CHAPTER 2: PROJECT DESCRIPTION

2.1 INTRODUCTION

The Los Angeles Department of Water and Power (LADWP) is proposing to replace the existing underground and marine electrical cables and the existing marine electrode portions of the Sylmar Ground Return System (SGRS), although not in the same alignment. The project is known as the Sylmar Ground Return System Replacement Project (Project or proposed Project) (refer to Figure 2-1).

The SGRS is an integral component of the Pacific Direct Current Intertie (PDCI), which transmits bulk power between Los Angeles and the Pacific Northwest. The PDCI is a direct current (DC) system, and it cannot operate without a ground return system. The proposed Project will enhance the operational capabilities of the PDCI, minimize voltage gradients even under the most severe credible operating conditions, and minimize on-shore electrostatic corrosion.

The existing SGRS runs from the Sylmar Converter Station in the San Fernando Valley in Los Angeles, California, into the Santa Monica Bay and terminates on the ocean floor approximately 6,000 feet offshore from Pacific Palisades. The SGRS consists of an overhead segment, an underground segment, and a marine segment.

The existing overhead segment, which travels from the Sylmar Converter Station in Sylmar to the Kenter Canyon Terminal Tower in the Los Angeles community of Brentwood, has been determined to be adequate to support the PDCI. Therefore, it does not need to be replaced, and thus the overhead segment is not included as part of the proposed Project.

Consequently, the Project would begin at the Kenter Canyon Terminal Tower (where the existing overhead segment terminates) and would include the replacement of the existing underground and marine segments of the system. The proposed alignment for the underground segment would run from the Kenter Canyon Terminal Tower to the proposed West Channel Vault near Will Rogers State Beach. The marine segment of the Project would begin at the proposed West Channel Vault, proceed underground below Will Rogers State Beach, and then would be trenched into the ocean floor to a location approximately three miles offshore in Santa Monica Bay.

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Legend

- Proposed Underground Alignment
- Proposed Marine Alignment
- Proposed Electrode Array
- Existing Underground Alignment
- Existing Marine Alignment
- City Boundary

PROPOSED PROJECT

SYLMAR GROUND RETURN
SYSTEM REPLACEMENT PROJECT

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2.2 DESCRIPTION OF THE EXISTING FACILITIES

2.2.1 Pacific Direct Current Intertie Transmission Line

The existing SGRS was constructed in 1969 as part of the PDCI. The PDCI is a high voltage DC transmission line that extends approximately 850 miles from the Celilo Converter Station near The Dalles, Oregon, to the Sylmar Converter Station in the San Fernando Valley in Los Angeles, California. The PDCI is used to transfer large quantities of power generated primarily from hydroelectric facilities and wind energy facilities to the grid in the greater Los Angeles area. It has a capacity of 3,100 megawatts (MW), which is enough power to serve three million Southern California households.

The line’s capacity is shared among the PDCI partners, which, in addition to LADWP, include Southern California Edison (SCE), and the cities of Burbank, Glendale, and Pasadena. LADWP owns a 40 percent share or about 1,240 MW, which represents approximately 20 percent of the peak demand for electrical energy in the LADWP service area. SCE owns a 50 percent share or about 1,550 MW, which represents approximately 6.5 percent of peak demand in the SCE service area. LADWP operates the portion of the PDCI that is south of the Oregon border, whereas the Bonneville Power Administration (BPA) owns and operates the system in Oregon.

The PDCI also transmits power from south to north during seasonal variations in load and resource conditions, but power primarily flows from north to south. When demand lessens on the system, excess power is transmitted elsewhere on the western power grid, which connects numerous states.

The PDCI was originally energized in 1970 at a voltage of +/- 400 kilovolts (kV) with a capacity of 1,440 MW. Numerous upgrades have been completed in the subsequent years to allow for additional capacity on the PDCI. The PDCI is currently energized at a voltage of +/- 500 kV with a capacity of 3,100 MW.

2.2.2 Existing Sylmar Ground Return System

Location

The existing SGRS is approximately 31 miles long; it is made up of three segments: a 22.5 mile overhead segment; a 7.5 mile underground segment; and a one mile marine segment terminating at an electrode array. Figure 2-2 illustrates the location of the existing SGRS.

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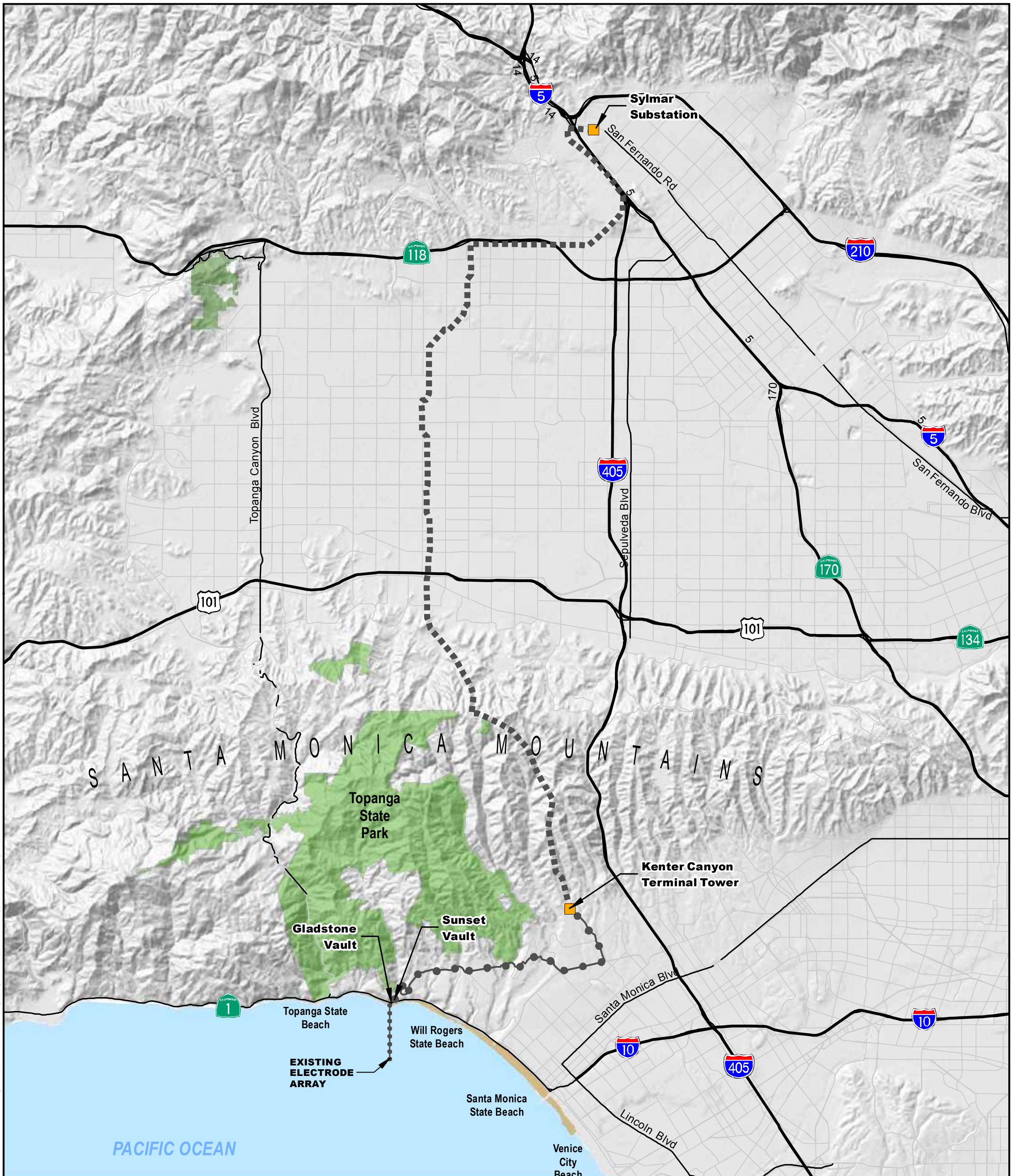

Legend

- Existing Overhead Alignment
- Existing Underground Alignment
- Existing Marine Alignment

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EXISTING SYLMAR GROUND RETURN SYSTEM

SYLMAR GROUND RETURN SYSTEM REPLACEMENT PROJECT

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Existing Overhead Segment

The overhead segment of the existing SGRS is composed of two single-conductor wires that travel about 22.5 miles to connect the Sylmar Converter Station to the Kenter Canyon Terminal Tower in the Brentwood community of Los Angeles. It is strung on the steel lattice towers of various existing transmission lines, which travel through the communities of Sylmar, Granada Hills, Northridge, Reseda, Tarzana, Encino, and Brentwood, as well as through lands administered by the Santa Monica Mountains Conservancy.

The overhead portion of the SGRS would not be upgraded or replaced as part of this Project because it has been determined that the overhead portion of the line is adequate to support the operation of the PDCI. This represents a reduction in scope for the Project as previously described in the Notice of Preparation (NOP) for an Environmental Impact Report (EIR).

Existing Underground Segment

The underground segment of the existing SGRS is made up of two single-conductor copper cables, known as the Kenter–Sunset Electrode Cables A and B, installed below streets and other property in the communities of Brentwood and Pacific Palisades of Los Angeles. The cables are insulated with oil-impregnated paper and covered with an outer lead sheath. Both cables are installed in concrete-encased conduits, with 47 subsurface vaults located in city streets along the alignment. The vaults house conduits, power cables, and related components and serve as cable-pulling points where tension can be controlled. The vaults are accessed via surface manholes for cable maintenance and repair, and are about nine feet deep and range from about six to ten feet wide and nine to 21 feet long. The tops of the vaults are typically two feet below the ground surface with an entrance into the vaults on the ground surface.

From the Kenter Canyon Terminal Tower, the cables follow a route under numerous streets throughout Brentwood and Pacific Palisades, including major streets and small residential blocks, to the Sunset Vault, located near U.S. Highway 1, the Pacific Coast Highway (PCH).

Existing Marine Segment

The marine segment of the existing SGRS starts at the existing Sunset Vault at 17350 Sunset Boulevard. This vault is approximately 80 square feet and 10 feet deep. From this vault, the two copper submarine cables, referred to as the Santa Monica and Malibu cables, connect to the Gladstone Vault, which is located 400 feet to the south in a commercial parking lot on the south side of PCH.

From the Gladstone Vault to a point approximately 1,000 feet offshore, the SGRS consists of two 3-conductor, copper cables, which are insulated with ethylene propylene rubber; both are encased in a common polyvinyl chloride jacket. From this location to approximately 6,000 feet offshore, the SGRS consists of two 3-conductor copper cables that are each insulated with high-density polyethylene (HDPE) and enclosed in a HDPE jacket. The Santa Monica cable was buried approximately three feet below the ocean floor during installation. The Malibu cable was laid on the ocean floor, although some segments are now buried below the surface as a result of currents and shifting sediments.

At the cable termini, approximately 6,000 feet offshore, each of the six copper conductors (three from each cable) is spliced and divided into four conductors for a total of 24 conductors connecting to the same number of precast reinforced concrete vaults containing two silicon iron alloy rods. Each vault is seven feet wide, 11 feet long, and six feet high; the vaults are typically placed from 10 to 23 feet apart. The length of the total array of electrodes is approximately 540 feet. The electrode is located directly on the ocean floor, approximately 60 feet below mean sea level. Two unlit, anchored buoys are located at the water's surface approximately 25 feet from either end of the array.

System Function

Normally, there is little or no electrical current being transmitted on the SGRS. The purpose of the ground return system is to carry current away from the PDCI during a disturbance, outage, or anomaly on the system that prevents the normal transmission of the energy. Utilization of the SGRS allows for the continued operation of the PDCI during short-term system anomalies, allowing time to resolve system issues or provide alternative generation sources, if needed.

In the PDCI system, the sea and earth are used as the return path. Because of the low resistance of the ocean and earth, the current released from the electrode follows the path of least resistance through the earth and water, returning back to its source, Rice Flats near the Celilo Converter Station in Oregon, where the northern electrode is located.

To support the operation of the PDCI, the SGRS is typically used less than 20 hours per year, which is made up of a number of shorter events. While the ground return system cables can be operated individually, they can also be operated simultaneously. Current ratings are as follows:

- Both cables operating simultaneously: 3,100 amperes (amps) for 20 minutes, followed by a "ramp down" to 1,460 amps and continuous operation at 1,460 amps thereafter.
- One cable operating: 3,100 amps for three minutes, followed by a ramp down to 730 amps and continuous operation at 730 amps thereafter.

Normal operations limit ground current operation to a maximum of 30 minutes for any single event, although this limit is procedural and not absolute. There have been occasions where the 30-minute limit was exceeded when necessary for the PDCI to remain within reliable operating parameters.

System Deficiencies

In order to maintain the reliability of the SGRS, the overhead, underground, and marine segments were reviewed to determine system deficiencies. The overhead system was found to be sufficient for operation of the PDCI. The underground and marine segments were found to have major deficiencies, and both segments need to be replaced.

Within the underground segment, the paper insulation of the existing cables contains insulating fluid (an oil), which over the years has migrated along the cables due to the elevation difference (500 feet) between end points. The oil migration has caused the cables at certain locations to have an internal pressure higher than the preferred operating pressures. High internal pressure has caused ruptures to the cable's sheath, which has allowed water penetration, causing subsequent cable failures.

Since 1970, the high internal pressures in the cables and other factors have contributed to numerous failures. Reservoirs were added to the system in 1981 to drain fluid from the cables and alleviate the high internal pressure. However, since 1998 there have been numerous additional failures, some of which involved both cables failing at the same time. Such failures critically jeopardize operations of the PDCI, potentially limiting power delivery to the Southern California area during periods of peak load.

In 2003, LADWP commissioned a study to further evaluate the existing underground segment. The study concluded that, in addition to the issues related to fluid migration, the underground cables do not have a conductor size to adequately meet the requirements of the PDCI's existing rating.

Several visual inspections of the offshore segment of the SGRS have been conducted by a team of divers since 2005. These inspections concluded that because of the original design and construction, the marine cables are vulnerable to damage from ships' anchors and wave action. Because it was not buried to the same extent as the Santa Monica Cable, the Malibu Cable has sustained the most electrical faults as a result of external damage. Due to repeated failures of the cables, seawater has penetrated the conductors.

Additionally, wave action over time has caused metal fatigue of the connecting wires on the electrode elements, resulting in breaks at the point of attachment between the marine electrode cables and the electrode array.

Based on these findings, it was determined that the underground and marine segments of the existing SGRS required replacement to avoid a complete breakdown of the system in the future, which would jeopardize the delivery of electrical energy carried by the PDCI.

2.3 PROJECT OBJECTIVES

The objectives for the proposed Project are to:

- maintain the reliability and stability of the power generation and delivery system for Southern California;
- continue to meet current and projected demand for power; and
- help increase the available share of renewable resource energy.

2.3.1 Maintain the Reliability and Stability

As described in the sections above, the PDCI has a capacity of 3,100 MW, which is enough power to serve three million Southern California households. Based on their allocation of the line’s capacity, the PDCI provides approximately 20 percent of LADWP’s peak demand for electrical energy, approximately 6.5 percent of SCE’s peak demand, and a major portion of peak demand for the cities of Glendale, Burbank, and Pasadena. Because the PDCI provides for a very large proportion of the demand for electricity in Southern California, its reliability is critical to the reliability and stability of the entire regional power generation and delivery system. The replacement of the underground and marine segments of the SGRS is necessary to maintain and improve the reliability of the PDCI, and as such, ensure the continued reliability and stability of the power generation and delivery system for Southern California.

Because existing technologies do not allow for mass storage of electrical energy, a primary characteristic of the electrical power system is that the total aggregate demand for power and the amount of power supplied within an area of control must be equalized on an instantaneous and continuous basis. The potential outcomes of not properly balancing supply with demand include the increased likelihood of brownouts or rolling blackouts to prevent widespread system failure when demand exceeds supply.

Potential unplanned outages of the PDCI, if not properly managed, could result in large rapid shifts in energy supply. Such outages have the potential to create system wide disruptions in the form of brownouts, blackouts, or system failure. The SGRS plays a critical role in the reliability and functionality of the PDCI by allowing the dispersion of current during disturbances or anomalies on the line. Use of the SGRS prevents damage to the PDCI system by carrying power away from the system during such incidents. This can allow for continued operation of the PDCI during short-term anomalies, providing additional time to resolve system issues or provide alternative energy sources, if needed.

Without the proposed Project upgrades, the ability to continue operation of the PDCI during short-term anomalies would be severely reduced or infeasible, increasing the likelihood of outages. Therefore, replacement of the underground and marine segments is essential for maintaining and improving the reliability of the PDCI, and critical for the continued reliability and stability of the power generation and delivery system in Southern California.

2.3.2 Continue to Meet Current and Projected Demand for Power

As municipal utilities, LADWP and the Water and Power Departments of the Cities of Glendale, Burbank, and Pasadena are obligated to provide a reliable supply of power to meet the current and future energy needs of their respective cities. Under the regulatory authority of the California Public Utilities Commission, SCE is obligated to provide power to a service area that includes parts of 11 counties and 180 cities and a population of 14 million.

In spite of a significant increase in new residential accounts, overall electrical energy consumption in the LADWP service area has remained relatively stable during the first decade of the twenty-first century, due primarily to aggressive energy conservation programs. With the continuation of planned conservation programs, this general pattern of energy use in Los Angeles is projected to remain relatively constant over the next two decades. This relatively flat projection in consumption reflects what is expected to be a relatively stable population base, as well as substantial increases in energy efficiency programs. However, some increases in consumption are expected in spite of energy conservation efforts because of an anticipated increase in the electrification of numerous functions that currently utilize a power source other than electricity. Electrification, whether prompted by legislative mandates, incentive programs, or voluntary efforts, is intended to reduce the production of greenhouse gases and air pollutant emissions, primarily by modifying various forms of transportation, including electric vehicles, expansion of light rail systems, and the electrification of the Port of Los Angeles.

Similar patterns of energy use (i.e., relatively stable but somewhat increased demand generated by increased electrification and new development offset by increased conservation and energy efficiency) are anticipated in the SCE, Burbank, Glendale, and Pasadena service areas. By supplying 3,100 MW of capacity, the PDCI plays a critical role in the provision of energy to the City of Los Angeles, as well as to the areas of Southern California served by the PDCI partner utilities.

The loss of the PDCI cannot feasibly be replaced through additional conservation or through other sources of generation, especially given the legislatively mandated elimination of coal-fired power generation for California utilities over the next decade and the unexpected retirement of the San Onofre Nuclear Generating Station, which provided approximately 2,200 MW of capacity for Southern California. Because the replacement of the deficient segments of the SGRS is essential to maintain the continued operation of the PDCI, the Project is critical to meeting the current and projected demand for power in the Southern California region.

2.3.3 Help Increase the Available Share of Renewable Resource Energy

Senate Bill (SB) 2 X1 was signed into law in April 2011, establishing a minimum level of 33 percent of annual electrical energy retail sales by California utilities that must be generated from eligible renewable resources by the end of 2020. SB 2 X1 also requires that utilities maintain 20 percent of sales from renewable resources through the year 2013 and established an interim goal of 25 percent of sales from renewable resources by the end of 2016.

The bill also requires that once utilities achieve 33 percent of energy sales generated from renewable resources in 2020, that level must be maintained in succeeding years, taking into account such factors as growth in demand for energy and replacement of existing renewable energy generation that is lost as the production capacity of aging facilities diminishes. In accordance with State law, eligible renewable resource energy includes, but is not limited to, that generated from wind, solar, small hydroelectric (30 MW or less), geothermal, and biomass sources.

The PDCI provides Southern California access to energy generated in the Pacific Northwest. While a majority of the electricity historically supplied by the PDCI to Southern California has been generated by hydroelectric facilities on the Columbia River, the Columbia River Gorge is also recognized as a world class wind resource. The development of numerous wind generation projects is on-going in the region, and it is anticipated that wind-generated energy carried on the PDCI will play an increasingly important role in fulfilling the requirement for renewable energy in the Southern California region. The replacement of the deficient segments of the SGRS is essential to maintaining the continued operation of the PDCI and ensuring access to the available share of renewable energy resources from the Pacific Northwest.

2.4 DESCRIPTION OF THE PROPOSED PROJECT

Since the September 2010 release of the SGRS Replacement Project NOP and Initial Study, further study of the existing system and projected upgrades to the PDCI has resulted in adjustments to the scope of the proposed Project. While the NOP originally considered the replacement of the existing overhead segment of the SGRS, subsequent analysis has established that the overhead segment is adequate in terms of the capacity and condition to support the operations of the PDCI; therefore, replacement of the overhead segment is no longer included within the scope of this Project.

The full replacement of the existing underground segment was considered in the Initial Study and is included in the current Project scope. At the time of the release of the Initial Study, it was not known if a complete replacement of the marine segment, including the actual electrode bed as well as the connecting cables, was required. Since that time, it has been determined that based on the continued physical degradation of both the marine cables and the offshore electrode itself, a full replacement of the marine system is required, and this action is included in the Project scope as described in this Draft EIR.

2.4.1 Project Location and Surrounding Land Uses

The Project, consisting of replacing the underground and marine segments of the existing SGRS, would be located in the City of Los Angeles, within the community of Brentwood, and in the City of Santa Monica; it would also extend into the Pacific Ocean in the Santa Monica Bay. Figure 2-3 illustrates the location of the proposed Project in a regional context. Table 2-1 describes jurisdictions crossed within the Project area.

TABLE 2-1 JURISDICTIONS CROSSED BY PROPOSED FACILITIES

JURISDICTION	DISTANCE - UNDERGROUND SEGMENT	DISTANCE- MARINE SEGMENT
City of Los Angeles, Communities of Brentwood and Pacific Palisades (Portion within Local Coastal Program - City of Los Angeles Coastal Zone)	18,000 feet (2,200 feet)	1,100 feet (1,100 feet)
City of Santa Monica	8,400 feet	N/A
California Department of Parks and Recreation/County of Los Angeles Department of Beaches and Harbors (Will Rogers State Beach)	N/A	700 feet
California Coastal Commission / California State Lands Commission/ U.S. Army Corps of Engineers (Santa Monica Bay)	N/A	23,000 feet

Source: POWER Engineers, Inc.

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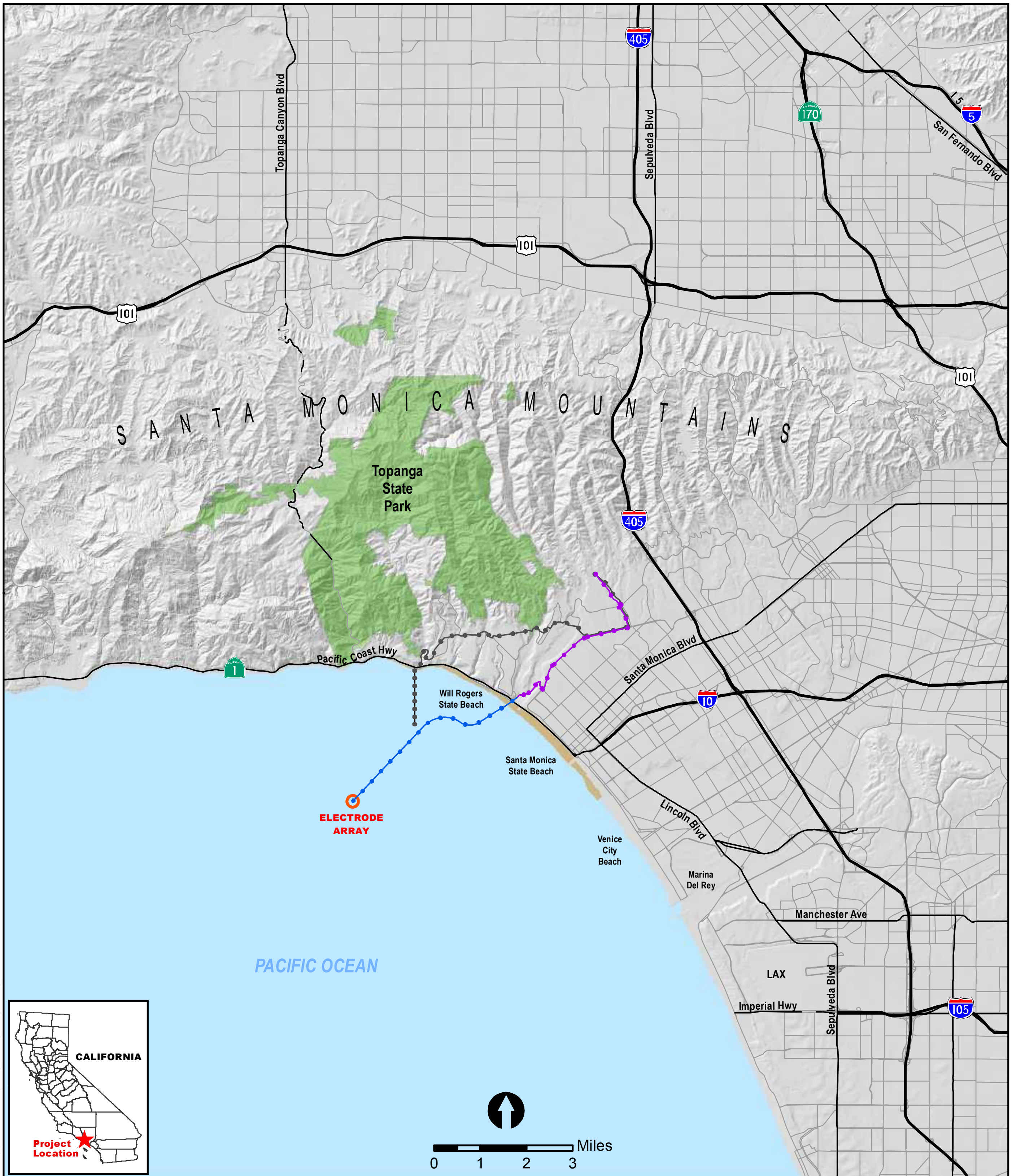

Legend

- Proposed Underground Alignment
- Proposed Marine Alignment
- Proposed Electrode Array
- Existing Underground Alignment
- Existing Marine Alignment

REGIONAL LOCATION

SYLMAR GROUND RETURN SYSTEM REPLACEMENT PROJECT

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The underground segment of the Project would be located below existing streets, extending for approximately five miles from the existing Kenter Canyon Terminal Tower to a proposed new vault on West Channel Drive, east of Will Rogers State Beach. Approximately 9.0 linear miles of residential land use and 0.4 linear mile of commercial land use front the proposed Project along both sides of each street[1].

Other uses occurring along the alignment include four schools/daycare facilities (Kenter Canyon Elementary School, Brentwood Science Magnet, Montana Preschool, and Canyon Charter Elementary School) and three recreational areas (Brentwood Country Club, San Vicente Median, and Will Rogers State Beach). The marine segment would extend from the proposed West Channel Vault, under Will Rogers State Beach, and along the ocean floor to a location in the Santa Monica Bay approximately three miles offshore.

The existing SGRS is described in Section 2.2.2 above; the existing underground and marine SGRS segments would be decommissioned after the new underground and marine segments are in-service. At that time, as feasible, existing facilities may be recovered or they may be abandoned in place.

2.4.2 Project Components

Proposed Underground Segment

The proposed underground segment would begin at the Kenter Canyon Terminal Tower where the existing overhead segment would be connected to the new underground segment. From there, it would be located underground through existing city streets to the proposed West Channel Vault, where it would connect to the new marine segment.

Kenter Canyon Terminal Tower

The Kenter Canyon Terminal Tower is an existing LADWP facility located on Homewood Road in the community of Brentwood. The existing facility includes an overhead rack which holds the protection and switching equipment necessary to make the transition from the existing SGRS overhead segment to the existing SGRS underground segment. A new rack would be assembled near the existing rack, and similar protection and switching equipment would be installed to facilitate the transition from existing overhead segment to the new underground segment. The proposed SGRS underground segment would connect to the existing SGRS overhead segment at this facility. The Project would not alter the overhead SGRS or the existing 138 kV and 230 kV transmission towers from which the overhead segment of the electrode is suspended. These towers serve an entirely independent function from the SGRS related to the delivery of electrical power to areas of the City, which establishes their location.

Underground Cables and Vaults

Extending from the Kenter Canyon Terminal Tower, the SGRS underground segment would require two copper cables insulated with DC Cross Linked Polyethylene (DC-XLPE), a plastic compound designed specifically for DC applications. The DC-XLPE is an oil-free material, unlike the existing SGRS underground cable insulation. The DC-XLPE insulated cables would be installed within two six-inch conduits encased in a concrete conduit bank located within existing streets with the conduit bank top at a minimum of five feet underground. The conduit bank would include four cable conduits; two would be utilized and two would be empty. The vacant conduits would be utilized for emergency repair and maintenance. Two communication conduits would also be included within the conduit bank. Approximately 20 new underground vaults would be required, one approximately every 1,500 feet along the alignment, to provide access to the conduits and cables.

The proposed alignment would be installed below the following streets:

[1] Mileage calculations are computed by adding land use frontage on each side of the Project alignment to derive the total mileage frontage.

- Homewood Road between the existing Kenter Canyon Terminal Tower and North Kenter Avenue
- North Kenter Avenue between Homewood Road and Sunset Boulevard
- Sunset Boulevard between North Kenter Avenue and South Gretna Green Way
- South Gretna Green Way between Sunset Boulevard and San Vicente Boulevard
- San Vicente Boulevard between South Gretna Green Way and 7th Street
- 7th Street between San Vicente Boulevard and Entrada Drive
- Entrada Drive between 7th Street and West Channel Road
- West Channel Road between Entrada Drive and the proposed West Channel Vault

Proposed Marine Segment

The proposed marine segment would be directionally drilled underground from the proposed West Channel Vault, cross under PCH and Will Rodgers State Beach, and continue under the ocean floor to a location approximately 1,000 feet offshore in Santa Monica Bay. From there, it would be installed in a trench approximately five feet below the ocean floor, as practicable, extending to the proposed electrode array which would be located on the surface of the ocean floor at a depth of about 160 feet. The existing SGRS marine segment is described in Section 2.2.2. These facilities would be abandoned in place or recovered as necessary and feasible; however, it is likely the existing marine cables and electrode elements would be removed as feasible, but the concrete structures associated with the electrode array would remain in place, providing a hard substrate for marine life.

West Channel Vault

The proposed West Channel Vault would be located under the existing street, in the center median, approximately 750 feet east of PCH. It would serve as the transition between the proposed underground and marine segments. During construction, directional drilling for the installation of a portion of the proposed marine segment would occur at this location. Once directional drilling is completed, a permanent vault 40 feet long by 12 feet wide by 12 feet deep would be installed to provide access for maintenance and testing.

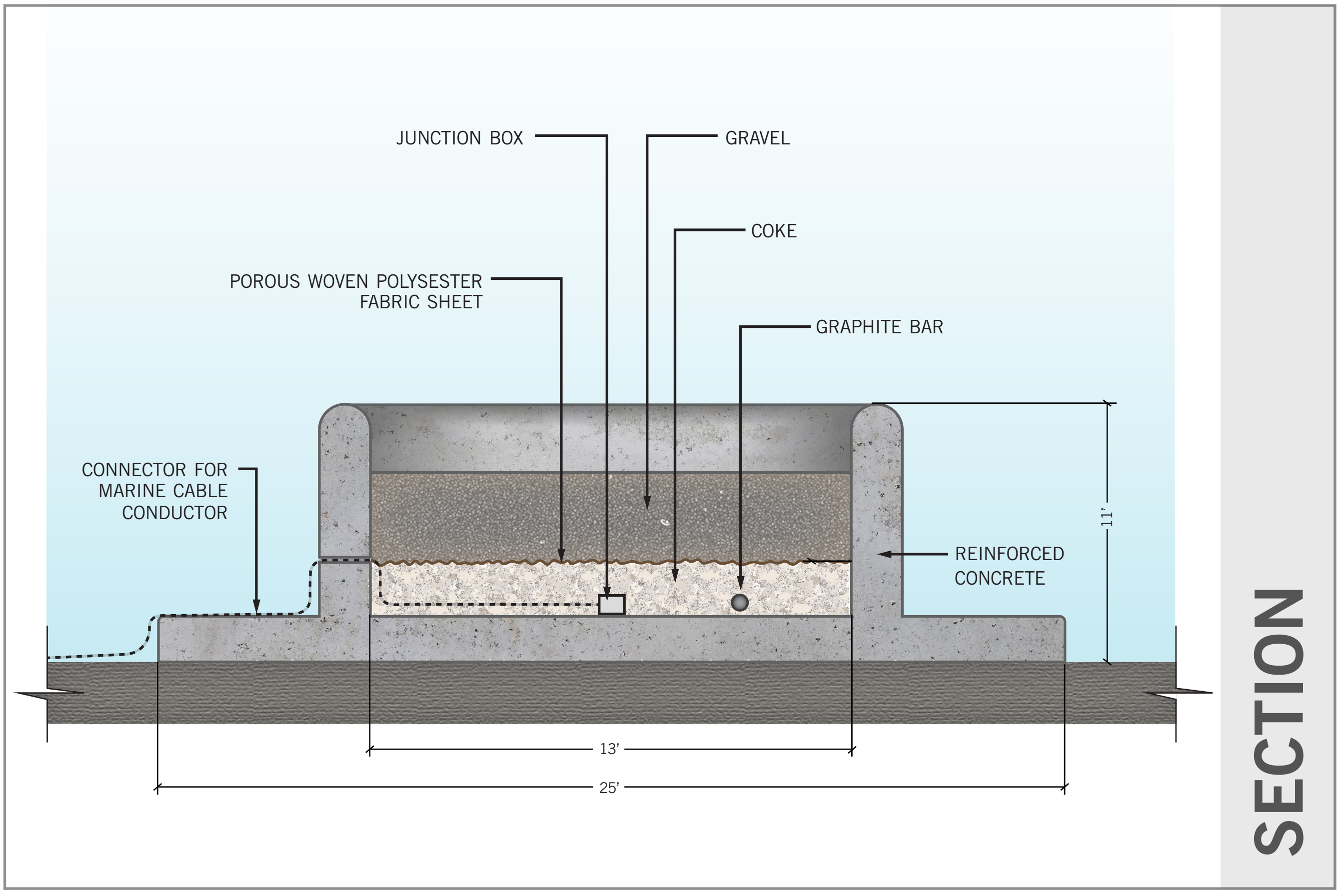
Marine Cables

From the proposed West Channel Vault, eight marine cables would extend to a new location in the Santa Monica Bay approximately three miles offshore. From the West Channel Vault to a location approximately 1,000 feet offshore, four marine cables would be installed underground within each of the two bore holes which would be stabilized with bentonite or similar material. From the location approximately 1,000 feet offshore to the proposed electrode array, the eight cables would be bundled into two sets of four cables each. The two sets would be installed in parallel trenches, approximately twenty feet apart. The cable depth, as practicable, would be approximately five feet below the ocean floor

Electrode Array

The electrode array would be located about three miles offshore on the ocean floor at a depth of approximately 160 feet below the water surface. Based on a preliminary design (that may be subject to change), the array would be composed of approximately 88 cylindrical boxes weighing about 100 tons each, arranged in a circular formation approximately 0.25 miles in diameter. Each open-topped cylindrical box would house an electrode element covered by layers of coke and gravel. The cylindrical boxes would have an internal diameter of approximately 13 feet and be approximately seven feet high. The base for each box would be 25 feet in diameter and two feet high. A conceptual diagram of an electrode box is provided in Figure 2-4. The eight marine cables would each be spliced into 11 smaller cables. Each of the 11 smaller cables would connect to a separate cylindrical box.

CONCEPTUAL DIAGRAM OF ELECTRODE BOX



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2.4.3 Project Construction

Project construction on the underground segment and marine segment would be conducted as distinct operations and may be conducted simultaneously. Each stage of underground and marine construction is described below.

Underground Segment Construction

Construction Preparation and Staging

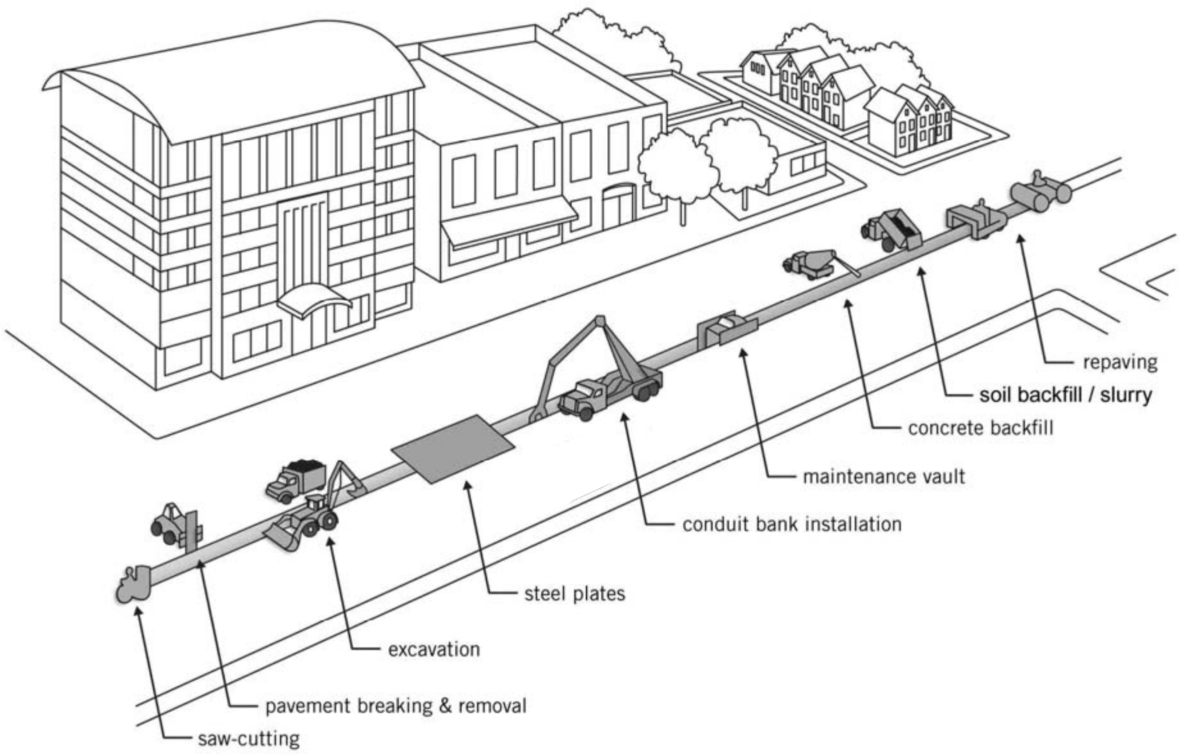
Staging areas would be required to store equipment and materials during construction of the underground segment. Staging areas would be located on previously developed or cleared areas such as empty industrial or commercial sites or similar spaces adjacent to or nearby the Project alignment. The Kenter Canyon Terminal Tower and Receiving Station K (1840 Centinela Avenue in Los Angeles) have been preliminarily identified as possible staging areas.

Underground Cable and Vault Installation

Construction of the underground segment would occur over an estimated 18-month period and involve the basic sequence listed below and illustrated in Figure 2-5. It should be noted that the underground cables and vaults would be constructed in segments, and construction of multiple segments would likely occur simultaneously along the Project route.

- Surveying of underground alignment, trench marking, and potholing.
- Saw-cutting and pavement breaking.
- Trenching to install conduit bank.
- Excavation for maintenance vaults.
- Install concrete encased conduit bank.
- Install maintenance vault.
- Cement slurry backfill.
- Repaving.
- Cable installation and splicing.
- Commissioning and testing.

FIGURE 2-5 UNDERGROUND CABLE CONSTRUCTION SEQUENCE



Survey, Trench Marking, and Potholing

Prior to excavations and trenching, coordination with the Underground System Alert would be conducted to locate and mark existing underground structures. This would help prevent accidental dig-ins and potential utility service interruptions to existing utility lines and substructures. The alignment would then be precisely surveyed and the centerline marked. Potholing, or digging test holes to expose and verify existing underground utilities, would be performed as necessary.

Saw-cutting, Pavement Breaking, Excavations, and Trenching

The conduit bank would be installed using open-cut trenching techniques that would require the closures of an approximate 20-foot-wide by 150- to 300-foot-long temporary construction corridor which would move as construction progresses along the alignment. The excavation would start with the removal of the concrete/asphalt by saw-cutting and breaking. Jackhammers would be used sparingly to break up any sections of concrete that could not be reached with the saw-cutting and pavement-breaking machines.

The typical trench for conduit bank installation would be approximately three feet wide and seven feet deep; trench depths may vary slightly depending on soil stability and presence of existing substructures. Depending on soil conditions and trench depth, the trench may be widened and shored where needed to meet California's Occupational Safety and Health Administration safety requirements. The conduit bank itself would be concrete encased and would measure approximately 20 inches wide and 20 inches tall.

Three construction crews, each crew consisting of five people, would work individually along different sections of the alignment such that concurrent trenching would occur along various points of the alignment. Each of the three construction crews would trench approximately 40 feet per day, with a total of 120 feet of trenching per day across the alignment. If a variance to the City of Los Angeles' Mayor's Directive No. 2 is issued to extend the work day in some areas, each crew would trench approximately 70 feet per day, with a total of 210 feet of trenching per day across the alignment. Areas that are trenched or excavated would be covered with steel plates every evening until the road surface is restored; this would allow for continued usage of the affected roadway during times when construction is not actually occurring. When segments of the trench are restored, more trenching would occur farther down the street until the conduit system was installed for the entire alignment. Provisions for emergency vehicle and local access would be provided. It is anticipated that construction of one mile of conduit bank (including vault installation, see below) would take approximately two months to complete with the variance to the Mayor's Executive Directive No. 2, and three months without the variance.

Approximately 25,000 cubic yards of soil would be removed from the trench excavations along the entire route and hauled away to an approved off-site location for disposal or reuse. Depending on the size of the truck, soils from a 40-foot-long trench segment would fill approximately three to four trucks.

When the conduit bank would cross or parallel existing substructures, the minimum clearance would be six inches and 12 inches, respectively. As the trench for the underground cables is excavated, the conduits and concrete conduit encasement would be installed. Concrete would be poured over the conduits and compacted. A slurry concrete cap would be poured, and the road surface would be restored. The conduit bank would be approximately five feet below ground surface, measured from street surface to the top of the bank.

Maintenance Vault Installation

The maintenance vaults would be installed within the roadway approximately every 1,500 feet along the proposed alignment. The vaults would initially be used to pull the cables through the conduits and splice cables together. During long-term operation, maintenance vaults would provide access to the underground cables for inspections, maintenance, and repairs. Maintenance vaults would be constructed in sections of steel-reinforced, precast concrete. The vaults' inside dimensions would be approximately 26 feet long, 8 feet wide and 11 feet high. The walls would be approximately 12 inches thick and designed to withstand heavy traffic loading.

Each vault would take approximately five days to install. During the installation, two traffic lanes would be closed for two to three days. The excavation of the maintenance vault would be approximately 30 feet long, 10 feet wide and 13 feet deep. The top of the vault would be approximately two feet below grade. Approximately 3,000 cubic yards of soil would be excavated for 20 vaults. Similar to the trenching excavation, trucks would haul material as it is excavated. The precast sections of the maintenance vault would be delivered by truck and lifted from the transport truck, lowered, and joined in the excavated hole with a crane. The area surrounding the vault would be filled with a cement slurry backfill, compacted, and repaved. Each maintenance vault would have two access openings sealed with cast iron covers on the road surface.

Cable Pulling, Splicing, and Termination

Once the conduit and vaults are in place, cable spans between two maintenance vaults would be pulled into the conduits. A cable reel would be placed at one maintenance vault, and a winch truck would be placed at the other maintenance vault. With a rope, a larger steel line would be pulled into the duct. The steel line would be attached to a cable-pulling eye for pulling. To ease pulling tensions, a lubricant would be applied to the cable as it enters the duct. Generally, two cable spans between maintenance vaults would be installed per day; this activity would require the isolated closure of one lane at each maintenance vault. Up to three crews may be pulling and splicing at various locations simultaneously along the Project alignment.

After installation, cables would be spliced in the maintenance vaults. A mobile generator would be located directly behind the splicing trailers to provide power for lighting and electric tools during the splicing operation. The underground cables would terminate at each terminal location: Kenter Canyon Terminal Tower and West Channel Vault.

Commissioning and Testing

Commissioning and testing would occur over the whole extent of the underground system, with testing conducted between two to four maintenance vaults at a time. These activities require an isolated lane closure at each vault for approximately four hours.

Special Construction Methods (Horizontal Dry Boring)

It is anticipated that special construction methods, such as horizontal dry boring (jack and bore), would be needed at two locations near the intersection of West Channel Road and Mesa Road, and the intersection of West Channel Road and Rustic Road to avoid existing storm channels at these intersections. However, during final design or during trenching excavations, some additional locations that may require horizontal boring may be identified. For example, crossings underneath large storm drains, sewer lines, or other substructures may require this method of construction.

Dry boring would begin with excavating a bore pit at the launching end and a trench at the receiving end. An area approximately 25 feet by 100 feet would be used for laydown and boring. Each bore pit would be approximately 44 feet long by 16 feet wide and would be as deep as required to clear existing substructures. The elevation at the bottom of the bore pit and receiving trench would be about the same. The horizontal bore equipment would then be installed in the bore pit. A steel casing 30 to 40 inches in diameter would be installed under the substructures. The steel casing would be welded in 10- to 15-foot long sections and pushed into the bore as the boring operation proceeds. The volume of soil removed from an individual bore site is estimated to be about 1,000 cubic yards. In addition to the boring machinery, a loader, backhoe, and dump truck would be used at both ends of the bore.

The setup for the dry boring operation, the actual boring operation, and the conduit pull through the casing would require a crew ranging from three to six. Each horizontal bore would take approximately one to three weeks to complete, depending on the length.

Marine Segment Construction

Construction Preparation and Staging

On-land staging areas would be required to store equipment and materials during construction. Staging areas would be located on previously developed or cleared areas, such as empty industrial or commercial sites, or similar spaces within or adjacent to the Port of Los Angeles.

Directional Drilling

The installation of the marine cable would begin at the proposed West Channel Vault located east of Will Rogers State Beach. The installation would begin on land by directional drilling under PCH and the State Beach, continuing beneath the ocean floor to a location approximately 1,000 feet offshore or a sufficient distance to avoid any rocky areas.

Horizontal directional drilling would involve drilling a pilot hole on the designed path and enlarging the hole using a large cutting tool known as a back reamer.

A work area measuring approximately 25 feet by 100 feet would be required during the directional drilling process. The drilling pit itself would be approximately 44 feet long by 16 feet wide and approximately 14 feet deep. Two bores (from the same pit) would be necessary. The total volume of soil resulting from excavation for the 2,400 feet of boring is anticipated to be approximately 600 cubic yards.

Four HDPE conduits would be pushed through each of the two bores. Bentonite, or a similar substance, would be utilized during the pushing process as a lubricant; it would ultimately harden and stabilize the bore holes. Each of the marine cables would be pulled through one of the eight conduits. A receiving barge would be anchored at the bore terminus to provide tension on the cable during the installation process.

Marine Plowing

Once past the zone of tidal influence and any existing offshore rocky areas, the marine cable installation would proceed by jet plowing or a similar process. A barge containing the cables would be set up to begin the process. From the barge, a marine plow would be attached to four cables and would begin burying the cables.

To install the eight cables, two furrows approximately 20 feet apart would be required. A set of four cables would be installed within each of the furrows. The barge would either utilize two adjacent plows in a single pass, or the installation process would be repeated a second time in an adjacent alignment.

As the barge and plow(s) advance, cables would be fed into the furrows from the back end of the plow as it moves along the ocean floor. The plow would bury the cables approximately five feet below the ocean floor as practicable. Sediments would resettle on top of the cable, closing the furrow.

Electrode Array Installation

The individual box components of the marine electrodes would be manufactured at an existing onshore facility in the City of Fontana. Each box would be transported as an oversized load during overnight hours from the source of manufacture via truck to the Port of Los Angeles.

At the port, the boxes would be layered with coke and gravel, and loaded onto a feeding barge. The feeding barge would transport about 12 of the preassembled boxes at a time to a laying barge anchored at the proposed location of the electrode array. Each box would be connected to a marine cable then lowered to the ocean floor by winch or crane mounted to the laying barge. An average of one box per day would be lowered by the laying barge. Divers would then be utilized to finalize the installation of the vaults. The entire installation is anticipated to take approximately nine months. This installation is conceptually illustrated in Figure 2-6.

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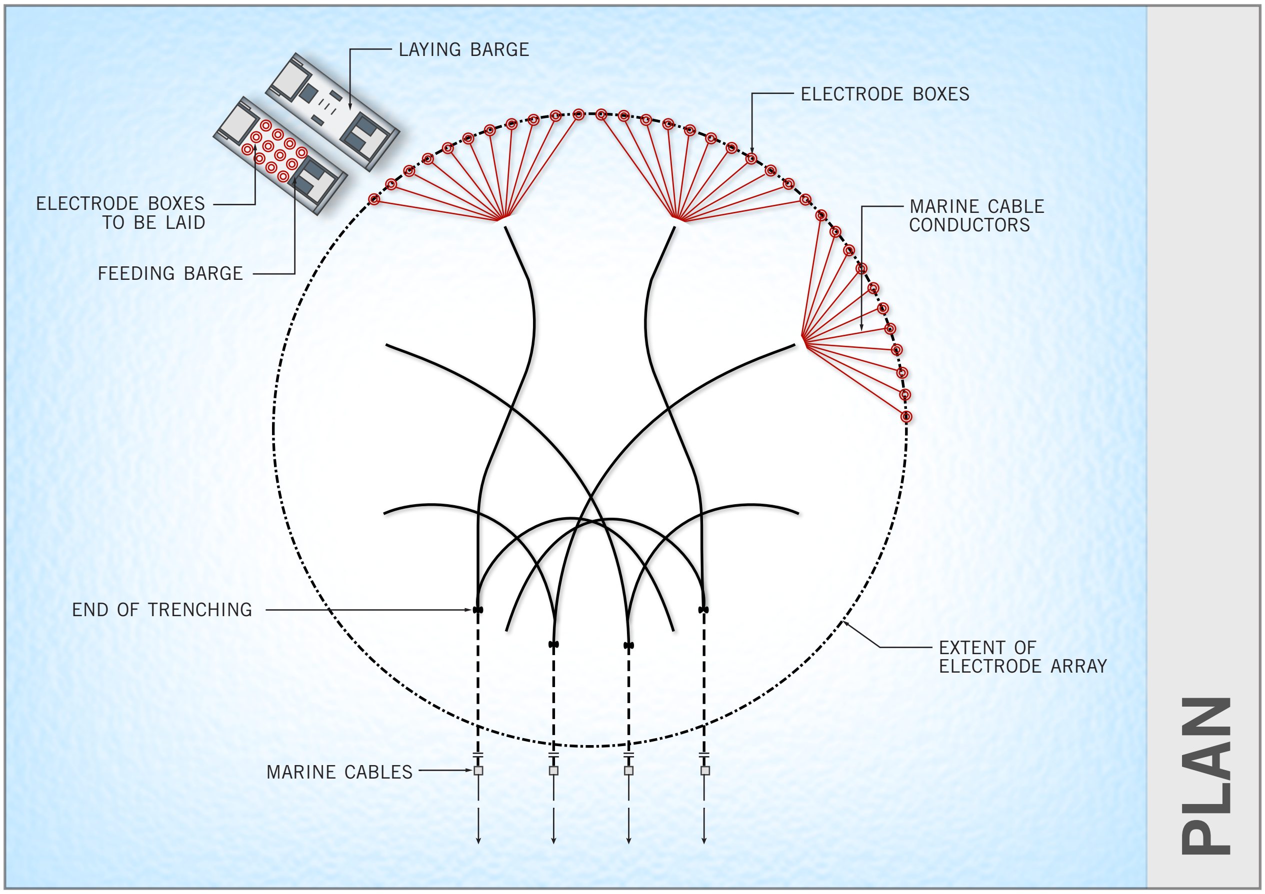
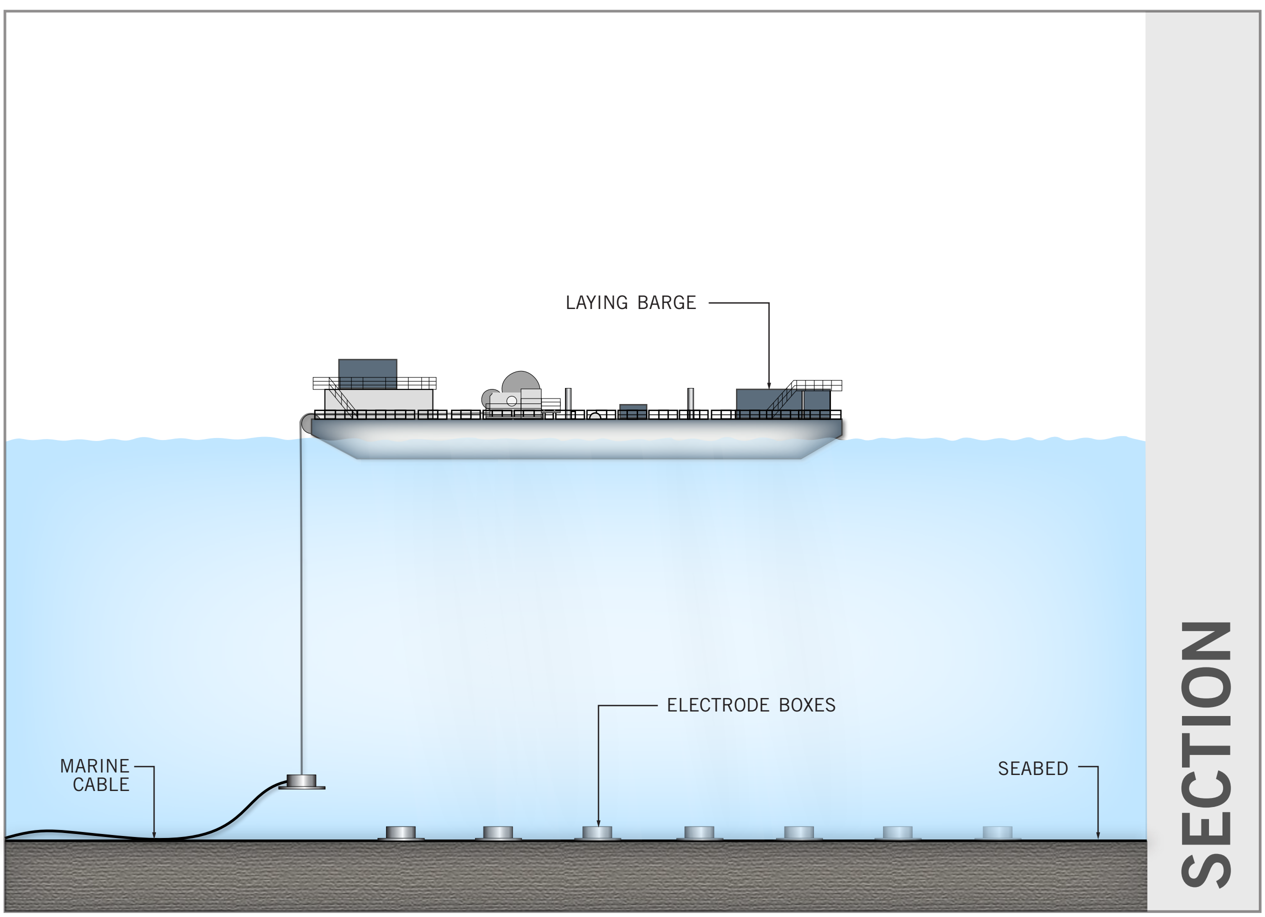
CONCEPTUAL ELECTRODE ARRAY INSTALLATION





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Abandonment/Recovery of Existing Facilities

After the completion of the installation, inspection, and testing of the new system, the existing underground cables would be removed as part of ongoing maintenance activities that would occur periodically over an extended period of time. The existing underground cables would be pulled through existing maintenance holes and ducts. The cable pulling equipment would have a cable-chopping capability to cut the cables into four- to five-foot long pieces during the removal process to facilitate transport and recycling through the LADWP Investment Recovery Facility in Sun Valley. In total, it is estimated that approximately 7.5 miles of the existing cable would be removed and recycled as part of future ongoing maintenance activities. While LADWP intends to remove all of the underground cable, access constraints and possible failures or breaks in the cable itself could limit the ability of the crews to reasonably remove all of the cable. Any cable that cannot be removed would remain in conduits or vaults that would be abandoned in place and sealed from public access.

During abandonment, the Sunset Vault would be excavated to remove the vault cover. The facility would then be filled with slurry and allowed to set up for two to three days before grading and paving over the vault location. The existing vault is 80 square feet and ten feet deep. Activities related to the abandonment of the vault would involve an area of approximately 100 feet by 50 feet. Likewise, the Gladstone Vault would be abandoned by removing the cover, filling with slurry, and grading and paving, similar to the Sunset Vault. The dimensions of the existing vault are 5.5 feet wide by 9.5 feet long by 9.2 feet deep. The activities related to the abandonment of the vault would require a work area of approximately 100 feet by 50 feet.

Removing the existing submarine cables would begin by disconnecting the two cables from switchgear located at the existing Sunset Vault. From shore to 1,000 feet offshore, if feasible and depending on the condition, the submarine cables would be removed in a similar manner to that described above for the underground cables. If removed from land, an approximately 100-foot by 25-foot area would be needed at the Gladstone Vault for up to three days. Removing the cables at sea would most likely occur from a marine barge. The existing electrode elements would be removed if feasible. Unless regulatory agencies require their removal, the concrete vaults would remain in place, providing a hard substrate to benefit marine life.

Because the removal of the existing facilities would occur intermittently and in limited work areas as crews are available, it is not anticipated that the activities associated with the removal would create significant disruptions or impacts.

Workforce and Scheduling

Construction of the proposed Project (as described above) is scheduled to begin in early 2016, with peak construction activity anticipated in 2017. Construction on various portions of underground and marine segments would occur simultaneously. It is anticipated that it would require about two years to complete Project construction, assuming 20 working days each month and land-side construction hours of 9:00 a.m. to 3:30 p.m. weekdays.

The City of Los Angeles Mayor's Executive Directive No. 2 limits in-street construction on weekdays to the hours of 9:00 a.m. through 3:30 p.m. However, exemptions to this directive may apply for major public works projects with mitigation plans. To assure the SGRS Replacement Project is completed on schedule, an exemption to Executive Directive No. 2 to allow construction outside those times would be requested. The variances are needed to expedite the Project schedule and limit the total duration of construction activities. If the variances are obtained, typical construction hours in the City of Los Angeles would be Monday through Friday from 7:00 a.m. to 5:00 p.m., and Saturday from 8:00 a.m. to 6:00 p.m. The City of Santa Monica limits construction hours on weekdays to 7:00 a.m. to 6:00 p.m. and on Saturdays to 9:00 a.m. to 5:00 p.m.; these construction hours would be adhered to in the City of Santa Monica. Under these working hours, it is estimated that construction of the Project would take approximately 18 months to complete.

Each major construction activity would be performed by one to three crews located in different areas, and typically each crew would include approximately five members. For example, trenching and conduit bank installation could occur concurrently along three separate segments and would require a total of 15 workers.

The estimated construction periods and anticipated lane closures for the conduit and vault installation for each affected street is summarized in Table 2-2. Subsequent cable splicing, pulling, and termination work at each vault location is anticipated to require a short-term (less than one day) isolated lane closure at the vault location itself for construction personnel access. In addition to the conduit and vault installation on West Channel Road, each horizontal dry bore operation would require approximately two to three weeks to complete, and the directional drilling operation would require approximately six weeks to complete. Conduit and vault installation; cable splicing, pulling, and termination; horizontal dry boring; and directional drilling may occur simultaneously in various areas along the Project alignment; therefore, the total project construction duration is not expected to exceed two years.

TABLE 2-2 ESTIMATED CONDUIT AND VAULT INSTALLATION DURATIONS ON AFFECTED STREETS

AFFECTED STREET	APPROXIMATE CONSTRUCTION WORKDAYS*	NUMBER OF LANES REMAINING OPEN DURING CONSTRUCTION
Homewood Road	50 days	1 - shared for both directions (vault installations may require two to three day temporary full closure)
North Kenter Avenue	10 days	2 – one lane each direction
Sunset Boulevard	15 days	Minimum 2 – at least one lane each direction
South Gretna Green Way	32 days	1 - shared for both directions (vault installations may require two to three day temporary full closure)
San Vicente Boulevard	124 days	3 - one westbound and two lanes eastbound (vault installations may require two to three day temporary restrictions to 2 lanes - one lane each direction)
7th Street	10 days	1 lane - shared by both directions (vault installation may require two to three day temporary full closure)
Entrada Drive	40 days	1 lane used for both directions (vault installations may require two to three day temporary full closure)
West Channel Road	20 days	2 – one lane each direction

*Construction activities would occur simultaneously in various locations; therefore, the above durations are not additive.

The timing for each construction activity/phase is described in Table 2-3.

TABLE 2-3 DURATION OF EACH CONSTRUCTION PHASE*

CONSTRUCTION ACTIVITY/PHASE	APPROXIMATE DURATION
Kenter Canyon Terminal Tower Connection	3 months
Underground Cable and Vault Installation	18 months
Marine Cable Installation: Directional Drilling	3 to 4 months
Marine Cable Installation: Marine Plowing	2 weeks
Electrode Array Installation	9 months
Abandonment/Recovery of Existing Underground Facilities	5 weeks
Abandonment/Recovery of Existing Marine Facilities	1 week

*Construction would occur over about a two year period with construction activities occurring simultaneously; therefore, the above durations are not additive.

Construction Equipment

The type of equipment used for Project construction is summarized in Table 2-4.

TABLE 2-4 EQUIPMENT REQUIRED FOR CONSTRUCTION ACTIVITIES

EQUIPMENT	KENTER CANYON TERMINAL TOWER	UNDERGROUND CABLE AND VAULT INSTALLATION	MARINE CABLE INSTALLATION	ELECTRODE ARRAY INSTALLATION
Back Hoe, with Bucket	x	x		
Trencher/Plow			x	x
Crane, Hydraulic, 200 Ton		x	x	x
Compactor	x	x		
Motor, Auxiliary Power, Generator	x	x	x	x
Reel Carrier	x	x	x	
Trailer, Flatbed, 40 feet	x	x		
Trailer, lowboy	x	x		
Trailer, Storage, 40 feet	x	x		
Truck, Crew Cab Flatbed, 1 Ton	x	x		
Truck, Dump, 10 Ton	x	x		
Truck, Pick-up	x	x		
Truck, Semi, Tractor	x	x		
Winch, Hydraulic	x	x	x	x
Vessels, cranes			x	x
Feeding Barge			x	x
Laying Barge			x	x
Directional Drill			x	
Hydraulic Jack and Bore Machine		x		

2.4.4 Project Operation and Maintenance

Once the installation of the new components for the SGRS is completed, the system would have a rated duty cycle of up to 50 hours of operation annually. However, based on past operations, the SGRS is projected to actually operate for approximately 20 hours per year. To establish conservative parameters by which to determine the strength of the electric field that would be generated by the SGRS, the system was modeled to operate at a maximum of 3,650 amps. However, the system would actually operate at a maximum of 3,100 amps. Even at the higher amperage, the electric field would be essentially contained by the insulation surrounding the underground cables. (For a discussion regarding the electric field generation at the offshore electrode array, see Section 3.7, Marine Resources, of the Draft EIR.) The cycle for a maximum single event would consist of the system operating at 3,100 amps for approximately 30 minutes, ramping down from 3,100 amps for 10 minutes to 2,000 amps, and sustaining 2,000 amps for 120 minutes, for a total operational time of 160 minutes per event. During these relatively brief operational cycles, a maximum magnetic field of about four gauss (G) would be present at the road surface directly above the cables during the peak level of the cycle (3,100 amps). When the system was operating at the lowest level of the cycle (2,000 amps), a magnetic field of about 2.6 G would be present at the road surface. Since the electrode would typically operate for approximately 20 hours per year in discrete events of about 2.5 hours in duration, during the vast majority of the time, there would be no magnetic field present because no current would be flowing in the line. Because the electric current in the DC electrode would flow in one direction, the magnetic field would be static; that is, it would have no frequency oscillation, unlike the extremely low frequency magnetic fields created by alternating current (AC) electrical lines, which have a frequency oscillation of 60 times per second. There are no known harmful effects related to static magnetic fields except primarily temporary effects noted in occupational environments involving field strengths substantially greater than that which would be generated by the SGRS. To avoid effects related to vertigo and nausea, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) has recommended a limit of 2,000 G time-weighted average per working day for occupational exposures, with a maximum occupational exposure of 20,000 G. For the general public, a continuous exposure limit of 400 G has been established by the ICNIRP.

Inspection of the SGRS is critical for the operation of the PDCI. Routine maintenance and testing of the SGRS would continue to be performed to ensure the system operates normally. Early identification of items needing maintenance, repair, or replacement would ensure reliable operation of the ground return system. The SGRS is tested periodically, typically once per year, to determine cable insulation integrity. The submarine cables are tested monthly by measuring the loop resistance of the conductors. Inspection, testing and maintenance activities may require the occasional brief closure of a single roadway lane for the duration of the activity.

2.4.5 Best Management Practices

For the purposes of this Draft EIR, the Best Management Practices (BMPs) listed in Table 2-5 below would be implemented during Project construction to help reduce potential environmental impacts associated with the proposed Project. The BMPs identified in this Draft EIR are inherently part of the proposed Project and are not additional mitigation measures proposed as a result of the significance findings from the California Environmental Quality Act (CEQA) environmental review process. An exhaustive list of BMPs is not provided in this EIR; only those BMPs referenced in this Draft EIR analysis are identified.

TABLE 2-5 BEST MANAGEMENT PRACTICES

BMP	DESCRIPTION
BMP-1	Stormwater Pollution Prevention Plan In compliance with requirements of the National Pollutant Discharge Elimination System (NPDES) permit, a Stormwater Pollution Prevention Plan (SWPPP) would be developed and prepared for the Project to ensure that protection of water quality and soil resources is consistent with County and State regulations. The plan would identify site surface water runoff patterns and include measures that prevent excessive and unnatural soil deposition and erosion throughout and downslope of the Project site and Project-related construction areas, and would also include measures for non-stormwater discharge and waste management. The SWPPP would cover all activities associated with the construction of the Project, including clearing, grading, and other ground disturbance such as stockpiling or excavation erosion control. The plan would prevent off-site migration of contaminated stormwater, changes in pre-Project storm hydrographs, or increased soil erosion.
BMP-2	Fugitive Dust Control Plan Construction of the project would be subject to the South Coast Air Quality Management District's (SCAQMD) Rule 403, Fugitive Dust. In compliance with this rule, a dust control supervisor shall be identified for the project and shall supervise implementation of the SCAQMD-approved dust control plan. The plan will itemize measures related to vehicle trackout, stabilizing soils, water application, and maintenance of soil moisture content.
BMP-3	Hazardous Materials As required by the Clean Air Act, Section 401 of the Clean Water Act, the Toxic Substance Control Act, and the Hazardous Materials Transportation Act, all vehicles and equipment must be in proper working condition to ensure that there is no potential for fugitive emissions or accidental release of motor oil, fuel, antifreeze, hydraulic fluid, grease, or other hazardous materials. Equipment must be checked for leaks prior to operation and repaired as necessary. Refueling of equipment must take place on existing paved roads, where possible, and not within or adjacent to drainages. Hazardous spills must be cleaned up immediately. Contaminated soil would be disposed of at an approved off-site landfill, and spills reported to the permitting agencies. Service/maintenance vehicles should carry appropriate equipment and materials to isolate and remediate leaks or spills, and an on-site spill containment kit for fueling, maintenance, and construction will be available.

BMP	DESCRIPTION
BMP-4	Marine Location Markings Mark the position of the electrode array using surface buoys and notify the U.S. Coast Guard and other responsible entities of the position and as-built characteristics of the electrode array and any other related infrastructure that could entangle fishing gear.
BMP-5	Human Remains In accordance with Section 7050.5 of the California Health and Safety Code, if human remains are found, the County Coroner shall be notified within 24 hours of the discovery. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined, within two working days of notification of the discovery, the appropriate treatment and disposition of the human remains. If the County Coroner determines that the remains are or believed to be Native American, s/he shall notify the Native American Heritage Commission (NAHC) in Sacramento within 48 hours. In accordance with California Public Resources Code, Section 5097.98, the NAHC must immediately notify those persons it believes to be the most likely descended from the deceased Native American. The descendents shall complete their inspection within 48 hours of being granted access to the site. The designated Native American representative would then determine, in consultation with the property owner, the disposition of the human remains.
BMP-6	Archaeological Resources Should archaeological resources be found during ground disturbing activities for the project, all grading activities shall cease in the immediate area of the discovered resource. A project archaeologist shall be retained to first determine whether an archaeological resource uncovered during construction is a “unique archaeological resource” pursuant to Section 21083.2(g) of the Public Resources Code (PRC) or a “historical resource” pursuant to Section 15064.5(a) of the CEQA Guidelines (CCR, Title 14). If the archaeological resource is determined to be a “unique archaeological resource” or a “historical resource,” the archaeologist shall recommend disposition of the site and formulate a mitigation plan in consultation with LADWP that satisfies the requirements of Section 21083.2 of the PRC and Section 15064.5 of the CEQA Guidelines. If the archaeologist determines that the archaeological resource is not a “unique archaeological resource” or “historical resource,” the site will be recorded and the site form submitted to the California Historic Resources Information System (CHRIS) at the South Central Coastal Information Center (SCCIC). The archaeologist shall prepare a report of the results of any study prepared as part of a testing or mitigation plan, following accepted professional practice and guidelines of the California Office of Historic Preservation. Copies of the report shall be submitted by LADWP to the CHRIS at the SCCIC.
BMP-7	Near Beach Parking Construction activities on West Channel Road will be avoided, if feasible, during the months of June, July and August to avoid temporary removal of near beach parking during the summer season.
BMP-8	Traffic Control Plan Prior to construction, construction traffic control plans will be prepared for review and approval by the LADOT and the City of Santa Monica. The plan will include, at a minimum, signage within the proposed Project corridor in advance of the start of construction, warning of potential delays once construction starts. The plan should include signage to alert motorists to temporary or limited access points to adjacent properties; appropriate barricades for road closures; construction speed limit signage along the haul route; and parking restrictions during construction. LADWP shall notify neighborhoods surrounding the construction in advance of the location and dates of construction hours and activities.
BMP-9	Detour Plan Detour plans will be developed, including identification of wayfinding signage locations, to encourage traffic diversions for through traffic to multiple parallel routes to San Vicente Boulevard.
BMP-10	Traffic Specifications Traffic will be controlled during construction by adhering to the guidelines contained in Standard Specifications for Public Works Construction and Caltrans’ Traffic Manual, Chapter 5, “Manual of Traffic Controls for Construction and Maintenance Work Zones” and applicable city requirements.
BMP-11	Avoid Sensitive Marine Habitats Perform a pre-construction survey of the proposed Project alignment to confirm baseline conditions and ensure that electrode array placement and cable routing avoids Habitat Areas of Particular Concern (HAPC), such as kelp forests and rocky reefs.

<table>
<tr><th>BMP</th><th>DESCRIPTION</th></tr>
<tr><td>BMP-12</td><td>Minimize Disturbance to Benthic Habitat
Use cable installation methodologies that minimize disturbance and permanent habitat alteration of benthic habitat, to the extent practicable, including:
Perform tunneling from the shoreline to 1,000 feet offshore to install cables in order to limit disturbance of the intertidal zone and rocky reefs in the near-shore environment.
Use jet plowing or mechanical plowing to install the cables extending from 1,000 feet offshore to the electrode array to allow for a rapid restoration of soft bottom habitat.
Bury cables to a depth of 5 feet, to the extent practicable, to limit potential for biological interaction during burrowing and foraging.</td></tr>
<tr><td>BMP-13</td><td>Minimize Generation of Electric Fields and Limit Production of Chlorine Gas
Incorporate Project design elements and operating procedures that minimize the generation of electric fields so that field strengths are less than 1.25 V/m. Use electrode materials and design elements that limit the production of chlorine gas to the extent practicable.</td></tr>
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