2 PROJECT DESCRIPTION

2.1 INTRODUCTION

This section of the Environmental Impact Report (EIR) describes SDG&E's Sycamore-Peñasquitos 230-kV Transmission Line Project (Proposed Project) in detail.

2.1.1 Project Overview

The Proposed Project involves construction of a new 230-kV transmission line between the existing Sycamore Canyon Substation and the existing Peñasquitos Substation. The Proposed Project would be located in the cities of San Diego, Poway and Carlsbad, and partially on Marine Corps Air Station (MCAS) Miramar (Figure 2.1-1). The Proposed Project consists of four transmission segments as well as modifications to existing substations, as shown in Figure 2.1-2:

- **Segment A:** Proposed construction of 8.31 miles of new 230-kV transmission line on new tubular steel poles (TSPs) replacing existing wood H-frame structures between Sycamore Canyon Substation and Carmel Valley Road.
- **Segment B:** Proposed construction of 2.84 miles of new 230-kV transmission line underground in Carmel Valley Road (including one riser/cable pole structure on each end), from Black Mountain Ranch Community Park, approximately at the intersection of Carmel Valley Road with Black Mountain Park Way, to about 250 feet east of the intersection of Carmel Valley Road with Via Abertura.
- **Segment C:** Proposed installation of 2.19 miles of new 230-kV conductor on existing transmission structures and one new TSP from about 250 feet east of the intersection of Carmel Valley Road with Via Abertura to Peñasquitos Junction.
- **Segment D:** Proposed installation of 3.34 miles of new 230-kV conductor on existing double-circuit steel lattice towers from Peñasquitos Junction to the Peñasquitos Substation and replace existing 69-kV wood H-frame structures with TSPs.
- **Substation Modifications:** Proposed minor modifications to the Sycamore Canyon, Peñasquitos, Chicarita, San Luis Rey, and Mission Substations.
- **Encina Hub Modifications:** Proposed power line rearrangement at Encina Hub to create an open position for the proposed 230-kV power line in Segment C.
- **Mission-San Luis Rey Phase Transposition**: Proposed change in existing 230-kV line phases between the Mission Substation and Peñasquitos Junction (southern end of Segment C) to accommodate the bundling of Mission - San Luis Rey power lines in Segment C.

Figure 2.1-1: Project Location

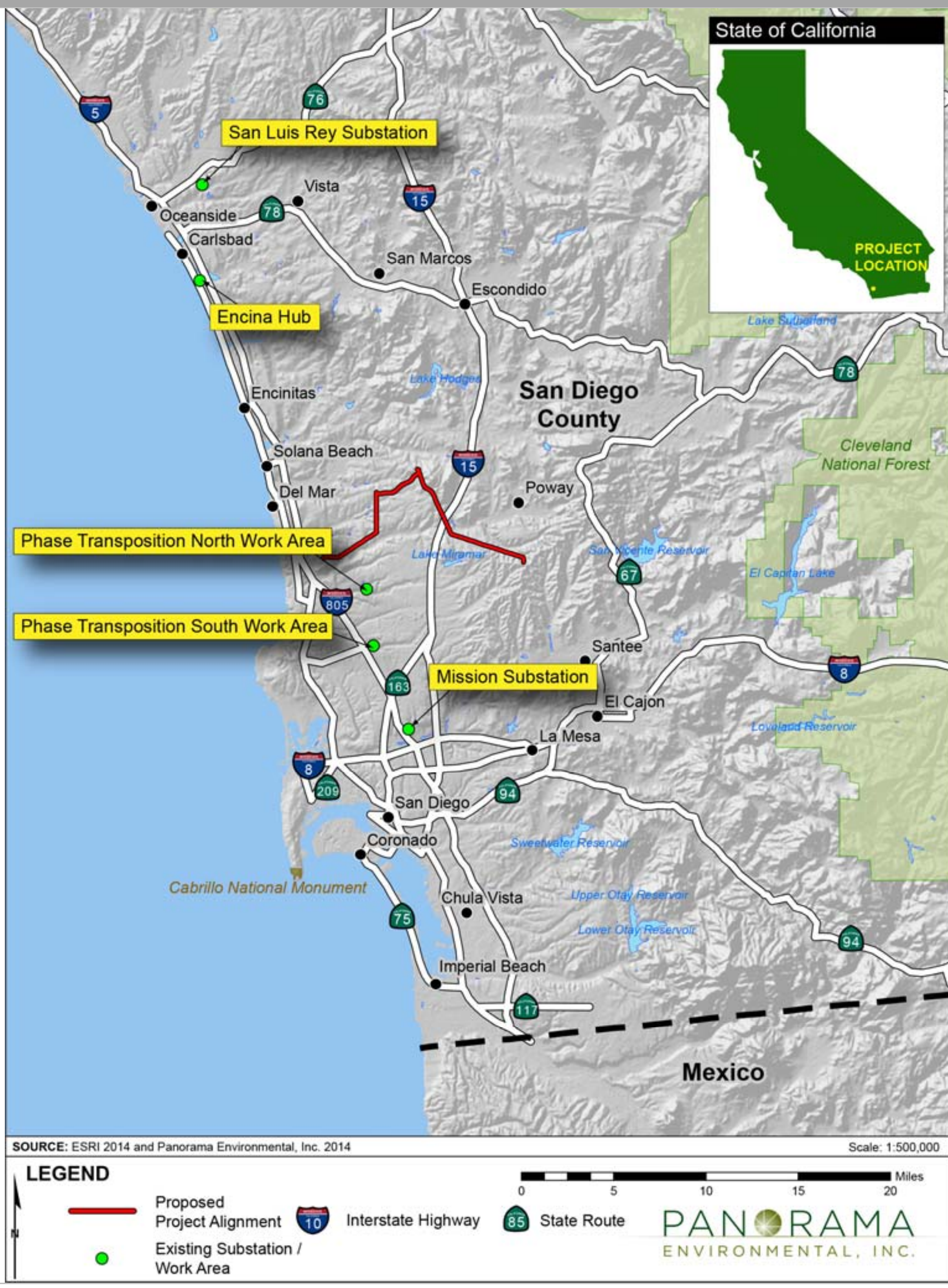
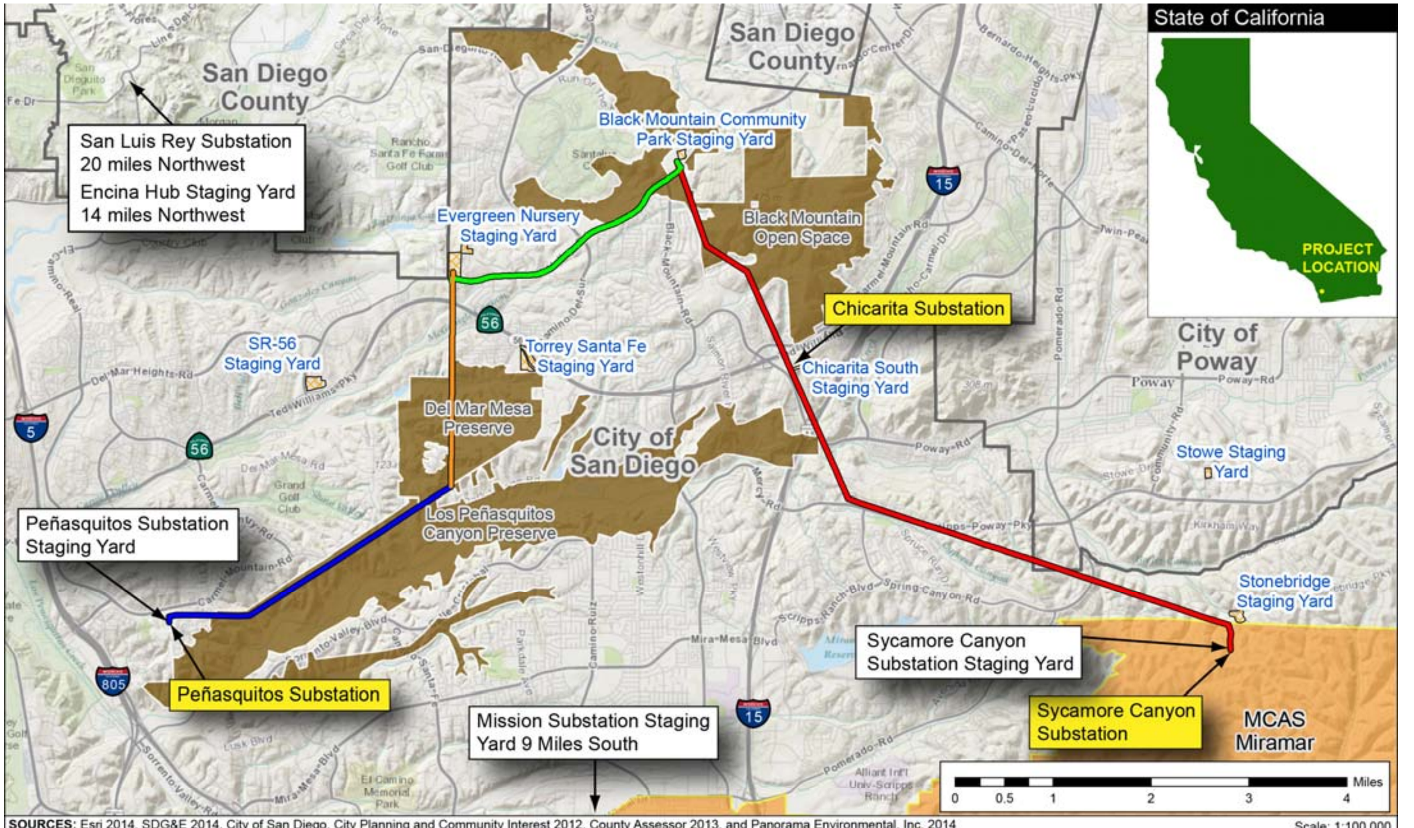


Figure 2.1-2: Project Alignment Overview



SOURCES: Esri 2014, SDG&E 2014, City of San Diego, City Planning and Community Interest 2012, County Assessor 2013, and Panorama Environmental, Inc. 2014

Scale: 1:100,000

LEGEND

- Segment A - New 230 kV Overhead - New Poles and Conductor - 8.31 Miles
- Segment B - New 230 kV Underground - New Duct and Cable - 2.84 Miles
- Segment C - New 230 kV Overhead - New Conductor on Mostly Existing Structures - 2.19 Miles
- Segment D - New 230 kV Overhead - New Poles and New Conductor on Existing Structures - 3.34 Miles
- Staging Yard
- Open Space Preserve
- MCAS Miramar
- City Boundary

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2.1.2 SDG&E Project Objectives

The Proposed Project is needed to meet state environmental and energy policy goals, and to ensure the bulk power system is in compliance with applicable North American Electric Reliability Corporation (NERC), Western Electric Coordinating Council (WECC) and California Independent System Operator (CAISO) transmission planning criteria.

The objectives of the Proposed Project were defined by the Project Applicant. SDG&E's objectives are to:

1. Meet the CAISO 2012–2013 Transmission Plan Functional Specifications for a new 230-kV transmission line between the Sycamore Canyon Substation and Peñasquitos Substation by:
   a. Ensuring the SDG&E bulk electric system continues to meet NERC, WECC, and CAISO reliability criteria
   b. Promoting compliance with State of California policy goals related to renewable integration and Once-Through Cooling retirement
   c. Economically and reliably meeting the San Diego metropolitan area's forecasted load growth
   d. Delivering energy more efficiently to the load center in San Diego
2. Locate the proposed facilities in existing transmission and power line corridors, SDG&E right-of-way (ROW), SDG&E-owned property, and San Diego franchise ROWs.

2.2 PROJECT LOCATION, REGIONAL CONTEXT, AND ELECTRICAL SYSTEM

2.2.1 Project Location and Regional Context

The Proposed Project would be located in the west-central area of San Diego County, in the cities of San Diego, Poway and Carlsbad, and partially on MCAS Miramar (Figures 2.1-1 and 2.1-2). Topography in the project area varies from rolling hills to flat terrain, with the western part of the project located on gentle sloping mesas interrupted by canyons and valleys. The project area (all segments) includes residential, commercial, and open space or undeveloped areas.

2.2.2 Existing Electrical Infrastructure in the Area

There is existing electrical infrastructure in corridors for Segments A, C, and D:

- **Segment A:** The Segment A corridor currently contains three existing lines located on two sets of overhead structures. There is one 138-kV power line located on one 100-foot tall steel cable pole, two 90-foot tall TSPs, three wood monopoles that have an average height of 73.5 feet, and 45 H-frame wood/steel poles that have an average height of 67 feet. There is one existing 230-kV transmission line, one existing 69-kV power line and a shield wire on a mix of 16 steel lattice towers and 26 TSPs that have an average height of 128 feet.

- **Segment C:** The Segment C corridor currently contains three existing lines (two transmission lines and one power line) and one shield wire located on two sets of structures. There is an existing 138-kV line on 20 H-frame wood/steel poles that have an average height of 56.5 feet. There are two existing 230-kV lines on 12 existing steel lattice towers that have an average height of 127.5 feet. The shield wire is on the top of the steel lattice towers.
- **Segment D:** The Segment D corridor currently contains three existing power lines and one shield wire located on two sets of structures. There is an existing 69-kV line on six wood monopoles that have an average height of 60.3 feet, 15 H-frame wood poles that have an average height of 70.3 feet, and two wood cable poles that have an average height of 62.8 feet. There is an existing 138-kV line and an existing 69-kV line on 15 steel lattice towers and one TSP that have an average height of 124 feet. The shield wire is on the top of the steel lattice towers.

The Segment B corridor currently does not contain electrical transmission infrastructure.

2.2.3 Electrical System and Loading

There are three major energy gateways in SDG&E's bulk electric transmission system that serves electricity customer load in the San Diego metropolitan area:

1. Miguel 500/230-kV Substation
2. Sycamore Canyon 230-kV Substation
3. Path 44
    a. Three 230-kV lines from the San Onofre Nuclear Generating Station (SONGS) Switchyard to the San Luis Rey Substation
    b. Two 230-kV lines from the SONGS Switchyard to the Talega Substation

According to SDG&E, their ability to operate a bulk electric transmission system reliably and efficiently has become constrained, particularly at gateway substations. In times of high electricity demand and high energy imports, including periods of high renewable energy generation in the Imperial Valley, imported energy flows toward San Diego on the 500-kV Southwest Powerlink transmission line to the Miguel Substation and on the Sunrise Powerlink transmission line into the Sycamore Canyon Substation. These heavy electricity flows into the Miguel and Sycamore Canyon Substations can result in congestion and violation of NERC reliability criteria in the downstream transmission and power lines. SDG&E, in such a situation, dispatches generated energy less efficiently, which increases costs to ratepayers.

Reliability has been further compromised because of the early SONGS retirement and the projected eventual retirement of the coastal once-through cooling generation units in San Diego and Los Angeles.

SDG&E has further indicated that these system constraints are projected to worsen over time. As the San Diego metropolitan area load continues to increase, the imports into Miguel and Sycamore Canyon Substations will also increase. The California Energy Commission (CEC) has forecasted that the 1-in-10 peak customer load served by SDG&E will increase by 390 megawatts (MW) from 2013 to 2017, for a peak 2017 load of 5510 MW. In addition, significant renewable generation is expected to be developed in the Southwestern United States, which will further increase flows on the Sunrise Powerlink and into Sycamore Canyon Substation.

The Governor of California assembled a task force in summer 2013 to determine how to address reliability issues stemming from retirement of SONGS and once-through cooling generation sources. The task force included CPUC, California Energy Commission (CEC), and CAISO staff. They created a Preliminary Reliability Plan for the Los Angeles Basin and San Diego. The task force identified the Proposed Project as necessary mitigation in Section 2 of the plan:

> Sycamore Canyon – Peñasquitos Transmission Line – To address local transmission overloads in the northern region of San Diego system, some of which are exacerbated by the absence of San Onofre, the [CA]ISO-approved a new 230 kV transmission line from the Sycamore Canyon to Peñasquitos Substations to improve power flows from east to west. The online date is targeted to 2017, although permitting and construction risk may delay the final operating date. There are multiple applicants seeking to build this line. As the CPUC is the lead siting agency for all of the applicants seeking to build this line, the CPUC is responsible for selecting the project sponsor to build the line. To meet the 2017 in-service date, the selected sponsor will need to be determined in early 2014 and file for a CPCN with the CPUC in mid-2014. The CPUC should process and approve the application by mid-2015.

Subsequent to the release of the Governor's task force report, CAISO became responsible for selecting the project sponsor to build the line. CAISO also identified the Proposed Project as assumed to be in service by 2017 in its 2013–14 Transmission Plan.

As part of the policy process, the CAISO issued a Functional Specification for the Project that stated the need for a transmission line with an emergency rating of 1175 megavolt-amperes (MVA). The purpose of the Proposed Project is to meet this capacity need by providing an additional 230 kV high-voltage outlet at Sycamore Canyon Substation. Installing this outlet would allow the delivery of power directly to the coastal load center rather than forcing it onto the 138 kV and 69 kV networks. As a result, the Project would relieve congestion on these lower-voltage facilities.

2.3 PROPOSED PROJECT COMPONENTS

The Proposed Project is composed of four electric transmission segments, modifications at five existing substations, and minor modifications to existing transmission line facilities. This section describes project components for each of the segments and substations. A summary of each component is provided in Table 2.3-1. Figure 2.1-2 provides an overview of the Proposed Project. Appendix A contains detailed route maps. Construction and operation and maintenance activities are described in Sections 2.4 and 2.5, respectively.

2.3.1 Right-of-Way Requirements

All of the Proposed Project transmission alignment would be located within SDG&E easements and franchise agreement rights. Easement widths within the Proposed Project segments are 200 feet in Segment A, 100 feet in Segment C, and 300 feet in Segment D. Franchise agreement rights in Segment B would accommodate a 16-foot wide construction corridor with a 30-foot wide corridor at vault locations.

Table 2.3-1: Summary of Proposed Project Components by Location

Component	Description
Segment A (Sycamore Canyon Substation to Carmel Valley Road)	• **New 230-kV Overhead Transmission and Communication Lines.** SDG&E would construct an approximately 8.31-mile-long, 230-kV transmission line on 37 new double-circuit 230-kV and two 138-kV TSPs) replacing existing wood H-frame structures (121-foot and 75-foot average heights, respectively) from the Sycamore Canyon Substation to Carmel Valley Road. Optical ground wire (OPGW) would be installed along the top of the new structures and would function as a communication cable and new shield wire. • **Relocation of Existing Transmission Lines and Underground Connections.** One existing 138-kV power line would be reconductored and relocated to the new TSPs between the Sycamore Canyon Substation and the northern terminus of Segment A. Approximately 42 wood/steel H-frame structures, two TSPs, one double-circuit cable pole, and two single-circuit wood monopoles associated with the existing power line would be removed. A portion of the relocated 138-kV power line would be undergrounded as it enters the Sycamore Canyon Substation. An existing 230-kV transmission line (TL 23041) would be relocated to two new 230-kV structures within and immediately adjacent to the Sycamore Canyon Substation to make room for the new 230-kV connection at the substation. One single-circuit 138-kV steel H-frame structure would also be replaced. ➢ **Result:** One new overhead 230-kV transmission line segment would be constructed on new TSPs from the Sycamore Canyon Substation to Carmel Valley Road. Two existing lines would be transferred to the new TSPs; the existing structures for these lines would be removed or topped. Replaces 48 existing structures with 42 new structures. In addition, seven existing structures would be topped where distribution underbuild exists.
Segment B (Carmel Valley Road)	• **New 230-kV Underground Transmission and Communications Line.** SDG&E would construct an approximately 2.84-mile-long, 230-kV underground transmission line in Carmel Valley Road. One cable pole structure (163-foot average height) for underground/overhead transmission conversion would be placed at each end of the undergrounded segment (two total). One double-circuit steel lattice tower would be removed at the western reach of the segment. Fiber optic cable would be installed with the underground transmission line. ➢ **Result:** One new underground 230-kV transmission line segment would be constructed under a 2.84-mile-long portion of Carmel Valley Road between the northern ends of Segment A and Segment C. A new cable pole would be added at each end of the underground Segment and one existing steel lattice tower would be removed.
Segment C (Carmel Valley Road to Peñasquitos Junction)	• **New 230-kV Overhead Transmission Line**. SDG&E would install approximately 2.19 miles of 230-kV conductor on existing steel lattice structures and one new TSP between Carmel Valley Road and Peñasquitos Junction. One steel lattice tower would be removed at Peñasquitos Junction.

Table 2.3-1: Summary of Proposed Project Components by Location

Component	Description
	• **Consolidation of Existing Overhead Transmission Lines and Replacement of Communication Line.** Two existing 230-kV transmission lines (TL 23001 and TL 23004) would be reconductored and bundled into one circuit on the existing structures. Existing shield wire on top of existing 230-kV steel lattice towers would be replaced with new OPGW. ➢ **Result:** Two existing overhead 230-kV transmission lines located on the same existing structures would be reconductored and bundled into one circuit, creating an open position for the new 230-kV transmission line that would be constructed between Carmel Valley Road and Peñasquitos Junction.
Segment D (Peñasquitos Junction to Peñasquitos Substation)	• **New 230-kV Overhead Transmission Line**. SDG&E would install approximately 3.34 miles of 230-kV conductor on existing double-circuit lattice towers and one TSP between Peñasquitos Junction and the Peñasquitos Substation. • **Consolidation of Existing Overhead Power Lines and Replacement of Communication Line.** SDG&E would also reconductor and consolidate two existing 69-kV power lines onto 17 new 69-kV TSPs (97-foot average height) that would replace 15 existing 69-kV wood H-frame structures and five wood monopoles. Two TSPs would replace two existing wood cable poles outside the Peñasquitos Substation. Existing shield wire on top of existing 230-kV steel lattice towers would be replaced with new OPGW. ➢ **Result:** One new 230-kV transmission line would be installed on existing structures between Peñasquitos Junction and the Peñasquitos Substation. Two parallel existing 69-kV power lines would be consolidated and installed on new TSPs adjacent to their existing location and the existing structures would be removed. Replaces 23 existing wood structures with 19 new steel structures.
Substation Modifications	• **Sycamore Canyon Substation**. SDG&E would modify Sycamore Canyon Substation to facilitate the new 230-kV transmission line connection. Modifications would include transferring five existing transmission lines from existing bay positions to new bay positions, and adding one new circuit breaker and two disconnects. • **Peñasquitos Substation**. SDG&E would modify Peñasquitos Substation to facilitate the new 230-kV transmission line connection. Modifications would include adding two circuit breakers and four disconnects. • **Chicarita, San Luis Rey, and Mission Substations**. Minor alterations may be made to these substations, including adjusting relays, and upgrading protection on remaining lines. ➢ **Result:** The substations would be configured to accept the new 230-kV transmission line connection.
Encina Hub Modifications	• **Reconfigure 230-kV power lines at Encina Hub.** SDG&E would~~ill~~ remove an existing San Luis Rey – Mission 230-kV transmission line from service to create an open position for the proposed 230-kV power line in Segment C. The Encina Hub reconfiguration would relocate the remaining portion of the San Luis Rey - Mission 230-kV power line and another 230-kV power line. ➢ **Result:** The transmission lines would be reconfigured to maintain the current number of 230-kV outlets at San Luis Rey Substation.
Mission-San Luis Rey 230-kV Phase Transposition	• **Transposition of 230-kV transmission line phasing between the Mission Substation and Peñasquitos Junction (south end of Segment C)**. Transpositioning of existing 230-kV line phases between the Mission Substation and the Peñasquitos Junction to accommodate the bundling of Mission - San

Table 2.3-1: Summary of Proposed Project Components by Location	
Component	**Description**
	Luis Rey transmission lines in Segment C. **Result:** The phase transpositioning is required to accommodate the existing substation phasing.

All access would be via SDG&E easements and franchise rights, including SDG&E's existing easement in MCAS Miramar. SDG&E would also utilize a number of additional sites for construction staging (described below in *Section 2.4.2 - Temporary Work Areas*).

2.3.2 New Components

Transmission and Power Poles

Approximately 64 new poles would be installed across the entire project alignment. Poles would be TSPs, H-Frame or cable poles fabricated of dulled galvanized steel. Table 2.3-2 contains average dimensions of new poles. Approximate pole heights and details for each pole that is being removed and each pole that is being installed are provided in Appendix B. Figures 2.3-1a through 2.3-1e present diagrams of pole structures that would be used for the Proposed Project. TSPs would be used for aboveground transmission support. Cable poles would be used where electric utility lines transition from overhead to underground.

Foundations

Two types of foundations (concrete pier or micropile) may be used for the TSPs and cable poles. Representative photographs of these foundations are provided in Figure 2.3-2.

Concrete Pier Foundation

Concrete pier foundations would be used in most instances. This foundation type would be 20 to 40 feet deep, but potentially deeper if needed due to soil conditions. Unstable soil may require use of steel casings to stabilize the excavated hole, which would be from 6 to 11 feet in diameter. The foundations would extend about 1 to 2 feet above the ground surface.

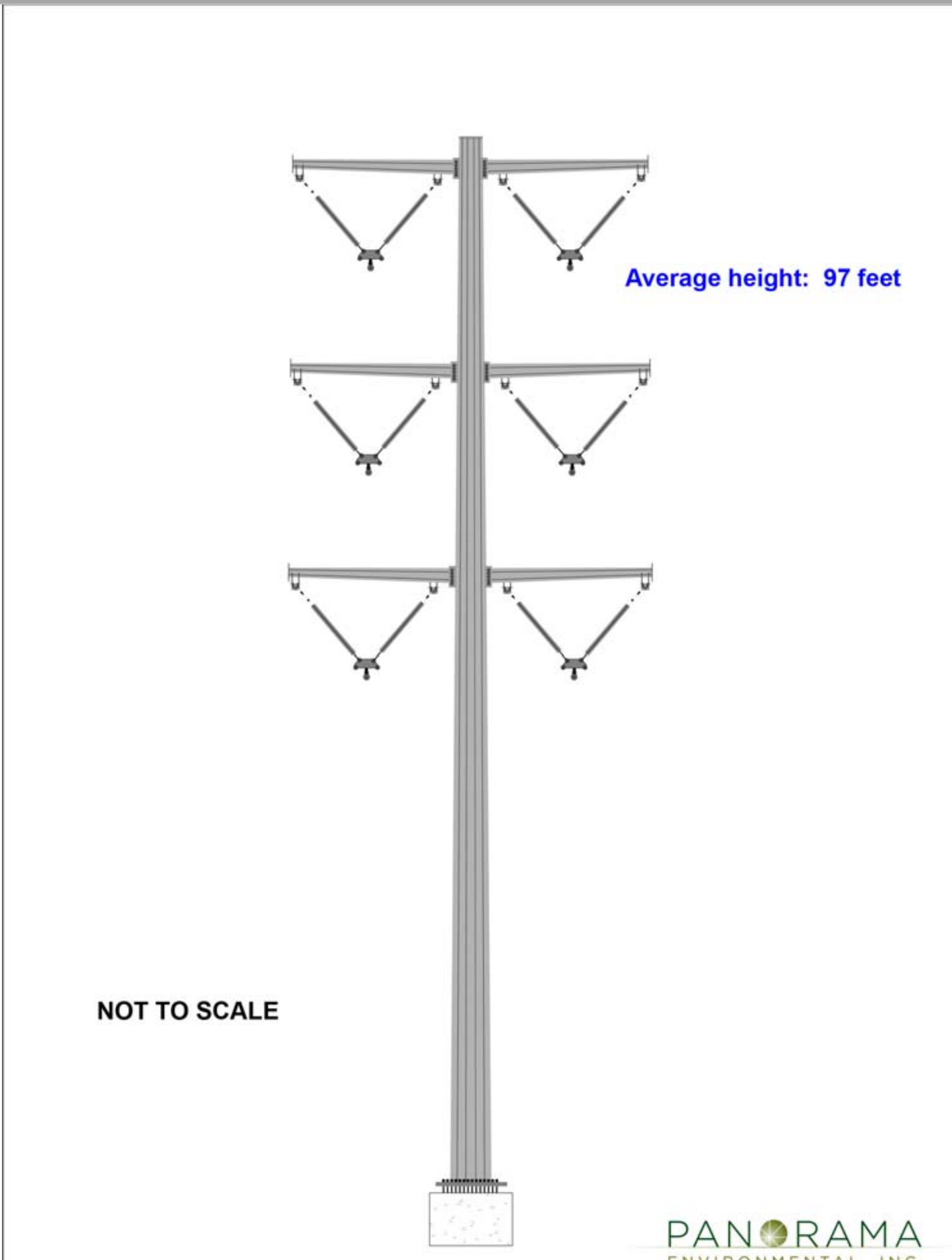
Concrete Micropile Foundation

Micropile foundations would be used where the substrate is rocky and excavation would be difficult or would require blasting or rock breakers. Micropile foundations would also be used where access is limited, such that concrete pier foundations cannot be constructed due to space constraints. Micropile foundations consist of several small-diameter, drilled, grouted, and reinforced foundations that are arranged in a circular pattern. Micropiles would be approximately 6 to 8 inches in diameter and 10 to 40 feet deep. Each foundation would have 4 to 16 micropiles in a circle that would be 4 to 10 feet in diameter.

Table 2.3-2: Pole Characteristics				
Pole Type	Average Height (feet)	Quantity	Pole Diameter (feet)	
			Base	Top
230-kV TSP	123	39	5 to 6	2 to 3
230-kV Steel Cable Pole	163	2	6 to 8	2 to 3
138-kV TSP	75	2	4 to 5	2
138-kV Steel Cable Pole	161	1	5 to 6	2 to 3
138-kV H-Frame	65	1	4-5	2
69-kV TSP	97	17	3 to 4	1.5
69-kV Steel Cable Pole	70	2	3 to 5	1.5

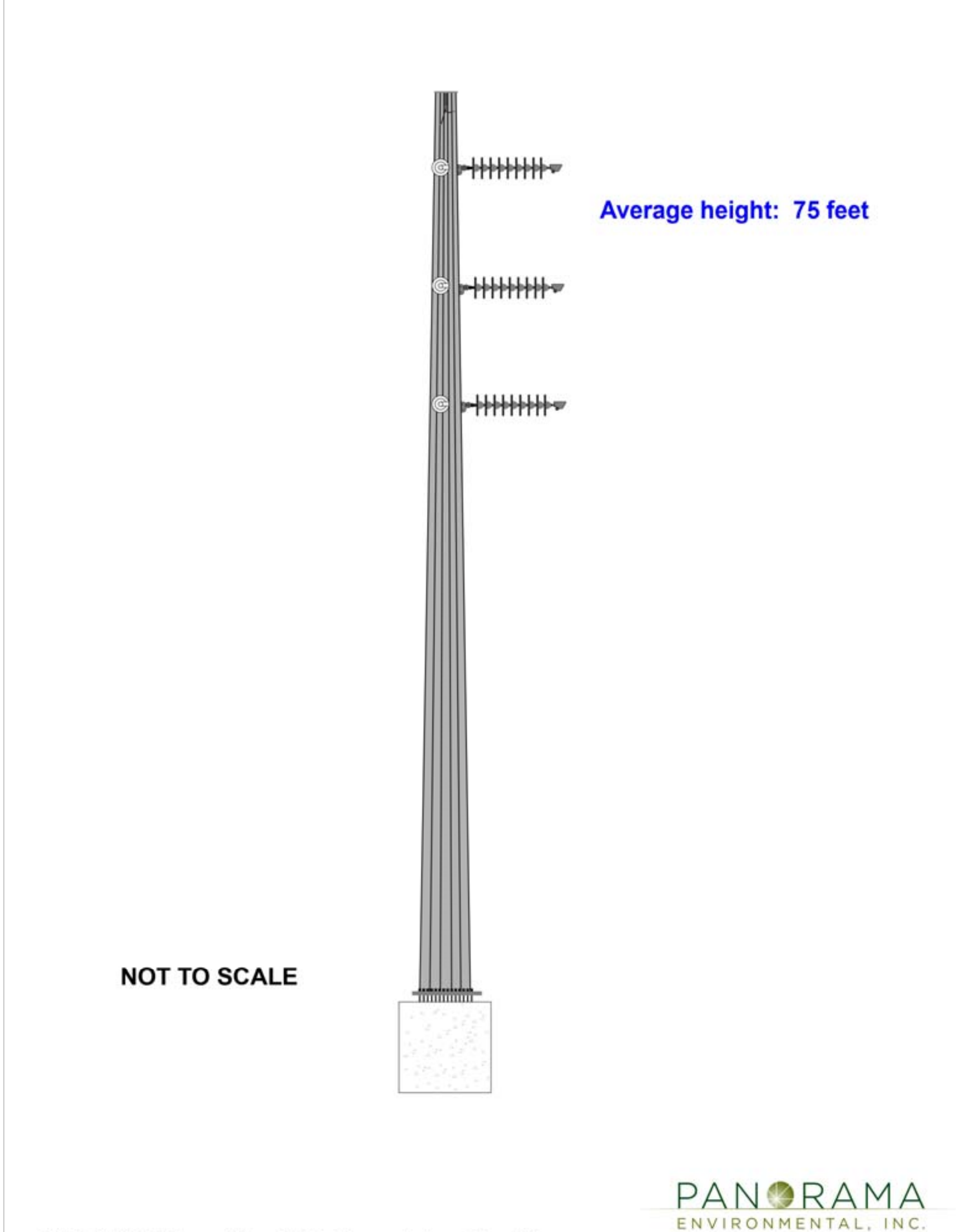
Comment [sh1]: **Data Need:** Provide typical detail for a 138-kV H-Frame structure similar to the diagrams provided in 2.3-1 below.

Figure 2.3-1a: Diagram of Proposed 69-kV TSP



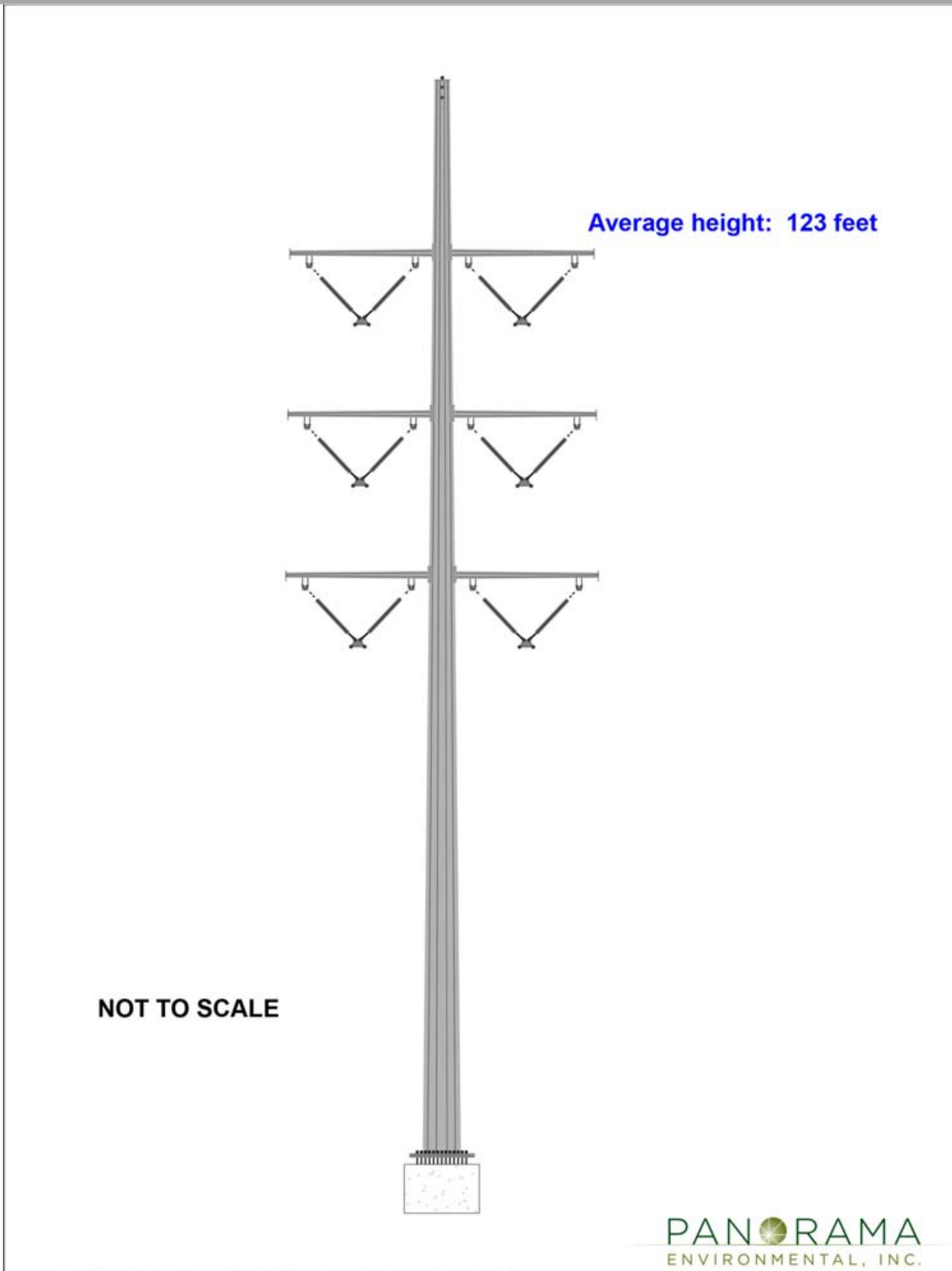
SOURCE: SDG&E 2014, Burns and McDonnell 2014, and Panorama Environmental, Inc. 2014

Figure 2.3-1b: Diagram of Proposed 138-kV TSP



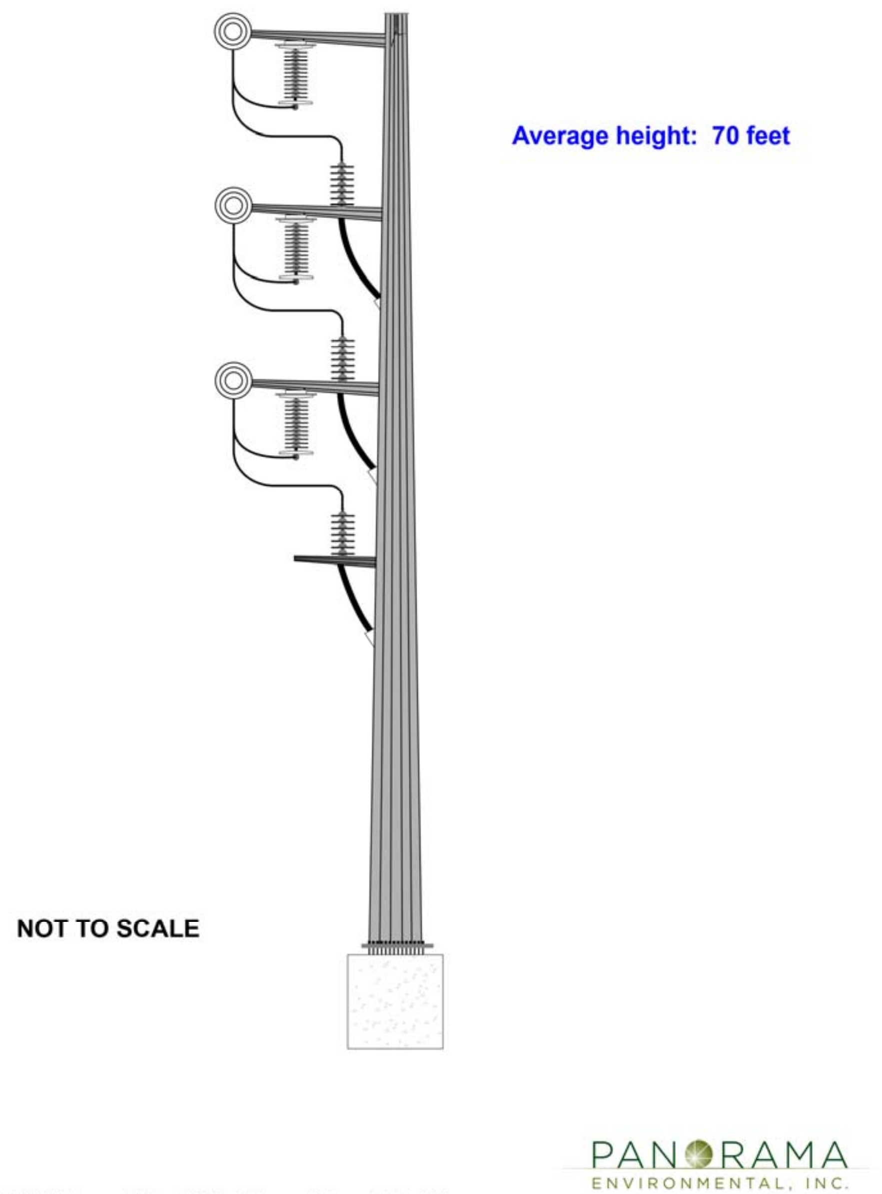
SOURCE: SDG&E 2014, Burns and McDonnell 2014, and Panorama Environmental, Inc. 2014

Figure 2.3-1c: Diagram of Proposed 230-kV Tangent Double-Circuit TSP



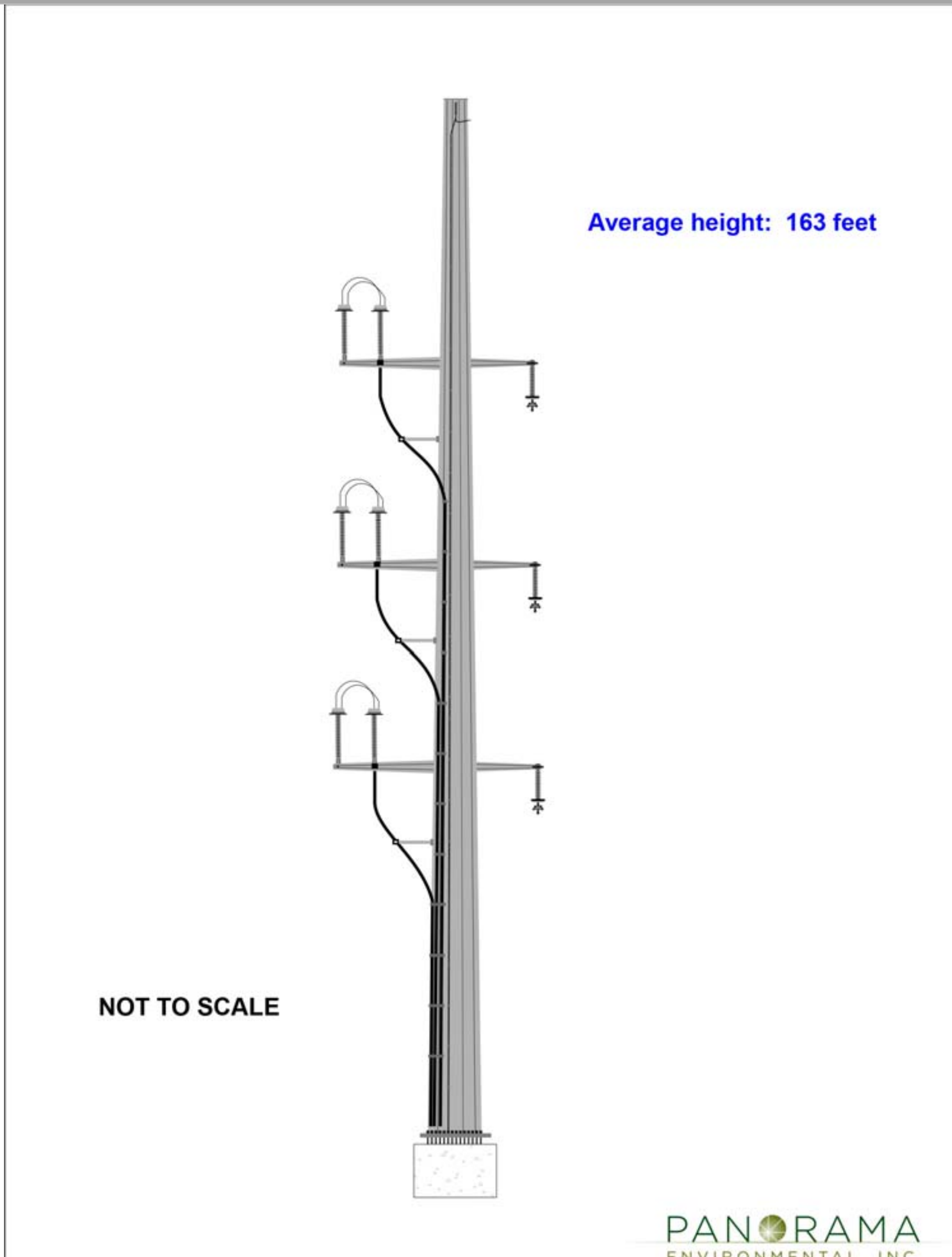
SOURCE: SDG&E 2014, Burns and McDonnell 2014, and Panorama Environmental, Inc. 2014

Figure 2.3-1d: Diagram of Proposed 69-kV Single-circuit Cable Pole



SOURCE: SDG&E 2014, Burns and McDonnell 2014, and Panorama Environmental, Inc. 2014

Figure 2.3-1e: Diagram of Proposed 230-kV Underground Double-Circuit Cable Pole



SOURCE: SDG&E 2014, Burns and McDonnell 2014, and Panorama Environmental, Inc. 2014

Figure 2.3-2: Representative Photographs of Concrete Pier and Micropile Foundations

Conductor

Proposed overhead conductor would be aluminum-clad, steel-supported wire. Conductor would be non-specular (i.e., mechanically or chemically treated to produce reduced reflectivity). Bundled lines would consist of two parallel wires spaced approximately 18 inches apart. A representative photograph of the bundled wire is provided in Figure 2.3-3.

Underground Duct Bank

The proposed underground transmission line in Segment B would consist of concrete encased duct banks with ten splice vaults placed approximately every 1,800 feet along the undergrounded segment.

Splice Vaults

Concrete splice vaults would be constructed of prefabricated, steel-reinforced concrete. Splice vaults facilitate pulling of cables through the duct bank and connecting pieces of cable. Each vault would have two manhole covers about 34 inches in diameter. The splice vaults would measure about 24 feet long by 10 feet wide by 8 feet deep. A diagram of a typical splice vault is provided in Figure 2.3-4.

Ducts

Polyvinyl chloride (PVC) duct would be installed approximately 4 to 6 feet underground. The duct dimensions would range from approximately 1.5 to 3.5 feet high, and between 2.5 and 9 feet wide. The duct configuration would be designed based on required clearances and the location of existing underground utility lines.

Figure 2.3-3: Representative Photograph of Bundled Conductor

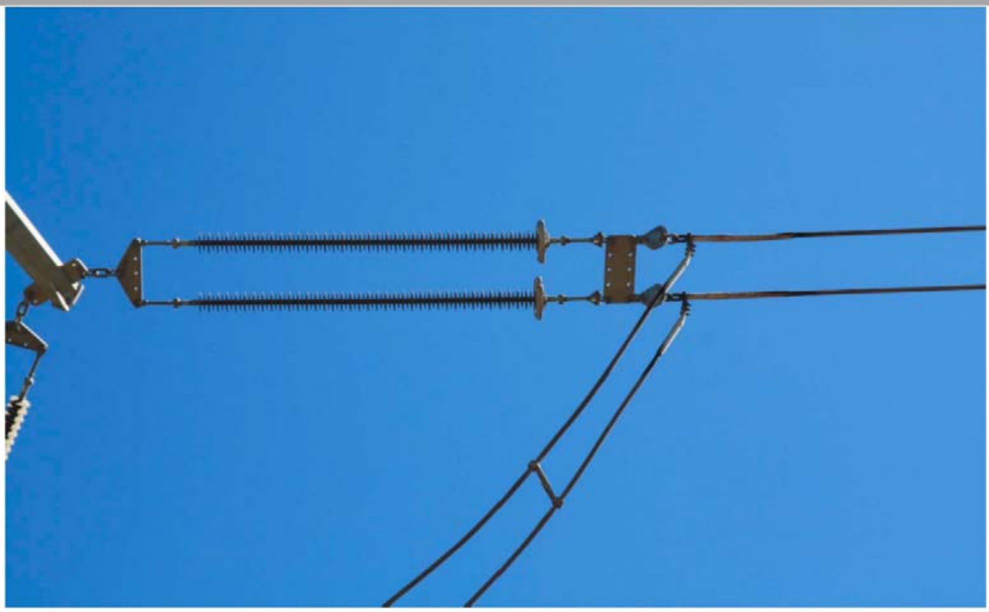
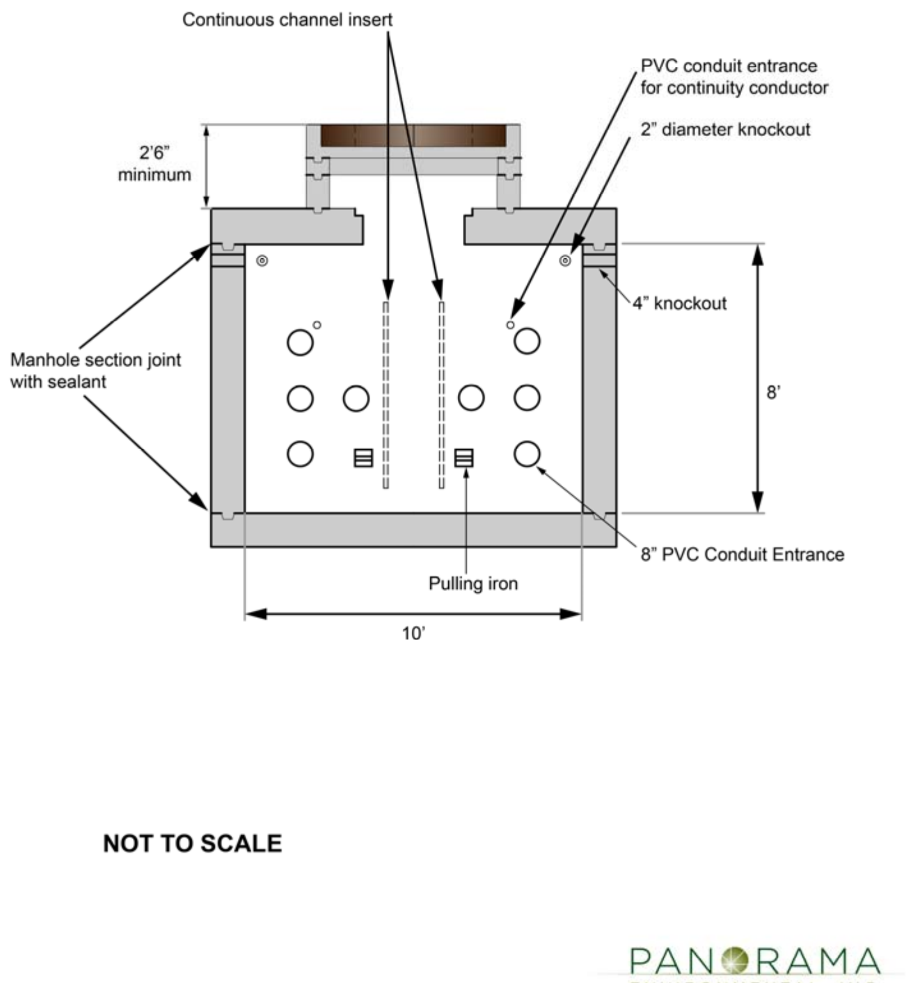


Figure 2.3-4: Typical Splice Vault



SOURCE: SDG&E 2014, Burns and McDonnell 2014, and Panorama Environmental, Inc. 2014

2.3.3 Segment A: Sycamore Canyon Substation to Carmel Valley Road

Segment A of the Proposed Project consists of four elements (see Figures 2.3-5a, 2.3-5b, and 2.3-5c):

1. Construction of 8.31 miles of 230-kV transmission line from the Sycamore Canyon Substation to Carmel Valley Road; install 37 new 230-kV TSPs and two new 138-kV TSPs.
2. Relocation of an existing 138-kV power line to the new 230-kV steel poles for the length of the alignment.
3. Placement of an existing 138-kV line underground for approximately 850 feet to connect to the Sycamore Canyon Substation.
4. Relocation of an existing 230-kV transmission line to two new 230-kV structures at the Sycamore Canyon Substation.
5. Replacement of one steel H-frame structure.

Comment [sh2]: **Data Need:** Describe where this will be replaced similar to number bullets above.

Appendix A shows details of the Segment A alignment. Table 2.3-3 presents details of the structures that would be installed and removed during Segment A construction. Figures 2.3-6a and 2.3-6b show the existing and proposed structures in Segment A for segments that include existing transmission towers and TSPs, respectively.

Table 2.3-3: Segment A Infrastructure to be Installed and Removed

Infrastructure Type	Installed	Removed
230-kV single-circuit TSP	1	0
230-kV TSP/138-kV cable pole	1	0
230-kV double-circuit TSP	37	0
138-kV single-circuit TSP	2	2
138-kV single-circuit wood H-frame structure	0	40
138-kV steel H-Frame structure	1	2
138-kV single-circuit wood pole	0	2
138-kV double-circuit cable pole	0	1
138-kV underground package	850 feet	0
Total	***42 poles 850 feet underground***	***47 structures***

Figure 2.3-5a: Detailed Map of Project Alignment: Segment A

SOURCES: Esri 2014, USDA Farm Service Agency 2012, SDG&E 2014, and Panorama Environmental, Inc. 2014

Figure 2.3-5b: Detailed Map of Project Alignment: Segment A

Figure 2.3-5c: Detailed Map of Project Alignment: Segments A, B, and C

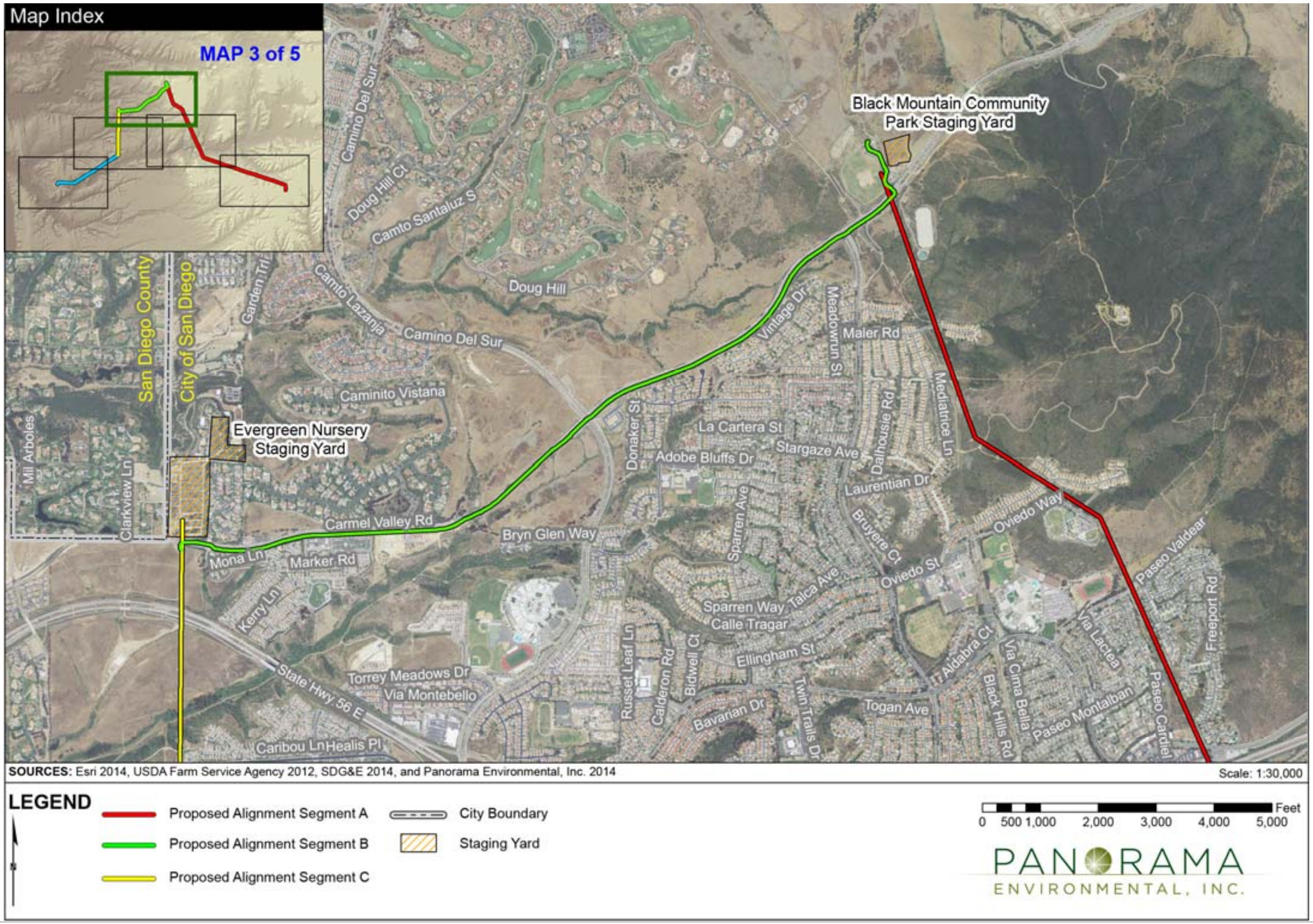


Figure 2.3-5d: Detailed Map of Project Alignment: Segments C and D

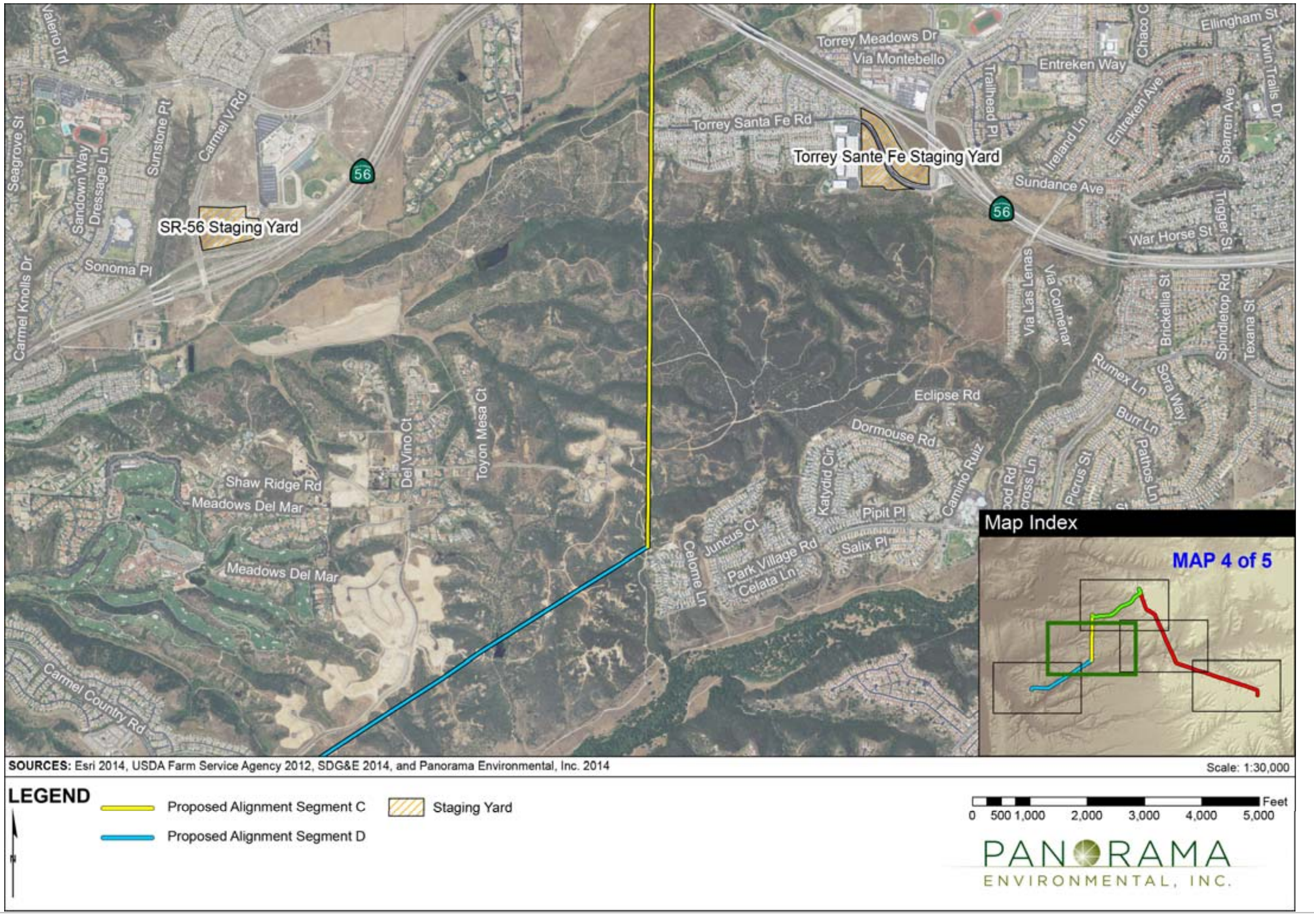


Figure 2.3-5e: Detailed Maps of Project Alignment: Segment D

Figure 2.3-5f: Detailed Maps of Project Alignment: Encina Hub

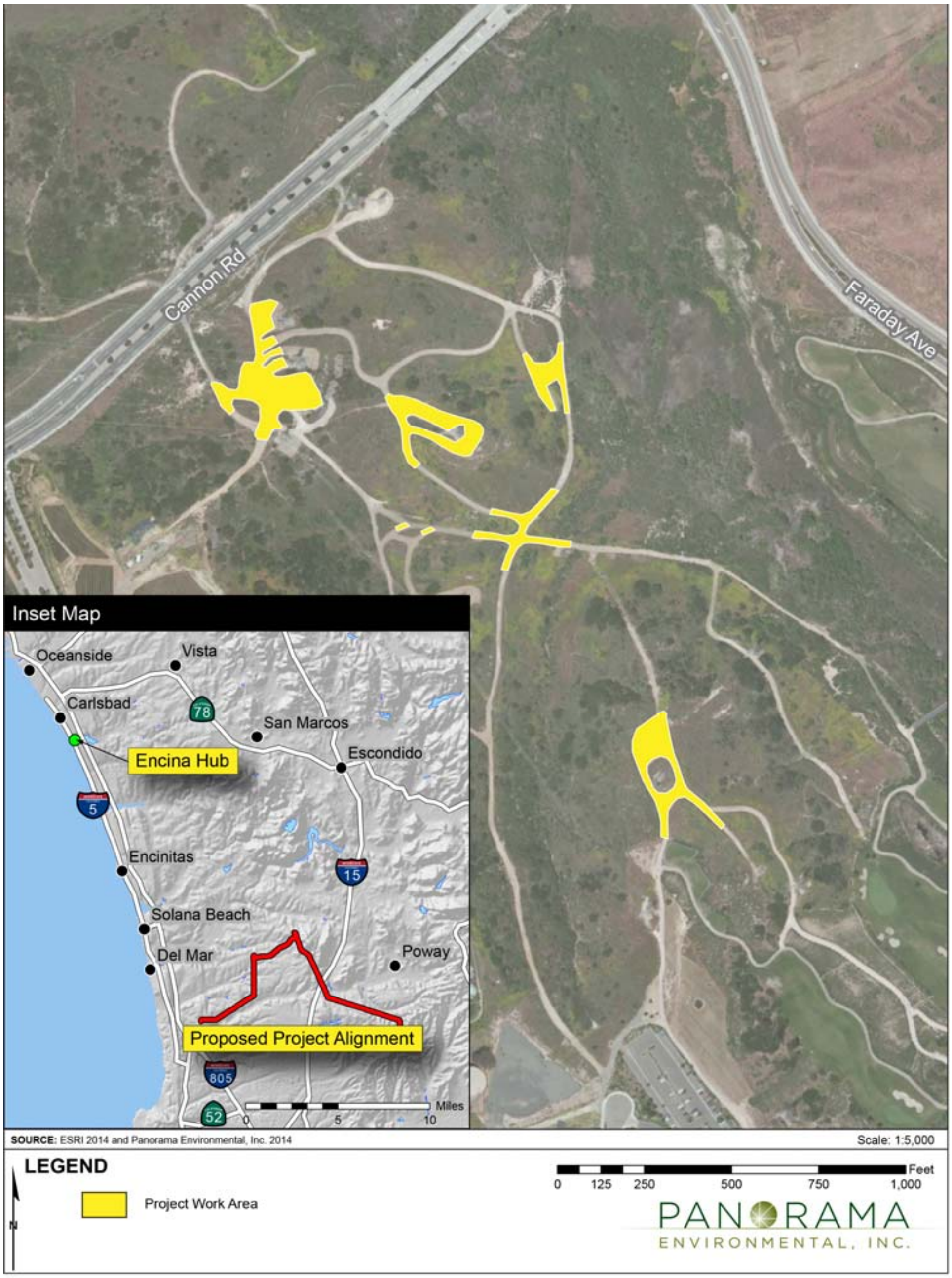


Figure 2.3-5g: Detailed Maps of Project Alignment: Mission-San Luis Rey Phase Transposition

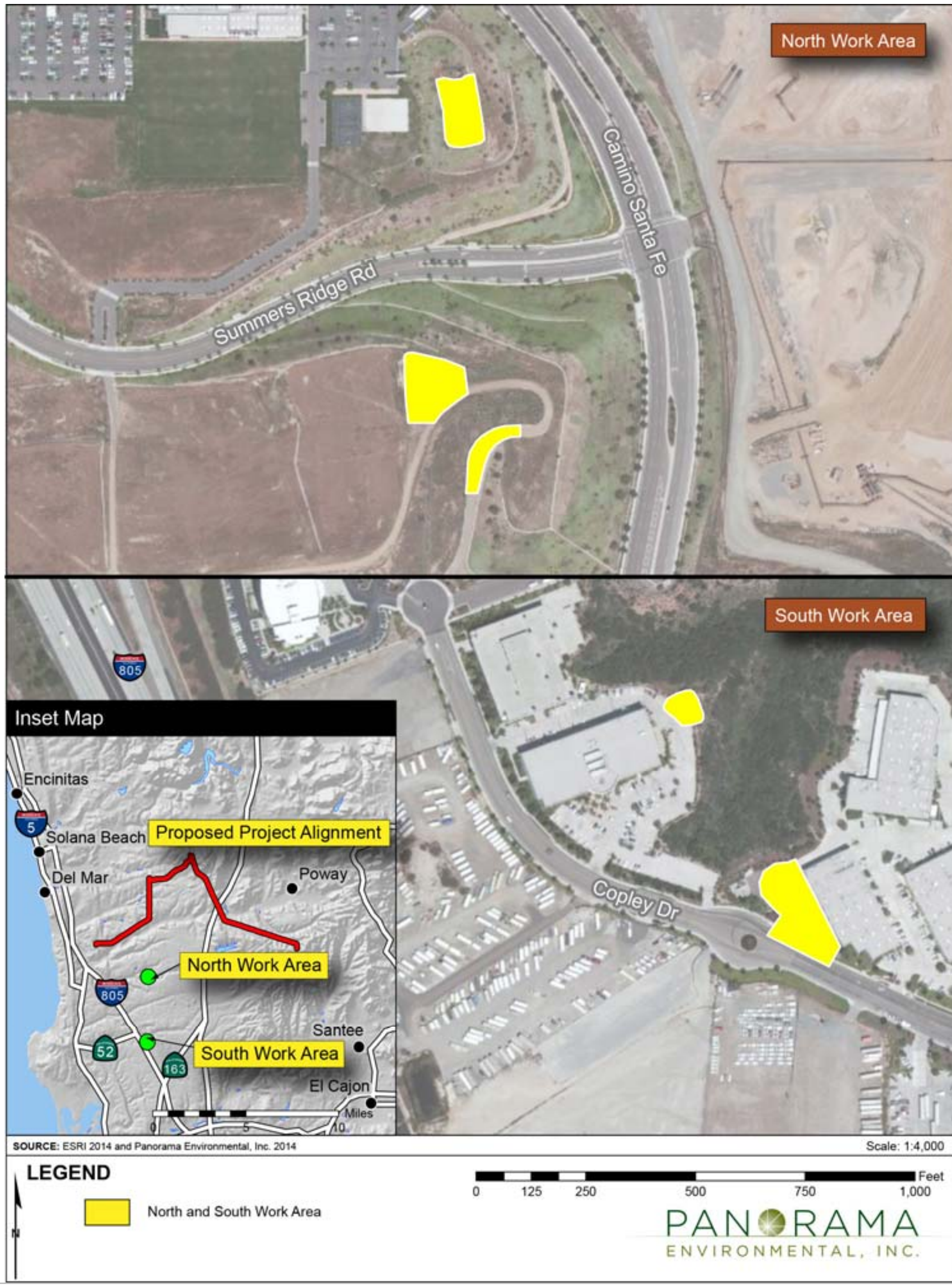
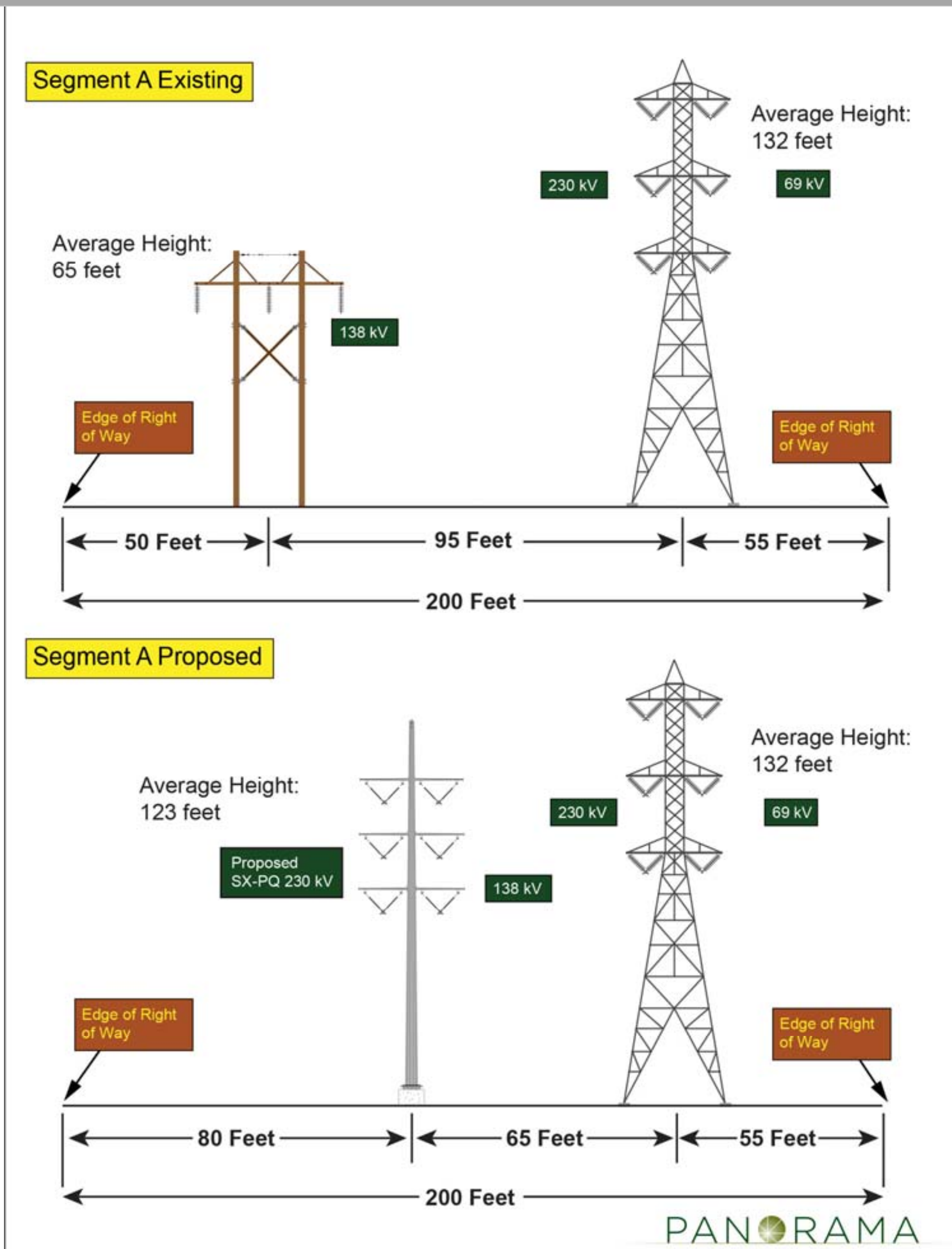
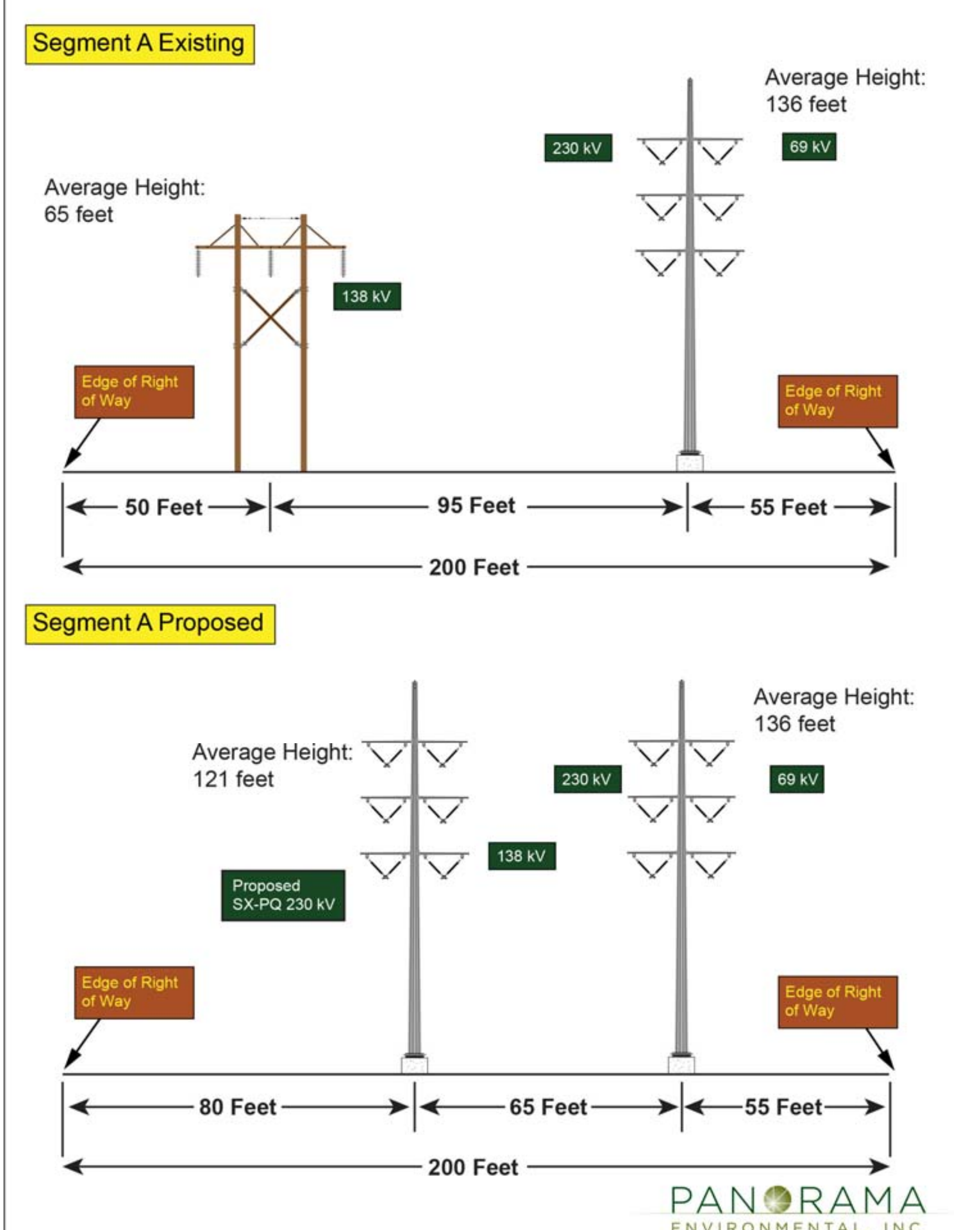


Figure 2.3-6a: Segment A Existing and Proposed Configurations



SOURCE: SDG&E 2014 and Panorama Environmental, Inc. 2014

Figure 2.3-6b: Segment A Existing and Proposed Configurations



SOURCE: SDG&E 2014 and Panorama Environmental, Inc. 2014

New 230-kV Transmission Line

The proposed 230-kV transmission line in Segment A would be installed on 37 new, double-circuit, dulled galvanized TSPs. The new 230-kV TSPs would be located within the existing 200-foot-wide SDG&E ROW that runs generally north-south from the Sycamore Canyon Substation to Carmel Valley Road. TSPs would be installed parallel to existing 230-kV structures in the ROW and approximately 30 feet east of the existing H-frame structures. Aluminum conductor and polymer insulators would be used on the transmission line. OPGW would be installed on the top of the 230-kV structures. Conductor would be located a minimum of 25 feet aboveground where only pedestrian access is present, and at least 30 feet aboveground in other cases. Spacing between conductors on the TSPs would be a minimum of 18 feet. Spacing between TSPs would be approximately 1,150 feet. Figures 2.3-6a and 2.3-6b show the proposed configuration of the new 230-kV TSPs in the segment. About 42 existing 138-kV wood/steel H-frame structures would be removed to make space for the new double-circuit steel 230-kV structures. Six (5 wood and one steel) of the 138-kV H-Frame structures and one wood monopole structure currently have distribution underbuild. The distribution portion of the existing H-frame structures would remain in place. The existing wood H-frame structures would be cut off above the distribution circuits and the upper portion of the wood H-frame structure would be removed. The leg of the steel H-Frame that carries distribution circuit would~~ill~~ remain in place and remaining transmission equipment would~~ill~~ be removed. The structure appearance after H-frame structures are cut off is shown on Figure 2.3-7.

Comment [sh3]: Data Need: Is this the same H-Frame that is described as "replaced" above? Or is this a different structure?

Relocation of Existing 138-kV Power Lines

SDG&E would relocate one existing 138-kV power line from existing wood H-frame structures to a position on the new 230-kV TSPs. The existing 138-kV power line is strung end-to-end along Segment A in two circuits; one circuit is installed between Sycamore Canyon Substation and Chicarita Substation, and the other circuit is installed between Chicarita Substation and the northern terminus of proposed Segment A. Aluminum conductor and polymer insulators would be used for both circuits. Figures 2.36a and 2.3-6b shows the proposed configuration of these power lines on Segment A. Only one line is shown for the purposes of illustration on Figures 2.3-6a and 2.3-6b since the two 138-kV circuits would be relocated end-to-end similar to their current configuration.

Underground Connection of Existing 138-kV Power Lines to Sycamore Canyon Substation

One existing 138-kV power line would be installed underground for approximately 850 feet along an existing access road from Structure P3 to the Sycamore Canyon Substation (refer to Appendix A, page 2).

Relocation of Existing 230-kV Transmission Line

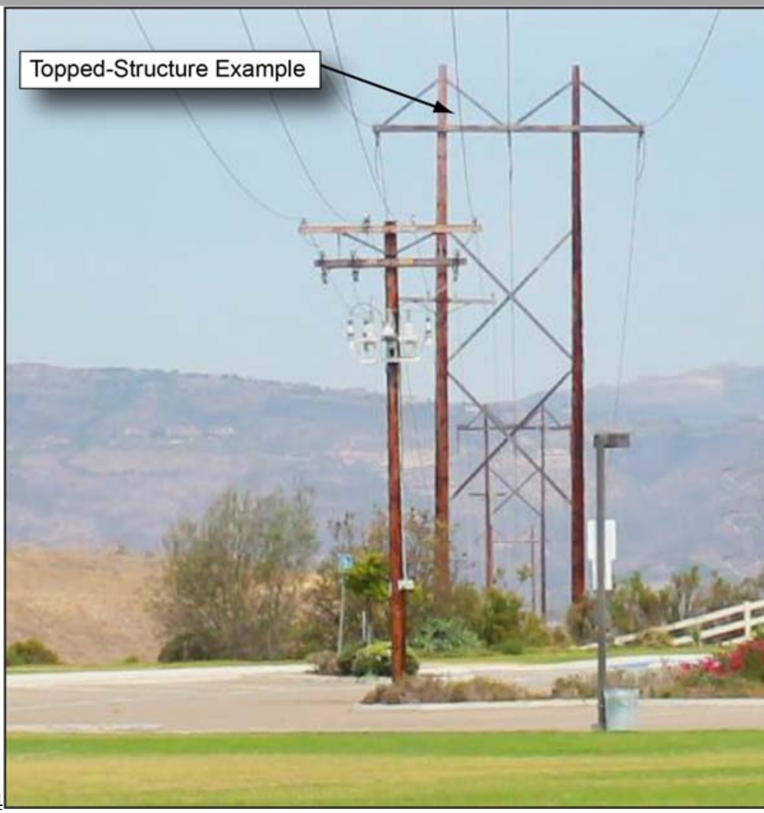
An existing 230-kV transmission line would be moved to structures P1 and P2 next to Sycamore Canyon Substation to open a position for connection of the new 230-kV transmission line at the substation.

New Conductor Configuration

The current conductor configuration within the Segment A transmission corridor is as follows:

- **138-kV Transmission Line:** One 138-kV power line circuit on 42 H-frame structures, one steel cable pole, three wood monopoles, and two TSPs

Figure 2.3-7: Typical Topped H-Frame Structure



4

- **69-kV Power Line:** One 69-kV power line on 16 steel lattice towers and 23 TSPs
- **230-kV Transmission Lines:** One bundled 230-kV transmission line on 16 steel lattice towers and 26 TSPs
- **Shield wire:** One shield wire on 16 steel lattice towers and 26 TSPs.
- **All-Dielectric Self-Supporting (ADSS) Telecommunication Cable:** One ADSS telecommunication cable on 15 spans of wood H-Frame structures.
- **Total Number of Conductors in Corridor: 12**

After implementation of the Proposed Project, conductor configuration within the Segment A transmission corridor would be as follows:

- **138-kV power line and 230-kV transmission line:** one bundled 230-kV transmission line and one 138-kV power line on 40 new TSPs.

- **69-kV Power Line:** One 69-kV power line on 16 steel lattice towers and 23 TSPs**.**
- **230-kV Transmission Lines:** One bundled 230-kV transmission line on 16 steel lattice towers and 26 TSPs
- **ADSS Telecommunications Cable:** One ADSS telecommunication cable on 13 spans of new TSPs.
- **Total Number of Conductors in Corridor: 18**

2.3.4 Segment B: Carmel Valley Road

Segment B of the Proposed Project consists of two elements (see Figure 2.3-5c):

1. Installation of about 2.84 miles of 230-kV transmission line underground on Carmel Valley Road, from Black Mountain Ranch Community Park, approximately at the intersection of Carmel Valley Road with Black Mountain Park Way, to about 250 feet east of the intersection of Carmel Valley Road with Via Abertura.
2. Installation of two 230-kV cable pole structures, one at each end of the proposed 230-kV undergrounded line segment.

Appendix A shows the alignment of Segment B within Carmel Valley Road. Table 2.3-4 presents details of the structures that would be installed and removed during Segment B construction. Figure 2.3-8 shows a typical line configuration within an underground duct bank in Segment B.

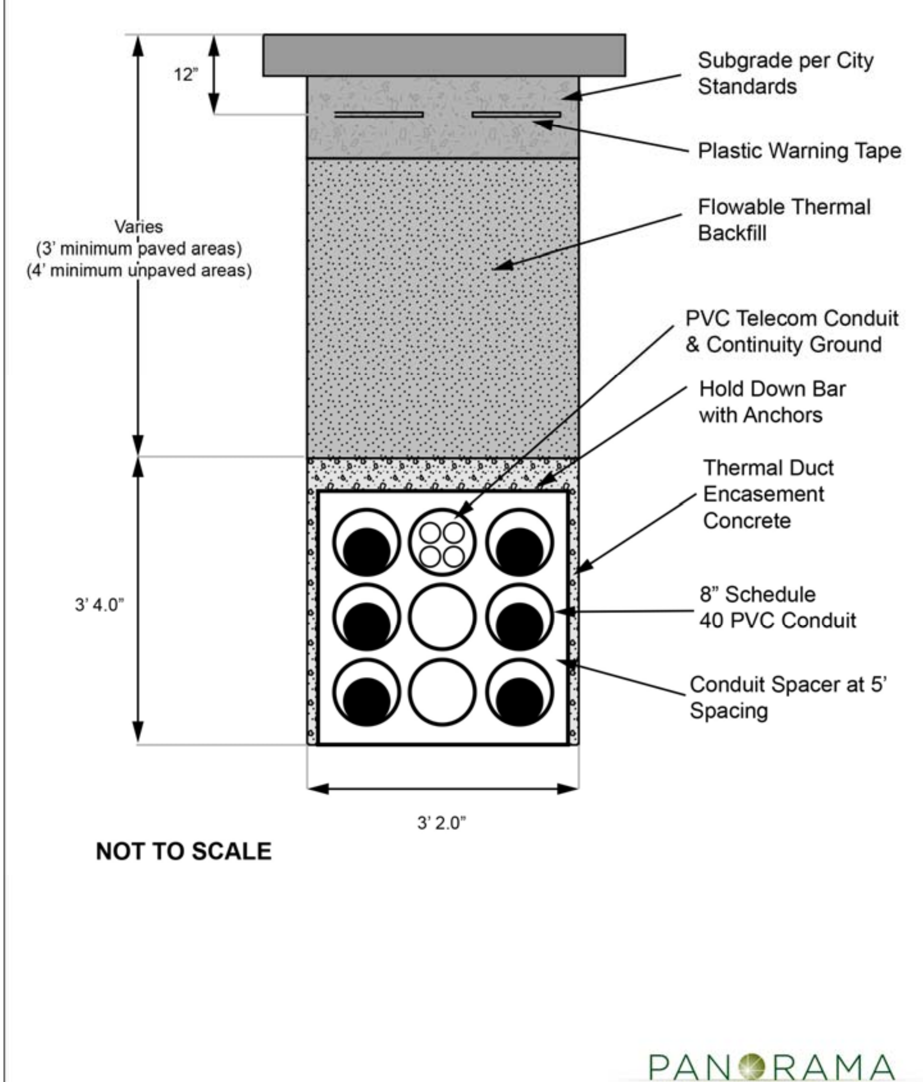
New 230-kV Underground Transmission Line

The 230-kV underground transmission line would be located in SDG&E's franchise position within Carmel Valley Road. The new 230-kV conductor would be located in a new duct bank package. The duct bank would have eight 8-inch PVC conduits for electrical cable and four 2-inch PVC conduits for the ground continuity conductor (GCC) and telecommunications cable. The new 230-kV conductor would be pulled through six of the 8-inch conduits, with the remaining two electrical conduits left vacant. One of the 2-inch conduits would be used for the GCC and another 2-inch conduit would hold a fiber optic cable, which would leave two 2-inch conduits vacant. All conduits in the package would be encased in thermal concrete to 6 inches above the top conduit to protect the duct package. The remainder of the trench would be filled

Table 2.3-4: Segment B Infrastructure to be Installed and Removed

Infrastructure Type	Installed	Removed
230-kV steel cable pole structure	2	0
230-kV steel lattice tower	0	1
230-kV underground package (i.e., duct bank and vault distance)	15,788 feet	0
230-kV splice vault	10	0
Total	***2 structures*** ***15,788 feet***	***1 structure***

Figure 2.3-8: Typical Segment B Duct Bank Diagram



SOURCE: SDG&E 2014, Burns and McDonnell 2014, and Panorama Environmental, Inc. 2014

with flowable thermal backfill slurry (FTB) in lieu of compacted soil, which is typically a mixture of sand, fly ash, and cementing materials. There would be splice vaults approximately every 1,800 feet along the alignment as shown in Appendix A.

Cable Pole Structures

Two approximately 163-foot-tall cable pole structures would be installed at both ends of the undergrounded 230-kV segment to transition the segment between underground and aboveground. The cable pole structure on the west end of Segment B is proposed south of Carmel Valley Road and approximately 250 feet east of Via Abertura within SDG&E ROW and would replace the existing tower. The structure would also serve as a dead-end overhead structure for two existing 230-kV transmission lines. The cable pole structure on the east end of Segment B is proposed within a disturbed area of the Black Mountain Ranch Community Park. An existing steel tangent structure located north of the proposed location for the eastern cable pole structure would be replaced by a new steel dead-end structure.

2.3.5 Segment C: Carmel Valley Road to Peñasquitos Junction

Segment C of the Proposed Project consists of two major elements (see Figure 2.3-5c and 2.3-5d):

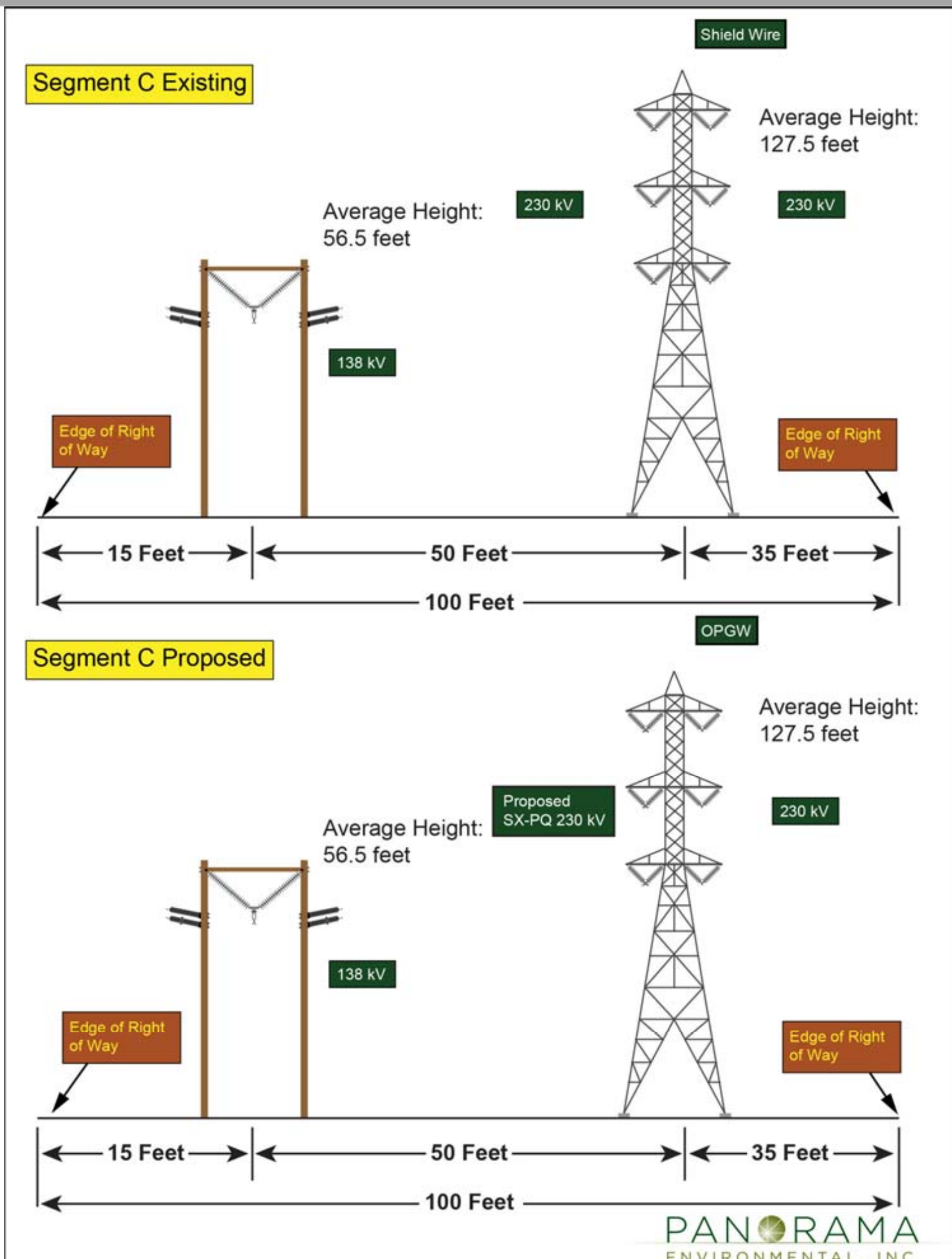
1. Consolidation of two existing 230-kV transmission lines currently located on 230-kV steel lattice towers and placement on one position on the same 230-kV steel lattice tower.
2. Placement of new 230-kV aluminum conductor on mostly existing 230-kV steel lattice towers and one new 230kV double circuit TSP.

Appendix A shows detail of the Segment C alignment. Table 2.3-5 details the structures that would be installed and removed during Segment C construction. Figure 2.3-9 shows the existing and proposed configurations of Segment C. The existing lattice towers and H-frame pole structures would remain in Segment C. Minor tower modifications may occur in order to reinforce overstressed members. These minor modifications could involve adding new redundant bracing members, as well as bolting new members onto existing members to increase their capacity. Tower modifications would not change the appearance or footprint of the existing towers. The only new transmission line structure would occur north of Peñasquitos Junction where an existing steel lattice tower would be replaced with a new TSP.

Table 2.3-5: Segment C Infrastructure to be Installed and Removed

Infrastructure Type	Installed	Removed
Double-circuit 230-kV TSP	1	0
Double-circuit 230-kV steel lattice tower	0	1
Total	***1 structure***	***1 structure***

Figure 2.3-9: Segment C Existing and Proposed Configurations



SOURCE: SDG&E 2014 and Panorama Environmental, Inc. 2014

Consolidation of Existing 230-kV Transmission Lines (San Luis Rey to Mission)

Two existing 230-kV transmission lines on existing 230-kV steel lattice towers would be bundled and placed on one position of the same 230-kV steel lattice towers. Two 230kV Circuits with single conductor per phase wouldill be consolidated into one 230kV circuit two conductors per phase using jumpers. Consolidation would occur in six steps:

1. Connect two existing 230-kV transmission lines together laterally to create one bundled 230-kV circuit between the San Luis Rey Substation and Carmel Valley Road.
2. Reconductor (with aluminum conductor and polymer insulators) and bundle approximately 2.19 miles of two existing 230-kV transmission lines from Carmel Valley Road to Peñasquitos Junction to create a vacant position on the west side of the existing 230-kV steel lattice towers. As needed, complete minor structural modifications to existing towers to meet final design loading.
3. Connect two existing 230-kV transmission lines together laterally to create one bundled 230-kV circuit between Peñasquitos Junction and the Mission Substation.
4. Split an existing three-terminal line (San Luis Rey-Encina-Palomar Energy) at Encina Hub to create two 2-terminal lines: one connecting Encina Substation and San Luis Rey Substation and the second connecting Palomar Energy Substation and San Luis Rey Substation.
5. Rearrange the phasing of one of the two transmission lines that run parallel between Mission Substation and San Luis Rey Substation to consolidate the two lines. Each of the three different levels on the tower wouldill be connected laterally at the same level to match phasing so that the phasing wouldill match when connected at each Substation.
6. Replace the existing shield wire located on top of the existing steel lattice towers with new OPGW from the new cable pole (Structure P42) to Peñasquitos Junction (Structure P43).

New 230-kV Transmission Line

New 230-kV aluminum conductor would be placed on existing 230-kV steel lattice towers and one new TSP with positions made vacant by the previously described consolidation of existing 230-kV transmission lines. OPGW would be installed at the top position on the existing steel lattice towers to serve as communications and as lightning shielding for the aluminum conductor. One existing double-circuit 230-kV steel lattice tower at Peñasquitos Junction would be replaced with a new double-circuit 230-kV TSP to provide sufficient clearance of the new 230-kV conductor over the adjacent 138-kV power line.

New Conductor Configuration

The current conductor configuration within the Segment C transmission corridor is as follows:

- **138-kV Transmission Line:** One 138-kV power line on 20 H-frame structures
- **230-kV Transmission Lines:** Two 230-kV transmission lines on 12 steel lattice towers

- **Shield Wire**: One existing shield wire on 12 steel lattice towers
- **Total Number of Conductors in Corridor:** 9

After implementation of the Proposed Project, conductor configuration within the Segment C transmission corridor would be as follows:

- **138-kV Transmission Line:** One 138-kV transmission line on 20 H-frame structures
- **230-kV Transmission Lines:** Two bundled 230-kV transmission lines on 10 steel lattice towers and one new TSP.
- **OPGW:** One OPGW cable on 10 steel lattice towers and one new TSP.
- **Total Number of Conductors in Corridor:** 15

2.3.6 Segment D: Peñasquitos Junction to Peñasquitos Substation

Segment D of the Proposed Project consists of two major elements (see Figure 2.3-5d and 2.3-5e):

1. Installation of about 3.34 miles of new 230-kV overhead transmission line on existing 230-kV steel lattice towers after relocating an existing 138-kV power line from the south side of the steel towers to the north side of the steel towers.
2. Relocation of two existing 69-kV power lines onto 17 new double-circuit TSPs; removal of 20 existing 69-kV wood structures; and replacement of two 69-kV wood cable poles with steel cable poles.

Appendix A shows detail of the Segment D alignment. Table 2.3-6 presents details of the structures that would be installed and removed during Segment D construction. Figure 2.3-10 shows the existing and proposed configurations of Segment D.

Relocation of Existing Power Lines

An existing 69-kV power line would be relocated from approximately fifteen 69-kV wood H-frame structures and five single-circuit monopole structures between Peñasquitos Junction and the Peñasquitos Substation. The structures would be removed, and approximately 17 new TSPs would be installed approximately 40 feet north of the existing H-frame structures within the 300-foot-wide transmission corridor. The existing 69-kV power line would be placed onto the new TSPs. An existing 69-kV line would be relocated from the 230-kV steel lattice towers to the new double-circuit 69-kV TSPs to create a vacant position on the 230-kV structures. The 69-kV TSPs would accommodate two levels of ADSS telecommunication cables below the conductors for future use.

Table 2.3-6: Segment D Infrastructure to be Installed and Removed

Infrastructure Type	Installed	Removed
69-kV double-circuit TSP	17	0
69-kV wood H-frame structure	0	15
69-kV single-circuit wood pole	0	5
69-kV single-circuit steel cable pole	2	0

Table 2.3-6: Segment D Infrastructure to be Installed and Removed		
Infrastructure Type	**Installed**	**Removed**
69-kV single-circuit wood cable pole	0	2
Total	***19 structures***	***22 structures***

Reconductoring
An existing 138-kV power line would be moved from the south side of the 230-kV steel lattice towers to the north side of the 230-kV steel lattice towers. New 230-kV aluminum conductor would be installed in the newly vacant southern position. OPGW would replace the existing shield wire at the top of the 230-kV towers.

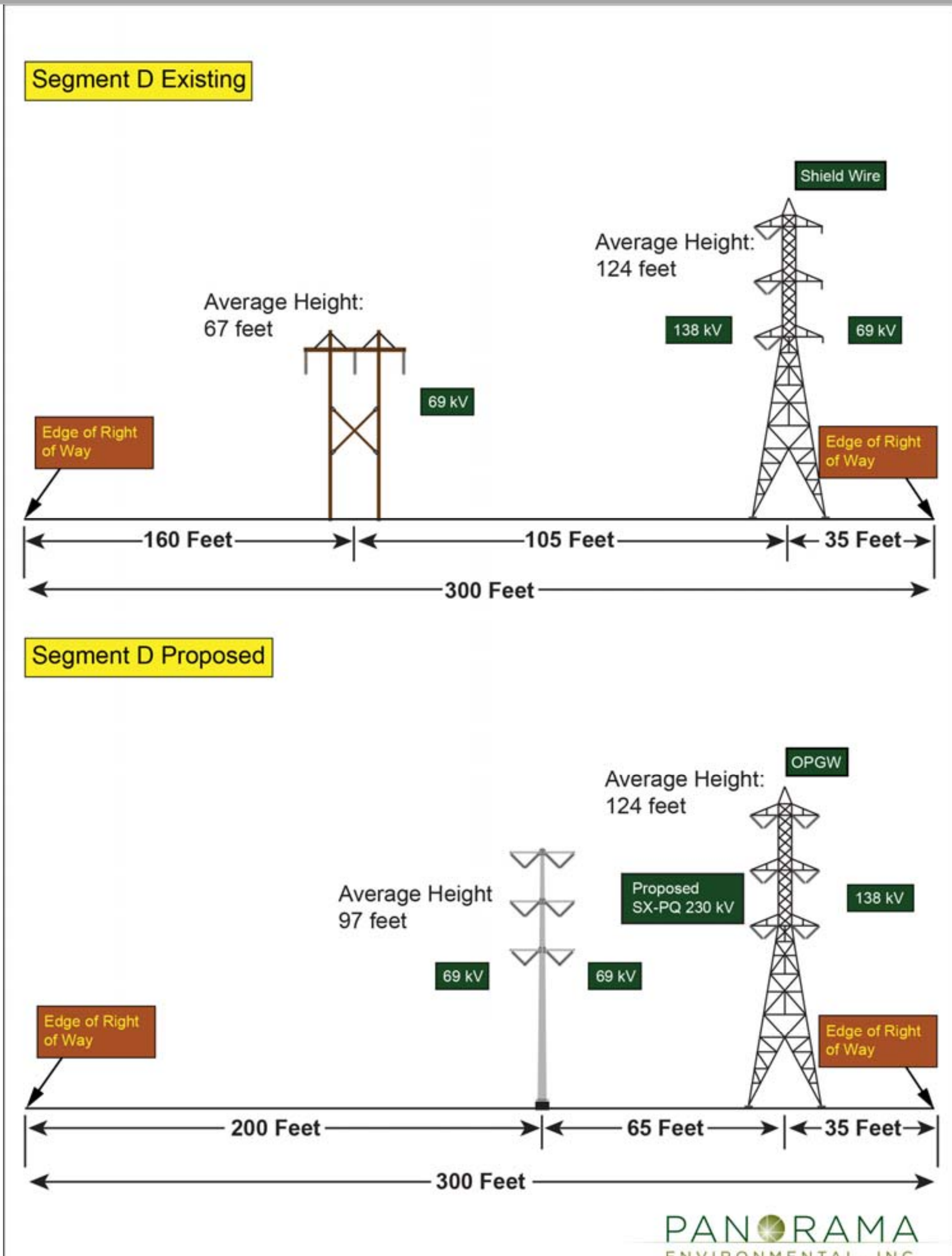
New Conductor Configuration
The current conductor configuration with the Segment D transmission corridor is as follows:

- **69-kV Power Line:** One 69-kV power line on 15 H-frame structures, five wood monopoles, and two wood cable poles and one 69-kV power line on 15 steel lattice towers and one TSP
- **138-kV Transmission Line:** One bundled 138-kV power line on 15 steel lattice towers and one TSP
- **Shield Wire:** One shield wire on 15 steel lattice towers
- **Total Number of Conductors in Corridor:** 12

After implementation of the Proposed Project, conductor configuration within the Segment D transmission corridor would be as follows:

- **69-kV Power Line:** Two 69-kV power lines on 17 new TSPs
- **138-kV Transmission Line:** One bundled 138-kV power line on 15 steel lattice towers and one TSP
- **230-kV Transmission Line:** One bundled 230-kV transmission line on 15 steel lattice towers and one TSP
- **OPGW:** One OPGW cable on 15 steel lattice towers and one TSP
- **ADSS Telecommunication Cables:** Two ADSS telecommunication cable positions on 17 new TSPs
- **Total Number of Conductors in Corridor:** 18

Figure 2.3-10: Segment D Existing and Proposed Configurations



SOURCE: SDG&E 2014 and Panorama Environmental, Inc. 2014

2.3.7 Substation and Other Modifications

Sycamore Canyon Substation

Several modifications would be made to the Sycamore Canyon Substation to connect the proposed 230-kV transmission line to the substation:

- Transfer five existing transmission lines from their current bay positions to new bay positions.
- Add one circuit breaker and two disconnects to an existing bay.
- Install one capacity voltage transformer (CVT).

Peñasquitos Substation

Several modifications would be made to the Peñasquitos Substation to connect the proposed 230-kV transmission line to the substation:

- Add two circuit breakers and four disconnects to the termination bay for the proposed 230-kV transmission line.
- Install one capacity voltage transformer.

Chicarita, San Luis Rey, and Mission Substations

Minor modifications would be required at the Chicarita, San Luis Rey, and Mission Substations to accommodate the addition of the new 230-kV transmission line:

- Adjust the configuration of transmission and power lines.
- Adjust relays.
- Upgrade line protection.

Encina Hub

An existing San Luis Rey – Mission 230-kV power line would be removed from service at the Encina Hub to create an open position for the proposed 230-kV transmission line in Segment C (see Figure 2.3-5f).

Mission - San Luis Rey Phase Transposition

The positions of the existing 230-kV line phase components between the Mission Substation and the Peñasquitos Junction (intersection of Segments C and D) would be reversed in order to accommodate the proposed bundling of power lines within Segment C to accommodate placement of the new 230-kV line (see Figure 2.3-5g).

2.4 CONSTRUCTION ACTIVITIES AND PROCEDURES

This section describes the construction activities associated with the following elements of the Proposed Project:

- Safety and Environmental Awareness Program
- Summary of Land Disturbance
- Underground Transmission
- Substations
- Helicopter Use

- Temporary Work Areas
- Access Roads
- Aboveground Transmission
- Water Use
- Traffic Management
- Site Cleanup and Waste Disposal

2.4.1 Safety and Environmental Awareness Program

SDG&E would prepare a Safety and Environmental Awareness Program (SEAP). The SEAP would outline training for project workers on topics including:

- General safety procedures
- General environmental procedures
- Fire safety
- Biological resources
- Cultural resources
- Paleontological resources
- Hazardous materials protocols and best management practices (BMPs)
- Stormwater Pollution Prevention Plan (SWPPP) requirements

2.4.2 Summary of Land Disturbance

Approximately 194.4~~124.2~~ acres would be temporarily disturbed and 6.6~~6.8~~ acres would be permanently disturbed during project construction. Areas of project disturbance are summarized in Table 2.4-1, and described in more detail in following sections below.

Table 2.4-1: Areas of Temporary and Permanent Project Disturbance

Proposed Project Component		Disturbance Area (acres)[1, 2]		
		Permanent[3]	Temporary[4, 5, 6]	Total
Transmission Line Segments				
Segment A (Sycamore Canyon Substation to Carmel Valley Road - Overhead)		5.0~~1~~	~~36.9~~47.5	~~42.0~~52.5
Segment B (Carmel Valley Road – Underground)		0.002	6.1~~6~~ (2.84 miles)	6.1~~6~~
Segment C (Carmel Valley Road to Peñasquitos Junction - Overhead)		0.2	~~3.9~~13.1	~~4.1~~13.3
Segment D (Peñasquitos Junction to Peñasquitos Substation - Overhead)		1.4~~5~~	~~13.6~~17.3	~~15.1~~18.7
Subtotal		~~6.8~~6.6	~~61.0~~84.0	~~67.8~~90.6
Line Configuration Locations				
Encina Hub		0	~~2.6~~4.4	~~2.6~~4.4
Mission – San Luis Rey	North	0	~~0.9~~1.7	~~0.9~~1.7

Comment [sh4]: **Data Request**: Provide GIS for all existing O&M work pads along Segments C and D that would be used for reconductoring and tower modifications See Data Request #7, Item 6 for additional data request details.

Table 2.4-1: Areas of Temporary and Permanent Project Disturbance

Proposed Project Component		Disturbance Area (acres)[1, 2]		
		Permanent[3]	Temporary[4, 5, 6]	Total
Phase Transposition	South	0	~~0.7~~0.8	~~0.7~~0.8
	Subtotal	0	~~4.2~~7.0	~~4.2~~7.0
Staging Yards				
Black Mountain Ranch Community Park		0	4.2	4.2
Chicarita South Staging Yard		0	5.0	5.0
Evergreen Nursery Staging Yard		0	3.5	3.5
Mission Substation Staging Yard		0	~~1.5~~5.9	~~1.5~~5.9
Peñasquitos Substation Staging Yard		0	~~1.7~~14.3	~~1.7~~14.3
San Luis Rey Substation Staging Yard		0	~~0.2~~10.3	~~0.2~~10.3
SR-56 Staging Yard		0	14.7	14.7
Stonebridge Staging Yard		0	9.0	9.0
Stowe Staging Yard		0	4.0	4.0
Sycamore Substation Staging Yard		0	~~3.1~~12.6	~~3.1~~12.6
Torrey Santa Fe Staging Yard		0	19.9	19.9
	Subtotal	0	~~66.8~~103.4	~~66.8~~103.4
TOTAL		**~~6.8~~6.6**	**~~132.0~~194.4**	**~~138.8~~201.0**

1 Based on preliminary engineering. Estimates may change based on final design and construction.

2 Overlapping areas were removed to avoid double-counting impact acreage (e.g., if a staging area or structure access site intersected with a stringing site area).

3 Permanent disturbance would occur at proposed structure pad locations (including retaining walls) and splice vault covers.

4 Temporary disturbance would occur at all other work areas including staging yards, laydown areas, structure installation and removal sites, line configuration sites, stringing sites, guard structure sites, and where additional access is required for maneuvering and passing vehicles.

5 At substations, the entire substation footprint is included in the staging yard acreage; however, actual staging acreages would be a smaller portion of each substation. Construction personnel would take direction from SDG&E substation operations on specifically where materials could be temporarily staged within each substation.

~~5~~6 Temporary disturbance areas do not~~also~~ include~~s~~ existing developed or paved areas and access ~~(aside from City streets)~~ that are temporarily used for construction purposes.

2.4.3 Temporary Work Areas

SDG&E would use several types of temporary work areas to construct the Proposed Project. The preparation (e.g., site clearing, vegetation removal, and grading) and use of temporary work areas are described below.

Staging Yards

In the PEA application, SDG&E identified five temporary materials storage and staging yards (Stonebridge, Stowe, Torrey Santa Fe, Carmel Valley Road, and Carmel Mountain Road); however, two of the proposed staging yards (Carmel Valley Road, Carmel Mountain Road) have been determined not to be viable since these properties are currently subject to development. SDG&E has since researched additional locations, five of which are potentially available. The status of these privately owned staging yards is described further below. Additionally, SDG&E would utilize up to four existing substation facilities for staging and materials laydown including the Peñasquitos, Mission, San Luis Rey, and Sycamore Canyon Substations. SDG&E may use any disturbed, unused portion of these existing substation properties at the direction of SDG&E substation operations.

Comment [sh5]: **Data Need:** Provide the safety guidelines or regulations that apply to where materials can be staged within the substation properties.

Black Mountain Ranch Community Park – Vacant, graded parcels adjacent to Black Mountain Ranch Community Park could be used for staging activities. The identified location is approximately 4.2 acres in size and connects to the existing Black Mountain Ranch Community Park parking lot, on the east side of the park. The site is owned by the City of San Diego.

Chicarita South – SDG&E received an email from the property owner granting permission for SDG&E to conduct non-invasive environmental resources surveys of the site and to potentially use the site as a staging yard during construction provided the land remains vacant and available.

Evergreen Nursery – SDG&E owns approximately 3.5 acres of land that is leased to the Evergreen Nursery. SDG&E will work with the Evergreen Nursery owner/operator to identify approximately 3.5 acres of disturbed, flat area within the 28 acre active nursery property that is advantageous to both SDG&E and Evergreen Nursery.

State Route 56 – The proposed site is at the northeast corner of SR-56 and Carmel Valley Road. The site is disturbed and has previously been used by SDG&E for a staging yard. SDG&E has received verbal approval to conduct environmental resources surveys of the site and to potentially use it for construction staging.

Stonebridge – Owned by the San Diego County Water Authority, this site is currently being used for SDG&E staging for the Fanita Junction project. SDG&E has the site leased until end of August 2015 with an option to extend one year to August 2016.

Stowe – SDG&E received an email from the property owner granting permission for SDG&E to conduct non-invasive environmental resources surveys of the site and to potentially use the site as a staging yard during construction provided the land remains vacant and available.

Torrey Santa Fe – The two parcels associated with this staging yard location are owned by Kilroy Development who is actively working on building permits for both parcels. SDG&E has used both sites before, one for a completed Wood to Steel Project and the other for a Pipeline Integrity Project. For several months, both sites were used simultaneously as staging yards.

Proposed staging yards are shown on Figure 2.4-1. The following activities and facilities would be conducted at the staging yards:

- Refueling and maintenance/repair areas for vehicles, helicopters, and construction equipment
- Pole assemblage
- Storage of materials and equipment
- Short-term helicopter operations[1]
- Temporary stockpile of material
- Portable restrooms
- Parking
- Lighting
- Generator use
- Worker meet up
- Construction trailers
- Temporary water and fuel storage for construction activities

In-ground fencing would be installed at the staging yards around the perimeter of the area actively used for staging if the staging yard does not already have fencing. SDG&E would place gravel, class II base, or equivalent material, or use other BMPs as necessary to control sedimentation and prevent stormwater runoff from leaving the site. Vegetation would be cleared from approximately 2,100 square feet and 100 cubic yards of cut/fill would be required to construct improved access to the Chicarita South Staging Yard. Vegetation clearing and cut/fill wouldill not be required at other staging yards. Table 2.4-2 describes the 12 identified staging yards. The detailed route maps in Appendix A also depict staging yard locations.

Material Storage

During construction, material or equipment may be stored within the median of Carmel Valley Road for undergrounding work in Segment B or within existing disturbed areas of the ROW for Segments A and D.

Helicopter Landing

Helicopters would be staged out of local airports (i.e., McClellan Palomar, Montgomery, and Gillespie). Activities such as helicopter refueling and maintenance could be conducted at all staging yards except Evergreen Nursery. Staging areas and stringing sites could also be used for short-term helicopter operations, such as picking up conductor. Additional detail is provided in Appendix X, Preliminary Helicopter Use Plan.

[1] Note that helicopter operations wouldare not anticipated to occur at the Evergreen Nursery Staging Yard.

Comment [sh6]: **Data Need:** Please verify that this is the intent of your comment.

Comment [sh7]: **Data Need:** Clarify the types of material that could be stored in these areas. Will temporary fencing be installed. What safety measures will be in place to protect storage areas in the median from vehicle collisions? What is the approximate duration of temporary storage in any given area?

Stringing Sites

Stringing sites would be used to install conductor on support structures. The 20 conductor stringing sites are shown in Appendix A. Any of these stringing sites could also be used to string OPGW. Vegetation removal and minor grading activities would occur within the stringing sites. Temporary anchors (e.g., wood poles or screw-type anchors) would be installed in the ground to support wires until conductor is pulled into place. Stringing sites would be returned to pre-construction conditions after use.

Table 2.4-2: Staging Yards

Staging Yard	Description	Approximate Acreage[1]
Black Mountain Ranch Community Park	• Site is located immediately east of the intersection of Segments A and B • Site was pre-graded as a future expansion of Black Mountain Ranch Community Park	4.2
Chicarita South	• South of SDG&E's Chicarita Substation	5.0
Evergreen Nursery	• Located immediately north of the intersection of Segments B and C • Site is an active nursery and is previously graded and disturbed.	3.5
SR-56	• North of Highway 56 and east of Carmel Valley Road approximately 1.25 miles west of Segment C	14.7
Stonebridge	• Located 800 feet northeast of the Sycamore Canyon Substation • Previously disturbed and graded	9.0
Stowe	• Located 1.6 miles north of the Sycamore Canyon Substation • Previously graded and fenced	4.0
Torrey Santa Fe	• South of SR-56 on Torrey Santa Fe Road • The area was previously graded	19.9
Mission, Peñasquitos, San Luis Rey, Chicarita and Sycamore Substations[2]	• Staging within cleared (previously disturbed) areas of SDG&E's existing substations at the direction of SDG&E substation operations	~~6.4~~43.1
TOTAL		**66.7**

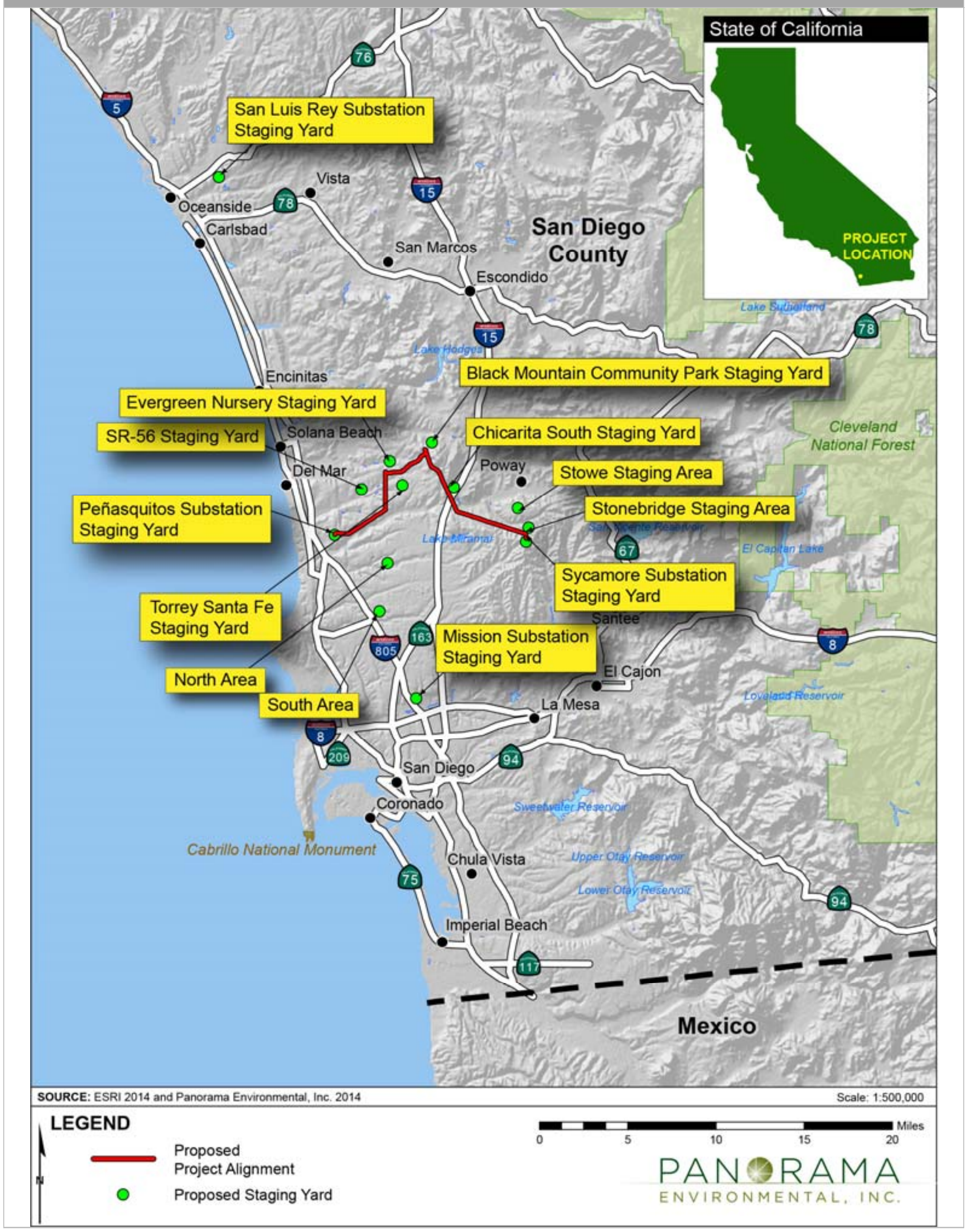
Notes:

[1] Approximate acreage is for the total site; SDG&E would likely use only a portion of some of the sites.

[2] At substations, the entire substation footprint is included in the staging yard acreage; however, actual staging acreages would be a smaller portion of each substation. Construction personnel would take direction from SDG&E substation operations on specifically where materials could be temporarily staged within each substation.

Comment [sh8]: Note to SDG&E - See prior data request comment regarding need to provide guidance or regulations for safety that would dictate where you could stage materials within the substation.

Figure 2.4-1: Staging Yards for Proposed Project



Structure Work Areas

Installation of new transmission structures would require an approximately 0.52-acre work area around each structure. The structure work areas would be used for equipment, vehicles, and materials during pole installation. Most of the new poles would be located near existing poles, which already include a maintained work area. Thus, many structure work areas would use portions of existing work areas. New work areas would be subject to grading and vegetation trimming or removal. Grading at each site would typically be less than 300 cubic yards of cut or fill, with the maximum cut or fill needed being approximately 2,300 cubic yards at a work area. The estimated cut-and-fill quantities required for construction of each project component are summarized in Table 2.4-3. Most vegetation clearing activities would involve overgrown brush removal, trimming, and mowing. A mowing skid steer, weed whackers, blading equipment, and hand tools would be used for vegetation removal and trimming activities. Removed vegetation would be disposed of appropriately off site or cut into small pieces and distributed nearby. No tree removal is anticipated to occur within structure work areas.

Retaining walls would be installed at several locations where the proposed pad elevation is higher than the existing surrounding terrain. Details are shown in Table 2.4-4.

Retaining walls would be designed using a mechanically stabilized earth retaining wall approach. Alternating layers of compacted soil and stabilizing geogrid fabric would be installed, with the fabrics attached to stabilize the wall. A matrix of stone blocks would be used to finish the wall face. Figure 2.4-2 provides a photograph of a typical retaining wall face.

Existing operation and maintenance work pads (flat, disturbed areas surrounding each existing pole) would be used during removal of the existing structures as well as during any tower modifications identified during final engineering. Existing maintenance work pads are flat, cleared/disturbed areas maintained by SDG&E for the ongoing operation and maintenance of existing facilities. Some of the temporary work space around structures would be maintained during the operation and maintenance period; permanent work areas are discussed in Section 2.5.

Table 2.4-3: Estimated Cut-and-Fill Quantities

Project Element	Cut (Cubic Yards)	Fill (Cubic Yards)
Structure Work Areas	15,200	11,200
Retaining Walls	??	??
Concrete Foundations	4,500	
Underground Duct Trenching	16,200	0
Staging Yards	2,500	2,500
Stringing Sites	5,000 -10,000	5,000 -10,000
TOTAL	**43,400 – 48,400**	**18,700 – 23,700**

Comment [JDT9]: The volume of fill associated with the walls will not be known until final structural design determines the developed length of the geogrid fabric. Length and height of wall face has been provided in table 2.4.4 instead to describe the walls.

Comment [sh10]: **Data Need:** Provide an estimate. It should be possible to calculate and estimated the volume of material from length and height. You can be conservative, but assuming 0 (which is currently in the table) is not reasonable.

Table 2.4-4: Retaining Wall Details*			
Segment	**Structure**	**Anticipated Maximum Height (feet)**	**Approximate Length (feet)**
A	P2	23	239.7
	P5	10	141.2
	P24	24	125.0
	P25	26	476.8
D	P46	7	60.4
	P47	12	135.3
	P52	5	115.8
	P58	5	160
*Table contents based upon preliminary engineering.			

Figure 2.4-2: Typical Retaining Wall Face

Underground Construction Work Area

Construction of the underground transmission line would require an approximately 16-foot-wide work area and work areas would be up to 22 feet wide in four 80-foot sections where conductor would be installed in a flat configuration. The work area would increase to a maximum of 30 feet wide and 120 feet long at vault locations. Prior to trenching, paint would be used to mark out the trench alignment, both centerline and 10 foot offsets, at 50-foot intervals and at the beginning and end of each curve in the alignment. Although not anticipated, approximately 5 trees could be removed within the Carmel Valley Road median. The work area would be demarcated by orange cones and Type II barricades or by the median of Carmel Valley Road. Part of the work area would contain the trench and the trenching area, whereas the rest of the work area would be reserved for truck loading. Vehicular traffic on Carmel Valley Road would be directed outside the work area.

2.4.4 Access Roads

Construction access to most sites would use existing roads three new spur roads are proposed along Segment A.

Existing Access Roads

Most work sites would be accessed via existing unpaved roads, primarily existing SDG&E access roads. Existing roads would be restored as needed to facilitate their use for construction access. SDG&E would conduct the following activities to maintain and re-establish existing access roads:

- Clear, trim, or mow overgrown vegetation using a mowing skid steer, weed whacker, and hand tools. Remove vegetation material and dispose of off-site or cut and spread nearby.
- Resurface and smooth where necessary with a grader.
- Transfer, add, or compact fill material (e.g., soil or gravel) with earth-moving equipment.
- Water the roadway with a water truck to compact the road and control dust.
- Install water bars and dissipaters or refresh existing dissipaters (e.g., replacing rip rap or cleaning out rip rap or accumulated silt).

New Spur Roads

A new, approximately 290-foot-long, spur road would be required to access proposed structure P2 along Segment A (see Appendix A) adjacent to the Sycamore Canyon Substation. Vegetation would be removed and the land would be graded to create a road about 12 to 14 feet wide in the straight segment and up to 20 feet wide in the curved section.

A new, approximately 200-foot-long, spur road would be required to access proposed structure P17 along Segment A (see Appendix A). Vegetation would be removed and the land would be graded to create a straight road about 12 to 14 feet wide.

A new, approximately 150-foot-long, spur road would be required to access proposed structure P18 along Segment A (see Appendix A). Vegetation would be removed and the land would be graded to create a straight road about 12 to 14 feet wide.

Temporary Access Road

Describe here the proposed temporary access road. How will it be constructed? How will it be restored so that it is a temporary rather than permanent road? How will you access the pole for maintenance after the road is restored?

Overland Travel

No overland travel routes are proposed to access work areas. Up to 30 passing locations outside of existing work areas and access roads may be required for vehicles to pass each other during construction. Passing areas would be located directly adjacent to existing access roads and would occur in primarily disturbed, ornamental, or non-native grassland areas. Passing lanes would typically be 15 feet wide and 30 feet long (450 square feet per location) and would involve minimal grading or other improvements.

Comment [sh11]: Data Need: Additional date is required on the temporary access road described in the comment below. Please fill in this information here. If the temporary road will be required in the future, please describe this road as permanent.

Comment [JDT12]: Potential access to Structures would be by temporary road, which would involve minor grading within the areas shown on DR5 Attachment B.

2.4.5 Overhead Transmission

This section describes the typical steps involved in constructing the overhead transmission segments.

Installation of New Transmission and Power Line Structures

New transmission structures would be installed on all segments. For each new overhead structure, a foundation would be installed and then the structure would be erected on the foundation. Concrete pier foundations or micropile foundations would be used, depending on geologic and site specific conditions. Blasting and dewatering may be necessary if hard rock or water, respectively, isare encountered. Soil may be imported if it is necessary to raise the elevation of structure pads; material removed from excavations and not needed would be spread over existing access roads and work pads or disposed of if dispersal is not feasible. Retaining walls would be installed as previously described.

Pad Construction

Prior to foundation construction, a 75 feet by 50 feet (typical) graded pad wouldill be constructed at each site. These pads are used to provide a level surface for installation of poles as well as for long--term maintenance of the structures. Cuts and fills are used to produce the 2% sloped pads. Most of the pads wouldill be built with the soil that is located onsite. There are a few sites that wouldill require retaining walls to achieve the desired slope.

Concrete Pier Foundations

Concrete pier foundations would be installed using a large auger. The steps for installing a concrete pier foundation are as follows:

1. Excavate 6- to 11-foot-diameter holes to 20 to 40 feet deep.
2. If soil is unstable, install steel casing to stabilize the sides of the excavation.
3. Install a reinforcing steel cage and anchor bolt cage in each hole.
4. Pour concrete into the excavation.
5. Allow concrete to cure over a 1-month period, during which time concrete forms would be removed and backfill would be placed around the foundations.

Micropile Foundations

Micropile foundations are typically installed from a platform about 6 feet aboveground that is put in place either by a truck-mounted crane or a helicopter. The platform is supported by four to six adjustable legs and contains the drill and generators or compressors to power the drill.

The steps for installing a micropile foundation are as follows:

1. Drill from the platform 4 to 16 small, 6- to 8-inch-diameter holes to 10 to 40 feet deep.
2. Insert a steel rod and center it in each excavation.
3. Fill the excavation with a non-shrink grout.

The platform would be removed once installation is complete.

Blasting

If rock is encountered when excavating foundation holes, SDG&E may use rock splitting or rock blasting to minimize the time it takes to excavate the foundation hole. Rock splitting involves drilling a hole in the rock and inserting a non-blasting propellant cartridge. An impact generation device then initiates the cartridge, causing the rock to crack without causing airborne rock pieces, noxious fumes, or ground vibrations.

Rock blasting would be used in situations where solid rock is encountered but the rock splitting technique would be ineffective. Blast holes (about 3 inches in diameter) would be drilled to the full depth of the excavation. Explosives would be detonated in the blast holes. SDG&E would use flyrock protection and dust control during rock blasting.

Dewatering

Although not anticipated, dewatering may be necessary if water is encountered during excavation for structure foundations. In the event that groundwater is encountered, dewatering activities would be conducted in accordance with all existing regulations and requirements. SDG&E may also use bentonite (water-absorbing clay) or another stabilizing material for foundation installation if water is present in the foundation excavation.

Structure Erection

Cranes, flatbed trucks, drill rigs, and excavators would be used to install transmission and power line structures. Flatbed trucks would deliver the poles in two or more sections to structure sites. Heavy lift helicopters may be used to transport poles to areas with limited access. A small truck-mounted crane would be used to assemble the poles on site. A crane would lift the pole and set it in place onto the anchor bolts in the pole foundation, and the pole would be attached to the foundation.

Removal of Existing Facilities

Existing facilities would be removed in the case of relocating existing transmission lines and in the case of removing existing pole structures.

Conductor Removal

Conductor would be removed from poles using wire trucks and pulling rigs; guard structures would be used where needed. For segments that would only be reconductored, existing hardware and insulators would be removed and replaced with new polymer insulators and hardware.

Pole Removal

For segments that would be removed from service, old metal poles and attached components would be dismantled using cranes, bucket trucks, and hand tools. Wood poles would be removed fully or cut about 2 feet below grade. Any remaining concrete foundations would be jackhammered to approximately 2 feet below grade, and the debris would be removed. The remaining hole would be backfilled with soil or materials similar to the surrounding area. Five of the existing wood H-frame structures, one steel H-frame structure, and one wood monopole structure on Segment A currently have distribution underbuild. These structures would be cut above the distribution circuits and the distribution portion of the existing would remain in place. This process is commonly referred to as "topping". Excess materials would be hauled away with trucks.

Conductor Stringing and Reconductoring

Conductor would be installed on new structures and replaced on existing structures where called for, as described in Section 2.3. Bundled lines would be placed onto structures using the same methods as described for reconductoring of a single line.

Guard Structures

Guard structures would be used during conductor stringing to prevent any dropped conductor from coming into contact with pedestrians, vehicles, or utilities (e.g., distribution lines and communication facilities) located beneath the stringing activities. Guard structures would also be used at crossings for large roadways and sensitive waterways. Anticipated guard structure locations are shown in Appendix A.

Two types of guard structures would be used. A guard structure may be constructed of wood poles embedded in the ground with a cross-beam. In this case, holes would be augered into the ground for the wood poles. A crane or a line truck would then lift the wood poles into place. Netting may be suspended between guard structures for larger crossings. Wood guard structures would be removed after stringing, and the augered holes would be backfilled with the excavated soil. Alternatively, a boom truck or bucket truck may be used as a guard structure; this option is typically used in paved areas. No foundations would be needed and no grading would occur for guard structures.

In lieu of guard structures, traffic control would be used during conductor stringing at road, freeway, and pedestrian crossings. Traffic control would involve flaggers temporarily holding traffic for short time periods while overhead line is installed. Larger crossings where traffic control is used could require closure of the road for longer periods of time. A combination of traffic control and guard structures with netting may be used for very large crossings, such as freeway crossings. Freeway crossings would be conducted according to California Department of Transportation (Caltrans) requirements, which could include traffic control, guard structures, netting, or any combination of these methods; methods would be outlined in the Caltrans encroachment permit that SDG&E would need to obtain for these parts of the project.

Conductor and OPGW Stringing

SDG&E would use aerial manlifts (e.g., bucket trucks) or helicopters to install sheaves or "rollers" on the pole structure prior to conductor installation. The sheaves would allow the conductor to be pulled past each structure prior to being pulled up to the final tension position. Following installation of the sheaves, a pull rope (a small cable used to pull the conductor) would be pulled onto the sheaves using a helicopter. Once the pull rope is in place, it would be attached to a steel cable and pulled back through the sheaves. The conductor would be attached to the cable and pulled back through the sheaves using conventional tractor-trailer pulling equipment located at the pull sites. This process would be repeated for each conductor and line segment (pull site to pull site).

After the conductor is pulled into place, the sags between the structures would be adjusted to a pre-calculated level at each stringing site. The line would be installed with minimum ground clearances, typically 30 feet of vertical clearance above drivable surfaces and 25 feet above non-drivable surfaces. The conductor would then be clipped into the end of each insulator, the sheaves would be removed, and vibration dampers and other accessories would be installed. This process would be repeated for each conductor and line segment.

Bundling
Conductor bundling would be achieved by adding an additional cable referred to as a "jumper" connecting both circuits together and spacing the conductor by a horizontal distance of 18 inches.

Grounding Rods
All steel poles would have at least two grounding rods, with the top of the rod buried 6 to 18 inches below ground. Additional grounding rods may be installed if required by the soil conditions. The rods would be approximately 8 feet long and would be spaced about 6 feet apart in work areas. Permanent impacts from grounding rod installation would be less than 1 square foot per transmission structure.

Marker Balls
Marker balls would be required on up to 15 conductor spans. The use of marker balls depends on the Federal Aviation Administration's (FAA) determination of whether the structure would propose a hazard to air navigation. Anticipated marker ball locations are shown in Appendix A. Final marker ball locations wouldill be determined by FAA.

Lighting
Lighting could be required on up to nine structures (P1, P2, P3, P4, P35, P36, P37, E2, and E3). The use of lighting on proposed structures would be determined by the FAA.

2.4.6 Underground Transmission

Trenching
SDG&E would utilize the DigAlert system which notifies other utility companies to locate and mark existing underground utilities along the proposed underground alignment prior to trenching. SDG&E would also conduct exploratory excavations (potholing) to verify the locations of existing facilities in the ROW. Vegetation would be removed in the trench areas, and up to 5 landscape trees could be removed from within the median of Carmel Valley Road.

Typical trench dimensions would be a minimum of 6.5 feet deep and 3.5 feet wide. The trench would be shored if necessary to meet California Occupational Safety and Health Administration (CalOSHA) requirements. Maximum trench width would be 8.8 feet along four, 80-foot long sections (320 feet in total) of the underground alignment. If trench water is encountered, trenches would be dewatered using a portable pump and recovered water would be disposed of in accordance with existing regulations and requirements.

Vault Installation
SDG&E would install the precast vaults in the trench. Backfill would be placed, grouted, and compacted. The excavated area would then be repaved if it was paved prior to excavation of the trench.

Duct Bank Installation
SDG&E would install the majority of the duct bank using open-cut trenching techniques. Most of the duct bank would have a double-circuit vertical duct bank configuration, with occasional transitions to a flat configuration to clear existing structures in highly congested areas or to fan out to termination structures at the cable pole transition area.

SDG&E would install the conduits and place concrete around the conduits to form the duct bank encasement as each section of the trench for the duct banks is completed. The duct banks would be, at a minimum, 3 feet below the ground surface. A fluidized thermal backfill would be placed to fill almost all of the remainder of the trench. Soil, an aggregate road base, or concrete slurry with an asphalt concrete cap would be installed to restore the road in compliance with local requirements. As trenches are being filled in one segment, additional trench would be opened further down the street, with the process continuing until the entire duct bank is in place.

The undergrounded portion of the Proposed Project (Segment B) would cross an existing bridge about 1.2 miles west of Camino Del Sur on Carmel Valley Road. At the bridge, the duct bank would be placed in an empty bridge cell. A 40-inch-diameter bore would be completed at each end of the bridge so that the line could be pulled through the abutment wall and bridge end diaphragms. Two 30-inch-square openings would be cut into the bridge to provide working access to the cell. Duct spacers and supports would be installed at 4- to 6-foot intervals along the length of the cell to support the ducts and maintain spacing. The openings in the bridge deck would be closed after the duct package is installed.

Cable Pulling, Splicing, and Termination
SDG&E would install cables in the duct bank once the duct banks and vaults are installed. Each cable segment would be pulled through the duct bank and cable ends spliced together in each vault along the route. At each end of Segment B, the cables wouldill be terminated at the transition area where the lines transition to the overhead sections. A cable reel and a pulling rig, each item placed at opposing ends of the cable segment, would be used to pull the cable through the ducts. It is anticipated that two cable segments would be pulled through the ducts per day. After cables are pulled through the ducts, a splice trailer would be set up adjacent to the vault, one at a time, in order to complete the cable splicing.

2.4.7 Substations and Encina Hub

Sycamore Canyon Substation
The following steps would occur to connect the proposed 230-kV transmission line to the Sycamore Canyon Substation:

- The proposed 230-kV transmission line would be strung on three existing TSPs to connect to the substation.
- Five existing transmission lines (TL 23021, TL 23041, TL 23051, TL 23054, and TL 23055) would be transferred from existing bay positions to new bay positions. The protective relays of each line would be rewired to the new bay positions.
- Two new 230-kV TSPs would be erected within and immediately adjacent to the substation to accommodate the transfer of the existing 230-kV power line (TL 23041).
- The existing 138-kV power line (TL 13820) would be relocated to an underground position approximately 850 feet in length and connect to the substation in a new bay position. One 138-kV breaker, two 138-kV disconnects, and an underground termination structure with foundations would be installed, and protective relays would be added to accommodate the new position for the tieline. Relays for the existing 138-kV bay position would be modified to protect the remaining section of bus.
- One 230-kV circuit breaker and two 230-kV disconnects would be installed. Protective relays would be added in the control shelter and wired to the breakers in the new 230-kV bay position.
- One 230-kV capacitor voltage transformer (CVT) would be installed for synch potential.

Peñasquitos Substation
The following steps would occur to connect the proposed 230-kV transmission line to the Peñasquitos Substation:

- The proposed 230-kV transmission line would be strung on an existing TSP north of the substation fence line and terminate into a vacant position in the substation.
- Two 230-kV circuit breakers and four 230-kV disconnects would be added to the bay for the proposed 230-kV transmission line. Termination structure and foundations would be installed. Protective relays wouldill be added in the control shelter and wired to the breakers in the proposed 230-kV bay.
- Two existing 69-kV power lines, TL 675 and TL 6906, would connect to the substation from new steel cable poles and existing ductbanks.
- One 230-kV CVT would be installed for synch potential.

Chicarita and San Luis Rey Substations
Minor modifications would be required at the Chicarita and San Luis Rey Substations. Activities would include adjusting relays to project the stubs of any abandoned bus systems or to maintain protection systems and upgrading protection on remaining transmission lines to improve reliability.

Mission – San Luis Rey Phase Transposition

The following steps would occur to transposition the phasing between the Mission Substation and the Peñasquitos Junction (intersection of Segments C and D) and the anticipated work areas are shown on Figure 2.3-5g:

- Site preparation and clear and ground circuits
- Mobilize crews and utilize cranes to hold the conductor tension on the existing phases
- Disconnect phase A and move it to phase C position between two existing structures
- Disconnect phase C and move it to phase A position between two existing structures
- Install permanent dead ends on the reconfigured phases A and C

Encina Hub

The following steps would occur to reconfigure the 230-kV transmission lines at Encina Hub and the anticipated work areas are shown on Figure 2.3-5f:

- Remove jumpers between tower E37 and tower E38
- Transfer the existing conductor between tower E36 and tower E37 from the south side to the north side of tower E37
- Install jumpers from tower E37 to tower E38
- Install new conductor from tower E37 to tower E34 or E35 with a small helicopter
- Install dead ends assemblies, dampers and spacers

2.4.8 Helicopter Use

A Preliminary Helicopter Use Plan has been prepared for the project (Appendix X of this Draft EIR). As described in the Helicopter Use Plan, helicopters would be used on the Proposed Project for stringing overhead conductor, installing or removing structures, and transporting equipment and personnel. While Hhelicopters are anticipated to be light- or medium-duty, while there is a low potential for heavy-duty helicopter usage. Helicopter use would occur during the day, and flight paths would typically follow the existing ROW, except when accessing the project ROW and work areas from adjacent landing areas and airports. Based on the current anticipated construction schedule of approximately one year, the project could potentially use multiple helicopters. At a minimum, one helicopter would be used for approximately seven to 10 months during the construction period. An additional helicopter may, could be used for up to approximately four months during the construction period depending upon the final sequencing of construction. The second helicopter cwould be used if multiple types of activities requiring helicopter operation (such as conductor stringing and material transport) occur simultaneously or if one type of activity requiring helicopter operation occurs at two separate locations along the project alignment and one helicopter is not sufficient.

Helicopter use would comply with FAA requirements. SDG&E would also coordinate with local air traffic control prior to all flights to prevent conflict with local airport air traffic. A

Congested Area Plan (CAP) and individual helicopter lift plans would be prepared, if required per FAA regulations. Prior to any helicopter operations, SDG&E's Aviation Services Department (ASD) would~~ill~~ review ~~look at~~ each anticipated helicopter incidental landing area (ILA), to ensure there is adequate clearance for planned operations.

2.4.9 Water Use

Water would~~ill~~ be used for dust control, increasing moisture content in soil used as compacted fill, fire suppression, and irrigation for seeded/planted areas requiring revegetation. The estimated water demand from construction is approximately 25 million gallons over 12 months. The estimated quantity of water is based on an assumed number of water trucks and the frequency of watering that would be required during construction. The City of San Diego Public Utilities Department, in a letter dated September 30, 2014, confirmed the availability of 25 million gallons of potable and recycled water for project construction.

In general, it has been assumed that during construction watering would occur every 2 to 4 hours using approximately three water trucks along the ROW and at the staging yards. Factors such as wind speed, precipitation, temperature, and moisture content of fill material could impact (increase or decrease) the quantity of water required for the project. If reclaimed water used during construction, SDG&E would~~ill~~ comply with all applicable permitting requirements associated with the use of reclaimed water.

2.4.10 Traffic Management

Standard traffic control methods would be employed to minimize traffic impacts during construction. In addition, along Carmel Valley Road (Segment B) other specific measure may be utilized. These may include, but are not limited to, flagging, signage, detours, Type II barricades, K-rails, cones, and adjusted working hours. The final alignment would~~ill~~ consider both traffic impacts during construction as well as ongoing operation and maintenance activities. A traffic control plan would be completed and approved by the City of San Diego prior to the start of any portion of construction of Proposed Project Segment B.

Traffic Management/Control Plans would be developed by SDG&E and approved by Caltrans prior to the start of construction for the SR-56 or I-15 locations where the conductor crosses over the roadway. Typical measures that could be included within the Traffic Control Plan(s) include:

- All traffic control plans would be developed, reviewed, and approved by the authority having jurisdiction of the specific roadway being impacted (Caltrans). Traffic control plans would include vehicular and non-vehicular traffic.
- Typically, for overhead transmission construction, traffic would be temporarily stopped when the sock line is flown over the SR-56 and I-15 highway crossings.
- Guard structures would be used on both sides of conductor crossings at the SR-56 and I-15 locations during the entire duration of stringing operations at that particular section of the project. Netting may be installed between the guard structures.

- Traffic would be stopped in the event that an external load, such as a structure section, is being flown over a public road including the SR-56 and I-15 highway crossings. The temporary stops would be no more than a few to several minutes.

Comment [sh13]: **Data Need:** How many is this? Please quantify.

2.4.11 Site Cleanup and Waste Disposal

As part of final construction activities, SDG&E would:

- Restore all removed curbs, gutters, and sidewalks.
- Repave all removed or damaged paved surfaces.
- Restore landscaping or vegetation as necessary.
- Replace any damaged or removed fencing.
- Remove all construction materials from the construction site.

SDG&E would restore all temporarily disturbed areas used during construction and that would not be maintained for operation and maintenance purposes (see Section 2.5 for a discussion of areas maintained during the operation and maintenance phase). Areas would be restored to approximate preconstruction conditions. Restoration activities may include reseeding, planting, and structure replacement.

All construction materials and debris would be removed from the project areas and recycled or otherwise disposed of off-site. SDG&E would conduct a survey to ensure and document that cleanup activities were successfully completed.

Stormwater Pollution Prevention Plan

To obtain coverage under the Construction General Permit, SDG&E would submit Permit Registration Documents, including a Notice of Intent, to the State Water Resources Control Board (SWRCB) and develop a SWPPP that complies with the Construction General Permit requirements. SDG&E would also receive a SWRCB-issued Waste Discharger Identification number before starting construction activities. SDG&E would implement the SWPPP during construction, which would include requirements for inspections and monitoring, BMPs, and requirements to revise the SWPPP and implement revisions as needed to protect stormwater quality. BMPs would also adhere to SDG&E's *Best Management Practices Manual for Water Quality Construction* dated July 2011.

The SWPPP describes:

- The project location, site features, area of disturbance, dates of construction, and types of materials and activities that may result in pollutant discharges.
- BMPs to implement during construction. The BMPs are selected to control erosion, discharge of sediments, and other potential impacts associated with construction activities.
- An inspection and maintenance program for BMPs.
- A sampling and analysis plan for monitoring pollutant discharges to water bodies, if required.

SDG&E must submit a Notice of Termination (NOT) to the SWRCB after completing a project subject to the Construction General Permit in order to be relieved of the permit requirements. Final soil stabilization throughout the project area must be achieved before the SWRCB will approve the NOT.

Hazards and Hazardous Materials

Hazardous wastes that could be used during project construction include:

- Gasoline
- Diesel
- Propane
- Insulating oil
- Brake fluid
- Hydraulic fluid
- Engine oils
- Battery acid
- Methyl alcohol
- Contact cleaner 2000
- Sulfur hexafluoride

Waste Management

SDG&E would attempt to reuse, recycle, or donate all old structures, poles, materials, and components not needed for the Proposed Project. Materials that could not be reused, recycled, or donated would be disposed of at an appropriate facility. Table 2.4-5 describes the likely end use of waste generated during the project.

Table 2.4-5: Typical End Destination of Removed Materials

Material	End Destination
Wood power line structures and poles	Donated for reuse or disposed of at appropriate facility
Conductor	Recycled
Insulators	Disposed of at appropriate facility
Scrap metal	Recycled
Concrete	Recycled
Soils	Reused on site or disposed of at appropriate facility
Batteries	Recycled

2.4.12 Workforce and Equipment

SDG&E personnel on the project would include construction crews, environmental monitors, construction inspectors, and SDG&E personnel. Crews may be working simultaneously along the project alignment and substations, with up to approximately 100 people working at one time. Workers, monitors, and inspectors needed for each construction activity are listed in Table 2.4-6. Table 2.4-6 also lists the equipment that would be needed for each project activity.

Table 2.4-6: Construction Equipment Use and Workers

Segment	Activity	Equipment, Workers	Quantity	Equipment, Workers	Quantity
All	Yard preparation, mobilization	**Workers**	**4 to 16**	Forklift	4
		Environmental Monitors and Construction Inspectors	2	Grader	2
		2-ton flatbed truck	2	Line truck	2
		Air compressor	4	Mobile fueling truck	2
		Backhoe	2	Mower/brush hog	2
		Boom truck	2	Pickup truck (regular cab)	4
		Bulldozer	2	Pickup truck (crew cab)	2
		Crane Truck	1	Portable generator	4
		Crane	1	Tool van	2
		Dump truck	4	Tractor/trailer unit	4
		Flatbed boom truck	2	Water truck	2
A, C, D	Overhead testing and commissioning	**Workers**	**7 to 9**	Pickup truck (regular cab)	4
		Environmental Monitors and Construction Inspectors	2	Pickup truck (crew cab)	2
		Aerial bucket truck	2	Portable generator	1
		Line truck	2	Water truck	1
A	Wire and structure removals	**Workers**	**9 to 11**	Line truck	2
		Environmental Monitors and Construction Inspectors	3	Mobile fueling truck	1
		2-ton flatbed truck	2	Mower/brush hog	1
		Aerial bucket truck	3	Pickup truck (regular cab)	5
		Air compressors	1	Pickup truck (crew cab)	2
		Backhoe	1	Portable generator	1
		Crane	2	Pulling rig/wire puller	1
		Dump truck	2	Wire tensioner	1
		Flatbed boom truck	2	Water truck	1
	Site Preparation and Road Construction	**Workers**	**4 to 10**	Grader	1
		Environmental Monitors and Construction Inspectors	3	Mobile fueling truck	1

Table 2.4-6: Construction Equipment Use and Workers					
Segment	**Activity**	**Equipment, Workers**	**Quantity**	**Equipment, Workers**	**Quantity**
		Air compressor	1	Mower/brush hog	1
		Backhoe	1	Pickup truck (regular cab)	5
		Bulldozer	1	Pickup truck (crew cab)	2
		Dump truck	1	Water truck	1
	Foundation construction	**Workers**	**6 to 11**	Dump truck	2
		Environmental Monitors and Construction Inspectors	4	Flatbed boom truck	1
		2-ton flatbed truck	1	Hydraulic rock splitting/rock drilling equipment	1
		Air compressor	1	Mobile fueling truck	1
		Concrete truck	10	Pickup truck (regular cab)	6
		Crane truck	1	Pickup truck (crew cab)	2
		Crane	1	Portable generator	2
		Drill rig/truck-mounted auger	2	Water truck	2
	Structure Assembly and Erection	**Workers**	**6 to 10**	Pickup truck (regular cab)	4
		Environmental Monitors and Construction Inspectors	2	Pickup truck (crew cab)	2
		Air compressor	1	Portable generator	1
		Crane	2	Tractor/trailer unit	2
		Line truck	2	Water truck	1
		Mobile fueling truck	1		
	Wire stringing	**Workers**	**10 to 27**	Pickup truck (regular cab)	1
		Environmental Monitors and Construction Inspectors	4	Pickup truck (crew cab)	9
		Aerial bucket truck	3	Portable generator	6
		Air compressors	1	Pulling rig/wire puller	1
		Bulldozer	2	Wire tensioner	1
		Crane	1	Tool van	1
		Light helicopter	1	Tractor/trailer unit	1

Table 2.4-6: Construction Equipment Use and Workers					
Segment	**Activity**	**Equipment, Workers**	**Quantity**	**Equipment, Workers**	**Quantity**
		Line truck	1	Wire boat (wire trailer)	6
		Mobile fueling truck	1	Water truck	1
	Cleanup and restoration	**Workers**	**4 to 10**	Grader	1
		Environmental Monitors and Construction Inspectors	2	Mower/brush hog	1
		2-ton flatbed truck	1	Pickup truck (regular cab)	4
		Backhoe	1	Pickup truck (crew cab)	2
		Bulldozer	1	Water truck	2
		Dump truck	1		
B	Excavation and Install Vaults and Trench	**Workers**	**36 to 62**	Jackhammer	4
		Environmental Monitors and Construction Inspectors	4	Mobile fueling truck	1
		Air compressors	1	Paver	2
		Backhoe	2	Pickup truck (regular cab)	12
		Bulldozer	2	Pickup truck (crew cab)	12
		Concrete saw	2	Tool van	1
		Concrete trucks	9	Tractor/trailer unit	4
		Crane	1	Vacuum truck	2
		Dump truck	26	Water truck	2
	Ducts through bridge	**Workers**	**6 to 10**	Flatbed boom truck	1
		Environmental Monitors and Construction Inspectors	2	Pickup truck (regular cab)	4
		Air compressor	1	Pickup truck (crew cab)	2
		Boom truck	2		
	Cleaning and proving ducts	**Workers**	**7 to 9**	Pickup truck (regular cab)	4
		Environmental Monitors and Construction Inspectors	2	Pickup truck (crew cab)	2
		Line truck	1	Pulling Rig/Wire puller	1
	Cabling	**Workers**	**16 to 18**	Pickup trucks (crew cab)	5
		Environmental Monitors and Construction	2	Pulling Rig/Wire puller	2

Table 2.4-6: Construction Equipment Use and Workers

Segment	Activity	Equipment, Workers	Quantity	Equipment, Workers	Quantity
		Inspectors			
		Boom truck	1	Wire tensioner	2
		Line truck	1	Tool van	1
		Mobile Fueling truck	1	Tractor/trailer unit	2
		Pickup truck (regular cab)	6	Wire boat (wire trailer)	6
	Cable Testing and Commissioning	**Workers**	**7 to 9**	Pickup truck (crew cab)	2
		Environmental Monitors and Construction Inspectors	2	Portable generator	1
		Pickup truck (regular cab)	4	Tool van	1
C	Wire and Structure Removals	**Workers**	**9 to 10**	Line truck	1
		Environmental Monitors and Construction Inspectors	3	Mobile fueling truck	1
		2-ton flatbed truck	2	Mower/brush hog	1
		Aerial bucket truck	3	Pickup truck (regular cab)	5
		Air compressor	1	Pickup truck (crew cab)	2
		Backhoe	1	Portable generator	1
		Crane	1	Pulling rig/wire puller	1
		Dump truck	1	Wire tensioner	1
		Flatbed boom truck	1	Water truck	1
	Site Preparation and Road Construction	**Workers**	**4 to 10**	Grader	1
		Environmental Monitors and Construction Inspectors	2	Mower/brush hog	1
		Air compressor	1	Pickup truck (regular cab)	2
		Backhoe	1	Pickup truck (crew cab)	2
		Bulldozer	1	Portable generator	1
		Dump truck	1	Water truck	1
	Wire stringing	**Workers**	**10 to 27**	Pickup truck (regular cab)	9
		Environmental Monitors and Construction Inspectors	3	Pickup truck (crew cab)	6

Table 2.4-6: Construction Equipment Use and Workers					
Segment	**Activity**	**Equipment, Workers**	**Quantity**	**Equipment, Workers**	**Quantity**
		Aerial bucket truck	3	Portable generator	1
		Air compressor	1	Pulling rig/wire puller	1
		Bulldozer	2	Wire tensioner	1
		Crane	1	Tool van	1
		Light helicopter	1	Tractor/trailer unit	1
		Line truck	1	Wire boat (wire trailer)	6
		Mobile fueling truck	1	Water truck	1
	Cleanup and restoration	**Workers**	**4 to 10**	Grader	1
		Environmental Monitors and Construction Inspectors	2	Mobile fueling tank	1
		2-ton flatbed truck	1	Mower/brush hog	1
		Backhoe	1	Pickup truck (regular cab)	4
		Bulldozer	1	Pickup truck (crew cab)	2
		Dump truck	1	Water truck	1
D	Wire and Structure Removals	**Workers**	**9 to 11**	Line truck	2
		Environmental Monitors and Construction Inspectors	4	Mobile fueling truck	1
		2-ton flatbed truck	2	Mower/brush hog	1
		Aerial bucket truck	3	Pickup truck (regular cab)	5
		Air compressor	1	Pickup truck (crew cab)	2
		Backhoe	1	Portable generator	1
		Crane	2	Pulling rig/wire puller	1
		Dump truck	2	Wire tensioner	1
		Flatbed boom truck	2	Water truck	1
	Site Preparation and Road Construction	**Workers**	**4 to 10**	Mobile fueling truck	1
		Environmental Monitors and Construction Inspectors	2	Mower/brush hog	1
		Air compressor	1	Pickup truck (regular cab)	5
		Backhoe	1	Pickup truck (crew cab)	2
		Bulldozer	1	Portable generator	1

Table 2.4-6: Construction Equipment Use and Workers					
Segment	**Activity**	**Equipment, Workers**	**Quantity**	**Equipment, Workers**	**Quantity**
		Dump truck	1	Water truck	1
		Grader	1		
	Foundation construction	**Workers**	**3 to 8**	Dump truck	1
		Environmental Monitors and Construction Inspectors	2	Flatbed boom truck	1
		2-Ton flatbed truck	1	Mobile fueling truck	1
		Air Compressor	1	Pickup truck (regular cab)	4
		Concrete truck	10	Pickup truck (crew cab)	2
		Crane Truck	1	Portable generator	1
		Crane	1	Water truck	1
		Drill rig/truck-mounted auger	1		
	Structure Assembly and Erection	**Workers**	**6 to 10**	Pickup truck (regular cab)	4
		Environmental Monitors and Construction Inspectors	2	Pickup truck (crew cab)	2
		Air Compressor	1	Portable generator	1
		Crane	2	Tractor/trailer unit	2
		Line Truck	2	Water truck	1
		Mobile fueling tank	1		
	Wire stringing	**Workers**	**10 to 27**	Pickup truck (regular cab)	9
		Environmental Monitors and Construction Inspectors	3	Pickup truck (crew cab)	6
		Aerial bucket truck	3	Portable generator	1
		Air compressor	1	Pulling rig/wire puller	1
		Bulldozer	2	Wire tensioner	1
		Crane	1	Tool van	1
		Light helicopter	1	Tractor/trailer unit	1
		Line truck	1	Wire boat (wire trailer)	6
		Mobile fueling truck	1	Water truck	1
	Cleanup and restoration	**Workers**	**4 to 10**	Grader	1
		Environmental Monitors	2	Mower/brush hog	1

Table 2.4-6: Construction Equipment Use and Workers

Segment	Activity	Equipment, Workers	Quantity	Equipment, Workers	Quantity
		and Construction Inspectors			
		2-ton flatbed truck	1	Pickup truck (regular cab)	4
		Backhoe	1	Pickup truck (crew cab)	2
		Bulldozer	1	Water truck	2
		Dump truck	1		
Sub-stations	Encina Hub	Tensioner	1	Puller	1
		Wire Truck	1	Boom Truck	2
		Crane Basket Truck	2	Winch Truck	1
		Foreman truck	1	MD500 (small helicopter)	1
	Sycamore & Peñasquitos Substations (equipment is the same for both)	Backhoe	1	Flat-bed truck	2
		Skip Loader	1	Boom truck	1
		Dump Truck	1	Pickup truck	2
		Line truck	2	Relay van	2
	Mission Substation	Relay van	1		

Table 2.4-7 describes the typical use of equipment for the Proposed Project.

Table 2.4-7: Equipment Use

Type	Use	Type	Use
2-ton flatbed truck	Haul materials (including new poles)	Helicopter	Transport materials, structures and personnel; string conductor; install and remove travelers; set structures
Aerial bucket truck	Access poles, string conductor, modify structure arms, provide guard structures, etc.	Hydraulic rock-splitting/rock-drilling equipment	Drill through rock
Air compressor	Operate air tools	Jackhammer	Break concrete and asphalt
Backhoe	Excavate trenches	Line truck	Install clearance structures
Boom truck	Access poles and other height-restricted items	Mobile fueling truck	Refuel equipment
Bulldozer	Repair access roads	Mower	Clear vegetation
Concrete saw	Cut concrete and asphalt	Paver	Paving new asphalt

Table 2.4-7: Equipment Use			
Type	**Use**	**Type**	**Use**
Concrete truck	Transport and process concrete	Pickup truck	Transport construction personnel
Crane truck	Lift and position structures	Portable generator	Operate power tools
Crane	Lift and position structures	Pulling rig	Pull conductor
Drilling rig/truck-mounted auger	Excavate for direct-bury and micropile poles	Tool van	Tool storage
Dump truck	Haul excavated materials/import backfill	Tractor/trailer van	Transport materials at structure sites and staging yards
Excavator	Excavate soils/materials (trenching)	Vacuum truck	Pump water and liquids
Flatbed boom truck	Haul and unload materials	Water truck	Transport and apply water for dust control
Forklift	Transport materials at structure sites and staging yards	Wire truck	Hold spools of wire
Grader	Road construction and maintenance		

2.4.13 Construction Schedule

The project is anticipated to take approximately 12 months to complete. Construction would begin in June 2016 and would end in May 2017. Table 2.4-8 summarizes the likely construction schedule.

Table 2.4-8: Proposed Construction Timetable		
Segment	**Task**	**Estimated Work Dates**
All	Staging Yard Preparation and Mobilization	June through July 2016
A	Site Preparation and Road Construction	July through August 2016
	Foundation Construction	August through September 2016
	Wire and Structure Removal	September through October 2016
	Structure Assembly and Erection	November through December 2016
	Wire Stringing	December 2016 through February 2017
	Cleanup and Restoration	March 2017
B	Excavation Vaults and Trench	June through November 2016
	Ducts through Bridge	August through October 2016
	Cleaning and Proving Ducts	December 2016

Table 2.4-8: Proposed Construction Timetable		
Segment	**Task**	**Estimated Work Dates**
	Cabling	January through February 2017
	Cable Testing and Commissioning	March through April 2017
C	Site Preparation and Road Construction	September 2016
	Wire and Structure Removal	October 2016
	Wire Stringing	November 2016
	Cleanup and Restoration	December 2016
D	Site Preparation and Road Construction	October 2016
	Foundation Construction	October through November 2016
	Wire and Structure Removal	February 2017
	Structure Assembly and Erection	January 2017
	Wire Stringing	March through April 2017
	Cleanup and Restoration	May 2017
A, C, D	Overhead Testing and Commissioning	May 2017

2.5 OPERATION AND MAINTENANCE

SDG&E currently operates and maintains similar transmission facilities along all of the Proposed Project alignment except the undergrounded Segment B. SDG&E would continue to regularly inspect, maintain, and repair the new and reconstructed transmission line, power line, and distribution line facilities and substations following completion of Proposed Project construction. Operation and maintenance of the aboveground and underground facilities are described in greater detail below.

2.5.1 Aboveground Facilities (Segments A, C, and D; Substations)

Permanent Work Areas

Permanent work areas would need to be maintained around the majority of the structures. Operation and maintenance would use existing work areas and roads, but some additional permanent work areas would need to be maintained to operate the Proposed Project. Table 2.5-1 summarizes new permanent work areas, all of which are within the temporary work areas described in Section 2.4.3 and Table 2.4-2.

Table 2.5-1: New Permanent Work Areas		
Work Area	**Quantity**	**Approximate Area (acres)**
New Structure Operation Work Pads	63	6.8
New Permanent Spur Roads	3	Included in pad work area

Comment [sh14]: **Data Need:** Will the temporary road be needed during maintenance? If so, it should be called a permanent access road and included in this table.

New poles would require a permanent maintenance pad that is typically about 50 feet by 75 feet (3,750 square feet) in size. Approximately 15 feet of clearance (approximately 700 square feet) would be maintained around new transmission poles for maintenance and inspection activities as required by CPUC General Order 95 and California Public Resources Code 4292. SDG&E would therefore keep the areas clear of shrubs and other obstructions for fire prevention purposes. SDG&E would trim vegetation that grows within 10 horizontal feet of any conductor within the ROW, if that vegetation has a mature height of 15 feet or greater. Herbicides would be used for some vegetation maintenance activities. Cleared areas would commonly overlap with permanent maintenance pads.

Inspections and Maintenance

SDG&E operations and maintenance on Segments A, C, and D would be substantially the same in intensity, frequency, duration, and type as existing operations and maintenance activities, given that there are existing facilities along all of these proposed aboveground segments. Typical activities include routine inspections and preventative maintenance. SDG&E would use helicopters for annual inspections of the overhead facilities; this activity would take about one day. Ground patrols would also be used. Inspections are used to identify corrosion, equipment misalignment, loose fittings, and other common mechanical problems. Typical maintenance would include access repairs, repairs and replacements of equipment, and insulator washing. Helicopters would be used in the case of an outage or service curtailment to patrol power lines in areas with no vehicle access or with rough terrain.

2.5.2 Underground Facilities (Segment B)

Permanent Work Areas

Permanent work areas would need to be maintained around the two cable poles installed on Segment B. The splice vault manholes would also be permanently maintained areas. Table 2.5-2 summarizes new permanent work areas, all of which are within the temporary work areas described in Section 2.4.3 and Table 2.4-2.

Table 2.5-2: New Permanent Work Areas

Work Area	Quantity	Approximate Area (acres)
New Structure Operation Work Pads and fence perimeter	2	0.1
Splice Vault Manhole	20	0.002

Inspections and Maintenance

Inspections of the undergrounded segment would be conducted annually from the ten new vaults. SDG&E would implement traffic control to access the vaults. Inspections would be done visually, as entry into the vaults with energized lines is not permitted. Inspections could also be performed with infrared, partial discharge monitoring, and other diagnostic instrumentation.

Each vault inspection would take less than one day. Maintenance could include cable repair and cable connection repair.

2.5.3 Substations

The affected substations would be operated and maintained as they are presently. Typical maintenance activities include equipment testing, equipment monitoring and repair, and emergency and routine procedures for service continuity and preventative maintenance. A major maintenance inspection would typically take place annually, lasting approximately one week.

Routine vegetation maintenance such as clearing and landscaping would continue to occur at each substation on an as-needed basis for purposes of safety, access, and aesthetics. Vegetation clearing activities would typically involve the presence of one or two small maintenance vehicles and one or more employees to clear or trim vegetation to achieve the minimum necessary working space around the substation facilities.

2.6 APPLICANT PROPOSED MEASURES AND NCCP/HCP OPERATIONAL PROTOCOLS

2.6.1 Applicant Proposed Measures

SDG&E included Project Design Features and Ordinary Construction/Operation Restrictions as well as Applicant Proposed Measures (APMs) in its April 2014 PEA. Both types of environmental commitments are referred to here as APMs. SDG&E proposes to implement these measures during the design, construction, and operation of the Proposed Project to avoid or minimize potential environmental impacts. APMs are considered part of the Proposed Project in the evaluation of environmental impacts. The APMs are presented in Table 2.6-1.

Table 2.6-1: Applicant Proposed Measures

APM Number	Requirements
Aesthetics	
APM AES-1: Visual Screening	Where staging yards are visible to the public, opaque mesh or slats (or equivalent material) will be installed along the fence that will screen view of the staging yards from public vantage points, such as roads and residences.
APM AES-2: Re-vegetation	When Proposed Project construction has been completed, all temporarily disturbed terrain will be restored, to the extent practical, to approximate preconstruction conditions while maintaining adequately safe work areas for operation and maintenance activities, as needed. Re-vegetation will be used, where appropriate (re-vegetation in certain areas is not possible due to vegetation management requirements related to fire safety) to re-establish a natural appearing landscape and reduce potential visual contrast between disturbed areas and the surrounding landscape. In addition, all construction materials and debris will be removed from the Proposed Project area and recycled or properly disposed of off-site.
APM AES-3: Cable Pole Screening	Final design of the eastern and western cable poles will consider design measures, such as landscaping installed outside of new perimeter chain-link fencing.

Table 2.6-1: Applicant Proposed Measures

APM Number	Requirements
APM AES-4: Temporary Lighting	Temporary security lighting at staging and storage areas will be directed on site and away from any sensitive receptors.
APM AES-5: Glare	New pole structures are designed utilizing dulled galvanized steel to minimize the potential for visual impacts relating to glare. Non-specular conductors are used to reduce potential glare. New fencing installed as part of the Proposed Project, including fencing around new cable poles, will be a dull, non-reflective finish or vinyl coated to reduce potential glare.
Air Quality and Greenhouse Gas Emissions	
APM AIR-1: Dust Control	All unpaved demolition and construction areas shall be wet/ watered at least three times daily during construction, and temporary dust covers shall be used to reduce dust emissions and meet SDAPCD Rule 55 requirements. All construction areas shall be sufficiently dampened to control dust caused by construction and hauling, and at all times provide reasonable dust control of areas subject to windblown erosion. All loads shall be secured by covering or use of at least 2 feet of freeboard to avoid carryover. All materials transported off-site shall be either sufficiently watered or securely covered. All earthmoving or excavation activities shall be discontinued during periods of winds greater than 25 miles per hour (mph) to prevent excessive amounts of fugitive dust generation.
APM AIR-2: Vehicle and Equipment Exhaust	All equipment shall be properly tuned and maintained in accordance with manufacturer specifications. An Idling Restrictions Program shall be implemented. SDG&E or its contractor shall maintain and operate construction equipment to minimize exhaust emissions. During construction, trucks and vehicles in loading and unloading queues shall have their engines turned off after 5 minutes when not in use. Construction activities shall be phased and scheduled to avoid emissions peaks, and equipment use shall be curtailed during second-stage smog alerts. This will also result in a significant decrease in impacts from Diesel Particulate Matter. All areas where construction vehicles are typically parked, staged, or operating shall be visibly posted with signs stating "No idling in excess of 5 minutes." Catalytic converters shall be installed on all heavy construction equipment, where feasible. To the extent possible, power shall be obtained from power or distribution poles (i.e., from the electrical grid) rather than through the use of large generators on-site. Deliveries shall be scheduled during off-peak traffic periods to reduce trips during the most congested periods of the day, where feasible. SDG&E would encourage carpooling to reduce worker trips where feasible. Construction sites shall be posted with signs providing a contact number for complaints. All complaints shall be addressed in a timely and effective manner.
APM AIR-3: VOC Emissions	Low- and non-VOC containing coatings, sealants, adhesives, solvents, asphalt, and architectural coatings shall be used to reduce VOC emissions.
APM AIR-4: Equipment Emission Standards	All equipment will meet a minimum of USEPA Tier 2 emission standards. For the purpose of this evaluation, equipment would be comprised of a mix of 70 percent Tier 2 equipment and 30 percent Tier 3 equipment. All on-road heavy-duty vehicles, off-road construction vehicles, and portable equipment used in the project will comply with CARB's Airborne Diesel Air Toxic Measures (ATCMs).
APM AIR-5: Greenhouse Gases	Equipment and vehicles supporting construction of the Proposed Project would comply with the requirements implemented by CARB to reduce GHG emissions and would be consistent with AB 32's goals. Additionally, SDG&E would implement ongoing standard internal programs and practices that ensure compliance with CARB's SF_6 regulations and maximum emission rates.

Table 2.6-1: Applicant Proposed Measures

APM Number	Requirements
Biological Resources	
APM BIO-1: Special-Status Plant Species	Implementation of the following measures will ensure impacts to special-status plant species remain less than significant: • Prior to construction, SDG&E shall retain a qualified biologist to conduct focused, special-status plant surveys during the spring and summer 2014 in all habitats that may support the special-status plant species with a potential to occur in the Proposed Project Survey Area. • Locations of special-status plants shall be identified and inventoried. • The qualified biologist shall supervise construction activities within the vicinity of areas identified as having special-status plant species. • Impacts to special-status plant species shall be avoided to the maximum extent possible by installing fencing or flagging, marking areas to be avoided in construction areas, and limiting work in areas identified as having special-status plant species to periods of time when the plants have set seed and are no longer growing. Where impacts to special-status plant species are unavoidable, the impact shall be quantified and compensated though off-site land preservation, plant salvage, transplantation, or other appropriate methods as determined by the qualified biologist. Alternatively, if the special-status plant species in question is a *SDG&E Subregional NCCP* covered species, mitigation consistent with measures established in the NCCP and discussed in the *SDG&E Subregional NCCP*, above, shall be provided.
APM BIO-2: SDG&E Subregional NCCP	The Proposed Project will avoid and minimize impacts to biological resources through implementation of the SDG&E Subregional NCCP. The SDG&E Subregional NCCP establishes a mechanism for addressing biological resource impacts incidental to the development, maintenance, and repair of SDG&E facilities within the SDG&E Subregional NCCP coverage area. The Proposed Project is located within the SDG&E Subregional NCCP coverage area. The SDG&E Subregional NCCP includes a Federal Endangered Species Act (ESA) Section 10(A) permit and a California ESA Section 2081 memorandum of understanding (for incidental take) with an Implementation Agreement with the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW – formerly the California Department of Fish and Game), respectively, for the management and conservation of multiple species and their associated habitats, as established according to the Federal and State ESAs and California's NCCP Act. The NCCP's Implementing Agreement confirms that the mitigation, compensation, and enhancement obligations contained in the Agreement and the SDG&E Subregional NCCP meet all relevant standards and requirements of the California ESA, the Federal ESA, the NCCP Act, and the Native Plant Protection Act with regard to SDG&E's activities in the Subregional Plan Area. Pursuant to the SDG&E Subregional NCCP, SDG&E will conduct pre-construction studies for all activities occurring off of existing access roads in natural areas. An independent biological consulting firm will survey all Proposed Project impact areas and prepared a Pre-activity Study Report (PSR) outlining all anticipated impacts related to the Proposed Project. The Proposed Project will include monitoring for all project components, as recommended by the PSR and outlined in the SDG&E Subregional NCCP, as well as other avoidance and minimization measures outlined in the NCCP's Operational Protocols. The PSR will be submitted to the CDFW and USFWS for review. Prior to the commencement of construction, a verification survey will be conducted of the Proposed Project disturbance areas, as required by the

Table 2.6-1: Applicant Proposed Measures	
APM Number	**Requirements**
	SDG&E Subregional NCCP. Biological monitors will be present during construction to assure implementation of the avoidance and minimization measures. If the previously-delineated work areas must be expanded or modified during construction, the monitors will survey the additional impact area to determine if any sensitive resources will be impacted by the proposed activities, to identify avoidance and minimization measures, and to document any additional impacts. Any additional impacts are included in a Post-construction Report (PCR) for purposes of calculating the appropriate mitigation, which generally includes site enhancement or credit withdrawal from the SDG&E mitigation bank. When construction is complete, the biological monitor will conduct a survey of the entire line to determine actual impacts from construction. The PCR will determine how much site enhancement and credit withdrawal from the SDG&E mitigation bank will be required to address impacts from project related activities. These impact and mitigation credit calculations are submitted to the USFWS and the CDFW as part of the NCCP Annual Report pursuant to requirements of the NCCP and the NCCP Implementing Agreement. Specific operating restrictions that are incorporated into the Proposed Project design to comply with the SDG&E Subregional NCCP include the following: • Vehicles would be kept on access roads and limited to 15 miles per hour (Section 7.1.1, 1.). • No wildlife, including rattlesnakes, may be harmed, except to protect life and limb (7.1.1, 2.). • Feeding of wildlife is not allowed (Section 7.1.1, 4.). • No pets are allowed within the ROW (Section 7.1.1, 5.).). • Plant or wildlife species may not be collected for pets or any other reason. (Section 7.1.1, 7). • Littering is not allowed, and no food or waste would be left on the ROW or adjacent properties (Section 7.1.1, 8.). • Measures to prevent or minimize wild fires would be implemented, including exercising care when driving and not parking vehicles where catalytic converters can ignite dry vegetation (Section 7.1.1, 9.). • Field crews shall refer all environmental issues, including wildlife relocation, dead, or sick wildlife, or questions regarding environmental impacts to the Environmental Surveyor. Biologists or experts in wildlife handling may be necessary to assist with wildlife relocations (Section 7.1.1, 10.). • All SDG&E personnel would participate in an environmental training program conducted by SDG&E, with annual updates (Section 7.1.2, 11.). • The Environmental Surveyor shall conduct pre-activity studies for all activities occurring in natural areas, and will complete a proactivity study form including recommendations for review by a biologist and construction monitoring, if appropriate. The form will be provided to CDFW and USFWS but does not require their approval (Section 7.1.3, 13.). • The Environmental Surveyor shall flag boundaries of habitats to be avoided and, if necessary, the construction work boundaries (Section 7.1.3, 14.). • The Environmental Surveyor must approve of activity prior to working in

Table 2.6-1: Applicant Proposed Measures

APM Number	Requirements
	sensitive areas where disturbance to habitat may be unavoidable (Section 7.1.4, 25.).). • In the event SDG&E identifies a covered species (listed as threatened or endangered by the federal or state) of plant within the temporary work area (10 foot radius) surrounding a power pole, SDG&E would notify the USFWS (for Federal ESA listed plants) and CDFW (for California ESA listed plants) (Section 7.1.4, 28.). • The Environmental Surveyor shall conduct monitoring as recommended in the pre-activity study form (Section 7.1.4, 35.). • Supplies, equipment, or construction excavations where wildlife could hide (e.g., pipes, culverts, pole holes, trenches) shall be inspected prior to moving or working on/in them (Section 7.1.4, 37, and 38.). • Fugitive dust will be controlled by regular watering and speed limits (Section 7.1.4, 39.). • During the nesting season, the presence or absence of nesting species (including raptors) shall be determined by a biologist who would recommend appropriate avoidance and minimization measures (Section 7.1.6, 50). • Maintenance or construction vehicle access through shallow creeks or streams is allowed. However no filling for access purposes in waterways is allowed (Section 7.1.7, 52). • Staging/storage areas for equipment and materials shall be located outside of riparian areas (Section 7.1.7, 53.).
APM BIO-3: SDG&E QCB HCP	SDG&E will implement the SDG&E QCB HCP, which was developed to protect the Quino Checkerspot Butterfly and its habitat through implementation of both general and Quino Checkerspot Butterfly-specific operational protocols that were designed to avoid or minimize take of the species.
Cultural Resources	
AMP CUL-1: Cultural Resources Training	A qualified archaeologist would attend preconstruction meetings, as needed, and a qualified archaeological monitor would monitor activities in the vicinity of all known cultural resources within the Proposed Project area. The requirements for archaeological monitoring would be noted on the construction plans. The archaeologist's duties would include monitoring, evaluation of any finds, analysis of collected materials, and preparation of a monitoring results report conforming to Archaeological Resource Management Reports guidelines.
APM CUL-2: Environmentally Sensitive Areas	Known cultural resources that will be avoided would be demarcated as Environmentally Sensitive Areas. Construction crews would be instructed to avoid disturbance of these areas.
APM CUL-3: Qualified Archeologist	In the event that cultural resources are discovered, the archaeologist would have the authority to divert or temporarily halt ground disturbance to allow evaluation of potentially significant cultural resources. The archaeologist would contact SDG&E's Cultural Resource Specialist and Environmental Project Manager at the time of discovery. If the resource was discovered on MCAS Miramar, the base archaeologist would also be contacted by SDG&E. The archaeologist, in consultation with SDG&E's Cultural Resource Specialist, would determine the significance of the discovered resources. SDG&E's Cultural Resource Specialist and Environmental Project Manager must concur with the evaluation procedures to be performed before construction activities are allowed to resume. For significant

Table 2.6-1: Applicant Proposed Measures	
APM Number	**Requirements**
	cultural resources, a Research Design and Data Recovery Program would be prepared and carried out to mitigate impacts.
APM CUL-4: Cultural Remains	All collected cultural remains would be cataloged, and permanently curated with an appropriate institution. All artifacts would be analyzed to identify function and chronology as they relate to the history of the area. Faunal material would be identified as to species.
APM CUL-5: Cultural Resources Monitoring	An archaeological monitoring results report (with appropriate graphics), which describes the results, analyses, and conclusions of the monitoring program, would be prepared and submitted to SDG&E's Cultural Resource Specialist and Environmental Project Manager following termination of the program. Any new cultural sites or features encountered would be recorded with the South Central Information (SCIC).
APM CUL-6: Native American Monitoring	Native American monitoring may be implemented if transmission line construction has the potential to impact identified and mapped traditional locations or places. The role of the Native American monitor shall be to represent tribal concerns and communicate with the tribal council. Appropriate representatives will be identified based on the location of the identified traditional location or place.
APM CUL-7: Paleontological Monitoring	A paleontological monitor would work under the direction of a qualified Project paleontologist and would be on site to observe excavation operations that involve the original cutting of previously undisturbed deposits for the eight poles located within paleontologically sensitive formations (i.e., Friars, Mission Valley, Scripps and the Ardath Shale Formations). A paleontological monitor is defined as an individual who has experience in the collection and salvage of fossil materials.
APM CUL-8: Paleontological Screen-Washing	In the event that fossils are encountered, the paleontological monitor would have the authority to divert or temporarily halt construction activities in the area of discovery to allow recovery of fossil remains in a timely fashion. The paleontologist would contact SDG&E's Cultural Resource Specialist and Environmental Project Manager at the time of discovery. The paleontologist, in consultation with SDG&E's Cultural Resource Specialist would determine the significance of the discovered resources. SDG&E's Cultural Resource Specialist and Environmental Project Manager must concur with the evaluation procedures to be performed before construction activities are allowed to resume. Because of the potential for recovery of small fossil remains, it may be necessary to set up a screen-washing operation on site. If fossils are discovered, the paleontologist (or paleontological monitor) would recover them along with pertinent stratigraphic data. In most cases, this fossil salvage can be completed in a short period of time. Because of the potential for recovery of small fossil remains, such as isolated mammal teeth, recovery of bulk-sedimentary-matrix samples for off-site wet screening from specific strata may be necessary, as determined in the field. Fossil remains collected during monitoring and salvage would be cleaned, repaired, sorted, cataloged, and deposited in a scientific institution with permanent paleontological collections, and a paleontological monitoring report would be written.
APM CUL 9: Discovery of Human Remains	If human remains are encountered during the course of construction, SDG&E staff would halt work in the vicinity of the find and would implement the appropriate notification processes as required by law (California Health and Safety Code 7050.5, Public Resource Code 5097.98-99, and NAGPRA).
Geology, Soils, and Mineral Resources	
APM GEO-1:	Design and construction of overhead facilities would conform to CPUC General

Table 2.6-1: Applicant Proposed Measures	
APM Number	**Requirements**
Seismic Shaking	Order 95, industry practice, and SDG&E internal structural design requirements to minimize damage from seismic shaking.
AMP GEO-2: Geotechnical Recommendations	A geotechnical study will be conducted for the Proposed Project under the direction of a California-licensed Geotechnical Engineer or Certified Engineer Geologist, and recommendations identified in the geotechnical report will be carried out.
APM GEO-3: Soil Disturbance	Ground and soil disturbance will be minimized through the use of existing access routes, to the extent feasible. Soil erosion and topsoil loss would be controlled by implementing SDG&E's *BMP Manual* during the construction of the Proposed Project. Additionally, the Proposed Project would comply with the Construction General Permit, which would include the preparation of SWPPP. Topsoil would be salvaged from areas where grading would otherwise result in loss of topsoil, and the salvaged soil would be used to reclaim areas of temporary construction disturbance.
Hazards and Hazardous Materials	
APM HAZ-1: Safety and Environmental Awareness Program	SDG&E will prepare a Safety and Environmental Awareness Program (SEAP) for project-personnel. The SEAP may include training for relevant topics such as: • General safety procedures • General environmental procedures • Fire safety • Biological resources • Cultural resources • Paleontological resources • Hazardous materials protocols and BMPs • SWPPP
APM HAZ-2: Hazardous Materials	SDG&E shall address potential impacts relating to the handling and use of hazardous materials through compliance with numerous state and federal regulations, including, but not limited to: • Federal Occupational Safety and Health Administration (OSHA) regulations for worker safety in hazardous material remediation and hazardous waste operations (29 CFR Section 1910.120) • Federal OSHA regulations hazard communication for workers (29 CFR Section 1910.1200) • Federal OSHA regulations for toxic air contaminants for workers (29 CFR Section 1910.1000) • CalOSHA regulations for worker safety in hazardous material remediation and hazardous waste operations (8 California Code of Regulations [CCR] 5192), • CalOSHA regulations for hazard communication for workers (8 CCR 5194), and • Department of Toxic Substances Control (DTSC) regulations implementing Resource Conservation and Recovery Act of 1976 (RCRA) and the California Hazardous Waste Control Law (HWCL) (22 CCR Division 4.5). SDG&E would implement standard operational procedures for the transport, use,

Table 2.6-1: Applicant Proposed Measures	
APM Number	**Requirements**
	storage, and disposal of hazardous materials. This includes, but is not limited to the use of absorbent pads for spill containment, specified locations for construction vehicle refueling, and a daily vehicle inspection schedule designed to identify leaking fuels and/or oils as early as possible.
APM HAZ-3: Compliance Management Program	The construction contractors would implement (in addition to regulatory and SDG&E requirements) their own compliance management programs to ensure that regulatory requirements are adhered to and that worker and public safety are secured.
APM HAZ-4: Herbicide Application	All herbicides utilized during maintenance around transmission and power line structures would follow SDG&E's existing procedures for application of herbicides.
APM HAZ-5: Wildland Fire Prevention and Fire Safety Practices	A project-specific fire prevention plan has been drafted for the Proposed Project consistent with Electric Standard Practice 113.1 and the SDG&E Fire Prevention Plan. Electric Standard Practice 113.1 outlines practices and procedures for SDG&E activities occurring within areas of potential wildland fire threat within SDG&E's service territory. The Proposed Project design includes replacement of wood poles with steel poles, increased conductor spacing to maximize line clearances, installation of steel poles to withstand an extreme wind loading case and known local conditions, and undergrounding of a portion of the power line. These design components of the Proposed Project minimize the fire risk through enhanced safety and reliability of the power line system, particularly during extreme weather conditions. The standard practices in Electrical Standard Practice 113.1 include avoidance and minimization measures to comply with state and local fire ordinances. The project-specific fire plan identifies project specific risk-related activities as well as measures (including tools and procedures) to address said risks.
Hydrology and Water Quality	
APM HYDRO-1: Water Quality	SDG&E's Water Quality Construction BMPs Manual (BMP Manual) organizes and presents SDG&E's standard water quality protection procedures for various specific actions that routinely occur as part of SDG&E's ongoing construction, operations, and maintenance activities. The primary focus of most BMPs is the reduction and/or elimination of potential water quality impacts during construction of linear projects such as the Proposed Project. The BMPs described within the BMP Manual were derived from several sources including the State of California guidelines as well as the Caltrans Water Quality BMPs. The BMP Manual will be utilized during construction (by way of preparation and implementation of the SWPPP), operation, and maintenance of the Proposed Project to ensure compliance with all relevant SDG&E and government-mandated regulatory water quality standards. Additionally SDG&E will follow the BMPs in the SDG&E Subregional NCCP.
APM HYDRO-2: Storm Water Prevention Program	Once temporary surface disturbances are complete, areas that would not be subject to additional disturbance will be stabilized to control soil erosion. Disturbed areas must be stabilized per the project SWPPP.
APM HYDRO-3: Jurisdictional Drainages	To avoid impacts to jurisdictional drainages during road refreshing or reestablishment activities, the following minimization measures would be implemented: • Any excess soil would be spread on site outside of jurisdictional drainages to match existing contours and property compacted or hauled off site.

Table 2.6-1: Applicant Proposed Measures	
APM Number	**Requirements**
	• Graded areas would be stabilized to promote infiltration and reduce run-off potential. • Erosion protection and sediment control BMPs would be implemented in compliance with the General Construction General Permit, Stormwater Pollution Prevention Plan (SWPPP), SDG&E Water Quality Construction BMPs Manual (BMP Manual), and the SDG&E Subregional Natural Community Conservation Program (NCCP). • At designated jurisdictional drainage crossings locations along the access roads, the blade of the smoothing equipment would be lifted 25 feet on either side of the drainage to avoid impacts.
Noise	
APM NOISE-1: Generators	Generator use will be limited to less than 50 horsepower (50 HP) at all staging yards, unless larger generators are appropriately permitted. Any generators used at staging yards will be located away from noise sensitive areas, and positioned on the property to comply with local noise ordinances.
APM NOISE-2: Mufflers	Functioning mufflers will be maintained on all equipment.
APM NOISE-3: Resident Notification	Residents within 50 feet of proposed construction activities will be notified of the start of construction at least 1 week prior to construction activity in the area.
APM NOISE-4: Helicopter use	Helicopter usage for the Proposed Project would be limited to those hours deemed acceptable for construction activities by the City of San Diego Noise Code (7 a.m. to 7 p.m.) and the City of Poway Noise Code (7 a.m. to 5 p.m.). Helicopter usage at any one location would be very brief as the lines are being strung or during pole removal and installation activities.
APM NOISE-5: Construction Noise	For the few locations where the Proposed Project would exceed the noise ordinances, as discussed previously, SDG&E would meet and confer with the appropriate City to discuss temporarily deviating from the requirements of the Noise Code, as described in the construction noise variance process (see Section 4.10.3.1). Additionally, In the unlikely event that rock blasting is used during construction, a noise and vibration calculation will be prepared and submitted to SDG&E Environmental Programs and Transmission Engineering and Design for review before blasting at each site. The construction contractor will ensure compliance with all relevant local, state, and federal regulations relating to blasting activities, as well as SDG&E's blasting guidelines.
Public Services	
APM PS-1: Recreation Access	Where construction within existing public parks, preserves, and open space areas would not completely restrict access through these areas, and where necessary, SDG&E will create temporary foot and bicycle paths along with appropriate advanced notice and signage to direct and allow for the pedestrian and bicycle access through each affected park.
APM PS-2: Public Notification of Construction	SDG&E will provide the public with advance notification of construction activities. Concerns related to dust, noise, and access restrictions with construction activities will be addressed within this notification.
APM PS-3: Coordination with	All construction activities will be coordinated with the authorized officer for each

Table 2.6-1: Applicant Proposed Measures	
APM Number	**Requirements**
Recreation Facilities	affected park, trail, or recreational facility prior to construction in these areas.
APM PS-4: Signage	As needed, signs will be posted directing vehicles to alternative park access and parking, if available, in the event construction temporarily affects parking near trailheads.
APM PS-5: Recreational Facilities Repair	All parks, trails, and recreational facilities that are physically impacted during construction activities and are not directly associated with the new permanent facilities, will be returned to an approximate pre-construction state, while still allowing for SDG&E to safely operate and maintain the facilities, following the completion of the Proposed Project. SDG&E will replace or repair any damaged or removed public equipment, facilities, and infrastructure in a timely manner.
APM PS-6: Theft Prevention	At the completion of each work day, construction crews will lock up and secure each worksite to prevent theft or vandalism associated with work equipment or supplies. SDG&E will also implement its project-specific fire plan, which will include private fire patrol monitoring as appropriate. Furthermore, SDG&E may have private security personnel monitoring construction sites where materials are stored, which may include the substations, staging yards and ROW.
Recreation	
APM REC-1: Coordination Measures with Parks and Preservers	Appropriate safety measures will be implemented where trails and parks are located in close proximity to construction areas to provide a safety buffer between recreational users and construction areas. Construction schedule and activities will be coordinated with the authorized officer for each affected recreation area.
APM REC-2: Temporary Trail Detours	Where feasible, temporary detours will be provided for trail users. Signs will be posted to direct trail users to temporary trail detours.
Transportation and Traffic	
APM TR -1: Emergency Access	SDG&E will coordinate with local emergency response agencies during all construction within Carmel Valley Road. Coordination with local emergency response agencies (in addition to other traffic APMs) would ensure that impacts to emergency access are less than significant.
APM TR-2: Helicopter Use	Any helicopter use will comply with all relevant usage restrictions including those imposed by the FAA and Caltrans. SDG&E and/or the construction contractor will coordinate with local air traffic control and comply with applicable FAA regulations regarding helicopter use to prevent conflict with air traffic generated by local airports. Helicopter usage will conform to acceptable hours for construction activities, as outlined within the applicable local noise codes and ordinances. As required, a Congested Area Plan (or CAP) will be prepared, based upon actual helicopter usage, pursuant to FAA regulations (14 CFR 137.51).
APM TR-3: Standard Control Procedures	SDG&E will implement traffic control plans to address potential disruption of traffic circulation during construction activities and address any safety issues. These traffic control plans will be prepared by the project engineer or contractor and subject to approval by the appropriate jurisdictional agency, such as the City of San Diego and Caltrans.
APM TR-4: Encroachment	SDG&E will obtain the required encroachment permits from the City of San Diego for crossings at city streets and Caltrans for work near I-15 and Hwy 56, and will ensure

Table 2.6-1: Applicant Proposed Measures

APM Number	Requirements
Permits	that proper safety measures are in place while construction work is occurring near public roadways. These safety measures include flagging, proper signage, and orange cones to alert the public to construction activities near the roadway.
Cumulative Impacts	
APM CUM-1: SDG&E Project Coordination	If any SDG&E system upgrade projects develop the potential to overlap with the Proposed Project, coordination of construction will be undergone to reduce cumulative impacts and minimize overall disruption to adjoining land uses.
APM CUM-2: CIP Coordination	If any City of San Diego CIP projects have the potential to directly conflict with Proposed Project construction activities, SDG&E shall coordinate with the City of San Diego CIP to ensure construction activities can be coordinated such that construction would not occur concurrently at the same location.

2.7 ELECTRIC AND MAGNETIC FIELDS

2.7.1 Overview

Recognizing that there is a great deal of public interest and concern regarding potential health effects from exposure to electric and magnetic fields (EMFs) from power lines, this section provides information regarding EMF associated with electric utility facilities and the potential EMF resulting from the Proposed Project. The CPUC does not consider EMF to be an environmental issue in the context of CEQA. This is because there is no agreement among scientists that EMF creates a potential health risk and because CEQA does not define or adopt standards for defining any potential risk from EMF. As a result, the following EMF information is presented for the benefit of the public and decision makers, but is not considered within the context of CEQA.

Other concerns related to power line[2] fields include nuisance (corona and audible noise; radio, television, electronic equipment interference) and potential health risk impacts (induced currents and shock hazards and effects on cardiac pacemakers). These field issues are addressed in Section 4.13: Electrical Interference and Safety. The effects of audible corona noise are evaluated in Section 4.8: Noise. Environmental impacts are defined for these issues, and mitigation measures are recommended.

[2] The term "power line" in this section refers generally to electric lines of all voltage classes operating in SDG&E's electric system. However, CPUC General Order 131-D distinguishes between distribution lines ("designed to operate under 50 kV"), power lines ("designed to operate between 50 and 200 kV"), and transmission lines ("designed to operate at or above 200 kilovolts").

2.7.2 Defining EMF

Electric and magnetic fields are separate phenomena and occur both naturally and as a result of human activity across a broad electrical spectrum. Naturally occurring electric and magnetic fields are caused by the weather and the Earth's geomagnetic field. The fields caused by human activity result from technological application of the electromagnetic spectrum for uses such as communications, appliances, and the generation, transmission, and local distribution of electricity.

The frequency of a power line is determined by the rate at which electric and magnetic fields change their direction each second. For power lines in the United States, the frequency of change is 60 times per second and is defined as 60 Hertz (Hz) power. In Europe and many other countries, the frequency of electric power is 50 Hz. Radio and communication waves operate at much higher frequencies: from approximately 3,000 Hz (3 kilohertz) to approximately 300,000,000,000 Hz (300 gigahertz). The information presented in this document is limited to the EMF from power lines operating at frequencies of 50 or 60 Hz.

Electric power flows across utility electric systems from generating sources to serve electrical loads within the community. The power flowing over these lines is determined by the line's voltage and current. The higher the voltage level of the line, the lower the amount of current needed to deliver the same amount of power. For example, a 115 kV power line with 200 amps of current will transmit approximately 40,000 kilowatts (kW), and a 230 kV transmission line requires only 100 amps of current to deliver the same 40,000 kW.

Electric Fields

Electric fields from power lines are created whenever the lines are energized, with the strength of the field dependent directly on the voltage of the line creating it. Electric field strength is typically described in terms of kilovolts per meter (kV/m). Electric field strength attenuates (reduces) rapidly as the distance from the source increases. Electric fields are reduced in many locations because they are effectively shielded by most objects or materials such as trees or houses.

Unlike magnetic fields, which penetrate almost everything and are unaffected by buildings, trees, and other obstacles, electric fields are distorted by any object that is within the electric field including the human body. Even trying to measure an electric field with electronic instruments is difficult because the devices themselves will alter the levels recorded. Determining an individual's exposure to electric fields requires the understanding of many variables, one of which is the electric field itself, with others including how effectively the person is grounded and their body surface area within the electric field.

Electric fields in the vicinity of power lines can cause the same phenomena as the static electricity experienced on a dry winter day, or with clothing just removed from a clothes dryer, and may result in small nuisance electric discharges when touching long metal fences, pipelines, or large vehicles. An acknowledged potential impact to public health from electric lines is the hazard of electric shock: electric shocks from the lines are generally the result of accidental or unintentional contact by the public with the energized wires. The issue of induced currents and shock hazards is addressed separately in Sections 4.11 and 4.13.

Magnetic Fields

Magnetic fields from power lines are created whenever current flows through power lines at any voltage. The strength of the field is directly dependent on the current in the line. Magnetic field strength is typically measured in milligauss (mG). Similar to electric fields, magnetic field strength attenuates rapidly with distance from the source. However, unlike electric fields, magnetic fields are not easily shielded by objects or materials. The nature of a magnetic field can be illustrated by considering a household appliance. When the appliance is energized by being plugged into an outlet but not turned on, no current flows through it. Under such circumstances, an electric field is generated around the cord and appliance, but no magnetic field is present. If the appliance is switched on, the electric field is still present and a magnetic field is created. The electric field strength is directly related to the magnitude of the voltage from the outlet and the magnetic field strength is directly related to the magnitude of the current flowing in the cord and appliance.

2.7.3 EMF in the Proposed Project Area

The Proposed Project consists of the installation of about 16.7 miles of new 230 kV transmission line. Approximately 13.9 miles of the proposed line would be installed overhead and approximately 2.8 miles would be underground. The project alignment includes developed areas and open space lands. Public exposure to EMFs in developed areas is more widespread and encompasses a very broad range of field sources~~, and~~ intensities~~ ~~ and durations.

2.7.4 Scientific Background and Regulations Applicable to EMF

EMF Research

For more than 20 years, questions have been asked regarding the potential effects of EMFs from power lines, and research has been conducted to provide some basis for response. Earlier studies focused primarily on interactions with the electric fields from power lines. In the late 1970s, the subject of magnetic field interactions began to receive additional public attention and research levels have increased. A substantial amount of research investigating both electric and magnetic fields has been conducted over the past several decades; however, much of the body of national and international research regarding EMF and public health risks remains contradictory or inconclusive.

Extremely low frequency (ELF) fields are known to interact with tissues by inducing electric fields and currents in these fields. However, the electric currents induced by ELF fields commonly found in our environment are normally much lower than the strongest electric currents naturally occurring in the body such as those that control the beating of the heart.[3]

Research related to EMF can be grouped into three general categories: cellular level studies, animal and human experiments, and epidemiological studies. Epidemiological studies have provided mixed results, with some studies showing an apparent relationship between magnetic fields and health effects while other similar studies do not. Laboratory studies and studies investigating a possible mechanism for health effects (mechanistic studies) provide little or no evidence to support this link.

Since 1979, public interest and concern specifically regarding magnetic fields from power lines has increased. This increase has generally been attributed to publication of the results of a single epidemiological study (Wertheimer and Leeper 1979). This study observed a statistical association between the high-current configuration (the "wire code") of electric power lines outside of homes in Denver and the incidence of childhood cancer. The "wire code" was assumed to be related to current flow of the line. The study did not take measurements of magnetic field intensity. Since publication of the Wertheimer and Leeper study, many epidemiological, laboratory, and animal studies regarding EMF have been conducted.

Research on ambient magnetic fields in homes and buildings in several western states found average magnetic field levels within most rooms to be approximately 1 mG, while in a room with appliances present, the measured values ranged from 9 to 20 mG (Severson et al. 1988; Silva 1988). Immediately adjacent to appliances (within 12 inches), field values are much higher.

Methods to Reduce EMF

EMF levels from transmission lines can be reduced in three primary ways: shielding, field cancellation, or increasing the distance from the source. Shielding, which reduces exposure to electric fields, can be actively accomplished by placing trees or other physical barriers along the transmission line ROW. Shielding also results from existing structures the public may use or occupy along the line. Since electric fields can be blocked by most materials, shielding is effective for the electric fields but is not effective for magnetic fields.

Magnetic fields can be reduced either by cancellation or by increasing distance from the source. Cancellation is achieved in two ways. A transmission line circuit consists of three “phases”: three separate wires (conductors) on a transmission tower. The configuration of these three conductors can reduce magnetic fields. First, when the configuration places the three conductors closer together, the interference, or cancellation, of the fields from each wire is enhanced. This technique has practical limitations because of the potential for short circuits if the wires are placed too close together. There are also worker safety issues to consider if spacing

[3] The power frequencies (50/60 Hz) are part of the ELF (3 Hz to 300 Hz) bandwidth.

is reduced. Second, in instances where there are two circuits (more than three-phase wires), such as in portions of the Proposed Project, cancellation can be accomplished by arranging phase wires from the different circuits that are near each other. In underground lines, the three phases typically can be placed much closer together than for overhead lines because the cables are placed in dielectric conduits.

The distance between the source of fields and the public can be increased by either placing the wires higher aboveground, burying underground cables deeper, or by increasing the width of the ROW. For transmission lines, these methods can prove effective in reducing fields because the reduction of the field strength drops rapidly with distance.

Scientific Panel Reviews
Numerous panels of expert scientists have convened to review the data relevant to the question of whether exposure to power-frequency EMF is associated with adverse health effects. These evaluations have been conducted in order to advise governmental agencies or professional standard-setting groups. These panels of scientists first evaluate the available studies individually, not only to determine what specific information they can offer, but also in terms of the validity of their experimental design, methods of data collection, analysis, and suitability of the authors' conclusions to the nature and quality of the data presented. Subsequently, the individual studies, with their previously identified strengths and weaknesses, are evaluated collectively in an effort to identify whether there is a consistent pattern or trend in the data that would lead to a determination of possible or probable hazards to human health resulting from exposure to these fields.

These reviews include those prepared by international agencies such as the World Health Organization (WHO 1984, 1987, 2001, and 2007), the international Non-Ionizing Radiation Committee of the International Radiation Protection Association (IRPA/INIRC 1990), and governmental agencies of a number of countries, such as the U.S. EPA, the National Radiological Protection Board of the United Kingdom, the Health Council of the Netherlands, and the French and Danish Ministries of Health.

As noted below these scientific panels have varied conclusions on the strength of the scientific evidence suggesting that power frequency EMF exposures pose any health risk.

In May 1999 the National Institute of Environmental Health Sciences (NIEHS) submitted to Congress its report titled, Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields, containing the following conclusion regarding EMF and health effects:

> Using criteria developed by the International Agency for Research on Cancer (IARC), none of the Working Group considered the evidence strong enough to label ELF-EMF exposure as a known human carcinogen or probable human carcinogen. However, a majority of the members of this Working Group concluded that exposure to power-line frequency ELF-EMF is a possible carcinogen.

In June 2001, a scientific working group of IARC (an agency of WHO) reviewed studies related to the carcinogenicity of EMF. Using standard IARC classification, magnetic fields were classified as "possibly carcinogenic to humans" based on epidemiological studies. "Possibly carcinogenic to humans" is a classification used to denote an agent for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence of carcinogenicity in experimental animals. Other agents identified as "possibly carcinogenic to humans" include gasoline exhaust, styrene, welding fumes, and coffee (WHO 2001).

On behalf of the CPUC, the California Department of Health Services (DHS) completed a comprehensive review of existing studies related to EMF from power lines and potential health risks. This risk evaluation was undertaken by three staff scientists with the DHS. Each of these scientists is identified in the review results as an epidemiologist, and their work took place from 2000 to 2002. The results of this review titled, An Evaluation of the Possible Risks From Electric and Magnetic Fields (EMFs) From Power Lines, Internal Wiring, Electrical Occupations, and Appliances, were published in June 2002. The conclusions contained in the executive summary are provided below:

- To one degree or another, all three of the DHS scientists are inclined to believe that EMFs can cause some degree of increased risk of childhood leukemia, adult brain cancer, Lou Gehrig's Disease, and miscarriage.
- They strongly believe that EMFs do not increase the risk of birth defects, or low birth weight.
- They strongly believe that EMFs are not universal carcinogens, since there are a number of cancer types that are not associated with EMF exposure.
- To one degree or another they are inclined to believe that EMFs do not cause an increased risk of breast cancer, heart disease, Alzheimer's Disease, depression, or symptoms attributed by some to sensitivity to EMFs. However, all three scientists had judgments that were "close to the dividing line between believing and not believing" that EMFs cause some degree of increased risk of suicide.
- For adult leukemia, two of the scientists are "close to the dividing line between believing or not believing" and one was "prone to believe" that EMFs cause some degree of increased risk.

The report indicates that the DHS scientists are more inclined to believe that EMF exposure increased the risk of the above health problems than the majority of the members of scientific committees that have previously convened to evaluate the scientific literature. With regard to why the DHS review's conclusions differ from those of other recent reviews, the report states:

> The three DHS scientists thought there were reasons why animal and test tube experiments might have failed to pick up a mechanism or a health problem; hence, the absence of much support from such animal and test tube studies did not reduce their confidence much or lead them to strongly distrust epidemiological evidence from statistical studies in human populations. They therefore had more faith in the quality of

the epidemiological studies in human populations and hence gave more credence to them.

While the results of the DHS report indicate these scientists believe that EMF can cause some degree of increased risk for certain health problems, the report did not quantify the degree of risk or make any specific recommendations to the CPUC.

In addition to the uncertainty regarding the level of health risk posed by EMF, individual studies and scientific panels have not been able to determine or reach consensus regarding what level of magnetic field exposure might constitute a health risk. In some early epidemiological studies, increased health risks were discussed for daily time-weighted average field levels greater than 2 mG. However, the IARC scientific working group indicated that studies with average magnetic field levels of 3 to 4 mG played a pivotal role in their classification of EMF as a possible carcinogen.

The 2007 WHO [Environmental Health Criteria (EHC) 238] report concluded that:

- Evidence for a link between Extremely Low Frequency (50 to 60 Hz) magnetic fields and health risks is based on epidemiological studies demonstrating a consistent pattern of increased risk for childhood leukemia. However, "…virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF magnetic fields and changes in biological function or disease status…the evidence is not strong enough to be considered causal but sufficiently strong to remain a concern."
- "For other diseases, there is inadequate or no evidence of health effects at low exposure levels."

2.7.5 Policies, Standards, and Regulations

A number of counties, states, and local governments have adopted or considered regulations or policies related to EMF exposure. The reasons for these actions have been varied; in general, however, the actions can be attributed to addressing public reaction to and perception of EMF as opposed to responding to the findings of any specific scientific research. Following is a brief summary of the guidelines and regulatory activity regarding EMF.

International Guidelines

The International Radiation Protection Association, in cooperation with the World Health Organization, has published recommended guidelines (ICNIRP 2010) for electric and magnetic field exposures. For the general public, the limits are 5 kV/m for electric fields and 2,000 mG for magnetic fields. Neither of these organizations has any governmental authority nor recognized jurisdiction to enforce these guidelines. However, because they were developed by a broad base of scientists, these guidelines have been given merit and are considered by utilities and regulators when reviewing EMF levels from electric power lines.

National Guidelines
Although the U.S. EPA has conducted investigations into EMF related to power lines and health risks, no national standards have been established. There have been a number of studies sponsored by the U.S. EPA, the Electric Power Research Institute (EPRI), and other institutions. Several bills addressing EMF have been introduced at the congressional level and have provided funding for research; however, no bill has been enacted that would regulate EMF levels.

The 1999 NIEHS report to Congress suggested that the evidence supporting EMF exposure as a health hazard was insufficient to warrant aggressive regulatory actions. The report did suggest passive measures to educate the public and regulators on means aimed at reducing exposures. NIEHS also suggested the power industry continue its practice of siting lines to reduce public exposure to EMF and to explore ways to reduce the creation of magnetic fields around lines.

State Guidelines
Several states have adopted limits for electric field strength within transmission line ROWs. Florida and New York are the only states that currently limit the intensity of magnetic fields from transmission lines. These regulations include limits within the ROW as well as at the edge of the ROW and cover a broad range of values. The magnetic field limits were based on an objective of preventing field levels from increasing beyond levels currently experienced by the public and are not based upon any link between scientific data and health risks (Morgan 1991).

Elsewhere in the United States, several agencies and municipalities have taken action regarding EMF policies. These actions have been varied and include requirements that the fields be considered in the siting of new facilities. The manner in which EMF is considered has taken several forms. In a few instances, a concept referred to as "prudent avoidance" has been formally adopted. Prudent avoidance, a concept proposed by Dr. Granger Morgan of Carnegie-Mellon University, is defined as ". . . limiting exposures which can be avoided with small investments of money and effort" (Morgan 1991). Some municipalities or regulating agencies have proposed limitations on field strength, requirements for siting of lines away from residences and schools, and, in some instances, moratoria on the construction of new transmission lines. The origin of these individual actions has been varied, with some initiated by regulators at the time of new transmission line proposals within their community, and some by public grassroots efforts.

California has not adopted exposure limits for power frequency electric fields or magnetic fields.

California Department of Education's (CDE) Standards for Siting New Schools Adjacent to Electric Power Lines Rated 50 kV and Above
The California Department of Education (CDE) evaluates potential school sites under a range of criteria, including environmental and safety issues. There are no EMF guidelines that apply to existing school sites; this information is presented to demonstrate the range of existing guidelines that address EMF. Exposures to power-frequency EMF are one of the criteria. CDE

has established "setback" limits for locating any part of a school site property line near the edge of easements for any electrical power lines rated 50 kV and above.

The setbacks from overhead transmission line easements are:

- 100 feet for lines from 50 to 133 kV
- 150 feet for lines from 220 to 230 kV
- 350 feet for lines from 500 to 550 kV

The setbacks from underground transmission line easements are:

- 25.0 feet for lines from 50 to 133 kV (interpreted by CDE up to 200 kV)
- 37.5 feet for lines from 220 to 230 kV
- 87.5 feet for lines from 500 to 550 kV

School districts that have sites that do not meet the California Department of Education setbacks may still obtain construction approval from the State by submitting an EMF mitigation plan. The mitigation plan should consider possible reductions of EMF from all potential sources, including power lines, internal wiring, office equipment, and mechanical equipment.

CPUC Guidelines
In 1991, the CPUC initiated an investigation into electric and magnetic fields associated with electric power facilities. This investigation explored the approach to potential mitigation measures for reducing public health impacts and possible development of policies, procedures or regulations.

Following input from interested parties the CPUC implemented a decision (D.93-11-013) that requires that utilities use "low-cost or no-cost" mitigation measures for facilities requiring certification under General Order 131-D.4 The decision directed the utilities to use a 4 percent benchmark on the low-cost mitigation. This decision also implemented a number of EMF measurement, research, and education programs, and provided the direction that led to the preparation of the DHS study described above. The CPUC did not adopt any specific numerical limits or regulation on EMF levels related to electric power facilities.

In Decision D.93-11-013, the CPUC addressed mitigation of EMF of utility facilities and implemented the following recommendations:

- No-cost and low-cost steps to reduce EMF levels
- Workshops to develop EMF design guidelines
- Uniform residential and workplace programs
- Stakeholder and public involvement
- A four-year education program
- A four-year non-experimental and administrative research program
- An authorization of federal experimental research conducted under the National Energy Policy Act of 1992.

Most recently the CPUC issued Decision D.06-01-042, on January 26, 2006, affirming the low-cost/no-cost policy to mitigate EMF exposure from new and upgraded utility power line, transmission line and substation projects. This decision also adopted rules and policies to improve utility design guidelines for reducing EMF. The CPUC stated, “at this time we are unable to determine whether there is a significant scientifically verifiable relationship between EMF exposure and negative health consequences.” At this time, the CPUC has not implemented a general requirement that utilities include non-routine mitigation measures, or other mitigation measures that are based on numeric values of EMF exposure and has not adopted any specific limits or regulation on EMF levels related to electric power facilities. Mitigation measures may be determined on a project-by-project basis by the CPUC.

2.7.6 EMF Data Applicable to the Proposed Project

The Proposed Project includes addition of a 230-kV transmission line between Sycamore Canyon Substation and Peñasquitos Substation. The magnetic field levels along the ROW from existing transmission lines and the Proposed Project can be modeled. The values calculated in an EMF model represent the magnetic field intensities for a hypothetical set of power flow conditions. The current flowing over a transmission line continuously varies based on customer demand, both over the course of a day and over the decades the transmission line will be in service, and the associated magnetic fields vary with the current flows. The periods during the day when the highest power use occurs are referred to as “daily peaks.” These peaks will vary seasonally. In Southern California, the highest daily peaks occur typically during the summer when air conditioning use is at its highest. Further, over the years as communities and electric consumption grow, the magnitude of daily and seasonal peaks may also increase over time.

As noted, the magnetic field information for the project is not based on field measurement; rather it is based on modeling which does not predict actual field levels. The CPUC has acknowledged that the purpose of magnetic field modeling is "to measure the relative differences between alternative mitigation measures."[4] Modeling also allows for comparison of magnetic fields in the existing environment and from the Proposed Project.

For the Sycamore to Peñasquitos 230-kV transmission line project, SDG&E modeled magnetic fields based upon projected high use currents for a 2017 heavy summer case. For the Proposed Project, the calculated existing EMF along segments A, C, and D, and "proposed" EMF levels along segments A, B, C, and D, are presented in Table 2.7-1. For underground Segment B, where there are no existing power or transmission lines, no modeling was done for existing levels, and corresponding values in Table 2.7-1 are zero. The EMF values are presented in mG as calculated at the edge of the ROW. The "proposed" calculations also reflect implementation of the proposed low- and no-cost mitigation measures to reduce magnetic fields (see Section 2.7.7).

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[4] CPUC Decision D.06-01-042, p.11

Table 2.7-1: Existing and Proposed EMF by Transmission Line Segment

Line Segment	Existing (mG)	Proposed (mG)	Change (mG)
Segment A West		48.9	
Segment A East		46.5	
Segment B North		0.1	
Segment B South		0.3	
Segment C West		122.3	
Segment C East		91	
Segment D North		9.5	
Segment D South		135.9	

SDG&E EMF Plan

Comment [KB15]: **Data Need:** Need existing EMF data from SDG&E to be able to quantify the change.

SDG&E to complete model by Feb. 13.

2.7.7 SDG&E's Proposed EMF Mitigation

SDG&E reviewed all portions of the power lines and transmission lines in the scope of the Proposed Project for implementation of magnetic field reduction measures. SDG&E would implement low- and no-cost measures to reduce magnetic field levels for the Proposed Project using the 4 percent CPUC benchmark and SDG&E's *EMF Design Guidelines for Electrical Facilities* filed with the CPUC in compliance with CPUC Decisions 93-11-013 and 06-01-042. SDG&E has described these measures in the Field Management Plan it submitted as part of its application for a Certificate of Public Convenience and Necessity (CPCN) enclosed in Appendix C. The measures are summarized in Table 2.7-2. SDG&E also considered several other measures but rejected them for various reasons. Table 2.7-3 describes the rejected measures and the rationale for their rejection.

If the Proposed Project or an alternative is approved, the CPUC would monitor implementation of the measures included in SDG&E's Final Field Management Plan. These measures would be included in the Mitigation Monitoring and Compliance Reporting Program (MMCRP).

Table 2.7-2: Low- and No-Cost Measures Identified for the Proposed Project

Project Component(s)	Low- or No-Cost Measure Considered	Proposed Low- and No-Cost Measures
Segments A and D where new overhead poles would be installed	Increase height of the conductors from ground level	Use taller soldiered pole locations relative to existing structures to increase the height of the conductor from the ground and therefore reduce EMF at ground level.
Segments B and C	Phase circuits to reduce magnetic fields	Reverse phase on one set of wires in Segment B to reduce EMF in the ROW. Reverse phase TL 23004 when bundling TL 23004 and TL 23001 in Segment C to reduce EMF in the ROW.

Table 2.7-3: Low- and No-Cost Measures Rejected for the Proposed Project		
Project Component(s)	**Low- or No-Cost Measure Considered**	**Reason for Rejection**
Segment C	Increase height of the conductors from ground level	Only existing structures would be used in Segment C.
Segments A, C and D	Increase structure height	Calculations indicate that an increase in structure height of 12 feet in Segment A would yield a 15% reduction in magnetic field values at the west edge of ROW, but a slight increase at the east edge. Further calculations for height increases greater than 12 feet yielded decreases of less than 1% at the east edge of ROW. Therefore, increasing structure height as a "low-cost" field reduction measure was rejected for of this Proposed Project. Only existing structures would be used in Segment C. Calculations also indicate that raising heights of the new 69 kV poles in Segment D from 5 to 15 feet beyond the initial design height reduced magnetic field values at the west edge of ROW no more than 1.5%, with a slight increase at the east edge. Even for sag height increases of 40 feet, calculations yielded only 5% decrease at the west edge, and less than 1% decrease at the east edge.
All segments	Locate power lines closer to center of the utility corridor to the extent possible.	**Segments A and D:** New steel poles in Segment A and Segment D cannot be moved closer to the center of the easement because of separation requirements with other tie lines. **Segment B:** Segment B is underground and by design is located away from the nearby daycare center. **Segment C:** Segment C is built on existing structures that are already as close to the center of the easement as possible.
All segments	Reduce conductor (phase) spacing.	**Segment A, B, and D:** Conductors in Segments A and D, and cables in Segment B, would be spaced per *SDG&E Electric Transmission Standards*, which provides optimum magnetic field reduction at the edge of the ROW. **Segment C:** The existing transmission lines would remain on existing structures with existing configurations; modification to the existing phase spacing is out of scope of the Proposed Project.
Segments A and D	Phase circuits to reduce magnetic fields	**Segments A and D:** Modeling demonstrated that the proposed phasing of the Proposed Project resulted in the lowest milligauss values throughout the corridor. Changing the phasing of the existing circuits could inadvertently increase EMF in areas that are out of scope of the Proposed Project.

Table 2.7-3: Low- and No-Cost Measures Rejected for the Proposed Project		
Project Component(s)	**Low- or No-Cost Measure Considered**	**Reason for Rejection**
Segments A, C, and D	Place overhead line underground	**Segments A, C, and D:** A low-cost measure totaling 4 percent of the project cost would allow for undergrounding approximately 0.37 miles of the Proposed Project. The *EMF Design Guidelines for Electrical Facilities* contains prioritized land uses to determine how mitigation costs should be applied. Schools are the highest priority; therefore, the highest priority segment for undergrounding was identified as Segment A, where there are five schools within or adjacent to a 1,000-foot buffer from the project alignment. These schools are located along a 4-mile length of Segment A. This portion of Segment A is transected by Ted Williams Parkway and Interstate 15. Further, the terrain is varying, which makes undergrounding more expensive if not infeasible. It would not be feasible to underground the whole of this 4-mile section given the low-cost measure standard of 4 percent of project cost. Alternately, undergrounding only 0.37 miles of the 4-mile segment would not provide equitable mitigation for all schools.
Segment B	Increase trench depth	**Segment B:** Increasing the depth of Segment B would degrade line rating of the Proposed Project and would result in the Proposed Project not meeting its required ampacity rating.

2.8 REQUIRED PERMITS AND APPROVALS

Required permits and approvals for the Proposed Project are presented in Table 2.8-1.

Table 2.8-1: Summary of Permits Requirements		
Permits and Other Requirements	**Agency**	**Jurisdiction/Purpose**
Federal		
NEPA Compliance, Tier 1 Approval	MCAS Miramar/Committee for Land and Airspace Management Policy	Construction on MCAS Miramar
Endangered Species Act Consultation	U.S. Fish and Wildlife Service	Impacts to federally listed species during installation of new facilities
Clean Water Act Section 404	U.S. Army Corps of Engineers	Impacts to Waters of the United States
Lighting and Aerial Marking	FAA and MCAS Miramar	Construction of overhead materials potentially requiring aerial marking
Congested Area Plan	FAA	Use of helicopters over congested areas
State		
CPCN	CPUC	Overall project approval and

Table 2.8-1: Summary of Permits Requirements		
Permits and Other Requirements	**Agency**	**Jurisdiction/Purpose**
		CEQA review
National Pollution Discharge Elimination System (NPDES)—Construction General Permit and Implementation of a Project-specific SWPPP	State Water Resources Control Board	Stormwater discharges associated with construction activities disturbing more than 1 acre of land
Order 97-03 Waste Discharge and Water Recycling Requirements for the Production and Purveyance of Recycled Water for the City of San Diego NCWRP	Regional Water Quality Control Board (RWQCB)	Use of reclaimed water during construction
Section 401 Water Quality Certification	RWQCB	Certification that the project is consistent with state water quality standards
Coastal Development Permit	California Coastal Commission	Construction of facilities within California Coastal Zone
California Endangered Species Act Consultation	CDFW	Impacts to listed species during installation of new facilities
Section 1602 of the California Fish and Game Code	CDFW	Impacts to Waters of the State of California
Encroachment Permit	Caltrans	Construction, operation, and maintenance within, under, or over state highway ROW
Local		
Encroachment Permit and Traffic Control Plan(s)	City of San Diego	Construction within, under, or over city roadways (Carmel Valley Road)
Coastal Development Permit	City of San Diego	Construction of facilities within California Coastal Zone, unless the City authorizes consolidated permitting the California Coastal Commission
Reclaimed Water Usage Permit	City and County of San Diego	Use of reclaimed water during construction
Temporary Use Permit	City of Poway	Use of Stowe Staging Yard

2.9 REFERENCES – PROJECT DESCRIPTION

ICNIRP (International Commission on Non-Ionizing Radiation Protection). 2010. ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz--100 kHz)

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