Huntington Beach.

The first approach was found to have more challenging constructability issues related to constructing a large diameter pipeline in a relatively shallow intertidal zone parallel to the shore with the significant hydrodynamic forces associated with the approaching waves and the potential exposure of the entire pipeline. The second approach remedies the construction in the intertidal zone by using a trestle to mitigate wave loading issues and is therefore the construction approach used in the alternative analysis. Figure 20 shows the general configuration for the alternative sites analysis. Further details are presented in Discharger's Appendix JJJJJ-2 and Discharger's Appendix RRRRR.

Santa Ana Water Board staff reviewed the technological feasibility of the alternative intake systems for Stations U2 and D2 looking for reasonable and technologically sound approaches for comparison to constructing an intake system at Station E. The primary areas of concern are listed in the February 4, 2019 Santa Ana Water Board letter to the

Discharger. These areas include the proposed construction method to install a pipeline in the ocean to Station U2 or D2, the proposed pipeline diameter for the intake system for Station U2 or D2, the constructability of the pipeline along the beach and possible alternative pipeline designs, and the location for the air burst systems to clear the intake. These areas are described separately below.

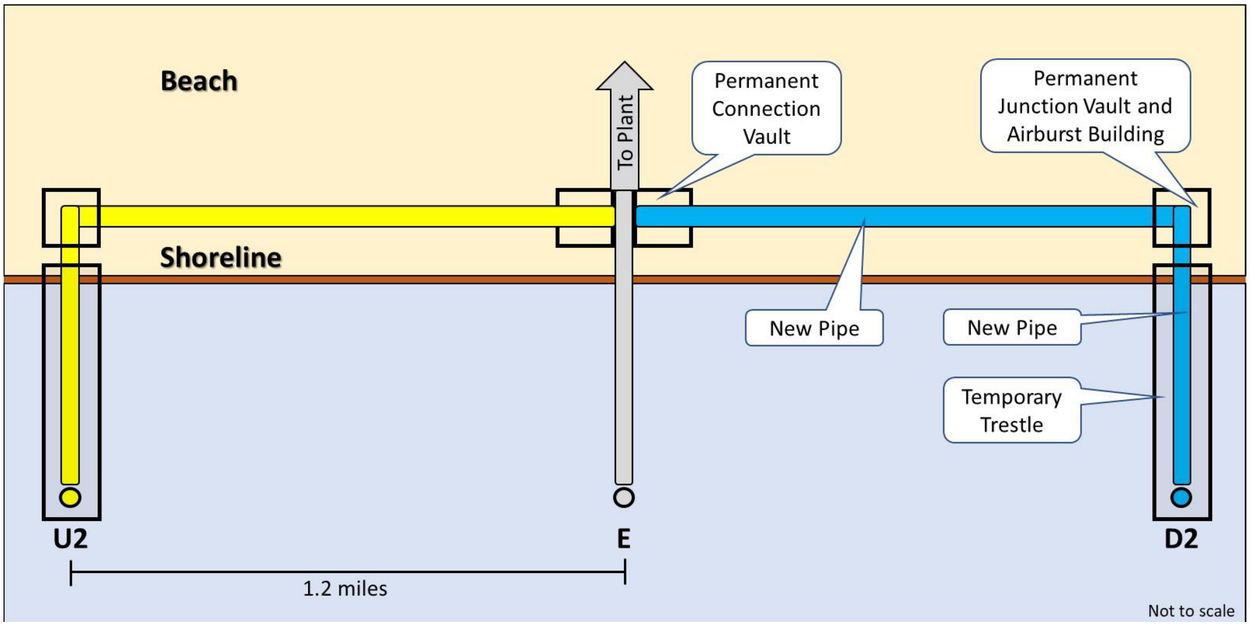


Figure 20. General configuration of the intake systems used for the Alternative Sites (Source: Discharger's Appendix JJJJJ-2, Fig.5, page 16)

Construction Method

In their feasibility analysis, the Discharger had proposed the use of a trestle construction method to install the intake systems at Station U2 or D2. This is a complex, high cost, proven method to extend a new pipeline to Station U2 or D2. Santa Ana Water Board staff asked if a float-in construction method could be used to install the intake system. This request was based on information provided in the 2014 Independent Scientific Technical Advisory Panel (ISTAP) Report dated November 9, 2015 (the Discharger's Appendix G) where construction of a subsurface infiltration gallery (SIG[11]), larger in size and more distant from the shore than the proposed intake and discharge structures, was evaluated using a float-in construction method. Santa Ana Water Board staff requested that the Discharger address the feasibility of using a modified version of the ISTAP's float-in method to install the intake pipe, or perhaps a combined version of the float-in and trestle methods, in which a trestle structure/construction platform could be built at the offshore end of the existing intake pipe to be used as a staging location for the offshore installation. The Discharger responded that they were not aware of a 'float-in' approach used in the application for construction in shallow water and open ocean adjacent to the high-energy surf zone. The Discharger also stated that an ISTAP panel

[11] Also called a seafloor or seabed infiltration gallery.

member said that “the cost-savings would not be significant for the float-in option, and being closer to shore could actually increase the cost because as you move closer into shore the waves start to drag on the bottom causing problems for the construction.” (Discharger’s Appendix RRRRR, Part II, Page 7).

<u>Pipeline Diameter</u>
In Discharger’s Appendix JJJJJ-2, the Discharger evaluated installing a 14-foot (168-inch) diameter intake pipe for Stations U2 and D2. The large pipe diameter results in overstated construction impacts and constructability concerns, as it appears the pipe could be designed with a significantly smaller diameter and still meet the flow requirements for the Facility. The Discharger was asked to re-evaluate their calculations for pipe size and construction methodologies. The Discharger has reviewed the sizing of the pipeline that would be required for the offshore option and refined the pipeline size from 14-foot to 12-foot. In determining the size of the pipe, the total head loss was calculated for the entire piping system for the full range of tide levels. The minimum net positive suction head for the intake pumps were compared to the total head loss calculated for the intake system, assuming 6 inches of marine growth in the large diameter piping. The 12-foot diameter pipeline would use the same construction methodology as the 14-foot diameter pipeline.

<u>Onshore Pipeline Construction Method and Design</u>
The Discharger proposed to install the onshore pipeline for the intake system to Station U2 or D2 using a trench and fill method that is very disruptive to beach activities and recreational uses. Santa Ana Water Board staff requested that the Discharger evaluate the feasibility of locating the pipelines for Stations U2 and D2 further inland to minimize beach impacts and/or using trenchless methods to construct the pipelines. The Discharger responded that moving the connection pipelines for the intake systems at Stations U2 and D2 farther inland would require facilities to be built under Pacific Coast Highway and/or on private property and through local wetlands. The Discharger indicated these options would require easements and other rights that may not be attainable. Construction of the connection pipelines inland from the beach would also result in some of the same environmental and social impacts that would be experienced on the beach. Construction in and under Pacific Coast Highway would require lane closures, resulting in increased traffic and impediments caused by the presence of construction equipment and materials. To address the request about use of trenchless methods for construction pipelines for the intake system to Station U2 or D2, the Discharger provided the following information. A trenchless method can be used to avoid construction in protecting wetlands, however, avoiding direct impacts in the wetlands would introduce risks of hydraulic fracturing, and locating entry and exit pits in areas that are not protected wetlands or developed areas would likely be infeasible.

In addition the Discharger raised other short-term, indirect effects from general construction that could occur in the vicinity of construction to biological resources such as sensitive coastal vegetation; noise from construction equipment could adversely affect wildlife and important wildlife activities such as bird breeding; contaminated stormwater runoff from construction sites could impact the water quality of nearby wetlands or streams; fugitive dust from construction could cause wetland degradation; vegetation removal that may be required to clear the construction site or staging area could affect the viability of plant communities, thereby decreasing available habitat; and increased human activity in the area could lead to trampling of vegetation or disruption of wildlife behavior to be considered.

<u>Air Burst System</u>
Water Boards staff requested additional information clarifying why onshore air burst systems would be required for intakes at Stations U2 and D2 and why self-cleaning screens, as currently proposed at Station E, manual cleaning by divers, use of a boat-based airburst system, or pigging could not be used instead. The Discharger responded in Discharger's Appendix RRRRR, stating that that Discharger's Appendix JJJJJ-2 concludes that if the 1-mm screened ocean intake is located at Stations D2 or U2 then the decision to utilize a shore-based air burst system would require that the facilities be placed on the beach in order to be close enough to the wedgewire screen to be effective. An air burst system located on the proposed on-shore plant site would be approximately 2.4 km away from the 1-mm screens if located at Station U2 or D2 and is too far to be effective. This is not the case for locating the intake at Station E. A shore-based air burst system could be located on the proposed plant site and effectively clean screens given the close proximity of Station E as compared to Stations U2 and D2. However, the currently approved wedgewire screen design does not utilize an air-burst system, although an airburst system may be deemed necessary in the future should the use of self-cleaning capabilities of the intake screening prove inadequate. Instead, the screens proposed would utilize rotating brushes and would be self-cleaning with additional cleaning by divers. This was the environmentally superior alternative approved in the California State Lands Commission's certified SEIR in 2017.

Though many technical aspects of the alternative intake locations are discussed and included in the referenced documents; the areas discussed in this section highlight the main concerns expressed by Santa Ana Water Board staff regarding the technological feasibility of moving the intake to either Station D2 or U2.

<u>Economic Feasibility</u>
The Discharger analyzed and compared the direct capital and financing costs for constructing a surface seawater intake at Station E, or at either Station U2 or D2. The results of the technical aspects of the project have a direct impact on cost; this section describes the comments related to cost after the technical issues were addressed.

As described in the technical feasibility discussion above, the construction approach used to develop an estimated cost to construct a surface intake system at either of the alternative Stations D2 or U2 was compared to the costs for the proposed surface intake location at Station E. Construction at Station D2 or U2 would require substantial site modifications outside of the existing industrial footprint of the AES HBGS. The onshore pipeline system and the offshore pipeline systems are components of construction that would add to the costs for a surface water intake system at Station U2 or D2, which are not required for the intake at Station E. All three locations would require the construction of the wedgewire screen system.

Discharger’s Appendix JJJJJ-2, revised in Discharger’s Appendix RRRRR, estimated that construction costs for an intake system at Station U2 or D2 would be $474 million dollars, adding nearly 50% to the total project costs that are currently estimated at $1 billion. From the information provided in Discharger’s Appendix JJJJJ-2, Water Boards staff requested more detailed breakdown of cost estimates for Station E, and Stations U2 and D2 be provided. Specifically, it was requested that the details of design and construction cost estimates, including but not limited to design/sizing calculations of the intake structure and pipeline, pump station, and pipeline connecting to the Facility onshore location, and what the additional cost for an intake at Station D2 or U2 would have on the cost of water to Orange County Water District.

The Discharger explained that the estimated cost of the proposed intake at Station E is based on fixed-price offers, meaning the level of detail is sufficient to select a contractor based on fixed-price bids. The pricing was based on engineering drawings and process equipment selection developed. Comparatively, the cost estimates to move the wedgewire screen intake to alternative Station D2 or U2 are based on a conceptual design level of detail to determine the feasibility of an alternate intake alignment. At the conceptual design level, higher contingencies are used since the engineering has not been advanced to a higher level of detail. The cost comparisons are shown in the table below that was taken from Attachment B in Discharger’s Appendix RRRRR. It should be noted that the costs for construction in the Discharger’s Appendix RRRRR are about $18M less than Discharger’s Appendix JJJJJ-2 due to the reduced pipeline diameter for the intake pipe from 14-foot to 12-foot diameter.

The cost comparison table shows that the total cost to build the wedgewire screen intake at Station E is $93 million, compared to $474 million to construct the wedgewire screen system and associated infrastructure at either Station D2 or Station U2. As shown the Discharger’s submittal, Appendix RRRRR, page 6, constructing and operating a wedgewire screen intake system at either Station D2 or U2 may increase the unit cost of water by over $600 per acre foot.

Santa Ana Water Board staff consulted with State Water Board’s Division of Financial Assistance (DFA) who have expertise in evaluating cost estimates associated with planning, designing, and constructing a facility, such as the proposed Facility. DFA staff reviewed the conceptual designs proposed for the alternative intake locations as compared to the proposed site. The review included evaluation of the pipeline sizing, construction methodology, and construction costs estimates. The evaluation concluded that the pipeline sizing, construction methods, and construction costs were reasonable for the proposed Facility, including the construction methods and additional costs associated with moving the intake to either Station D2 or U2 (email dated July 1, 2019 from DFA).

Table 3 – Cost Comparison

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Comparison of Proposed Intake to Alternative Intake Cost Estimate ($'000s)		
Intake:	**Proposed Intake (E)**	**Alternative Intake (U2 / D2)**
Construction Period (Months) (1)	**39**	**72**
Financial Close Pricing Year	2020	2024
Direct Capital Costs		
Pipeline and Associated Infrastructure (2)	-	26,312
Trestle and Associated Infrastructure (2)	-	31,541
Intake Screen and Related Costs (2)	22,135	22,135
Other Project Costs (Unallocable) (2)	2,178	2,178
Indirect, Insurance and Overhead Costs (2)	13,372	45,192
Subtotal	**37,685**	**127,358**
Engineering (15%) (2)	5,653	19,104
Contingency (40%) (2)	15,074	50,943
Direct Capital Cost (2018$)	**58,412**	**197,405**
Direct Capital Cost Escalation (to Year of Financial Close)	2,957	38,736
Direct Capital Cost ($ in Year of Financial Close)	**61,369**	**236,140**
Development and Construction Costs (3)	9,438	53,367
Capitalized Interest During Construction (4)	12,816	151,540
Financing Fees and Reserves (5)(6)	8,996	32,811
Total Intake Cost Estimate (7)	**92,618**	**473,858**
Total Intake Cost Estimate - Rounded	**93,000**	**474,000**
% Increase over E		*409.7%*

Note: Direct Capital Costs reflect 12' Pipeline Diameter, see cost detail on the 'Direct Capital Cost Detail' tab

(1) Construction Schedule for U2/D2 assumes new Intake construction commences prior to Plant Construction
(2) For detail of Direct Capital Costs components please refer to the color coded legend on the 'Direct Capital Costs (RWB)' tab starting in tab A78
(3) Costs include Property Taxes, Title Insurance, Construction Management and Permitting and Development Costs
(4) Includes a 6 Month Capitalized Interest Contingency
(5) Reserves include Debt Service, Working Capital and Project O&M
(6) Financing Fees include Conduit, Rating Agency, Underw riting, Equity and Advisory Fees
(7) Proposed Intake (E) Total Intake Cost Estimate is in 2020$ and Alternative Intake (U2/D2) is in 2024$ (both the respective year of Financial Close)

(Source: Appendix RRRRR – Attachment B – Cost Comparison)

<u>Social Feasibility</u>

Construction of a pipeline from the desalination facility to an intake and discharge structure located at either Station D2 or U2 would result in the loss of beach access and usage within the construction area by limiting or precluding access to the beach and shoreline in the onshore and offshore construction areas. The social and local business economic impacts may make it challenging to obtain permits from the City of Huntington Beach for the alternative intake locations. Figure 8 below shows the locations of the onshore intake pipeline system that would be needed to move the intake to Station D2 or U2. (See Discharger's Appendix JJJJJ-2)

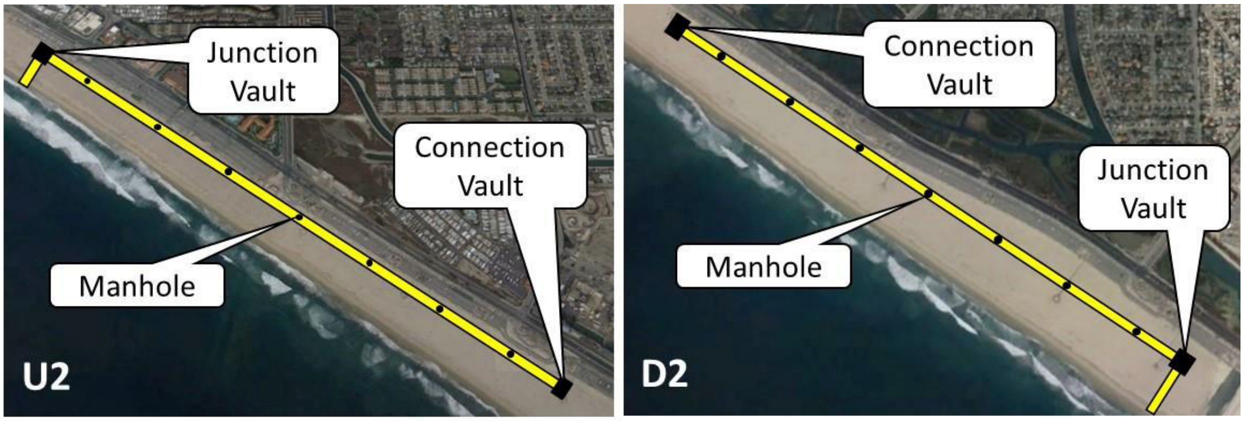

Figure 21. Location of the onshore pipeline system that would be needed to move the intake for the proposed desalination facility to either Station U2 or D2.
(Source: Discharger's Appendix JJJJJ-2, Figure 6)

Santa Ana Water Board staff asked that the Discharger provide information on what impacts to beach access, beach usage, and annual beach events would result from construction of an intake at Station E for comparative purposes.

The Discharger responded that the intake system at Station E would not require construction on the Huntington State Beach. Onshore construction associated with the existing surface intake near Station E would be confined to the existing AES HBGS footprint. Therefore, onshore construction and operation associated with a surface intake at Station E is not anticipated to result in recreational impacts. Offshore construction would be required for the diffuser and wedgewire screen installation as part of the operation at intake Station E. Diffuser installation would be confined to the area directly above the existing discharge tower, located approximately 1,500 feet offshore. Wedgewire screen installation work would be conducted from a derrick barge moored above the existing intake tower and would be confined to the area directly surrounding the tower, located approximately 1,650 feet offshore. Offshore construction would not occur within the State Beach. Therefore, operation and construction of the intake at Station E would avoid recreational impacts as it would utilize the existing intake infrastructure.

To summarize the feasibility factors for the infrastructure at Stations E, U2 and D2, Table 4 was developed to show the pros and cons for Station E as compared to Stations U2 and D2.

Table 4. Summary of Feasibility Factors for Infrastructure at Stations E, U2, and D2

Feasibility Factors	Station E	Stations U2 and D2
<u>Environmental:</u> 1. ETM/APF 2. MLC/SLC 3. Geology 4. Construction	1. Sufficient data to calculate ETM/APF 2. Estimated higher marine life impacts 3. Similar bathymetry, hydrodynamic, and oceanographic characteristics 4. Some local impacts during construction	1. Not sufficient data to calculate ETM/APF 2. Estimated lower marine life impacts 3. Similar bathymetry, hydrodynamic, and oceanographic characteristics 4. Major onshore and offshore impacts during construction
<u>Technology:</u> 1. Construction 2. Operation	1. Retrofit of existing pipeline with wedgewire screens and diffusers 2. Same technology needed for all stations	1. Build pipelines and equip pipelines with wedgewire screens and diffusers 2. Same technology needed for all stations
<u>Economic:</u> 1. Construction 2. Operation	1. Construction costs are for intake/discharge retrofits 2. Same operational costs for all stations	1. Significantly higher construction costs 2. Same operational costs for all stations
<u>Social:</u> 1. Construction 2. Operation	1. Some public access restrictions offshore near the intake and discharge 2. Minimal and temporary public access restrictions	1. Significant public access restrictions onshore and offshore during construction 2. Some temporary and permanent public access restrictions (junction vault installation~~s~~)

Conclusion and Recommendation

Based on considerations of technological, economic, and social factors and the additional time that would be needed to move the surface intake for the proposed Facility to an alternative location at Station U2 or D2, the Santa Ana Water Board staff recommends that the existing surface intake and discharge structures at the AES HBGS (located adjacent to Station E) be used for the proposed desalination facility and upgraded as required by the Ocean Plan (i.e., add 1mm wedgewire screens to the intake structure, linear diffuser to the discharge structure).

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Attachment G.2 - Analysis in Support of Finding 7 Identified need for Desalinated Water

INTRODUCTION

This attachment provides Santa Ana Water Board staff's analysis in support of Finding 7 of Attachment G of the Tentative Order. In its analysis of whether the proposed Huntington Beach Desalination Facility (Facility) uses the best available site under Water Code section 13142.5, subdivision (b) (section 13142.5(b)), the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) must consider whether Poseidon Resources (Surfside) LLC (Discharger) has demonstrated an identified need for 56,000 acre-feet per year (AFY) of desalinated water and has shown that the identified need for that volume of water is consistent with an applicable urban water management plan or other water planning documents.[1] The Santa Ana Water Board must also consider the identified need for desalinated water in the assessment of the best available technology when determining the feasibility of subsurface intakes.[2]

As part of their application for a section 13142.5(b) determination, the Discharger submitted a document titled "Clearly Identifying the Local Need for 50 Million Gallons per Day of Desalinated Water for the Huntington Beach Desalination Project's Planned Designed Capacity" (Discharger's Identified Need Whitepaper and an Addendum to the Whitepaper) (Appendices LL1 and LL2). In the submittal, the Discharger cites various regional and municipal water planning documents (including the Urban Water Management Plan (UWMP) for the Municipal Water District of Orange County (MWDOC) and the Groundwater Management Plan (GWMP) for the Orange County Water District (OCWD)) to support their conclusion that there is an identified need for 56,000 AFY of desalinated water that is consistent with water planning documents in the region.

Santa Ana Water Board staff reviewed the Discharger's Identified Need Whitepaper and related submittals (Appendices LL1 and LL2), supplemental information provided by the Discharger in response to board member questions (Appendix CCCCCC), the relevant water planning documents, letters from water supply agencies, information presented to the Board in public workshops, public comments, and other submittals from interested parties regarding identified need, and recommends that the Santa Ana Water Board find that the Discharger has demonstrated an identified need for 56,000 AFY of desalinated water that is consistent with MWDOC's 2015 UWMP, other applicable UWMPs, and other relevant municipal and regional water planning documents.

THE USE OF "IDENTIFIED NEED" IN THE OCEAN PLAN

Section 13142.5(b) requires new or expanded industrial facilities using seawater for industrial purposes to use the best available site, design, technology, and mitigation measures that are feasible to minimize the intake and mortality of all forms of marine

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[1] See *infra*, fn. 5.
[2] See *infra*, fn. 6.

life.[3] In 2015, the State Water Resources Control Board (State Water Board) added chapter III.M. to the Water Quality Control Plan for the Ocean Waters of California (Ocean Plan) to provide a framework for consistent statewide application of section 13142.5(b) to desalination facilities (Desalination Amendment).[4] Under chapter III.M. of the Ocean Plan, the regional water boards must first individually analyze the best available site, design, technology, and mitigation, and then assess the factors collectively to determine the best combination of feasible alternatives. Identified need factors into the analyses for the best available site and technology.

Turning first to the best available site, chapter III.M.2.b.(2) directs the regional water boards to require the owner or operator of the proposed desalination facility to consider a reasonable range of nearby sites. In the assessment of the alternative sites, the owner or operator must consider, among other factors, "whether the identified need for desalinated water is consistent with an applicable adopted urban water management plan prepared in accordance with Water Code section 10631, or if no urban water management plan is available, other water planning documents such as a county general plan or integrated regional water management plan."[5]

Next, in the context of the best available technology, the Ocean Plan provides that the regional water boards must require subsurface intakes unless the regional water board determines that subsurface intakes are infeasible.[6] In determining the feasibility of subsurface intakes, "[a] design capacity in excess of the need for desalinated water as identified in chapter III.M.2.b.(2) shall not be used by itself to declare subsurface intakes as not feasible."[7] "If the regional water board determines that subsurface intakes are not feasible for the proposed intake design capacity, it shall determine whether subsurface intakes are feasible for a reasonable range of alternative intake design capacities. The regional water board may find that a combination of subsurface and surface intakes is the best feasible alternative to minimize intake and mortality of marine life and meet the identified need for desalinated water as described in chapter III.M.2.b.(2)."[8]

INTERPRETATION AND SCOPE OF IDENTIFIED NEED

The Ocean Plan requires "the identified need for desalinated water" to be "consistent with" an applicable UWMP, or other plan if an UWMP is not available. However, the Ocean Plan does not define "identified need" or elaborate on what it means to be

[3] Wat. Code, § 13142.5, subd. (b).
[4] State Water Board Resolution 2015-0033, p. 1, Finding 6; *see also* State Water Board, Water Quality Control Plan for the Ocean Waters of California (2015) (Ocean Plan), pp. 34–51.
[5] Ocean Plan, pp. 37–38, (ch. III.M.2.b.(2)). Other factors for site consideration are whether subsurface intakes are feasible; placement of facility infrastructure so as to avoid impacts to sensitive habitats and species; direct and indirect effects of facility construction and operation on all forms of marine life; oceanographic geologic, hydrogeologic and seafloor topographic conditions; availability of wastewater to dilute the brine discharge, and proximity of MPA's or SWQPAs. Ocean Plan, pp. 37–38. These other factors are analyzed in Attachment G.1.
[6] Ocean Plan, p. 39, (ch. III.M.2.d.(1)(a)).
[7] *Ibid.*
[8] *Id.* at 40, (ch. III.M.2.d.(1)(a)ii.).

"consistent with." As evidenced by differing interpretations advanced by stakeholder groups, there is some ambiguity regarding the meaning of these terms and the scope of a regional water board's review. There are also differing interpretations regarding who identifies the need for desalinated water. This section provides Santa Ana Water Board staff's interpretation of the "identified need" provision based on plain meaning, the administrative record for the Desalination Amendment, and the regulatory framework.

In the absence of definitions for "identified need" and "consistent with," the terms are construed using their plain, commonsense meanings, the documents underlying the Desalination Amendment (such as the staff report and the responses to comments), and their placement in the regulatory scheme.[9]

Turning first to plain meaning, "identify" as used in this context means to "recognize or distinguish"[10] or "to establish the identity of."[11] "Need" means "a lack of something requisite, desirable, or useful"[12] or "a thing that is wanted or required."[13] "Need" could also mean "circumstances in which something is necessary."[14] "Consistent" in this context means "compatible or in agreement with something"[15] or "marked by agreement: compatible—usually used with with."[16] Additionally, courts have construed "consistent with" in other contexts, finding that "consistency with" separate planning documents requires only compatibility or agreement rather than "rigid conformity with every detail."[17] Under the plain meaning of "identified need," someone must recognize or distinguish the lack of desalinated water that is required, desired, useful, or necessary. And to be "consistent with," that "identified need" must be compatible or in agreement with an applicable UWMP or other water planning documents. Though helpful for parsing out the two parts of the need provision, the plain meaning of the terms does not resolve the ambiguity. So, we turn to the intent of the State Water Board as can be gleaned from the administrative record (and in particular, the response to comments) for the Desalination Amendment and the regulatory scheme to construe these terms.

The term "identified need" has been construed differently by various stakeholders. On the one hand, environmental groups argue that there is no "need" for desalinated water if there are other sources of water that can meet regional water demands. On the other hand, water supply agencies and other similarly situated stakeholder groups viewed

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[9] Hoitt v. Dept. of Rehabilitation (2012) 207 Cal.App.4th 513, 523; see also Cnty. of Sacramento v. State Water Res. Control Bd. (2007) 153 Cal.App.4th 1579, 1586 [providing that principles of statutory construction also apply to the interpretation of regulations].
[10] Lexico (Powered by Oxford Eng. Dict.), identify <https://www.lexico.com/en/definition/identify>.
[11] Merriam-Webster Dict. Online, identify <https://www.merriam-webster.com/dictionary/identify>.
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[13] Lexico (Powered by Oxford Eng. Dict.), need < https://www.lexico.com/en/definition/need>
[14] Lexico (Powered by Oxford Eng. Dict.), need < https://www.lexico.com/en/definition/need>
[15] Lexico (Powered by Oxford Eng. Dict.), consistent <https://www.lexico.com/en/definition/consistent>
[16] Merriam-Webster Dict. Online, consistent <https://www.merriam-webster.com/dictionary/consistent>
[17] Muzzy Ranch Co. v. Solano County Airport Land Use Commission (2008) 164 Cal.App.4th 1, 9 (quoting San Franciscans Upholding the Downtown Plan v. City and County of San Francisco (2002) 102 Cal.App.4th 656, 678.)

need as a more flexible concept that considers a range of factors that affect water supply reliability as well as water planning policies and priorities. The administrative record for the Desalination Amendment shows that the State Water Board intended a more flexible construction consistent with the latter view.

The Ocean Plan requires that the regional water board consider whether the identified need for desalinated water is "consistent with" an applicable UWMP, or other plan if no UWMP is available. Further, in considering whether subsurface intakes are feasible, the Ocean Plan states that "[a] design capacity in excess of the need for desalinated water . . . shall not be used by itself to declare subsurface intakes as not feasible." This language, together with the general directive of Water Code section 13142.5(b) to "minimize intake and mortality of all forms of marine life," indicates that the project applicant must show why a particular volume of desalinated water is identified as needed. This interpretation is supported by the administrative record for the Desalination Amendment, which suggests that the "identified need" requirements were intended to "ensure that an owner or operator would not declare subsurface intakes infeasible based on inflated water needs."[18] However, neither the Ocean Plan nor the administrative record supporting the Desalination Amendment contains further direction on how that identified need is to be documented. Therefore, a regional water board has discretion to weigh the information in the record to determine whether a project applicant has adequately documented an identified a need for the planned capacity of a proposed desalinated water facility.

To be "consistent with" water planning documents, by contrast, does not require that water planning documents specifically identify a project and the specific volume of desalinated water as a source that is absolutely required to meet water demand.[19] Certain comments and responses in the administrative record appear to contemplate a requirement that a specific volume of desalinated water either be identified within the applicable planning documents, or demonstrated at a level of detail and specificity that would allow precise assessments of water needs.[20] The response to comments illustrates that requiring consistency with an UWMP rather than more general documents was intended to facilitate decision-making knowledge about "specific projects and water volumes that water districts expect to rely on . . . ."[21] Although the administrative record[22] contains discussions of "identified need" that could be

[18] State Water Resources Control Board Final Staff Report, Amendment to the Water Quality Control Plan for Ocean Waters of California Addressing Desalination Facility Intakes, Brine Discharges and the Incorporation of Other Non-Substantive Changes (Desalination Amendment Staff Report), Response No. 18.14, p. H-267.
[19] See supra fn. 10–17 and accompanying discussion of plain meaning.
[20] Desalination Amendment Staff Report, Response No. 6.3, p. H-12 to H-13; Response No. 20.4, pp. H-294 to H-295; Response No. 14.8, p. J-153.
[21] Desalination Amendment Staff Report, Comment No. 24.5, pp. H-412 to H-413.
[22] All references to "administrative record" in this analysis refers to the administrative record for the Desalination Amendment.

interpreted as requiring need to be demonstrated by a shortfall of a specific volume,[23] the nature of water planning and the limitations of the Water Boards' authority under Porter-Cologne suggest that the requirement for a proven shortfall in forecasted supplies that cannot otherwise be met is an overly prescriptive interpretation of consistency with an UWMP.

In comments on the Desalination Amendment, the California Coastal Commission (CCC) recommended that identified need for water be based upon consistency with urban water management plans,[24] if available, rather than more general planning documents.[25] The CCC noted that an UWMP could show that "the project and the amount of water expected from it are included as part of a water district's specifically identified Planned Water Supply Projects and Programs, required pursuant to Water Code section 10631(h) . . . . A project identified in this section of an UWMP generally establishes a degree of commitment, planning and engineering by a water district that the regional boards can rely upon with greater certainty" relative to other, more general planning documents.[26] The CCC further noted that Water Code section 10631(h) "requires that UWMPs identify the specific projects and water volumes that water districts expect to rely on to serve an area's water needs" under a range of conditions, for twenty years into the future.[27] The State Water Board, however, revised the draft Ocean Plan amendment shortly before adoption, changing chapter III.M.2.b(2) to require that the identified need for desalinated water be consistent with an UWMP "prepared in accordance with Water Code section 10631," in general, and not limited to only subsection (h) of that statute.[28]

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[23] See, e.g., Desalination Amendment Staff Report, Response No. 6.3, pp. H-12 to H-13 ("The intent of the [identified need] provision is to ensure that the water demand assumption made as part of the feasibility studies required by the amendments be consistent with the water demand assumptions in those planning documents prepared for other purposes.").

[24] Water Code section 10631 sets forth the requirements for UWMPs. Under section 10631, an UWMP must address the following: describe the service area of the provider, including current and projected population and other factors that affect the supplier's water quality management planning; identify and quantify, to the extent practicable, existing and planned sources of water available over five-year increments to twenty years or as far as data is available; describe the reliability of the water supply and vulnerability to seasonal or climatic shortage under a variety of scenarios; describe opportunities for exchanges or transfers; describe water demand management measures; and describe all water supply projects and programs that may be undertaken to meet total projected water use. (Wat. Code § 16031, subds. (a)–(f).) The UWMP must also describe opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply. (Wat. Code § 10631, subd. (g).) The statute notes that, if groundwater is identified as an existing or planned source available to the supplier, the plan should include a copy of any groundwater management plan, a description of any groundwater basin(s) from which groundwater is pumped, and other relevant information. (Wat. Code, § 10631, subd. (b).)

[25] Desalination Amendment Staff Report, Comment No. 24.5, p. H-412.

[26] Desalination Amendment Staff Report, Comment No. 24.5, pp. H-412 to H-413.

[27] Desalination Amendment Staff Report, Comment No. 24.5, pp. H-412 to H-413; Comment No. 14.8, pp. J-153 to J-154.

[28] Desalination Amendment, Change Sheet #1, State Water Board Meeting Agenda (May 6, 2015), Item 7 (available at https://www.waterboards.ca.gov/board_info/agendas/2015/may/050615_7_change_sheet_1.pdf).

The State Water Board's reference to Water Code section 10631 in general, rather than subdivision (h) of the section specifically as suggested by the CCC, supports a less prescriptive interpretation of "consistency with" an UWMP. Water Code section 10631 requires water suppliers to "[i]dentify and quantify, to the extent practicable, existing and planned sources of water" and provide detailed information regarding these sources in an UWMP.[29] It may not be practicable in many circumstances for a water supplier to include a specific volume from an as-yet-unpermitted project in its projected water sources.[30] Water Code section 10631 also requires water districts to describe projected population and climate factors that affect the supplier's water planning,[31] the reliability of its supply sources (including impacts of climate change and drought risks),[32] quantify projected water use,[33] describe future projects to increase water supply,[34] and describe opportunities for development of desalinated water as a long-term supply.[35] These components of an UWMP would not necessarily demonstrate a specific shortfall, but would be considered in determining whether the need for desalinated water was consistent with an UWMP. "Identified need" should thus be interpreted as a concept allowing for multiple considerations, including uncertainty of current supplies, competing demands, and the inherent risk of unforeseen circumstances.

The use of "identified need" in both the site analysis and the technology analysis bears on the scope of the provision and the State Water Board's intent regarding its application. Identified need is not an independent factor in the section 13142.5(b) determination; as discussed in the previous section, it is a component of the analysis for best available site and best available technology. Statements[36] in the administrative

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[29] Wat. Code, § 10631, subd. (b). Water Code, section 10631, subdivision (b) is referred to in subdivision (h).

[30] In response to a Santa Ana Water Board inquiry, MWDOC submitted a letter in March 2020, providing further context and explanation of its water planning documents and of the 2018 OC Water Reliability Study. The letter noted that UWMPs are statutorily required plans that are written to fulfill specifically enumerated state requirements and are generally not used by local agencies for strategic or operational management purposes. (Letter from Robert J. Hunter, General Manager, MWDOC, to Hope Smythe, Santa Ana Water Board, March 4, 2020, at p. 3.) In MWDOC's view, it is not appropriate to define need based on the contents of an UWMP because the UWMP provides a framework for long term water planning rather than a precise assessment of needs. Noting that differing assumptions may yield alternative demand and supply scenarios, as well as the statutorily defined nature of UWMPs and their contents, MWDOC opines that inclusion in an UWMP is not a highly relevant indication of the need for desalinated water.

[31] Wat. Code, § 10631, subd. (a).

[32] Wat. Code, §§ 10631, subd. (b)(1), 10635.

[33] Wat. Code, § 10631, subd. (d)

[34] Wat. Code, § 10631, subd. (f).

[35] Wat. Code, § 10631, subd. (g).

[36] "The amount of water a facility takes in through a surface intake is within the statutory authority of Water Code section 13142.5(b) because the intake volume from a surface intake is directed related to the amount of impingement and entrainment. Taking in less water through a surface water intake is a siting or design element that would minimize intake and mortality of all forms of marine life. The provision in chapter III.L.2.b.(2) helps to ensure that project is not built to an unnecessary scale based on inflated water needs." Desalination Amendment Staff Report, Response No. 18.14, p. H-266. See also,

record for the Desalination Amendment underscore the intent of these provisions as directing that specific water needs play a significant part in sizing a facility. While some commenters argued that water planning considerations were outside the scope of State Water Board authority, the Board noted the relationship between intake volume and intake and mortality of marine life, with the scale of the facility serving an important role in selecting an environmentally protective alternative among several alternatives.[37] It is not within the purview of the Water Boards to determine the need for desalinated water. The role of the regional water boards is to determine whether the project applicant has demonstrated that the relevant water agencies have identified a need for the volume of water that will be produced by a proposed facility and shown that the identified need is compatible with the applicable water planning documents. This limited scope of review is supported by the inclusion of identified need within the site and technology analyses.

As discussed above, there is some ambiguity concerning whether the need for desalinated water must be identified in the water planning documents themselves. Although portions of the responses to comments seem to support a requirement that the need be identified in the planning documents,[38] this interpretation would render the requirement that the identified need be consistent with an UWMP or other water planning document meaningless. If the need were identified by the planning documents themselves, then the need would not have to be reviewed for consistency with such plans. The Ocean Plan expressly requires that the project proponent's proposed production of desalinated water be consistent with an applicable UWMP and other water planning documents, not identified as necessary within those plans. In the absence of guidance regarding who identifies the need from the Ocean Plan and the administrative record, it is reasonable to interpret the provision as requiring regional water suppliers to identify and support the need for the volume of water planned for a proposed facility. It is the regional water suppliers who are in the best position to determine whether there is a need for desalinated water, and if so, how much is needed. The need identified by regional water suppliers must then be compared to the applicable water planning documents for consistency.

WATER SUPPLY AGENCIES IDENTIFYING A NEED FOR DESALINATED WATER

The two regional water supply agencies—MWDOC and OCWD—have provided information and analyses to support a finding that the water agencies have identified a need for 56,000 AFY of desalinated water. Both MWDOC and OCWD have submitted letters regarding whether there is a need for 56,000 AFY of desalinated water that is consistent with an applicable UWMP. Additionally, representatives from both agencies

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Desalination Amendment Staff Report, Response No. 20.4, H, p. H-294 ("It is environmentally protective to produce only the amount of desalinated water that is needed.")

[37] See, e.g., Desalination Amendment Staff Report, Response No. 20.4, p. H-12.

[38] *See* Desalination Amendment Staff Report, Response No. 21.68, p. H-354 ("requires design capacity to be consistent with need for desalinated water as determined by a county general plan, integrated regional water management plan, or an urban water management plan or other planning documents"); Appx. J., Response No. 14.8, p. J-153 ("Urban water management planning documents are best suited to identify the need for desalinated water.")

presented the basis for their position on the need for the Facility's desalinated water at a workshop on May 15, 2020.

Background on Water Planning in Orange County

There are two regional water supply agencies in Orange County: the Municipal Water District of Orange County (MWDOC) and Orange County Water District (OCWD). MWDOC is a regional water wholesaler and resource planning agency. MWDOC manages Orange County's imported water supply, with the exception of water imported to the cities of Anaheim, Fullerton, and Santa Ana. MWDOC serves imported water supplied by the Metropolitan Water District of Southern California (Metropolitan) in Orange County through 28 retail water agencies. MWDOC is a member agency of Metropolitan, a "consortium of 26 cities and water agencies that provides supplemental water supplies to parts of Los Angeles, Orange, San Diego, Riverside, San Bernardino and Ventura Counties … [with] two main sources of supply . . . the Colorado River and Sacramento-San Joaquin Bay-Delta."[39] MWDOC's most recent UWMP was prepared in 2016. MWDOC also prepares long-term reliability studies, the most recent being the 2018 Long-Term Reliability Study.

The second water supply agency, OCWD, manages the Santa Ana River, Orange County Groundwater Basin, and the Groundwater Replenishment System. OCWD manages water supply for use by retail water districts, but it does not directly serve water to consumers or retailers. Nineteen municipal water departments and special water districts comprise the member agencies of OCWD, and these members pump groundwater from the basin and deliver the water to customers throughout OCWD's service areas. Urban water suppliers, including OCWD's member agencies, have UWMPs for their respective service area.[40] OCWD does not prepare an UWMP; instead, OCWD prepares a groundwater management plan, its most recent one being the 2015 Groundwater Management Plan.[41] OCWD also prepared a 2014 Long-term Facilities Plan.

<u>MWDOC's and OCWD's Statements Regarding a Need for 56,000 AFY of Desalinated Water</u>

Both MWDOC and OCWD have submitted letters to the Santa Ana Water Board stating that they believe that the identified need for 56,000 AFY of desalinated water is consistent with the MWDOC UWMP and OCWD GWMP, respectively.[42] OCWD has stated that the identified volume of desalinated water is needed to meet OCWD's water

[39] Municipal Water District of Orange County, 2015 Urban Water Management Plan (MWDOC UWMP), May 2016, p. 1-5.
[40] MWDOC UWMP, p. 7-7.
[41] Every "urban water supplier" must prepare and adopt an urban water management plan. (Wat. Code, § 10620, subd. (a).) An "urban water supplier" is defined as "a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually." (Wat. Code, § 10617.) OCWD manages the groundwater basin and, as noted, does not itself supply water to the retail agencies.
[42] Letter from MWDOC, to then-Exec. Officer Kurt Berchtold, July 7, 2016; Letter from OCWD, to then-Exec. Officer Kurt Berchtold, Aug. 3, 2016.

planning goals and is the single largest source of new, local drinking water supply available to the region.[43] Additional information submitted in support of OCWD's stated need for the specified volume of desalinated water is included in the section below, considering OCWD water planning documents.

The water supply agencies presented information on the need for the desalinated water at the Santa Ana Water Board's workshop on May 15, 2020. MWDOC Assistant General Manager Karl Seckel and OCWD General Manager Mike Markus each presented at the workshop and answered questions from members of the Board.

In its presentation, MWDOC provided more detail on the use of UWMPs as water planning documents, highlighting their limitations as five-year snapshots in time. MWDOC also explained that the need for an additional water supply may be interpreted to include the need to reduce the frequency and severity of water shortage allocation or drought events, as well as a need for supplies that are not subject to emergency shortages that would cut off access to imported water. According to MWDOC, determining water supply needs is not a simple process; it is a complex, iterative process that is based on ever-changing assumptions. So, the process must be flexible to adapt to changing conditions. MWDOC indicated that there is a need for additional water supply projects in Orange County, and the Facility is one of several projects that can meet the need. Specifically addressing the need for the desalinated water from the Facility, MWDOC offered three circumstances under which the Facility is needed. Among those circumstances offered was a situation where OCWD decided to pursue the project to increase reliability and to provide Orange County with greater independence from Metropolitan. Ultimately, MWDOC concluded that it should be the water agencies that determine the need for water supply projects—it is not an easy process and it is the water supply agencies that will be responsible for dealing with ratepayers and securing funding to move projects forward.

Turning to OCWD's presentation, OCWD stated that the desalinated water supplied by the proposed Facility would provide several benefits: it is drought-proof and climate resistant; it would diversify OCWD's water supply sources; and it would improve the reliability and security of OCWD's water supplies. Further, OCWD represented that the specific volume of 56,000 AFY is necessary to reduce the amount of imported water needed in the future in OCWD's service area, to insure against climate change, and to benefit from economies of scale. Essentially, OCWD's view is that water supply reliability may encompass substituting a more reliable source for an existing, less reliable source.

For many aspects of the proposed project, including distribution, OCWD has stated that it has not completed its plans or analyses. OCWD is looking into the possibility of supplying coastal cities with the desalinated water in lieu of the pumping from the groundwater basin and the possibility of injecting the desalinated water into the groundwater basin. OCWD affirmed that it would inject any desalinated water that is not

[43] Letter from OCWD, to then-Exec. Officer Kurt Berchtold, August 3, 2016.

directly supplied to consumers into the groundwater basin. OCWD made clear that a final water purchase agreement is contingent on finalizing a distribution plan and obtaining a subsidy from Metropolitan under their Local Resources Program—if these two conditions are not met, OCWD will not purchase the desalinated water. OCWD's representative reiterated its position, also stated by MWDOC, that water supply planning choices should be left to the water agencies.

REVIEW OF THE MWDOC UWMP AND OTHER WATER PLANNING DOCUMENTS

Santa Ana Water Board staff reviewed the MWDOC UWMP, the UWMPs of retail agencies, the OCWD GWP, the OCWD Long-Term Facility Plan, and the California Water Plan. As discussed above, the identified need for desalinated water is not required to be explicitly stated within an UWMP, but an appropriate UWMP or other planning documentation must include data, projections or information that is consistent with the need for desalinated water. The MWDOC UWMP, the municipal UWMPs, and the other water planning documents appear consistent with the identified need for 56,000 AFY of desalinated water.

Relevant Water Planning Documents

1. Municipal Water District of Orange County UWMP

MWDOC's most recent UWMP is the 2015 Urban Water Management Plan (UWMP) for the Municipal Water District of Orange County (MWDOC). The MWDOC UWMP discusses direct and indirect water uses and examines historical and projected water demands.[44] A discussion of twenty-five year total demand projections within the service area lists the following water sources: groundwater from the basin managed by OCWD; non-OCWD groundwater; recycled water; surface water; and imported water. From fiscal year 2014-15 to 2040, MWDOC reported that total direct and indirect water demands were projected to increase from 499,120 AFY to 515,425 AFY, an increase of 3.27 percent.[45]

MWDOC is not directly responsible for carrying out supply development projects in the region.[46] However, MWDOC works closely with its retail agencies to increase water supply reliability by expanding local water supplies.[47] The statutorily required section discussing Planned Future Water Supply Projects and Programs includes the proposed Facility as a potential project that would produce up to 56,000 AFY; the proposed Facility is one of a number of planned water supply projects and programs that could improve water supply and system reliability in Orange County.[48] Other potential projects and programs described include transfer or exchange opportunities to address short-term outages and other long-term water allocation issues, indirect potable reuse, water storage, enhanced pumping, and other potential desalination projects. The

[44] MWDOC UWMP, p. 2-5.
[45] MWDOC UWMP, p. 2-5.
[46] MWDOC UWMP, p. 2-5
[47] MWDOC UWMP, p. 2-5.
[48] MWDOC UWMP, p. 7-8.

UWMP states that the "development of additional local supplies improves both local and regional reliability as well as system (emergency reliability)."[49] The proposed Facility and other desalination projects, if developed, could reduce Metropolitan's imported water deliveries to Orange County.[50] In addition to decreasing reliance on imported supplies, the water from the proposed Facility could also augment water supplies for injection into the Talbert Seawater Barrier to prevent seawater intrusion.[51]

The identified need for 56,000 AFY of desalinated water appears consistent with the MWDOC UWMP. The proposed Facility and its projected production of desalinated water is identified in the plan as a source that could fill a need to increase local water supplies and the reliability of the water system and decrease reliance on imported water.

2. Other Relevant Water Planning Documents

The Ocean Plan provides that other water planning documents may be used if no applicable UWMP is available. Here, the MWDOC UWMP is the relevant UWMP and the identified need for desalinated water appears to be consistent with it. Although the Santa Ana Water Board isn't required to review other water planning documents since there is an applicable UWMP, there other water planning documents that are relevant and appear to be consistent with the identified need for 56,000 AFY of desalinated water.

Other UWMPs

In addition to the MWDOC UWMP, the nineteen member agencies of OCWD also have UWMPs. The most recent UWMPs for the constituent agencies all list actual and projected water supplies as consisting of some combination of groundwater, purchased or imported water, recycled water, and in two instances, surface water.[52] As required by Water Code section 10631, these UWMPs assess reliability of the water supply and vulnerability to seasonal or climatic shortage for average year, single dry year, and multiple dry year periods.[53] All agencies project supplies as meeting demand. Many rely on Metropolitan's 2015 UWMP finding that Metropolitan will meet full-service demands of its member agencies from 2020 through 2040 during normal, single and multiple dry years.[54] Many cite their projections as an outcome of the 2015 Orange County Reliability Study prepared by MWDOC.[55] Some include conservation among the factors that will help to ensure reliability.[56]

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[49] MWDOC UWMP, p. 2-5.
[50] See MWDOC UWMP, p. 7-7.
[51] MWDOC UWMP, pp. 7-8 to 7-9.
[52] See, e.g., Irvine Ranch Water District 2015 UWMP, Table 6-8; Serrano Water District Wholesale 2015 UWMP, Tables 6-7 and 6-8.
[53] Wat. Code, § 10631, subd. (c)(1).
[54] See, e.g., City of Buena Park 2015 UWMP, p. 3-16; East Orange County Water District 2015 UWMP, p. 3-19; City of Fountain Valley 2015 UWMP, p. 3-16; and others.
[55] See City of Anaheim 2015 UWMP, p. 2-5.
[56] See City of Garden Grove 2015 UWMP, p. 3-20 ("The City has documented that it is 100 percent reliable for single dry year demands from 2020 through 2040 with a demand increase of six percent from

Each of the local UWMPs discusses desalination opportunities, as directed by statute. Some of the UWMPs note that wholesalers providing their water are "actively pursuing seawater desalination projects."[57] Most of the plans describe the current status of the proposed Facility in a section addressing Future Water Supply Projects and Programs, with a subsection covering Desalination Opportunities.[58] To the extent that these plans identify desalinated water as a future supply, they point to OCWD documents for these conclusions.[59]

As with MWDOC's UWMP, a number of these local UWMPs note that development of any future water supply projects and programs (including the proposed Facility) could serve to reduce Metropolitan's deliveries to Orange County, or otherwise note that desalination and other measures such as indirect potable reuse can reduce regional reliance on imported water.[60] Irvine Ranch Water District (IRWD) notes in a section describing Desalinated Water Opportunities that "IRWD does not anticipate receiving any water from [the proposed Facility]; however, any water delivered to IRWD through a future ocean desalination facility would offset potable water imported through MWD."[61] The City of Fullerton UWMP states that, while potential desalination projects could reduce imported water deliveries to Orange County, "[the City of Fullerton] has not attempted to investigate seawater desalination on its own due to economic and physical impediments."[62]

Although none of the local agency UWMPs include desalinated water as part of their projected portfolio, they do indicate that desalinated water, including water from the Facility, would increase the reliability of regional water supplies and decrease reliance on imported supplies.

2018 Orange County Water Reliability Study

The 2018 Orange County Water Reliability Study (2018 OC Reliability Study) was prepared by CDM Smith, Inc. for MWDOC. The 2018 OC Study projects water supply and demand in Orange County through the year 2050 and compares local projects that can meet the forecasted water demands.[63] The study looks at four scenarios that

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normal demand with significant reserves held by Metropolitan, local groundwater supplies, and conservation.")

[57] See Final Report, West Orange 2015 UWMP (Golden State Water Company), p. 6-12.

[58] See City of Huntington Beach 2015 UWMP, pp. 7-2 to 7-4.

[59] See *id.* at 7-3 ("OCWD's current Long-Term Facilities Plan (LTFP) identifies the Huntington Beach Seawater Desalination project as a priority project and determined the plant capacity of 56,000 AFY as the single largest source of new, local drinking water available to the region. In addition to offsetting imported demand, water from this project could provide OCWD with management flexibility in the OC Basin by augmenting supplies into the Talbert Seawater Barrier to prevent seawater intrusion.")

[60] See, e.g., City of Anaheim 2015 UWMP, pp. 7-1, 7-3; City of Buena Park 2015 UWMP, pp. 7-1, 7-2; City of Huntington Beach 2015 UWMP, pp. 7-1, 7-3.

[61] Irvine Ranch Water District 2015 UWMP, p. 6-14.

[62] City of Fullerton 2015 UWMP, p. 7-2.

[63] MWDOC 2018 Orange County Reliability Study (2018 OC Reliability Study) (Feb. 1, 2019) p. i.

account for varying climate change impacts and water supply investments outside of Orange County.[64] The proposed Facility is among the local projects that were compared and ranked last in all four scenarios based on system reliability and supply reliability metrics.[65] The purpose of the study, however, was not to determine which projects should be implemented; rather, it was intended to provide information to local decisionmakers charged with choosing local projects.[66] While there may be more cost-effective projects to meet water supply needs in Orange County, the proposed Facility is among the potential projects that local suppliers can choose to pursue to meet water demand. The cost of the proposed Facility's water is a factor that water suppliers will likely consider, but it is not an issue that falls within the Santa Ana Water Board's jurisdiction.

MWDOC provided additional context for the 2018 OC Reliability Study in its March 2020 letter and its presentation at the workshop on May 15, 2020. MWDOC's March 2020 letter stated that, at the request of OCWD, the 2018 OC Reliability Study did not rank projects within the OCWD Basin area. The rankings contained within the study assessed only projects for the South Orange County service area. The MWDOC presentation also emphasized that the 2018 OC Reliability Study did not rank the proposed Facility against other potential water supply projects in the Orange County Basin, only in the South Orange County area. Further, given the dynamic nature of water supply planning, MWDOC noted that the some of the assumptions in the 2018 OC Reliability Study are already dated in several respects, including changes to the California WaterFix and Delta Conveyance Project.[67] MWDOC further emphasized the complexity of water reliability issues, including continually changing conditions and a variety of potential supply projects that may be chosen, each with its own variables.[68]

OCWD Water Planning Documents

OCWD is expected to be the primary buyer of the proposed Facility's desalinated water.[69] OCWD executed a non-binding term sheet in 2015 (2015 Term Sheet) indicating a desire to develop an actual agreement to purchase water from the proposed Facility. Modifications were made to the 2015 Term Sheet, and a new term sheet was approved by OCWD in 2018 (2018 Term Sheet). OCWD describes its pursuit of new local water supplies as being based upon policies adopted by its board over several

[64] *Ibid.*
[65] See *id.* at 5-10 to 5-15.
[66] *Id.* at 1-5.
[67] The California WaterFix Project was a plan involving construction and operation of water diversion facilities to convey water from the Sacramento River through two tunnels to existing State and federal pumping facilities near Tracy.
https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/
[68] Letter from Robert J. Hunter, General Manager, MWDOC, to Hope Smythe, Santa Ana Water Board, March 4, 2020, p.3.
[69] The City of Huntington Beach has an agreement with the Discharger that provides the City with the right to purchase up to 3,360 AFY.

years, including a goal to maintain a 75 percent Basin Production Percentage (BPP)[70]; OCWD believes a 75 percent BPP "can only be achieved through the development of new supplies that are locally controlled by [OCWD] to ensure that the higher BPP is sustainable over time."[71] Referencing a May 2013 resolution of its Board of Directors, OCWD states that it is their policy to develop a variety of new, local sources and to reduce the BPP if the cumulative groundwater basin overdraft reaches 350,000 acre feet. As of August 2016, the OCWD stated a cumulative overdraft standing at 370,000 acre feet.[72] OCWD further states that water from the proposed Facility could offset demand for imported water and increase flexibility in basin management, and potentially augment supplies injected into the Talbert Seawater Barrier to prevent seawater intrusion.[73] OCWD does not prepare a UMWP, but they do have a Groundwater Management Plan and a Long-term Facilities Plan. The identified need for desalinated water appears to be consistent with the OCWD plans.

OCWD Groundwater Management Plan 2015 (GWMP)

The 2015 GWMP reports that sources of groundwater recharge for water years 2009-10 through 2013-14 were largely composed of incidental recharge, Santa Ana River base flow, storm flow, imported water, and recycled water.[74] Analyzing water demands, the GWMP evaluates use of groundwater, surface water from Santiago Creek and Irvine Lake, recycled water, and imported water.[75] The GWMP states that "[s]urface water from the Santa Ana River is the predominate [sic] source of recharge supply for the groundwater basin"[76] and describes "[r]ecent trends show[ing] a decline in base flow, which may be a result of increased recycling, drought conditions, declining per capita water use, and changing economic conditions in the upper watershed."[77] OCWD meets approximately sixty to seventy percent of the water supply demand within its service area,[78] managing the groundwater basin and "seek[ing] to expand the basin's annual yield by maximizing the amount of water recharged into the basin, developing new sources of water to recharge the basin, and increasing the effectiveness of the District's facilities."[79]

The Discharger points to discontinuation of an in-lieu recharge program for imported water purchased from Metropolitan as evidence of changes in the cost and availability

[70] "The BPP is a percentage of each Producer's [those pumping groundwater] water supply that comes from groundwater pumped from the basin. The BPP is set on an annual basis and is uniform for all Producers. Groundwater pumping above the BPP is assessed an additional charge that creates a disincentive for over-producing." OCWD GWMP 2015 Update, p. ES-9.
[71] Letter from General Manager Michael Markus and President of the Board Cathy Green, OCWD, to Exec. Officer Kurt Berchtold (Aug. 3, 2016), at p. 1.
[72] *Ibid*.
[73] *Ibid.*
[74] OCWD GWMP Update 2015, at 3-9, 5-4.
[75] Orange County Water District, Groundwater Management Plan, 2015 Update, p. 10-12.
[76] OCWD GWMP Update 2015, p. 4-11.
[77] *Id.* at 5-7. See also, *id.* at 10-5 to 10-6 (Table 10-2); 10-11 (Table 10-4).
[78] OCWD GWMP Update 2015, p. 1-1.
[79] OCWD GWMP Update 2015, p. ES-1.

of imported water supplies.[80] Noting that demand projections within OCWD's service area are based upon UWMPs from retailers and other entities pumping within OCWD's area, the GWMP includes a table of estimated future water demands within that service area. Table 10-6 in the GWMP projects an increase in total demand from 442,048 AFY in 2015 to 525,079 AFY in 2035.[81] OCWD cites population growth as potentially driving this increased demand.[82]

The 2015 GWMP notes the need for flexibility to manage basin pumping and the need for a variety of measures that may be used alone or in combination to manage and refill the basin in periods of drought management.[83] The 2015 GWMP specifically includes the Facility as a recommended project "to continue sustainable management of the basin."[84] "OCWD plans for the next five years include accomplishment of the recommendations listed," further stating that the Facility would benefit the basin by "[i]ncreas[ing] water supply by up to 56,000 afy."[85] OCWD also describes among its collaborative processes regular meetings with MWDOC to discuss water resource reliability planning issues that include "[e]valuating ocean water desalination, water recycling and other means to increase the supply and system reliability."

The identified need for 56,000 AFY of desalinated water appears to be consistent with OCWD's 2015 GWMP.

OCWD's Long-Term Facility Plan (LTFP)

In addition to the 2015 GWMP, OCWD has a 2014 Long-Term Facility Plan Update (LTFP). The LTFP is OCWD's strategic planning tool and is used to identify potential projects for consideration in pursuit of OCWD's goals. Describing potential limits in future availability of imported water supplies,[86] the LTFP states that as of 2014, average

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[80] OCWD GWMP Update 2015, p. 5-11 ("Treated imported water was used extensively for in-lieu recharge from 1977 to 2007. . . . OCWD recharged over 900,000 acre-feet of water using in-lieu recharge purchased from MWD. The MWD discontinued the program in 2012. OCWD would pay the pumpers the incremental additional cost of taking imported water versus groundwater to make the cost of this water equivalent to groundwater.") See also, Poseidon Water, *Water Demand White Paper: Clearly Identifying the Local Need for 50 Million Gallons per Day of Desalinated Ocean Water for Huntington Beach Desalination Project's Planned Design Capacity*, p. 11.
[81] OCWD GWMP, p. 10-14. OCWD has since adjusted the projected demand. As of July 12, 2018, OCWD projects that future demand will be 447,000 AFY, and not 525,079 as reported in the 2015 GWMP. (See Letter from General Manager Michael Markus, OCWD, to Exec. Officer Hope Smythe, July 12, 2018.)
[82] OCWD GWMP, p. 10-13 ("Population within OCWD's service area is expected to increase from approximately the current 2.38 million to 2.54 million by 2035.")
[83] OCWD GWMP, pp. 10-15 to 10-16.
[84] OCWD GWMP 2015 Update, p. 2-7.
[85] *Id.* at 2-10 (Table 2-7).
[86] The LTFP states that Metropolitan's water supplies from the State Water Project (SWP) have been reduced by approximately a third in recent years, a situation that could be rectified by construction of tunnels under the Sacramento Delta, if approved and constructed. (OCWD Long-Term Facilities Plan (LTFP) 2014 Update, p. 2-11.)

water demands for southern California exceeded average water supplies.[87] In 2014, the water demand within OCWD's boundaries was 434,535 AFY and the LTFP estimates that demand will increase to 525,000 AFY.[88] As part of efforts to increase local water supplies and improve local water supply self-sufficiency, the LTFP lists projects evaluated and selected for future study of their costs and benefits. From a potential sixty-three, fourteen projects were identified for additional study, with several added during public comment.[89] The proposed Facility is included on the list of projects for focused study, potentially meeting District objectives to increase reliable, "drought-proof" water supplies and basin yield.[90] The LTFP supports a finding that the desalinated water is needed to increase local, drought-proof water supplies, consistent with the MWDOC UWMP.

3. The California Water Plan (CWP)

The regional and local water plans all discuss the need to increase local water supplies and to increase the reliability of the water system. These goals are consistent with the California Water Plan (CWP), which calls for an increase in regional self-reliance and a reduction in dependence on imported water.[91] The CWP Update 2013 also identifies desalination as "one of the few options available to augment California's water supply" and recognizes that desalinated water is a potential source for reliable water in the face of drought and climate change.[92] The CWP was recently updated in 2019 (Update 2018). The CWP Update 2018 update builds upon Update 2013 and focuses on management of California's water resources for sustainability.[93] Although the CWP is not specifically referenced in the Ocean Plan, the Santa Ana Water Board must consider effect of its actions on the CWP.[94] The goals and principles of the CWP support staff's recommendation that the Santa Ana Water Board factor in local water suppliers' goals to develop local, drought-proof sources (such as desalinated water) and increase supply reliability when considering identified need.

LETTERS FROM ENVIRONMENTAL ORGANIZATIONS

In addition to the submittals from the Discharger, the water agencies, and the various water planning documents, Santa Ana Water Board staff also considered letters regarding identified need from California Coastkeeper Alliance (CCKA), Residents for Responsible Desalination (R4RD), and Orange County Coastkeeper (OCCK) (collectively Environmental Organizations).[95] The Environmental Organizations

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[87] OCWD LTFP 2014 Update, p. 2-12.
[88] OCWD LTFP 2014 Update, pp. 1-2, 2-2. See *supra* fn. 58.
[89] OCWD LTFP 2014 Update, pp. 3-20 to 3-21.
[90] OCWD LTFP 2014 Update, Table 3-5.
[91] See California Water Plan Update 2013, Department of Water Resources, p. 8-8.
[92] *Id.* at 10-5.
[93] California Water Plan Update 2018, Department of Water Resources, p. 0 (unnumbered page following the cover page, titled *About the California Water Plan*).
[94] Wat. Code, § 13225, subd. (i).
[95] Letter from California Coastkeeper Alliance, to Exec. Officer Hope Smythe, July 9, 2018 (CCKA Letter) (Appendix); Letter from Residents for Responsible Desalination, to Exec. Officer Hope Smythe, Oct. 15, 2018 (R4Rd Letter) (Appendix); Letter from California Coastkeeper Alliance et al., to Exec. Officer Hope Smythe, May 6, 2019 (Environmental Organizations Letter) (Appendix).

essentially argue that the Discharger has not shown that there is a need for 56,000 AFY of desalinated water and as such cannot be permitted to use surface water intakes.

CCKA Letter

CCKA submitted a letter on July 9, 2018 and included two reports relevant to their arguments regarding identified need: *A Review of Water Demand Forecasts for the Orange County Water District* (July 2016) prepared by James Fryer (Fryer Report) and *An Assessment of the Reports on the Proposed Huntington-Poseidon Seawater Desalination Project Prepared by the Independent Scientific Technical Advisory Panel* (June 2018) prepared by Michael Hanemann (Hanemann Report).

The purpose of the Fryer Report was to "to assess the demand forecasts used by the Orange County Water District as the rationale for new water supply projects."[96] To do this, Fryer reviewed the demand forecast assumptions used in the 2015 UWMPs and in MWDOC's 2015 Orange County Reliability Study and compared those assumptions to past and current day trends.[97] The Fryer Report found that the water suppliers used outdated forecasts,[98] failed to consider new recycled water supplies, and used overly conservative assumptions (regarding factors such as population growth, conservation innovation, drought demand, and price elasticity of demand).[99] According to Fryer, these factors resulted in water suppliers overestimating future demand in previous and current UWMPs.[100] The Fryer Report is not relevant to the Santa Ana Water Board's assessment of need. The Santa Ana Water Board's review under the "identified need" provision is limited to determining whether the need for desalinated water has been demonstrated and whether it is consistent with the relevant planning documents. The Santa Ana Water Board does not have the expertise or the regulatory jurisdiction to review the underlying assumptions made by water supply agencies in their water planning documents.

The Hanemann Report reviewed the Independent Scientific Technical Advisory Panel (ISTAP) reports that analyzed the feasibility of subsurface intakes for the proposed Facility prior to the adoption of the Desalination Amendment. Hanemann concludes that the ISTAP reports cannot be used for assessing feasibility of subsurface intakes (specifically, slant wells) under the Ocean Plan.[101] Relevant to identified need, Hanemann asserts that the ISTAP reports did not consider whether there was a documented need for the water and cannot be used by the Santa Ana Water Board for

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[96] James Fryer, A Review of Water Demand Forecasts for the Orange County Water District (Fryer Report) (July 2016), p. 1 (Appendix)
[97] *Id.* at 2.
[98] OCWD submitted a letter in response to the Fryer Report and provided documents showing that they have since updated their demand forecast. *See* Letter from General Manager Michael Markus, OCWD, to Exec. Officer Hope Smythe, July 12, 2018 (Appendix).
[99] Fryer Report, pp. 1–2
[100] See *ibid.*
[101] Michael Hanemann, An Assessment of the Reports on the Proposed Huntington-Poseidon Seawater Desalination Project Prepared by the Independent Scientific Technical Advisory Panel (Hanemann Report) (June 16, 2018), pp. 3, 16.

this purpose.[102] Santa Ana Water Board staff did not rely on the ISTAP reports to assess the need for desalinated water. As discussed above, in accordance with the Ocean Plan requirements, staff reviewed the information provided by the Discharger, the information provided by MWDOC and OCWD, the relevant UWMPs, and other relevant water planning documents to analyze whether the identified need for desalinated water has been demonstrated and whether the identified need is consistent with MWDOC's UWMP and other water planning documents.

R4RD Letter

R4RD submitted a letter on October 15, 2018 in response to the Discharger's rebuttal to the CCKA letter. R4RD argues that the Discharger must demonstrate a definitive need for the proposed Facility after accounting for all alternative sources that can meet the projected water demand.[103] This "loading order" argument was rejected by the State Water Board. During the development of the Desalination Amendment, environmental groups advocated for a stricter "need" provision that would ensure that the capacity of a desalination facility was limited to that supplied by a subsurface intake. They argued that alternative supplies should be developed before desalination and sought a stronger "need" analysis that would permit only those projects "appropriately scaled to meet demonstrated water supply needs."[104] However, the State Water Board did not include the stricter requirement that environmental groups sought, which would require a more thorough analysis of forecasted water supply shortfalls and whether other sources could fill those needs.

R4RD next argues that decreasing reliance on imported water cannot be considered when determining whether the identified need is consistent with an UWMP and other water planning documents.[105] As discussed above, the identified need for desalinated water does not require a specific showing of a supply shortage; the concept of need allows for consideration of multiple aspects of water supply reliability issues. In other words, there could be a need for desalinated water as part of a plan to increase drought-proof, reliable water supplies and decrease imported water needs.

Finally, R4RD argues that water from the proposed Carson Indirect Potable Reuse project is a better alternative to meet demand.[106] The record for the Desalination Amendment indicates that the State Water Board did not intend for regional water boards to engage in decisions about water planning or how to allocate water resources: "The ["identified need" provision] does not propose that the Water Boards will be determining the need for desalinated water. But it requires that need for desalinated water be considered in context of minimizing intake and mortality of all forms of marine

[102] *Id.* at 7, 16.
[103] R4RD Letter (Appendix _), p. 5.
[104] See, Comment letter from Coastkeeper Alliance, et. al., to State Water Board, Apr. 9, 2015, pp. 2, 35–37.
[105] R4RD Letter (Appendix _), p.6.
[106] R4RD Letter (Appendix _), p.6.

life per Water Code section 13142.5(b)."[107] The State Water Board's consideration of "identified need" focused on the size of the intake and its relation to impingement and entrainment, as well as mortality resulting from the volume of brine discharge.[108] Specifically, identified need informs the section 13142.5(b) determination by allowing a regional water board to consider the proposed design capacity in making determinations about whether subsurface intakes can be used for all or part of the intake. The "identified need" provisions were included in the Ocean Plan to ensure that decisions about the location and capacity of a seawater intake are supported by information in planning documents rather than just anticipated cost concerns, and to ultimately maximize use of subsurface intakes as it is the least harmful method of withdrawing seawater for processing. The Santa Ana Water Board does not have the expertise or jurisdiction to choose the best project for water suppliers to meet their water demands.

Environmental Organizations Joint Letter

The Environmental Organizations submitted a joint letter on May 6, 2019 asserting that the Santa Ana Water Board cannot rely solely on MWDOC's inclusion of the Facility in its UWMP to find that there is a need for the Facility's desalinated water. The Environmental Organizations also argue that there is no need for the desalinated water because there are alternative water supplies that can meet the forecasted demand. As discussed above, staff reviewed the available information and the applicable water planning documents and concluded that the record supports a finding that there is an identified need for 56,000 AFY that is consistent with MWDOC's UWMP. Staff's analysis does not rely exclusively on the fact that the Facility was identified as a potential desalination project in MWDOC's UWMP. The Santa Ana Water Board's scope of review under the Ocean Plan is not to determine whether desalinated water is the best choice to meet water supply needs, but whether the identified need has been adequately documented and is consistent with the MWDOC UWMP and other water planning documents.

The Environmental Organizations' main contention is that the Santa Ana Water Board must require subsurface intakes for the Facility because the Discharger has not shown a need for the 56,000 AFY of desalinated water. In making this argument, the Environmental Organizations construe "need" too narrowly. Moreover, even if "identified need" were construed as advocated by the Environmental Organizations, other feasibility considerations must be considered in choosing the best combination of alternatives. The State Water Board reasoned that the requirement would "ensure that the environmentally superior option of subsurface intakes is considered first and used to the extent possible."[109] A requirement to mandate subsurface intakes for as much of the intake water as possible was rejected as insufficiently flexible, failing to account for site-specific factors.[110] Staff is not recommending that the Santa Ana Water Board find that subsurface intakes infeasible based on need alone. As discussed in part 1 of Attachment G.1, Santa Ana Water Board staff determined that subsurface intakes were

[107] Desalination Amendment Staff Report, Appx. H, Response No. 18-14, pp. H-266 to H-267.
[108] Desalination Amendment Staff Report, Appx. H, Response No. 6.3, p. H-12.
[109] Response #20.4, Final SED, at H-294.
[110] Response #18.14, Final SED, at H-267.

technically and economically infeasible after considering other factors and did not rely exclusively on the amount of water needed to make this determination.

Staff Recommendation

Based on the discussion above, staff recommends that the Santa Ana Water Board find that the Discharger has demonstrated that there is an identified need for 56,000 AFY of desalinated water and that the identified need is consistent with the MWDOC UWMP and other water planning documents.

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Hanemann, M. 2018 An Assessment of the Reports on the Proposed Huntington-Poseidon Seawater Desalination Project Prepared by the Independent Scientific Technical Advisory Panel (Hanemann Report)

Irvine Ranch Water District 2015 Urban Water Management Plan (UWMP)

Letter from General Manager Robert J. Hunter, MWDOC to Exec. Officer Hope Smythe, March 4, 2020.

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State Water Resources Control Board. 2015. Water Quality Control Plan: Ocean Waters of California (Ocean Plan)

State Water Resources Control Board Final Staff Report, Amendment to the Water Quality Control Plan for Ocean Waters of California Addressing Desalination Facility Intakes, Brine Discharges and the Incorporation of Other Non-Substantive Changes (Desalination Amendment Staff Report)

Attachment G.3 — ETM/APF Analysis for a Surface Intake and Discharge at Station E (Discharger's Proposed Intake/Discharge Location)

Introduction

Poseidon Resources (Surfside) LLC (Discharger) must mitigate for the loss of marine life and habitat due to the construction and operation of the proposed Huntington Beach Desalination Facility (Facility) for the operational lifetime of the Facility. Pursuant to the Ocean Plan chapter III.M.2.e.(1), the Discharger must estimate the marine life mortality resulting from construction and operation of the Facility after accounting for the required site, design, and technology measures. The Discharger submitted their estimate of mortality as part of their Marine Life Mitigation Plan. This attachment provides Santa Ana Water Board staffs' analysis of the expected marine life mortality that may result from the construction and 50-year operational life of the proposed Facility from the existing AES Huntington Beach Generating Station intake and discharge structures (as modified as required by the Ocean Plan and discussed in Attachment G.1) located adjacent to Station E in support of Findings 38-41 of Attachment G to the tentative Order.

Background

To assess potential entrainment impacts that would result from operation of the existing seawater intake for their proposed Huntington Beach Desalination Facility (Facility), the Discharger proposed that they use the 2003-2004 plankton data collected for the AES HBGS entrainment study (MBC and Tenera, 2005) for the Marine Life Mortality Report required by chapter III.M.2.e(1) of the Ocean Plan. Chapter III.M.2.e.(1)(a) lays out the sampling methods and analysis that must be used to determine the mortality of all forms of marine life related to the operation of a surface intake. However, it also includes an option that *"At their discretion, the regional water boards may permit the use of existing entrainment data from the facility to meet this requirement*" (chapter III.M.2.d.(1)(c)(iii)). The Discharger submitted Appendices Q and SSS to support their assertion that the 2003-2004 HBGS data met the Ocean Plan requirements in chapter III.M.2.e.(1)(a).

The Discharger's Appendix SSS (HDR, April 2017) states that the 2003-2004 plankton data represent the most robust and informative dataset available and that (1) the sampling was done in accordance with the guidelines in the Ocean Plan (chapter III.M.2.en(1)(a)); (2) the sampling was spatially and temporally robust; (3) the larval fish communities collected in 2003-2004 were consistent with more recent samples collected (2014/2015 study) but the 2003-2004 abundances were far in excess of surveys since 2008 and therefore, would provide a more conservative estimate of potential entrainment impacts; and (4) no significant, semi-permanent oceanographic changes had been documented to change the spatial distribution patterns in plankton since 2003-2004. During this early stage of project evaluation, Santa Ana Water Board staff determined that the 2003-2004 data met the requirements of the Ocean Plan.

As required by chapter III.M.2.e.(1)(a) of the Ocean Plan, the Discharger used the Empirical Transport Model/Area of Production Foregone (ETM/APF) method to estimate entrainment of marine life that could occur at Station E from the 50-year operation of the proposed Facility (Discharger's Appendix V). The Area of Production Foregone (APF) translates marine life mortality into the number of acres of marine life productivity that will need to be mitigated to offset impacts to marine life from the construction and operation of the proposed desalination Facility.

The Discharger submitted a marine life mortality report (Appendix TT) and originally estimated that marine life mortality resulting from the construction and operation of the Facility would be approximately 40.3 acres after applying a mitigation ratio of 1:10 to coastal taxa as allowed under chapter III.M.2.e.(3)(b)vi.[1] California Coastal Commission staff could not reproduce the Discharger's calculations and raised numerous concerns regarding the age of the data used, taxa selected, how the calculations were made, the mitigation ratio that was applied, and other limitations of the Discharger's marine life mortality report. Therefore, the Discharger's and California Coastal Commission staffs' ETM/APF calculations were reviewed by a neutral third-party reviewer, Dr. Peter Raimondi. Based on Dr. Raimondi's review (Raimondi 2019), Santa Ana Water Board staff determined that the estimated marine life mortality resulting from the construction and operation of the Facility would be **423.0 acres** before a mitigation ratio is applied.

Calculation of the Area of Production Foregone for an Intake and Discharge Located Near Station E

The APF for the surface intake is calculated first (chapter III.M.2.e.(1)(a) of the Ocean Plan) and then that APF is proportionally scaled based on the volume of the brine discharge (including the volume of water subject to shearing-related mortality) to determine the total APF for both the intake and discharge for the facility. Chapter III.M.2.e.(1)(b) requires that the Marine Life Mortality Report address marine life mortality related to shearing stress related to the proposed Facility's discharge and the brine mixing zone (BMZ). Chapter III.M.2.e.(1)(c) addresses construction-related mortality that may occur as a result of the construction of offshore infrastructure associated with a surface seawater intake and discharge. In addition, the regional water board may apply a one percent (1%) credit to the intake APF if the Discharger opts to use a 1-millimeter slot size screen on the intake to reduce entrainment-related mortality.

Intake APF[2]

Dr. Raimondi had both the Discharger and California Coastal Commission staff submit their calculations of the APF for Station E for his review (Raimondi 2019). Those calculations assumed the following: 1) a proposed intake volume of 106 MGD; 2) a suite

[1] Santa Ana Water Board staff did not agree with the proposed mitigation ratio. The discussion of staff's recommended mitigation ratio for coastal taxa is included in Attachment G.4.

[2] The 2003-2004 data did not include sufficient larval length data to complete an ETM/APF analysis for the other six sampling stations (D2, D4, O2, O4, U2, and U4). The ETM/APF analysis, if sufficient data existed, would be used to determine if one of those locations would result in less impacts to all forms of marine life. However, there were sufficient data collected at Station E, the location of the proposed surface intake to calculate a robust ETM/APF for that location. Other non-environmental factors considered (technical, social and economic) eliminated two of the alternative sites that were potentially environmentally equivalent to or superior to Station E (Stations D2 and U2; see Raimondi (2019) and Poseidon's Appendix JJJJJ-2).

of 12 taxa, including two estuarine and 10 coastal taxa; 3) the larval concentration data collected in 2003-2004 at Station E; 4) larval durations representing the time period over which larvae are susceptible to entrainment, calculated as the difference between the 1st and 99th length percentiles for larval lengths collected at Station E and converted to days based on the documented relationship between larval length and growth rate for each taxa; 5) Orange County Sanitation District (OCSD) ocean current measurements recorded in the study area during two 12-month deployments (1999-2000 and 2007-2008); and 6) the estimated estuarine larval source water body concentrations for estuarine taxa collected in Los Alamitos Bay and Agua Hedionda Lagoon (Raimondi 2019). The calculation methodology included using the standard ETM (Appendix E to the Supplemental Environmental Document for the Ocean Plan Desalination Amendment) for all coastal taxa and a modified ETM for those estuarine taxa entrained at an open coastal site. Both the Discharger and California Coastal Commission staff calculated two APFs, one for each ocean current dataset (1999-2000 and 2007-2008), and then averaged these estimates to arrive at a single APF.

After multiple discussions with Dr. Raimondi, Water Boards staff, California Coastal Commission staff, and the Discharger, all parties agreed that habitat assignments (i.e., estuarine or open coast) should be based on the agreed-upon source water locations for each taxon. As a result, CIQ Gobies and Diamond Turbot were classified as estuarine while the remaining taxa were classified as coastal open water and/or soft bottom species (coastal taxa). A total of twelve taxa, which included ten fish taxa and two invertebrate taxa, were included in the ETM/APF calculations. For each of the two habitat groups, the 95% confidence interval was calculated using standard practice for an APF determination (see Appendix E to the staff report to the Ocean Plan desalination amendment). The final estimated APF represents the sum of the two habitat groups' APFs after the 95% confidence intervals are calculated. The intake entrainment ETM/APF was calculated by the Discharger and California Coastal Commission staff separately, with those results presented in Table 1 below. The final APF for each set of calculations (the Discharger and California Coastal Commission staffs') represents the mean of the APFs derived for each ocean current measurement dataset (1999-2000 and 2007-2008).

Table 1 includes the APFs calculated by the Discharger and California Coastal Commission staff for intake-related mortality. Differences in the calculations are primarily due to differences in rounding. One substantial difference is a result of the different larval duration (time during which the larvae are vulnerable to entrainment and an integral part of the APF calculation) values used in calculating ETM for mole crab, *Emerita spp.,* the most abundant species entrained. The Discharger used a value of three days, while California Coastal Commission staff used a value of five days (Raimondi 2019).

In addition**,** chapter III.M.2.e.(3)(b)ii. requires that, "impacts on the mitigation project due to entrainment by the facility must be offset by adding compensatory acreage to the mitigation project." The Discharger has proposed two mitigation projects: preservation, restoration, and enhancement of several areas within the Bolsa Chica Wetlands and creation of an artificial reef offshore of the Palos Verdes Peninsula. Santa Ana Water Board staff revised the APF to account for the potential entrainment of larvae dispersed from the two proposed mitigation projects (Bolsa Chica Wetlands and the Palos Verdes Artificial Reef) by the intake and discharge from the proposed Facility.

Santa Ana Water Board staff first revised the APF calculations for estuarine taxa (CIQ Gobies and Diamond Turbot) found in Dr. Raimondi's 2019 report to include larvae that may be dispersed from the Bolsa Chica Wetlands, one of two proposed mitigation projects, and entrained by the proposed intake. The Bolsa Chica Wetlands are coastal, estuarine wetlands and provide spawning and nursery habitat for several fish taxa. Santa Ana Water Board staff conducted additional analysis to determine how much compensatory mitigation would be required to offset entrainment of larvae by the proposed Facility that were produced by the Bolsa Chica Wetlands. Staff revised the ETM/APF calculations found in Dr. Raimondi's 2019 report, which included the ETM/APF results for the location of the proposed intake (Station E). Santa Ana Water Board staff discussed their proposed approach with Dr. Raimondi and developed a memorandum addressed to Dr. Raimondi documenting how and why the revisions were made (memorandum dated July 21, 2020).

Santa Ana Water Board staff recalculated the APF for the estuarine taxa with a new source water body that included the 317-acre full tidal basin in the Bolsa Chica Wetlands, which is a spawning area for CIQ gobies and diamond turbot as well as other estuarine taxa. The net result was an increase of the source water body for estuarine species from 2278.6 acres to 2595.6 acres. Santa Ana Water Board staff made this change to the estuarine APFs originally calculated by both Coastal Commission staff and Poseidon. A new estuarine APF for the intake was calculated based on the inclusion of the Full Tidal Basin and the numbers adjusted in Table 1 below. The mean of the four different revised APFs (95th percentile confidence interval values for each of the two sets of current meter data - including the additional acreage to account for impacts to the mitigation project (Table 1, 95th percentile confidence interval: 10.66, 7.92, 9.96, 7.46 acres) resulted in an increase in the required mitigation for estuarine species resulting from entrainment by the proposed intake by an additional 1.1 acres for an average of 9 acres (see revisions to Table 1, below, and Table 2).

Table 1. Area of production foregone (APF) estimates for entrainment by a surface intake located at Station E, using each ocean current speed datasets and the mean APF across both ocean current speeds derived by the Discharger and California Coastal Commission staff. Taxa are split into two habitat groups: estuarine taxa and coastal taxa (Raimondi 2019). Estuarine values include overlap from the Bolsa Chica Wetlands mitigation area with the proposed Facility to account for larvae produced from the wetlands that may become entrained.

	Discharger APF Estimates (acres)		California Coastal Commission Staff APF Estimates (acres)		Mean APF (acres)
	1999-00	2007-08	1999-00	2007-08	Mean
Estuarine Taxa					
CIQ Gobies	8.85	6.54	8.26	6.18	7.5
Diamond Turbot	3.24	2.26	2.98	2.17	2.7
Mean	6.05	4.40	5.62	4.17	5.1
Std Err	2.80	2.14	2.64	2.00	2.4
95% CI	10.66	7.92	9.96	7.46	9
Coastal Taxa					
Black Croaker	23.4	23.5	23.3	23.3	23.4
California Halibut	31.9	31.9	31.7	31.7	31.8
Combtooth Blennies	20.6	20.6	20.6	20.6	20.3
Jacksmelt	38.7	38.7	38.8	38.8	38.8
Mole Crab *(Emerita spp.)*	31.5	31.6	50	50.1	40.8
Queenfish	161.5	160.9	161.1	161.1	161.2
Rock Crab	265	265.8	265.7	265.8	265.6
Spotfin Croaker	13.6	13.6	13.7	13.7	13.7
Northern Anchovy	298.5	297.8	298.8	298.9	298.5
White Croaker	101.4	101.4	101.1	101.2	10.3
Mean	98.6	98.6	100.5	100.5	99.6
Std Err	33.9	33.8	33.5	33.6	33.68
95% CI	154.3	154.2	155.6	155.7	154.94
Total Estuarine + Coastal APF	165.0	162.1	165.6	163.2	**164.0**

The mean of the four APFs – two APFs each calculated by the Discharger and California Coastal Commission staff – for a surface intake located at Station E is approximately 163.9 acres, with approximately **9.0 acres** resulting from potential impacts to estuarine taxa and 154.9 acres resulting from potential impacts to coastal taxa (Table 2).

Santa Ana Water Board staff then calculated that approximately **0.2** acres of intake-related impacts to rocky reef taxa from the proposed Palos Verdes Artificial Reef may occur as a result of the 50-year operation of the Facility. This increases the intake APF to 164.1acres.

The Discharger is adding a wedgewire screen system with a 1.0-millimeter (mm) slot size to the existing AES HBGS surface intake. Therefore, as allowed under chapter III.M.2.e.(1)(a), Santa Ana Water Board staff applied a one percent (1%) credit to the intake APF. Application of this 1% credit yields a **final intake APF of 162.5 acres** (8.9 acres for estuarine taxa plus 153.4 acres for coastal taxa plus 0.2 acres for rocky reef taxa).

Discharge APF

As recommended by Dr. Raimondi in his 2019 report, Santa Ana Water Boards staff took the mean of both the Discharger's and California Coastal Commission staffs' intake APFs for each taxon and then proportionally scaled those means to determine an APF for each taxon for the discharge. The discharge scaling factor is calculated based on the volume of water exposed to shearing-related mortality (Roberts 2018) and the intake volume. Based on Santa Ana Water Boards staffs' calculations, the shearing-related mortality volume from the proposed brine discharge is 168 MGD[3]. The intake volume from the proposed Facility is 106 MGD. Therefore, the ratio of the brine discharge to the surface intake would be 168/106 = 1.58. Each taxon-specific APF from the intake is then multiplied by 1.58. The discharge scaling factor is then applied to each taxon before the 95% CI is calculated. After adjusting the taxon-specific APFs, the new 95% APF is calculated (Raimondi 2019). This is the discharge APF, as shown in Table 2 below. As noted above, the intake APF for estuarine taxa increased from 7.9 acres to 9.0 acres when adding the 317-acre full tidal basin at Bolsa Chica into the source water body calculation for estuarine taxa. This increase affects the discharge entrainment. The numbers in Table 2 reflect this increase.

[3] The proposed Facility will discharge approximately 60 MGD of brine and wastewater. In order to dilute the brine, approximately 168 MGD of seawater will be entrained and marine life within this volume of water will die due to shearing-related mortality. For the purposes of Attachment G (and Attachments G.1 – G. 5), 168 MGD is used to refer to the volume of water from the discharge where shearing-related mortality will occur. This volume of water (168 MGD) is used to determine the area of production foregone (APF) that will result from shearing-related entrainment in the discharge.

Table 2. Combined intake APF, ratio applied to determine discharge APF, and total APF for both intake and discharge. (The intake APF calculations below do not include the 1% credit for the wedgewire screen.)

	Mean of Discharger & Calif. Coastal Comm. Staffs' Intake APFs	**$V_{discharge}/V_{intake}$**	**Discharge APF**	**Total APF**
	Acres	**168 MGD/ 106 MGD**	**Acres**	**Acres**
Estuarine Taxa				
CIQ Gobies	7.46	1.58	11.79	
Diamond Turbot	2.67	1.58	4.21	
Mean	5.06	1.58	7.99	
Std Err	2.40		3.79	
95% CI	9.00		14.23	23.23
Coastal Taxa				
Black Croaker	23.4	1.58	36.97	
California Halibut	31.8	1.58	50.24	
Combtooth Blennies	20.6	1.58	32.55	
Jacksmelt	38.75	1.58	64.23	
Mole Crab *(Emerita spp.)*	40.8	1.58	64.46	
Queenfish	161.15	1.58	254.62	
Rock Crab	265.55	1.58	419.57	
Spotfin Croaker	13.65	1.58	21.57	
Northern Anchovy	298.5	1.58	471.63	
White Croaker	101.25	1.58	159.98	
Mean	99.5		157.28	
Std Err	33.68		53.21	
95% CI	154.94		244.81	399.75
Total Estuarine + Coastal APF	163.9		259.0	422.9

Note: Staff recalculated the discharge APFs for both estuarine and coastal taxa using a rounded discharge to intake volume ratio of 1.58.

Based on Table 2, the discharge shearing APF for estuarine taxa increased from 12.5 acres to **14.2 acres.** The discharge shearing APF for coastal taxa is 244.8 acres for a total of 259.0 acres (Table 2). In addition, Santa Ana Water Board staff calculated that approximately **0.3 acres** of discharge-related impacts to rocky reef taxa from the proposed Palos Verdes Artificial Reef may occur as a result of the 50-year operation of the Facility. This increases the discharge shearing APF to **259.3 acres**.

In addition to shearing-related mortality from the multiport diffuser, calculation of the APF for the brine discharge must also include the impacts to marine life from the Brine Mixing Zone (BMZ), the installation of the wedgewire screen system to the existing intake, and the construction of the multiport diffuser (Ocean Plan chapter III.M.2.e.(1)(b-c)).

The area affected by the BMZ has been modeled and calculated to be **1.09 acres** (Discharger's Appendix TT4 and Finding 64). The BMZ increases the **total discharge APF to 260.4 acres**.

Total APF

Construction impacts to the benthos related to modification of the offshore intake and discharge structures have been estimated to be **0.086[4] acres**. (Discharger's Appendices EEEE, SSSSS and Finding 64).

Therefore, **the total APF** for the construction and the 50-year operation of the Facility is:

> 162.5 acres (intake APF including 1% credit for the WWS) + 260.4 acres (discharge APF) + 0.086 acres (offshore construction APF) = **423.0 acres (total APF).**

As discussed above, this calculation also includes the adjustment to the APFs caused by the proposed Facility's impact to the proposed mitigation projects at the Bolsa Chica Wetlands and the proposed Palos Verdes Artificial Reef. The APFs for impacts to estuarine and rocky reef taxa must be mitigated at 1:1 through "in-kind" mitigation at Bolsa Chica and the proposed Palos Verdes Artificial Reef, respectively. The remaining APF for impacts to coastal taxa are mitigated as "out of kind" mitigation projects at the two proposed mitigation projects, each of which has a different mitigation ratio applied to out-of-kind mitigation based on the relative biological productivity of the marine environment provided by these two different mitigation projects as compared to the impacted habitat. (See Attachment G.4 – Rationale for Determining Appropriate Mitigation Ratios to Apply to the APF.)

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[4] Note that the construction impact acreage of 1.03 acres used previously came from the Discharger's Appendix TT4. However, that document included a typographical error. The correct area of benthic impacts from construction of the wedgewire screens on the existing surface intake and the addition of the diffuser to the existing outfall structure is 0.086 acres (*Intake*: 3848 ft^2 – 3240 ft^2 = 608 ft^2 (0.014 acres); *Diffuser*: 6375 ft^2 – 3240 ft^2 = 3185 ft^2 (0.072 acres); *Total* = 0.086 acres). See the Sant Ana Water Board's CEQA Addendum for additional information

Rationale for Additional Mitigation Added to the Final APF to Account for Potential Entrainment of Marine Life from the Discharger's Proposed Palos Verdes Artificial Reef

In addition to the proposed mitigation projects in the Bolsa Chica Wetlands, the Discharger has proposed creation of an artificial reef along the Palos Verdes Peninsula, located offshore of the City of Rancho Palos Verdes (Discharger's Appendix IIIIII). This area lies within the source water body for the proposed Facility (Discharger's Appendix PPPPPP-2). The Discharger must construct an artificial reef large enough to mitigate for the impacts not offset by mitigation at the Bolsa Chica Wetlands (see discussion in Attachment G.4 and G.5 to the Tentative Order and Discharger's Appendix WWWWWW-2).

The final size of the artificial reef must take into account the fact that some of the larvae produced by the reef may be entrained by the proposed Facility, which is located 37 kilometers (23 miles) southeast of the proposed Palos Verdes Artificial Reef. Therefore, an ETM/APF needs to be calculated to determine how much additional mitigation is needed to offset this loss.

The proposed mitigation at the Bolsa Chica Wetlands is sufficient to provide mitigation to offset all of the mortality for estuarine taxa and some of the coastal taxa after a mitigation ratio developed for the difference in productivity between the wetlands mitigation habitat and the impacted habitat is applied. There are sufficient mitigation acre credits available from the Discharger's proposed Bolsa Chica mitigation projects (see Attachment G.5) to offset some of the mortality to coastal taxa. Based on the mitigation acre credits calculated by Santa Ana Water Board staff, approximately 238.0 acres of coastal taxa require out-of-kind mitigation at the proposed artificial reef.

Only five reef taxa were collected within the source water body for the Facility during the 2003-2004 sampling. However, none of the five reef taxa were included in the ETM/APF calculation for the Facility's intake and discharge as they did not meet the data requirements for this calculation. While these taxa were collected at both the intake area and within the source water body, they were only collected during one survey, and limited larval length data were available for most of these taxa. There are, however, sufficient data for two of the five rocky reef taxa to calculate APFs for potential entrainment of these taxa from the proposed Palos Verdes Artificial Reef by the operation of the proposed Facility (Discharger's Appendix PPPPPP-2). The following screening criteria were used to determine which rocky reef taxa could be used in the ETM/APF calculation for the proposed Palos Verdes Artificial Reef (from Discharger's Appendix PPPPPP-2):

1. Classification in Allen and Pondella (2006) as a rocky reef taxon.
2. At least 10 individuals caught during the monthly source water and intake/diffuser site (Station E) area sampling.
3. Individuals caught during the same survey at both the intake/diffuser site and in the source water stations.

Only clinid kelpfishes (*Gibbonsia* sp.) and sea basses (*Paralabrax* sp.) met all three of the above criteria.

The combined APFs for the two rocky reef taxa increased the proposed required reef size by an additional **0.5 acres** (Discharger's Appendices PPPPPP-2 and WWWWWW-2).

This additional mitigation acreage is added to the total APF for the proposed Facility and increases the total APF from 422.5 acres to 423.0[5] acres. Note that the above numbers, including those in Tables 1-3, are the original or "raw" APFs calculated for marine life mortality of estuarine and coastal taxa as a result of the construction and operation of the Facility. In addition to the 1% credit allowed for the use of a wedgewire screen on the intake, which has already been included in the total calculated APF of 423.0 acres, the Ocean Plan Chapter III.M.2.e.(3).(b).vi allows the required APF to be scaled by adding a mitigation ratio to the APF to account for differences in the productivity of the impacted habitat versus the mitigation habitat for out-of-kind mitigation (i.e., coastal taxa). See Attachment G.4 to the Tentative Order for additional information regarding the application of mitigation ratios for out-of-kind mitigation for the two mitigation projects proposed by the Discharger.

<u>Conclusion</u>

Based on the results of this analysis, Santa Ana Water Board staff concludes that **423.0 acres** of impacts to all forms of marine life may occur from the construction and 50-year operation of the proposed Facility. This is the total impact acreage and does not include the application of a mitigation ratio to account for differences in the relative productivity between the area of impact and the area being mitigated. The total APF of 423.0 acres includes 23.1 acres of estuarine taxa, 0.5 acres of rocky reef taxa, and 399.4 acres of coastal taxa that may impacted by the construction and operation of the proposed Facility.

[5] A difference on the order of 0.1 acre may occur in the calculations as a result of rounding.

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ATTACHMENT G.4 – Rationale for Determining Appropriate Mitigation Ratios to Apply to the Area of Foregone Production (APF)

Introduction

Poseidon Resources (Surfside) LLC (Discharger) has submitted a report of waste discharge and a request for a Water Code section 13142.5, subdivision (b) (section 13142.5(b)) for the proposed Huntington Beach Desalination Facility (Facility). The proposed Facility will be located on the AES Huntington Beach Generating Station (AES HBGS) property. The Discharger proposes to use the generating station's existing intake and discharge structures after modifying them to comply with chapter III.M of the Water Quality Control Plan for the Ocean Waters of California (Ocean Plan). To comply with Water Code section 13142.5(b) and chapter III.M of the Ocean Plan, the Discharger must mitigate for impacts to all forms of marine life resulting from the construction and operation of the Facility.

At its discretion, the Santa Ana Water Board may apply a mitigation ratio of no less than 1:10 to the required mitigation acreage based on the relative biological productivity of the impacted open water, soft-bottom habitat and the mitigation habitat. The Discharger proposes to provide out-of-kind mitigation for potential entrainment impacts to open water and soft bottom coastal species and in-kind mitigation for estuarine species by performing restoration and preservation activities at the Bolsa Chica Lowlands Restoration Project (also referred to as the Bolsa Chica Ecological Reserve or Bolsa Chica Wetlands), and in-kind and out-of-kind mitigation for coastal and rocky reef species by creating an artificial reef along the Palos Verdes Peninsula. Based on the analysis below, Santa Ana Water Board staff recommends that the Santa Ana Water Board apply a mitigation ratio of 1:4.5 to for the Area of Production Foregone (APF) for out-of-kind mitigation (coastal taxa) and a mitigation ratio of 1:1 to the APF for in-kind mitigation (estuarine taxa) for the Bolsa Chica wetlands mitigation projects and 1:5.8 for out-of-kind mitigation for coastal taxa and 1:1 for in-kind mitigation for rocky reef taxa at the Palos Verdes Artificial Reef.

This document provides the rationale for the recommended mitigation ratios and supports Findings 50 to 53 of Attachment G.

Background

The Ocean Plan requires the owner or operator of a desalination facility to submit a report to the regional water board estimating the marine life mortality resulting from construction and operation of the facility after implementation of the facility's required site, design, and technology measures. (Ocean Plan, chap. III.M.2.e.(1).) Upon approval of the report by the regional water board in consultation with State Water Board staff, the calculated marine life mortality provides the basis for the mitigation required under Water Code section 13142.5(b) and the Ocean Plan. (Ocean Plan, chap. III.M.2.e.(1)(d).) To mitigate for the impacts to all forms of marine life caused by the operation and construction of a desalination facility, the owner or operator must either (1) complete a mitigation project, or (2) if an appropriate fee-based mitigation program is available, provide funding for the program. (Ocean Plan, chap. III.M.2.e.(2).) There currently are no fee-based mitigation programs that meet the Ocean Plan requirements; therefore, the Discharger must complete a mitigation project.

The Discharger submitted a marine life mortality report (Appendix TT) and originally estimated that marine life mortality resulting from the construction and operation of the Facility would be approximately 40.3 acres after applying a mitigation ratio of 1:10 to coastal taxa. California Coastal Commission staff could not reproduce the Discharger's calculations and raised numerous concerns regarding the age of the data used, taxa selected, how the calculations were made, and other limitations of the Discharger's marine life mortality report. Therefore, the Discharger's calculation was reviewed by a neutral third-party reviewer, Dr. Pete Raimondi (Raimondi 2019).

The Discharger has proposed to mitigate for the Facility's impacts by completing several mitigation projects in the Bolsa Chica Wetlands and creating an artificial reef offshore of the Palos Verdes Peninsula (Palos Verdes Artificial Reef). The Bolsa Chica Wetlands is a highly productive estuarine ecosystem that provides important habitat for many estuarine and coastal, open water and soft-bottom fish species at some point in their life history. Artificial reefs are an even more productive marine environment than estuarine wetlands and provide important habitat for reef fish, invertebrates, and some coastal, open water fish species. The Discharger's proposed Palos Verdes Artificial Reef will likely follow a similar design, and will be constructed adjacent to, the recently restored Palos Verdes Reef that was part of the mitigation required under the Montrose Settlements Restoration Program (MSRP) Phase 2 Restoration Plan (Discharger's Appendix IIIIII).

The Discharger's proposed mitigation projects would provide primarily out-of-kind mitigation. Out-of-kind mitigation is permissible for open water or soft-bottom coastal species, but in-kind mitigation must be done for all other species (e.g., estuarine, rocky reef) whenever feasible. (Ocean Plan, chap. III.M.2.e.(3)(b)v.) The regional water boards have discretion to apply a mitigation ratio for out-of-kind mitigation to account for differences in productivity between the impacted habitat and the mitigation habitat; however, the mitigation ratio may not be less than one acre of mitigation habitat for every 10 acres (1:10) of coastal open water or soft-bottom habitat. (Ocean Plan, chap. III.M.2.e.(3)(b)vi.) For in-kind mitigation, the ratio may not be less than one acre of mitigation habitat for every one acre (1:1) of impacted habitat for in-kind mitigation (e.g., wetlands, estuaries, rocky reefs, kelp/eelgrass/surfgrass beds). (Ocean Plan, chap. III.M.2.e.(3)(b)vii.)

The Discharger originally proposed to apply a mitigation ratio of 1:10 for out-of-kind mitigation in the Bolsa Chica Wetlands, and 1:8.6 for out-of-kind mitigation at the Palos Verdes Artificial Reef, for the loss of open water and soft-bottom coastal species to the acres of impact (area of production foregone or APF) that would result from the construction and 50-year operating life of the proposed Facility. Santa Ana Water Board staff, in consultation with other state and federal agencies' staff, has determined that these ratios are not appropriate and that more conservative ratios should be applied.

The intake and discharge structures of the Facility are located approximately 0.5 kilometers (km) offshore in 9.5 meters (m) of water in coastal open water, soft bottom habitat on the San Pedro Shelf. As such, the Facility will impact open water and soft bottom coastal species in habitats along the San Pedro Shelf, an area that has been subject to a significant loss of open ocean and soft bottom habitat along the shelf, especially in coastal areas. The cumulative loss of habitat is primarily a result of coastal development, including the construction of the Ports of Los Angeles and Long Beach (Ports) as well as other projects along the coast. These habitat losses have reduced the amount of this habitat, which has resulted in an increase in its overall value. More conservative ratios than 1:10 or 1:8.6 should therefore be considered when accounting for the relative productivity of coastal, open water and soft bottom habitat compared to the Bolsa Chica Wetlands and the proposed Palos Verdes Artificial Reef.

To account for this loss in habitat on the San Pedro shelf, Santa Ana Water Board staff reviewed the Bond et al., 1999 paper "*A method for estimating marine habitat values based on fish guilds, with comparisons between sites in the Southern California Bight*" (Bond Paper) for appropriate habitat values and calculated areas of habitat loss and gain from construction of the Ports using data provided by NOAA National Marine Fisheries Service (NOAA Fisheries) staff and information from a study of the San Pedro Shelf conducted by the U.S. Geological Survey (Wong et al., 2012).

<u>Summary of Conclusions</u>

Applying the habitat values from the Bond Paper, and the data provided by NOAA Fisheries staff, Santa Ana Water Board staff derived a ratio of 1:4.5 for out-of-kind mitigation projects in the Bolsa Chica Wetlands. For the Discharger's proposed Palos Verdes Artificial Reef, staff derived a mitigation ratio of 1:5.8 for out-of-kind mitigation.

<u>Detailed Analyses/Discussion</u>

The Area of Production Foregone (APF) converts the impacts to all forms of marine life from the operation of a proposed Facility using a surface intake to acres of habitat that require mitigation. The APF is based on the number of fish and invertebrate taxa larvae and eggs that would be potentially subject to entrainment from the intake and discharge (as well as from temporary construction impacts) from the proposed Facility during its 50-year operational life. As discussed previously, the Ocean Plan requires that a mitigation ratio of no less than 1:1 be applied to in-kind mitigation (e.g., estuarine species). For open coast and soft bottom species, a mitigation ratio of no less than 1:10 may be applied if the out-of-kind mitigation is more productive than the habitat being impacted by the Facility. In order to determine how the APF for the proposed Facility could be adjusted (or "scaled"), consistent with Ocean Plan chapter III.M.2.e.(3)(b)(vi) to account for the loss of the shallow, soft bottom substrate from coastal development along the San Pedro Shelf, Santa Ana Water Board staff reviewed available data to determine the percent lost to coastal development and the relative value of the impacted versus mitigated habitat.

<u>The San Pedro Shelf</u>

The surface intake and discharge structures for the Discharger's proposed Facility are located on the shallow, inner shelf area (less than 30 meters depth) of the San Pedro Shelf. The San Pedro Shelf is one of the broadest mainland continental shelf segments on the west coast between Monterey, California, and the United States-Mexico border (Wong et al., 2012). The shelf extends from Palos Verdes at its northern end south to Newport Canyon. Approximately 75 to 80 percent of the San Pedro Shelf segment is composed of low-relief, sediment-covered seafloor, and the remaining 20 to 25 percent is composed of rock outcrop interspersed with boulders and cobbles (Figure 1).

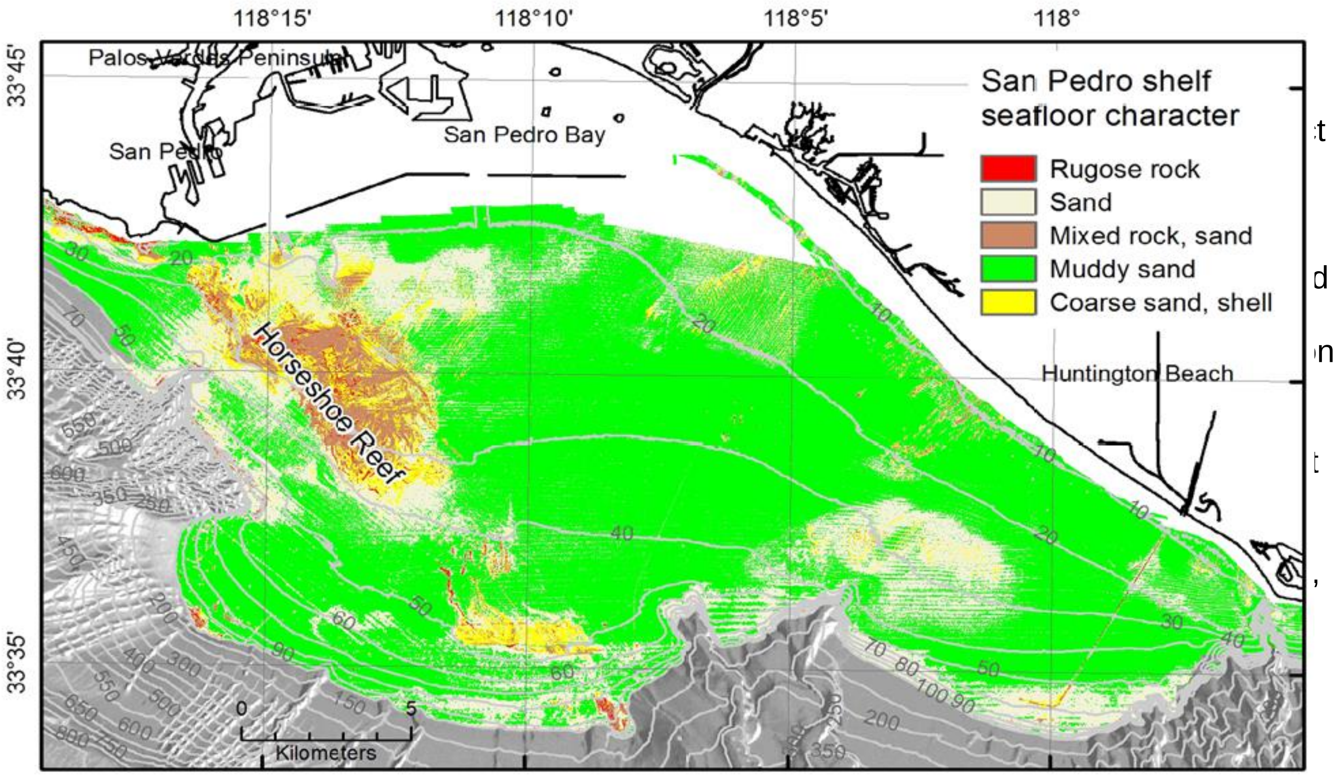

Figure 1. Surficial geology and bathymetry of the San Pedro Shelf (Wong et al., 2012).

Construction and continued expansion of the Ports have resulted in the infilling and loss of shallow, coastal soft bottom habitat along this portion of the San Pedro Shelf. Santa Ana Water Board staff calculated the amount of habitat lost using data provided by NOAA Fisheries staff. Approximately 4,266 acres of open coast and intertidal habitat has been lost as a result of the development of the Ports (Table 1). Modest habitat gains of around 1/10 acre have resulted from the construction of rock breakwaters. Approximately 5.7% of the shallow, soft bottom habitat in less than 30 meters of water has been lost to the development of the Ports (Table 1 and Figure 2). This loss has increased the relative value of this habitat, which is the same habitat that will be impacted by entrainment from the proposed Facility's intake and discharge.

Table 1. Habitat Losses in the Los Angeles/Long Beach Harbor Area[1]

Table 1a: Habitat Area Loss:

Habitat Type	Habitat Loss (acres)	Habitat Loss (km^2)
Intertidal Flat	0.19	0.001
Pacific Ocean	4,266.2	17.3
Total Loss	4,266.4	17.3

Table 1b: Habitat Area Gain:

Habitat Type	Habitat Gain (acres)	Habitat Gain (km^2)
Rock	0.106	0.00043
Total Gain	0.106	0.00043

Net Loss (Total Loss - Total Gain) = ***4,266.3 acres*** *(17.3 km^2)*

Table 1c. Total San Pedro Bay Shelf Habitat Percent Loss from Shoreline to the 30-meter bathymetric depth:

Shelf Depth (m)	Area of Shelf (acres)	Area of Shelf (km^2)	Net Loss ÷ Shelf Area (acres)	Percent Loss
Shoreline to -30	75,104.3	303.9	4,266.3 ÷ 75,104.3 = 0.057	5.7%

[1] Data provided by NOAA Fisheries staff (see end of this document for data sources).

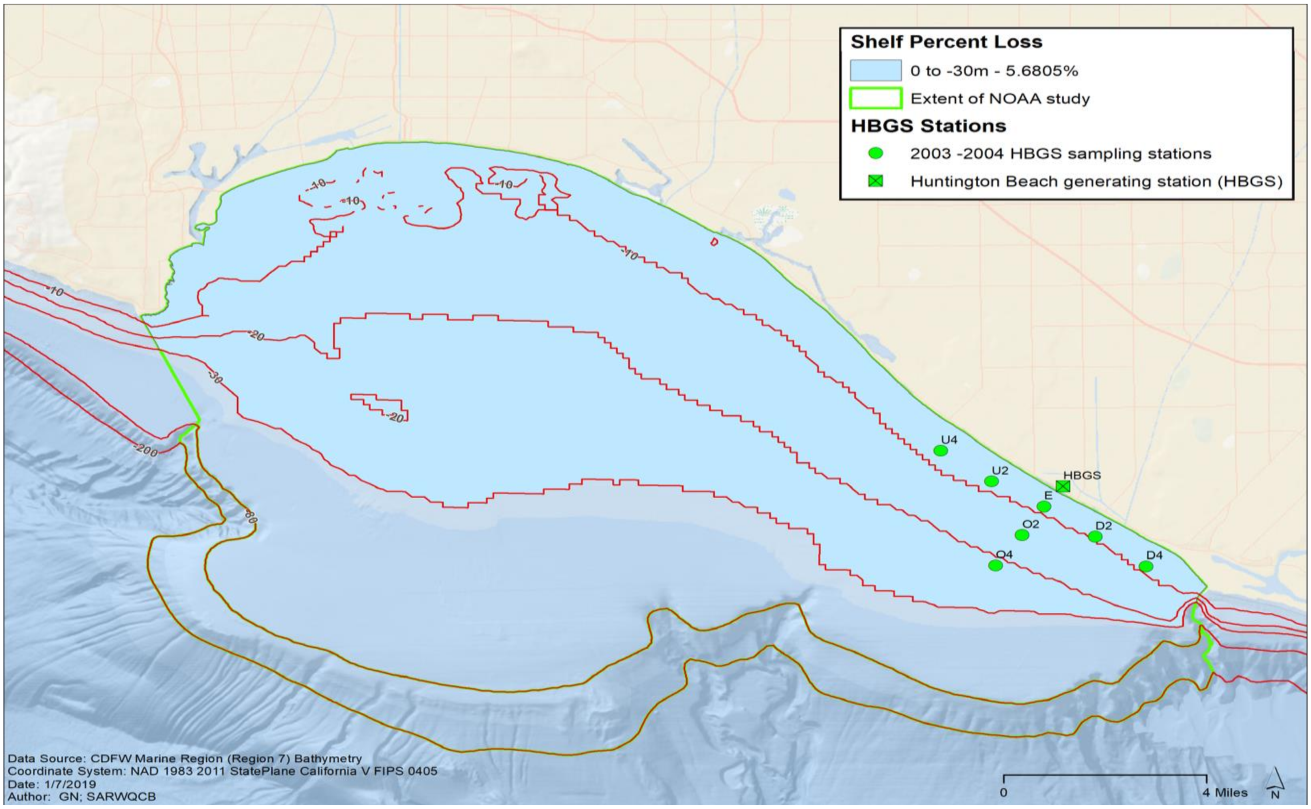

Figure 2. Location of the proposed Facility (adjacent to and just southeast of the AES HBGS) and offshore locations sampled in 2003-2004 on the San Pedro Shelf. The surface intake and discharge for the facility are located at Station E.

Estimating Marine Habitat Values for Determining Environmental Mitigation

The recommended mitigation ratios rely largely on the approach and data used in the Bond et al. 1999 paper "*A method for estimating marine habitat values based on fish guilds, with comparisons between sites in the Southern California Bight*." The Bond Paper is the most comprehensive assessment of habitat values conducted in the Southern California Bight. The paper was recommended by NOAA Fisheries staff during discussions with agencies staff on how to determine an appropriate mitigation ratio that would be applied to coastal open water and soft bottom taxa that would be potentially impacted by construction and operation of the proposed Facility. The purpose of the paper was to develop a method for tracking changes in habitat quality and to assist in adjudicating environmental mitigation.

The authors of the Bond Paper estimated marine habitat values for 23 fish guilds in the southern California Bight using multiple datasets. Fish guilds were evaluated based on population density, fidelity, and mean size. A single habitat value was estimated from these three guild-based parameters by taking the product of the three parameters, transforming it to its square root, and then summing across all guilds in each habitat. Fish assemblage is a good indicator of the health of the entire aquatic community and because fish guilds are found in a variety of different habitat types, the use of fish guilds provided comparability across habitats. Data were drawn from existing surveys and tables in the literature for thirteen sites in the Southern California Bight (Figure 3).

Seven primary habitat sites were selected that had a large and detailed data base of operations spanning over twenty years or more (1970s-1990s) (Bond et al., 1999). Five of the seven primary sites were sampled exclusively with otter trawls, which are designed to capture demersal (benthic) fish. The five sites included: Los Angeles Harbor, shallow sand (< 30m water depth); Continental Shelf (30m $\leq$ depth< 200m); White's Point Outfall (water depth = 60m); and Continental Slope (depth $\geq$ 200m). The other two primary sites were reef areas, sampled with visual self-contained underwater breathing apparatus (SCUBA) transects and icthyocides: King Harbor at Redondo Beach and the kelp bed at Palos Verdes Point, Rancho Palos Verdes (Figure 3).

Six additional comparison sites were evaluated based on data in the existing literature or on other smaller, research databases. The six comparison sites included a second study of White's Point Outfall using otter trawl data from the Los Angeles County Sanitation District (LACSD); data for the Marine Review Committee's analysis of the San Onofre Nuclear Generating Station (SONGS) including SCUBA transects of the kelp bed and shallow otter trawls and lampara nets (for water column fish) in the adjacent shallow sand area; data collected using beach seines, common sense seines, and drop nets with quinaldine in Upper Newport Bay; data from divers transects, traps, etc., from an artificial reef at Torrey Pines; studies of Mother's Beach in Marina del Rey (beach seine data only); and data collected from the area adjacent to the Portuguese Bend landslide using otter trawls, beach seines, divers' transects, and ichthyocides (Bond et al., 1999). Kelp beds and associated rocky reef habitats were compared at Palos Verde Point, San Onofre, and Portuguese Bend. Two sites, King's Harbor and Torrey Pines, were used to compare artificial reef sites, and Upper Newport Bay and Marina del Rey were used to compare and estimate habitat values for coastal wetlands. The comparison sites selected for the study are also shown in Figure 3.

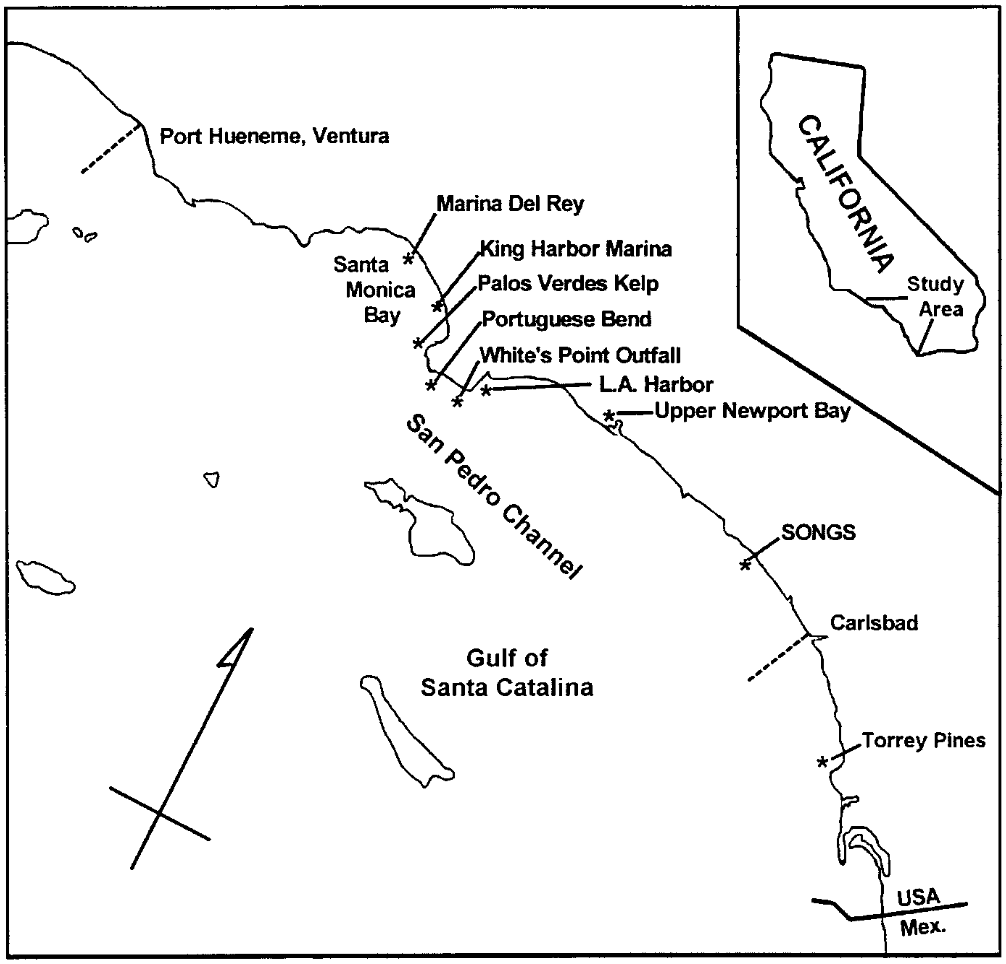

Figure 3. Map of the study sites in the Southern California Bight used for habitat valuation (Bond et al., 1999).

The Bond Paper fish guild classifications were developed by modifying Allen's (1982) taxonomy, which separates species by communities (e.g., surface, water column, benthic), preferred foraging location (e.g., shelf, slope, rocky reef), feeding technique (e.g., filter feeders, engulfers, pickers), activity period (diurnal or nocturnal), and location of refuges. The broadest array of guilds was chosen to increase sensitivity and reduce bias. Where species undergo ontogenetic changes from one guild to another (e.g., juvenile is a picker, adult an engulfer), they were distributed among the guilds based on the size that triggered the switch. All species that occurred in any of the study site habitats in at least 25% of the samples (site fidelity) were included in the analysis.

The authors of the Bond Paper developed habitat values using the square root products for the 23 fish guilds for both the seven principal study sites and the six comparison sites. These habitat values included both the shallow, soft substrate (soft bottom) typical of the inner portion of the San Pedro shelf, coastal wetlands similar to the Bolsa Chica wetlands, and both natural and artificial reefs. As required by chapter III.M.2.e(3)(ix) of the Ocean Plan, the mitigation developed must account for differences in productivity from the habitat that will be impacted by the operation of the proposed Facility and the habitat that will be used to mitigate for those impacts (Bolsa Chica Wetlands and Palos Verdes Artificial Reef).

The authors of the Bond Paper developed habitat values for soft substrate habitat along the inner portion (<30 m depth) of the San Pedro Shelf using the 23 identified fish feeding guilds and 20+ years of otter trawl data. For shallow water, soft substrate habitat consistent with the conditions at the proposed intake and discharge locations for the Facility, they calculated a habitat value, which is a unitless number, of 651.2 (Bond et al., 1999, Table 1). However, very few estimates of fish abundances from the water column are available in those areas where otter trawls were the primary method of sampling with the exception of some lampara net data collected at the SONGS site and beach seine data collected along with otter trawl data at the Portuguese Bend site. Ideally, multiple data sources using different collection methods (e.g., otter trawls, lampara nets, beach seines, diver surveys) would be collected and would provide the most robust habitat value for a site. Additionally, the time of sampling (daytime only verses both day and nighttime sampling) also may produce disparity in habitat types given that the number and cumulative biomass of fishes caught at night are much greater than during the day (LACSD, 1981: DeMartini and Allen, 1984).

Therefore, the Bond Paper also recommends increasing this habitat value to account for fish that were likely underrepresented by the sampling that used only one method (otter trawls), smaller net sizes than some of the other surveys, and were only conducted during daylight hours (more fish are caught at night than during the day)[2]. Santa Ana Water Board staff used the habitat value of 651.2 and then increased it by 30%, to 846.6 as recommended by the Bond Paper (page 236 of the paper; page 19 of the pdf). Staff then used this habitat value to determine what the habitat value would have been before the Ports were built by applying the percent habitat lost to the Ports (5.7%; Table 1 and Figure 2) to the Bond Paper adjusted habitat value for inner shelf, soft bottom substrate of 894.9 as shown below.

Santa Ana Water Board staff used the habitat value developed for the wetlands in Upper Newport Bay of 4005.4 as a surrogate for the mitigation projects proposed in the Bolsa Chica Wetlands and the historic Palos Verdes Reef habitat value of 5754.1 as a surrogate for the Discharger’s proposed Palos Verdes Artificial Reef.

Calculation of the Mitigation Ratios for Out-of-Kind Mitigation

<u>USGS 2012 report (Wong et al.):</u>

- Area of inner shelf <30 m (i.e., shallow water) is composed primarily of muddy sand (soft substrate)

[2] The Bond Paper recommends as a rule of thumb, multiplying habitat values developed from a single sampling method such as otter trawls or diver transects by 30% to account for fish not adequately sampled by these methods (e.g., pelagic fish, cryptic fish).

NOAA Fisheries Data:

- Area of San Pedro Shelf from shoreline to -30 m bathymetry (inner shelf) = 75,104 Ac
- Area of shallow water, soft substrate habitat lost due to development of the Ports of LA/LB = 4,266 Ac
- Percent of shallow water, soft substrate habitat lost to the Ports = 4,266 Ac/75,104 Ac = **5.7%**
- To estimate what the habitat value would have been if the area of the Ports had not been developed, multiply the shallow water, soft substrate habitat value adjusted by 30% (846.6) by the percent area of habitat loss (5.7%): 846.6 + (846.6 x 0.057) = **894.9**

Using the Bond Paper Habitat Values (Figure 4, Tables 1 and 2) to Calculate an out-of-kind Mitigation Ratio for the Bolsa Chica Wetlands

- Wetlands habitat value (based on Upper Newport Bay as surrogate for Bolsa Chica) = 4005.4
- 4005.4/894.9 = **4.5** (wetlands are 4.5 x more productive than shallow water, soft substrate habitat)
- Mitigation Ratio for remaining shallow water, soft substrate habitat = **1:4.5**

Using the Bond Paper Habitat Value (Figure 4, Table 1) to Calculate an out-of-kind Mitigation Ratio for the proposed Palos Verdes Artificial Reef

- Reef habitat value (based on the historic Palos Verdes reef as a surrogate for the Discharger's proposed artificial reef) = 5754.1
- 5754.1/894.9 = **6.4** (reefs are 6.4 times more productive than shallow water, soft substrate habitat)
- Mitigation ratio for remaining shallow water, soft substrate habitat = 1:6.4
- Apply a 10% margin of safety[3] to account for uncertainties in the calculation: 6.4 – (6.4 x 0.10) = **1:5.8**

[3] This margin of safety is used to account for uncertainties in the habitat value calculation and the performance of the artificial reef once it is constructed. The Bond Paper habitat value used as a surrogate for the artificial reef is based on the historic Palos Verdes Reef, which was primarily a low relief kelp reef and differs from the high relief reef design that the Discharger proposes to use for the proposed Palos Verdes Artificial Reef. The historic Palos Verdes Reef was buried by landslides and sedimentation from the Palos Verdes Peninsula. As landslides and excessive sedimentation still occur in this area, the proposed artificial reef will be designed to avoid potential burial.

Figure 4: Tables 1 and 2 from Bond et al., 1999. Habitat valuations for shallow, soft substrate (before the increase of 30% was applied) on the left and Upper Newport Bay on the right (red boxes) used to calculate a mitigation ratio to scale the APF for the Facility for the Discharger's proposed mitigation at the Bolsa Chica wetlands. The habitat value for the Palos Verdes kelp reef (first column in Table 1, below, under "Hard Substrate") was used to scale the APF for the Discharger's proposed artificial reef.

Table 1.

	Hard Substrate			Soft Substrate			
Guild	Palos Verdes	King Harbor	LA Harbor	Shallow	Shelf	Point	Slope
1	0.0	74.9	52.9	62.5	1.7	3.5	0.2
2	32.6	51.3	127.3	129.4	1.1	0.1	0.1
3	6.1	89.8	109.0	132.1	4.1	0.1	0.0
4	446.0	178.9	0.6	0.7	0.2	0.1	0.5
5	687.1	608.2	9.4	2.1	30.0	33.7	11.8
6	23.6	43.7	0.4	0.6	34.3	50.5	46.3
7	0.0	0.0	9.4	9.3	52.8	38.7	23.9
8	847.8	302.3	8.6	7.9	2.8	4.7	0.0
9	465.0	301.0	5.3	14.0	0.1	0.0	0.1
10	11.9	36.2	2.6	8.6	37.1	39.1	1.3
11	257.6	305.0	42.3	25.4	12.6	9.3	0.5
12	316.1	235.3	1.2	4.0	0.4	0.1	0.0
13	509.4	247.8	0.0	0.1	0.0	0.0	0.0
14	63.2	168.8	173.5	131.3	40.8	20.4	2.3
15	0.0	0.1	1.7	6.4	11.3	16.0	6.5
16	8.2	30.0	48.2	33.4	15.0	16.9	1.9
17	10.5	35.8	31.9	35.1	100.2	92.0	67.1
18	524.3	319.4	0.6	1.2	2.6	2.2	26.6
19	1,131.5	884.2	0.3	0.3	0.0	0.0	0.0
20	250.4	303.2	0.1	0.4	0.1	0.0	0.0
21	0.0	0.0	69.6	10.2	21.9	22.4	37.0
22	2.0	22.3	23.9	30.6	91.2	102.5	79.3
23	160.8	201.3	1.0	5.2	0.2	1.6	0.2
Value	5,754.1	4,439.5	719.6	651.2	460.4	454.1	305.6

Table 2.

Guild	LACSD Outfall	SONGS Lampara	SONGS L&T Combined	SONGS Trawls	SONGS Kelp Bed	Torrey Pines	Newport Bay	Marina del Rey	Portuguese Bend
1	4.1	300.8	300.8	0.0	0.0	0.0	249.0	5.0	464.8
2	14.5	84.6	84.6	95.1	0.0	0.0	887.1	1,190.9	173.1
3	1.8	88.0	88.0	58.1	0.9	3,303.0	3.0	0.0	88.7
4	0.0	55.8	55.8	0.0	46.2	0.0	1,845.4	578.5	58.3
5	48.3	0.0	0.0	0.0	1.1	1,086.9	0.0	0.0	13.0
6	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	46.5	0.1	16.2	16.2	0.0	0.0	3.8	0.0	11.8
8	11.6	1.0	9.7	9.7	581.1	676.1	658.6	152.4	0.0
9	2.4	2.2	7.8	7.8	329.9	588.4	0.0	44.6	30.6
10	34.8	1.1	6.4	6.4	0.0	185.5	0.0	0.0	18.3
11	19.5	5.9	64.0	64.0	86.4	901.6	0.0	0.0	15.7
12	1.8	0.0	0.2	0.2	282.8	597.6	0.0	0.0	0.0
13	0.2	0.3	0.3	0.0	118.3	277.7	4.2	0.0	0.0
14	14.7	105.4	105.4	135.6	3.3	306.1	2.6	88.2	50.2
15	4.5	0.7	128.1	128.1	0.0	0.0	0.0	0.0	0.0
16	33.3	3.6	41.0	41.0	0.0	102.5	4.5	7.4	69.5
17	103.4	0.4	149.5	149.5	0.0	18.9	0.0	0.0	85.9
18	9.7	0.0	0.3	0.3	0.0	0.0	120.2	33.6	0.0
19	0.1	0.0	3.1	3.1	0.0	546.6	202.9	69.6	0.0
20	0.1	0.0	0.0	0.0	0.0	21.8	0.0	2.5	0.0
21	36.5	0.0	46.3	46.3	0.0	0.0	3.1	0.0	60.7
22	115.2	1.2	51.2	38.7	0.1	46.5	18.6	78.5	47.5
23	0.2	68.5	68.5	0.0	139.4	0.0	2.5	163.5	0.0
Value	553.0	719.7	1,227.2	800.1	1589.5	8,659.2*	4,005.4	2,414.5	1,188.0

*this value is anomalous and its adjusted value is 2589 (please see discussion)

Attachment G.3 includes a detailed discussion of how the APF was calculated for Station E, which is located near the existing intake and discharge structures that will be used for the Discharger's proposed Facility. A brief summary follows.

Calculation of the Area of Production Foregone for Marine Life Mortality from the Proposed Facility

The APF for the intake is calculated first (chapter III.M.2.e.(1)(a) of the Ocean Plan) and then that APF is proportionally scaled based on the volume of the brine discharge (including the volume of water subject to shearing-related mortality) to determine the total APF for both the intake and discharge for the facility. Chapter III.M.2.e.(1)(a) also allows the application of a one percent (1%) credit to the intake APF if the Discharger opts to use a 1-millimeter slot size screen on the intake to reduce entrainment-related mortality. Chapter III.M.2.e.(1)(b) requires that the Marine Life Mortality Report address marine life mortality related to shearing stress related to the proposed Facility's discharge and the brine mixing zone (BMZ). Chapter III.M.2.e.(1)(c) addresses construction-related mortality that may occur as a result of the construction of offshore infrastructure associated with a surface seawater intake and discharge. However, the determination as to whether a mitigation ratio may be applied to the APF for the proposed Facility is made based on the relative biological productivity of the proposed mitigation site(s) to the impacted habitat (Chapter III.M.2.e(3)(b)v-ix), not whether the impact is from the intake or discharge.

The area being impacted by entrainment from the proposed Facility is open water, soft bottom coastal habitat. Chapter III.M.2.e.(3)(b)v. allows out-of-kind mitigation for this habitat type if the proposed mitigation is more biologically productive than the area impacted. For all other species, the Ocean Plan requires in-kind mitigation whenever feasible. The Discharger has proposed to provide mitigation at two mitigation sites: the Bolsa Chica Wetlands and offshore of the Palos Verdes Peninsula (Palos Verdes Artificial Reef). The APF calculated for marine life mortality that may result from the construction and operation of the Facility includes estuarine and coastal (open water or soft bottom) taxa. In addition, chapter III.M.2.e.(3)(b)ii. requires that, "impacts on the mitigation project due to entrainment by the facility must be offset by adding compensatory acreage to the mitigation project." Though rocky reef taxa were not included in the original ETM/APF calculation for the proposed Facility as a result of data limitations, the potential entrainment of these taxa from the proposed Palos Verdes Artificial Reef must also be calculated and included in any proposed mitigation project.

Santa Ana Water Board staff revised the APF calculations for estuarine taxa (CIQ Gobies and Diamond Turbot) found in Dr. Raimondi's 2019 report to include larvae that may be dispersed from the Bolsa Chica Wetlands, one of the two proposed mitigation sites, and entrained by the proposed intake. Staff recalculated the APF for the estuarine taxa with a new source water body that included the 317-acre Full Tidal Basin in Bolsa Chica, which is a spawning area for CIQ gobies and diamond turbot as well as other estuarine taxa. The net result was an increase in the APF for estuarine taxa of **2.8 acres**. Santa Ana Water Board staff made this change to the estuarine APFs originally calculated by both Coastal Commission staff and the Discharger.

While the rocky reef taxa collected in the 2003–2004 sampling did not meet the data requirements for calculating an ETM/APF for those taxa at the proposed intake for the Facility, the Discharger was able to use data to calculate APFs for two rocky reef taxa to determine the additional mitigation acres needed to offset potential entrainment of larvae from the proposed artificial reef. The methods used to determine this calculation are outlined in the Discharger's Appendices PPPPPP-2 and WWWWWW-2, and Attachment G.3 to the Tentative Order. For the Discharger's proposed Palos Verdes Artificial Reef, Santa Ana Water Board staff determined that marine life mortality from operation of the proposed Facility would result in **0.5 acres** of in-kind impacts to rocky reef taxa.

The final APF for the proposed Facility, before any mitigation ratio is applied to out-of-kind taxa includes the following:

Estuarine taxa APF = 23.1 acres
Rocky reef taxa APF = 0.5 acres
<u>Coastal taxa APF = 399.4 acres</u>
Total APF = 423.0 acres

The two mitigation projects must therefore provide a total of **23.6 acres of in-kind mitigation** for estuarine and rocky reef taxa and **399.4 acres of out-of-kind mitigation** for coastal taxa.

<u>Applying the Mitigation Ratio to the APF</u>

Chapter III.M.2.e(3)(vi) of the Ocean Plan allows the application of a mitigation ratio of 1:1 and up to 1:10 (one acre of mitigation to between 1-10 acres of impact) for species for which the proposed mitigation is considered "out-of-kind" and when the mitigation area is more biologically productive than the area of impact. Chapter III.M.2.e(3)(vii) states that for "in-kind" mitigation *"…the mitigation ratio shall not be less than one acre of mitigation habitat for every one acre of impacted habitat*" (1:1).

<u>Development of a Mitigation Ratio to Apply to the APF for Mitigation Projects Proposed at the Bolsa Chica Wetlands</u>

For coastal open water and soft bottom taxa such as California Halibut and Queenfish, which will be most impacted by entrainment from intake and discharge during the operational life of the proposed Facility, mitigation at the Bolsa Chica Wetlands is considered out-of-kind mitigation. For estuarine taxa such as CIQ Gobies and Diamond Turbot that may be entrained by the project, mitigation at Bolsa Chica is classified as in-kind mitigation. Therefore, a mitigation ratio of 1:1 is applied to the APF for estuarine taxa. Santa Ana Water Board staff's mitigation ratio of 1:4.5 can then be applied to coastal open water and soft-bottom taxa. Santa

Ana Water Board staff's calculations of the mitigation ratios applied to the APFs for estuarine and coastal taxa from the proposed Facility are shown below:

Station E APF[4] (Location of existing intake and discharge for the proposed Facility – see Figure 2):

Estuarine taxa (in-kind mitigation):
9.0 acres (intake APF) − 1% credit for WWS = 8.9 acres
8.9 acres + 14.2 acres (discharge APF) = 23.1 acres
Mitigation ratio = 1:1 → 23.1 acres/1 = 23.1 acres

Coastal taxa (out-of-kind mitigation):
154.9 acres (intake APF) − 1% credit for WWS = 153.4 acres
153.4 acres + 246.0 acres (discharge APF) = 399.4 acres
Proposed Bolsa Chica mitigation projects = 162.4 acres
Mitigation ratio for Bolsa Chica Wetlands = 1:4.5
162.4 acres/4.5 → 36.1 acres

The proposed projects at the Bolsa Chica Wetlands cannot fully mitigate for impacts to coastal taxa. Therefore, the proposed Palos Verdes Artificial Reef must provide 237.0 acres (399.4 acres – 162.4 acres) of out-of-kind mitigation for coastal taxa before a mitigation ratio is applied.

<u>Alternative Methods to Develop an Appropriate Mitigation Ratio to Scale the APF for the Proposed Bolsa Chica Wetlands Mitigation Projects</u>

The Discharger calculated their own mitigation ratio for the proposed Facility using more recent data collected from the Southern California Coastal Water Research Project's (SCCWRP) Bight regional monitoring program (Appendix QQQQQ, dated March 29, 2019). The Discharger used the more recent Bight dataset as they considered it to be more representative of the current oceanic regime, which has changed since the Bond et al., 1999 study (Miller and McGowan, 2013; Peabody et al., 2018). Data from the 1994, 1998, 2003, 2008, and 2013 surveys were included in the Discharger's analysis. Using the habitat value equation developed by the authors of the Bond Paper for soft bottom habitats, as updated by Pondella (2009), the Discharger calculated a habitat value for shallow (<30 m), soft substrate along the San Pedro Shelf of 535.27, compared to the Bond Paper's habitat value of 651.2.

The Discharger also argues that the APF for the proposed Facility represents the amount of habitat needed to replace the larval organisms lost to entrainment, not physical habitat loss. Therefore, they did not reduce the habitat value of 535.27 calculated from the Bight survey data to account for the development of the Ports. As the Bight surveys do not include wetlands data, and there have been no recent surveys of wetlands to generate more recent habitat values than that presented in the 1999 Bond Paper, the Discharger compared their

[4] Information on the calculated APFs can be found in Raimondi, 2019 and the Discharger's Appendix TT4.

calculated habitat value for the shallow, soft substrate to the Bond Paper's habitat value for Upper Newport Bay of 4005.4 as a surrogate for habitat values at Bolsa Chica:

- 4005.4/535.27 = 7.5 (wetlands are 7.5 x more productive than shallow water, soft substrate habitat)
- Mitigation Ratio for remaining shallow water, soft substrate habitat = 1:7.5

The Bight data used in the Discharger's proposed mitigation ratio calculations were collected using otter trawls only, and as noted in the Bond Paper, otter trawl data underrepresent water column (pelagic) fish as otter trawls are designed to target demersal (benthic) fish. The Bond Paper habitat value was also based only on otter trawl data. Authors of the Bond Paper noted that combining the SONGS otter trawl data with the lampara net data (which targets water column fish) provides a better habitat valuation than otter trawl alone. The authors of the Bond Paper concluded that the value of the shallow sand habitat was best estimated using the combined SONGS lampara and trawl data and that reliance on only data collected by otter trawls resulted in an unrealistically lower habitat value. Therefore, adjustment for this disparity using a factor of 30% per the Bond Paper could be used to provide a more conservative estimate.

If the Bond Paper estimate that otter trawl data underpredict the habitat value for shallow, soft substrate by approximately 30%, then the habitat value the authors of the Bond Paper calculated for that area of the San Pedro Shelf should actually be 846.6 [(651.2 x 0.30) + 651.2], and the habitat value calculated by the Discharger based on the five Bight surveys would be 695.9 [(535.27 x 0.30) + 535.27]. Comparison of these habitat values to the wetlands habitat value of 4005.4 yields the following potential mitigation ratios that could be used to scale the APF for the Facility (neither estimate accounts for habitat loss due to the construction of the Ports):

- 4005.4/846.6 = 4.7; applicable mitigation ratio adjusted by 30%: 1:4.7 (Bond et al., 1999)
- 4005.4/695.9 = 5.8; applicable mitigation ratio adjusted by 30%: 1:5.8 (Discharger's Appendix QQQQQ)

As stated previously, because there have been no recent habitat valuations for wetlands, the Discharger compared the habitat value they calculated from the Bight survey data with the habitat value of the Bond Paper that was calculated for Upper Newport Bay using data collected by Allen (1982) from January 1978 through January 1979. It should also be noted that the Upper Newport Bay habitat value is more robust than either the Bond Paper or the Discharger's 2019 habitat values for shallow, soft substrate habitat as six different quantitative sampling methods were used to collect fish versus one sampling method for the shallow, soft substrate (otter trawls). Table 4 below, provides a summary of different out-of-kind mitigation ratios that could potentially be applied to the APF for the proposed mitigation projects in the Bolsa Chica wetlands.

Table 2. Potential Mitigation Ratios for Scaling the APF for the Proposed Facility Based on a Comparison of Habitat Values for Open Coast, Soft Bottom Habitat and Estuarine Habitat

Habitat	APF (acres)	Mitigation Ratio (MR) (Santa Ana Water Board staff)				Mitigation Ratio (MR) (Discharger)			
		Adjustment to habitat values (HV): None, Ports Loss, 30%; Both (Ports + 30%)							
Total (unscaled) APF	423.5	None	Ports Loss	30%	Both	None	Ports Loss	30%	Both
Estuarine MR	23.2	1:1	1:1	1:1	1:1	1:1	1:1	1:1	1:1
Coastal MR (wetlands HV ÷shallow, soft substrate HV)	399.7	**1:6.2** (4005.4 ÷ 651.2)	**1:5.8** (4005.4 ÷ 688.3)	**1:4.7** (4005.4 ÷ 846.6)	**1:4.5** (4005.4 ÷ 894.8)	**1:7.5** (4005.4 ÷ 535.3)	**1:7.1** (4005.4 ÷ 565.8)	**1:5.8** (4005.4 ÷ 695.9)	**1:5.4** (4005.4 ÷ 735.5)
Total Scaled APF* (acres)	NA	87.7	92.2	108.3	112.1	76.5	79.5	92.2	97.3

*These scaled APF estimates include the 1% credit that may be applied to the seawater intake APF for the use of a 1-millimeter wedgewire screen as allowed under Chapter III.M.2.e(1)(a) of the Ocean Plan.

<u>Santa Ana Water Board Staffs' Rationale for the Mitigation Ratio Applied to Mitigation at the Bolsa Chica Wetlands</u>

The Bond Paper used data collected from the San Pedro Shelf over a period of more than 20 years (1974-1996) by the Vantuna Research Group (VRG) and Love et al. (1986). The Upper Newport Bay data (used as a surrogate for the Bolsa Chica wetlands) were collected from January 1978 through January 1979 (Allen 1982). Therefore, the data period for the Upper Newport Bay data and the San Pedro Shelf data are contemporaneous in that they were both collected prior to the current oceanic regime represented by the Bight survey data. For this reason, Santa Ana Water Board staff, in consultation with other agencies staff, recommend use of the Bond Paper habitat value for the shallow, soft substrate along the San Pedro Shelf, as it is more conservative and better represents the oceanic regime present during the late 1970s when the Upper Newport Bay data were collected[5] verses the Bight survey data used by the Discharger. However, Santa Ana Water Board staff recommends adjusting the habitat value for the San Pedro Shelf using the Bond Paper estimate of 30% to account for the lack of adequate representation of water column fish in the otter trawl data but do not recommend adjusting the Upper Newport Bay habitat value for the following reasons.

The Bond Paper notes that even very small differences in sampling techniques can also yield measurably different habitat valuations (page 233 in the paper; page 16 in the pdf). The size of the net has a direct effect on catchability, especially of larger fish. Large, highly mobile

[5] The purpose of Allen's study was to focus sampling on littoral (intertidal) fish; each sampling station was located in shallow water adjacent to marsh vegetation. Also, at the time of Allen's study, eelgrass was not present. This means that there was less structural complexity in the habitats present at the time of Allen's study than that which currently exists in Upper Newport Bay.

fishes are particularly likely to be underrepresented in smaller cross-section trawls. The VRG sampling conducted on the San Pedro Shelf deployed otter trawls that used both 4.9 and 7.6 m headrope nets; other comparative surveys used only the larger net size (7.6 m headrope nets). Adams et al. (1995) compared surveys using a 29 m headrope trawl to video observations with a remote operated vehicle (ROV); both methods gave much higher abundance values for the continental slope than the otter trawls that used smaller nets. In addition, the Bond Paper states that otter trawls are considered to have catch efficiencies of between 30% to 50% and are not fully representative of both water column and larger fish. As a result, the Bond Paper recommends increasing a habitat valuation that is based on only one sampling method or when it is clear that certain types of fish may have been under sampled (e.g., pelagic or cryptic[6] fish) by 30% as a “rule of thumb” (page 236 of the paper; page 19 of the pdf). Increasing these types of habitat valuations can then account for disparities in different sampling methods, net size and/or time of day the sampling occurred.

Baseline surveys of juvenile and adult fish from the Ports of Los Angeles and Long Beach also indicate that net size, use of multiple sampling methods (appropriate for the different targeted habitats), season (with higher summer catches, at least for trawl data) and day verses night sampling (greater variety and more fish caught at night) can impact estimates of fish variety, abundance, and density (MEC Analytical Services, Inc. 2002, Science Applications International Corporation 2010, and MBC Applied Environmental Sciences and Merkel & Associates 2016).

Similarly, sampling at Batiquitos Lagoon conducted from January 1996 through November 2006 (Merkel & Associates 2009) included daytime and nighttime sampling at five different stations using five different sampling methods: purse seine, large seine, small seine, otter trawl and square enclosures. The five different gear types used in the monitoring program were selected to sample both demersal (benthic) and pelagic (water column) species and were expected to have varying fish catch efficiencies as a result of the varying area, slope, substrate (e.g., sand, eelgrass) and depth sampled. Figure 5 shows the number of individual fish captured in each replicate haul for each gear type.

[6] Also called cryptobenthic fishes. Defined as ‘adult fishes of typically <5 cm that are visually and/or behaviourally cryptic (camouflage, conceal) and maintain a close association with the benthos’. Cryptic fishes represent the ‘hidden half of coral reef vertebrate biodiversity; they are hard to observe due to their small size, camouflage colors, erratic behavior, and long residency (Cadena-Estrada et al., 2019).

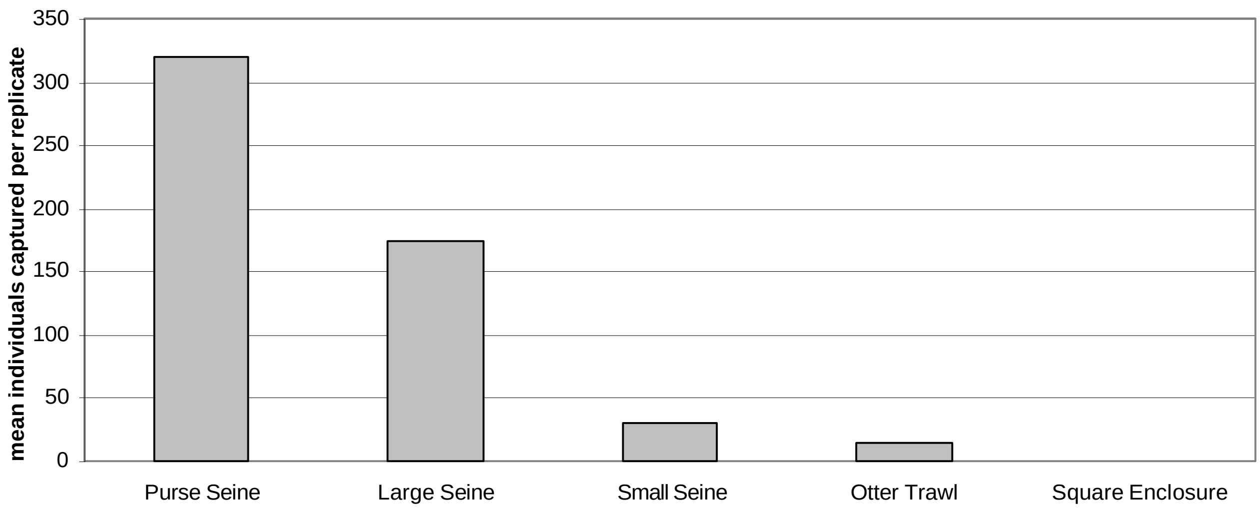

Figure 5. Mean number of individuals captured per replicate in each gear type per day (Merkel & Associates, 2009, Figure 5-33).

These factors (physical characteristics of the area being sampled, season, day or night sampling and sampling method(s)/gear type(s) used) can also skew habitat value estimates, especially those based on one sampling method (i.e., the VRG otter trawl sampling) that used relatively small nets (4.9 and 7.6 m headrope nets) and was only deployed during daylight hours. In contrast, while the Upper Newport Bay data were also only collected during daylight hours (comparable with the VRG otter trawl data), six different methods were used to collect fish (Horn and Allen, 1981). These included the following:

1) An otter trawl with a 3.8 m headrope, 4.1 m wings of 2.0 cm mesh, a 2.6 m cod end with 0.8 cm mesh in the liner and 0.3 x 0.5 m doors towed with 30 m polypropylene bridles to collect bottom-associated juvenile and adult fishes in the channel areas of each station.
2) A 45.6 x 2.4 m monofilament gill net set parallel to the shore in 2-3 m of water once at each station during each sampling period to capture juvenile and adult fishes in the water column of the channel and deeper inshore areas.
3) A 15.2 x 1.8 m seine (bag seine) fitted with a 1.8 x 1.8 x 1.8 m bag used to collect inshore juvenile and adult fishes.
4) A 4.6 x 1.2 m seine (small seine) with 0.3 cm mesh also used to collect inshore juvenile and adult fishes.
5) A 2.45 x 2.45 x 1.00 m drop-net with 0.3 cm mesh used to collect inshore juvenile and adult fishes at depths of approximately 0.5 - 1.5 m.
6) A 1.0 x 1.0 x 1.0 m square enclosure constructed of heavy duck material fastened to a frame of 2.5 cm diameter PVC pipe used in conjunction with an anesthetic (quinaldine mixed 1:5 with isopropyl alcohol) to sample inshore juvenile and adult fishes.

The multiple sampling methods used in the Upper Newport Bay study were designed to specifically sample fish from the different littoral habitats in the bay, including shallow water, panne areas, and the deeper channels (Horn and Allen 1981; Allen 1982). Each method had different catch efficiencies with the bag seine capturing the highest number of fish and the drop net and square enclosure with the lowest catch efficiencies. The otter trawl and gill nets resulted in the greatest number of species and were most efficient at catching larger fish. A total of 51,816 juvenile and adult fish belonging to 46 species and weighing over 353 kg were collected bimonthly at four stations in Upper Newport Bay from January 1978 to January 1979 using these six different sampling methods/gear types. Because of the variety of sampling methods used for this sampling, Santa Ana Water Board staff do not recommend increasing the Bond Paper habitat value of 4005.4 for Upper Newport Bay by 30%.

However, given the uncertainties in the habitat value assigned in the Bond Paper to the shallow, soft substrate from the VRG studies (relatively small net sizes and likely under representation of water column and larger fish), Santa Ana Water Board staff do recommend increasing the habitat value for the shallow, soft substrate of the San Pedro Shelf by 30%. A 30% increase is recommended in the Bond Paper to account for disparities in sampling methods, net sizes and types, and time of day the sampling occurred. In addition, application of an increase of the habitat value by 30% is supported by NOAA Fisheries staff, based on their concerns that the Bond Paper habitat value for the shallow, soft substrate does not adequately capture water column (pelagic) fish.

<u>Development of a Mitigation Ratio for the Proposed Palos Verdes Artificial Reef</u>

The Discharger's proposed Palos Verdes Artificial Reef is located within the source water body for the proposed Facility (Discharger's Appendix IIIIII). The Discharger submitted Appendix IIIIII, which described the proposed artificial reef project and included a mitigation ratio of 1:8.6. After further discussions with Santa Ana Water Board staff regarding the proposed mitigation project, the Discharger submitted a draft of Appendix WWWWWW on October 28, 2020, which included a revised mitigation ratio for the Discharger's proposed Palos Verdes Artificial Reef and accompanying supporting information. Santa Ana Water Board staff provided responses to the analyses contained in the draft Appendix WWWWWW via a letter dated December 18, 2020. During the intervening time, Santa Ana Water Board staff continued to review the Discharger's submittals and consult with California Coastal Commission staff as well as Dr. Peter Raimondi. On January 27, 2021, the Discharger submitted a final draft of Appendix WWWWWW for Santa Ana Water Board staff's review (Appendix WWWWWW-2).

Similar to the approach staff used to determine a mitigation ratio for the Bolsa Chica projects, the Discharger's revised Appendix WWWWWW-2 utilizes the habitat values from Bond et al. (1999) for their proposed mitigation ratio for the proposed Palos Verdes Artificial Reef. The Discharger proposes to use the habitat value of 894.9 for the open coast, soft bottom habitat impacted by the Facility. This is consistent with staff's recommendations (see additional discussion, above). The Discharger further proposes using the Bond et al. (1999) habitat value for the Palos Verdes Rocky Reef of 5754.1. Therefore, the resulting mitigation ratio in Appendix WWWWWW-2 is calculated using the following numbers: 5754.1/894.9 = 6.4.

Applying this to the portion of the APF that will not be mitigated by the projects at Bolsa Chica (238.0 acres) results in the need for a 37.2-acre mitigation reef.

Santa Ana Water Board staff completed an independent analysis of the mitigation ratio for the proposed Palos Verdes Artificial Reef. Staff concurred with using the historic Palos Verdes Reef habitat value as a surrogate for the Discharger's proposed artificial reef; however, staff adjusted the recommended mitigation ratio per Ocean Plan Chapter III.M.2.e.(3)(b)vii by 10%. This section of the Ocean Plan states

> "…regional water boards may increase the required mitigation ratio for any species and impacted natural habitat calculated in the Marine Life Mortality Report when appropriate to account for imprecisions associated with mitigation including, but not limited to, the likelihood of success, temporal delays in productivity, and the difficulty of restoring or establishing the desired productivity functions."

The 10% adjustment is to account for the uncertainty in the Discharger's proposed artificial reef. Though the proposed reef will use a design similar to that used for NOAA's Palos Verdes Reef Restoration Project, completion of that reef only occurred at the end of September 2020, so there is not sufficient information available to determine how successful the restoration has been. In addition, the Discharger's proposed Palos Verdes Artificial Reef and the historic Palos Verdes Reef that was analyzed in the Bond Paper differ in habitat type (the historic Palos Verdes reef was primarily a low relief kelp reef). The proposed artificial reef and the newly restored Palos Verdes Reef are designed primarily to attract fish (and both will also be fished reefs), though there may be some kelp recruitment from other natural reefs in the area. This results in additional uncertainty in the mitigation ratio calculation. Finally, the proposed artificial reef may not function as designed; the SONGS artificial reef, for example, was undersized and therefore did not meet some performance metrics. Santa Ana Water Board staff, therefore, maintains that these uncertainties must be accounted for in the mitigation ratio. The 10% adjustment provides a margin of safety to account for these uncertainties and this adjustment is therefore directly applied to Poseidon's proposed mitigation ratio of 1:6.4. This results in a **final mitigation ratio of 1:5.8**, which results in the need for a **40.8-acre** artificial reef.

In addition, the final size of the artificial reef must take into account the fact that some of the larvae produced by the reef may be entrained by the proposed Facility, which is located 37 kilometers (23 miles) southeast of the proposed artificial reef. Therefore, an ETM/APF needs to be calculated to determine how much additional mitigation is needed to offset this loss.

Only five reef taxa were collected within the source water body for the Facility during the 2003-2004 sampling. However, none of the five reef taxa were included in the ETM/APF calculation for the Facility's intake and discharge because they were only collected during one survey, and there were very limited larval length data available for these taxa. There are, however, sufficient data for two of the five rocky reef taxa to calculate APFs for potential entrainment of these taxa from the artificial reef by the operation of the proposed Facility.

Based on the need for a 40.8-acre artificial reef to mitigate for the remaining impacts not mitigated by projects in the Bolsa Chica Wetlands, the combined APFs for the two reef taxa, which require in-kind mitigation, increased the proposed required reef size by another **0.5 acres**, for a total of **41.3 acres**.

Conclusions and Recommendations

Santa Ana Water Board staff recommends using the Bond Paper's habitat value for shallow, soft bottom substrate as adjusted by 30% (from 651.2 to 846.6) to account for uncertainties in habitat values based on only one type of sampling method that may underrepresent the marine life found in this habitat. Santa Ana Water Board staff also recommends modifying the adjusted Bond et al. (1999) habitat value (846.6) to account for the loss of this habitat as a result of the construction of the Ports. This approach is valid in that the areal production potential of that habitat was lost for those species dependent on that habitat. Santa Ana Water Board staff however, do not recommend adjusting the Upper Newport Bay habitat value of 4005.4 by 30% as this habitat value is based on the use of multiple sampling methods (six gear types) specifically targeted for the physical characteristics and different fish habitats present in Upper Newport Bay.

Based on an assessment of the above, Santa Ana Water Board staff recommend using Santa Ana Water Board staffs' calculations to adjust the final APF for impacts to coastal, soft bottom species from intake and discharge at the proposed Facility using an out-of-kind mitigation ratio of 1:4.5 for mitigation projects proposed for the Bolsa Chica Wetlands to account for the difference in biological productivity between the habitat being impacted and the habitat that will be used to mitigate for those impacts.

For the Discharger's proposed Palos Verdes Artificial Reef, Santa Ana Water Board staff recommend using an out-of-kind mitigation ratio of 1:5.8, which includes a 10% margin of safety to account for uncertainties in the calculated ratio. After accounting for potential entrainment of marine life from the proposed artificial reef itself, a **41.3-acre artificial reef** is recommended to offset remaining impacts from the construction and 50-year operation of the proposed Facility.

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Shoreline layer: The Continually Updated Shoreline Product (CUSP), National Oceanic and Atmospheric Administration (NOAA), National Geodetic Survey (NGS) 1:1000 scale, 8/1/2016.
https://shoreline.noaa.gov/data/datasheets/cusp.html

Bathymetric Depth Contour layer: 10m_bathy_to_600m.shp
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Attachment G.5 – Approach for Mitigation of the Facility

Introduction

Poseidon Water (Surfside) LLC (Discharger) has proposed to locate the proposed Huntington Beach Desalination Facility (Facility) within the AES Huntington Beach Generating Station (AES HBGS) site. The Water Quality Control Plan for the Ocean Waters of California (Ocean Plan) requires that the Discharger mitigate to replace all forms of marine life or habitat that is lost due to the construction and operation of a desalination facility after minimizing intake and mortality of all forms of marine life. The Discharger has proposed to implement both in-kind (for estuarine and rocky reef species) and out-of-kind (for coastal species) mitigation by completing mitigation projects at the Bolsa Chica Ecological Reserve and creating an artificial reef offshore of the Palos Verdes Peninsula (Palos Verdes Artificial Reef). This attachment provides Santa Ana Water Board staff's analysis of the mitigation acreage available for the mitigation projects at the Bolsa Chica Ecological Reserve (also referred to as the Bolsa Chica Lowland Restoration Project or Bolsa Chica Wetlands) and for the Palos Verdes Artificial Reef to support Findings 45–48 and 51–54 of Attachment G to the Tentative Order.

Ocean Plan Requirements

Chapter III.M.2.eof the Ocean Plan requires the owner or operator of a proposed new desalination facility to develop a Marine Life Mitigation Plan to determine the best available mitigation measures feasible to mitigate for mortality of all forms of marine life. The specific requirements are listed below:

1. Mitigation shall be accomplished through expansion, restoration or creation of one or more of the following: kelp beds, estuaries, coastal wetlands, natural reefs, MPAs, or other projects approved by the regional water board that will mitigate for intake and mortality of all forms of marine life associated with the facility. (Chapter III.M.2.e.(3)(b)i; Finding 45)
2. The owner or operator shall demonstrate that the project fully mitigates for intake-related marine life mortality by including expansion, restoration, or creation of habitat based on the APF acreage calculated in the Marine Life Mortality Report above. The owner or operator using surface water intakes shall do modeling to evaluate the areal extent of the mitigation project's production area to confirm that it overlaps the facility's source water body. Impacts on the mitigation project due to entrainment by the facility must be offset by adding compensatory acreage to the mitigation project. (Chapter III. M.2.e.(3)(b)ii; Finding 46)
3. The owner or operator shall demonstrate that the project also fully mitigates for the discharge-related marine life mortality projected in the Marine Life Mortality Report above. (Chapter III. M.2.e.(3)(b)iii; Finding 47)
4. The owner or operator shall demonstrate that the project also fully mitigates for the construction-related marine life mortality identified in the Marine Life Mortality Report above. (Chapter III. M.2.e.(3)(b)iv; Finding 48)

5. For in-kind mitigation, the mitigation ratio shall not be less than one acre of mitigation habitat for every one acre of impacted habitat. (Chapter III. M.2.e.(3)(b)vii; Finding 51)
6. For both in-kind and out-of-kind mitigation, the regional Santa Ana Water Board may increase the required mitigation ratio for any species and impacted natural habitat calculated in the Marine Life Mortality Report when appropriate to account for imprecisions associated with mitigation, including but not limited to, the likelihood of success, temporal delays in productivity, and the difficulty of restoring or establishing the desired productivity functions. (Chapter III. M.2.e.(3)(b)viii; Finding 52)
7. The rationale for the mitigation ratios must be documented in the administrative record for the permit action. (Chapter III. M.2.e.(3)(b)ix; Finding 53)
8. The Mitigation Plan is subject to approval by the regional water board in consultation with State Water Resources Control Board (State Water Board) staff and with other agencies having authority to condition approval of the project and require mitigation. (Chapter III.M.2.e.(3)(c); Finding 54).

Summary of Analyses Conducted

Santa Ana Water Board staff evaluated the Discharger's Marine Life Mitigation Plan (MLMP) submittals to determine the following:

- If the proposed mitigation was in compliance with the Ocean Plan's requirement for expansion, creation, or restoration of habitat;
- If the proposed mitigation acreage is sufficient to fully mitigate for impacts from the proposed Facility for the operational lifetime of the Facility; and
- If the MLMP included adequate information regarding performance standards and monitoring requirements.

Summary of Conclusions

Based on Santa Ana Water Board staff's analysis of the Discharger's submittals, discussions with the Discharger, and discussion with other state and federal agencies staff, Santa Ana Water Board staff recommends that the Santa Ana Water Board conditionally find the following:

1. Preservation of the Full Tidal Basin via inlet maintenance dredging will provide 28 acres of mitigation credit.
2. Restoration of the Fieldstone property to subtidal habitat will provide 4.5 acres of mitigation credit.
3. Restoration of the Oil Pads to subtidal habitat will provide 1.2 acres of mitigation.
4. Enhancement of water circulation within the Muted Tidal Basins will provide 15 acres of mitigation credit.
5. Restoration of the cordgrass marsh on the Intertidal Shelf in the Full Tidal Basin will provide 10.5 acres of mitigation credit.
6. Creation of the Palos Verde Artificial Reef will provide 41.3 acres of mitigation credit.
7. In total, the projects described herein constitute the best available mitigation feasible and fully mitigate for all intake and mortality caused by the Facility's operation and construction.

These findings are conditional and awarding of all mitigation acreage credit is contingent upon:

1. Completion of all tasks in the Marine Life Mitigation Plan Schedule (Attachment K) and any environmental analysis required under the California Environmental Quality Act (CEQA); and
2. Successful (as determined by performance standards) implementation of all components of the mitigation in items 1–6 above.

Applicable Definitions

As discussed in the requirements above, the Ocean Plan requires that mitigation be accomplished through “expansion, restoration or creation.” (Ocean Plan, chap. III.M.2.e.(3)(b)i.) However, the Ocean Plan does not define these terms. In the absence of definitions in the Ocean Plan, it is reasonable to consider definitions used by other agencies for similar compensatory mitigation programs to aid in defining these terms.

The U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (U.S. EPA) require compensatory mitigation to offset the loss of aquatic resources resulting from dredge or fill activities permitted under Clean Water Act section 404. (See 33 CFR part 332; Institute for Water Resources *Mitigation Rule Retrospective* prepared for USACE and U.S. EPA, 2015.) Under the regulations jointly promulgated by USACE and U.S. EPA, mitigation may be accomplished through restoration, enhancement, establishment, and sometimes preservation. (33 CFR § 332.3(a)(2).) The joint regulations define restoration as “the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource”, and divides restoration into two categories: re-establishment and rehabilitation. (33 CFR § 332.2.) These categories of restoration are defined as follows:

> Re-establishment means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.
>
> Rehabilitation means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function but does not result in a gain in aquatic resource area. (33 CFR § 332.2.)

The USACE and U.S. EPA refer to “creation” as “establishment” and define it as “the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions.” (33 CFR § 332.2.)

Expansion is not defined in the joint regulations, but other relevant definitions include the following:

> Enhancement means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.
>
> Preservation means the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions. (33 CFR § 332.2.)

Although these definitions are not binding, given the absence of definitions in the Ocean Plan, this analysis uses these definitions as guidance to categorize the Discharger's proposed mitigation actions.

Marine Life Mitigation Plan Evaluation

The Discharger first submitted a Marine Life Mitigation Plan (MLMP) as Appendix TT in July of 2016. The Discharger submitted revised versions in February 2018 (Appendix TT2), March 2019 (Appendix TT3), and most recently, June 2019 (Appendix TT4). Santa Ana Water Board staff in consultation with State Water Board staff (collectively, Water Boards staff) provided comments on the documents via teleconference, in-person meetings, letter, and email communication. As part of Santa Ana Water Board staff's comprehensive review, staff consulted with other agencies as directed by Ocean Plan chapter III.M.2.a.(4). Specifically, staff from the California Coastal Commission, California State Lands Commission, and the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) (collectively, with Water Boards staff, Agencies staff) provided additional review of the Discharger's MLMP.

Initially, the Discharger proposed in Appendix TT to dredge the ocean inlet at Bolsa Chica. The Discharger described this action as "restoration" and proposed that dredging of the ocean inlet should result in 199 acres of mitigation credit (Appendix TT, pages 6 and 26). The Discharger stated that dredging of the Bolsa Chica inlet would, "…assure long-term and effective tidal action to support estuarine and coastal fish populations in this important regional wetland habitat." (Appendix TT, page 1).

Water Boards staff reviewed Appendix TT and, during a January 10, 2018 meeting, Agencies staff informed the Discharger of several concerns regarding the MLMP. Staff's primary concern was that the proposed maintenance dredging did not comply with the Ocean Plan chapter III.M.2.e.(3)(b)i requirement that "[m]itigation shall be accomplished through expansion, restoration or creation….of coastal wetlands." Specifically, staff determined that the inlet maintenance dredging is a "preservation" form of mitigation, not "restoration." The existing habitat at Bolsa Chica is not degraded and is currently functioning; however, if the inlet were not maintained the existing habitat could degrade and there could be a potential loss of function. Thus, the proposed maintenance dredging would only preserve the already existing habitat at Bolsa Chica. Based on the above definitions, the inlet maintenance dredging clearly falls under the “preservation” definition: when the dredging is carried out as needed to maintain an expected volume of tidal flow, it acts to “remove a threat to, or prevent the decline of” existing habitat functions and values. Additionally, Agencies staff know of no other projects in the state where dredging, in and of itself, has been considered a form of restoration mitigation. Staff recommended that the Discharger modify the proposed MLMP to specifically include restoration within Bolsa Chica in addition to any proposed dredging.

The Discharger submitted Appendix TT2 which modified the MLMP to include several major revisions. The Discharger replaced the phrase “inlet maintenance” throughout the document with “inlet rehabilitation,” which the Discharger explained was a form of restoration and was meant to demonstrate that the maintenance dredging would comply with the requirement in chapter III.M.2.e.(3)(b)i of the Ocean Plan that mitigation take the form of “expansion, restoration, or creation.” However, the Discharger’s change in phrasing did not change the nature of the dredging project—the dredging is a form of preservation and not restoration, as discussed above. The Discharger also proposed several projects to provide additional, potential mitigation acreage: 1) preservation of eelgrass in the Bolsa Chica Full Tidal Basin; 2) adaptive management for sea level rise (SLR); and 3) potential restoration opportunities within Bolsa Chica muted and full tidal areas. (See Appendix TT2, page 1, Table 1.)

Santa Ana Water Board staff, in consultation with State Water Board, California Coastal Commission, California State Lands Commission, and NOAA Fisheries staff, raised several concerns with Appendix TT2. The concerns were similar to those raised regarding Appendix TT. Agencies staff did not agree with the Discharger’s proposed acreage credit calculation for the maintenance dredging. The Discharger stated (in both Appendix TT and TT2) that 199 mitigation acres of credit were available for the inlet dredging. The Discharger performed a functional lift analysis to calculate the available mitigation acreage, a method that is used to identify the increased functions and habitat values that result from a habitat improvement project. Specifically, the Discharger used fish diversity data from several Southern California lagoons that were closed to tidal influence and compared these data with data from Bolsa Chica. Santa Ana Water Board staff determined that this comparison was not an appropriate metric for determining mitigation acreage for the following reasons: 1) no functional lift would occur as a result of the dredging, because the Bolsa Chica ocean inlet is currently open and hydrologically connected to the Pacific Ocean. (if the inlet were closes and no tidal connectivity existed, functional lift could result from dredging); 2) functional lift does not apply to preservation actions, since they result in maintaining existing conditions; 3) the calculation looked at fish richness data only, which is an important metric for examining ecosystems, but is not sufficient to adequately characterize the productivity of the wetlands; and 4) the data used in the analysis were temporally limited to August and did not adequately capture the range of seasonal changes within Bolsa Chica.

Santa Ana Water Board staff also had concerns about the Discharger's proposed mitigation acres of credit for eelgrass habitat. The eelgrass was planted in the Full Tidal Basin in 2006 by state and federal agency partners and volunteers after the Coastal Commission approved acres of mitigation credit for the Ports of Los Angeles and Long Beach for the original Bolsa Chica restoration project. Although no party has received mitigation acreage for the eelgrass, the Discharger did not contribute to the creation of the eelgrass habitat and cannot justify receiving mitigation acres for its creation simply because no other party has claimed it as mitigation. However, any acres of mitigation credit given for the maintenance dredging of the inlet, which would preserve the habitats within the Full Tidal Basin, would include preservation of the eelgrass. Staff elected not to recommend providing additional, separate mitigation acreage for the eelgrass habitat for these reasons.[1] Regarding the adaptive management to sea level rise, Appendix TT2 noted that it was premature to provide a detailed description of this work and that substantial, additional planning would be required. Additional permitting may also have been required for this work, so it was not discussed further. Finally, Santa Ana Water Board staff requested additional clarification and information regarding the several potential upland restoration opportunities identified by the Discharger in Appendix TT2.

In response to the requests for information for Santa Ana Water Board staff, the Discharger submitted Appendix TT3 in March 2019. Appendix TT3 contained new analyses from the Discharger regarding the calculations of acres of mitigation as well as additional information on some aspects of the proposed mitigation projects. On May 14, 2019, Santa Ana Water Board staff sent the Discharger a written notice of outstanding information in Appendix TT3. The letter included additional requests for information and clarification. Following a May 21, 2019 discussion with Agencies staff, the discharger submitted Appendix TT4 on June 26, 2019 which purported to address the concerns and outstanding issues raised in the May 14, 2019 Santa Ana Water Board letter. Appendix TT4 did not address the outstanding issues. However, Appendix TT4 includes sufficient information and clear performance standards to make a conditional determination regarding the mitigation project, subject to the Discharger's submission of more detailed plans. Santa Ana Water Board staff, in consultation with State Water Board management, recommends that the Santa Ana Water Board provide the Discharger with a Marine Life Mitigation Plan Schedule (MLMP Schedule). The MLMP Schedule (Attachment K to the Order; Finding 5 in Attachment G to the Order) provides the Discharger with a schedule to submit additional plans to supplement and finalize the MLMP. Taken together, the proposed restoration projects, including circulation

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[1] California Coastal Commission staff raised additional concerns about the Discharger's proposed crediting approach because the Discharger had not considered the California Coastal Commission's prior approval of mitigation credits for the original Bolsa Chica restoration project. The California Coastal Commission had already awarded credits to other parties for most of what the Discharger was currently proposing at Bolsa Chica—with the exception of the eelgrass—and California Coastal Commission staff determined that this "double counting" of credits would substantially reduce the number of credits it would recommend for the Discharger's proposed mitigation. A more detailed discussion of the project approved by the California Coastal Commission is included below.

enhancements, and the proposed dredging will restore coastal wetlands (i.e., the Bolsa Chica Wetlands). When analyzed holistically, the preservation and enhancement activities—both imperative to the success of the overall mitigation and merit-worthy in their own right—constitute restoration consistent with chapter III.M.2.e.(3).

During the public hearing on July 30 and 31, 2020, Santa Ana Water Board staff provided an overview of the Discharger's proposed mitigation. Staff also recommended the amount of mitigation acres credit that could be awarded for each proposed mitigation activity. During the Board's deliberation on July 31, 2020, some board members expressed concerns about the number of acres of mitigation credit that staff recommended for the dredging of the Bolsa Chica inlet. After the July 31 meeting, the Discharger initiated discussions with Santa Ana Water Board staff, State Water Board staff, and California Environmental Protection Agency staff to modify the proposed mitigation to address the Santa Ana Water Board's concerns. On August 7, 2020, the third day of the public hearing, Santa Ana Water Board staff presented the proposal developed during those discussions, which included the reduction of acres of credit for maintenance dredging to 45 acres of credit.

The Santa Ana Water Board rejected staff's revised recommendation for inlet maintenance dredging acreage and gave direction that the dredging should not account for more than 25% of the required acres of mitigation credit. As a result of this reduction, the Discharger's mitigation proposal in Appendix TT4 was not sufficient to fully mitigate the construction and operation impacts of the Facility. In identifying additional mitigation opportunities to address the shortfall, the Santa Ana Water Board directed the Discharger to prioritize restoration, creation, and expansion projects within Bolsa Chica to the extent feasible or otherwise identify additional mitigation outside of Bolsa Chica but within the source water body (as required by Ocean Plan, chapter III.M.2.e.(3)(b)ii.).

Santa Ana Water Board staff consulted with California State Lands Commission staff to identify other potential restoration projects in Bolsa Chica and evaluate the expected feasibility of the potential projects (see additional discussion at the conclusion of this document). In addition, Santa Ana Water Board staff consulted with other agencies staff (e.g., NOAA Marine Fisheries, California Coastal Commission, and California Department of Fish and Wildlife) to identify other potential restoration projects located outside of Bolsa Chica but within the source water body for the proposed Facility. Santa Ana Water Board staff shared information about potential mitigation projects obtained from other agencies with the Discharger for their review and analysis.

The Discharger evaluated the potential projects and submitted additional analyses (Appendices HHHHHH, IIIIII, PPPPPP, PPPPPP-2, and WWWWWW-2) to supplement their MLMP with the proposed intertidal shelf cordgrass marsh restoration in Bolsa Chica's Full Tidal Basin and the proposed Palos Verdes Artificial Reef project. The calculations of mitigation acreage below are based on Santa Ana Water Boards staff's analysis of Appendix TT4 and the supplemental appendices with adjustments to incorporate the Board's direction on acres of mitigation credit for the dredging. The calculations are contingent upon the Discharger complying with the MLMP Schedule in Attachment K to the Order.

Acres of Mitigation Credit for Bolsa Chica Activities – Maintenance Dredging

The Mitigation Ratio Calculator

State Ana Water Board staff worked with California State Lands Commission and NOAA Fisheries staff to develop their preliminary recommendation to the Board for the acres of mitigation credit available for dredging the Bolsa Chica Inlet. To estimate the acres of mitigation credit available, staff utilized the Mitigation Ratio Calculator (MRC) developed by Dr. Dennis King, for NOAA (see King and Price (2004)).[2] The MRC allowed staff to develop a site-specific ratio that can be applied to the mitigation project to determine the appropriate amount of acres of mitigation credit available.

The MRC requires users "to set numerical values for eight parameters associated with the impacted and the mitigation wetlands. . . Once these parameters are determined, the tool can be used in one of three ways: 1) to establish compensation ratios for a particular mitigation proposal or trade, 2) to establish the number of acres associated with 'consolidated' mitigation projects or mitigation banking ventures, and 3) to influence the outcome of ad hoc negotiations over what constitutes acceptable wetland mitigation" (King and Price (2004), page 5). The MRC was applied the discharger's proposed mitigation consistent with scenario 1 above.

King and Price (2004) developed three different versions of the MRC. The first version typically applies to situations where the mitigation that is under consideration involves wetland creation, restoration, or enhancement, and the analytical focus is on the gains in wetland functions and values at the mitigation site and how they compare with the losses at the wetland impact site. The second version is used when the conservation or preservation of one wetland area is being considered as mitigation for the destruction of another wetland area. The third version of the MRC combines the first two versions; it is used when a proposed mitigation project includes both wetland conservation/preservation and wetland restoration (King and Price (2004)). Because both enhancement actions (water circulation improvements in the Muted Tidal Basins) and preservation actions (the inlet maintenance dredging) are proposed by the Discharger, the first and second version of the calculator were used for the two actions, respectively[3].

Per King and Price (2004), to account for differences in the ecosystem services provided per acre by impacted and replacement wetlands, a mitigation ratio should take

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[2] At this point, California Coastal Commission staff determined that it would need to provide a separate evaluation of the mitigation credits that might be available at Bolsa Chica, as staff noted that the California Coastal Commission has not accepted use of this calculator or other similar calculators for determining mitigation credits.

[3] As detailed on page 12, below, the Discharger also proposed additional mitigation activities. Because these additional qualify as restoration, no use of the Calculator was required when determining the amount of mitigation acres.

into account five factors, detailed below. While King and Price (2004) describe the MRC as it applies to “wetlands,” it is important to note that it is applicable to any mitigation project and is not specific to wetlands projects.

1. The existing level of wetland function at the site prior to the mitigation;
2. The resulting level of wetland function expected at the mitigation site after the project is fully successful;
3. The length of time before the mitigation is expected to be fully successful;
4. The risk that the mitigation project may not succeed; and
5. Differences in the location of the lost wetland and the mitigation wetland that affect the services and values they have the capacity and opportunity to generate.[4]

These five factors are taken into account through the eight parameters used in the MRC formula presented in Table 1 below. The MRC requires the user to estimate values for each of the parameters in Table 1.[5]

Application of the MRC to dredging

Working with staff from NOAA Fisheries, Santa Ana Water Board staff developed initial estimates for the MRC in the Fall of 2018. Staff’s initial analyses are shown in Table 1, below. Santa Ana Water Board staff applied the MRC to the inlet dredging and considered the action to be preservation (or “conservation,” per King and Price 2004). These inputs to the table resulted in a final mitigation ratio of 4.25 (see equation 1, below). When applied to Bolsa Chica’s full tidal basin (the area that would be maintained due to the Discharger’s proposed dredging), it resulted in 317 acres ÷ 4.25 = 75 acres of mitigation credit (Table 1).

Equation 1

$$R = \frac{\sum_{t=0}^{T_{max}} (1+r)^{-t}}{(B(1-E)(1+L)-A)\left[\sum_{t=-D}^{C-D-1} \frac{(t+D)}{C(1+r)^{t}} + \sum_{C-D}^{T_{max}} (1+r)^{-t}\right] + \left[\sum_{t=-D}^{T_{max}} \frac{\left(1-(1-k)^{(t+D)}\right)}{(1+r)^{(t+D)}}\right](A(1+L))}$$

[4] Note, these factors are also discussed in the Ocean Plan Staff Report.

[5] A detailed explanation of each parameter in the MRC is found in Appendix A of King and Price 2004; summarized definitions are provided below.

Table 1 – MRC Input Parameters and Selection Input Values

Parameter	Description	Value	Value Justification
A	The level of wetland function provided per acre at the mitigation site prior to the mitigation project, expressed as a percentage of the level of function per acre at the wetland impact site;	100%	Maintenance dredging will allow Bolsa Chica to maintain the same level of productivity it has historically. This is considered “preservation” not restoration for the purposes of the MRC.
B	The maximum level of wetland function each acre of mitigation is expected to attain, if it is successful, expressed as a percentage of the per acre level of function at the wetland impact site;	100%	Maintenance dredging will allow Bolsa Chica to maintain the same level of productivity it has historically (MRC preservation scenario)
C	The number of years after construction that the mitigation project is expected to achieve maximum function;	0	Parameter does not enter the equation for a preservation scenario
D	The number of years before destruction of the impacted wetland that the mitigation project begins to generate mitigation values (negative values of D represent delayed compensation);	0	Parameter does not enter the equation for a preservation scenario
E	The percent likelihood that the mitigation project will fail and provide none of the anticipated benefits (with mitigation failure, wetland values at the mitigation site return to level A);	0%	Parameter does not enter the equation for a preservation scenario
L	The percent difference in expected wetland values based on differences in landscape context of the mitigation site when compared with the impacted wetland (positive values represent more favorable landscape context at mitigation site);	0%	This parameter is evaluated separately by applying a mitigation ratio to the Area of Production Foregone (APF) as allowed under Ocean Plan Chapter III.M.2.e.(3)(b)vii (see Attachment G.4).
k	The percent likelihood that the mitigation site, in the absence of the proposed conservation action (e.g., purchase or easement) would be developed in any future year. This is treated as a cumulative distribution function in the equation;	8%	Translates to a 8% chance that Bolsa Chica would fail completely due to lack of funding.

Parameter	Description	Value	Value Justification
r	The discount rate used for comparing gains and losses that accrue at different times in terms of their present value;	3%	The standard value for mitigation calculations.
T_{max}	The time horizon used in the analysis.	12	12 years was selected because 1) there is no assumed risk of failure in the calculation (this is the “E” parameter in the MRC which is set at 0), so a shorter project time horizon addressed this, 2) climate change will continue to affect the function and success of Bolsa Chica, and 3) re-configuration or adaptive management actions are likely to affect mitigation at Bolsa Chica in the next 5-10 years.[6]
Ratio		2.92	**Final Mitigation Ratio to apply to inlet dredging**

[6] California Coastal Commission staff decided that the Mitigation Ratio Calculator (MRC) was inappropriate for use in determining the mitigation ratios for the proposed work at Bolsa Chica. The MRC is structured to create a comparison between an impacted wetland and a wetland where restoration or enhancement will occur, and to evaluate the difference in functional lift before and after impact and before and after enhancement or restoration. In this case, there is no existing impacted wetland to use for comparative purposes. Rather, impacts occur to fish larvae in the open ocean. Further, the California Coastal Commission establishes its own ratios for impacts to wetlands. California Coastal Commission staffs’ established ratios take into consideration the temporal loss of the impacted resources and potential restoration failure. California Coastal Commission staffs’ ratios apply to creation or “substantial restoration” of the impacted habitat and are generally in the range of 4:1 for wetland impacts (acres of mitigation: acres of impacts. California Coastal Commission staff require higher ratios for enhancement or preservation of habitat. Maintenance dredging will allow Bolsa Chica to maintain the same level of productivity it has historically.

In response to Santa Ana Water Board staff's proposed use of the MRC, the Discharger submitted Appendix MMMMM. Appendix MMMMM proposed a longer time horizon (T_{max} = 25) and a higher k value (14%) resulting in 317 acres ÷ 1.48 = 214 acres of mitigation credit. Santa Ana Water Board staff and staff from the California State Lands Commission (the agency that manages Bolsa Chica) met with the Discharger to discuss these analyses. Santa Ana Water Board staff increased the value used for k to 8%, after additional consultation with California State Lands Commission staff regarding their estimates of the risk of failure of Bolsa Chica due to lack of funding to keep the tidal inlet open. Santa Ana Water Board staff then recalculated the R value using the MRC which resulted in an R value of 2.92 resulting in 317 acres ÷ 2.92 = **108 acres of mitigation** credit for the preservation of the Full Tidal Basin through maintenance inlet dredging. Given the uncertainty about the short- and long-term effects of climate change at Bolsa Chica, staff did not agree with the Discharger's proposed increase of the time horizon (T_{max}) from 12 years to 25 years.

As discussed above, the Board rejected staff's recommended calculation for the acres of mitigation credit for the maintenance dredging of the Bolsa Chica ocean inlet. Consistent with the Board's direction, the maintenance dredging is assigned 28 acres of mitigation credit.[7] The 28 acres of credit is calculated by taking 25% of 112 acres—the mitigation acres of credit that was required after applying the mitigation ratios developed for the Bolsa Chica projects to scale the then-total APF of 423.5 acres—which was the applicable mitigation acreage required at the August 7, 2020 meeting when the Board provided it's direction.[8] The Santa Ana Water Board's adjustment to the maintenance dredging acreage is appropriate because the dredging is not, in and of itself, "restoration, expansion, or creation" but is essential to the success of the restoration projects within the Bolsa Chica Wetlands.

<u>"Double Counting" of Mitigation Credits for Dredging</u>

An additional concern for California Coastal Commission staff is the issue of "double counting" acres of mitigation credit. California Coastal Commission previously approved three sets of mitigation credits for different phases of restoration at Bolsa Chica for the Ports of Los Angeles and Long Beach (Ports). The California Coastal Commission's

[7] NOAA Fisheries staff has indicated that the Santa Ana Water Board staff's initially proposed ratio (317 acres/2.92) was atypically low for preservation actions and recommended that the Santa Ana Water Board apply the minimum ratio for preservation actions established by the U.S. Army Corps of Engineers in their regional federal guidance as an appropriate minimum preservation mitigation ratio. Based upon regional federal guidance developed by the U.S. Army Corps of Engineers, the minimum ratio for preservation actions is 4:1, which would result in approximately 79 acres of mitigation (317 acres/4). The adjusted dredging acreage comports with the minimum ratio recommended by the US Army Corps of Engineers.

[8] The scaled APF has changed slightly since the August 7, 2020 meeting due to the application of a new mitigation ratio for the Palos Verdes Artificial Reef. (See Attachment G.4 for a full discussion.)

approval of acres of mitigation credit was based in part on the restoration plan, which included maintenance dredging of the ocean inlet at Bolsa Chica. California Coastal Commission staff believes that allowing the Discharger to receive mitigation acreage for conducting the same inlet dredging without the Discharger also providing additional restoration acreage within Bolsa Chica that is dependent on the dredging would result in double counting of those credits.[9] California Coastal Commission staff also believes that maintenance dredging is required to maintain functional benefits that were contemplated during prior approval and may not warrant additional acres of mitigation.

Santa Ana Water Board staff has reviewed the previously awarded mitigation plans and does not believe double counting is an issue. Although the credits have been fully earned by the Ports, no entity is currently obligated to do the dredging necessary to maintain the ocean inlet at Bolsa Chica—an activity that is necessary to preserve the wetlands. As such, for Regional Water Board purposes, the Discharger may perform the dredging for mitigation credits proportional to the benefits derived from the activity. In 1996, the California Coastal Commission approved the Bolsa Chica Lowland Acquisition and Conceptual Restoration Plan (1996 Mitigation Plan). To fulfill their obligation under the 1996 Mitigation Plan, the Ports provided $66.75 million for the state to purchase 880 acres at Bolsa Chica for wetland restoration and for the U.S. Fish and Wildlife Service (USFWS) to restore 344 acres of full tidal wetlands and 260 acres of muted tidal wetlands. The funding was also expected to cover the establishment and maintenance of an ocean inlet to ensure a full tidal range within the area of Bolsa Chica known as the "Full Tidal Basin." Upon implementation of the Plan, California Coastal Commission would provide each of the Ports 227 acres of mitigation acres (454 acres total) for the 1996 Mitigation Plan.

In 1997, the Ports paid an additional $6 million each to allow for the future restoration of full tidal circulation within an additional 275 acres in Bolsa Chica, which was referred to in the 1996 Mitigation Plan as the "Future Full Tidal Area." This funding was to support the design and maintenance of an ocean inlet that would be sized to ensure adequate tidal circulation within both the Full Tidal Basin and the Future Full Tidal Basin. The California Coastal Commission gave each of the Ports an additional 40 acres of mitigation for funding this work.

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[9] The Discharger must obtain a Coastal Development Permit (CDP) from the California Coastal Commission for the proposed Project. If the California Coastal Commission issues the CDP, it will include any mitigation requirements needed to conform to applicable Coastal Act and Local Coastal Program polices and regulations. California Coastal Commission staff takes the position that the Discharger cannot receive mitigation credit for the benefits that dredging of the ocean inlet would provide to areas already restored by the Ports because the Ports already received acres of mitigation credit for this. California Coastal Commission staff would, however, recommend approval of some mitigation acres for the Discharger if its dredging activities support areas in Bolsa Chica that the Discharger restores above and beyond what the Ports have restored or sustained values beyond those already credited as mitigation.

In 2001, the California Coastal Commission approved a more detailed version of the 1996 Mitigation Plan that was based on studies conducted after approval of the 1996 Plan. The updated plan included a $5-million maintenance account that was expected to fund the long-term maintenance of the ocean inlet. The Ports did not receive any additional mitigation acres as part of this updated plan.

In 2005, the California Coastal Commission approved a modified version of the mitigation plan to install self-regulating tide gate structures in parts of Bolsa Chica to increase the tidal exchange and improve estuarine functions in 173 acres of the muted tidal basins (MTBs). The original design had anticipated very little or no estuarine functions in the MTBs, but with the larger tide gate structure, productivity in the MTBs was expected to be about a third of that in the Full Tidal Basin. The California Coastal Commission provided the ports with 38 acres each for the improvements expected from these gate structures.

The three sets of mitigation acres that the California Coastal Commission approved were all calculated with the understanding that the ocean inlet would be maintained. Under each scenario, the obligation of the Ports was to provide the designated amount of funds that was expected to support the restoration plans, including necessary and ongoing maintenance and monitoring, and in turn they received their mitigation acres; the ongoing maintenance, including inlet dredging was to be performed by the U.S. Fish and Wildlife Service to the extent that funding was available. The Ports have paid all they were required to pay and have received their mitigation acres. However, the money set aside for funding this dredging proved insufficient and has since been depleted. Although the Ports received mitigation acres based on the expectation that the ocean inlet would be regularly dredged and maintained, none of the approved mitigation plans included a mechanism through which the California Coastal Commission could require the Ports to provide additional funding to fulfill this obligation. The current lack of funding for dredging the inlet poses a threat to continued functioning of the restored ecosystem. There is no other party that is currently obligated to perform the maintenance dredging since depletion of long-term maintenance funds. Thus, there is a preservation mitigation opportunity available for the Discharger.

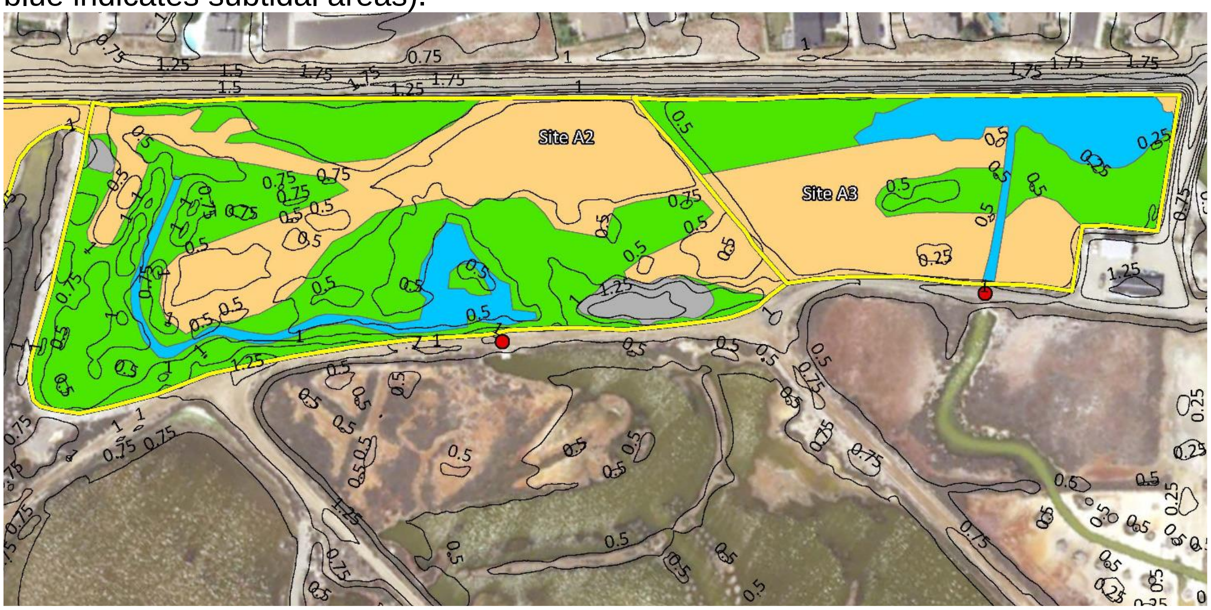
Other than recognizing previously approved mitigation included as part of CEQA compliance for the Ports, the Santa Ana Water Board have not separately awarded any acres of mitigation credit for the Bolsa Chica wetlands to any person or entity as part of any mitigation required as a condition for a regulatory approval. Santa Ana Water Board staff does not believe that double counting is an issue here. Although the Ports received mitigation acres for maintaining the ocean inlet, the Ports do not have a continuing obligation to fund the dredging and the U.S. Fish and Wildlife Service does not have an obligation to perform the dredging in the absence of sufficient funding. If the parties who previously undertook the restoration work were continuing work on the originally approved mitigation project, then that could pose a double counting issue for the Santa Ana Water Board—but that is not the case here. Based on California Coastal Commission staff's interpretation of the Coastal Act and previous California Coastal

Commission decisions, the California Coastal Commission may have a different approach to awarding acres for the Discharger's proposed mitigation project. The Santa Ana Water Board's decision on the mitigation required under the Ocean Plan does not bar the California Coastal Commission (or any other agency) from requiring any additional mitigation necessary to satisfy the agency's program requirements in the course of reviewing the Project. All agencies retain their authority to require mitigation associated with their statutorily required approvals for projects such as the proposed Facility.

Acres of Mitigation Credit for Bolsa Chica Activities – Fieldstone Property Restoration

As noted in Appendix TT4 (and shown in Figure 1 below), the Fieldstone Property is approximately 12 acres of barren, salt panne habitat. The Discharger proposes to restore the habitat to vegetated or intertidal/subtidal habitat.

Figure 1 – From the Discharger's Appendix TT4, the Fieldstone Property is shown below. Yellow areas are salt panne areas, green areas are partly or fully vegetated, and blue indicates subtidal areas).



The Discharger has not yet determined how the restoration activities within the Fieldstone Property are to be implemented; the Discharger will provide these details in accordance with the MLMP Schedule (Attachment K to the Order).

While the MTB water circulation improvements and the maintenance dredging of the ocean inlet are essential components to the overall mitigation at Bolsa Chica, they are enhancement and preservation actions, respectively. Thus, the Mitigation Ratio Calculator was used, in addition to interagency consultation, to determine the acres of mitigation credit resulting from these activities. The Discharger's proposal to restore barren, salt panne qualifies as "restoration" pursuant to Ocean Plan Chapter III.M.2.e.(3)(b)i. The MRC, therefore, was not utilized for this assessment. The

Discharger's planned restoration activities are expected to result in approximately 4.5 acres of subtidal or intertidal habitat, which can be counted towards offsetting the impacts from intake and discharge of the proposed Facility. Though the entire Fieldstone property is approximately 12 acres, only 6 acres within that area is salt panne habitat suitable for restoration. There will be 6 acres of restoration accomplished within the Fieldstone Property; after accounting for a "buffer zone" around the restored areas, 4.5 acres of credit for restoration will result.

Acres of Mitigation Credit for Bolsa Chica Activities – Oil Pad/Berms/Road Areas Restoration

In addition to restoring vegetated or subtidal/intertidal habitat in the Fieldstone Property, the Discharger has proposed additional restoration projects, scattered throughout Bolsa Chica. These additional restoration projects consist of restoring habitats that currently contain active and inactive oil pads and roads. Like the restoration activities within the Fieldstone Property, the MRC was not utilized when determining the acres of mitigation credit resulting from removal of the oil pads. As discussed in Appendix TT4, the inactive oil pads and roads will result in a net increase of approximately 1.2 acres of subtidal or intertidal habitat. The Discharger has not yet determined how the oil pads and road removal projects will be implemented; the Discharger will provide these details in accordance with the MLMP Schedule.

Acres of Mitigation Credit for Bolsa Chica Activities – Water Circulation Enhancement within Muted Tidal Basins

Based on staff's consultation with the Bolsa Chica managing agencies, success of the Discharger's restoration projects would require improvements to the water circulation in the MTBs. These circulation improvements could take the form of changing the size or slope of tidal channels, modifying the existing tide gate, removal of excessive sediment, or other similar and related activities. The improvements would also be designed to provide capacity for the Bolsa Chica Steering Committee and its reserve manager, the California Department of Fish & Wildlife (CDFW), to more effectively manage hydrology within the MTBs. In accordance with the MLMP Schedule, the Discharger must submit additional plans for the proposed restoration projects that include improvements to water circulation to enhance the MTBs.

In addition to supporting the Discharger's restoration activities in Bolsa Chica, the circulation improvements would also increase fish richness by helping to stabilize salinity, temperature, and dissolved oxygen conditions within MTB waters. As a result, these improvements would provide the Discharger with additional mitigation acreage. Santa Ana Water Board staff, in consultation with California State Lands Commission and NOAA Fisheries staff, has calculated the acres of credit available for circulation improvements by using the MRC. The MRC was utilized for an “enhancement” action, not a “preservation” action, for the water circulation improvements.[10]

Santa Ana Water Board staff calculated the potential mitigation acreage available for the West, Central, and East Muted Tidal Basins (WMTB, CMTB, and EMTB respectively). To account for differences in productivity and functionality of the different MTBs, Santa Ana Water Board staff evaluated a range of mitigation ratio scenarios by accounting for potential differences in function, resilience, durability, and landscape setting by varying the MRC parameters. An average of ratio values (R in Table 2) was then taken for each scenario run for the different MTBs.

Table 2—Example calculation of different input parameters for the MRC for a given MTB. The final ratio would be calculated by taking an average of the values in the far right column.

A	B	C	D	E	L	k	r	T_{max}	R
0.25	0.33	3	0	5	-10	0	3	24	34.92
0.25	0.33	3	0	10	-10	0	3	24	64.9
0.25	0.33	3	0	5	-15	0	3	24	68.15
0.25	0.33	3	0	5	-10	0	3	12	37.89
0.25	0.33	3	0	10	-10	0	3	12	70.41
0.25	0.33	3	0	5	-15	0	3	12	73.94
0.25	0.33	5	0	5	-10	0	3	24	37.07
0.25	0.33	5	0	10	-10	0	3	24	68.89
0.25	0.33	5	0	5	-15	0	3	24	72.34
0.25	0.33	5	0	5	-10	0	3	12	42.23
0.25	0.33	5	0	10	-10	0	3	12	78.48
0.25	0.33	5	0	5	-15	0	3	12	82.41
0.2	0.33	3	0	5	-10	0	3	24	13.67
0.2	0.33	3	0	10	-10	0	3	24	16.68
0.2	0.33	3	0	5	-15	0	3	24	16.89
0.2	0.33	3	0	10	-15	0	3	24	21.41
0.2	0.33	3	0	5	-10	0	3	12	14.83
0.2	0.33	3	0	10	-10	0	3	12	18.1
0.2	0.33	3	0	5	-15	0	3	12	18.32
0.2	0.33	3	0	10	-15	0	3	12	23.22
0.2	0.33	5	0	5	-10	0	3	24	14.51
0.2	0.33	5	0	10	-10	0	3	24	17.71
0.2	0.33	5	0	5	-15	0	3	24	17.93
0.2	0.33	5	0	10	-15	0	3	24	22.72
0.2	0.33	5	0	5	-10	0	3	12	16.53
0.2	0.33	5	0	10	-10	0	3	12	20.17
0.2	0.33	5	0	5	-15	0	3	12	20.42
0.2	0.33	5	0	10	-15	0	3	12	25.89

[10] The details of the water circulation improvement plan will be submitted by the Discharger in accordance with the MLMP Schedule.

The WMTB is currently functioning at a relatively higher level than the CMTB or EMTB, so limited enhancement acres are available. Unlike the maintenance dredging, which is a preservation action, the water circulation improvements are enhancement (restoration), and therefore, all of the MRC inputs are used. For the WMTB calculation, values of A=0.2 and 0.25 were used to reflect the likely success of the WMTB circulation improvements. These values of A reflect the relative drainage and circulation of each MTB. Figure 2, below, shows the tidal level of each MTB. As discussed below, and indicated in Table 2, an iterative analysis was conducted by staff to account for uncertainties in the functionality of the different MTBs.

A value of B = 0.33 was used to represent the maximum function of the MTBs relative to the more productive FTB. The value of 0.33 was used because during the planning of the Bolsa Chica restoration it was anticipated that the MTBs would be approximately 1/3 as productive as the FTB. (For this reason, B = 0.33 was used for the WMTB, CMTB, and EMTB calculations.) It has since been shown that overall, the MTBs are currently providing much less productivity than originally expected, as subsidence of the MTBs[11] has reduced water circulation within the MTBs, especially in the central and eastern MTBs. If the MTBs, however, were functioning as designed they would be equally productive. Therefore, the same B value is used for the WMTB, CMTB, and EMTB. To reflect the relative improvements of the different MTBs, different A values are used.

Parameter C in the MRC represents the number of years it will take for the mitigation to be effective. Santa Ana Water Board staff believe that the project will be effective in between 3 and 5 years, so both values were used to represent endpoints. The estimate of 3 to 5 years is based on similar mitigation projects in coastal wetlands in southern California and Agencies staffs' best professional judgment. Because the Discharger is required to perform mitigation in order to operate their proposed facility, Santa Ana Water Board staff anticipates no time lag between implementation of the mitigation projects and the proposed Facility's first day of operation, and thus D = 0 is used throughout the analyses. Given the relative circulation problems in the three different MTBs – namely that the EMTB is barely functional, the CMTB, is only occasionally fully functional, and the WMTB is almost fully functional – the values of parameter E reflect the percent (%) chance the project will fail. The function, in terms of drainage, is shown in Figure 2, below. As it is unlikely that the WMTB will fail under current conditions, parameter E was varied between 5 and 10%.

For the MTBs, Santa Ana Water Board staff, based on consultation with NOAA Fisheries and California State Lands Commission staff, varied L between -10 and -15 (this was applied, uniformly, across the WMTB, CMTB, and EMTB) to note that the muted tidal basins have an unfavorable landscape/ seascape context (i.e., limited

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[11] Subsidence related to oil extraction, which is still occurring in the areas surrounding the Bolsa Chica wetlands.

nekton[12] exchange due to tide gates and engineered hydrology) compared to the impact habitat (i.e., open ocean habitat with unconstrained nekton exchange)[13]. The improvements to water circulation will contribute to an overall gain in aquatic resources, assure that the proposed restoration components (Fieldstone and Oil Pad restorations) succeed, and improve foraging habitat for bird species. Finally, a T_{max} value of 12 years, and an r of 3% were used for consistency with the Full Tidal Basin estimates.

The average ratio (calculated across 16 scenarios) for the WMTB was calculated to be R = 34.84. Assuming that the enhancements apply to all of the 25 acres WMTB, it results in the following: 25 acres ÷ 34.84 = **0.71** acres of mitigation credit.

The CMTB and EMTB were calculated similarly. In the CMTB, the primary difference from the WMTB is that A varied from 0.1 to 0.15 (10 to 15%). This is a reflection of the limited ability of the CMTB to properly drain and circulate water (see Figure 2, below). Given the overall greater affect in the CMTB the ratios were significantly lower, resulting in more acres of available mitigation credit. The average ratio was R = 9.41 for the 38 acres in the CMTB, which when applied to all 38 acres it yielded the following: 38 acres ÷ 9.41 = **4.03** acres of mitigation credit.

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[12] Nekton refers to the aggregate of actively swimming aquatic organisms in a body of water.

[13] Note that in the preservation scenario used to calculate mitigation credit for the Full Tidal Basin, L was omitted from the preservation calculation because a different approach to account for productivity differences was adopted by Santa Ana Water Board staff.

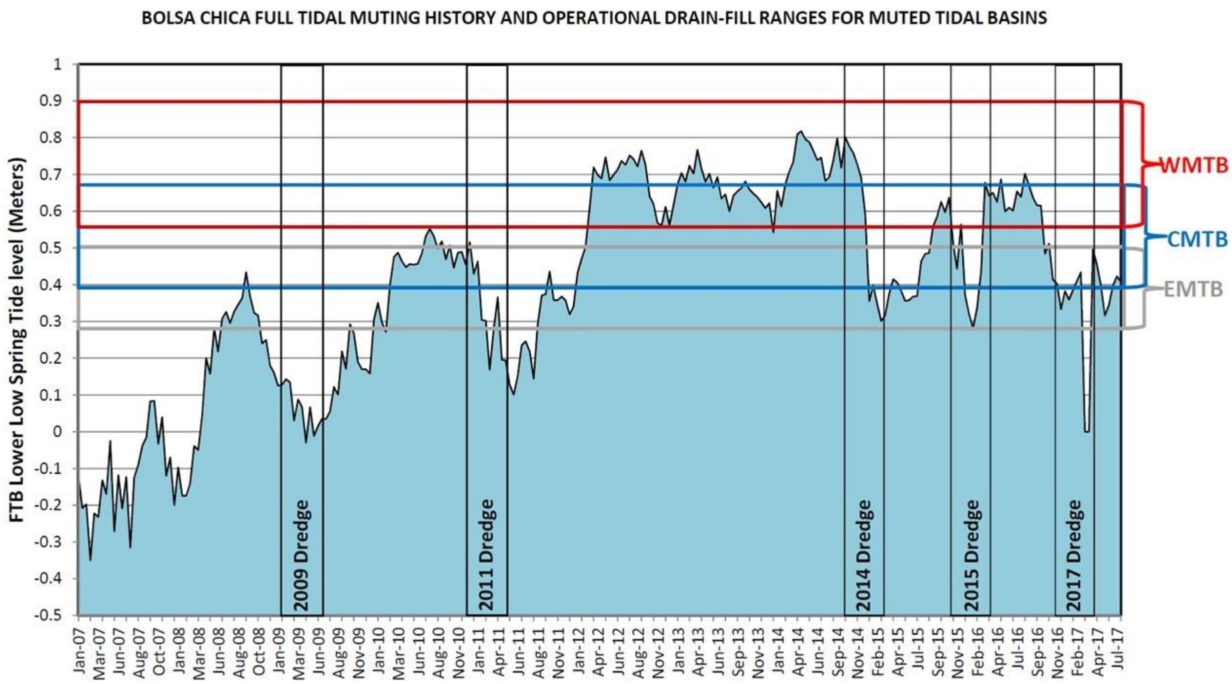

Figure 2 The tidal range, shown in light, shaded blue, needs to be below the gray, blue, and red lines for the EMTB, CMTB, AND WMTB, respectively to drain effectively. As shown in the figure, the is rarely the case for the EMTB and CMTB, but it is generally true for the WMTB

For the EMTB, where circulation of water was severely impaired, an even lower value of A was used. Here, A ranged from 0.025 to 0.05 (2.5 to 5 %). However, given the challenges facing the EMTB, the likelihood of failure was slightly increased. In these scenarios, E ranged from 10 to 15%. The final, average ratio for the EMTB was 6.02. When applied to all 62 acres it yielded the following: 62 acres ÷ 6.02 = **10.3** acres of mitigation credit.

In total, the water circulation improvements in the MTB result in an estimated **15.04** acres of credit available for the enhancement opportunities (0.71 acres [WMTB] + 4.03 acres [CMTB] + 10.3 acres [EMTB]). Because staff has not yet received a full description of the changes needed to provide these improvements, it is not yet clear whether the enhancements would occur throughout the MTBs or within just a portion of each MTB. There would be proportionally fewer available mitigation acres if the enhancements occur within less than the full area of each of the MTBs.

<u>Acres of Mitigation Credit for Bolsa Chica Activities – Intertidal Shelf Restoration</u>

Appendix HHHHHH describes the proposed restoration in more detail, but a brief summary follows: The Discharger is proposing to raise the elevation of a low-lying marsh area to approximately 1 – 1.5 m above mean lower low water. The final size of the area will be determined when the final design plans are submitted (per Attachment K), but it is approximately 23 acres in size. The restored habitat will include primarily cordgrass with some pickleweed habitat in order to restore the habitat to be consistent with the original restoration plans developed in the late 1990s.

Santa Ana Water Board staff employed the Mitigation Ratio Calculator in a similar fashion to the Muted Tidal Basin and Full Tidal Basin as described above. The Discharger also proposed to use the Mitigation Ratio Calculator in Appendix HHHHHH but their proposed inputs differ from those recommended by Santa Ana Water Board staff, which are shown below:

Table 3: Mitigation Ratio Calculator Inputs as recommended by Santa Ana Water Board Staff

Enter Parameter Values	
A	30.0%
B	100%
C	5
D	-1.5
E	10%
L	0%
k	0%
r	3%
Tmax	25

R =	2.20

As discussed above, A is the value of the current unvegetated area, B is the expected value following restoration, C is the number of years before it meets the maximum performance standards, D is the number of years after the plant operations begins before the mitigation area begins to generate its ecological functions, E is the likelihood it might fail, L relates to any change in landscape function, and r is the discount rate.

Santa Ana Water Board staff's analysis uses a value of D = -1.5. Using a value of D = -1.5 notes that a delay between the mitigation project providing value and the operation of the Facility will likely occur. Therefore, Santa Ana Water Board staff recommends using a ratio of 2.20 (see table 3) and that the Intertidal shelf restoration garner 10.5 (23/2.20) acres of credit.

Total Acres of Credit for Bolsa Chica Mitigation Activities

The mitigation projects at Bolsa Chica analyzed include:

1) Maintenance dredging of the ocean inlet (28 acres of credit)
2) Fieldstone Property restoration (4.5 acres of credit)
3) Oil Pads and Roads restoration (1.2 acres of credit)
4) Muted Tidal Basin water circulation improvements (15.04 acres of credit)
5) Intertidal shelf restoration (10.5 acres of credit)

This results in a total of 59.2 acres of credit: (28) + (4.5) +(1.2) + (.71+4.03+10.3) + 10.5 = 59.2 acres of credits.

Acres of credit for Palos Verdes Artificial Reef

Santa Ana Water Board staff's analysis of the Discharger's proposed projects in the Bolsa Chica Wetlands results in 59.2 acres of credit. This, in turn, means that the Discharger is still required to complete additional mitigation projects to offset the remaining impacts from the proposed Facility. However, as discussed in Attachment G.4, there are additional steps necessary to determine the acres of mitigation required when an artificial reef is proposed because a reef is a more biologically productive marine environment than a coastal wetland like Bolsa Chica. Using the methods recommended in Attachment G.4, the Discharger would need to create a 41.3-acre artificial reef to fulfill the total mitigation required for the proposed Facility (see detailed discussion in Attachment G.4).

The Discharger's proposal to create the Palos Verdes Artificial Reef qualifies as "creation" pursuant to Ocean Plan Chapter III.M.2.e.(3)(b)i and is considered to be out-of-kind mitigation for coastal taxa (and in-kind mitigation for the rocky reef taxa). The mitigation habitat created by the proposed Palos Verdes Artificial Reef is significantly more productive than the soft-bottom habitat impacted by the proposed Facility. As such an appropriate mitigation ratio is derived in Attachment G.4

Conclusions for Calculations of Mitigation Acre Credits

Santa Ana Water Board staff recommends that the Santa Ana Water Board find that the proposed Palos Verdes Artificial Reef of 41.3 acres results in 41.3 acres of credits. The restoration projects at Bolsa Chica, discussed above, were each awarded one acre of credit per acre of restoration. Similarly, Santa Ana Water Board staff recommend that the creation of a highly productive artificial reef also result in 1 acre of credit for each acre of artificial reef habitat created. Santa Ana Water Board staff further notes that while rock may not cover every square inch of the habitat, the channels between rock outcroppings provide valuable ecotonal habitat for fish and invertebrates. Therefore, when determining the credit calculation, it is essential to acknowledge the overall benefit of the entire rocky reef system (both rock and sand channels).

These mitigation acreage calculations are estimates that may change as part of Santa Ana Water Board staff's and California State Lands Commission staff's review of the Discharger's mitigation plans submitted to comply with the Special Provisions in the Tentative Order (Marine Life Mitigation Plan Schedule, Attachment K). Santa Ana Water Board staff also recognizes that California Coastal Commission staff's review is likely to result in different and fewer mitigation acres than described herein, due in part to its concerns about double counting relating to some of the proposed projects in the Bolsa Chica Wetlands.

Best Available Mitigation Feasible

In addition to the projects discussed above, Santa Ana Water Board staff evaluated several other potential mitigation projects. At the request of staff, the Discharger also evaluated some of these potential projects (see Appendix QQQQQQ). The Discharger's analysis of a potential mitigation project at Newland Marsh is also discussed in Appendix XXXXXX**.**

Table 4 was prepared by Santa Ana Water Board staff after extensive consultation with staff from the California Coastal Commission, State Lands Commission, and California Department of Fish Wildlife. Within each row is Santa Ana Water Board staff's analysis of each project's potential feasibility considering the information provided by the Discharger (see also Appendix VVVVVV).

Table 4: Alternative Mitigation Sites

Project	Acres	Staff Analysis
Pocket Marsh ESHA Area restoration	5	<u>CEQA:</u> not examined by any existing CEQA analysis. New CEQA/NEPA analysis likely will be required. <u>Cost:</u> $0.5-1.0 million <u>Technical information required</u>: The resulting acreage is rather small, but the project is also rather simple. This would involve some excavation and new culverts. Grading plans, design plans, and limited hydrologic modeling may be required. <u>Timeframe:</u> 1-2 years <u>Mitigation type:</u> restoration <u>Staff recommendation</u>: After reviewing the information in Appendix QQQQQQ and consulting further with California Coastal Commission staff, Santa Ana Water Board staff does not recommend this project as the best available mitigation feasible. This is primarily because the current property owner may use the property as mitigation to satisfy separate Coastal Commission permit requirements.
Muted Pocket Marsh to Full Tidal Pocket Marsh	43	<u>CEQA:</u> not examined by any existing CEQA analysis. New CEQA/NEPA analysis may be required. <u>Cost:</u> $2.0 -5.0 million following separate action at Warner Avenue Bridge and Huntington Harbor. <u>Technical information required</u>: Consideration was given to development of a full tidal Pocket Marsh in the initial Bolsa Chica restoration project. However, restriction of tidal flows at the Warner Avenue Bridge and concerns over potential for exacerbation of erosion within the main channel margins in Huntington Harbor posed constraints beyond the scope of the project at the time and the marsh was restored as a muted tidal marsh rather than a full tidal marsh. With the County and Corps proposing a project that would increase throughput at Warner Avenue and address scour in Huntington Harbor as required for storm conditions, the potential for full tidal marsh restoration should again be considered for the Pocket

		Marsh. Grading plans, design plans, and extensive hydrologic modeling would be required. Timeframe: unknown Mitigation type: enhancement Staff recommendation: Santa Ana Water Board staff does not recommend this project as the best available mitigation feasible. For the project to succeed, the hydrology of the site will need to be altered. Unfortunately, USACE is also proposing mitigation in the area. While it is possible for the two projects to be completed (staff's current understanding is that they are distinct projects), the potential project analyzed herein does depend on the USACE implementing its proposed project. This, in turn, means the project's potential success would not be within the Discharger's control.
Convert muted tidal basins to full tidal	70-100	CEQA: CEQA/NEPA analysis would be required. Estimated Cost: Not yet developed Technical information required: groundwater studies, sea level rise analysis, grading plans, hydrologic modeling, information on abandoned pipelines. Investigations into potential oil infrastructure conflicts and opportunities for coordination of activities Timeframe: 3-5 years Mitigation type: restoration Staff recommendation: Based on the information submitted by the Discharger, this project is not the best available feasible mitigation. Santa Ana Water Board staff estimated a timeline of 3–5 years to permit the project; however, the need to potentially purchasing the land from the oil company as well permitting concerns of other agencies (e.g. CDFW and California Coastal Commission) make the timeline uncertain. Furthermore, it is unclear if the oil company currently using this area would be open to this project. These concerns affect the availability and feasibility of this project.
Outer Bolsa Bay Mesa restoration	15-25	CEQA: not examined by an existing CEQA analysis. Would require new CEQA/NEPA analysis. Estimated Cost: $6-18 million Technical information required: Cumulative impacts study. Information regarding the effects of the proposed USACE projects in the area, as well as a cultural resources survey. Additional concerns: USACE and the Orange County Flood Control District are moving forward with other projects in this area that may affect the feasibility and design plans for this mitigation opportunity. The land is currently owned by CDFW and the State Lands Commission. There are potentially significant Native American cultural resources at the site, which may limit habitat restoration opportunities. Coordination would be needed with multiple stakeholders to address public access, upland restoration, and integration of community concerns and opportunities.

		Timeframe: 4-6 years Mitigation type: restoration Staff recommendation: Based on the information submitted by the Discharger and the concerns noted above, Santa Ana Water Board staff does not recommend this project as the best available mitigation feasible. There is some uncertainty about other potential projects that affect the availability and feasibility of the proposed site. The Discharger has not performed any analyses or conducted any surveys of the area to confirm the presence or absence of Native American cultural resources; however, there may be some Native American cultural resources present as noted above.
Artificial reef at Huntington Flats or inshore of existing Huntington Beach artificial reefs	70-115 (20-60 credits)	CEQA: This is an entirely new project and would therefore require a new CEQA/NEPA review. Estimated Cost: 70 acres (low relief, high density reef): $38 million; 115 acres (low relief, low density reef): $20.1 million (Acreage and costs vary depending on reef design. Costs do not include long-term monitoring costs.) Technical information required: Performance metrics, success criteria, and site selection would likely require a Science Advisory Panel; type of habitat being restored would require additional studies (e.g., benthic surveys); substrate characterization study to determine if selected areas contain appropriate seafloor conditions suitable for artificial reefs; ocean currents and sediment transport and erosion studies, and studies focusing on other factors necessary to determine where the best conditions occur along this area of the coast for a giant kelp/rocky reef complex. Poseidon would be required to consult extensively with the relevant state and federal agencies before obtaining Santa Ana Water Board approval Additional concerns: CDFW has raised multiple concerns over new artificial reef development. This idea. however, has the support of several other permitting agencies. Timeframe: unknown Mitigation type: restoration/creation Staff recommendation: While this project may be viable, Santa Ana Water Board staff does not recommend it as the best available mitigation feasible. This is due to the significant time it would require to develop, permit, and implement a project of this magnitude. Unlike the proposed Palos Verdes Artificial Reef, the studies needed to develop a conceptual plan have not been completed, construction of the reef would require obtaining a new (as opposed to amending an existing) lease from the State Lands Commission, and no environmental analysis or permitting has been done for this potential project. As a result, it is not likely that this potential project is feasible.
East San Pedro Bay restoration project	40-60	CEQA: No CEQA/NEPA analysis has been completed, however, the USACE has done extensive initial planning that would provide background for future environmental analysis. Cost: unknown. Technical information required: USACE has provided preliminary plans for the possible restoration opportunities. Additional modeling and design would be necessary.

		Additional concerns: This project would require substantial coordination with the USACE (who has not yet committed to moving forward with the project), the City of Long Beach, and other state and federal agencies in order to determine how the Discharger could assist with this project. Furthermore, the project has not received funding from Congress to proceed at this time, making USACE involvement uncertain. Timeframe: 8-10 years Mitigation type: restoration Staff recommendation: After additional discussions with staff from the California Coastal Commission and NOAA Fisheries, Santa Ana Water Board staff does not recommend this project as the best available mitigation feasible. This is due to the unknown timelines and uncertainties regarding funding. It is possible that this project is 8-10 years from even beginning the permitting process.
Newland Marsh Restoration		The Discharger has not provided any additional information about the feasibility of Newland Marsh other than what was provided in Appendix RR. Some conditions that could affect feasibility of this project have changed. First, the property is no longer owned by CalTrans. Santa Ana Water Board staff has talked with staff from the State Coastal Conservancy and confirmed that the transfer from CalTrans is now complete. Given this change in ownership, the project is no longer being considered by CalTrans as a mitigation site. Furthermore, the proposed restoration plans for the Newland Marsh include a system of culverts and tide gauges allowing control over the tidal ranges the wetlands will experience. This likely alleviates the concern previously stated in Appendix RR. Water Boards staff requested that the Discharger update the feasibility assessment in Appendix RR for Newland Marsh (as was also reflected in Attachment G, Finding 43) based on this updated information. The Discharger, in letter dated January 15, 2021 (Appendix XXXXXX), maintains that Newland Marsh remains infeasible. Coastal Commission staff has previously indicated that given the shape and size of the Newland Marsh area that could be utilized for potential mitigation for impacts from the proposed Facility, some of the restoration would occur inside the buffer zone. Restoration within the buffer zone has limited opportunities for success and the Coastal Commission has historically awarded few mitigation credits for such work. Given uncertainties in the mitigation credits that Coastal Commission staff may recommend for the muted tidal areas in the marsh, the Discharger has not proposed the Newland Marsh as a mitigation site and it does not appear to be the best available mitigation feasible at this time. Staff recommendation: Based on discussions with Agency staffs, there have been several changed circumstances at Newland Marsh over the past year that may have changed the feasibility of a mitigation project at Newland Marsh.

Conclusion on Best Available Mitigation Feasible

Santa Ana Water Board staff recommends that the Santa Ana Water Board conditionally find the proposed mitigation projects (including all proposed preservation, enhancement, restoration and creation projects) are the best available mitigation feasible to minimize intake and mortality of all forms of marine life. This finding is conditional on completion of all tasks in the Marine Life Mitigation Plan Schedule (Attachment K) and any environmental analysis required under the California Environmental Quality Act.

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ATTACHMENT H– MINIMUM LEVELS OF OCEAN PLAN APPENDIX II

APPENDIX II
MINIMUM* LEVELS

The Minimum* Levels identified in this appendix represent the lowest concentration of a pollutant that can be quantitatively measured in a sample given the current state of performance in analytical chemistry methods in California. These Minimum* Levels were derived from data provided by state-certified analytical laboratories in 1997 and 1998 for pollutants regulated by the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) and shall be used until new values are adopted by the State Water Resources Control Board. There are four major chemical groupings: volatile chemicals, semi-volatile chemicals, inorganics, and pesticides & PCBs. “No Data” is indicated by “--“.

TABLE II-1
MINIMUM* LEVELS – VOLATILE CHEMICALS

		Minimum* Level (µg/L)	
Volatile Chemicals	**CAS Number**	**GC Method [a]**	**GCMS Method [b]**
Acrolein	107028	2.	5
Acrylonitrile	107131	2.	2
Benzene	71432	0.5	2
Bromoform	75252	0.5	2
Carbon Tetrachloride	56235	0.5	2
Chlorobenzene	108907	0.5	2
Chlorodibromomethane	124481	0.5	2
Chloroform	67663	0.5	2
1,2-Dichlorobenzene (volatile)	95501	0.5	2
1,3-Dichlorobenzene (volatile)	541731	0.5	2
1,4-Dichlorobenzene (volatile)	106467	0.5	2
Dichlorobromomethane	75274	0.5	2
1,1-Dichloroethane	75343	0.5	1
1,2-Dichloroethane	107062	0.5	2
1,1-Dichloroethylene	75354	0.5	2
Dichloromethane	75092	0.5	2
1,3-Dichloropropene (volatile)	542756	0.5	2
Ethyl benzene	100414	0.5	2
Methyl Bromide	74839	1.	2
Methyl Chloride	74873	0.5	2
1,1,2,2-Tetrachloroethane	79345	0.5	2
Tetrachloroethylene	127184	0.5	2
Toluene	108883	0.5	2
1,1,1-Trichloroethane	71556	0.5	2
1,1,2-Trichloroethane	79005	0.5	2
Trichloroethylene	79016	0.5	2
Vinyl Chloride	75014	0.5	2

Table II-1 Notes

a) GC Method = Gas Chromatography
b) GCMS Method = Gas Chromatography / Mass Spectrometry
* To determine the lowest standard concentration in an instrument calibration curve for these techniques, use the given ML (see Chapter III, “Use of Minimum* Levels”).

TABLE II-2
MINIMUM* LEVELS – SEMI VOLATILE CHEMICALS

		Minimum* Level (µg/L)			
Semi-Volatile Chemicals	**CAS Number**	**GC Method [a,*]**	**GCMS Method [b,*]**	**HPLC Method [c,*]**	**COLOR Method [d]**
Acenapthylene	208968	--	10	0.2	--
Anthracene	120127	--	10	2	--
Benzidine	92875	--	5	--	--
Benzo(a)anthracene	56553	--	10	2	--
Benzo(a)pyrene	50328	--	10	2	--
Benzo(b)fluoranthene	205992	--	10	10	--
Benzo(g,h,i)perylene	191242	--	5	0.1	--
Benzo(k)floranthene	207089	--	10	2	--
Bis 2-(1-Chloroethoxy) methane	111911	--	5	--	--
Bis(2-Chloroethyl)ether	111444	10	1	--	--
Bis(2-Chloroisopropyl)ether	39638329	10	2	--	--
Bis(2-Ethylhexyl) phthalate	117817	10	5	--	--
2-Chlorophenol	95578	2	5	--	--
Chrysene	218019	--	10	5	--
Di-n-butyl phthalate	84742	--	10	--	--
Dibenzo(a,h)anthracene	53703	--	10	0.1	--
1,2-Dichlorobenzene (semivolatile)	95504	2	2	--	--
1,3-Dichlorobenzene (semivolatile)	541731	2	1	--	--
1,4-Dichlorobenzene (semivolatile)	106467	2	1	--	--
3,3-Dichlorobenzidine	91941	--	5	--	--
2,4-Dichlorophenol	120832	1	5	--	--
1,3-Dichloropropene	542756	--	5	--	
Diethyl phthalate	84662	10	2	--	--
Dimethyl phthalate	131113	10	2	--	--
2,4-Dimethylphenol	105679	1	2	--	--
2,4-Dinitrophenol	51285	5	5	--	--
2,4-Dinitrotoluene	121142	10	5	--	--
1,2-Diphenylhydrazine	122667	--	1	--	--
Fluoranthene	206440	10	1	0.05	--
Fluorene	86737	--	10	0.1	--
Hexachlorobenzene	118741	5	1	--	--
Hexachlorobutadiene	87683	5	1	--	--
Hexachlorocyclopentadiene	77474	5	5	--	--

Table II-2 (Continued)
Minimum* Levels – Semi Volatile Chemicals

Semi-Volatile Chemicals	CAS Number	Minimum* Level (µg/L) GC Method [a, *]	GCMS Method [b, *]	HPLC Method [c,*]	COLOR Method [d]
Hexachloroethane	67721	5	1	--	--
Indeno(1,2,3-cd)pyrene	193395	--	10	0.05	--
Isophorone	78591	10	1	--	--
2-methyl-4,6-dinitrophenol	534521	10	5	--	--
3-methyl-4-chlorophenol	59507	5	1	--	--
N-nitrosodi-n-propylamine	621647	10	5	--	--
N-nitrosodimethylamine	62759	10	5	--	--
N-nitrosodiphenylamine	86306	10	1	--	--
Nitrobenzene	98953	10	1	--	--
2-Nitrophenol	88755	--	10	--	--
4-Nitrophenol	100027	5	10	--	--
Pentachlorophenol	87865	1	5	--	--
Phenanthrene	85018	--	5	0.05	--
Phenol	108952	1	1	--	50
Pyrene	129000	--	10	0.05	--
2,4,6-Trichlorophenol	88062	10	10	--	--

Table II-2 Notes:

a) GC Method = Gas Chromatography
b) GCMS Method = Gas Chromatography / Mass Spectrometry
c) HPLC Method = High Pressure Liquid Chromatography
d) COLOR Method= Colorimetric

* To determine the lowest standard concentration in an instrument calibration curve for this technique, multiply the given ML by 1000 (see Chapter III, "Use of Minimum* Levels").

TABLE II-3
MINIMUM* LEVELS - INORGANICS

		Minimum* Level (µg/L)								
Inorganic Substances	**CAS Number**	**COLOR Method[a]**	**DCP Method[b]**	**FAA Method[c]**	**GFAA Method[d]**	**HYDRIDE Method[e]**	**ICP Method[f]**	**ICPMS Method[g]**	**SPGFAA Method[h]**	**CVAA Method[i]**
Antimony	7440360	--	1000.	10.	5.	0.5	50.	0.5	5.	--
Arsenic	7440382	20.	1000.	--	2.	1.	10.	2.	2.	--
Beryllium	7440417	--	1000.	20.	0.5	--	2.	0.5	1.	--
Cadmium	7440439	--	1000.	10.	0.5	--	10.	0.2	0.5	--
Chromium (total)	--	--	1000.	50.	2.	--	10.	0.5	1.	--
Chromium (VI)	18540299	10.	--	5.	--	--	--	--	--	--
Copper	7440508	--	1000.	20.	5.	--	10.	0.5	2.	--
Cyanide	57125	5.	--	--	--	--	--	--	--	--
Lead	7439921	--	10000.	20.	5.	--	5.	0.5	2.	--
Mercury	7439976	--	--	--	--	--	--	0.5	--	0.2
Nickel	7440020	--	1000.	50.	5.	--	20.	1.	5.	--
Selenium	7782492	--	1000.	--	5.	1.	10.	2.	5.	--
Silver	7440224	--	1000.	10.	1.	--	10.	0.2	2.	--
Thallium	7440280	--	1000.	10.	2.	--	10.	1.	5.	--
Zinc	7440666	--	1000.	20.	--	--	20.	1.	10.	--

Table II-3 Notes

a) COLOR Method = Colorimetric
b) DCP Method = Direct Current Plasma
c) FAA Method = Flame Atomic Absorption
d) GFAA Method = Graphite Furnace Atomic Absorption
e) HYDRIDE Method = Gaseous Hydride Atomic Absorption
f) ICP Method = Inductively Coupled Plasma
g) ICPMS Method = Inductively Coupled Plasma / Mass Spectrometry
h) SPGFAA Method = Stabilized Platform Graphite Furnace Atomic Absorption (i.e., US EPA 200.9)
i) CVAA Method = Cold Vapor Atomic Absorption

* To determine the lowest standard concentration in an instrument calibration curve for these techniques, use the given ML (see Chapter III, "Use of Minimum* Levels").

TABLE II-4
MINIMUM* LEVELS – PESTICIDES AND PCBs*

Pesticides – PCB's	CAS Number	Minimum* Level (µg/L) GC Method[a,*]
Aldrin	309002	0.005
Chlordane	57749	0.1
4,4'-DDD	72548	0.05
4,4'-DDE	72559	0.05
4,4'-DDT	50293	0.01
Dieldrin	60571	0.01
a-Endosulfan	959988	0.02
b-Endosulfan	33213659	0.01
Endosulfan Sulfate	1031078	0.05
Endrin	72208	0.01
Heptachlor	76448	0.01
Heptachlor Epoxide	1024573	0.01
a-Hexachlorocyclohexane	319846	0.01
b-Hexachlorocyclohexane	319857	0.005
d-Hexachlorocyclohexane	319868	0.005
g-Hexachlorocyclohexane (Lindane)	58899	0.02
PCB 1016	--	0.5
PCB 1221	--	0.5
PCB 1232	--	0.5
PCB 1242	--	0.5
PCB 1248	--	0.5
PCB 1254	--	0.5
PCB 1260	--	0.5
Toxaphene	8001352	0.5

Table II-4 Notes

a) GC Method = Gas Chromatography

* To determine the lowest standard concentration in an instrument calibration curve for this technique, multiply the given ML by 100 (see Chapter III, "Use of Minimum* Levels").

ATTACHMENT I

NOT APPLICABLE

ATTACHMENT J – RECEIVING WATER MONITORING STATIONS

<**PLACEHOLDER FOR MONITORING STATION DIAGRAM** –

Once the coordinates of the monitoring locations are determined, the Discharger will submit a final map for this attachment.>

Attachment K – Marine Life Mitigation Plan Schedule

As discussed in Finding 5 in the Water Code Determination (Attachment G to the Order), the Santa Ana Water Board conditionally finds that the Discharger's proposed mitigation is the best available mitigation feasible. Poseidon Resources (Surfside) LLC (Discharger) submitted a Marine Life Mitigation Plan (MLMP) (Appendix TT4) and supplemental documents (Appendices IIIIII, PPPPPP-2, HHHHHH, and WWWWWW-2) modifying the MLMP. The MLMP (inclusive of the supplemental appendices) outlines an approach for providing the mitigation required to replace habitat lost due to the construction and operation of the proposed Huntington Beach Desalination Plant (Facility).

The Discharger's proposed mitigation includes restoration, enhancement, and preservation projects at the Bolsa Chica Wetlands, and the creation of an artificial reef offshore of the Palos Verdes Peninsula (Palos Verdes Artificial Reef). The mitigation at the Bolsa Chica Wetlands consists of approximately 4.5 acres of subtidal/intertidal habitat on the Fieldstone Property located at the northwest boundary of Bolsa Chica; approximately 1.2 acres of subtidal/intertidal Oil Pad/Road property; approximately 10.5 acres for the restoration of the intertidal shelf; approximately 15 acres for the enhancement of water circulation in the Muted Tidal Basin; and 28 acres for the maintenance dredging of the Bolsa Chica ocean inlet to ensure that the Full Tidal Basin continues to function properly and to support the restoration projects (see Attachment G.5 for a detailed discussion and analysis of the acres of mitigation). The Discharger's proposed Palos Verdes Artificial Reef will provide approximately 41.3 acres of rocky reef habitat within a 133-acre lease (PRC-9448.9) granted by the California State Lands Commission to the Southern California Marine Institute (SCMI).[1]

The Discharger's proposed restoration, enhancement, and creation projects are based on currently available data and information. Santa Ana Water Board staff's analysis has indicated that further studies and data collection will be required to refine the proposed restoration, enhancement, and creation projects. The proposed projects are conceptual at this time and sufficient details are not available to complete a meaningful environmental analysis under the California Environmental Quality Act (CEQA). The Marine Life Mitigation Plan Schedule below requires the Discharger to perform additional studies, complete supplemental reports, and coordinate with the appropriate agencies. The Discharger shall adhere to the requirements outlined below. The Santa Ana Water Board expects that the additional submittals—subject to any environmental review required by CEQA and any changes to the proposed projects arising therefrom—will confirm its conditional finding that the mitigation at the Bolsa Chica Wetlands and the creation of an artificial reef offshore of the Palos Verdes Peninsula are the best available mitigation measures feasible for the proposed Facility.

[1] The Southern California Marine Institute is the current lease holder and is responsible for monitoring the existing reef.

As explained in Attachment G.5, the restoration activities outlined in this Marine Life Mitigation Plan Schedule and the mitigation activities proposed in the Discharger's MLMP (inclusive of the supplemental appendices) are necessary for the Santa Ana Water Board to make a determination that the proposed mitigation measures comply with the Ocean Plan. All of the mitigation activities combined are expected to result in sufficient mitigation acres to offset the marine life impacts and mortality that may result from the construction and 50-year operation of the Facility. The Santa Ana Water Board has determined that specific details regarding the restoration at the Fieldstone Property, the Oil Pad/Road properties, and the Intertidal Shelf, and the Muted Tidal Basins circulation enhancement activities can be developed with the Discharger and interested parties, including the California State Lands Commission and the Bolsa Chica Wetlands Steering Committee (Steering Committee) prior to the construction of the Facility. Similarly, the details regarding the proposed Palos Verdes Artificial Reef can be developed with the Discharger and interested parties, including the California State Lands Commission, the Los Angeles Regional Water Quality Control Board, State Water Resources Control Board, California Coastal Commission, California Department of Fish and Wildlife, and NOAA. These specific details will take time to determine and require coordination with several agencies interested in the mitigation projects. Therefore, putting these conditions in the permit will allow the Discharger time to develop a final MLMP and specify the project details such that meaningful environmental review under CEQA can be conducted. The findings and requirements for mitigation in this Order and the accompanying section 13142.5(b) determination (Attachment G to the Order) do not prevent or otherwise limit other agencies from requiring additional mitigation for the proposed Facility, nor do they preclude changes to the proposed projects through the CEQA process.

Furthermore, it is important to note that the Bolsa Chica Lowlands Restoration Project (BCLRP) is managed under the oversight of the interagency partners as specified in the 1996 Interagency Agreement (which established the Steering Committee) for the benefit of multiple ecological resources, whereas the Discharger's mitigation will need to meet specific regulatory requirements of the Santa Ana Water Board and California Coastal Commission. To be workable/feasible, the Discharger's mitigation must be compatible with the management goals, policies, and decisions of the California State Lands Commission with input from the Steering Committee. Accordingly, the Discharger must coordinate with the California State Lands Commission with input from the Steering Committee as the details of the final MLMP are further developed. The Discharger must address any conflicts that are identified between the needs of the California State Lands Commission with input from the Steering Committee for present and future operations, as well as system adjustments necessary in light of projected sea level rise (SLR). These issues must be addressed in the final MLMP in a manner that provides clear assurance that the compensatory mitigation requirements of the Discharger's mitigation will be met.

Table K-1 below establishes the schedule under which the Discharger must submit the following plans to the Santa Ana Water Board for review and approval:

1) Coordination and Communication Plan
2) Final Restoration Plan for the Fieldstone Property (including Enhancement Plan for the Muted Tidal Basins)
3) Final Oil Pads/Road Restoration Plan (including Enhancement Plan for the Muted Tidal Basins)
4) Final Restoration Plan for the Intertidal Shelf Cordgrass Project
5) Final Palos Verdes Artificial Reef Creation Plan
6) Final Adaptive Management Plan for the Bolsa Chica Mitigation Projects and the Palos Verdes Artificial Reef

The Discharger must submit the required plans to the Santa Ana Water Board for review and approval by the stated due date. The approved plans will supplement the Discharger's preliminary MLMP and the documents will constitute the final MLMP. If the submitted plans do not obtain final approval, the Santa Ana Water Board may reopen the section 13142.5(b) determination and require the Discharger to submit a new MLMP to satisfy the mitigation requirements of the Ocean Plan, chapter III.M. The performance standards that the Discharger is required to meet to satisfy the requirements of the Ocean Plan are specified in Table K-2 at the end of this document. These performance standards will ensure that the mitigation performed compensates for the loss of marine life due to the construction and operation of the Facility for the operational lifetime of the Facility.

Definitions

The following definitions apply to Table K-1:

"30% design plan" refers to a design plan completed to 30% that includes, but is not limited to, the specific tasks listed by project in Table K-1 for 30% design plans. The 30% design plans must be completed in accordance with the schedule in Table K-1 or sooner, and to the point where the cost estimates for all components of each mitigation project that include planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility are within a 50% confidence level.

"60% design plan" refers to a design plan completed to 60% that includes, but is not limited to, the specific tasks listed by project in Table K-1 for 60% design plans. The 60% design plan must be completed in accordance with the schedule in Table K-1 or sooner, and to a point where the cost estimates for all components of each mitigation project that include planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility are within a 75% confidence level.

"Final MLMP" refers to the Discharger's preliminary MLMP (Appendices TT4, HHHHHH, IIIIII, PPPPPP-2, and WWWWWW-2) and the supplemental plans required in Table K-1. The constituent documents must be approved by the Santa Ana Water Board to be included as a component of the final MLMP.

"Financial assurance" refers to the financial assurance required by the State Lands Commission, and does not include the financial assurance that may be required by the Santa Ana Water Board as a condition of the removal of the discharge and intake prohibitions in the Order.

"Performance standards" refers to the specific measures set forth in Table K-2 that the Santa Ana Water Board has determined that the Discharger's proposed mitigation project must achieve to comply with the Ocean Plan's requirements for the best available mitigation feasible. Approval of the plans submitted under the MLMP schedule are contingent upon their ability to meet the established performance standards. The performance standards are final and are subject to change only in the event that the Santa Ana Water Board reopens the conditional determination of project compliance with the mitigation requirement of Water Code section 13142.5(b).

"Success criteria" refers to metrics or tools that will be developed in accordance with the plans required under the MLMP Schedule. The success criteria will be used to evaluate whether the Discharger's proposed mitigation is meeting performance standards.

"Subtidal" refers to habitats or areas that are permanently submerged. Specifically, these areas are submerged by circulating marine water and are therefore subject to tidal influence, even though the tidal influence may be muted and not fully governed by natural tidal cycles.

"Supplemental plans" refers to all plans required under Table K-1.

"Intertidal" refers to habitats or areas that are periodically submerged. Specifically, these areas are intermittently submerged by marine waters subject to tidal influence, including muted tidal influence. The submergence, however, is variable depending on tidal action and habitat management actions at the site undertaken by the Bolsa Chica Steering Committee and the California Department of Fish and Wildlife. Intertidal does not include seasonal ponding or unanticipated flooding by freshwater in areas where circulation of marine waters is not a substantial portion of the hydrology.

Table K-1. Marine Life Mitigation Plan Schedule

TASK	DUE DATE
1) The Discharger shall submit a Coordination and Communication Plan that includes, at a minimum, the following: A. Bolsa Chica Mitigation Projects: i. A summary of the methods and milestones (and any necessary interim milestones) to be used to coordinate with the California State Lands Commission and the Bolsa Chica Wetlands Steering Committee (Steering Committee) regarding the MLMP design, operations, performance standards, success criteria, and requirements under any permits the Discharger will need to obtain to complete the mitigation projects at the Bolsa Chica Wetlands. This summary shall include at least two scheduled meetings with representatives from the California State Lands Commission, the Steering Committee, and the Santa Ana Water Board. ii. A process for California State Lands Commission staff with input from the Steering Committee to submit comments on any drafts of the plans required below for the Bolsa Chica Wetlands. iii. An explicit statement that the Discharger shall submit the plans required below for the Bolsa Chica Wetlands for Santa Ana Water Board review and approval only after the California State Lands Commission staff and Steering Committee has had a reasonable period of time to review the plans required below for the Bolsa Chica Wetlands and provide any recommended changes before the Santa Ana Water Board considers the plans. iv. A plan for managing potential conflicts between the proposed circulation improvements and the California State Lands Commission with input from the Steering Committee's operation of the Muted Tidal Basins (MTBs). For example, there may be a scenario where the California State Lands Commission with input from the Steering Committee would like to operate the MTBs for multi-species benefit. Specifically, during Snowy Plover nesting season, the MTB flats may be completely drained to provide nesting habitat. This management decision could have impacts on the Discharger's compliance with the final MLMP and success criteria that may be developed for the MTB enhancement activities.	All Documents discussed in Task 1 shall be submitted no later than 6 months after approval of a Coastal Development Permit (CDP) for the Facility from the California Coastal Commission

TASK	DUE DATE
v. A plan for documenting the California State Lands Commission staff and Steering Committee's comments and concerns and how these were addressed by the Discharger. vi. A letter of intent from the California State Lands Commission or other agreement between the California State Lands Commission and the Discharger, which demonstrates a willingness by the California State Lands Commission to accept the Discharger's mitigation proposal for the Bolsa Chica site. vii. A plan and schedule for submittal of an Application for Use of State Lands and other required application materials to the State Lands Commission to obtain a lease and/or other mechanism(s) (which may include a Land Use Agreement or other agreement(s)) to be executed between the California State Lands Commission and the Discharger providing the Discharger with land use rights to carry out the mitigation at the Bolsa Chica Wetlands and requiring the Discharger to provide financial assurances to implement the restoration and enhancement projects at the Bolsa Chica Wetlands in the final MLMP for the operational lifetime of the Facility. The schedule must also include a timeline for completing any environmental review required under CEQA. viii. A plan and schedule for the Discharger to assume responsibility for performing the maintenance dredging from the State Lands Commission and to provide financial assurances to perform the maintenance dredging as required by the State Lands Commission and Steering Committee for the operational life of the Facility. B. Palos Verdes Artificial Reef i. A summary of the methods and milestones (and any necessary interim milestones) to be used to coordinate with staff from the California State Lands Commission, NOAA Restoration Center/Montrose Settlements Restoration Center, California Coastal Commission, Santa Ana Water Board, California Department of Fish and Wildlife (collectively, agency staff), and United States Army Corps of Engineers regarding the Discharger's proposed creation of the Palos Verdes Artificial Reef design, operations, performance standards, success criteria, and commitments under the permits. This summary shall include at least two scheduled meetings with the agency staff.	

TASK	DUE DATE
ii. A process for agency staff to submit comments on the plans required below for the proposed Palos Verdes Artificial Reef. iii. An explicit statement that the Discharger shall submit the plans required below for the Palos Verdes Artificial Reef for Santa Ana Water Board review and approval only after agency staff has reviewed and provided any recommended changes. iv. A plan for managing potential conflicts between the Discharger and agency staff on the habitat design, performance standards, and monitoring that will be developed and provided to the Santa Ana Water Board for review and approval. v. A plan for documenting agency staff comments and concerns including how they were addressed by the Discharger. vi. A letter of intent from SCMI and the California State Lands Commission or other agreement between SCMI and the California State Lands Commission and the Discharger, which demonstrates a willingness to accept the Discharger's mitigation proposal for the Palos Verdes Artificial Reef site. vii. A plan and schedule for submittal of an Application for a Use of State Lands and other required application materials to the State Lands Commission to obtain a lease, and/or other mechanism(s) (which may include a Land Use Agreement or other agreement(s)) to be executed between SCMI, the California State Lands Commission, and the Discharger providing the Discharger with land use rights to carry out the Palos Verdes Artificial Reef project and requiring the Discharger to provide financial assurances to implement the Palos Verdes Artificial Reef project in the final MLMP for the operational life of the Facility. The schedule must also include a timeline for completing any environmental review required under CEQA. viii. A plan and schedule for submittal of an application for a Coastal Development Permit for the Palos Verdes Artificial Reef from the California Coastal Commission. Upon Santa Ana Water Board approval of the above plans and actions, the Discharger shall implement them as approved.	

TASK	DUE DATE
2) The Discharger shall submit a Restoration Plan for the Fieldstone Property to provide at least 4.5 acres of intertidal and subtidal area suitable for fish habitat. At a minimum, the plan must include the following: A. A detailed 30% design plan and map that show: i. The existing culverts that the Discharger plans to unblock or enlarge that connect the Fieldstone property to the western MTB. ii. Planned berm breaches from the western MTB to the Fieldstone property. iii. Planned berm breaches from the Fieldstone property to the central MTB. iv. Planned grading changes needed to ensure restoration success. v. Existing and planned buffers around restored area(s). vi. A plan for management of water levels within the proposed restoration sites under the new operational water levels that will occur within the MTBs as part of the enhancement/restoration. vii. A cost estimate for all components of the project, including planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. viii. Hydrologic analyses showing muted tidal/water circulation under existing conditions and as expected upon completion of the proposed modifications that must, at a minimum, include the following: 1. The expected total area of intertidal and subtidal areas adequate to provide fish habitat. 2. The expected timing and volume of tidal circulation adequate to support fish habitat. 3. An evaluation of potential conflicts between the proposed restoration and the California State Lands Commission with input from the Steering Committee operations of the MTBs and a plan for managing these conflicts. i. A report of soil conditions, following California State Lands Commission, Steering Committee, and Santa Ana Water Board staff approval of a sampling plan, based on an investigation of soils in the restoration areas that includes, at a minimum, the following: 1. The results of the soil investigation.	All submittals specified under task 2 shall be submitted in accordance with the schedule detailed below: *Interim deadlines* 1. The 30% Design Plan must be submitted no later than 9 months from approval of a CDP for the Facility by the California Coastal Commission 2. The 60% Design Plan must be submitted no later than 18 months from approval of a CDP for the Facility by the California Coastal Commission 3. The Final 90% Design Plan and habitat assessment must be submitted

TASK	DUE DATE
2. A map of the investigation area that identifies areas of contaminated soil, if any. 3. If contaminated soils are identified, a plan of remediation that identifies the extent of contamination and proposed methods of contaminant removal or treatment that will allow for successful restoration. B. A 60% design plan that describes how tidal exchange within the MTBs will be accomplished. i. An analysis of any new channels or existing channels requiring modification that are necessary to ensure the success of the project and inclusion of a map that details possible locations for these new/modified channels and calculations for sizing (sectional area and depth) of the required channels. ii. Identification of how inundation frequency desired within restored habitats is to be achieved, including MTB operating assumptions and any control structures necessary to achieve hydrologic objectives. (Discharger's Appendix. TT4, page 27) iii. Identification of the habitats within all areas to be modified through the above restoration actions, along with proposed measures to be conducted during construction to avoid and minimize impacts to sensitive habitats and sensitive species. 1. A description of the habitats that will be restored within each subarea of Fieldstone as well as a breakdown of the estimated acres of restoration in each subarea. iv. A cost estimate for all components of the project, including planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. v. The 60% design plan must include a grading and excavated materials plan that includes the following: 1. An estimated schedule. 2. The estimated amount of soil to be removed. 3. Identification of soil testing protocols for potential suitable reuse or disposal (off- or on-site). 4. A plan for disposal of the saline soils that may be removed from the site.	no later than 6 months from the issuance or waiver of a Section 401 Water Quality Certification (401 Certification) for the Fieldstone Property Restoration or, if a 401 Certification is not required, 6 months from a determination by the Santa Ana Water Board that a 401 Certification is not required for the Fieldstone Property Restoration 4. Any modified success criteria for the Fieldstone Property Restoration must be submitted to the Santa Ana Water Board no later than 6 months from the issuance or waiver of a 401 Certification for the Fieldstone

TASK	DUE DATE
5. Confirmation from California Department of Fish and Wildlife (CDFW) and California State Lands Commission that suitable material may remain on site (if necessary or desirable). 6. The location(s) and methods for reuse of the excavated materials. 7. Discussion of how such material will contribute to the habitat functions within the Bolsa Chica wetlands in a manner that would fully offset any potential impacts of reuse (e.g., raising depressed ponding basin areas to suitable elevations to support vegetated marsh, should the California State Lands Commission, with input from the Steering Committee, identify this as a beneficial use of available material to curb SLR impacts). 8. Confirmation that material that is deemed either not suitable for reuse, or not desired to remain on-site will be disposed of off-site. 9. Any future uses for the excavated soils, as well as its estimated volume. 10. Period of time that the material may be stored onsite based on authorization from CDFW, California State Lands Commission staff, and the Steering Committee and designation of a storage location(s) that does not adversely affect wetland or sensitive species functions. 11. Best management practices that the Discharger will implement to ensure that any stored materials stay onsite and do not erode, drift or blow into other adjacent areas. vi. A habitat assessment that investigates the effects of the proposed activities on sensitive species, including breeding, nesting, and foraging activities of Belding's savannah sparrow, California least tern, Western snowy plover, and other avian species known to use the area. vii. Proposed hydrologic monitoring measures adequate to identify the timing and range of tidal circulation and inundation within the proposed restoration areas and proposed biological monitoring measures adequate to identify the number and species of fish using the restored areas. viii. A description of how tidal flushing form the restoration site will occur. ix. Development and implementation of any additional success criteria, based on new studies or new information, to measure the success of the proposed restoration	Property Restoration or, if a 401 Certification is not required, 6 months from a determination by the Santa Ana Water Board that a 401 Certification is not required for the Fieldstone Property Restoration *Interim Deadlines for Water Circulation Enhancement Plan:* 1. The 30% Design Plan must be submitted no later than 9 months from approval of a CDP for the Facility from the California Coastal Commission 2. The 60% Design Plan must be submitted no later than 18 months from

TASK	DUE DATE
areas that incorporate any recommendations made by the California State Lands Commission staff with input from the Steering Committee. 1. Success criteria must rely on both reference sites within, and outside of, Bolsa Chica. The reference sites from elsewhere in the Southern California Bight, shall be representative of the habits the Discharger is establishing within Bolsa Chica and shall be submitted the Santa Ana Water Board Executive Officer for Approval. C. A final 90% design plan incorporating comments from the Santa Ana Water Board's Executive Officer and the California State Lands Commission with input from the Steering Committee. The plan must include, at a minimum, the following: i. Plans, sections, profiles, and construction notes. ii. Stormwater management and best management practices iii. An estimated schedule of construction. iv. The estimated soil volumetric balance. v. A cost estimate for all components of the project, including planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. Unless the California State Lands Commission with input from the Steering Committee indicates that improvements to Water Circulation are not necessary for success of the restoration project, an ***<u>Enhancement Plan to Improve Water Circulation for the Muted Tidal Basins</u>*** shall be submitted *that, at a minimum, includes the following:* D. A detailed 30% design plan and map that show: i. The existing channel network, culverts and weirs including dimensions and channel floor elevations relative to surrounding ground elevations. ii. Proposed channel additions and improvements of existing channels, including dimensions, that will provide for effective drainage of low-lying terrain within the western, central, and eastern MTBs. Plans for the channel additions and improvements shall also provide for an improved hydraulic gradient so that flows move, unimpaired,	approval of a CDP for the Facility by the California Coastal Commission 3. The final 90% Design Plan must be submitted no later than 6 months from the issuance or waiver of a 401 Certification for the Water Circulation Enhancement or, if a 401 Certification is not required, 6 months from a determination by the Santa Ana Water Board that a 401 Certification is not required for the Water Circulation Enhancement 4. Any modified or additional success criteria must be submitted to the Santa Ana Water Board no later than 6

TASK	DUE DATE
from the western MTB into the central MTB and then into the eastern MTB before being discharged to Freeman Creek. iii. Existing, as well as any proposed new or modified, culverts, weirs, and gates of suitable size and nature to allow for efficient management of circulation drainage within and between basins to allow for transfer of water between basins and down to Freeman Creek. iv. A plan for integration of on-site soil reuse that balances the channel volume removals with placement in the MTBs (or elsewhere in Bolsa Chica) where elevated mounds or infills of low-lying terrain would enhance habitat conditions (see additional discussion under “60% design plan,” below)Hydrologic analysis showing tidal circulation under existing conditions and as expected upon completion of the proposed modifications described in the detailed plan above. The analysis must, at a minimum, include the following: 1. The expected total area of fish-accessible intertidal habitat that may be available under anticipated maximum, normal recurrent, and minimum operational scenarios as determined and implemented by the California State Lands Commission with input from the Steering Committee. (Intertidal inundation and drainage will continue to be conducted at the discretion of the California State Lands Commission with input from the Steering Committee to meet multiple ecological objectives. As such, the intertidal fish habitat estimate is intended to be a best estimate derived through coordination with the California State Lands Commission with input from the Steering Committee and is not a performance measure.) 2. The expected total area of enhanced tidal channel system anticipated to be operated as a subtidal channel condition by the California State Lands Commission with input from the Steering Committee. (It is generally anticipated that the main MTBs channel network will be maintained as an inundated subtidal environment by the California State Lands Commission with input from the Steering Committee. This area is expected to be predictably enhanced for fish by the circulation improvements and would provide an expected doubling of fish richness in the muted tidal basins.)	months from the issuance or waiver of a 401 Certification for the Water Circulation Enhancement or, if a 401 Certification is not required, 6 months from a determination by the Santa Ana Water Board that a 401 Certification is not required for the Water Circulation Enhancement

TASK	DUE DATE
3. Documentation, from the hydrologic analysis, of the maximum achievable sustained volume of circulated water through the MTBs. vi. A cost estimate for all components of the project, including, planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. vii. Development and implementation of any additional success criteria, based on new studies or new information, to measure the success of the proposed restoration areas that incorporate any recommendations made by the California State Lands Commission staff with input from the Steering Committee. viii. Success criteria must rely on both reference sites within, and outside of, Bolsa Chica. The reference sites from elsewhere in the Southern California Bight shall be representative of the habits the Discharger is establishing within Bolsa Chica and shall be submitted the Santa Ana Water Board Executive Officer for Approval. ix. The 30% design plan and map must be reviewed and approved by the California State Lands Commission with input from the Steering Committee and the Santa Ana Water Board's Executive Officer. E. The 60% design plan that includes the following: i. Plan and typical section views of the circulation channel systems to be constructed. ii. Plan views and stationing of channels that include channel invert elevation details presented on basin topographic plans adequate to document surrounding ground elevations accurate to within 0.5 feet or better as may be required to depict suitable drainage information. iii. Plan locations and details for water control structures including culverts, weirs, and gates suitable to control water levels individually within the three basins and not disrupt required roadway infrastructure or oil infrastructure. iv. Identification of the habitats within all areas to be modified through the circulation restoration actions, along with proposed measures during construction to avoid or minimize impacts to sensitive habitats or sensitive species. v. Design drawings identifying wetland habitat restoration opportunities. Specifically, the plan must identify opportunities for expanded planting areas or for drainage restoration	

TASK	DUE DATE
(to facilitate marsh recovery in areas previously lost to inundation by uncontrollable ponding). vi. Proposed hydrologic monitoring measures adequate to identify the timing and range of tidal circulation and inundation within the proposed restoration areas and proposed biological monitoring measures adequate to identify the number and species of fish using the restored areas. vii. Identification of staging and work limits, operational areas, and preliminary schedule of work including avian nesting season constraints. viii. A plan for integration of on-site soil reuse that balances the channel volume removals with placement in the MTBs (or elsewhere in Bolsa Chica) where elevated mounds or infills of low-lying terrain would enhance habitat conditions. The plan shall include the following: 1. A description of how the material will be reused to contribute to the habitat functions within Bolsa Chica (e.g., raising depressed ponding basin areas to suitable elevations to support vegetated marsh, should the California State Lands Commission with input from the Steering Committee identify this a beneficial use of available material to curb SLR impacts). 2. A cut/fill volumetric estimate of the work required. 3. The reuse location for any material that remains onsite. 4. Identification of soil testing protocols for potential suitable reuse or disposal (off- or on-site). 5. Any future uses for the excavated materials, as well as its estimated volume. 6. Period of time that the material may be stored on site and designation of a storage location(s) that does not adversely affect wetland or sensitive species functions. 7. Best management practices that the Discharger will implement to ensure that any stored materials stay onsite and do not erode, drift, or blow into other adjacent areas. ix. A plan for haul away and legal offsite disposal of any encountered rubbish or soil unsuitable for reuse.	

TASK	DUE DATE
x. Confirmation that material that is deemed either “not suitable for reuse,” or “not desired to remain on-site” will be disposed of off-site. xi. A cost estimate for all components of the project, including planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. F. A final 90% design plan incorporating comments from the Santa Ana Water Board’s Executive Officer and the California State Lands Commission with input from the Steering Committee. The plan must include, at a minimum, the following: i. Plans, sections, profiles, and construction notes. ii. Stormwater management and best management practices iii. An estimated schedule of construction. iv. The estimated soil volumetric balance. v. A cost estimate for all components of the project, including planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. An implementation plan that includes timelines, schedules, and completion deadlines for the Fieldstone Restoration activities (including the enhancement of the Muted Tidal Basins via improved water circulation). Upon Santa Ana Water Board approval of the above plans and actions, the Discharger shall implement them as approved.	
3) The Discharger must submit an Oil Pads and Road Restoration Plan that will restore a minimum of 1.2 acres of intertidal or subtidal habitat. At a minimum, the plan must include the following: A. A 30% design plan that provides the following: i. A list and map of all roads, berms, and oil pads to be removed. ii. Methods of pad removal (including testing and disposal or beneficial reuse of the excavated materials). iii. Timeline for project completion.	All submittals specified under task 3 shall be submitted in accordance with the schedule listed below

TASK	DUE DATE
iv. Expected results (i.e. type and area of each habitat that will replace oil operation-related structures). v. Estimates of the elevation that the pads/roads will be lowered to within each cell. vi. Determination as to whether other infrastructure will need to be moved/relocated so that habitat restoration can occur. vii. The Appendix TT4 states that site B2, "involves grading to create open water coastal saltmarsh" 1. Provide estimates of how the grading will be accomplished including how much material will be removed, the methods that will be used to remove the materials, and information on testing and disposal options including potential options for beneficial reuse. 2. Provide types and area of each expected habitat to be restored at the site after grading and any necessary drainage improvements are completed. viii. A cost estimate for all components of the project, including, planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. ix. Development and implementation of any additional success criteria, based on new studies or new information, to measure the success of the proposed restoration areas that incorporate any recommendations made by the California State Lands Commission staff with input from the Steering Committee. 1. Success criteria must rely on both reference sites within, and outside of, Bolsa Chica. The reference sites from elsewhere in the Southern California Bight shall be representative of the habits the Discharger is establishing within Bolsa Chica and shall be submitted the Santa Ana Water Board Executive Officer for Approval. x. For each proposed site include the number of acres for each habitat type (e.g. site B1, B2, etc.) that are planned for restoration or enhancement. xi. For improvements to the circulation of Site B2 in the eastern MTB, provide: 1. An explanation of how the improved water circulation (see discussion regarding water circulation improvements in Task 2) in the Eastern MTB will be sufficient for	*Interim deadlines* 1. The 30% Design Plan must be submitted no later than 9 months from approval of a CDP for the Facility from the California Coastal Commission 2. The 60% Design Plan must be submitted no later than 18 months after approval of a CDP for the Facility by the California Coastal Commission 3. The final 90% Design Plan must be submitted no later than 6 months from the issuance or waiver of a 401 Certification for the Oil Pads and Road Restoration or, if a 401 Certification is not required, 6 months from a

TASK	DUE DATE
the proposed restoration at Site B2, or a detailed plan of any circulation improvements that will be necessary. 2. Information (e.g. success criteria, monitoring-driven trigger levels, etc.) that will be used to inform long-term maintenance plans. 3. A report of soil conditions based on an investigation of soils in the restoration areas that includes, at a minimum, the following: a. The results of the soil investigation. b. A map of the investigation area that identifies areas of contaminated soil, if any. c. If contaminated soils are identified, a plan of remediation that identifies the extent of contamination and proposed methods of contaminant removal or treatment that will allow for successful restoration. d. A plan for disposal of the saline soils that may be removed from the site. e. Confirmation from California Department of Fish and Wildlife (CDFW) and California State Lands Commission that suitable material may remain on site (if necessary or desirable). f. Identification of the habitats within all areas to be modified through the above restoration actions, along with proposed measures to be conducted during construction to avoid and minimize impacts to sensitive habitat and sensitive species. g. A habitat assessment that investigates the effects of the proposed activities on sensitive species, including breeding, nesting, and foraging activities of Belding's savannah sparrow, California least tern, Western snowy plover, and other avian species known to use the area. xii. Proposed hydrologic monitoring measures adequate to identify the timing and range of tidal circulation and inundation within the proposed restoration areas and proposed biological monitoring measures adequate to identify the number and species of fish using the restored areas. B. A 60% design plan that includes: i. Estimated amount of soil to be removed or used as fill. ii. Identification of soil testing protocols for potential suitable reuse or disposal (off- or on-site).	determination by the Santa Ana Water Board that a 401 Certification is not required for the Oil Pads and Road Restoration 4. Any modified or additional success criteria must be submitted to the Santa Ana Water Board no later than 6 months from the issuance or waiver of a 401 Certification for the Oil Pads and Road Restoration or, if a 401 Certification is not required, 6 months from a determination by the Santa Ana Water Board that a 401 Certification is not required for the Oil Pads and Road Restoration

TASK	DUE DATE
iii. Authorization from California Department of Fish and Wildlife (CDFW) and California State Lands Commission that suitable material may remain on site (if necessary or desirable). iv. The location(s) and methods for reuse of the excavated materials. v. Discussion of how such material will contribute to the habitat functions within the Bolsa Chica wetlands in a manner that would fully offset any potential impacts of reuse (e.g., raising depressed ponding basin areas to suitable elevations to support vegetated marsh, should the California State Lands Commission with input from the Steering Committee identify this as a beneficial use of available material to curb SLR impacts). vi. Confirmation that material that is deemed either not suitable for reuse, or not desired to remain on-site will be disposed of off-site. vii. Any future uses for the excavated soils, as well as its estimated volume. viii. Period of time that the material may be stored on site based on CDFW and the California State Lands Commission with input from the Steering Committee input and designation of a storage location(s) that does not adversely affect wetland or sensitive species functions. ix. Best management practices that the Discharger will implement to ensure that any stored materials stay onsite and do not erode, drift or blow into other adjacent areas. x. A cost estimate for all components of the project, including planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. xi. A description of how tidal flushing from the restoration sites will occur (see Task 2, above). C. A final 90% developed plan incorporating comments from the Santa Ana Water Board's Executive Officer and the California State Lands Commission with input from the Steering Committee. The plan must include, at a minimum, the following: i. Plans, sections, profiles, and construction notes. ii. Stormwater management and best management practices iii. An estimated schedule of construction. iv. The estimated soil volumetric balance.	

TASK	DUE DATE
v. A cost estimate for all components of the project, including planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. D. Consistent with the requirements in Task 2, An Enhancement Plan to Improve Water Circulation for the Muted Tidal Basins in order to ensure successful implementation of Task 3. An implementation plan that includes timelines, schedules and completion deadlines for the Oil Pads/Roads Restoration activities (including the enhancement of the Muted Tidal Basins via improved water circulation). Upon Santa Ana Water Board approval of the above plans and actions, the Discharger shall implement them as approved**.**	
4) The Discharger shall submit an Intertidal Shelf Restoration Plan that will restore a minimum of 23 acres of coastal salt marsh. At a minimum, the plan must include the following: A. A 30% design plan that provides the following: i. Overall site plan and determination of area subject to restoration of coastal salt marsh including location of any channels within the salt marsh. ii. Proposed elevations for the restoration site including but not limited to: 1. Determination of elevation ranges of coastal salt marsh habitat currently present within the Bolsa Chica Full Tidal Basin 2. Documentation of expected inundation frequencies for the coastal salt marsh habitat types to be restored under the performance standards determined for the inlet maintenance activities. 3. Delineation of buffer zones surrounding the proposed restoration area iii. Expected results (i.e. type and acreage of each habitat (e.g. low, mid, and high marsh) that will be restored) including but not limited to the following: 1. Anticipated areas of cordgrass habit. 2. Anticipated areas of pickleweed habitat. 3. Anticipated habitat type in remaining acres of restoration	All submittals specified under task 4 shall be submitted in accordance with the schedule listed below *Interim deadlines* 1. The 30% Design Plan must be submitted no later than 9 months from approval of a CDP for the Facility from the California Coastal Commission

TASK	DUE DATE
iv. Determination as to whether any temporary or permanent wave protection measures will be necessary to assure vegetation survival. The determination must include any necessary modeling of the hydrodynamics, wave run up, or wind conditions in the Full Tidal Basin that may affect inundation, sedimentation, or erosion of the intertidal shelf. v. Proposed construction methodology 1. Provide a description of potential sources of sediment, an estimate of the type and volume of sediment that will be required, the methods that will be used to place the materials, and information on sediment quality testing (chemistry, including potential contaminants and salinity, particle size, moisture content, and organic matter content) prior to placement. 2. Provide information on the methods to retain the material within the restoration site during construction. 3. Provide estimates on the timing and duration of the construction. 4. Provide information on the sources of plant material and planting methods. 5. Indicate if any sensitive habitats are present and how construction will be accomplished to avoid impacts to those areas where feasible. vi. A cost estimate for all components of the project, including, planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. vii. Development and implementation of any additional success criteria, based on new studies or new information, including any recommendations made by the California State Lands Commission staff with input from the Steering Committee, that can be used to measure the success of the proposed restoration areas. 1. Success criteria must rely on reference sites both within and outside of Bolsa Chica. The reference sites outside of Bolsa Chica must be from elsewhere in the Southern California Bight and must be representative of the habitats the Discharger is establishing within Bolsa Chica. The Discharger shall consult with the State Lands Commission and the Steering Committee prior to selecting the proposed reference sites, which must then be submitted to the Santa Ana Water Board Executive Officer for approval.	2. The 60% Design Plan must be submitted no later than 18 months after approval of a CDP for the Facility by the California Coastal Commission 3. The final 90% Design Plan must be submitted no later than 6 months from the issuance or waiver of a 401 Certification for the Intertidal Shelf Restoration or, if a 401 Certification is not required, 6 months from a determination by the Santa Ana Water Board that a 401 Certification is not required for the Intertidal Shelf Restoration 4. Any modified or additional success

TASK	DUE DATE
viii. A report of proposed sediment characteristics that are necessary for successful restoration of the coastal salt marsh habitat on the intertidal shelf based on an investigation at the selected reference sites within the Full Tidal Basin and outside of Bolsa Chica that includes, at a minimum, the following: 1. A map that shows the investigation areas and identifies the habitat types and vegetation present at the selected reference sites. 2. Proof of authorization (e.g. permits or letters from responsible agencies indicating permits are unnecessary) for all sediment, vegetation, and habitat investigations. 3. The results of the sediment investigations. 4. Particle size, salinity, moisture content, and organic matter content of the sediment at the mitigation and reference sites. 5. Sources for the sediment to be used to raise elevations on the intertidal shelf and how they will be mixed, if necessary, to attain the particle size and organic matter content determined to be necessary for the restoration area. 6. Volume of sediment necessary to achieve the elevations discussed in section 4.A.ii, above. 7. Sediment evaluation and screening plan to assure that material to be placed on the intertidal shelf is not contaminated. 8. Plan for disposal of or alternative uses at Bolsa Chica for sediment that does not meet the quality standards for use in the intertidal shelf restoration. 9. Geotechnical analysis to demonstrate that the materials to be placed can hold the designed slope along the existing edges of the intertidal bar without excessive slumping or erosion. ix. A habitat assessment that investigates the effects of the proposed restoration (including construction access) on sensitive species and habitats, including breeding, nesting, and foraging activities of Belding's savannah sparrow, California least tern, Western snowy plover, and other avian species known to use the area. x. Hydrologic analysis (including any modeling, field work, sampling, etc.) for the excavation and sizing of any tidal channels needed within the coastal salt marsh restoration area to promote water drainage between tidal cycles.	criteria must be submitted to the Santa Ana Water Board no later than 6 months from the issuance or waiver of a 401 Certification for the Intertidal Shelf Restoration or, if a 401 Certification is not required, 6 months from a determination by the Santa Ana Water Board that a 401 Certification is not required for Intertidal Shelf Restoration

TASK	DUE DATE
B. A 60% design plan that includes estimated amount of sediment to be placed within the restoration site that includes: i. Details on the methods to be used to locate suitable sediment for the restoration site (including any necessary coordination with the State Lands Commission and the Steering Committee). ii. Methods for meeting the sediment composition requirements as determined from the reference sites and conditions discussed in section 4.A.viii, above. iii. Methods for sediment delivery and placement at the restoration site including: 1. Designation of staging areas and sediment stockpile/mixing areas, if needed. 2. Determination and implementation of any internal road improvements after consultation with the State Lands Commission and Steering Committee. 3. Designation and location of any dewatering, if required. If dewatering is necessary, proposed treatment prior to discharge. 4. Assessment and description of any potential post-sediment placement compaction or subsidence that needs to be addressed. 5. Disposal (or alternative use at Bolsa Chica, if approved by State Lands Commission, Steering Committee, and the California Department of Fish and Wildlife) of any sediment deemed unsuitable for use in the intertidal shelf restoration project. iv. Construction and placement of any wave barriers if determined to be required. 1. If temporary barriers are recommended, the type, location, and duration of placement to be specified. 2. If permanent wave barriers are recommended, the location, areal extent, height, and materials to be specified. 3. Assessment of any potential impacts from the barriers to marine life, tidal hydrology, or success of the other mitigation projects v. Methods for construction of tidal channels if determined to be required. 1. Include proposed methods of assessing the effectiveness of the tidal channels and determining if adding new channels or altering existing channels is necessary	

TASK	DUE DATE
vi. Identified sources of plant material including species, amount, and size of nursery stock, if any, required for the restoration area. 1. Include amount, size, and expected percent cover for the cordgrass, pickleweed, any other plants necessary for the restoration, and—where necessary—the marsh habitat. vii. Planting methods, including timing after construction and appropriate time of year. 1. Include anticipated time from initial planting to expected maturity for each species of plant proposed. viii. Best management practices (developed per task 1 with the State Lands Commission and the Steering Committee) that the Discharger will implement to ensure that any sediment is retained on onsite and does not erode, drift, or blow into other adjacent areas. ix. A cost estimate for all components of the project, including, planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. C. A final 90% developed plan incorporating comments from Santa Ana Water Board and the California State Lands Commission with input from the Steering Committee. The plan must include, at a minimum, the following: i. Plans, sections, profiles, and construction notes. ii. Storm water management and best management practices iii. An estimated schedule of construction. iv. The estimated soil volumetric balance. v. A cost estimate for all components of the project, including planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. vi. All items discussed in items 4.A through 4.B above, revised as necessary based on comments from agency staff. An implementation plan that includes timelines, schedules, and completion deadlines for the intertidal shelf activities.	

TASK	DUE DATE
Upon Santa Ana Water Board approval of the above plans and actions, the Discharger shall implement them as approved.	
5) The Discharger must submit a creation plan for the Palos Verdes Artificial Reef that will create a minimum of 41.3 acres of rocky reef habitat. At a minimum, the plan must include the following A. A 30% design plan that provides the following: i. Project description, including reef design and materials (e.g. high vs low reef profiles, proposed rock type for use as substrate, locations and width of any sand channels/ecotonal areas). ii. Overall site plan and determination of area subject to rocky reef habitat created by construction of the artificial reef. iii. Magnitude of rocky reef relief and rugosity for the artificial reef creation including: 1. Determination of rocky reef relief and rugosity ranges of natural, functioning rocky reefs in and near the existing SCMI lease area. 2. Estimated volumes and weights (e.g. metric tons) of rock to be used in constructing the reef. 3. Source of rock(s) (e.g. quarries) and plans for transporting rock to and from the site. iv. Expected type and acreage of each habitat, (e.g. high-relief, high-rugosity rocky reef habitat and sand channel ecotonal habitat) that will be created. v. Depth/bathymetry of reef area and estimation of amount of fine sediments present within the proposed reef footprint where rock will be placed. vi. Construction methods that provide: 1. A description of potential sources of rock, how much rock will be required, the methods that will be used to place the rock, and information on verifying rock placement. 2. Information on the methods to monitor the site's conditions (e.g., water quality, marine mammal and sea turtle protection) during construction. 3. Estimates on the timing and duration of the construction.	All submittals specified under task 5 shall be submitted in accordance with the schedule listed below *Interim deadlines* 1. The 30% Design Plan must be submitted no later than 9 months from approval of a CDP for the Facility from the California Coastal Commission 2. The 60% Design Plan must be submitted no later than 18 months after approval of a CDP for the Facility by the California Coastal Commission

TASK	DUE DATE
vii. A cost estimate for all components of the project, including, planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. viii. Development and implementation of any additional success criteria, based on new studies or new information, for the proposed reef creation areas that incorporate any recommendations made by the Neutral Third Party Reviewer(s) (see section ix, below) and agency staff. 1. Success criteria must rely on reference sites of functional, natural, rocky reefs in the SCMI lease and areas around the Palos Verdes Peninsula. ix. Engagement of neutral third-party reviewer(s) 1. The Discharger must engage neutral third-party reviewer(s) to review studies and models and make recommendations to the Santa Ana Water Board. Selection of the neutral third-party reviewer(s) will be subject to approval by the Santa Ana Water Board's Executive Officer. 2. The neutral third-party reviewer(s) will assist in development of success criteria per 5.A.viii.1 above and will also provide technical input on reef design, construction, and appropriate reference sites. 3. The neutral third-party reviewer(s) will be also be available to review monitoring reports and provide technical assistance to the Santa Ana Water Board. x. A report documenting the pre-construction conditions using existing data collected in the SCMI lease area under contract to the NOAA Restoration Center/Montrose Settlements Restoration Program and California Coastal Conservancy that includes, at a minimum, the following: 1. The results of the sediment depth investigation to determine the likelihood of the created reef sinking into the soft sediments. 2. A map of the investigation areas that identifies the habitat types and vegetation present at the reference sites. 3. Characterization of the existing biological resources in the area within the proposed rocky reef habitat creation site and the functional, natural rocky reefs in and near the SCMI lease.	3. The final 90% Design Plan must be submitted no later than 6 months from the issuance or waiver of a 401 Certification for the Palos Verdes Artificial Reef or, if a 401 Certification is not required, 6 months from a determination by the Los Angeles Water Board that a 401 Certification is not required for the Palos Verdes Artificial Reef 4. Any modified or additional success criteria must be submitted to the Santa Ana Water Board no later than 6 months from the issuance or waiver of a 401 Certification for the Palos Verdes Artificial Reef or, if a

TASK	DUE DATE
4. Planned rocky reef habitat and rock source and screening plan for creation of the artificial reef to assure that material to be placed within the lease area is not contaminated. 5. An assessment of the baseline conditions for each Palos Verdes Artificial Reef performance standard in Table K-2 below using the adjacent NOAA restoration reef or other rocky reef reference sites in the area approved by the Neutral Third Party Reviewer(s) and agency staff. 6. Any additional biological data (e. g. fish size, and fish richness, diversity, macroalgae recruitment and persistence) for review by Santa Ana Water Board staff. xi. A habitat assessment that investigates the effects of the proposed reef creation (including construction) on sensitive species, including Giant Sea Bass, all abalone species, marine mammals, and sea turtles known to occur in the Southern California Bight. B. A 60% design plan for the artificial reef that includes estimated amount of rock to be placed within the reef creation site that includes: i. Details on the variable design of the independent reef modules, including the size, location, number, and construction method for each reef module ii. Methods for constructing the independent reef modules. iii. Methods for bringing rock to the reef creation site and placement within the creation site including: 1. Designation of source(s) for the rock. 2. Designation of the rock transport process. 3. Designation of any proposed mitigation associated with the rock transport process, e.g., marine mammal and sea turtle monitoring during the transport(s) by barge from Santa Catalina Island or other quarry area. 4. Compaction or expected subsidence following placement of the reef rock to be described. iv. Plans to monitor turbidity, as well as, marine mammal and sea turtle presence during construction.	401 Certification is not required, 6 months from a determination by the Los Angeles Water Board that a 401 Certification is not required for the Palos Verdes Artificial Reef

TASK	DUE DATE
v. An anchoring plan for any barges, tugboats, or other heavy watercraft required for the construction. vi. Anchoring plan environmental survey confirming that no anchors will be placed in or on sensitive habitat including surfgrass, giant kelp, or existing rocky reef. vii. A cost estimate for all components of the project, including planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. C. A final 90% developed artificial reef plan incorporating comments from the Santa Ana Water Board's Executive Officer, neutral third-party reviewer(s), and agency staff. The plan must include, at a minimum, the following: i. Plans, sections, profiles, and construction notes. ii. Storm water management and best management practices. iii. An estimated schedule of construction. iv. The estimated amount of rock to be placed on the reef creation site. v. A cost estimate for all components of the project, including planning, permitting, construction, operation and maintenance, and monitoring and reporting for the operational life of the Facility. An implementation plan that includes timelines, schedules, and completion deadlines for the Palos Verdes Artificial Reef activities. Upon Santa Ana Water Board approval of the above plans and actions, the Discharger shall implement them as approved.	
6) The Discharger shall submit an Adaptive Management Plan for all facets of the proposed mitigation activities A. The Bolsa Chica Adaptive Management Plan shall, at a minimum, include the following: i. A plan to solicit and address California State Lands Commission and Steering Committee input at regular intervals for the operational life of the Facility.	All submittals specified under task 6 shall be submitted and approved no later than 24 months from the approval of a CDP for the

TASK	DUE DATE
ii. A plan to address any changes recommended by the California State Lands Commission with input from the Steering Committee that may result from the ongoing Bolsa Chica Lowlands Restoration Project: Sustainability Alternatives Study to address SLR impacts iii. Evaluation of how SLR scenarios (both the Medium High and H++ scenario) calculated according to Coastal Commission guidance documents (available here: https://www.coastal.ca.gov/climate/slrguidance.html) are likely to affect Bolsa Chica. iv. A plan for corrective actions that will be implemented to meet performance standards or success criteria should functions in Bolsa Chica diminish that includes: 1. A description of the process for evaluating shortfalls using the performance standards or success criteria and means for correcting shortfalls through adaptive management. 2. Proposed methods to coordinate corrective actions with the California State Lands Commission with input from the Steering Committee to recover functionality of the mitigation. 3. A remedy for temporal delays that may occur in implementing corrective actions. v. Information regarding the expected frequency of dredging including information regarding sand/sediment disposal during and after dredging. 1. Any additional trigger levels recommended by the Bolsa Chica Steering Committee for additional dredging needed to maintain open inlet and minimize tidal muting. 2. Based on above-referenced modeling, a proposed change in the dredging regime needed to address expected changes in sediment volumes, tidal circulation, etc., resulting from higher sea levels, wave heights, and storm energy. vi. A plan to assess existing performance standards and success criteria periodically to see if they are still applicable given potential changes to Bolsa Chica from SLR or management actions taken by the California State Lands Commission with input from the Steering Committee. vii. Identification of contingency mitigation options to address the following potential occurrences:	Facility from the California Coastal Commission

TASK	DUE DATE
1. Updated modeling of the effects of the state's most recent SLR scenarios at the FTB and MTBs (including the oil pad/road restoration components and Fieldstone properties), pursuant to current state guidance. 2. If sufficient mitigation (e.g. due to unsuccessful restoration, or other circumstances resulting in a failure to provide sufficient acreage) is not available at Bolsa Chica to adequately offset the project's APF. 3. If, due to climate change, SLR, or other impacts (both climate and non-climate related), the proposed mitigation at Bolsa Chica will not succeed for the entire operating life of the proposed Facility. 4. If no feasible remedy for SLR at Bolsa Chica exists, alternative mitigation sites may be considered to offset the lost productivity to SLR. 5. Any additional factors that may impact the success of the proposed mitigation project that may be identified by the California State Lands Commission with input from the Steering Committee or Santa Ana Water Board B. The Palos Verdes Artificial Reef Adaptive Management Plan shall, at a minimum, include the following: i. A plan to solicit and address input from staff at California Department of Fish and Wildlife, California Coastal Commission, and Santa Ana Water Board at regular intervals for the operational lifetime of the Facility ii. A plan to solicit and address input from the neutral third-party reviewer(s) (see task 5.A.ix above) at regular intervals for the operational life of the Facility iii. A plan to assess existing performance standards and success criteria periodically to see if they are still applicable. iv. A plan for corrective actions that will be implemented to meet performance standards or success criteria should functions in the Palos Verdes Artificial Reef diminish that includes the following: 1. A description of the process for evaluating shortfalls using the performance standards or success criteria and means for correcting shortfalls through adaptive management.	

TASK	DUE DATE
2. Proposed methods to coordinate corrective actions with the neutral third-party reviewer(s) as well as staff from the agencies listed in task 1.A. (above) to recover functionality of the mitigation. 3. A remedy for temporal delays that may occur in implementing corrective actions. v. A plan to address climate change, including sea level rise, ocean acidification, and any potential impacts resulting from changes in offshore sedimentation. Upon Santa Ana Water Board approval of the above plans and actions, the Discharger shall implement them as approved.	

NOTE: The performance standards from Appendices TT4, HHHHHH, IIIIII, and ZZZZZZ are incorporated into this document by reference. However, they are reproduced below for convenience.

Table K-2

Performance Standard	Performance Measure
Inlet Maintenance Dredging	
Tidal Muting	Tidal muting within the Bolsa Chica Full Tidal Basin shall not be greater than 0.5 meters above 30 day moving spring tide lower low water average (as compared to the fully tidal reference station NOAA 9410660 Los Angeles Outer Harbor) for a period of nine months after completion of inlet maintenance. This standard is subject to revision based on data collected following inlet maintenance activities by the State Lands Commission prior to Poseidon's actions. Any proposed changes are subject to review and approval by the Santa Ana Water Board and may require permit amendment.
Eelgrass: extent	Eelgrass aerial extent shall remain above 100 acres within the Full Tidal Basin, based on a four-year running mean of annual surveys. The annual surveys shall be completed between the months of July-October. Upon review by the Executive Officer, annual surveys may be reduced after five years if eelgrass extent has not exhibited significant change over time. This metric shall be met by a four-point running average of areal extent determined by annual surveys, unless it is determined that regional declines, as compared to performance of similar reference sites, are the likely cause of a decline in eelgrass extent. If eelgrass prior to the project initiation or any time after project initiation show that the extent of eelgrass is below the metric established by this standard, comparison to other eelgrass systems where ongoing measurements have been undertaken (e.g. Pier 300 Basin/Seaplane Lagoon, Agua Hedionda Lagoon, Batiquitos Lagoon, Newport Harbor) may be used to determine

	if there are regional changes in eelgrass extent that may be responsible for not meeting the standard. Any proposed changes in the standard will be reviewed and accepted by the Executive Officer.
Eelgrass: density	Prior to inlet maintenance assumption by Poseidon, an initial survey of eelgrass within Bolsa Chica will be undertaken to determine mean eelgrass turion density using the methods in the California Eelgrass Mitigation Program (CEMP). Mean eelgrass turion density within Bolsa Chica Full Tidal Basin shall be not drop more than 20% below that level at α=0.2 and β=0.2 levels. If the turion density is below this level, comparison to other eelgrass systems where ongoing measurements have been undertaken may be used to determine if there are regional changes in eelgrass turion density that may be responsible for not meeting the standard. Any proposed changes in the standard will be reviewed and accepted by the Executive Officer.
WQ: Dissolved Oxygen (DO)	The daily mean shall not fall below 5 mg/L, with no individual measurement falling below 3 mg/L at Bolsa Chica Water Quality Station 1 in the Full Tidal Basin for more than 12 hours. Dissolved oxygen shall be measured continuously at a point as close to the benthos as possible but no greater than 1 m above the bottom. Red tide events, instrument failure or loss, or similar documented unique and uncontrollable event may not be considered as failing to meet the requirement of “no individual measurement falling below 3 mg/L.” Instrument failures shall be addressed as quickly as practical. Any uncontrollable event resulting in a DO metric failure shall be subject to review and acceptance by the Executive Officer.
WQ: Salinity	Salinity levels shall not be greater than 38 ppt at Bolsa Chica Water Quality Station 1 in the Full Tidal Basin
For fish performance factors, two out of the three listed below shall be met annually for at least the first three years of inlet dredging. Sampling frequency may be reduced or increased after the initial first three years dependent upon the results of the surveys. Justification for a reduction in sampling frequency must be provided to the Executive Officer for review and approval.	
Fish: Richness	Fish richness in summer months (July-September) shall be greater than 25 species as determined by three replicate purse seine, otter trawl, and beach seine hauls conducted at a minimum of two fisheries stations in the Full Tidal Basin following the methods and gear used in the Bolsa Chica monitoring program (2013). No more than 3 repeated sampling events per year may be used to meet this standard and they may not be considered cumulatively (i.e., each sampling event would be treated as a stand-alone sampling effort requiring that at least one effort generate 25 species to be compliant with the metric). If this annual standard is met for four consecutive years following initiation of sampling, monitoring frequency may be reduced subject to approval by the Executive Officer.
Fish: Density	Fish density shall equal or exceed 1 fish/m^2 as an average of densities derived from the replicate beach seine and purse seine sampling conducted at a minimum of least two fisheries stations in summer months (July-September),

	with the average reflecting the gear type results, not cumulative area sampled combination. No more than 3 sampling events may be used to meet this standard and may not be used cumulatively (i.e., each sampling event would be treated as a stand-alone sampling effort requiring that at least one effort generate 25 species to be compliant with the metric). If this annual standard is met for four consecutive years following initiation of sampling, monitoring frequency may be reduced subject to approval by the Executive Officer".
Fish: Diversity	Should one of these criteria not be met, Poseidon shall propose that other reference sites be used where similar data is being collected using similar methodology (e.g. reference sites used for Otay River Estuary Restoration Project monitoring, Batiquitos Lagoon, Agua Hedionda Lagoon, Pier 300 Basin/Seaplane Lagoon). Fish diversity during summer months (July-September) in Bolsa Chica shall not be less than 20% below that of the mean of the reference sites.
Restoration of Fieldstone Property (Task 2)	
Restoration acres	As noted in attachment G.5, the Discharger will restore 4.5 acres of the Fieldstone Property.
Restoration of Oil Pads and Roads (Task 3)	
Restoration acres	As noted in attachment G.5, the Discharger will restore 1.2 acres of the Oil Pads and Roads Property.
Enhancement of Muted Tidal Basins via Improved Water Circulation	
Fish Species Richness	Doubling of the fish species richness within the Muted Tidal Basins as compared to current fish species richness.
Restoration of Intertidal Shelf	
Restoration acres	The Discharger will restore at least 23 acres of coastal salt marsh on the Intertidal Shelf.
Vegetative Cover	At the end of 5 years, vegetative cover on the intertidal shelf should be similar to the coastal salt marsh reference sites. Vegetative cover will be measured using aerial photography.
Tidal inundation	Inundation frequency for each specific habitat type (e.g. low marsh and high marsh) as averaged over the year should be similar to other tidal coastal salt marsh habitats. Inundation frequency will be measured by locally placed tidal monitoring gauges.
Fish: Density	Fish density within the salt marsh vegetation on the intertidal shelf shall be similar to reference locations within Bolsa Chica. Fish density will be measured by using fish traps within the tidal marsh during periods of high tide inundation in the summer months.
Palos Verdes Artificial Reef	
Monitoring frequency may be reduced after the initial first five years dependent upon the results of the surveys. Justification for a reduction in sampling frequency must be provided to the Santa Ana Water Board Executive Officer for review and approval.	

Reef Footprint	Once every two years, a hydrographic survey documenting the reef footprint (acres) will demonstrate at least 90% of the hard substrate placed on the reef remains exposed.
Fish Density	Fish density on the created reef will be similar to the reference reefs in the area.
Fish Species Richness	The total number of fish species will be similar to the reference reefs in the area.
Fish Size	Fish size for non-gamefish species (e.g., Black Perch, Señorita, Halfmoon, Blacksmith, Garibaldi, Pile Perch, Rubberlip Seaperch) on the Palos Verdes Artificial Reef will be similar to the reference reefs in the area.
Fish Production	Fish production calculated using the model in Claisse et al. (2014) will be similar to the reference reefs in the area.
Mobile Macroinverte-brate density	Mobile macroinvertebrate density will be similar to the reference reefs in the area.
Mobile Macroinverte-brate Species Richness	Mobile macroinvertebrate species richness on the Palos Verdes Artificial Reef will be similar to the reference reefs in the area.
Understory Algae	The density and species richness of understory algae on the Palos Verdes Artificial Reef will be similar to the reference reefs in the area. Only reef habitat at least 2 m above the seafloor will be surveyed to avoid effects of shifting sediments and suspended sediments resulting from the historic landslides in the area. Example understory algae includes, but is not limited to: Laminaria farlowii, Laminaria setchellii, Pterygophora californica, Egregia menziesii, Eisenia arborea, Corallina spp., Bosiella spp., and encrusting algae/Crustose coralline algae.
Similarity will be determined using the same method as is used for the Wheeler North Reef (Reed et al. 2020). References to the Wheeler North Artificial Reef in the following text has been replaced by "PVAR" to mean the Palos Verdes Artificial Reef. Evaluating whether the performance of PVAR is similar to that at the two reference reefs requires that the mean (or in some cases the median) value for a given relative performance variable at PVAR not be significantly lower than the mean (or median) value at the lower performing of the two reference reefs. We use a one-sample, one-tailed approach for all comparisons. Significance is determined using a method that utilizes both a formal probability value (i.e., p-value) and an effect size. This is generally done by means of a t-test. The performance at PVAR with respect to a given relative performance standard is considered to be worse than the lower of the two reference reefs if the p-value for the comparison is ≤ to the proportional effect size (i.e., the proportional difference between the PVAR and the lowest performing reference reef). The only exception to this rule is when both the p-value and the proportional effect size are greater than 0.5, in which case assessment for the period is considered inconclusive. As an example, if the proportional effect size for a given variable was 0.25 (i.e., the mean value at PVAR was 75% of the mean value at the lower of the two reference reefs), then a t-test yielding a p-value ≤0.25 would indicate the PVAR did not meet the performance standard, whereas p-values > 0.25 would indicate that it did meet the performance standard. The rationale for using the lower of the	

two reference reefs is that both reference reefs are considered to be acceptable measures of comparison for PVAR. Hence, if PVAR is performing at least as well as one of the reference reefs, then it should be judged successful.