3.0 PROJECT DESCRIPTION

3.0 PROJECT DESCRIPTION

The proposed Seawater Desalination Project at Huntington Beach consists of the construction and operation of a 50 million gallon per day (MGD) seawater desalination facility by Poseidon Resources Corporation. The proposed facility would be located adjacent to the Applied Energy Services Corporation (AES) LLC Huntington Beach Generating Station (HBGS), within the southeastern portion of the City of Huntington Beach (City). The proposed facility would convert a fraction of the HBGS' condenser cooling seawater discharge into fresh drinking water using a reverse osmosis desalination process. Source water for this facility would be taken from the existing HBGS condenser cooling-seawater discharge pipeline system, which is permitted to circulate up to 514 MGD of seawater. The historical maximum flow rate at HBGS has been 507 MGD. After the seawater passes through the HBGS' condensers, the desalination facility would intake approximately 100 MGD of HBGS' cooling water discharge and produce 50 MGD of high-quality potable drinking water for use by residents and businesses in Orange County. The remaining 50 MGD becomes concentrated seawater, which would re-enter the HBGS condenser cooling water discharge system downstream of the desalination facility's intake point and blend with up to 407 MGD (507 MGD of historical maximum flow minus 100 MGD of water diverted towards the desalination facility) of HBGS condenser cooling circulation system flow for dilution prior to discharge back into the Pacific Ocean.

3.1 PROJECT LOCATION

The proposed seawater desalination project site is approximately 11 acres in size and is located at 21730 Newland Street. The City of Huntington Beach is a coastal city along the Pacific Ocean in northwestern Orange County. It is surrounded by the City of Westminster to the north, City of Fountain Valley to the northeast, Cities of Costa Mesa and Newport Beach to the east, and the City of Seal Beach to the northwest. Los Angeles is located approximately 35 miles to the northwest while San Diego is 95 miles to the southeast (refer to Exhibit 3-1, *REGIONAL VICINITY MAP*).

The site is bordered by a fuel oil storage tank to the north, the Huntington Beach Channel (a facility operated by the Orange County Flood Control District [OCFCD]) to the east, HBGS facilities to the southwest, a wetland area to the southeast, and an electrical switchyard to the west (refer to Exhibit 3-2, *SITE VICINITY MAP*).

3.2 ENVIRONMENTAL SETTING

The subject site is situated on an unused fuel oil storage tank area formerly owned and operated by Southern California Edison (SCE). In 2001, AES Huntington Beach, LLC acquired the property, and, upon project implementation, would lease a portion of the property to the project proponent, Poseidon Resources Corporation (refer to Section 3.3b, *SITE LEASE AGREEMENT*). The storage tank area contains a total of six tanks, ranging in capacity from 924,000 gallons to 8.64 million gallons. Implementation of the proposed project would require the demolition of three of the six tanks (three fuel oil tanks). The three fuel oil storage tanks to be demolished have historically been referred to as the South, East, and West fuel oil storage tanks (refer to Exhibit 3-2, *SITE VICINITY MAP* for the precise location). Each of these storage tanks is 40 feet high, cylindrical in shape and surrounded by 10 to 15-foot high earthen containment berms, pipelines, pumps, and associated structures. On-site vegetation consists mainly of non-native low-lying shrubs and bushes along the eastern border of the project site. The topography of the site is relatively flat, gently sloping to the southwest, with an elevation of approximately five feet above mean sea level (msl) (refer to Section 5.7, *AESTHETICS/LIGHT AND GLARE* for information on views of the existing site). Section 4.0, *EXISTING CONDITIONS*, provides additional information regarding existing conditions and environmental setting.

In addition to the desalination facility site, the proposed project would also include several related off-site improvements, including tie in pipelines between the existing HBGS condenser cooling water discharge system and the proposed desalination project, up to approximately 10 miles of product water delivery pipeline and two new underground booster pump stations. The intake/discharge pipelines would be located entirely within the existing HBGS site, and would not require modifications to the coastal/marine portions of the existing HBGS ocean intake/discharge facilities. However, it should be noted that the existing HBGS intake/discharge facilities traverse land owned by the California State Lands Commission (CSLC), and the land is leased to AES. A lease agreement between the CSLC, AES, and the project applicant may be required prior to project implementation. The product water delivery pipeline would be up to approximately 10 miles in length, extending from the proposed desalination facility to the OC-44 water transmission line within the City of Costa Mesa, east of State Route 55 (SR-55) at the intersection of Del Mar Avenue and Elden Avenue. The majority of the pipeline alignment would occur within existing public streets, easements, or other rights-of-way (ROW) in urbanized areas. Although precise pipeline alignments may be modified during final engineering analyses, the conceptual pipeline alignments are shown in Exhibit 3-3, *CONCEPTUAL PIPELINE ALIGNMENTS*.

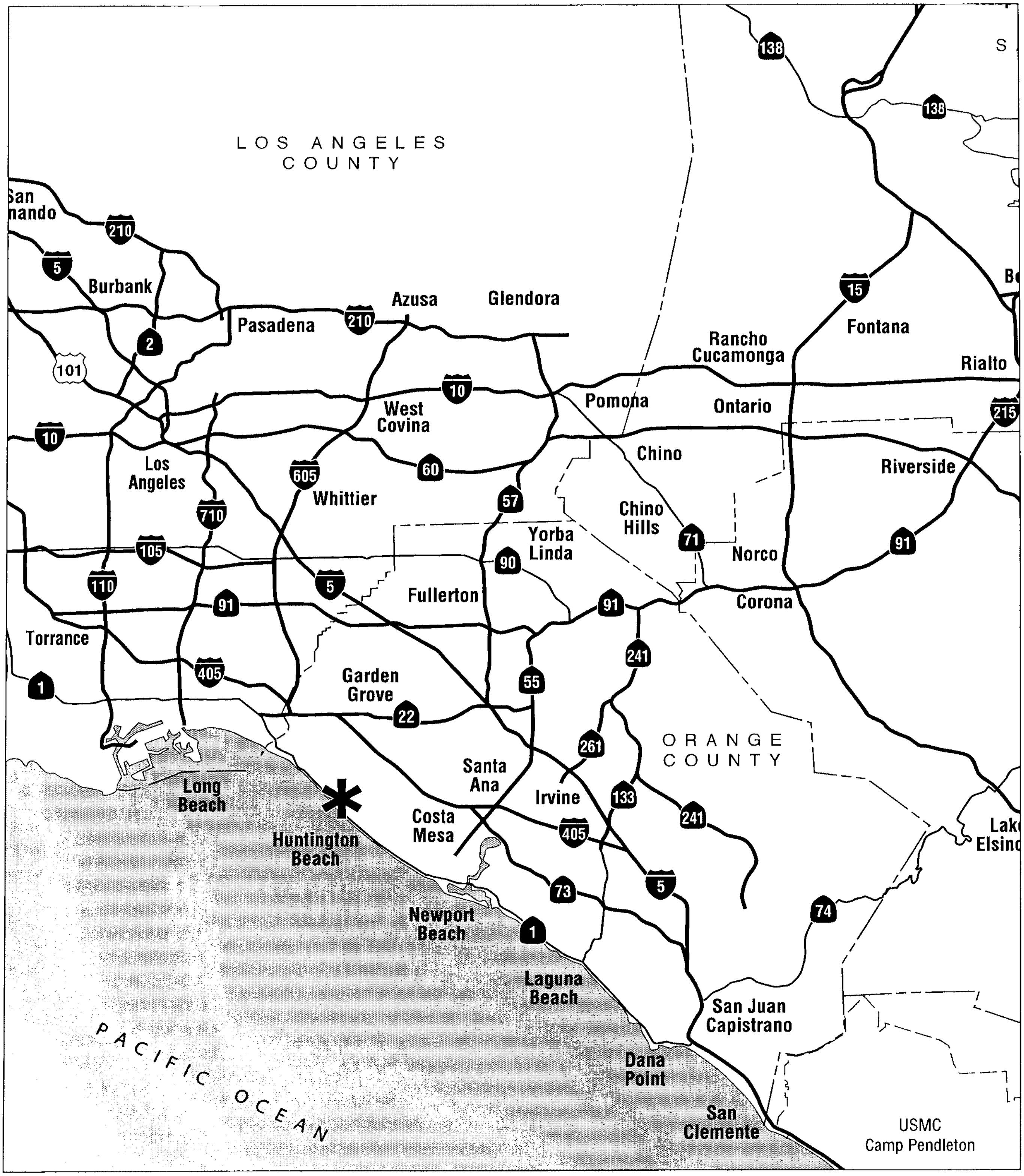
Two off-site underground booster pump stations are needed as part of the distribution system. The first off-site underground booster pump station (the OC-44 booster pump station) is proposed to be located within an unincorporated area of the County of Orange along the eastern border of the City of Newport Beach, within an Orange County Resource Preservation Easement but outside of the Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) delineation zone (refer to Exhibit 3-4, *OC-44 BOOSTER PUMP STATION LOCATION MAP*). The second underground booster pump station (the Coastal Junction booster pump station) would be located in the parking lot of St. Paul's Greek Orthodox Church, at 4949 Alton Parkway within the City of Irvine (refer to Exhibit 3-5, *COASTAL JUNCTION BOOSTER PUMP STATION LOCATION MAP*).

3.3 PROJECT CHARACTERISTICS

The proposed project consists of construction of a seawater desalination facility to meet the needs of Orange County. The proposed desalination project would consist of seawater intake system, pretreatment facilities, a seawater desalination facility utilizing reverse osmosis (RO) technology, post-treatment facilities, product water storage, on- and off-site landscaping, chemical storage, on- and off-site booster pump stations, and 42- to 48-inch diameter product water transmission pipelines up to 10 miles in length. This section presents an overall description of the proposed project by summarizing six basic project characteristics associated with the desalination facility: on-site improvements, the proposed desalination facility's association with HBGS, off-site improvements, desalinated water distribution facilities, quality of potable water produced by the desalination facility, and facility operations.

A. ON-SITE IMPROVEMENTS

The proposed project involves the implementation of a desalination facility producing approximately 50 MGD, or 56,000 acre-feet per year (afy) of potable water. The project would require the demolition of three fuel storage tanks and the remediation of any soil/groundwater impacted by contamination associated with previous site usage as a fuel storage facility. In addition, the existing interior berms would be demolished while the existing exterior berms would remain as is. On-site structures would consist of an administration building, a reverse osmosis facility building,



* - Subject Site

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Regional Vicinity Map

Exhibit 3-1

1 - Huntington Beach Generating Station
2 - Pacific Holdings Storage Tank Facility
3 - Ascon/Nesi Landfill
4 - Edison High School
5 - Edison Community Center/Cannery Street Landfill (closed)
6 - Mobile Home Parks
7 - Open Space/Wetlands
8 - Project Site
9 - Distillate Fuel Storage Tank
10 - South Fuel Oil Storage Tank
11 - East Fuel Oil Storage Tank
12 - West Fuel Oil Storage Tank
13 - North Fuel Oil Storage Tank

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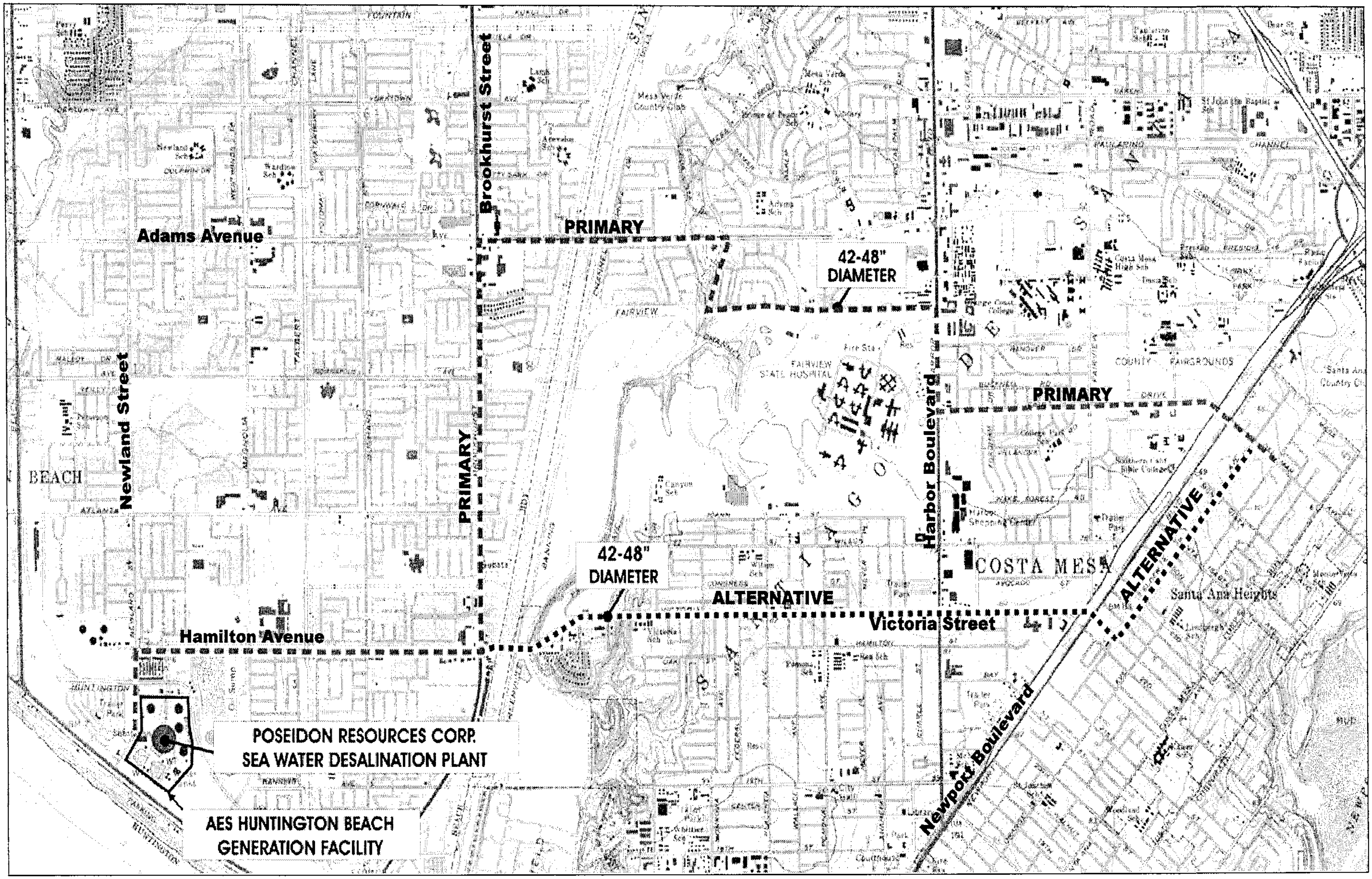
SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Site Vicinity Map

Exhibit 3-2



Source: Carollo Engineers, August 2002.

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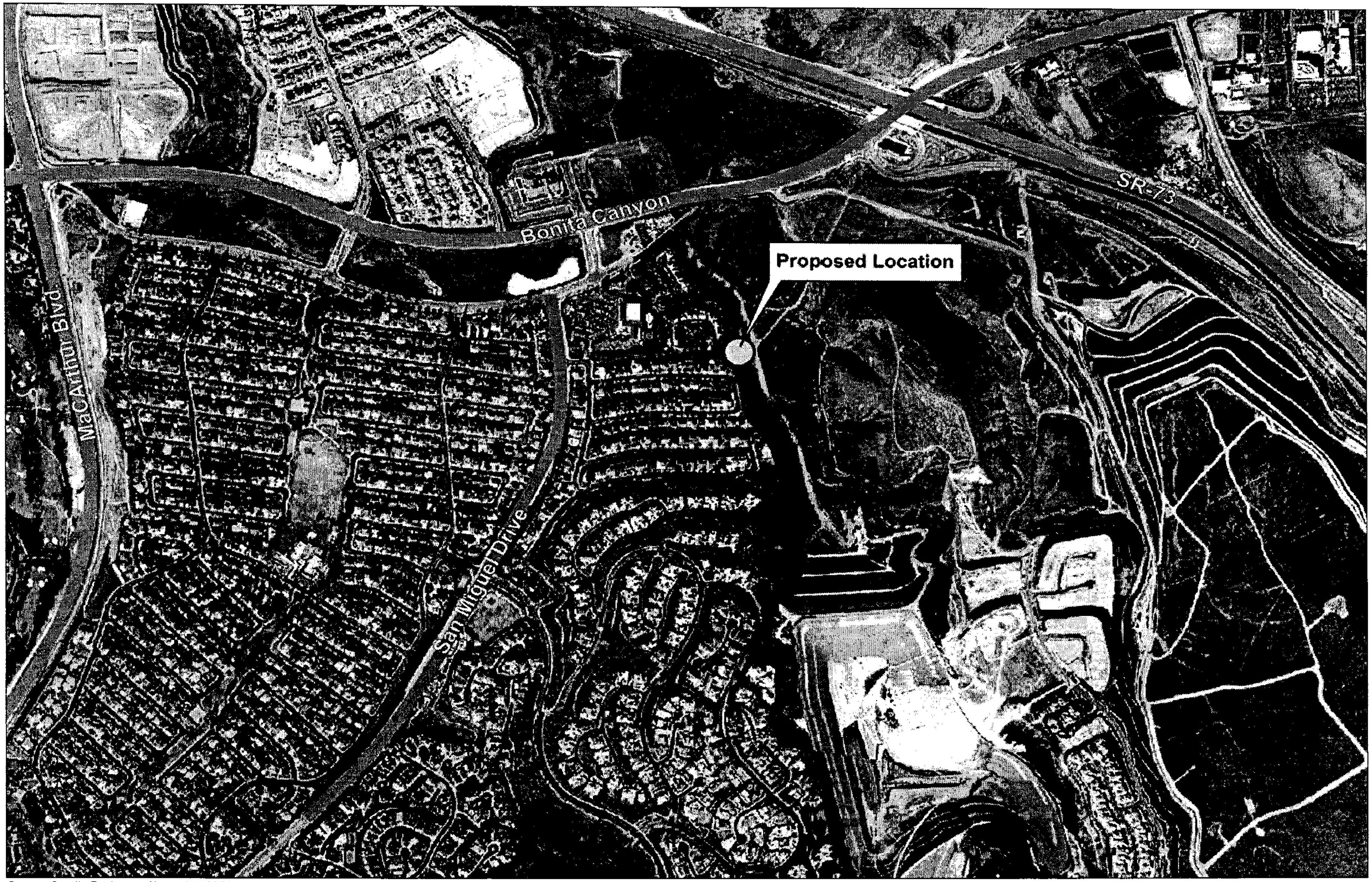
SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Conceptual Pipeline Alignments

Exhibit 3-3



Source: Carollo Engineers, November 2004.

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

OC-44 Booster Pump Station Location Map

Exhibit 3-4

Source: Carollo Engineers, November 2004.

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Coastal Junction Booster Pump Station Location Map

Exhibit 3-5

pretreatment filter structure, chemical storage/solids handling building, bulk chemical storage building, product water pump station (situated underground) and surge tank, rinse tank, lime silos, wash water tank, ammonia tank, influent pump station (situated underground), an electrical substation building, an aboveground product water tank, and appurtenant facilities (refer to Exhibit 3-6, *CONCEPTUAL SITE PLAN*).

Proposed Buildings and Structures

All proposed buildings and structures would comply with state and local standards in regards to fire and structural safety. The proposed desalination project would consist of the following buildings and structures:

- **Administration Building (approximately 158'L x 64'W x 18'H, 10,120 s.f.):** This building is proposed to be Type-II, non-rated (generally defined by the California Building Code as structures incorporating non-combustible materials [steel, iron, concrete, or masonry] for structural elements, floors, walls, and roofs) and would be constructed of steel. The exterior would feature flat metal wall panels running vertically along the face of the structure. A metal panel roof system would be screened with a metal fascia using deep-ribbed metal panels running horizontally. All glazing would be tinted and would include clear anodized window frames (refer to Exhibit 3-7, *ADMINISTRATION BUILDING PLAN/EXTERIOR ELEVATIONS*).

- **Reverse Osmosis Building (approximately 293'L x 130'W x 25'H, 38,090 s.f.):** This building would be a Type-II, non-rated, steel-constructed building housing the reverse osmosis components of the desalination facility and associated indoor pumps. The exterior would feature flat metal wall panels running vertically along the face of the structure. A continuous metal reveal band would be placed mid-height to break up the 25-foot structure vertically. A metal panel roof system would be screened with a metal fascia using deep-ribbed metal panels running horizontally. Full height louvers would match the wall panel color and would be recessed slightly from the face of the structure to allow for shadowing. Panel coloring would match the Administration Building (refer to Exhibit 3-8, *REVERSE OSMOSIS BUILDING PLAN/EXTERIOR ELEVATIONS*).

- **Pretreatment Filter Structure (approximately 196'L x 195'W x 16'H, 38,270 s.f.):** This open-air structure would house the pretreatment filter components of the facility. It would feature concrete walls matching the color of the Reverse Osmosis Building. The concrete walls would stair-step in elevation to a peak that would be finished with the deep-ribbed metal panels running horizontally. These panels would match the fascia of the Administration and Reverse Osmosis Buildings. A painted band would be included to match the reveal band of the Reverse Osmosis Building (refer to Exhibit 3-9, *PRETREATMENT FILTER STRUCTURE PLAN/EXTERIOR ELEVATIONS*). The influent pump station (to be located in an underground vault) would be situated adjacent to the Pretreatment Filter Structure.

- **Solids Handling Building (approximately 170'L x 50'W x 21'H, 7,590 s.f.):** This Type-II, non-rated, steel-constructed building would house solids handling equipment associated with facility operation. The building would architecturally match the Administration Building, featuring flat metal wall panels running vertically along the face of the structure. The metal panel roof system would be screened with a metal fascia using deep-ribbed metal panels running horizontally (refer to Exhibit 3-10, *SOLIDS HANDLING BUILDING PLAN/EXTERIOR ELEVATIONS*).

- **Chemical Storage Structure (approximately 112'L x 39'W x 23'H, 4,368 s.f.):** This structure would also feature Type-II, non-rated, canopy steel construction and would house various chemicals stored in bulk. The metal panel roof system would be screened with a metal fascia using deep-ribbed panels running horizontally (refer to Exhibit 3-11, *CHEMICAL STORAGE STRUCTURE PLAN/EXTERIOR ELEVATIONS*).

- **Electrical Room/Substation Building (approximately 60'L x 30'W x 12'H, 1,800 s.f.):** This Type-II, non-rated, steel-constructed building would match the Administration Building architecturally. The exterior design utilizes flat metal wall panels running vertically along the face of the structure. The metal panel roof system would be screened with a metal fascia using deep-ribbed metal panels running horizontally (refer to Exhibit 3-12, *ELECTRICAL ROOM/SUBSTATION BUILDING PLAN/EXTERIOR ELEVATIONS*).

- **Lime Silos (six tanks approximately 20' in diameter and 25' high, 314 s.f.):** The lime silo tanks would be arranged in two rows of three tanks each within the northern portion of the subject site in an area approximately 80 feet long by 57 feet wide. These tanks would be placed within an open air, welded steel structure incorporating aesthetic treatments to enhance the character of the site. (refer to Exhibit 3-13, *STORAGE TANK PLAN/EXTERIOR ELEVATIONS*).

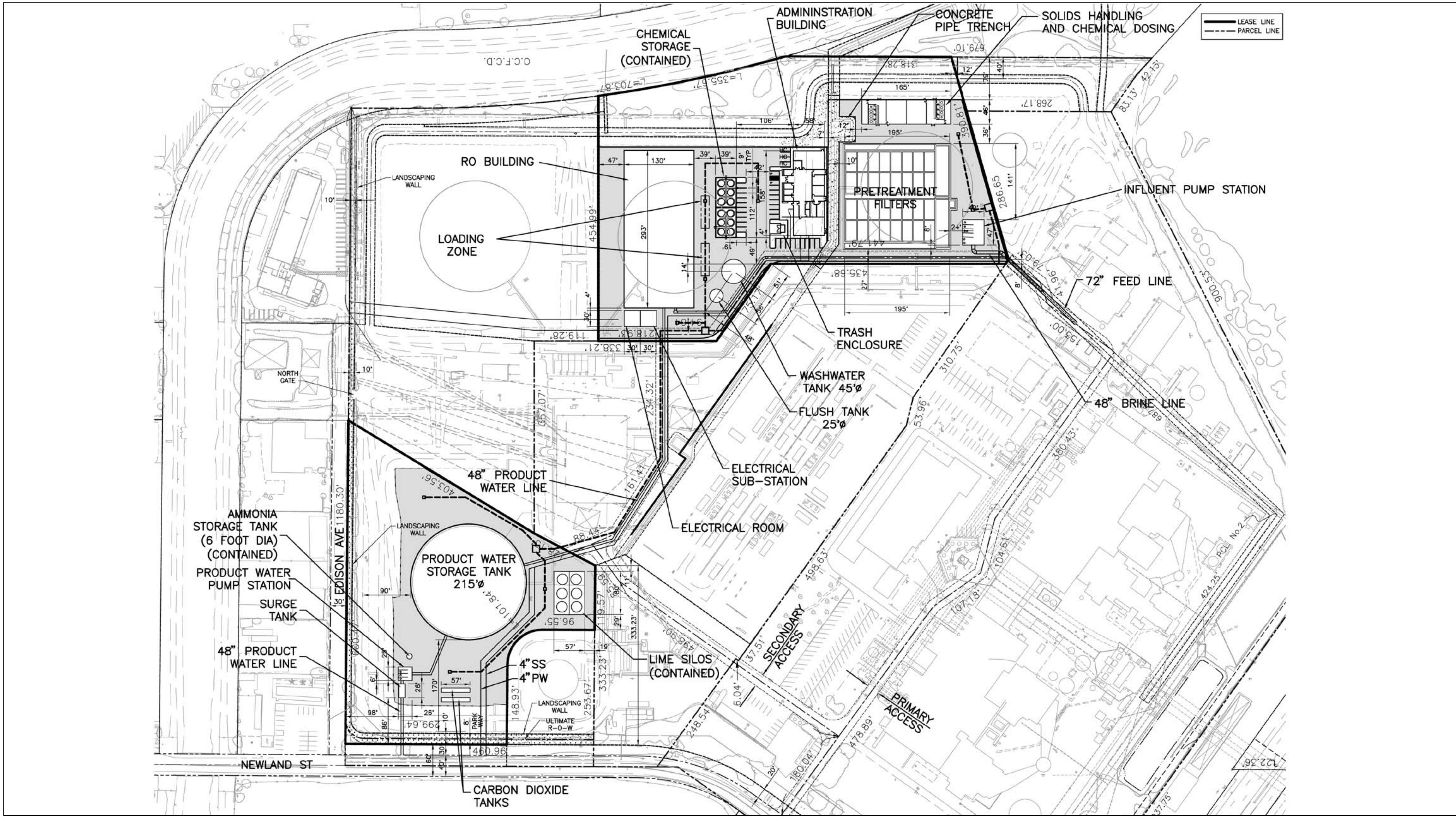
- **Washwater Tank (approximately 45' in diameter by 19' high, 1,590 s.f.):** This single tank would store washwater and would be constructed of steel, painted to match the surrounding buildings and structures. The approximate capacity of this tank would be 200,000 gallons (refer to Exhibit 3-13, *STORAGE TANK PLAN/EXTERIOR ELEVATIONS*).

- **Rinse Tank (approximately 25' in diameter by 29' high, 491 s.f.):** This single tank would store the desalination facility's rinse water and would have an approximate capacity of 100,000 gallons. This tank would be constructed of steel and would be painted to match the surrounding buildings and structures (refer to Exhibit 3-13, *STORAGE TANK PLAN/EXTERIOR ELEVATIONS*).

- **Ammonia Tank (approximately 6' in diameter by 6' high, 28.35 s.f.):** This single tank would store ammonia and would be constructed of high density polyethylene or fiberglass reinforced polyester, and would have an approximate capacity of 1,000 gallons (refer to Exhibit 3-13, *STORAGE TANK PLAN/EXTERIOR ELEVATIONS*).

- **Carbon Dioxide Tanks (approximately 7'8" in diameter by 57' long, 1,482 s.f):** Two tanks would store carbon dioxide. These tanks would be constructed of welded steel and would be painted to match the surrounding buildings and structures. The storage tanks would be double-wall vessels. The inner vessel wall would be made of high-strength carbon steel, while the outer vessel wall material would be aluminum or structural grade carbon steel (refer to Exhibit 3-14, *CARBON DIOXIDE TANK PLAN/EXTERIOR ELEVATIONS*).

- **Aboveground Product Water Storage Tank (approximately 215' in diameter and 40' high [30' above grade and 10' below grade]):** The aboveground product water storage tank would be circular in shape and would have an approximate capacity of 10 million gallons. The tank would be a steel structure (refer to Exhibit 3-15, *PRODUCT WATER STORAGE TANK PLAN/EXTERIOR ELEVATIONS*). The



Source: Poseidon Resources Corporation.

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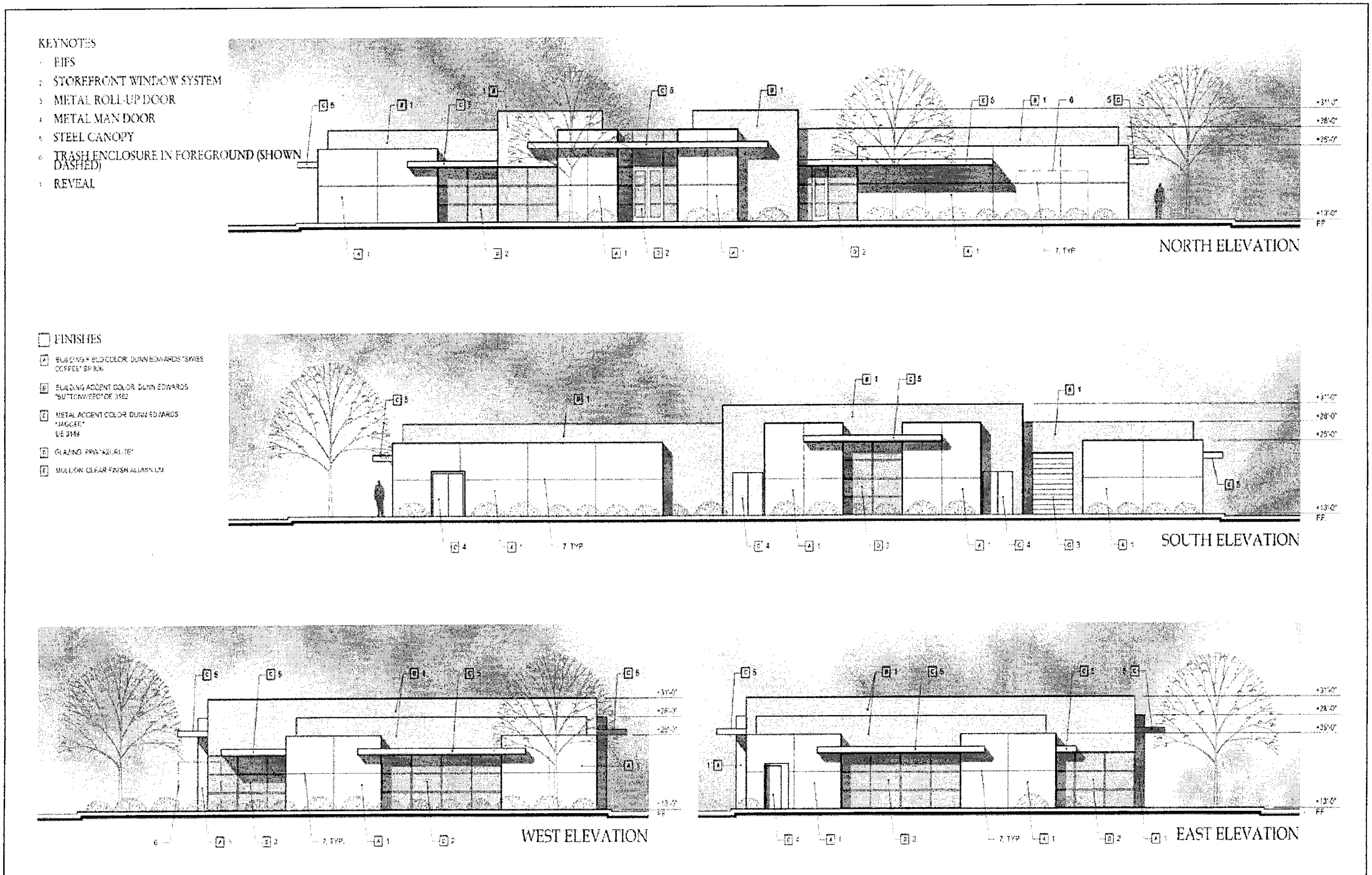
SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Conceptual Site Plan

Exhibit 3-6



Source: Carollo Engineers, November 2004.

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Administration Building Plan/Exterior Elevations

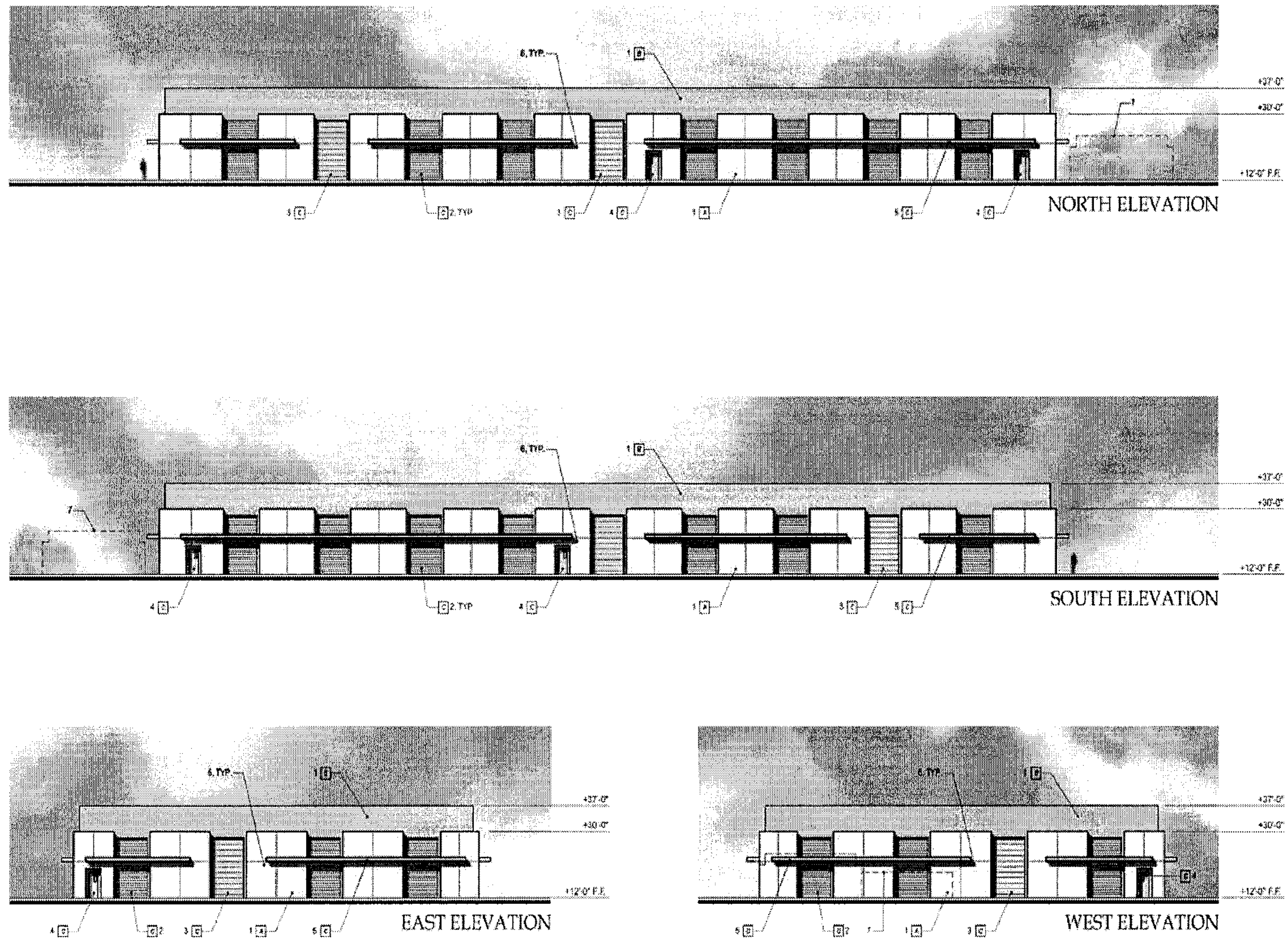
Exhibit 3-7

KEYNOTES

1. EIFS
2. METAL LOUVER
3. METAL ROLL-UP DOOR
4. METAL MAN DOOR
5. STEEL CANOPY
6. REVEAL
7. ELECTRICAL ROOM (SHOWN DASHED)

FINISHES

- A BUILDING FIELD COLOR: DUNN EDWARDS "SWISS COFFEE" SP 636
- B BUILDING ACCENT COLOR: DUNN EDWARDS "BUTTONWEED" DE 3182
- C METAL ACCENT COLOR: DUNN EDWARDS "JAGGED" DE 3143



Source: Carollo Engineers, November 2004.

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Reverse Osmosis Building Plan/Exterior Elevations

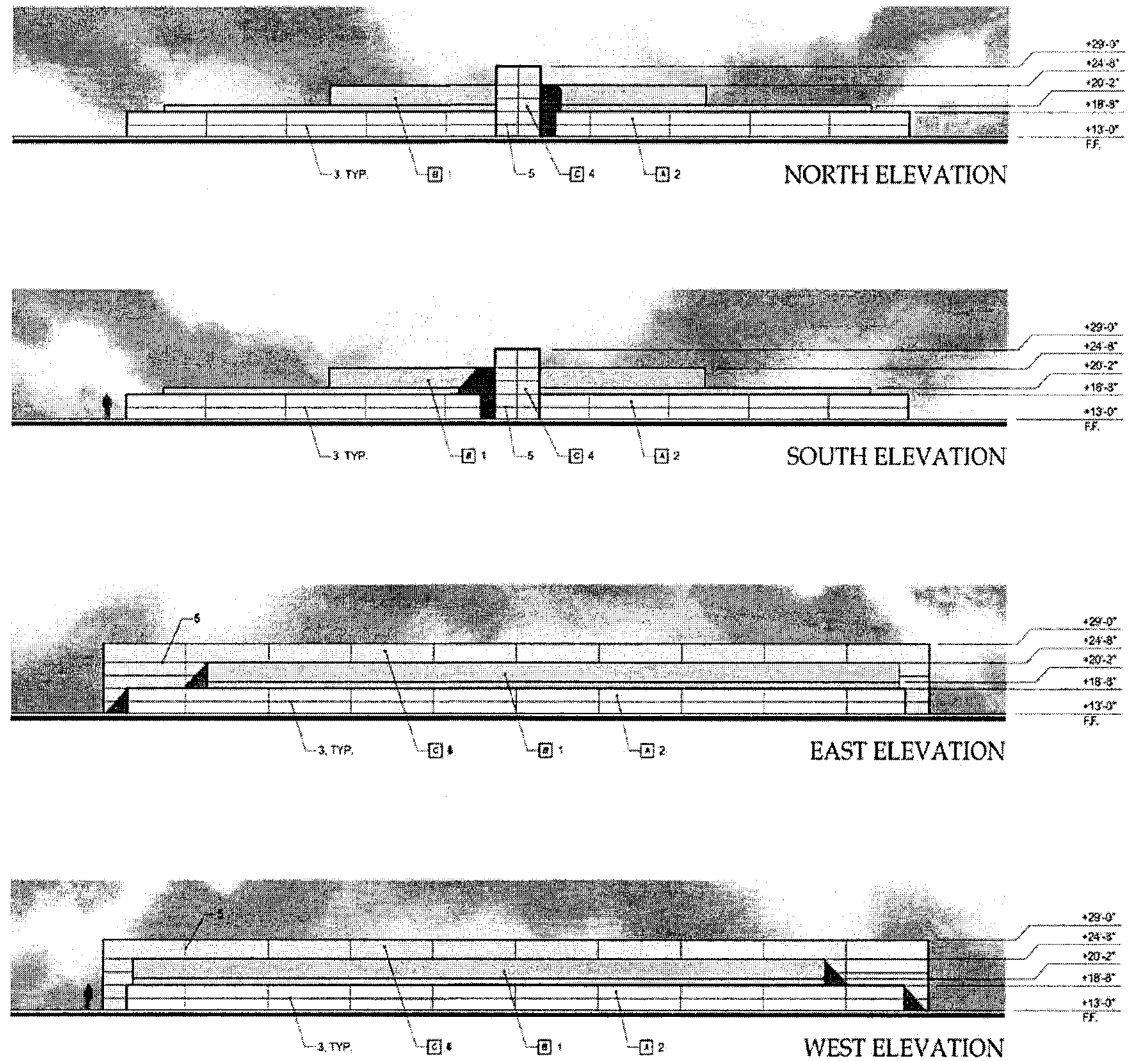
Exhibit 3-8

KEYNOTES

1. CONCRETE TANK
2. PERIMETER CONCRETE WALL
3. REVEAL
4. FLAT METAL WALL PANEL
5. METAL WALL PANEL REVEAL

FINISHES

[A] FIELD COLOR: DUNN EDWARDS "SWISS COFFEE" SP 836
[B] ACCENT COLOR: DUNN EDWARDS "BUTTONWEED" DE 3162
[C] ACCENT COLOR: DUNN EDWARDS "JAGGED" DE 3149



Source: Carollo Engineers, November 2004.

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Pretreatment Filter Structure Plan/Exterior Elevations

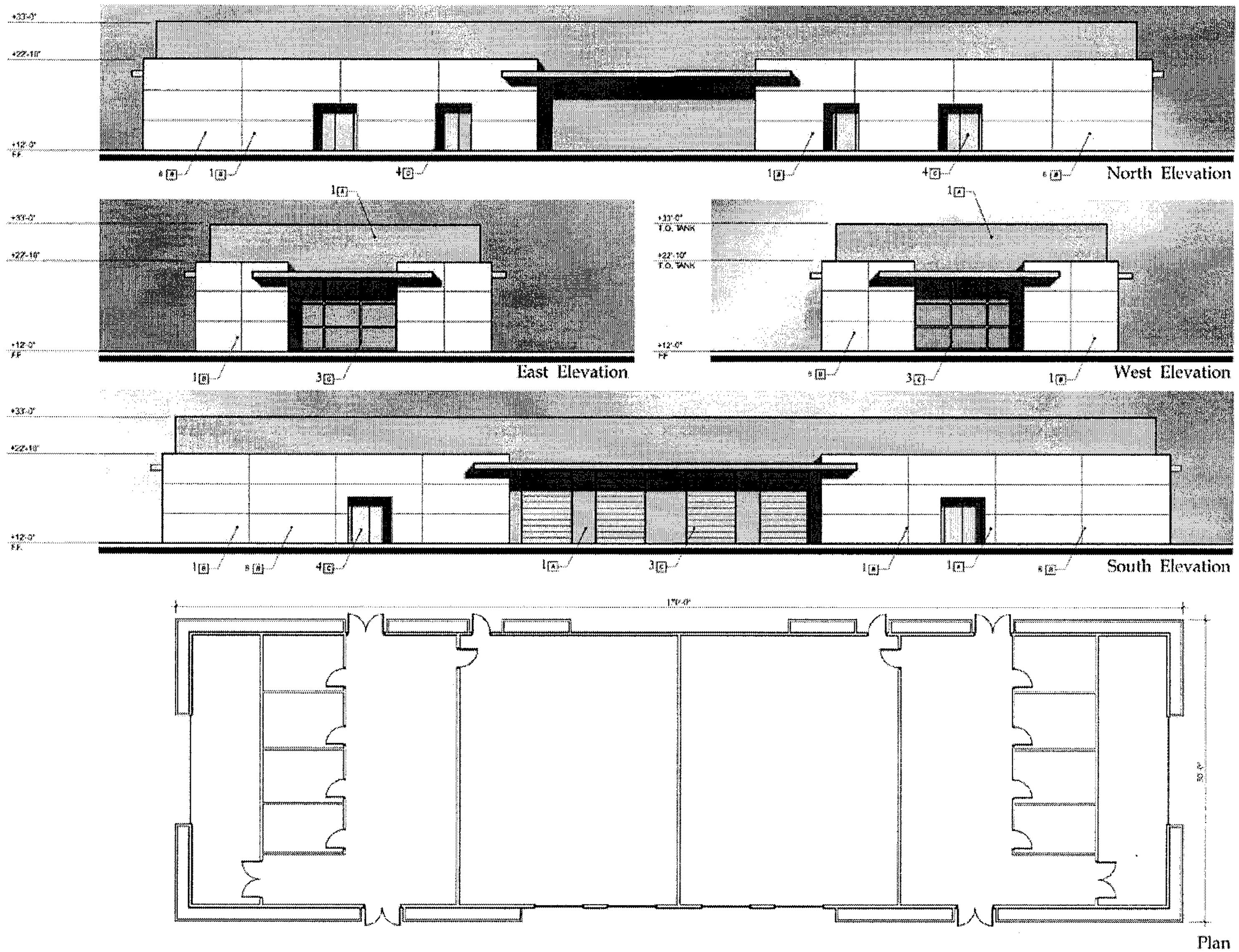
Exhibit 3-9

KEYNOTES

1. EIFS
2. METAL LOUVER SCREEN WALL
3. METAL FRAME WINDOW
4. METAL MAN DOOR
5. METAL ROLLUP DOOR
6. REVEAL

FINISHES

- A BUILDING FIELD COLOR: DUNN EDWARDS "SWISS COFFEE" SP 636
- B BUILDING ACCENT COLOR: DUNN EDWARDS "BUTTONWEED" DE 3162
- C METAL ACCENT COLOR: DUNN EDWARDS "JAGGED" DE 3148



Source: Carollo Engineers, November 2004.

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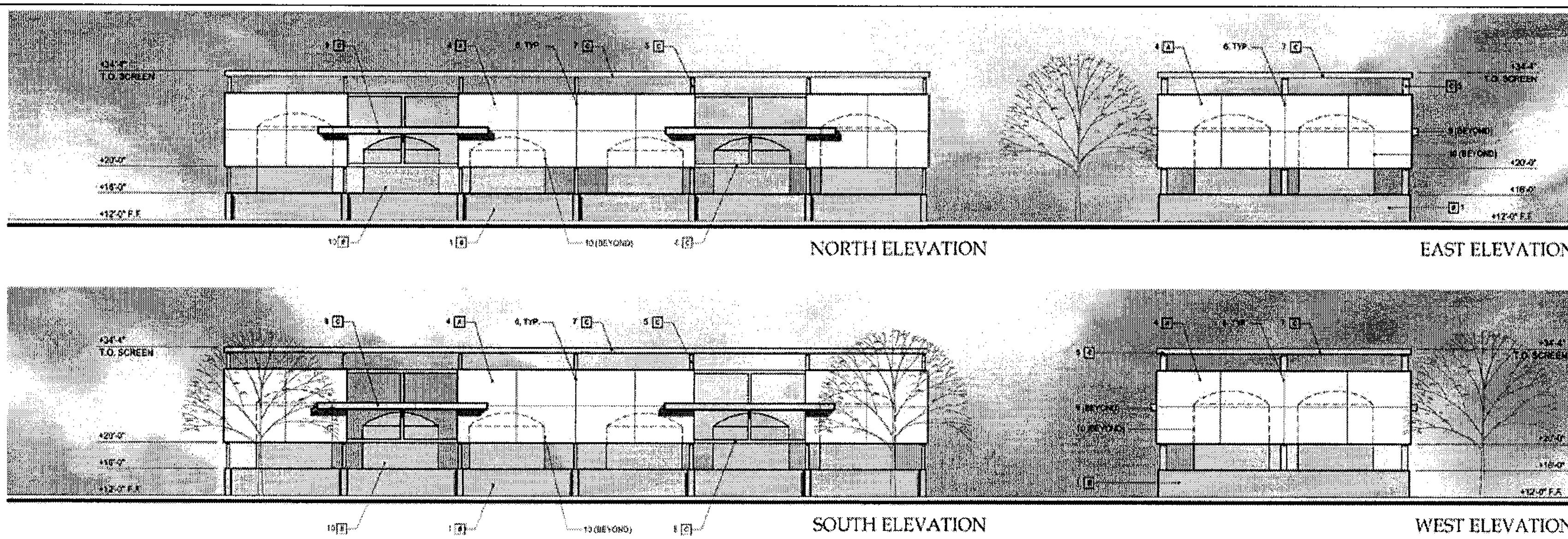
SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Solids Handling Building Plan/Exterior Elevations

Exhibit 3-10

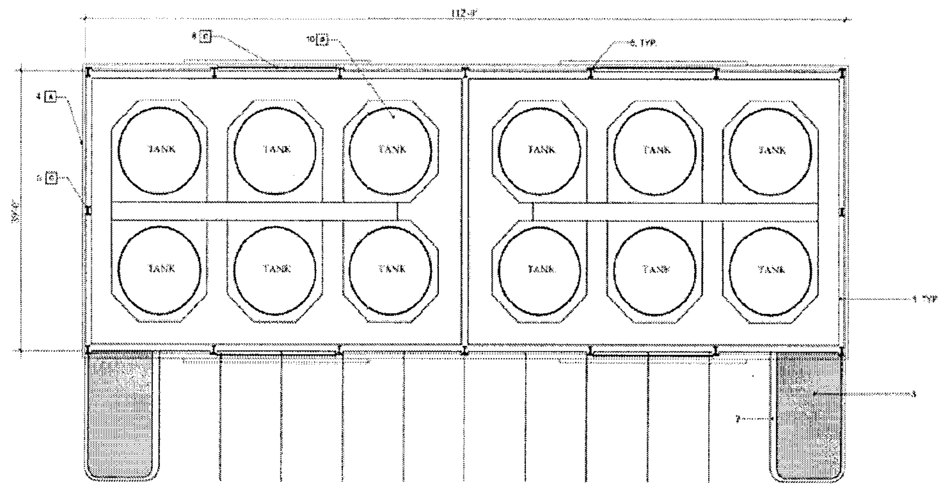


KEYNOTES

1. CONCRETE CONTAINMENT WALL
2. 12" WIDE CURB ADJACENT TO END STALL
3. LANDSCAPE PLANTER PER LANDSCAPE DRAWINGS, 7'-0" MIN. CLEAR WIDTH
4. FLAT METAL PANELS WITH TEXTURED FINISH
5. STEEL COLUMN
6. METAL WALL PANEL REVEAL
7. HORIZONTAL STEEL CAP AT PERIMETER
8. STEEL FRAMING AT OPENING
9. STEEL CANOPY AT OPENING
10. TANK

FINISHES

[A] METAL PANEL COLOR: DUNN EDWARDS "SWISS COFFEE" SP 896
[B] ACCENT COLOR: DUNN EDWARDS "BUTTONWEED" DE 3162
[C] STEEL COLUMN COLOR: DUNN EDWARDS "JAGGED" DE 3149



PLAN

Source: Carollo Engineers, November 2004.

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Chemical Storage Building Plan/Exterior Elevations

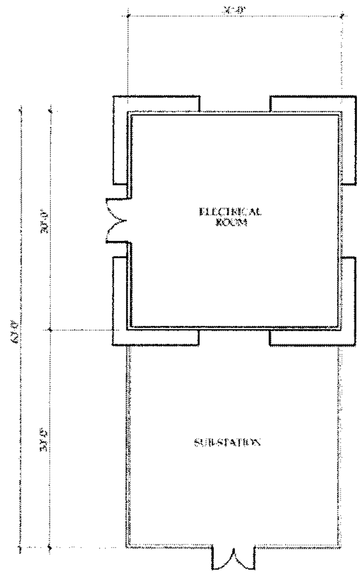
Exhibit 3-11

KEYNOTES

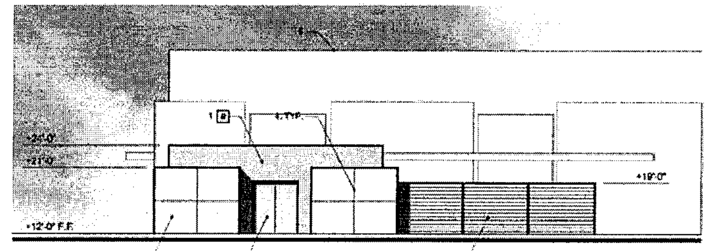
1. EIFS
2. METAL LOUVER SCREEN WALL
3. METAL MAN DOOR
4. REVEAL
5. ADJACENT R.O. BUILDING

FINISHES

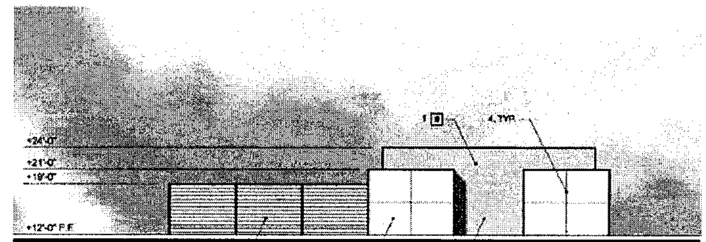
- [A] BUILDING FIELD COLOR: DUNN EDWARDS "SWISS COFFEE" SP 336
- [B] BUILDING ACCENT COLOR: DUNN EDWARDS "BUTTONWEED" DE 3162
- [C] METAL ACCENT COLOR: DUNN EDWARDS "JAGGED" DE 3149



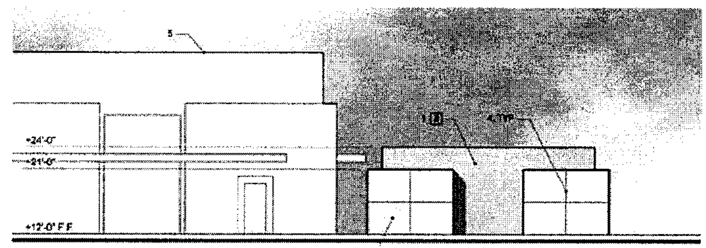
PLAN



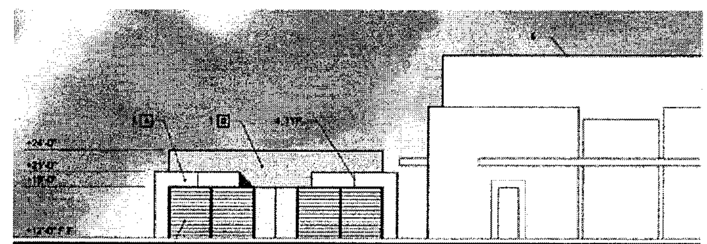
WEST ELEVATION



EAST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION

Source: Carollo Engineers, November 2004.

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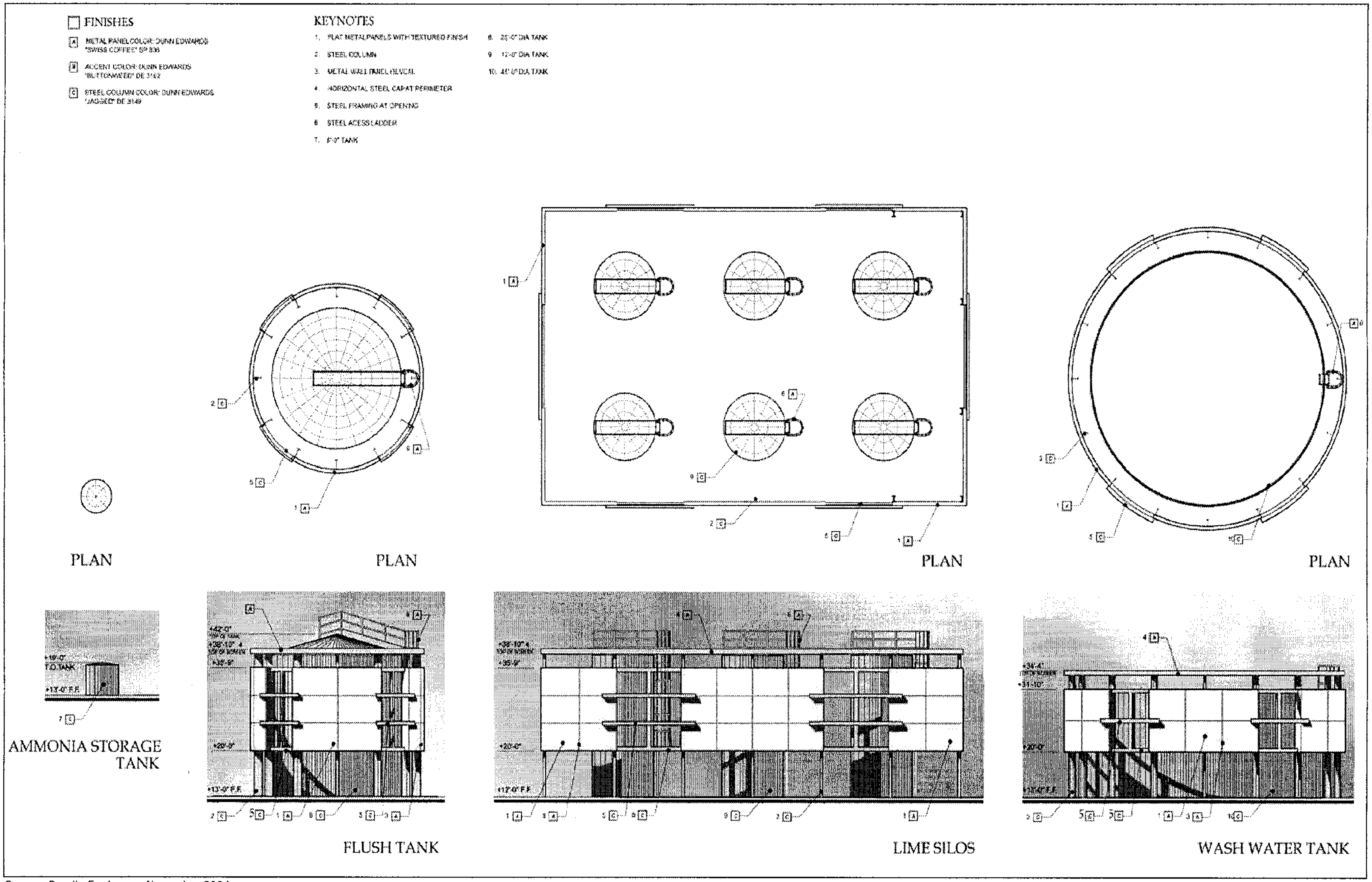
SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Electrical Room/Substation Building Plan/Exterior Elevations

Exhibit 3-12



Source: Carollo Engineers, November 2004.

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Storage Tank Plan/Exterior Elevations

Exhibit 3-13

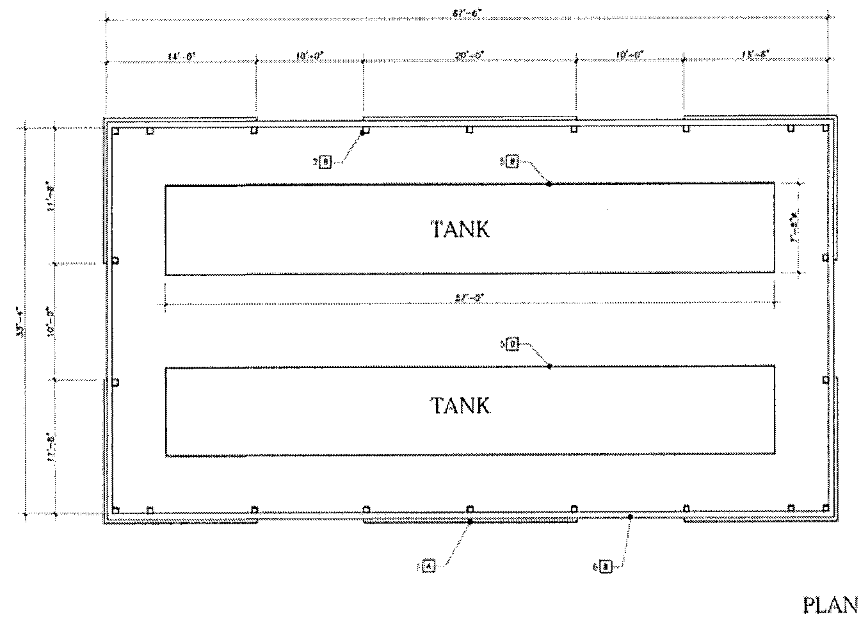
KEYNOTES

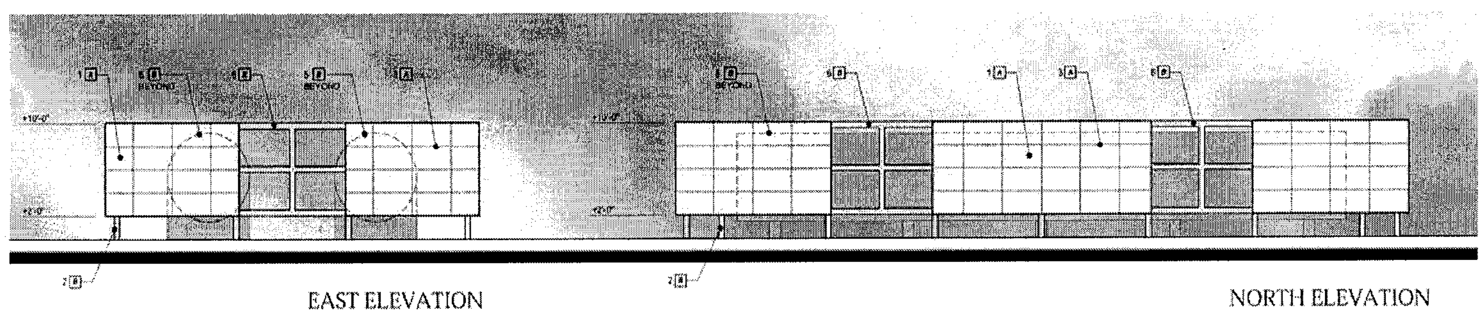
1. FLAT METAL PANELS WITH TEXTURED FINISH
2. STEEL COLUMN
3. METAL WALL PANEL REVEAL
4. HORIZONTAL STEEL CAP AT PERIMETER
5. 7'-8" DIA. TANK
6. STEEL FRAME AT OPENING

FINISHES

[A] METAL PANEL COLOR: DUNN EDWARDS "SWISS COFFEE" SP 830

[B] STEEL COLUMN COLOR: DUNN EDWARDS "JAGGED" DE 3149





Source: Carollo Engineers, January 2005.

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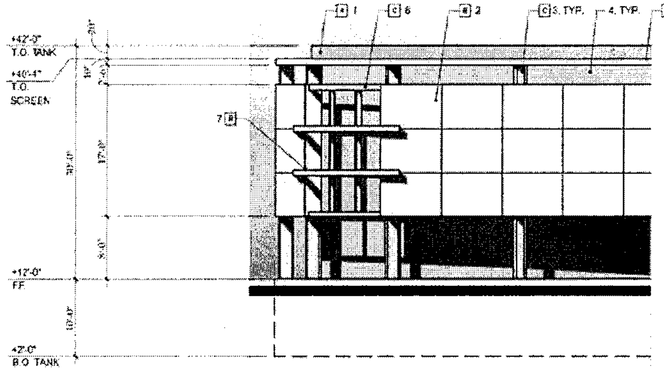
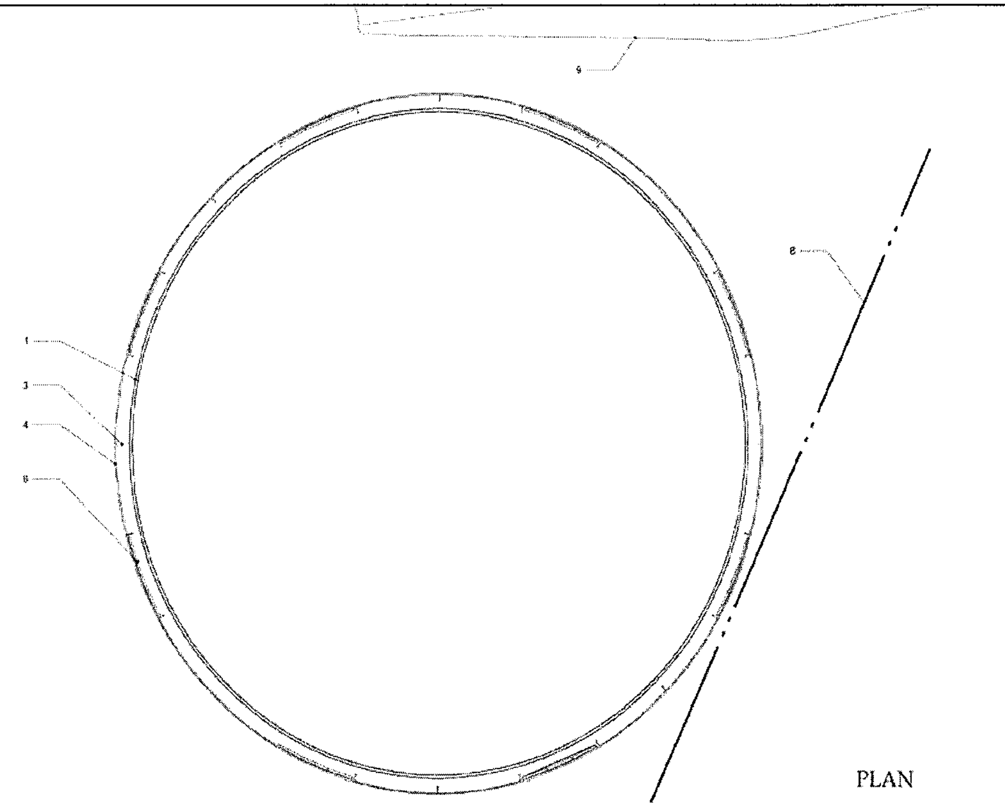
SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Carbon Dioxide Tank Plan/Exterior Elevations

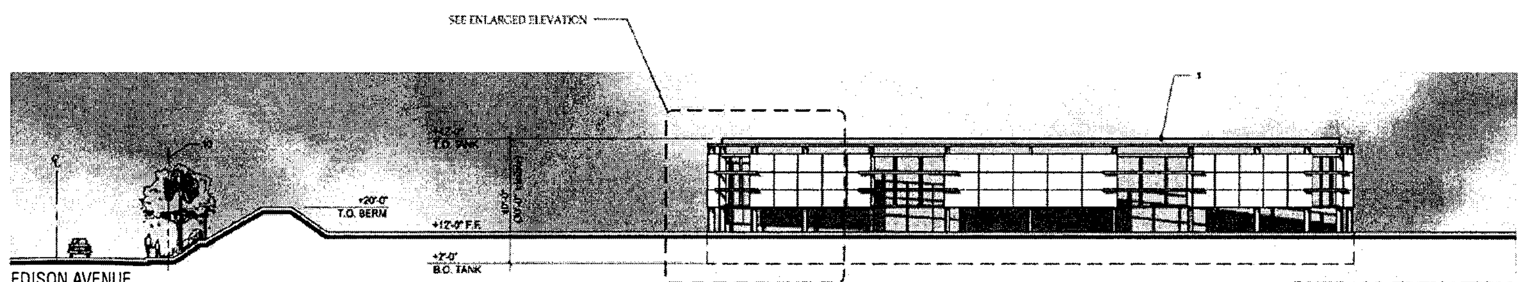
Exhibit 3-14



ENLARGED ELEVATION



PLAN



OVERALL ELEVATION

KEYNOTES

1. 215'-0" DIAMETER x 40'-0" HIGH (30'-0" VISIBLE, BOTTOM 10'-0" BELOW GRADE) STEEL TANK
2. FLAT METAL PANELS WITH TEXTURED FINISH
3. STEEL COLUMN
4. METAL WALL PANEL REVEAL
5. HORIZONTAL STEEL CAP AT PERIMETER
6. STEEL FRAMING AT OPENING
7. STEEL CANOPY AT OPENING
8. PROPERTY LINE
9. EDGE OF BERM
10. RIGHT OF WAY

FINISHES

- A: STEEL TANK COLOR: DUNN EDWARDS BUTTONWEED DE 2162
- B: METAL PANEL COLOR: DUNN EDWARDS SWISS COFFEE SP 636
- C: STEEL COLUMN COLOR: DUNN EDWARDS JAGGED DE 3149

Source: Carollo Engineers, November 2004.

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Product Water Storage Tank Plan/Exterior Elevations

Exhibit 3-15

product water pump station (to be located in an underground vault) would be situated adjacent to the Product Water Storage Tank.

Landscaping and Street Improvements

Based upon 2003 Design Review Board approval, landscaping and street improvements would be focused on the northern, western, and eastern portions of the subject site (refer to Exhibit 3-16, *CONCEPTUAL LANDSCAPE MASTER PLAN*). Along the northern portion of the project site, Edison Avenue would be improved. These improvements would consist of the dedication of 12 feet along the frontage of the existing Edison Avenue (for curb, gutter, paving, and street lighting improvements) for a total of approximately 600 linear feet. It should be noted that AES Huntington Beach, LLC would be responsible for dedication of property to the City for these improvements, as AES owns the entire southern frontage of Edison Avenue and would lease property to the applicant for the proposed project. However, the project applicant would be responsible for completing the roadway and landscaping improvements as a condition of approval for the project subsequent to property dedication. It should also be noted that street widening along Newland Street (west of the proposed project site) would be performed by the City, with separate entitlements and environmental evaluation. AES Huntington Beach, LLC would dedicate 10 feet of right-of-way (to 50 feet east of centerline) along Newland Street. In addition, AES and the project applicant would be required to pay their fair share of the cost to widen and improve Newland Street.

A ten-foot wide landscaping planter (including street trees, accent palms, shrubs, and groundcover) would be planted around the northern perimeter and a portion of the western side of the project site. In addition, an eight-foot high masonry block wall would be placed between the landscaping and the earthen berms. Adjacent to the eastern portion of the project site is a wetland area. Therefore, landscaping within the eastern portion of the site would consist of compatible native wetland vegetation, which would be coordinated with the Huntington Beach Wetlands Conservancy and the City of Huntington Beach.

B. INTERACTION BETWEEN THE PROPOSED DESALINATION FACILITY AND THE HBGS

Project Site Lease

The project applicant, Poseidon Resources Corporation, has entered into agreements with AES for the lease of an approximately 11-acre site and for the use of various easements on the adjacent properties for the construction and operation of the proposed Seawater Desalination Facility at Huntington Beach. The lease agreement is with AES Huntington Beach Development, LLC; the easement agreement is with AES Huntington Beach Generation, LLC. The easement agreement provides for interconnection of pipes and associated pumps with the existing HBGS condenser cooling water infrastructure. The easement agreement also provides for site access and other underground piping among the water treatment facilities and the water storage tank. The term of both agreements is for 38 years, plus options to extend for two 10-year periods. However, since the desalination facility would withdraw HBGS cooling waste water rather than pump seawater directly from the ocean; should the HBGS cease operation permanently, the applicant has the option to purchase the intake/discharge infrastructure to ensure continued operation of the water facility and would be required to seek new permits for operations due to the change in the project description.

Proposed Physical Connection between the Desalination Facility and the HBGS

Source water for the desalination facility would be taken from the existing condenser cooling seawater discharge pipe system of the HBGS (Exhibit 3-17, *DESALINATION FACILITY/HBGS COOLING WATER CONNECTION*). The seawater desalination facility intake would only be connected to the HBGS 108-inch cooling water discharge lines and would only collect seawater that has already been screened and pumped through the generating station cooling water system facilities. The desalination facility would not have a separate intake that can collect seawater directly from the ocean nor would it require modifications to the exiting HBGS intake system (refer to Section 4.1, *PROJECT SITE*).

At all times and under any mode of HBGS operation, the desalination facility would collect approximately 100 MGD of seawater from the HBGS cooling water discharge pipelines. The desalination facility would have only one (normal) mode of operation and would be operated at 50 MGD of potable water production capacity 24 hours per day and 365 days per year. This mode is expected to change only during unpredictable emergencies. It should be noted that the proposed project would utilize new feedwater pumps. These pumps would operate constantly and would be independent of the HBGS. Should the HBGS cease to operate, the applicant would purchase the HBGS pumps and intake/discharge facilities and continue to produce and distribute potable water, subject to approvals as noted above.

Currently, HBGS is permitted to operate at full capacity and to use and discharge up to 514 MGD of seawater 24 hours per day, and 365 days per year. The operation of the desalination facility would not result in any changes to the permitted operations or in the maximum HBGS intake flow rate (refer to Section 4.1, *PROJECT SITE,* for a description of HBGS operations).

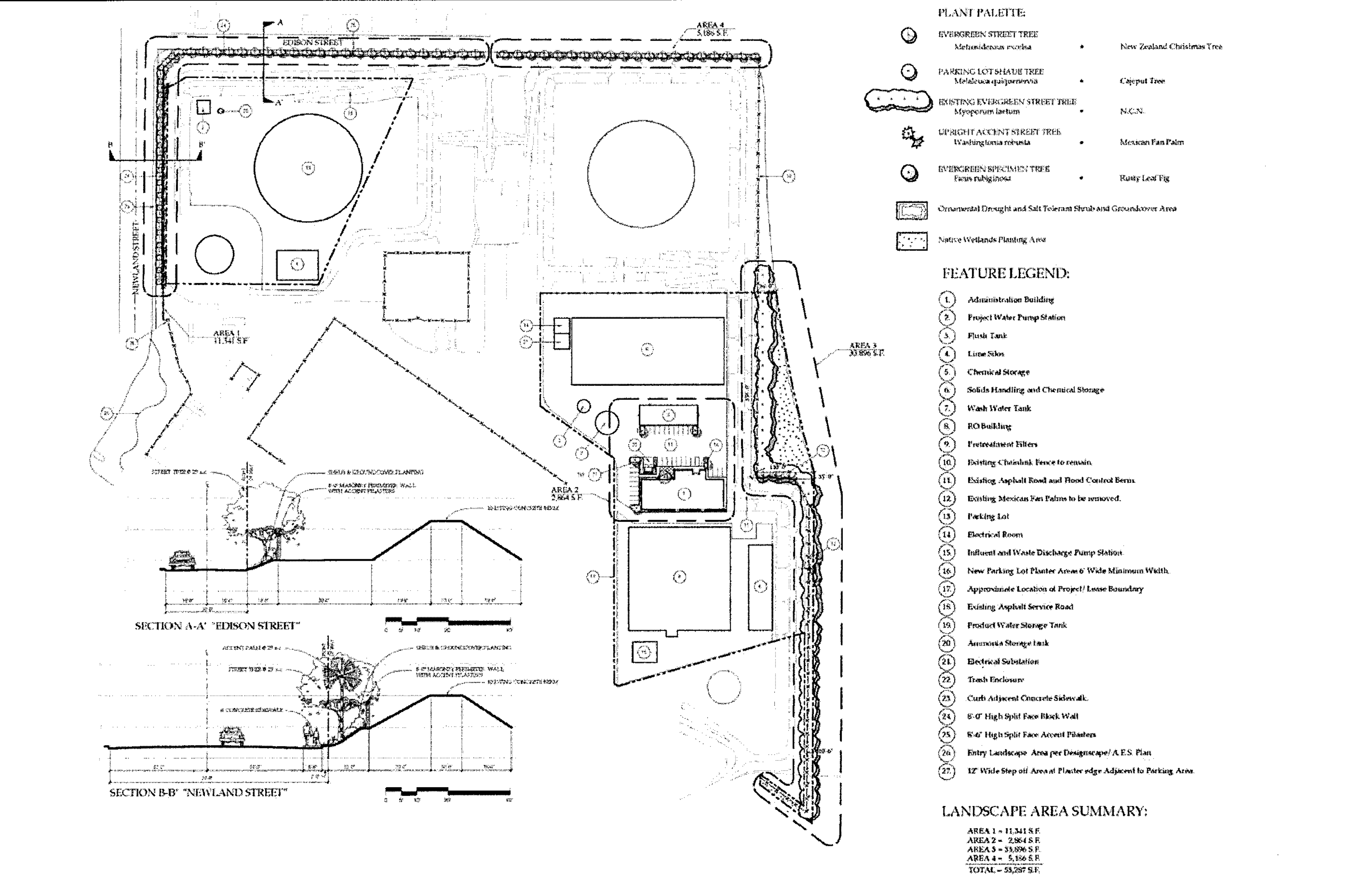
C. DESALINATION TREATMENT PROCESS

The desalination facility treatment process is presented in Exhibit 3-18, *DESALINATION TREATMENT PROCESS FLOW SCHEMATIC,* and includes the following key treatment facilities, processes, and characteristics:

- Intake system, which consists of:
  - intake pipeline connection to HBGS discharge lines,
  - intake pump station,
- Pretreatment filtration system,
- Reverse osmosis membrane system, which includes:
  - reverse osmosis membrane maintenance process facilities,
- Product water post treatment facilities,
- Chemical storage/handling facilities,
- Reverse osmosis concentrated discharge and filter backwash discharge facilities; and
- Energy consumption.

Intake System

The desalination facility intake system would consist of a connection to the HBGS discharge pipes, a 72-inch desalination facility intake pipeline and approximately a 100 MGD pump station. The point of the desalination facility connection would be downstream from the HBGS condensers (refer to item 1 on Exhibit 3-18). Approximately 100 MGD of source seawater for the desalination facility would be drawn from the existing HBGS condenser cooling water discharge system through this connection and conveyed to the desalination facility intake pump station via the 72-inch pipeline. This intake pipeline would be located entirely within the existing HBGS site. The desalination facility pump station would consist of five vertical turbine pumps of approximate capacity of 25 MGD each. Four of the five pumps would be operational while one would be a standby unit. It should be noted that these pumps would operate constantly and would be independent of the HBGS. The desalination facility's pumps would not be able to withdraw seawater from the ocean; only the HBGS pumps are



Source: Poseidon Resources Corporation, February 2005.

NOT TO SCALE

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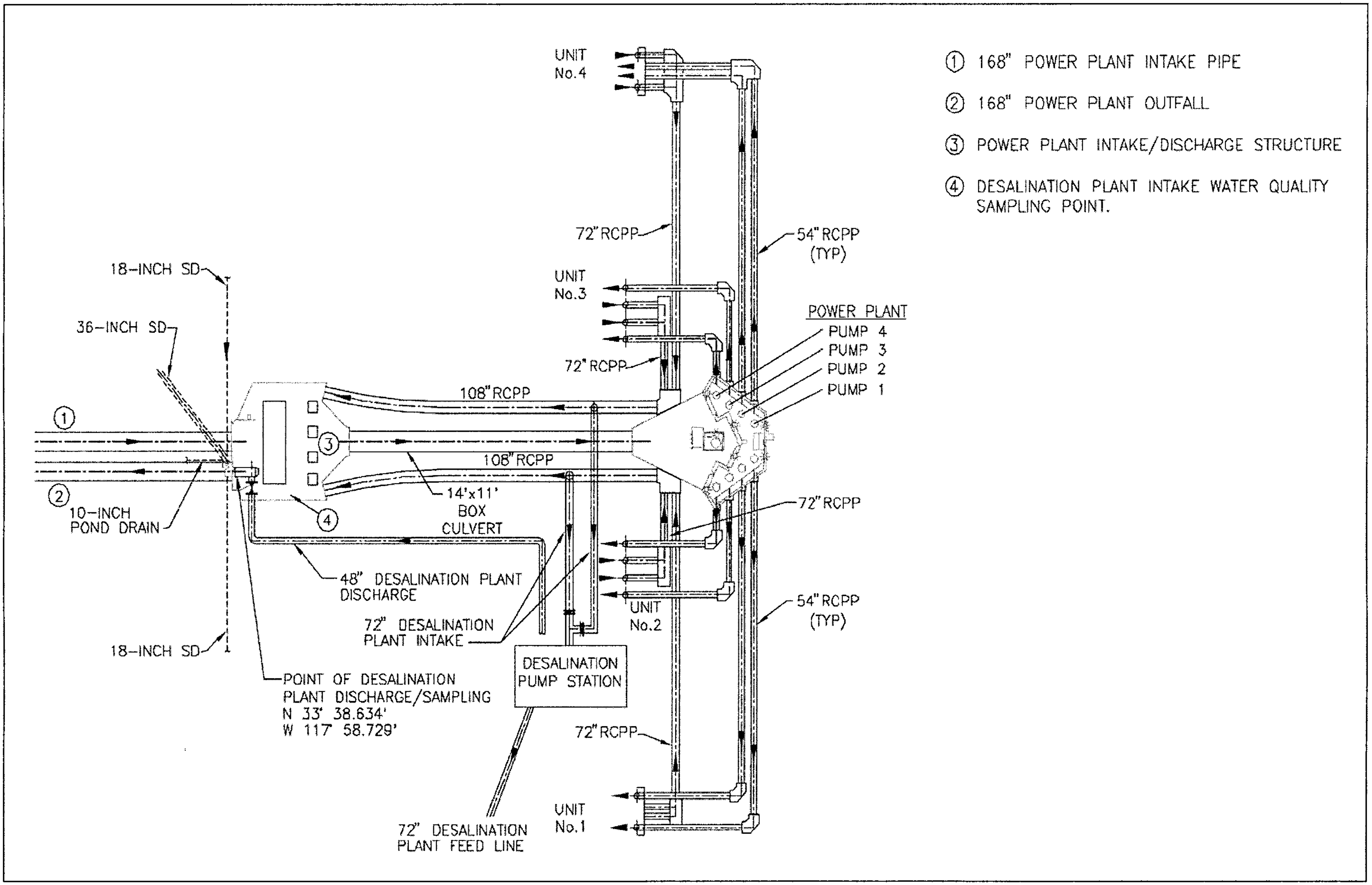
SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Conceptual Landscape Masterplan

Exhibit 3-16



Source: Carollo Engineers, November 2004.

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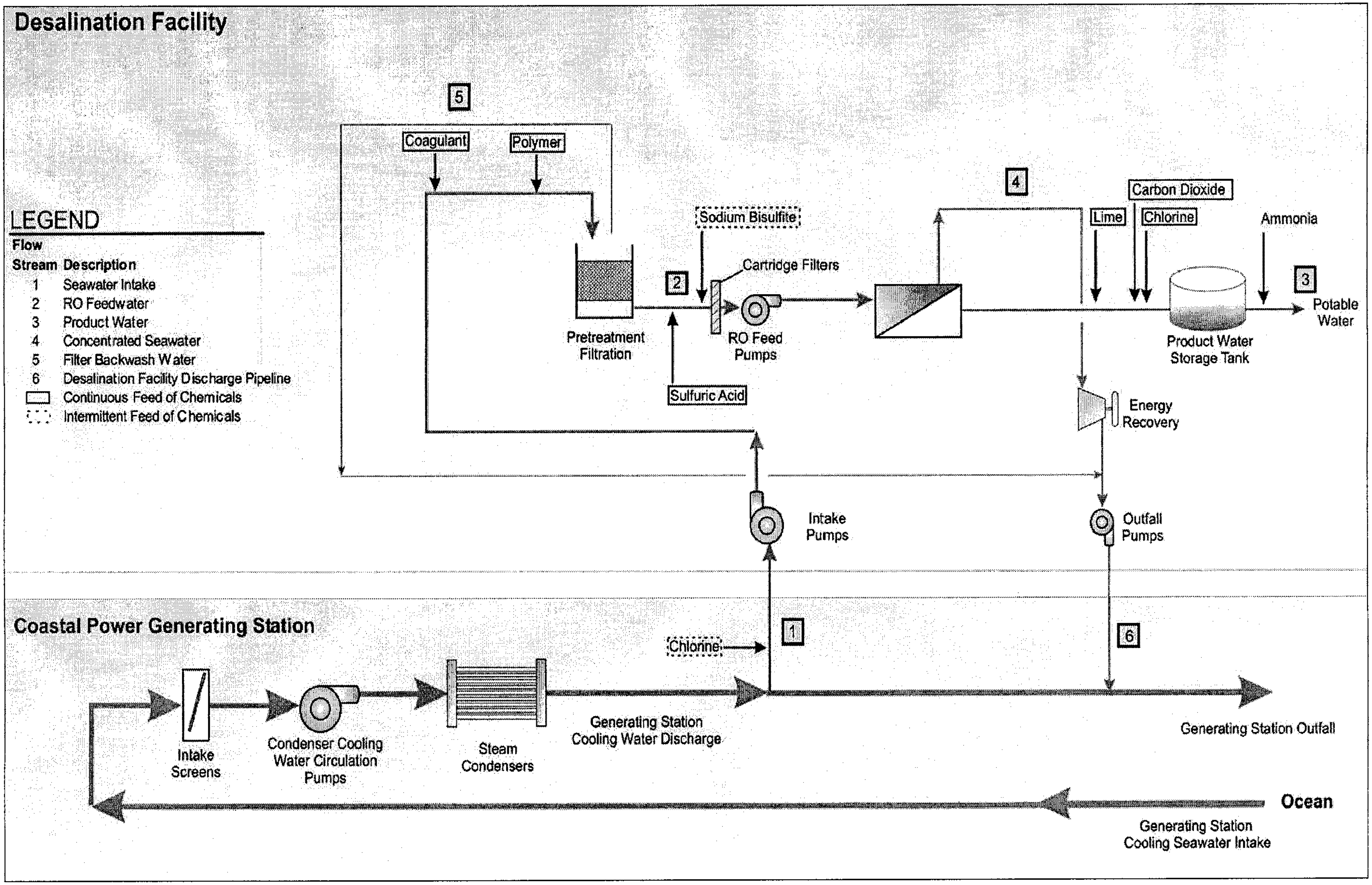
SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Desalination Facility/HBGS Cooling Water Connection

Exhibit 3-17



Source: Poseidon Resources Corporation, November 2004.

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Desalination Treatment Process Flow Schematic

Exhibit 3-18

capable of this. To prevent growth of marine organisms in the intake system, chlorination and dechlorination of the supply water would be on an as-needed basis. Aside from the connection point within the HBGS site, no modifications to the HBGS would be required.

Pretreatment Filtration System

The proposed desalination facility would utilize either a single-stage or two-stage gravity media filtration pretreatment system. The addition of coagulants, such as ferric chloride and polymers, would be provided as appropriate to enhance the operation of the media filters and to prepare the water for RO treatment. There are a variety of pretreatment filtration systems and technologies available that can meet the requirements for RO treatment. The actual pretreatment process to be used would be determined during the final design phases of the project. The final phase of pretreatment would be cartridge filtration. The filter cartridges would be standard five-micron polypropylene wound filters enclosed in a pressure vessel. The pressure vessels would be located on the RO feed water piping between the pretreatment and RO processes.

The RO intake water would be chlorinated intermittently to prevent microbiological growth on the filter media. Since any chlorine remaining in the filter effluent water can damage the RO membranes, the filter effluent would be dechlorinated using sodium bisulfite. In addition, the RO feed water would be treated with sulfuric acid as needed to reduce the potential for scale formation in the RO system. The amount of sulfuric acid added to the water would be determined by 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 (product water), which is needed to react with the lime for product water stabilization in the post-treatment step.

Reverse Osmosis Membrane System

The RO process would be a single-pass design using high-rejection seawater membranes. The system would be made up of 13 process trains (12 duty and one standby), each train with a design capacity of about four MGD. This arrangement provides approximately eight percent standby capacity, which is needed to ensure continuous water delivery with normal membrane wear and maintenance requirements.

High-pressure, electrically-driven feed pumps would convey water from the intake filters through the RO membranes. The pumps would provide feed pressures ranging from 800 to 1,000 pounds per square inch (psi), and would be located within the RO building. The actual feed water pressure depends on several factors including temperature of the intake water, salinity of the intake water, and the age of the membranes. The pumps would be equipped with variable frequency drives to improve energy efficiency and to provide pressure control over a wide range of feed water quality and membrane conditions. To further improve energy efficiency, the high-pressure feed pumps would be equipped with energy recovery devices. A large amount of residual pressure remains in the concentrated seawater leaving the RO process. The energy recovery devices recover this energy, reducing the net energy demand for the system by approximately 30 percent. Additional energy savings may result from the use of warmer water provided to the RO process by the HBGS' cooling process. The desalination system would be designed to operate at both ambient and elevated seawater temperature. However, using warmer water increases the efficiency of the RO membranes.

Reverse Osmosis Membrane Maintenance Facilities

The accumulation of silts or scale on the RO membranes causes fouling, which reduces membrane performance. The membranes would be periodically cleaned to remove these foulants and extend membrane life. Normally cleaning frequency is twice per year per train and there are thirteen trains. To clean the membranes, a chemical cleaning solution is circulated through the membranes. The RO system trains would be cleaned using a combination of cleaning chemicals such as industrial soaps (e.g. sodium dodecylbenzene, which is frequently used in commercially available soaps and toothpaste) and weak solutions of acids and sodium hydroxide.

The cleaning process includes two steps: first, circulating a number of cleaning chemicals in a predetermined sequence through the membranes; and second, rinsing the cleaned membranes with clean water (permeate) to remove the waste cleaning solutions and prepare the membranes for normal operation. It should be noted that the actual cleaning chemicals used would be based on the observed operation and performance of the system once it is placed in operation. For a detailed discussion of chemicals and materials to be utilized for reverse osmosis membrane maintenance, including a description of volumes/ratios, refer to Section 5.8, *HAZARDS AND HAZARDOUS MATERIALS*.

As noted above, subsequent to the circulation of the cleaning chemicals through the RO membranes, membrane rinsing would be performed using membrane permeate fresh water, which would be free of chlorine. The membrane rinsing process would include a first rinse (removing most of the waste chemicals), and subsequent rinses (containing only trace amounts of cleaning chemicals). It should be noted that besides permeate and residual cleaning solution, the waste rinse water would also contain a small amount of concentrated waste cleaning solution. All chemicals used in the membrane cleaning process and the membrane's first rinse would generate approximately 91,000 gallons of spent cleaning solution and would be directed to a designated 300,000-gallon storage tank (wash water tank) for mixing and treatment. The wash water tank would be equipped with a mixing system and chemical feed system. The content of the tank would be continuously mixed and the pH of the waste cleaning mix would be monitored. The waste cleaning solution would be treated using sulfuric acid or sodium hydroxide as needed to neutralize the solution.

The first rinse water would go to the washwater tank to be neutralized and then discharged into the local sanitary sewer for further treatment at the Orange County Sanitation District (OCSD) regional wastewater treatment facility. OCSD has indicated that its facilities are of adequate capacity to accommodate this waste cleaning solution.[1] The rinse water following the first rinse water would be diluted with the RO process discharge, treated filter backwash, and HBGS cooling water discharge, and then sent to the Pacific Ocean via the HBGS outfall. An alternative to discharging the RO membrane cleaning solution into the OCSD system is to discharge the solution into the Pacific Ocean via the HBGS outfall. The majority of the chemicals within the membrane cleaning solution would be either below detection levels or regulatory limits, even before dilution with other desalination facility and HBGS discharges. Dilution with the HBGS discharge would ensure National Pollution Discharge Elimination System (NPDES) compliance. It should be noted that potable water coming from off-site City facilities would not be utilized for operation of the rinse tank or wash water tank.

For a discussion of potential impacts in regards to RO membrane cleaning solution, refer to Section 5.3, *HYDROLOGY, DRAINAGE, AND STORM WATER RUNOFF*, Section 5.6, *PUBLIC SERVICES AND UTILITIES*, and Section 5.8, *HAZARDS AND HAZARDOUS MATERIALS.*

[1] Email between Nikolay Voutchkov, Poseidon Resources Corporation, and OCSD, May 29, 2002.

Product Water Post Treatment Facilities

Product water from the RO process requires chemical conditioning prior to delivery to the distribution system to increase hardness and protect the new and existing distribution system against corrosion. Lime and carbon dioxide would be used for post-treatment stabilization of the RO water as a source for pH and alkalinity adjustment. In addition, the final product water would be disinfected prior to delivery to the distribution system. Chlorine, in the form of sodium hypochlorite and ammonia, would be added to disinfect the product water by chloramination in order to meet the State Department of Health Services (DHS) water quality standards for potable water disinfection and to control biological growth in the transmission pipeline (refer to Section 5.11 *PRODUCT WATER QUALITY AND EXISTING POTABLE WATER QUALITY IMPACTS*).

Chemical Storage/Handling Facilities

Various chemicals typically associated with desalination facility operation would be stored on-site. These chemicals include sodium hypochlorite, ammonia, lime, carbon dioxide, ferric sulfate, polymer, sulfuric acid, sodium bi-sulfite, and the RO membrane-cleaning solution described above. All such chemicals would be stored, handled, and used in accordance with all applicable Federal, State, and local standards. This topic is further addressed in Section 5.8, *HAZARDS AND HAZARDOUS MATERIALS*. These chemicals are food-grade purity compounds typically used in most conventional water treatment facilities.

Reverse Osmosis Concentrated Seawater Discharge and Filter Backwash Discharge Facilities

The byproduct of the RO process would be concentrated seawater. Approximately one gallon of concentrated seawater would be created for every gallon of potable drinking water produced. Therefore, for the proposed 50 MGD desalination facility, approximately 50 MGD of concentrated seawater would be generated. The salinity of the concentrate would be about 68,000 parts per million (ppm), twice the concentration of the incoming seawater prior to blending with the HBGS condenser cooling water discharge (refer to section 5.10, *OCEAN WATER QUALITY AND MARINE BIOLOGICAL RESOURCES*, for additional information). The concentrated seawater would re-enter and blend with up to 407 MGD of the HBGS's condenser cooling water circulation system for discharge back into the ocean. The blending point would be downstream of the intake point for the desalination facility to prevent re-circulation of the concentrated seawater back into the desalination facility intake (refer to Exhibit 3-17, *DESALINATION FACILITY/HBGS COOLING WATER CONNECTION*). In addition, the filters would be cleaned (backwashed) to remove the seawater solids that accumulate in the media beds. The amount of backwash water necessary would be about four percent of the total intake water flow. For a 50 MGD facility, with an intake of approximately 100 MGD of raw seawater, approximately four million gallons of filter backwash water would be produced per day. The filter backwash water would be combined with the concentrated seawater for return back into the ocean. The constituent concentrations of the combined desalination facility concentrated seawater discharge and the HBGS' cooling water discharge would meet the requirements of the California Ocean Plan as administered by the State Regional Water Quality Control Board (also refer to 5.10, *OCEAN WATER QUALITY AND MARINE BIOLOGICAL RESOURCES*). Aside from a connection point to the cooling water discharge system within the adjacent HBGS site, no modification of HBGS facilities would be required.

Energy Consumption

A 50 MGD desalination facility would require approximately 30 to 35 megawatt hours of power to operate. Based on 24 hour per day operation, the daily energy consumption of the proposed desalination facility is estimated to be between 720 and 840 megawatt hours per day. This amount of electricity could provide power for the average demand of between 30,000 and 35,000 residential units. The total amount of power required to produce desalinated water for one family per year is approximately the same as the amount of power used by the family's refrigerator in one year.

The desalination facility would utilize off-peak power to the maximum extent practicable. In order to maximize the desalination facility's power efficiency, potable water production may be halted for short periods of time, at which point the facility would distribute water from its product water storage tank. The desalination facility would not include a backup generator. Emergency backup power would come from the electrical power grid and/or HBGS auxiliary reserve bank. For further discussion see Section 5.4, *AIR QUALITY.*

D. OFF-SITE IMPROVEMENTS

New Water Transmission Pipeline

In order to convey the project's potable drinking water off-site, the project requires construction of water transmission lines to connect to existing regional transmission and local water distribution systems. Although precise pipeline alignments may be modified during final engineering analyses, the conceptual pipeline alignments are shown in Exhibit 3-3, *CONCEPTUAL PIPELINE ALIGNMENTS.* A total of two pipeline alignments are currently being considered to convey water eastward from the desalination facility to its destination within the City of Costa Mesa, east of SR-55 at the intersection of Del Mar Avenue and Elden Avenue. The majority of each pipeline alignment is planned for existing public streets, easements, or other rights-of-way, and the alignments are not anticipated to require disturbance of native vegetation or otherwise impact sensitive resources. The proposed alignments consist of a 42- to 48-inch pressure main, up to 10 miles in length along the two different conceptual alignments. The proposed routes would utilize trenchless installation of pipeline in order to traverse waterways and/or roadways with a high sensitivity to traffic disturbance. This topic is further addressed in Section 5.9, *CONSTRUCTION RELATED IMPACTS.*

Primary Alignment

The primary, or northern, alignment has a total length of approximately 40,050 feet (7.5 miles). This pipeline alignment would extend in a northerly direction from the AES facility within Newland Street. The pipeline would utililize micro-tunneling or directional boring technology to cross the Orange County Flood Control District's (OCFCD) Huntington Beach Channel, as the bridge crossing the channel lacks the capacity to support the proposed pipeline. The pipeline would then proceed in an easterly direction within Hamilton Avenue from the Newland Street/Hamilton Avenue intersection to the Hamilton Avenue/Brookhurst Street intersection. Along Hamilton Avenue, the pipeline would be either micro-tunneled or directionally bored to cross the Talbert Channel. The pipeline would continue northerly within Brookhurst Street and would proceed in an easterly direction within Adams Avenue. The pipeline would again utilize trenchless methods to cross the Santa Ana River and Greenville-Banning Channel, as the Adams Avenue Bridge is not capable of supporting a 42- to 48-inch pipe. The alignment would then proceed in a southerly direction within Placentia Avenue to the Costa Mesa Country Club, at which point the route would proceed east along the northern boundary (utilizing off-pavement, open trenching methods) of the property to Harbor Boulevard. The pipeline would then proceed along the eastern boundary of the Fairview State Hospital to the Harbor Boulevard/Fair Drive intersection, again using off-pavement, open trenching methods. The alignment would then cross Harbor Boulevard (most likely utilizing trenchless methods) and proceed easterly within Fair Drive. Routing the pipeline on the northern side of Fair Drive would permit the construction of the line off-pavement once the Orange County Fairgrounds is reached. East of the fairgrounds, the pipeline would pass under the SR-55 freeway utilizing trenchless construction until it ultimately terminates at OC-44, located at the intersection of Del Mar Avenue and Elden Avenue. Refer to Table 5.9-3, *PIPELINE ALIGNMENT DETAILS*.

Alternative Alignment

The alternative alignment would follow a path located south of the primary alignment. This route would rely entirely on the implementation of the pipeline within public easements, through the Cities of Huntington Beach and Costa Mesa. The total distance for this route would be approximately 30,000 feet (5.7 miles). This pipeline would follow the same route as the primary alignment until the intersection of Hamilton Avenue and Brookhurst Street. At this point, the pipeline would continue eastward within Victoria Street and would utilize trenchless methods to cross under the Santa Ana River and Greenville-Banning Channel. Trenchless construction would also be necessary to cross Harbor Boulevard and the SR-55 along Victoria Street. After crossing SR-55, the pipeline would continue for a short distance along 22nd Street and would proceed northeast to its termination point at OC-44, located at the intersection of Del Mar Avenue and Elden Avenue. Refer to Table 5.9-3, *PIPELINE ALIGNMENT DETAILS*.

Underground Booster Pump Stations

The off-site construction of two underground booster pumping stations would be required as part of the seawater desalination facility project in order to convey potable water from the subject site to the regional distribution system. The OC-44 underground pumping station is proposed to be located underground within an unincorporated area of the County of Orange, along the eastern border of the City of Newport Beach, approximately 1.5 miles south of the University of California, Irvine. The site is within an Orange County Resource Preservation Easement, but outside of the NCCP/HCP delineation zone, approximately ¼ mile north of the San Joaquin Reservoir, where the East Orange County Feeder Number Two and the OC-44 transmission pipelines converge (refer to Exhibit 3-4, *OC-44 BOOSTER PUMP STATION LOCATION MAP*).

The OC-44 underground booster pump station would include pumps, a surge tank to protect the distribution system from sudden pressure changes, telemetry equipment, appurtenances, and three diesel powered electrical generators for emergency back-up purposes. These generators would be Caterpillar Model 3516 units or similar equipment and would supply approximately seven megawatts of emergency power for adequate operation of the pump station (in regards to flow and pressure). These diesel-powered generators would require an 8,700-gallon diesel fuel storage tank (assuming a 24-hour emergency period), with a diameter of eight feet and a depth of 26 feet. The booster pump station, including the surge tank, the three generators and diesel fuel storage tank, would require a total footprint area of approximately 110 feet by 110 feet, and would be placed entirely underground to maintain the natural character of the surrounding resource preservation easement. Any displaced vegetation would be replaced upon completion of construction.

A second underground booster pump station (the "Coastal Junction" pump station) is proposed within the parking lot of St. Paul's Greek Orthodox Church within the City of Irvine, located at 4949 Alton Parkway. The underground pump station would be constructed within the north/northwestern portion of the church parking lot, in an area used for both parking and volleyball activities. The site is surrounded by the St. Paul's Church to the south, the Woodbridge Village Association to the west, an apartment complex to the east, and open space to the north. The footprint of the proposed underground pump station would be approximately 100 feet by 100 feet, and would require a construction easement of 125 feet by 125 feet. The pump station would be entirely underground except for a small pipe vent and a ground-level steel access door for maintenance (the access door would not impede parking after construction). It should be noted that St. Paul's Greek Orthodox Church has been contacted by the applicant and has issued a statement of interest for the underground pump station site. This location is near the connection points of the existing regional water distribution system, Aufdenkamp Transmission Main and the Tri-Cities Transmission Main to the East Orange County Feeder Number Two (refer to Exhibit 3-5, *COASTAL JUNCTION BOOSTER PUMP STATION LOCATION MAP*).

The Coastal Junction off-site underground booster pump station would include pumps, telemetry equipment, appurtenances, and one diesel powered electrical generator for emergency back-up purposes. This generator would be a Caterpillar Model 3516 unit or similar equipment and would supply approximately seven megawatts of emergency power for adequate operation of the pump station (in regards to flow and pressure). This diesel-powered generator would require a 1,300-gallon diesel fuel storage tank (assuming a 24-hour emergency period), with a diameter of six feet and a depth of 15 feet. The booster pump station, including the generator and diesel fuel storage tank, would require a total footprint area of approximately 100 feet by 100 feet and would be placed entirely underground to maintain the appearance and functionality of the existing parking lot. Additional information regarding the proposed off-site pump stations is included in Section 5.9, *CONSTRUCTION RELATED IMPACTS.*

Edison Avenue Improvements

As a condition of approval by the City of Huntington Beach for the proposed project, the applicant would be required to complete improvements along the southern side of Edison Avenue (situated north of the subject site as shown in Exhibit 3-2, *SITE VICINITY MAP*). These improvements would consist of the dedication of 12 feet along the frontage of the existing Edison Avenue (for curb, gutter, paving, and street lighting improvements) for a total of approximately 600 linear feet. It should be noted that AES Huntington Beach, LLC would be responsible for dedication of property to the City for these improvements, as AES owns the entire southern frontage of Edison Avenue and would lease property to the applicant for the proposed project. However, the project applicant would be responsible for completing these roadway and landscaping improvements as a condition of approval for the project subsequent to property dedication. It should also be noted that street widening along Newland Street (west of the proposed project site) would be performed by the City, with separate entitlements and environmental evaluation. AES Huntington Beach, LLC would dedicate 10 feet of right-of-way (to 50 feet east of centerline) along Newland Street and both AES and the project applicant would be required to pay their fair share of the cost.

E. DESALINATED WATER DISTRIBUTION

As described below in Section 3.4, *PROJECT NEED AND OBJECTIVES*, the project would provide a supplemental and alternative source of potable water to Orange County. Water produced at the Seawater Desalination Facility at Huntington Beach would be delivered via the off-site project pipeline into a large water transmission pipeline operated by Mesa Consolidated Water District (the OC-44 pipeline). From there the product water would travel into the existing regional water distribution system that is operated and maintained by the Metropolitan Water District (MWD) of Southern California. It would be necessary for the applicant to negotiate and enter into institutional agreements with Mesa Consolidated Water District, MWD, the Municipal Water District of Orange County and other local water agencies that own or operate those portions of the regional water distribution system that would be utilized for delivery of the water produced by the project.

The water agencies that would either receive the desalinated water or a blend of desalinated water and imported supply include:

- City of Huntington Beach
- El Toro Water District
- Irvine Ranch Water District
- Laguna Beach County Water District

- Mesa Consolidated Water District
- Moulton Niguel Water District
- City of Newport Beach
- City of San Clemente
- City of San Juan Capistrano
- Santa Margarita Water District
- South Coast Water District

Exhibit 3-19, *APPROXIMATE DESALINATED WATER DISTRIBUTION AREA,* depicts the approximate distribution of the desalinated water throughout Orange County in the year 2010. The amount that is received by an agency may vary depending on a number of factors, but the main factor would be the water demands from the water agencies connected to the transmission pipelines that are conveying the desalinated water. For example, if the amount of water taken from the transmission pipelines in central Orange County increases, then the amount of desalinated water that actually makes its way to south Orange County decreases. Conversely, a decrease in central Orange County usage results in an increase of desalinated water going to south Orange County.

F. DESALINATED WATER QUALITY

The desalination facility would produce drinking water of very high and consistent quality, which meets or exceeds all applicable regulatory requirements established by the US Environmental Protection Agency (EPA) and the California Department of Health Services (DHS). The desalinated water would be produced applying state-of-the-art seawater reverse osmosis membranes which are capable of removing practically all contaminants in the source water: turbidity, taste, odor, color, bacteria, viruses, salts, proteins, asbestos, organics, etc. With pores ranging from 0.00005 to 0.0000002 microns (for comparison - human hair size is 200 microns) the reverse osmosis membranes would retain and remove over 99.5 percent of the seawater salinity; over 99 percent of the metals and organics; 99.999 percent of the bacteria and other pathogens (*Giardia* and *Cryptosporidium*) and 99.9 percent of the viruses in the source water.

Currently, EPA recognizes reverse osmosis membrane treatment as a best available technology for water treatment and for meeting future more challenging water quality regulations. This technology has proven its viability and performance in a number of facilities worldwide over the last 20 years. An example of a seawater desalination facility in California is the Marina Coast Water District's (MCWD) facility, which has been in operation since 1996 in the City of Marina, at Marina State Beach. This facility has been delivering high quality desalinated water to the MCWD's distribution system for over eight years – with no customer complaints or measurable corrosivity effects on the distribution system or household plumbing.

To provide an additional level of safety after RO membrane filtration, the desalinated water produced by the proposed facility would be disinfected applying the same chemicals that are currently used for disinfection of all other water sources in the Orange County's water distribution system (chloramines). In addition, the desalinated water would be conditioned with a combination of lime and carbon dioxide to make it non-corrosive to the water distribution system and to household plumbing. The desalinated water quality would be compatible with the water quality of all other sources of potable water with which it would be blended in the distribution system.

The viability and performance of seawater desalination treatment using Pacific Ocean water have been proven at Poseidon's demonstration desalination facility in Carlsbad, California (situated on-site at the Encina Power Station). This facility has been in operation for over two years and has produced over 20 million gallons of high-quality fresh water to date.

Table 3-1, *DESALINATED WATER QUALITY – KEY PARAMETERS* presents key desalinated water quality parameters and provides a comparison with the existing drinking water produced at the Diemer Water Treatment Plant, operated by the MWD, and federal/state limits. Currently, the Diemer Water Treatment Plant is one of the main plants supplying Orange County with drinking water.

Table 3-1
DESALINATED WATER QUALITY
KEY PARAMETERS

Parameter	Desalinated Water	MWD Diemer Plant Water	EPA/CDHS Limits
Total Dissolved Solids (TDS), mg/L	250 - 350	373 - 491	500/1,000
Hardness (as $CaCO_3$), mg/L	40 – 100 (Moderately Hard)	200 – 260 (Hard)	No Limit
Sulfate, mg/L	5 - 20	111 - 173	250
Total Trihalomethanes (TTHMs), µg/L	5 - 10	27 - 51	80
Haloacetic Acids (HAAs), µg/L	1 - 5	10 - 24	60

MWD = Metropolitan Water District of Southern California
EPA = Environmental Protection Agency
CDHS = California Department of Health Services
mg/L = milligrams per liter
µg/L = micrograms per liter

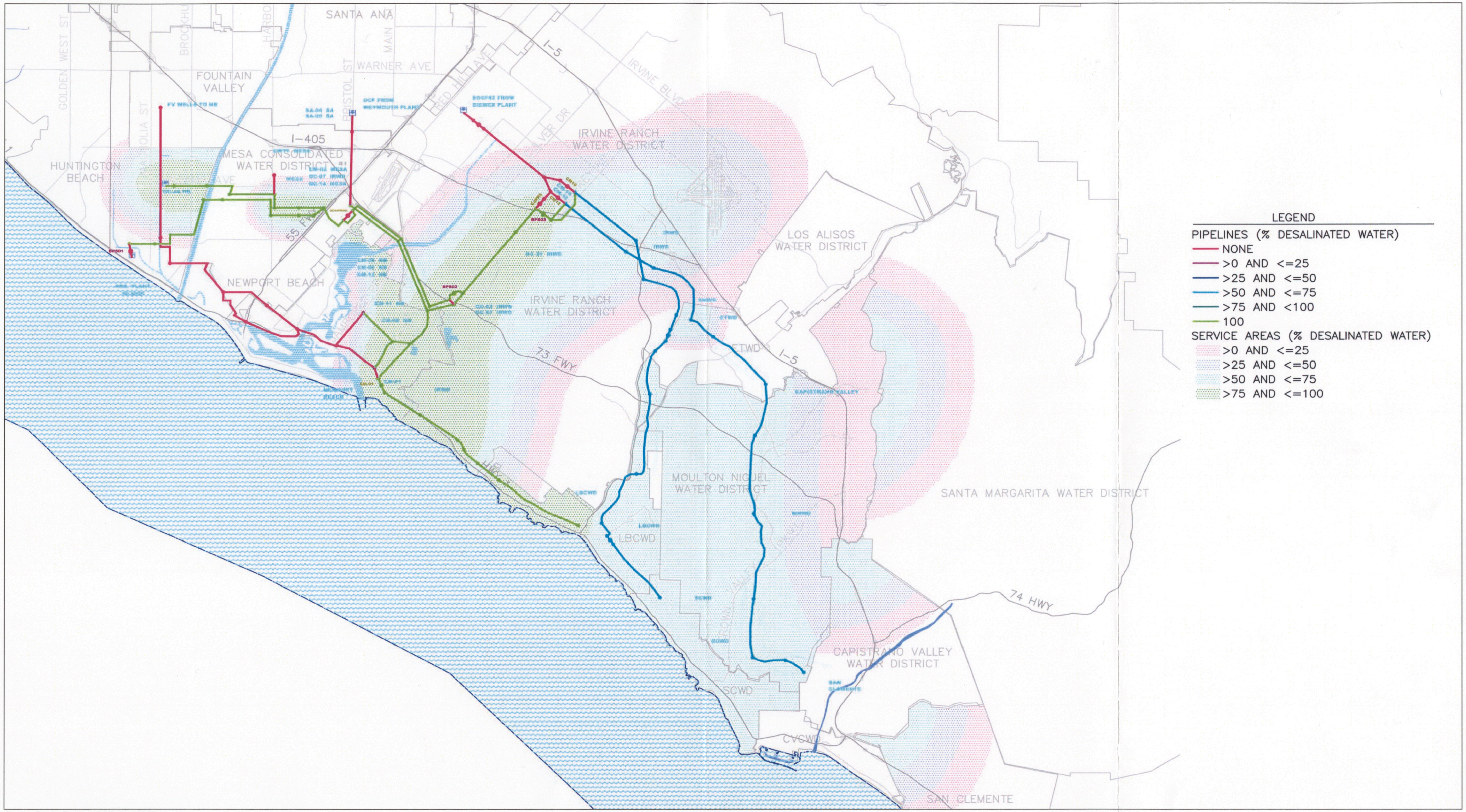
A review of Table 3-1 indicates that the desalinated water would have approximately 100 mg/L lower salinity (listed in the table as TDS) than the existing drinking water. The lower drinking water salinity should result in better taste and lower water distribution system corrosivity. The desalinated seawater would be softer than the existing water sources. Softer water has a number of benefits such as: better taste; formation of less calcium deposits on household appliances and cutlery; and lower detergent use. Commercial and industrial establishments which currently use softening devices to treat the potable water would also benefit from introduction of the softer desalinated water in the distribution system – their softening costs would be reduced and some of these users may not need to soften their water anymore (most industrial users typically require water with a hardness below 80 mg/L – as desalinated water would reduce hardness by at least 50 percent, softening costs would also be reduced commensurately). Similar to TDS, drinking water of lower sulfate concentration would have a better taste. The desalinated water would have order-of-magnitude lower concentrations of disinfection byproducts (TTHM and HAA) than the existing drinking water. Disinfection byproducts are well known carcinogens and their reduction in the drinking water would be an added benefit.

Section 5.11, *PRODUCT WATER QUALITY*, provides a more detailed analysis of the desalinated water quality and the potential water compatibility impacts that may result from introduction of desalinated seawater into the regional water distribution system.

G. SEAWATER DESALINATION FACILITY OPERATIONS

Parking

Automobile parking for facility employees and visitors would be provided in an area surrounding the administration building, located within the northern portion of the subject site. Approximately 30



Source: Carollo Engineers, February 2005.

NOT TO SCALE

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02/05 • JN 10-101409.002

SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Approximate Desalinated Water Distribution Area

Exhibit 3-19

parking stalls would be provided, which would include several stalls designated for disabled persons in accordance with Americans with Disabilities Act (ADA) requirements. The parking lot would feature appropriate landscaping along its perimeter, per City standards.

Site Access

Access to the proposed desalination site for employees, delivery trucks, and construction vehicles would be provided via the existing HBGS access point (main gate) along the eastern side of Newland Street. From this point vehicles would travel in a southeasterly direction, along the northern side of the HBGS generating units. At a point just east of HBGS generating unit number one and north of the service water tank, the access route would turn to the northeast and would proceed to the southwestern corner of the project site. Vehicles would then utilize internal access roads to their destination within the proposed project site. All access roads would comply with Huntington Beach fire code and City specifications.

Staffing

The proposed desalination facility would employ an approximate total of 18 people and would operate 24 hours a day, 365 days a year. Staff positions would include management, operators, maintenance, and administration/staff support. In addition, outside contracting of part-time staff is anticipated for specialized services such as electrical and mechanical maintenance. The estimated number of staff on duty during regular working hours Monday through Friday would be five to seven, with a minimum of two people on duty during swing shifts, graveyard shifts, and weekends.

Chemicals

The seawater desalination facility would use the same type and grade of chemicals as any other conventional surface water treatment plant. However, the seawater desalination facility would use fewer chemicals of lower dosages than existing conventional water treatment plants in Southern California, because its unique source of water (the Pacific Ocean) is of significantly better quality than other available water sources (i.e. Colorado River, the San Joaquin and Sacramento River Deltas, local surface water, and most groundwater sources in the area). The seawater desalination facility would also use significantly (order of magnitude) less chemicals than water reclamation/re-purification facilities in Southern California. Since the desalination facility would use fewer chemicals, this would reduce the potential of chemical exposure to the surrounding environment, compared to producing water using the existing water treatment plants or reclaiming wastewater for reuse. Also with fewer chemicals, there are fewer deliverables to the plant and less disruption of surrounding neighbors, lower traffic impacts and reduced labor costs.

The normal operation of the desalination treatment facility would require the continuous use of the following chemicals:

- Coagulant (Ferric Sulfate) for Removal of Naturally Occurring Solids from Seawater

  The purpose of coagulant addition is to remove solids, which occur naturally in the seawater. Ferric sulfate would be added in typical dosage of 5 to 10 mg/L. Occasionally, mostly during rainy events, the ferric sulfate dosage may be increased to up to 20 mg/L for the duration of the event.

  The addition of ferric sulfate to the seawater would enhance removal of seawater solids and would generate a small amount of sulfates (3 to 5 mg/L vs. seawater sulfate concentration of 2,300 mg/L). The two products of the coagulation process (solids and sulfates) would be returned to the ocean via the power plant outfall after blending with the concentrate from the desalination process and the power plant cooling water. Because both iron and sulfates are environmentally safe, their discharge is currently not regulated by the California Ocean Plan.

- Sulfuric Acid for Seawater Alkalinity Adjustment

The seawater is slightly alkaline (has pH of 7.8 to 8.3) and sulfuric acid would be added as needed to make the natural seawater more neutral (less aggressive and corrosive to the equipment) before membrane treatment. The maximum dosage of sulfuric acid that may be used for seawater alkalinity neutralization is 30 mg/L. Typically, this dosage would be between 15 and 20 mg/L.

Because the seawater has high alkalinity, the amount of hydroxide ions in the seawater is more than 10 times higher than the amount of hydrogen ions. Sulfuric acid, which contains an excess of hydrogen ions, is added in dosage to bring a balance between the hydroxide and hydrogen ions in the seawater, i.e. to reduce the pH from alkaline (pH of 7.8 to 8.3) to neutral (pH of 7). The added sulfuric acid reacts with the seawater creating two environmentally safe products: water (from the reaction of the excess hydroxide ions of the seawater and excess hydrogen ions of the acid) and sulfates.

- Lime and Carbon Dioxide for Product Water Alkalinity and Softness Adjustment

The water produced by the reverse osmosis desalination system (permeate) is very soft and cannot be used directly for potable purposes. Lime and carbon dioxide would be added to the permeate to increase product water alkalinity to a desirable range specified in the drinking water regulations. Lime and carbon dioxide addition for alkalinity adjustment and water distribution system corrosion control is very widely practiced at many conventional and desalination water treatment plants today. Added lime and carbon dioxide would not be discharged to the ocean.

- Sodium Hypochlorite and Ammonia for Product Water Disinfection

Sodium hypochlorite and ammonia would be added continuously for product water disinfection by chloramination. Chloramination is the current disinfection practice used at most of the other product water sources in the plant service area, which the product water from the desalination facility would be blended with. The applied dosages of sodium hypochlorite and ammonia are in a similar range of that used at the other water treatment plants in the area.

In addition, the desalination facility would intermittently use the following chemicals:

- Sodium Hypochlorite and Bisulfite for Bacterial and Algal Control

Chlorine in the form of sodium hypochlorite may need to be added to the seawater occasionally (for several hours per day and several days, two to three times per year) to protect the pretreatment facilities and the membrane equipment from excessive growth of algae and bacteria naturally conveyed in the seawater. Most of the sodium hypochlorite would be consumed in the disinfection process. The residual chlorine would be neutralized using sodium bisulfite. The chlorine would react with the seawater and the sodium bisulfite producing chlorides, sulfates, and sodium of amounts of less than 5 mg/L. For comparison, the concentration of chlorides in the seawater is usually in a range of 16,000 mg/L to 19,000 mg/L. The total increase in chloride, sodium and sulfate concentrations would be less than 0.05 % and would have no harmful effect on the marine environment.

- Polymer for Enhanced Solids Removal form Seawater

  Occasionally, typically during rainy events as needed, polymer would be added in small dosages (0.5 to 1 mg/L) to enhance the removal of solids from the intake seawater. Polymer addition would be intermittent for the duration of the event. The used polymers would be of high quality food grade approved for potable water production and would be of type customary for water treatment plants. The added polymer would react with the solids in the seawater and would be removed along with them and returned to the ocean. The amount of polymer in the discharge water would be negligible - below detection limits.

- Membrane Cleaning Chemicals

  Two times per year reverse osmosis membranes would be cleaned with chemicals similar to those used for household cleaning. The cleaning chemicals are citric acid (used for cooking in everyday life); hydrochloric acid (widely used for swimming pool conditioning); mild detergents (which can be found in products such as toothpaste and baby shampoo) and low-concentration caustic soda. The use of these chemicals for membrane cleaning is not unique for the proposed desalination facility. These membrane cleaning chemicals are used in all existing desalination installations in California (i.e. West Basin Desalter, Marina Coast Water District Plant, Irvine Ranch Desalter, etc.), Florida and worldwide. All chemicals listed above would be of a high grade and are approved for potable water use by the National Safety Foundation. After membrane cleaning, the chemicals from the first rinse would be neutralized and sent to OCSD. Subsequent rinses would be mixed with the desalination facility concentrate and power plant seawater and discharged through the power plant outfall. Because of the small amount of chemicals used, the concentration of the cleaning chemicals would be below their detection limits and would be in compliance with all local, state and Federal discharge regulations.

A more detailed description of the individual chemicals and their storage, delivery and handling at the proposed desalination facility is presented in Section 5.8, *HAZARDS AND HAZARDOUS MATERIALS*.

3.4 PROJECT NEED AND OBJECTIVES

NEED FOR THE PROJECT

It is well established that Southern California as we know it today could not exist without the region's historic investment in numerous and varied local water projects. These well-known regional water projects include: the Los Angeles Aqueduct (operated by the Los Angeles Department of Water and Power); the State Water Project (operated by California Department of Water Resources [DWR]); and the Colorado River Aqueduct (operated by MWD), as well as award-winning recycling and other local water supply projects. MWD continues to encourage the development of local water projects to reduce reliance on the regional water projects and help meet the water needs of the region.

The Seawater Desalination Project at Huntington Beach is one of several local water projects currently being proposed to meet Orange County's ongoing water needs. The project meets Orange County's water needs in four different ways.

A. The project would provide Orange County with increased water supply reliability during times of drought or during shortages in other water supplies.

B. The project would replace imported water supplies lost by Orange County to statewide and environmental needs.

C. The project would provide a new water supply source to accommodate Orange County's increasing water needs as shown in the water plans adopted by state, regional and local water agencies.

D. The project would provide a new source of supply, thus allowing operational flexibility in managing the amount of groundwater pumped from underground aquifers. This would assist in protecting the Orange County Groundwater Basin from seawater intrusion and/or replace groundwater supplies lost to overdraft concerns.

A. The Project Provides a Drought-Proof Water Supply

California has not experienced the hardships and environmental pressures of a prolonged drought since the early 1990s, but experts agree that similar or worse conditions of unreliable water supplies can and would reoccur. During long or extreme droughts, water supplies are less reliable, groundwater levels decline and conflicts increase among water users. Business is also adversely affected, jeopardizing the economy and ecosystems are strained, risking sensitive and endangered plants, animals, and habitats.

California's most severe recorded drought occurred in 1976–1977. Two consecutive years with little precipitation (fourth driest and the driest year in the recorded history) left California with record low storage in its surface reservoirs and dangerously low groundwater levels. Socioeconomic and environmental impacts were very severe during these extreme drought conditions. According to the Department of Water Resources, the total loss due to the drought during these two years exceeded $ 2.5 billion ($6.5 billion at today's cost). The most recent prolonged drought in California's recent history lasted 6 years from 1987 to 1992. Department of Water Resources studies indicate that in 1990–1992 the drought resulted in reduced gross revenues of about $670 million to California agriculture. Energy utilities were forced to substitute hydroelectric power with more costly fossil-fuel generation at an estimated statewide cost of $500 million in 1991. The drought also adversely affected snow-related recreation businesses. Some studies suggest as much as an $85 million loss for snow-related recreation businesses during the winter of 1990–91.
Since the last drought (1987–1992), many notable changes have occurred and would alter the impacts of future droughts. Some changes would result in making it more difficult to respond to future drought conditions. For example, California's population has increased to about 36 million people as of January 1, 2004, meaning that over-all demand has increased. In addition, the State Water Resources Control Board adopted Decision 1630 in 1995, which requires higher flows to protect the San Joaquin and Sacramento River Deltas, meaning that less water would be available to those areas that rely on the imported water supplies of the State Water Project.

Other changes (primarily improvements in infrastructure) would make it easier to respond to future drought conditions. Completion of construction of the Coastal Aqueduct (DWR), the Morongo basin pipelines (Mojave Water Agency), Diamond Valley Lake (MWD), Los Vaqueros Reservoir (Contra Costa Water District), and five large-scale groundwater recharge/storage projects should add flexibility in operating California's water system.

The Draft 2004 California Water Plan recognizes that one of the potential benefits that seawater desalination can provide is "increased water supply reliability during drought periods." (Draft California Water Plan, Volume 2, Resources Management Strategies, Desalination, page 3.) "The primary benefit of desalting is to increase California's water supply. Seawater desalting creates a new water supply by tapping the significant supply of feedwater from the Pacific Ocean" (page 3). Because the supply available from the Pacific Ocean is not affected by drought conditions, the

Seawater Desalination Project at Huntington Beach would add even more flexibility in operating California's water system, and would provide particular drought protection in Orange County.

B. The Project Provides a Replacement Water Supply

Although Orange County has made a significant financial investment in the regional imported water system (through ongoing contributions to MWD), and the system has historically met all of Orange County's water supply needs, there is concern regarding the amount of water that would continue to be available for delivery through the imported water system. Increasing regulatory activity and environmental water needs in Northern California and in the Mono Lake area have reduced the amount of imported water supply (compared to system capacity and earlier projections) that is available to Southern California. Likewise, there is a fundamental change occurring in the availability and use of Colorado River water because California, for the first time, would be required to reduce the amount of Colorado River water it uses. Implementation of the Colorado River Water Use Plan would, among other things, result in a reduction of up to 1 million acre- feet per year as compared to the highest amount diverted in the past 25 years (from a high of 5.4 million acre-feet per year to the California allotment of 4.4 million acre-feet per year). The project provides a new source of supply to offset any imported water supply losses experienced by Orange County.

C. The Project Provides a Planned-For Supply to Meet Increasing Water Needs

Water planning documents are legally required to provide projections of future water needs (based on population projections and other factors) and to identify, to the extent feasible, where the water supplies to meet those needs would be found. As is discussed below, state, regional and local planning documents have identified seawater desalination as one of the future supplies required to meet Orange County's water needs.

The California Water Plan

The DWR provides an assessment of anticipated statewide population growth and related water consumption statistics in their "Bulletin 160 series" California Water Plan.[2] The DWR employs these projections in developing and implementing long-range strategies addressing California's water demands. The 1998 Plan provided readers with estimates of the magnitude of dry-period water shortages in different areas of the state and also presented some options for reducing those shortages. DWR projected 2020 statewide water shortages at approximately 2.4 million acre-feet in an average water year, and 6.2 million acre-feet in drought years. In response, Senate Bills (SB) 221 and 610, which became effective January 1, 2003, require demonstration of water supply reliability prior to development.

In the 2004 Plan, DWR and water industry stakeholders wanted a more comprehensive analysis that included economics, water quality, and environmental and social considerations rather than focusing on the water budgets presented in Bulletin 160-98. As explained by DWR, this goal was not realized.

> "The analytical work could not be completed for use in [the 2004] water plan update. Without this analysis, update 2004 lacks the information to make the types of

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2 In 1957, the Department of Water Resources published Bulletin 3, the California Water Plan. Bulletin 3 was followed by the Bulletin 160 series. The Bulletin 160 series was published six times between 1966 and 1993, updating the California Water Plan. A 1991 amendment to the California Water Code directed the Department to update the plan every five years. Bulletin 160-98 (the 1998 Plan) is the latest adopted plan in the series. However, the 2004 Water Plan Update has been available in draft form for several months. The 2004 Plan will not be adopted until Fall 2005. This EIR presents information provided in both the 1998 Plan and the draft 2004 Plan.

regional-specific water budget comparisons afforded by Bulletin 160-98. However, update 2004 provides qualitative discussions and presents the analytical approach for use in update 2008 and beyond. If the past is any indication, we expect the analytical approach to continue to evolve long after 2008 is completed." (Draft 2004 Plan, Volume 1, Chapter 3, Box 3-xx, "Evolving Analytical Approach").[3]

The draft 2004 Plan extended the planning period to 2030, and includes an estimated population increase of 14 million people, from about 34 million to 48 million. (Volume 1, Chapter 2, page 2) The draft 2004 Plan also employs "a new analytical approach to be refined over the next several years and to be used in preparation of California Water Plan Update 2008. The major change in this analytical approach from past water plan updates is the evaluation of multiple plausible future scenarios rather than a single projected future." (Volume 1, chapter 3, page 1.)

DWR considered numerous factors that could vary in the future and developed three future scenarios (that would be used to begin the analysis for water plan update 2008).

- Scenario 1—**Current Trends**: Continue based on current trends with no big surprises.
- Scenario 2—**Resource Sustainability**: California is more efficient in 2030 water use than today while growing its economy and restoring its environment.
- Scenario 3—**Resource Intensive**: California is highly productive, respectful of the environment, yet less efficient in 2030 water use than today.

(The three scenarios are listed in the draft 2004 Plan, Volume 1, Chapter 3, Page 14.) While the analysis is not yet completed, numerous "Resource Management Strategies" have been identified in the draft 2004 Plan to address the three scenarios. One of those strategies is seawater desalination.

The 1998 Plan recognized that "seawater desalting is sometimes described as the ultimate solution to Southern California's water supply shortfall" (Bulletin 160-98, page 7-70), but failed to provide any projections regarding the estimated future water supply to be provided by seawater desalination projects. The draft 2004 Plan surveyed "the number and capacity of seawater desalting plants in operation and in design and construction as of 2002 and plants that are currently planned or projected for construction" (Vol. 2, Resource Management Strategies, Desalination, page 3). According to the draft 2004 Plan, the following table (Table 3-2, *DESALTING IN CALIFORNIA FOR NEW WATER SUPPLY*) includes "the plants proposed in response to the MWD solicitation (see below) and plants in Huntington Beach, the Monterey Bay area and Marin County."

As referenced in the above table, DWR projects that a combination of six new seawater desalination facilities would provide up to 187,100 acre-feet of California's urban water supply by 2030. The same number (rounded to 200,000 acre-feet) is listed as the target amount to be produced by seawater desalination, one of the 25 "Resource Management Strategies" featured in the draft 2004 Water Plan Update's "Strategy Investment Options Table." (Draft 2004 Plan, Volume 1, Findings and Recommended Actions.)

[3] The California Water Plan Volume 1 – The Strategic Plan, Chapter 3, Planning for an Uncertain Future, Internal Review Draft, June 21, 2004.

Table 3-2 (from Draft 2004 California Water Plan, Volume 2)
DESALTING IN CALIFORNIA FOR NEW WATER SUPPLY

	Plants in Operation		**Plants in Design and Construction**		**Plants Planned or Projected**	
Feedwater Source	Number of Plants	Annual Capacity	Number of Plants	Annual Capacity	Number of Plants	Annual Capacity
Groundwater	14	68,500	3	31,700	3	55,800
Seawater	6	1,440	1	50	6	187,100
Total	20	69,940	4	31,750	9	242,900
Cumulative			24	91,690	33	298,700

1. Capacity in Acre-feet per year. No. of plants is number of new plants.
2. Design and Construction – Construction underway or preparation of plans and specifications has begun.
3. Planned – Planning studies underway for new or expanded capacity
4. Projected – Assumed new or expanded capacity of plants in operation or design and construction.

Sources: "Water Desalination Report" and Worldwide Desalting Plants Inventory series by International Desalination Association.

Southern California's Integrated Water Resources Plan

In 1996 the major imported water supplier in the region, MWD, first adopted "Southern California's Integrated Water Resources Plan" (the "IRP") representing a dramatic shift in water management and resource planning for the region. The IRP recommended that groundwater recovery projects, storage projects, water recycling projects, water transfer projects and water conservation projects be considered in addition to available imported supplies to determine the "resource mix" available to the region. The IRP set resource development targets (in acre-feet per year) for water conservation and for each of the various water supply sources needed to meet projected water demands. Although no target was set for desalinated ocean water as a future supply, the 1996 IRP stated that, based on feasibility studies on potential projects, about 200,000 acre-feet per year (of desalinated ocean water) could be developed by 2010 (p. 3-12).

The 2003 IRP Update (approved by MWD in July 2004) refined the resource development targets based on changed conditions and updated the resource targets through 2025 (see Table 3-3, *UPDATED RESOURCE TARGETS [WITH SUPPLY BUFFER]*). The 2003 IRP Update continued to confirm that "[t]here is no single cornerstone for regional supply reliability. Because of this, the region has developed an integrated resource plan that depends on many sources of supply" (p. 11). In the 2003 IRP Update, seawater desalination became a targeted resource, included with recycling and groundwater recovery in the mix of necessary local resources (pp. 31-33).

According to the 2003 IRP Update: "Recent improvements in membrane technology and new plant siting strategies have reduced costs, and may make seawater desalination a potential supply option for the region. In 2001, MWD issued a competitive RFP for seawater desalination projects with the goal of developing up to 50,000 acre-feet per year. In light of the enthusiastic response to the proposals submitted under the RFP, this report [the 2003 IRP Update] includes a revised local resources target that can accommodate a seawater desalination goal of 150,000 acre-feet."

MWD's 2003 Report on Water Supplies explains MWD's Seawater Desalination Program. "Launched in the summer of 2001, the program would provide financial and technical support for the development of local cost-effective seawater desalination projects. A call for proposals produced five projects, (refer to section 6.3, *CUMULATIVE IMPACTS*), proposed by member agencies, which were evaluated by MWD's review committee of staff and consultants. Collectively, the projects

Table 3-3 (from 2003 IRP Update)
UPDATED RESOURCE TARGETS (WITH SUPPLY BUFFER)

	1996 IRP 2020	IRP Update 2020	Change	IRP Update 2025
Conservation	882,000	1,028,000	+145,600	1,107,000
• Recycling • Groundwater Recovery • Desalination	500,000	750,000	+250,000 (buffer)	750,000
Colorado River Aqueduct *	1,200,000	1,250,000	+50,000	1,250,000
State Water Project	593,000	650,000	+57,000	650,000
Groundwater Conjunctive Use	300,000	300,000	0	300,000
CVP/SWP Storage and Transfer	300,000	550,000	+250,000 (buffer)	550,000
MWD Surface Storage **	620,000	620,000	0	620,000

* The 1,250,000 acre-feet supply from the Colorado River Aqueduct is a target for specific year types when needed. Metropolitan is not depending upon a full aqueduct in every year.
** Target for Surface Storage represents the total amount of water that can be extracted from storage.

could produce about 132,000 acre-feet of drinking water per year."[4] The 56,000 acre-foot per year Seawater Desalination Project at Huntington Beach is independent from MWD's Seawater Desalination Program, but would still be considered an Orange County local project for purposes of the 2003 IRP Update.

Orange County Water Plans

The County of Orange and the service area of the Municipal Water District of Orange County (MWDOC) are located at the center of the MWD service area. In addition to the water planning information available in the California Water Plan and the IRP, local water planning information is also readily available for Orange County water supplies. The Urban Water Management Planning Act of 1983 requires all urban water suppliers to prepare and adopt an Urban Water Management Plan, and to update that plan every five years using a 20-year planning horizon.

As a member agency of MWD, MWDOC supplies imported water to 32 local water purveyors throughout the County of Orange (all of Orange County except the cities of Anaheim, Fullerton and Santa Ana). The most recent MWDOC Regional Urban Water Management Plan (UWMP), dated December 20, 2000, provides an excellent basis for discussing Orange County water planning efforts because the 2000 UWMP includes countywide information to supplement the information specific to MWDOC's service area.

According to the 2000 UWMP, Orange County 2020 water needs are projected to be as high as 856,000 acre-feet in an average year. If conservation, also known as water use efficiency (WUE), efforts are successful, the County's water needs can be reduced by 99,000 acre-feet per year to 757,000 acre-feet. Refer to Table 3-4, *PROJECTED ORANGE COUNTY WATER DEMAND THROUGH 2020* (from the 2000 UWMP, page 2-10).

Figure 3-1, *ORANGE COUNTY WATER SUPPLY SOURCES* (from the 2000 UWMP, page 3-2) identifies expected sources of supply to meet a hypothetical water need of 700,000 acre-feet.

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4 The five desalination projects are proposed by the City of Los Angeles, City of Long Beach, Municipal Water District of Orange County, San Diego County Water Authority, and West Basin Municipal Water District.

The information in the 2000 UWMP is in the process of being updated by MWDOC to reflect MWD's 2003 IRP Update assumptions (a revised UWMP must be adopted by MWDOC in 2005). In completing the IRP Update, MWD included two specific assumptions for Orange County: 1) an increase in conservation from 84,000 acre-feet in 2005 to 148,000 acre-feet in 2025 and 2) an increase in "local supplies" from 350,000 acre-feet in 2005 to 512,000 acre-feet in 2025 (April 22, 2004 presentation by MWDOC: "Orange County's Part in the IRP").

The conservation assumptions in the 2003 IRP Update are more aggressive than those projected in MWDOC's 2000 UWMP. Table 3-4 indicates total conservation (WUE) of 32,000 acre-feet in 2000 and projects only 57,000 acre-feet for 2005. The 2020 projection of 99,000 acre-feet in the 2000 UWMP is 49,000 acre-feet short of the 2003 IRP Update assumption. In addition, the assumption that Orange County can increase local supplies to 512,000 acre-feet is dependent on continued significant groundwater production. According to MWDOC, a "lower groundwater production" scenario could leave Orange County up to 52,000 acre-feet short of the 512,000 acre-foot local project goal in 2025 even assuming that all existing and planned recycling projects (including Phase I of the Orange County Water District's Groundwater Replenishment System) were fully operational (April 22, 2004 presentation by MWDOC: "Orange County's Part in the IRP").

The 2000 UWMP specifically stated that "seawater desalination is undoubtedly in the future of Orange County's water supplies" and describes a seawater desalination facility within the City of Huntington Beach (situated adjacent to the HBGS) as a "future water supply for Orange County" (2000 UWMP, page 3-13). In 2002, MWDOC submitted a proposal for the South Orange County Seawater Desalination Project to MWD in response to MWD's call for proposals (refer to Table 6-4, *PLANNED DESALINATION FACILITIES ALONG THE SOUTHERN CALIFORNIA COAST*). That

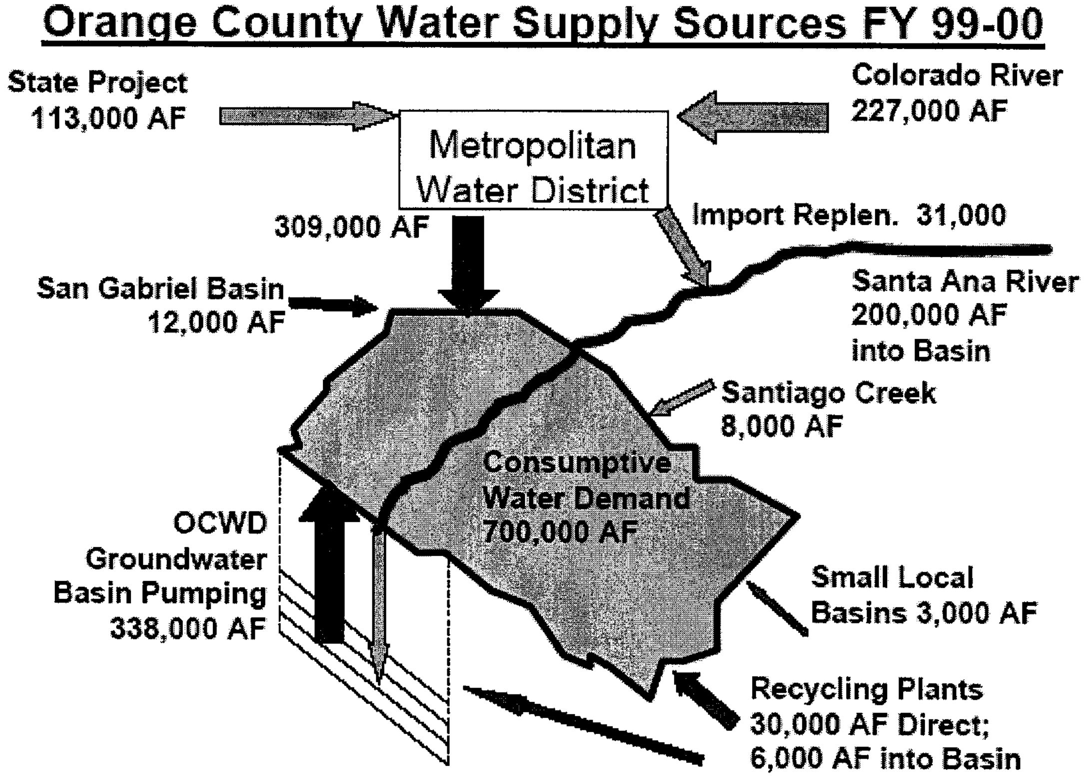
Table 3-4
PROJECTED ORANGE COUNTY WATER DEMAND THROUGH 2020

Orange County

Year	Population [1] (millions)	Urban Water Demand [2] (acre-feet)			Notes
		Without WUE	WUE Amount [3]	Net With WUE	
1990	2.40	617,000	-	617,000	Historical
1995	2.59	583,000	13,000	570,000	
2000	2.86	706,000	32,000	674,000	Yr 2000- 2nd year of dry, warm weather
2005	3.00	707,000	57,000	650,000	Projections assume a "normal" weather year. Actual demands may vary on the order of +/- 10% from "normal" due to weather and economic conditions.
2010	3.09	755,000	72,000	683,000	
2015	3.15	798,000	86,000	712,000	
2020	3.23	856,000	99,000	757,000	
% Increase 1990 to 2020	35%	39%	n/a	23%	
% Increase 2000 to 2020	13%	21%	209%	12%	

[1] Population estimates by the Center for Demographic Research, CSU Fullerton.
[2] Numbers represent consumptive urban water demand. Includes recycled water; does not include agricultural use; does not include replenishment of storage. Projections per MWD-MAIN model.
[3] Water conserved due to both "active" water efficiency efforts and to the "passive" efforts of plumbing codes. Estimates per MWD-MAIN model.

Figure 3-1
ORANGE COUNTY WATER SUPPLY SOURCES



project has been included in the MWD Seawater Desalination Program. MWDOC continues to list ocean desalination as a one of the "next steps for Orange County" together with additional recycling, additional groundwater recharge and additional conservation (April 22, 2004 presentation by MWDOC: "Orange County's Part in the IRP").

D. The Project Provides a New Source to Protect Against Seawater Intrusion

The Orange County Water District (OCWD) oversees management of Orange County's most important local water supply – the Santa Ana River Groundwater Basin (the "Basin"). The 2003-2004 Orange County Grand Jury studied groundwater conditions in the Basin and provided certain operational recommendations to OCWD. This study is entitled, "The Groundwater Replenishment System: Providing Water for the Future".

All of the facts set forth in this section were identified during the Grand Jury study. OCWD does not manage the Basin by trying to keep it full. Rather it has established a goal of maintaining an accumulated overdraft of about 200,000 acre-feet to allow storage space for replenishment when excess water is available during wet years (page 8). In fact, the Grand Jury commended OCWD for its "efforts to capture and recharge floodwater" stating that the "average of 70,000 acre-feet of storm flows captured each flood season saves Orange County water users more than $17 million per year" (page 23).

In 1965, OCWD installed injection wells along the coast near the mouth of the Santa Ana River (at a place called the "Talbert Gap") to pump water into the shallow aquifers. Injecting water into the shallow aquifers produced a groundwater mound that stood higher than sea level. With a barrier in place to retard seawater intrusion, it became feasible to draw water levels down during dry periods when local surface water and imported water sources were in short supply, instead of simply keeping the basin as full as possible to prevent seawater intrusion. During wet periods, the depleted aquifer could be replenished with storm runoff and excess imported water. Utilizing this method of groundwater management, OCWD allowed the amount of depleted groundwater supply (basin overdraft) to fluctuate between "full" in 1969 to an overdraft of nearly 500,000 acre-feet in 1977 without causing irreparable damage to the resource (page 7).

Groundwater withdrawals from the Basin have increased from less than 200,000 acre-feet per year in the early 1960s to more than 350,000 acre-feet per year in 2002 (page 7). In comparison to the 350,000 acre-feet of annual withdrawals from the Basin during the period 1998-2002, the natural recharge is small (estimated by the OCWD to be about 70,000 acre-feet per year) (page 9). The majority of replenishment water is from "artificial recharge" operations whereby OCWD captures the flow of the Santa Ana River (which currently averages about 150,000 acre-feet per year) in recharge facilities located in the river bed and through deep recharge basins (abandoned sand and gravel pits) near the river. OCWD also captures an average of about 70,000 acre-feet of storm flows each year. To make up for the imbalance between this 290,000 acre-feet of recharge and the 350,000 acre-feet of withdrawals, OCWD has purchased an average of 60,000 acre-feet of imported water from MWD each year for supplementary recharge.

If the accumulated overdraft becomes excessive, OCWD uses complex financial disincentives to discourage groundwater withdrawals. Since the 1997-98 water year (a wet year), the County has experienced dry conditions, resulting in overdrafts in excess of 30,000 acre-feet per year. Groundwater levels have declined more than 20 feet throughout the basin since 1998, and water levels near the coast are currently as much as 80 feet below sea level. In November 2002, the accumulated overdraft was estimated to be more than 400,000 acre-feet, which prompted OCWD to take actions to limit groundwater production rates and reduce the rate of withdrawal to about 324,000 acre-feet per year in 2003 (page 8).

One key finding made by the Grand Jury was that "depressed groundwater levels near the coast have exacerbated the inland advance of saline water [into the Basin]" (finding No. 4, page 21). To remedy this condition, the Grand Jury recommended that "Orange County Water District curtail groundwater withdrawals from deep wells and obtain blending water for the Talbert Gap seawater-intrusion barrier from other sources" (recommendation No. 3, page 22). The Grand Jury also found that "changes in groundwater management strategies would be required to increase the current rate of groundwater withdrawals to satisfy future needs" (finding No. 8, page 21).

One such strategy known as the Groundwater Replenishment System (GWRS) is currently being pursued by OCWD. According to the Grand Jury study, OCWD:

> "would convert 100 million gallons per day of wastewater from the Sanitation District's sewer collection system into 72,000 acre-feet per year of desalted and purified wastewater. Treated wastewater from the Sanitation District wastewater treatment facilities would be filtered through a state-of-the-art micro-filtration system to remove particulate matter, passed through reverse-osmosis membranes to remove dissolved salts, and purified with ultraviolet and hydrogen-peroxide disinfection to produce 'ultra pure' water that exceeds all drinking water standards. The purified water would be used to protect and replenish Orange County's underground water supplies" (page 3)."

The 72,000 acre-feet would essentially offset the 60,000 acre-feet of imported water purchased from MWD each year by OCWD, and, when added to the normal year recharge of 290,000 acre-feet, could allow for a slight increase in available groundwater supply. However, the coastal pumping depression problem would likely remain. According to the Grand Jury, OCWD's modeling efforts "clearly illustrate that simply increasing recharge in the Water District recharge facilities and extending the seawater-intrusion barrier [as proposed by the GWRS project] would stabilize, but not alleviate, the coastal pumping depression" (page 16). The Seawater Desalination Project at Huntington Beach could provide an alternative supply of water to coastal communities that would allow operational flexibility in managing the groundwater basin.

PROJECT OBJECTIVES

The overall objective of the project is to provide Orange County with a long-term, reliable, high quality local source of potable water. Project implementation would create a local drought-proof supply of domestic water and would reduce Orange County's dependence on imported water, consistent with the goal of integrated water resource management. A key advantage of the selected site is to utilize existing ocean intake/discharge lines of sufficient seawater volume to avoid the impact of constructing new ocean intake/discharge facilities.

The project is intended to realize the following objectives:

- Provide a reliable local source of potable water to Orange County that is sustainable independent of climatic conditions and the availability of imported water supplies or local groundwater supplies;
- Provide product water that meets the drinking water requirements of the Safe Drinking Water Act (SDWA) and the Department of Health Services (DHS);
- Reduce salt imbalance of current imported water supplies by providing a potable water source with lower salt loads for blending with existing supplies;
- Remediate the subject site of on-site contaminants resulting from approximately 35 years of use as a fuel oil storage facility in order to protect the health and safety of those in the surrounding community;
- Create ecosystem and biologic resource benefits that may accrue due to decreased pressures on existing water resources and reduced contamination within receiving waters; and
- Minimize demands on the existing imported water system.

3.5 PROJECT PHASING

The demolition, remediation, and construction process of the proposed project would last approximately 24 months, including time necessary to acquire all required agreements, permits, and approvals. Project phasing would be divided into three separate categories, composed of the following:

- **On-Site Desalination Facility Construction:** This portion of the proposed project would last approximately 24 months, and would include such activities as on-site demolition, grading/excavation, construction of desalination facilities, landscaping, and facility startup/testing. Import and export of earthen materials would occur primarily during the first six months and last four months of this phase of the project.
- **Off-Site Product Water Transmission Pipeline Construction:** This portion of the project would last approximately 21 months, and would start about three months after the beginning of on-site desalination facility construction. This phase would include such activities as pipeline installation, implementation of pipeline under waterways/major roadways, soil remediation, removal of pipeline, and facility startup/testing. Import and export of earthen materials would occur primarily during the middle 12 months of this phase.

- **Off-Site Product Water Underground Booster Pump Stations Construction:** This phase of the proposed project would last approximately 18 months, and would begin approximately six months subsequent to the commencement of on-site desalination facility construction. This portion of the project would include such activities as grading/excavation/paving, pump station construction, emergency power generator construction, landscaping, and facility startup/testing. Import and export of materials would occur mainly within the first six months and final six months of the phase.

It should be noted that it is anticipated that all three phases would be implemented concurrently for the final 18 months of the proposed project.

3.6 AGREEMENTS, PERMITS, AND APPROVALS REQUIRED

The following agreements, permits, and approvals are anticipated to be necessary:

Approval/Permit, Permits to Operate	Agency
Final EIR Certification	City of Huntington Beach
Conditional Use Permit	City of Huntington Beach
Coastal Development Permit [5]	City of Huntington Beach
Franchise Agreement	City of Huntington Beach
Owner Participation Agreement and/or Development Agreement	City of Huntington Beach
Domestic Water Supply Permit	State of California Department of Health Services
Coastal Development Permit (CDP) [6]	California Coastal Commission (CCC)
NPDES Permit	Santa Ana Regional Water Quality Control Board
Permit to Operate	South Coast Air Quality Management District
Encroachment Permits	U.S. Army Corps of Engineers (Santa Ana River Crossing)
	Caltrans, District 12 (SR-55 undercrossing)
	County of Orange (channel crossings, pump station)
	City of Huntington Beach (product water pipeline)
	City of Costa Mesa (product water pipeline)
	Mesa Consolidated Water District (product water pipeline)
Institutional Agreements	Various cities, agencies, and regional water purveyors (including the Metropolitan Water District of Southern California [product water pipeline])
Lease Agreement	California State Lands Commission
Industrial Source Control Permit	Orange County Sanitation District

[5] The City's Coastal Development Permit approval may be appealed to the California Coastal Commission.

[6] A CDP is required directly from the CCC for the ocean discharge.