TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

THIS PAGE IS INTENDED TO BE LEFT BLANK

3.0 PROPOSED PROJECT DESCRIPTION

3.1 PROPOSED PROJECT OVERVIEW

SDG&E is a regulated public utility that provides electric service to three million customers within a 4,100 square mile service area, covering parts of two counties and 25 cities in the San Diego area. To increase reliability and reduce the risk of a system-wide outage affecting all its customers and substations in the South Orange County area, SDG&E is proposing to rebuild and upgrade the existing 138/12kV Capistrano Substation with a 230/138/12kV substation and replace an existing 138kV transmission line (TL13835) with a new 230kV double-circuit extension between SDG&E's Capistrano and Talega Substations. The Proposed Project is intended to meet the area load growth and service reliability for approximately 129,000 customers (approximately 10 percent of SDG&E's total customer load) within South Orange County. By adding the new 230kV double-circuit extension, the Proposed Project will bring a new 230kV transmission source into South Orange County for increased capacity and reliability. The Proposed Project would have an anticipated in-service date of approximately 2017.

Specifically, the Proposed Project would include the following primary components:

- Within SDG&E's existing property, build a new 230kV partially enclosed gas insulated substation at the existing 138/12kV Capistrano Substation site;
- Within SDG&E's existing property, relocate, rebuild, and expand the existing 138kV facility with a new partially enclosed gas insulated substation;
- Relocate, rebuild, and expand existing 12kV facilities within SDG&E's existing Capistrano Substation property;
- Replace an existing 138kV transmission line (TL13835) with a new 230kV double-circuit extension between SDG&E's Capistrano and Talega Substations, described as follows:
    - Within SDG&E's existing ROW build approximately 7.5 miles of new overhead double-circuit 230kV transmission lines;
    - Acquire new ROW for approximately 0.25 mile of new overhead 230kV transmission line adjacent to SDG&E's Talega Substation;
    - Within SDG&E's existing Vista Montana street easement position, replace 0.36 mile of existing 138kV underground transmission system with one new 230kV underground transmission line; and
    - Install 0.36 mile in franchise position within Vista Montana Street one 230kV underground transmission line.
- Realign existing 69kV and 138kV transmission lines near the Talega Substation;

- Relocate the three existing 138kV transmission lines from the Capistrano Substation into the new San Juan Capistrano Substation. Loop-in the two 138kV transmission lines that currently bypass the existing substation into the new San Juan Capistrano Substation. Underground all of the westbound 138kV transmission line getaways;
- Install approximately 81 new steel transmission line poles (49 230kV poles, 23 138kV poles, and 9 69kV poles);
- Remove approximately 86 wood structures/poles, 12 steel poles, and 5 steel lattice towers;
- Reconfigure the Talega Substation to accommodate the new TL13835 connection; and
- Undertake other activities required to implement the Proposed Project, including upgrading the communications, controls, and relays for corresponding facilities, as required.

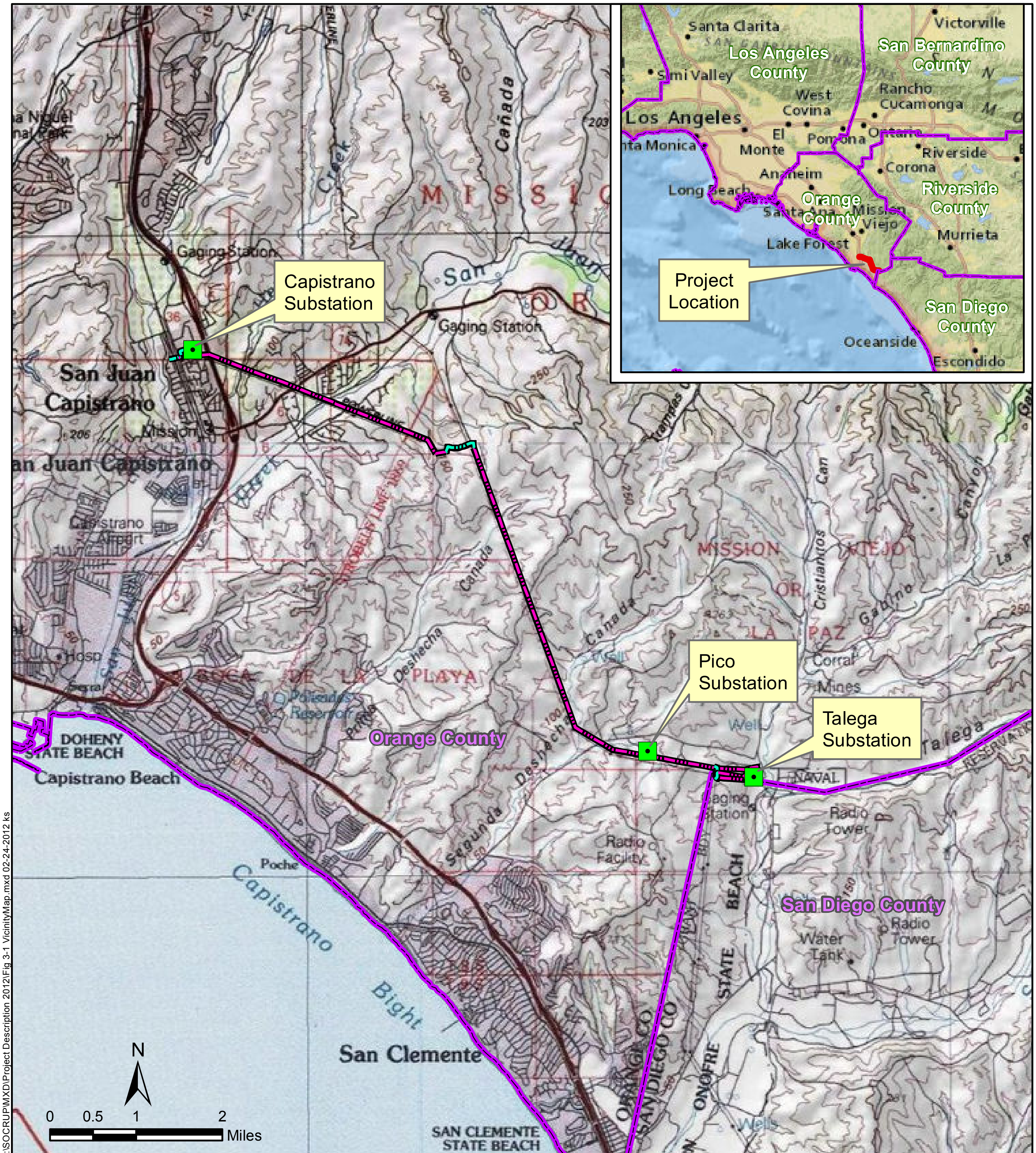
The CPUC will be the lead agency for the Proposed Project under CEQA. SDG&E is submitting this PEA (Part II of II) in support of its Application (Part I of II) for a Certificate of Public Convenience and Necessity (CPCN).

It should be noted that there will be several 12kV electric distribution improvements outside of the San Juan Capistrano Substation that will also be implemented. These include the following:

- Remove and relocate 12kV distribution lines from within SDG&E's existing Talega to Capistrano utility corridor to accommodate the new 230kV double-circuit line; and
- Relocate and underground all existing 12kV circuits to positions in the new 12kV switchgear.

3.2 PROPOSED PROJECT LOCATION AND REGIONAL CONTEXT

As shown in Figure 3-1, Project Vicinity Map, the Proposed Project components are primarily located in portions of the cities of San Juan Capistrano and San Clemente as well as unincorporated Orange and San Diego Counties. A complete list of jurisdictions crossed by the Proposed Project is included in Section 4.9, Land Use and Planning. The Proposed Project and its associated components will be located primarily within existing SDG&E ROW or underground in franchise position (i.e., city streets). South Orange County is composed of residential, commercial, industrial, recreational, and open space land uses. The transmission line crosses Interstate 5 (I-5) east of the Capistrano Substation, a major regional transportation corridor, and continues on to span San Juan Creek east of I-5. At the approximate middle section of the transmission line route, the ROW is located to the east of the Prima Deshecha Landfill. The remaining portion of the transmission line travels southeast through the city of San Clemente, unincorporated Orange and San Diego Counties, and ending at the Talega Substation at the border of United States Marine Corps Base Camp Pendleton (Camp Pendleton) and Orange County.



G:\SOCRUP\MXD\Project Description 2012\Fig 3-1 VicinityMap.mxd 02-24-2012 ks

South Orange County Reliability Enhancement Project

Project Vicinity Map

Figure 3-1

Created For: Mary Turley

Created By: TRC

Date: 4/25/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

- Substations
- Proposed Overhead Transmission Lines
- Proposed Underground Transmission Lines
- County Boundary

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-1

3.2.1 Capistrano Substation Site

The existing Capistrano Substation is a 6.4 acre industrial zoned site located within an urbanized area in the city of San Juan Capistrano in South Orange County (see Figure 3-1 and Figure 3-2, Project Overview Map). This community is known for blending a mix of residential, commercial, and tourism uses in the surrounding area. The existing 138/12kV Capistrano Substation is bounded by residential streets Calle Santa Rosalia to the east and Calle Bonita to the south, by a parking/storage lot to the southeast, residential developments to the south and north, and a major thoroughfare, Camino Capistrano, to the west. The existing Capistrano Substation site has an upper and lower yard, with the upper yard occupied by a 138/12kV operating substation and the lower yard containing an old, abandoned concrete structure and remnant facilities previously utilized for utility purposes. The existing substation property has a change in elevation of approximately 47 feet from west to east with three existing pad areas. The concrete structure is located on the west end of the lower yard and has an approximate 1.1 acre flat pad. On the north end of the property is an approximate 0.45 acre pad where former facilities were located. The eastern third of the property contains the upper yard which consists of an approximately two-acre flat pad where the currently operating 138/12kV substation is situated.

The majority of the site's storm water drainage currently flows to a discharge structure located at the southwest corner of the site and from there is discharged via an 18-inch pipe into the existing 57-inch city storm drain running along Camino Capistrano. A portion of the northwestern quadrant of the site drains by sheet flow to the curb inlets along the east side of Camino Capistrano. The site contains no native vegetation, wetland habitat, steep slopes, or other natural features.

3.2.2 Talega Substation Site

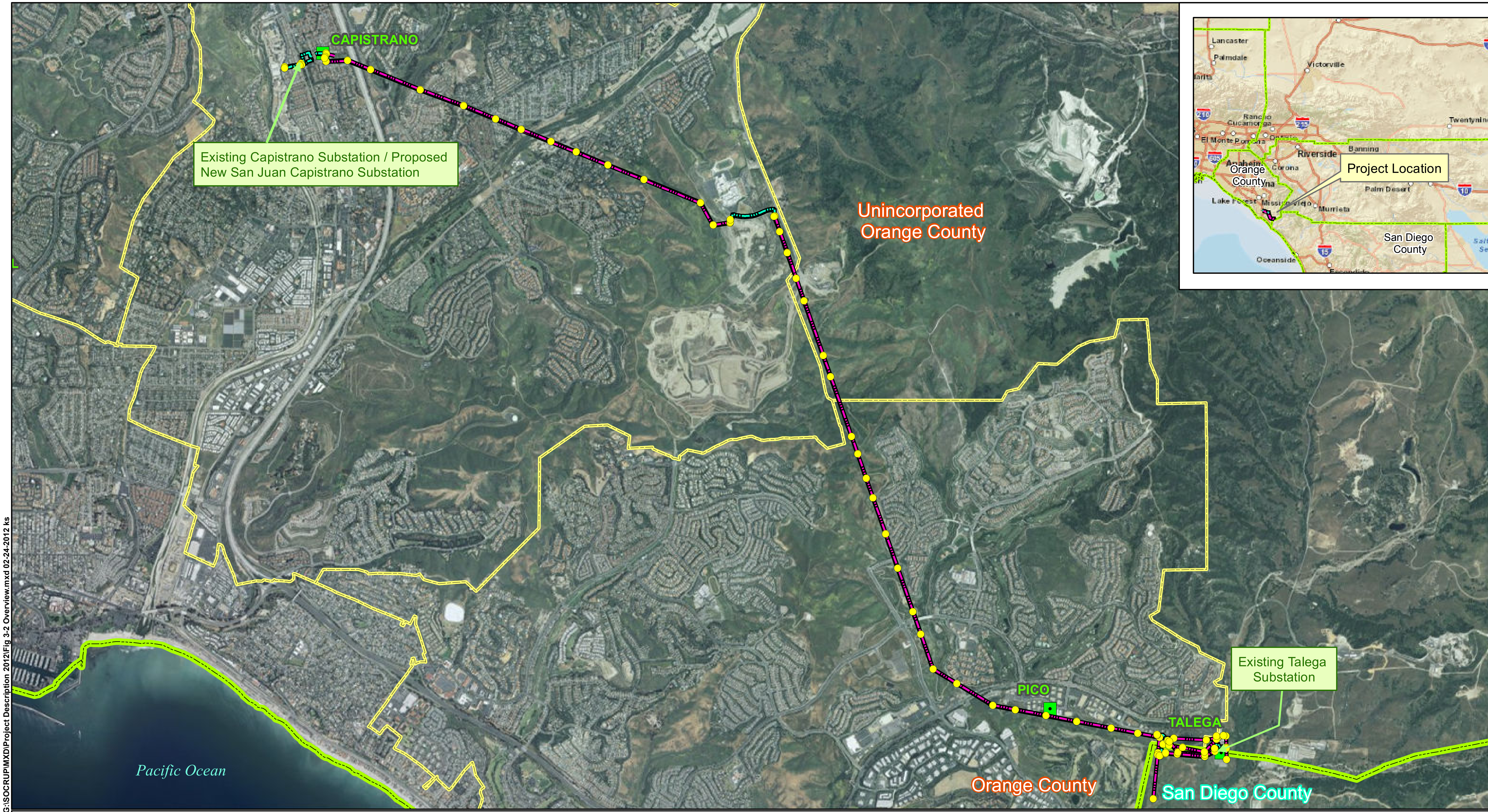
SDG&E's Talega Substation is located partially within the Orange and San Diego Counties, on land owned and operated by Camp Pendleton (refer to Figure 3-1). The Talega Substation is surrounded by undeveloped land to the north, east and south. The western boundary of the Talega Substation is occupied by existing SDG&E's 69kV, 138kV, and 230kV transmission lines and associated ROW. The nearest existing development to the Talega Substation includes the Bella Colina Towne and Golf Club 2,000 feet west, residential development 1,000 feet northwest and Camp Pendleton facilities 1,000 feet east. The Talega Substation occupies approximately 6.1 acres and is a flat site with no variation in topography.

3.3 EXISTING REGIONAL ELECTRIC SYSTEM

3.3.1 Capistrano Substation

The existing SDG&E Capistrano Substation is approaching 60 years old. The current 138/12kV air insulated substation consists of three 138kV transmission lines (TL13816, TL13834, and TL13837), seven 12kV circuits, one 138kV capacitor, two 12kV capacitors, two 138/12kV transformers, and a control shelter (see Figure 3-3, Existing Capistrano Substation Layout).

THIS PAGE IS INTENDED TO BE LEFT BLANK



G:\SOCRUP\MXD\Project Description 2012\Fig 3-2 Overview.mxd 02-24-2012 ks

Created For: Mary Turley

Created By: TRC

Date: 4/25/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

- Proposed New Transmission Line Structures (Including 69kV, 138kV and 230kV)
- Proposed New Transmission Line - Overhead
- Proposed New Transmission Line - Underground
- Capistrano, Pico and Talega Substations
- County Boundary
- City Boundary

Notes: Transmission line structure locations based upon preliminary engineering.

N

0 0.25 0.5 1 Miles

South Orange County Reliability Enhancement Project

Project Overview Map

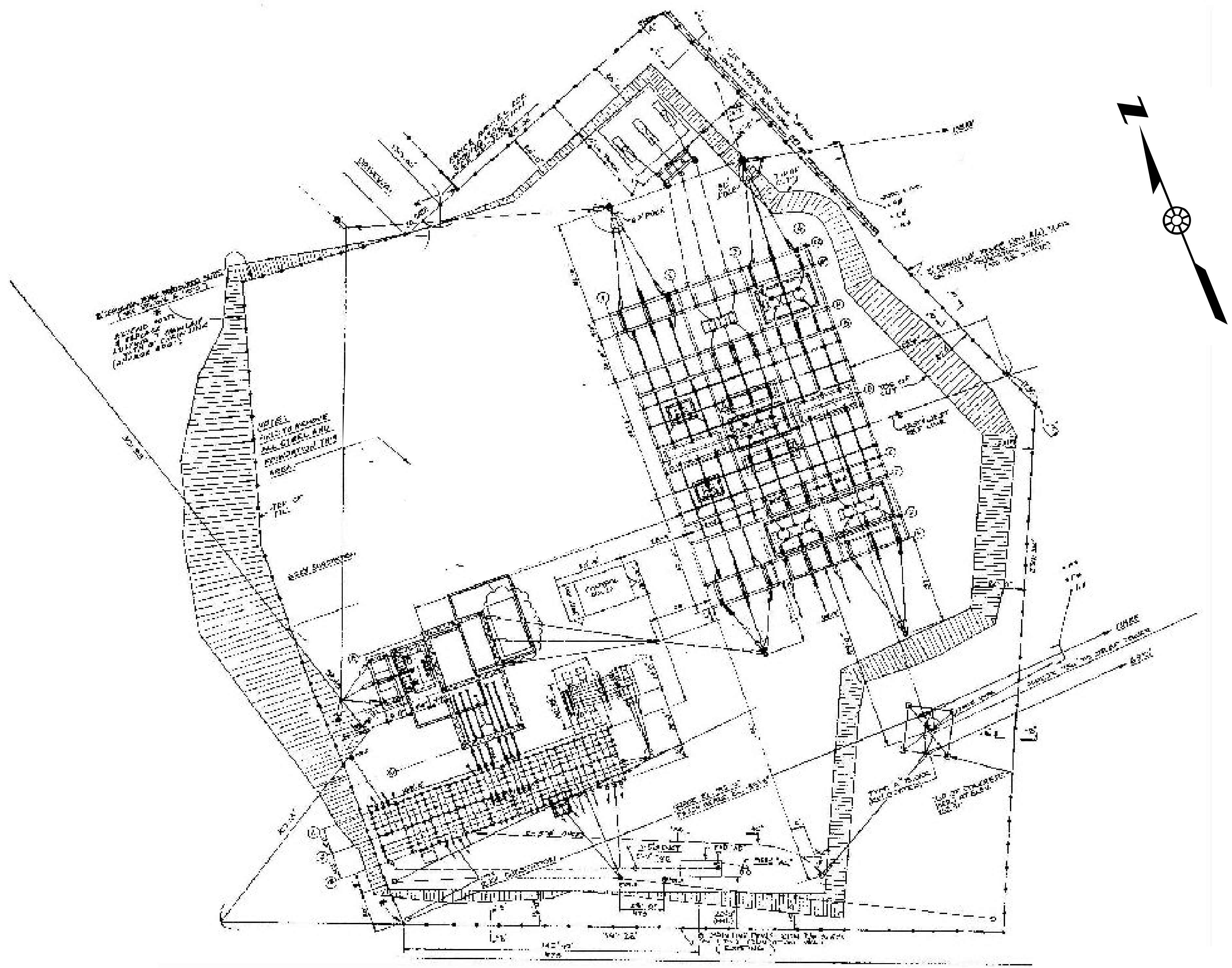
Figure 3-2

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-2



South Orange County Reliability Project

Existing Capistrano Substation Layout

Figure 3-3

Source: SDG&E, December 2011

Created For: Mary Turley

Created By: TRC

Date: 4/25/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE

A Sempra Energy utility

G:\SOCRUP\MXD\Project Description 2012\Fig 3-3 ExistingCapistrano.mxd 02-24-2012 ks

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-3

The existing SDG&E 138/12kV substation is located on the eastern (upper yard) portion of the SDG&E property and consists of an open rack design with poles approximately 50 feet high and the accompanying transmission and distribution poles (refer to Figure 3-4, Existing Capistrano Substation Site Overview). Two additional 138kV transmission lines (TL13833 and TL13835) pass next to (but do not connect to) the Capistrano Substation along the southern property line.

3.3.2 Talega Substation

The existing SDG&E Talega Substation is a 230/138/69kV bulk transmission substation located at the east end of Pico Avenue on the border of unincorporated Orange and San Diego Counties. The substation is also partially located on Camp Pendleton. The Talega Substation consists of one 69kV, four 138kV, and three 230kV transmission lines along with one 138/69kV transformer, four 230/138kV transformers, two 230kV capacitors, one Static Synchronous Compensator (STATCOM), and a control shelter (see Figure 3-5, Existing Talega Substation Layout).

3.3.3 Transmission Lines

The existing 138kV transmission system in the South Orange County service area forms a loop that begins and ends at the Talega Substation. This 138kV loop connects the existing San Mateo, Pico, Laguna Niguel, Capistrano, Trabuco, Margarita, and Rancho Mission Viejo SDG&E Substations. The loop consists of double-circuit transmission lines on the west side and single-circuit transmission lines on the east side. The Talega Substation is the only power source serving the South Orange County area, and is the only substation with 230kV capacity.

There is currently only one double-circuit 138kV transmission line (TL13816/TL13836 and TL13833) that provides service between the Talega and Capistrano Substations. TL13836 connects the Talega Substation to the Pico Substation and TL13816 connects the Pico Substation to the Capistrano Substation. Therefore, the combination of TL13816 and TL13836 combine to provide 138kV service between the Capistrano and Talega Substations. The TL13816/TL13836 and TL13833 double-circuit, along with one other 138kV transmission line (TL13835), are all located within SDG&E ROW between Capistrano and Talega Substations and are supported on a combination of steel lattice towers, wood poles, and steel poles. There is an approximate 2,000 foot long section of the existing transmission route that is located in an underground position within Vista Montana immediately south of San Juan Hills High School. The existing transmission line routes and poles are shown on the Talega to Capistrano Existing Transmission Line Map, which has been included as Appendix 3-A.

SDG&E has continuously operated and maintained these existing electric transmission, distribution and substation facilities for decades and will continue to operate and maintain these facilities both pending agency review of the Proposed Project and after the Proposed Project is constructed and in service. Existing and proposed operation and maintenance activities are discussed in Section 3.8, below.

THIS PAGE IS INTENDED TO BE LEFT BLANK

G:\SOCRUP\MXD\Project Description 2012\Figure 3-4 Substation.mxd

Created For: Mary Turley

Created By: TRC

Date: 4/25/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

SDG&E Property Boundary

Source: Aerial Bing Maps 2011

N

0 50 100 200 Feet

South Orange County Reliability Enhancement Project

Existing Capistrano Substation Site Overview

Figure 3-4

South Orange County Reliability Enhancement

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-4

Figure 3-5: Existing Talega Substation Layout

THIS FIGURE HAS BEEN OMITTED – IT HAS BEEN SUBMITTED UNDER CONFIDENTIAL COVER

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-5

3.4 PROPOSED PROJECT FACILITIES

The Proposed Project includes the following three main components:

- Complete re-build and modification of the Capistrano Substation within the existing property footprint;
- Minor alterations to the Talega Substation within the existing substation footprint including the addition of one new 138kV connection and the removal of one 230kV connection; and
- Removal, installation, and relocation of multiple transmission lines resulting in the upgrading of an existing 138kV line to 230kV.

Each of these general Proposed Project components is discussed in detail within the following subsections. Table 3-1, Proposed Project Cost Estimate, presents the estimated total cost for construction of the Proposed Project.

Table 3-1: Proposed Project Cost Estimate

TABLE 3-1 HAS BEEN OMITTED –
IT HAS BEEN SUBMITTED UNDER CONFIDENTIAL COVER

3.4.1 Substations

The Proposed Project includes the rebuilding of the existing Capistrano Substation into a new combined 230/138/12kV transmission and distribution substation on the existing SDG&E property. The new substation will be named the San Juan Capistrano Substation. The Proposed Project will include the replacement of the aging substation equipment by rebuilding and modernizing the existing 138/12kV substation that currently exists on the Capistrano Substation site as well as the addition of a new 230kV substation. The existing 138/12kV facilities are currently located on the upper yard portion of the property and will be re-built on the lower yard portion of the property (refer to Figure 3-4). The upper yard portion of the property will then be utilized for the construction of the new 230kV substation. Both the 138kV and the new 230kV substation will utilize gas insulated substation technology. The Talega Substation will undergo alterations to accommodate the 138kV transmission line addition and the 230kV rearrangement of the Proposed Project. The following subsections provide a detailed description of the proposed new facilities at each substation site. It is anticipated that environmental monitors will not be required for work within substation fenced areas since they are fully developed sites. Furthermore, due to safety concerns all work within developed energized substation fence areas will be completed under strict safety enforcements which may include restricting access to non-construction workers.

3.4.1.1 San Juan Capistrano Substation

The proposed rebuild and modification of the existing 138/12kV Capistrano Substation will result in a 230/138/12kV substation to be re-named the San Juan Capistrano Substation. This substation will occupy the full 6.4 acres of SDG&E electric facility property of the existing Capistrano Substation site (approximately 360 feet wide by 700 feet long at its widest points) The existing property is irregular shaped with a maximum depth of approximately 700 feet and a width ranging from 330 feet to 530 feet at the widest point. Once complete, the San Juan Capistrano Substation will initially connect to seven 12kV distribution circuits, six 138kV transmission lines and two 230kV transmission lines.

The completed substation would include permanent cut and fill slopes and retaining walls constructed within the existing property boundary. The substation will be enclosed by a 10 foot high masonry screen wall on the south, east, and west sides. The existing fence on the north side will be replaced with an approximate eight foot high chain link fence with vinyl slats and two feet of barbed wire. Along the north property boundary, the masonry screen wall will be set back a minimum of 10 feet from the property line to provide a landscaped buffer zone between the wall and the adjacent home owner’s property. A six to eight foot high chain link fence without barbed wire will be installed along this property line to provide separation for the private residences adjacent to the substation property.

Access to the substation will continue to be from Camino Capistrano with two 30 foot wide driveways leading to locked access gates installed in the west perimeter screen wall. Each of the access gates will consist of two approximately eight foot high by 15 foot wide vinyl slated chain link sliding style gates with barbed wire. The existing southernmost access drive will be reconstructed and widened to a 30 foot width in the current location of the existing south access drive to the property. The existing northern access drive to the property will be abandoned and rebuilt as typical curb, gutter and sidewalk. A 30 foot wide access drive to replace the north access drive will be constructed approximately 100 feet north to accommodate the new substation arrangement and better facilitate access to the upper yard area.

The Proposed Project will implement water quality standards and hydromodification controls consistent with the requirements of the Regional Water Quality Control Board (RWQCB), District 9 and the South Orange County MS4 Permit requirements. Doing so will include construction of hydromodification control best management practices (BMP’s) and facilities such as bioswales paralleling the access roads and installation of bioretention facilities, such as open water quality basins and/or subsurface vaults to provide flow duration control of the site runoff to a level consistent with the city of San Juan Capistrano’s requirements.

The San Juan Capistrano Substation initial configuration will be designed to include the following components:

- A 230kV yard with double 230kV busses and three bays of breaker and a half configuration. Each of the three bays will consist of three breakers, six disconnects, potential transformers, and protection equipment. This equipment will be of gas insulated substation technology and be housed in a steel framed, metal sided building approximately 65 feet wide by 180 feet long and 50 feet tall.
- Two 230/138kV, 352 MVA transformers will be installed with oil spill containment basins. One fire wall, approximately 52 feet wide by 30 feet tall, will be installed between the two transformers. Two 55 foot steel deadend structures will be installed at the transformer locations to terminate the 230kV and 138kV bank leads. This equipment will be installed outside of the gas insulated substation building.
- Two approximately 55-foot steel deadend structures will be installed to terminate the 138kV bank leads into the gas insulated substation building.

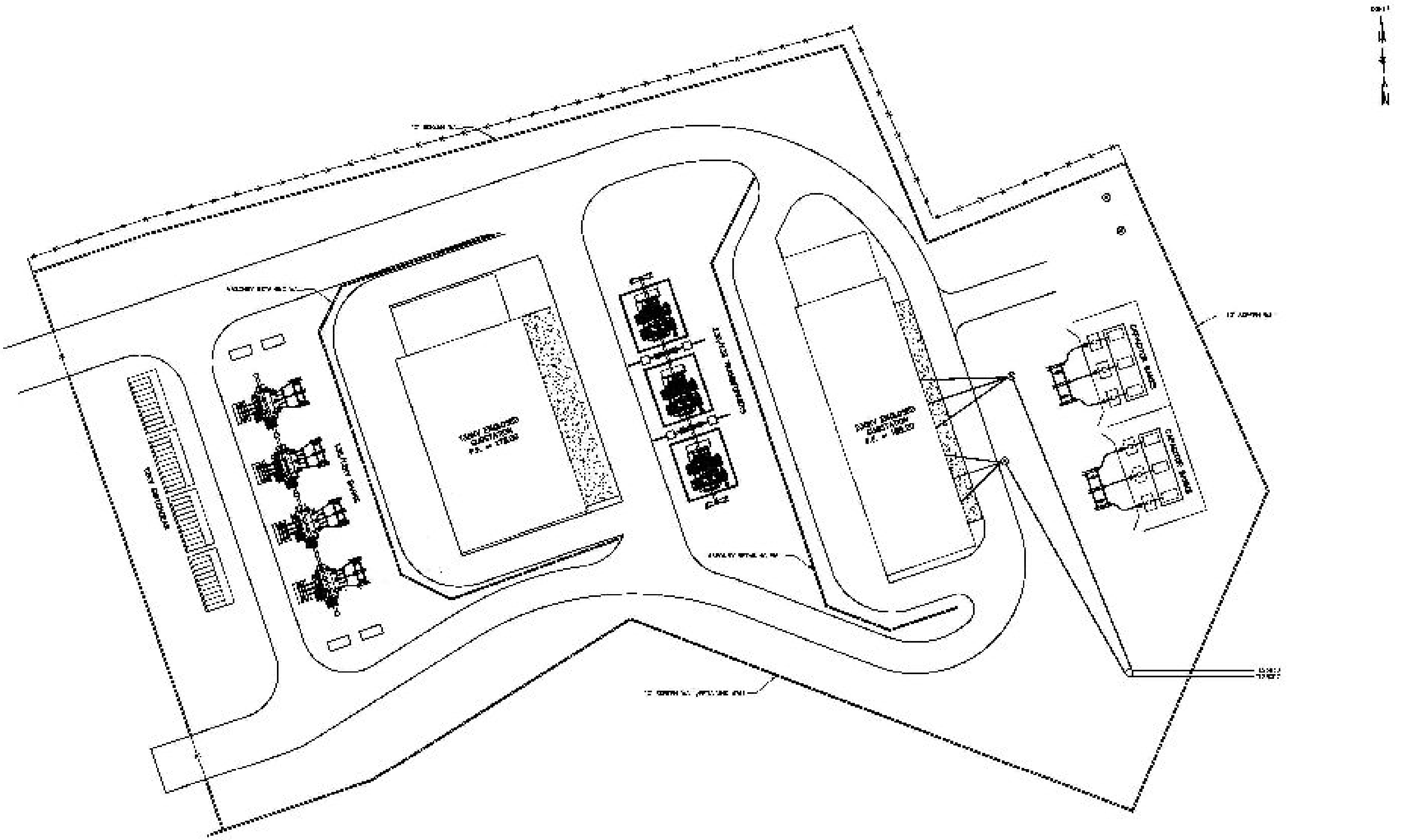
- Two 230kV transmission lines will be installed overhead into the gas insulated substation structure. The overhead lines will be installed via the addition of one 120 foot double-circuit pole and two approximately 80 foot single-circuit poles located inside the 230kV substation yard.
- Two 230kV capacitors will be installed outside of the gas insulated substation building.
- One concrete masonry block control shelter will be installed to house the 230kV relays, controls, and batteries. This shelter will measure approximately 55 feet by 32 feet by 12 feet high.
- A 138kV yard with double 138kV busses and eight bays of breaker and a half configuration. Each bay will consist of three breakers, six disconnects, potential transformers, and protection equipment. This equipment will utilize gas insulated substation technology and be housed in a steel framed, metal sided building approximately 85 feet wide by 150 feet long and 45 feet tall.
- Six 138kV transmission lines installed with underground getaways.
- Three 138/12kV, 30MVA transformers will be installed with oil spill containment basins. Two fire walls, approximately 32 feet wide by 16 feet tall, will be installed between the three transformers. Three approximately 30 foot high H-framed structures will be installed to terminate the 138kV bank leads.
- Three 12kV capacitors will be installed.
- Three ¼ sections of 12kV switchgear will be installed with twelve 12kV circuit positions will terminate inside the switchgear.
- One concrete masonry block control shelter will be installed for the 138kV and 12kV relaying and controls, measuring approximately 70 feet by 32 feet by 12 feet high. This control shelter will house the relay and controls and station batteries for the 138kV and 12kV yards respectively.
- An AT&T communication line and SDG&E fiber communication lines will be upgraded from the current lines installed at the existing Capistrano Substation.

Substation lighting will be installed in the 230kV, 138kV, and 12kV yards with the purpose to:

- Allow for safe entry and exit from substation.
- Allow for safe driving around busses/racks, corners, and roadways.
- Allow for a preliminary visual inspection of substation inspection.
- Lights are not for security and are not to be left on at night.
- Lighting designs will result in approximately 0.5 foot-candles in walkway areas with high pressure sodium used for gate entry light only and, metal halide used for all yard lights. Different light types will be used for the wall/control shelters and deadend structures, if necessary. All lights will be shielded and aimed downward.

The ultimate arrangement would be as depicted in Figure 3-6, Ultimate San Juan Capistrano Substation Layout. The ultimate list of components, which is in addition to the components of the initial arrangement listed above, is:

- One 230/138kV, 352 MVA transformers will be installed with an oil spill containment basin. One fire wall, approximately 52 feet wide by 30 feet tall, will be installed between the second and third transformers. One approximately 55 foot steel deadend structure will be installed at the third transformer location to terminate the 230kV and 138kV bank leads.
- One additional approximately 55 foot deadend structure will be installed to terminate the 138kV bank leads into the gas insulated substation building.
- One additional 230kV transmission line will be installed into the gas insulated substation structure terminated with associated circuit breakers, disconnects, controls and protection.
- One additional 138/12kV, 30 MVA transformer will be installed with oil containment basin. One fire wall, approximately 32 feet wide by 16 feet tall, will be installed between the third and fourth transformers. One approximately 30 foot high H-framed structure will be installed to terminate the 138kV bank leads.
- One additional 12kV capacitor will be installed.
- One additional ¼ section of 12kV switchgear will be installed with four 12kV circuit positions terminating inside the switchgear.
- All additional relay and protection equipment will be housed inside the two masonry block control shelters previously discussed for the 138kV and 230kV yards respectively.
- An AT&T communication line and SDG&E fiber communication lines will be upgraded from the current lines installed at the existing Capistrano Substation.



G:\SOCRUP\MXD\Project Description 2012\Figure 3-6 UltimateSanJuanCapLayoutApril2012.mxd 04-23-2012 ks

South Orange County Reliability Enhancement Project

Ultimate San Juan Capistrano Substation Layout

Figure 3-6

Created For: Mary Turley

Created By: TRC

Date: 4/25/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Source: Nolte, December 2011

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-6

The approximate sequencing of work at the San Juan Capistrano Substation site for all 12kV, 138kV and 230kV work will be as follows:

1. Demolish the existing structure and foundation pads in the lower yard and regrade the lower yard area (Phase 1 grading).
2. Construct a temporary getaway to remove the existing two 12kV circuits crossing the lower yard.
3. Construct the new 138kV gas insulated substation facility and the new 12kV air insulated substation facility in the lower yard portion of the Capistrano Substation site.
4. Connect and energize the following existing 138kV transmission lines, in no particular order:
    - Connect TL13834 to the new 138kV gas insulated substation facility.
    - Loop TL13833 into new 138kV gas insulated substation facility. Cut TL13837 over to the new 138kV gas insulated substation facility.
    - Connect TL13816 to the new 138kV gas insulated substation facility.
    - Tie portion of TL13835 connecting at Laguna Niguel Substation into new 138kV gas insulated substation facility.
    - Install a temporary 138kV position at San Juan Capistrano Substation utilizing existing poles and equipment to allow for construction work on the 230kV transmission facilities.
    - Energize 138/12kV transformers.
5. Connect seven existing 12kV circuits to new 12kV substation and energize.
6. De-energize the existing 138kV and 12kV air insulated substation.
7. Remove the old 138kV and 12kV air insulated substation system and all equipment from the upper yard.
8. Re-grade upper yard (Phase 2 grading).
9. Construct the new 230kV gas insulated substation.
10. The new 230kV lines (TL23030 and Tl23007) will be connected into the new 230kV gas insulated substation facility.
11. Adjust relays at remote ends of transmission lines as required
12. Energize the 230/138kV transformers
13. Energize the 230kV capacitors

3.4.1.2 Talega Substation

At the Talega Substation, one 138kV transmission line (TL13835) will be connected to the Talega Substation and one 230kV transmission line (TL23007) will disconnected from the Talega Substation and instead be rerouted and connected to the San Juan Capistrano Substation. To accommodate these changes, existing 138kV and 230kV poles within the Talega Substation will have to be re-arranged to accommodate the crossing of the 230kV line. Approximate sequencing of work at the Talega Substation will be as follows:

1. Relocate TL13831 to a new bay position. One new breaker and disconnects will be added. Existing pole will be relocated to accommodate the new bay position.

2. Relocate TL13812 to the position vacated by TL13831, including installation of one new 138kV cable pole and approximately 700 feet of new underground cable.

3. Tie in TL13835 to the Talega Substation in the position vacated by TL13812.

4. Rearrange existing TL23030 at Talega Substation by installing two new poles (and removing one existing pole) inside Talega Substation and extending the existing transmission line to continue onto San Juan Capistrano Substation creating a three terminal transmission line.

5. Disconnect TL23007 from the Talega Substation.

6. Remove transformer Banks 60 and 62 from service at Talega Substation.

3.4.2 Substation Getaways

3.4.2.1 San Juan Capistrano Substation

Distribution Getaways

All 12kV circuits will leave the San Juan Capistrano from the 12kV switchgear underground into Camino Capistrano.

West San Juan Capistrano Substation 138kV Getaways

Four of the six 138kV transmission lines will exit the substation site via an underground conduit system and cross Camino Capistrano heading west to four new steel cable poles (Pole Nos. 1a, 2a, 4a, and 5a – see Figure 3-7, Proposed Transmission Line Route, Sheet 1). One new steel pole (Pole No. 3a) will also be installed west of the San Juan Capistrano Substation site, immediately adjacent to the existing railway line. One steel and six wood 138kV poles will be removed from the same area west of the San Juan Capistrano Substation site. Two of the four lines will then transfer to overhead positions on Pole Nos. 4a and 5a before heading north. The remaining two 138kV transmission lines will be installed under the existing railway line using the jack-and-bore method (refer to Figure 3-7, Sheet 1). Typical jack-and-bore diagrams and photographs have been included within Appendix 3-B. These two 138kV transmission lines will continue west in an underground position through existing private recreational area (within existing SDG&E ROW) until transitioning to an overhead position via Pole Nos. 1a and 2a (located along Avenida de la Vista) before continuing to the west. Three new 138kV splice vaults will be installed west of the railway line and one new 138kV splice vault will be located within Camino Capistrano. The new 138kV trench packages will be approximately three feet wide by six to eight feet deep.

East San Juan Capistrano Substation 138kV Getaways

Two of the six 138kV transmission lines will exit the substation site via two new steel cable poles that will be installed in the northeast corner of the substation site. Also within the substation property, approximately nine existing wood and one steel lattice structure will be removed. Typical diagrams of 138kV single-circuit steel cable poles, 138kV wood poles, and 138kV steel lattice towers have been included within Appendix 3-B.

230kV Getaways

The new 230kV transmission lines will enter into the new 230kV gas insulated substation on two new steel poles and one double-circuit new steel pole located on the east end of the Capistrano Substation site (refer to Figure 3-7, Sheet 1 and Appendix 3-B).

3.4.2.2 Talega Substation

Existing TL13831 will be transferred in the Talega Substation on a new overhead steel pole connecting to a new bay position. Existing TL13812 will then be relocated to its new bay position (now vacated by TL13831). A new 138kV cable pole (refer to typical 138kV steel pole diagram included within Appendix 3-B) will be located within the fence line of the substation (on the western end of the substation) and approximately 700 feet of underground duct bank package will be constructed completely within the fence line of the existing substation (refer to Figure 3-7, Sheet 18 for the location of new poles and underground cable within the Talega Substation). TL13835 will then be connected to Talega Substation by overhead connection at the existing bay position now vacated by TL13812. Existing 230kV transmission line TL23007 will be reconfigured to bypass the Talega Substation. TL23007's existing line drops will be removed from its current deadend position at Talega Substation.

Existing TL23030 will be re-arranged at the Talega Substation by installing two new transmission poles and removing one existing pole inside the Talega Substation and extending the existing TL23030 to continue onto the new San Juan Capistrano Substation creating a three terminal transmission line, connecting the Escondido, Talega, and San Juan Capistrano Substations.

3.4.3 Transmission Lines

The Proposed Project will involve the installation and removal of 69kV and 138kV poles and the installation of new 230kV poles along with associated overhead conductor and underground cable (refer to Appendix 3-B for typical pole diagrams and Figure 3-7 (Sheets 1-19) for the location of all proposed new transmission line poles). Additionally, the Proposed Project will include removal and relocation of existing transmission poles and modifications at two existing substations.

A substantial portion of the transmission line work will be completed within SDG&E's existing ROW between the existing SDG&E Capistrano and Talega Substations (refer to Figure 3-7, Sheets 1-20). A small portion of the work will be completed within a segment of acquired ROW near the Talega Substation (refer to Figure 3-7, Sheet 19). In addition, the existing ROW used for the Proposed Project contains two 138kV transmission lines that will not be affected by this Proposed Project.

THIS PAGE IS INTENDED TO BE LEFT BLANK

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

- Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 1 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 1)

G:\SOCRUP\MXD\Project Description 2012\Fig 3.7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 2 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 2)

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 3 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 3)

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

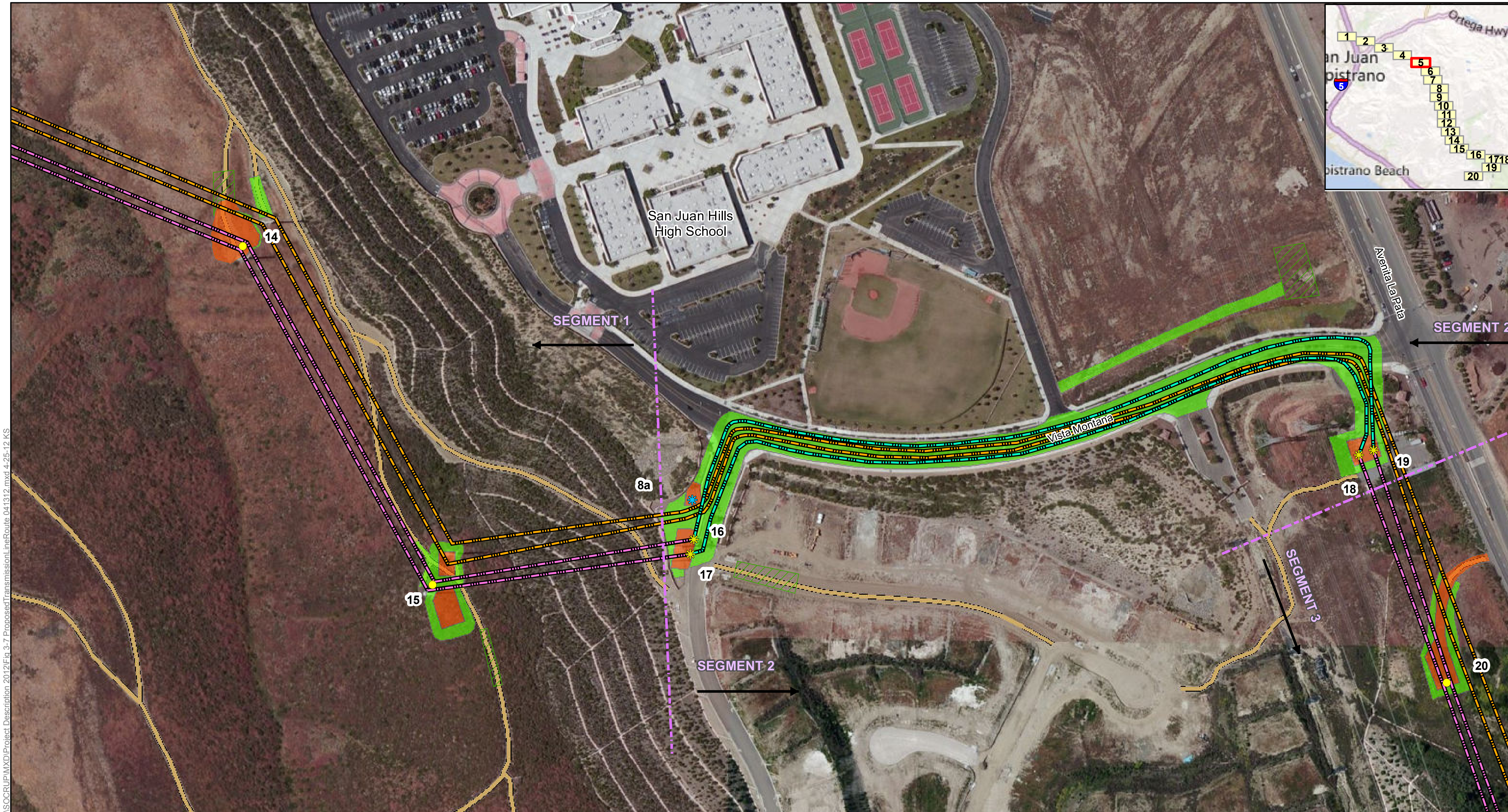
Sheet 4 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 4)



G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

- Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 5 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 5)

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 6 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 6)

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 7 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 7)

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 8 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 8)

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

- Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 9 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 9)

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For:
Mary Turley

Created By:
TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

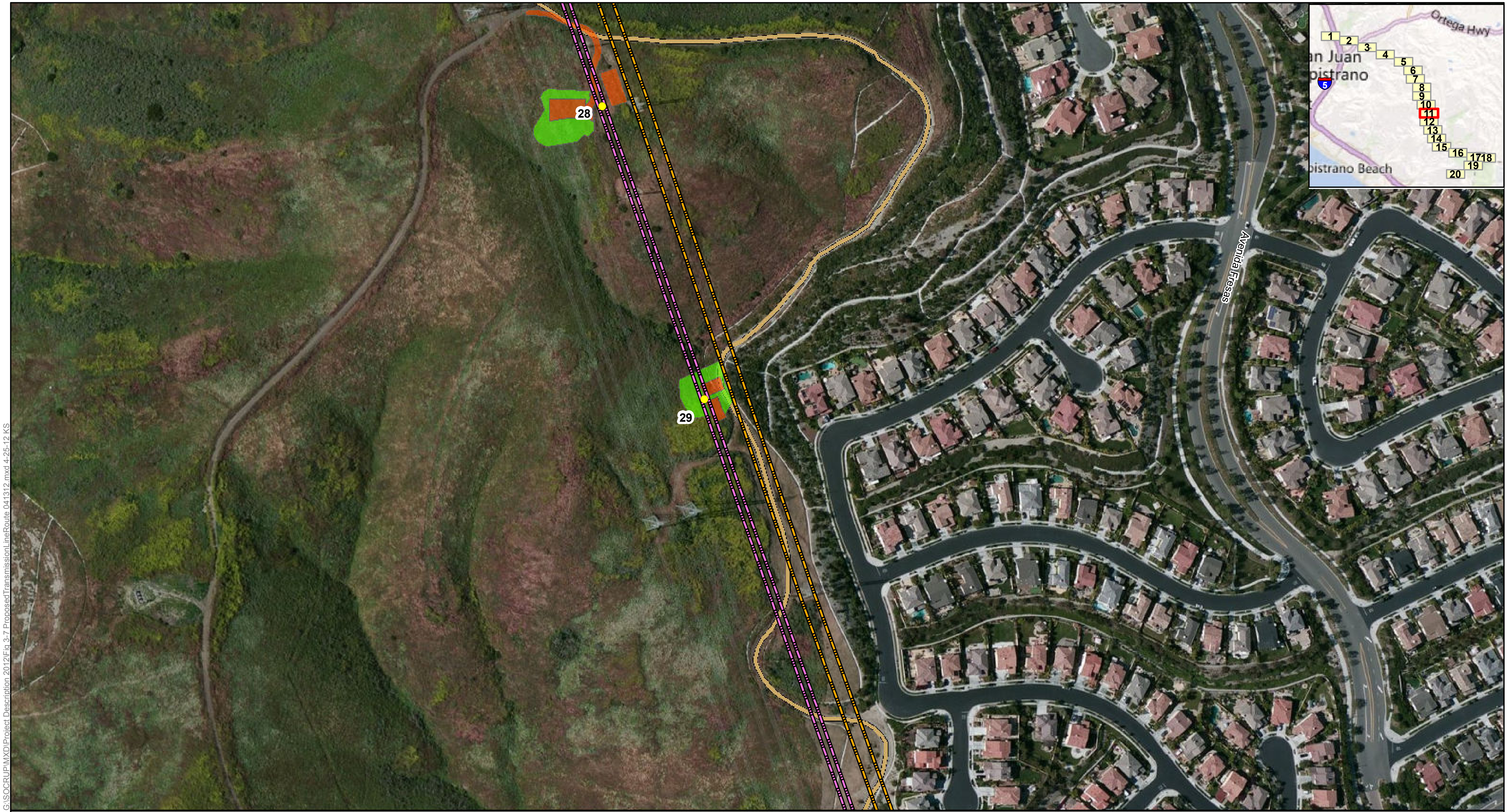
Sheet 10 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 10)



Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 11 of 20

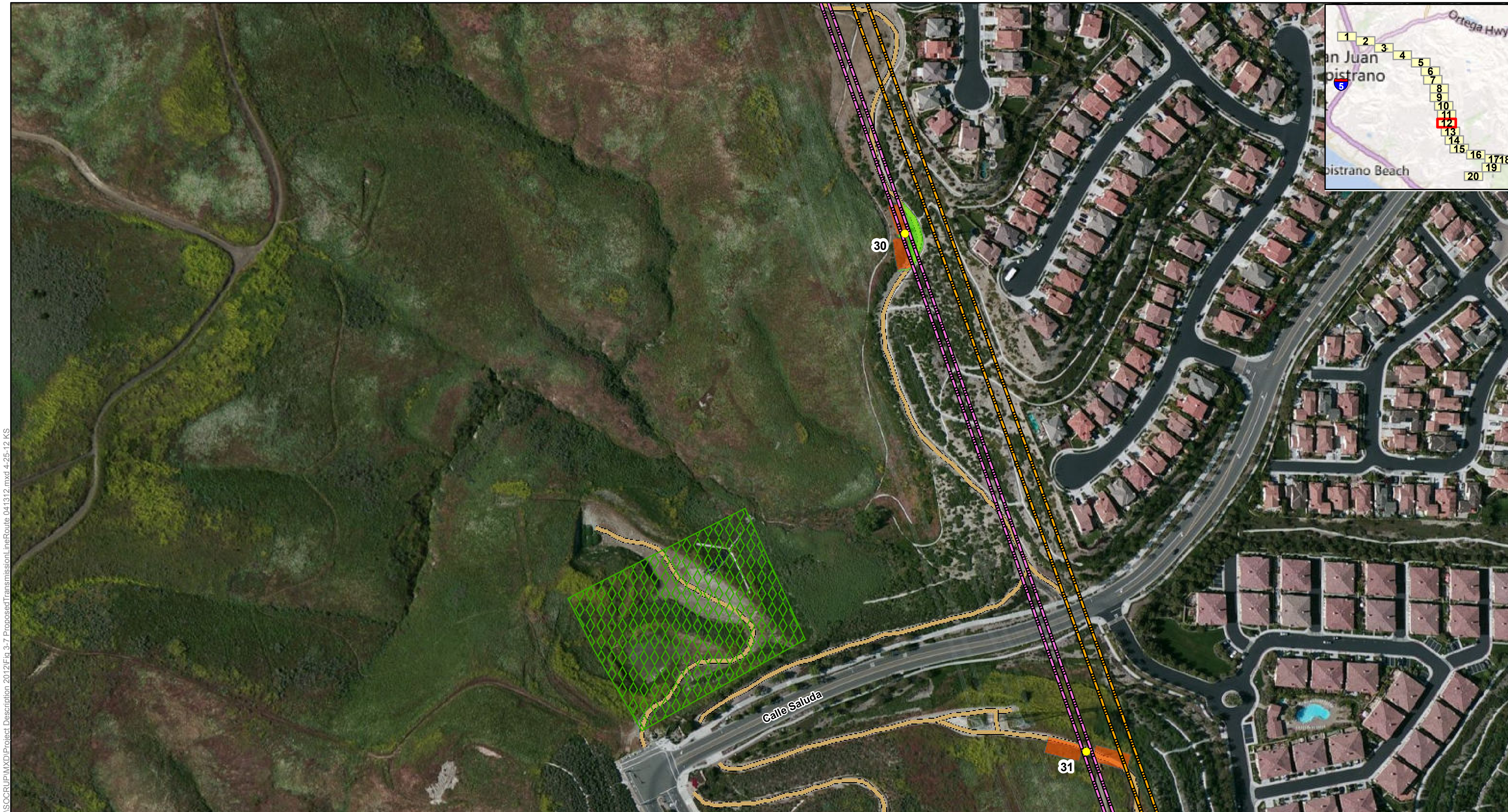
SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 11)



G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

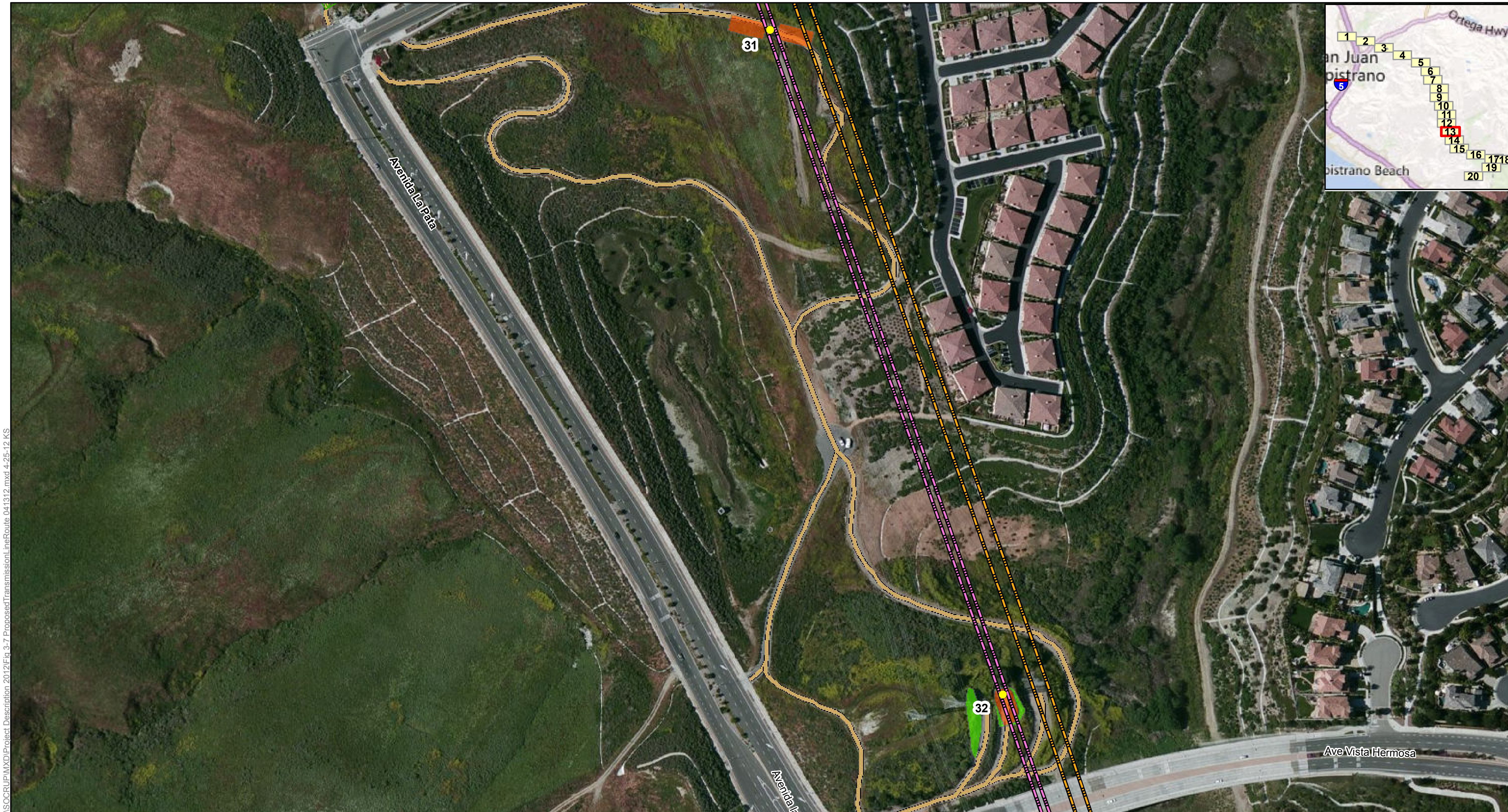
Sheet 12 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 12)



G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 13 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE

A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 13)

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

- Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 14 of 20

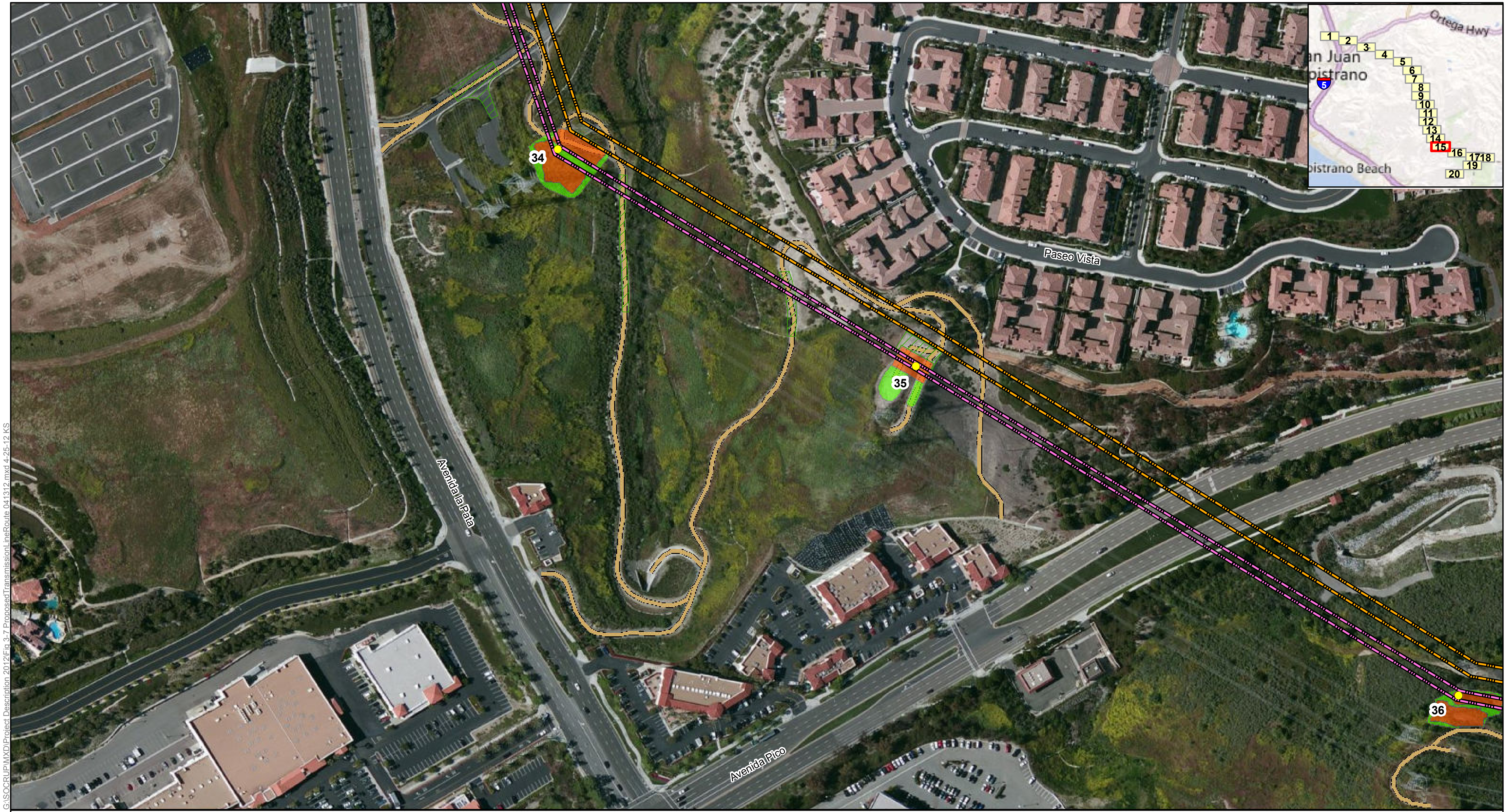
SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 14)

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS



Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

- Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 15 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 15)

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

- Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

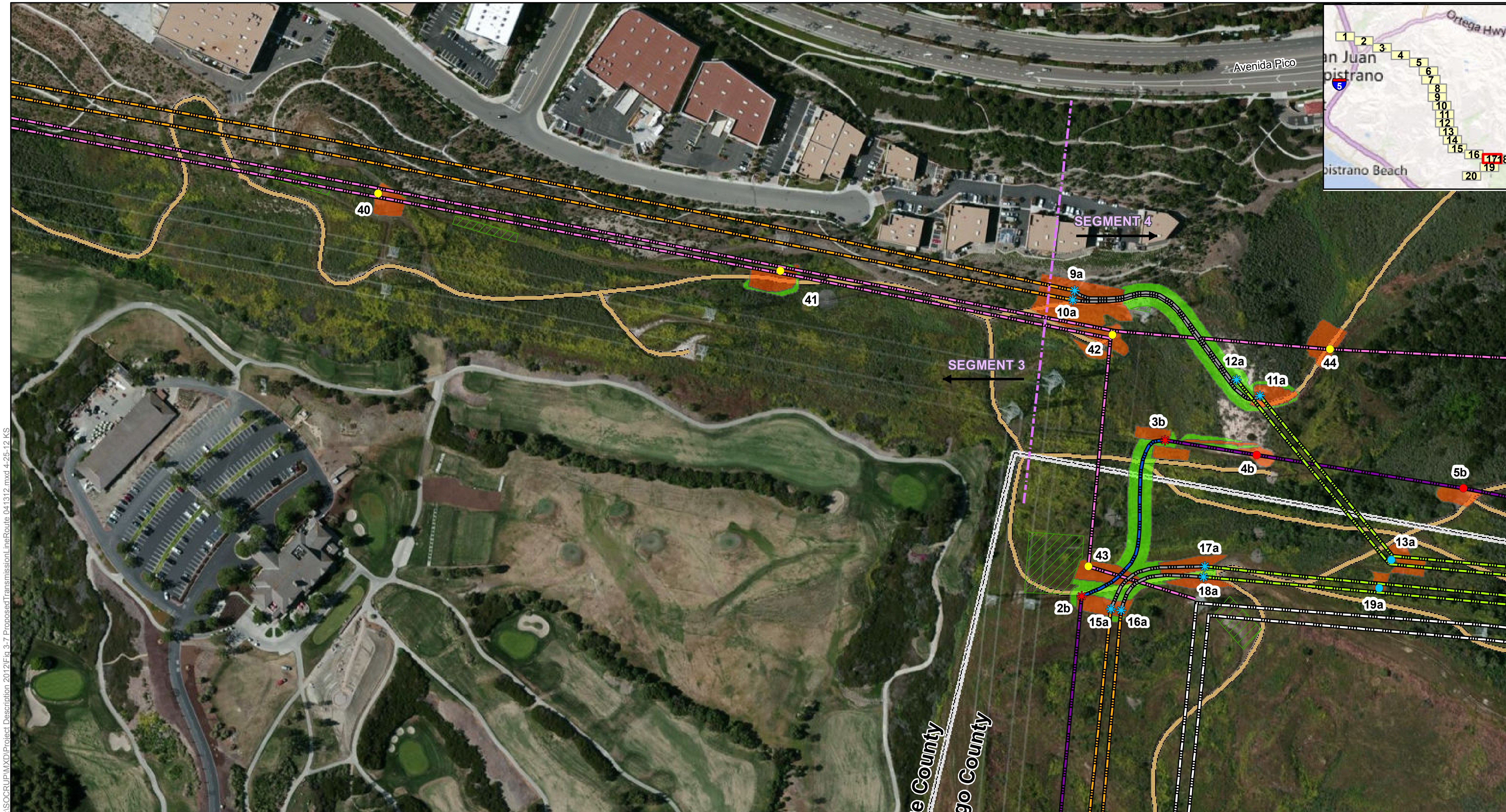
Sheet 16 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 16)



G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

- Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

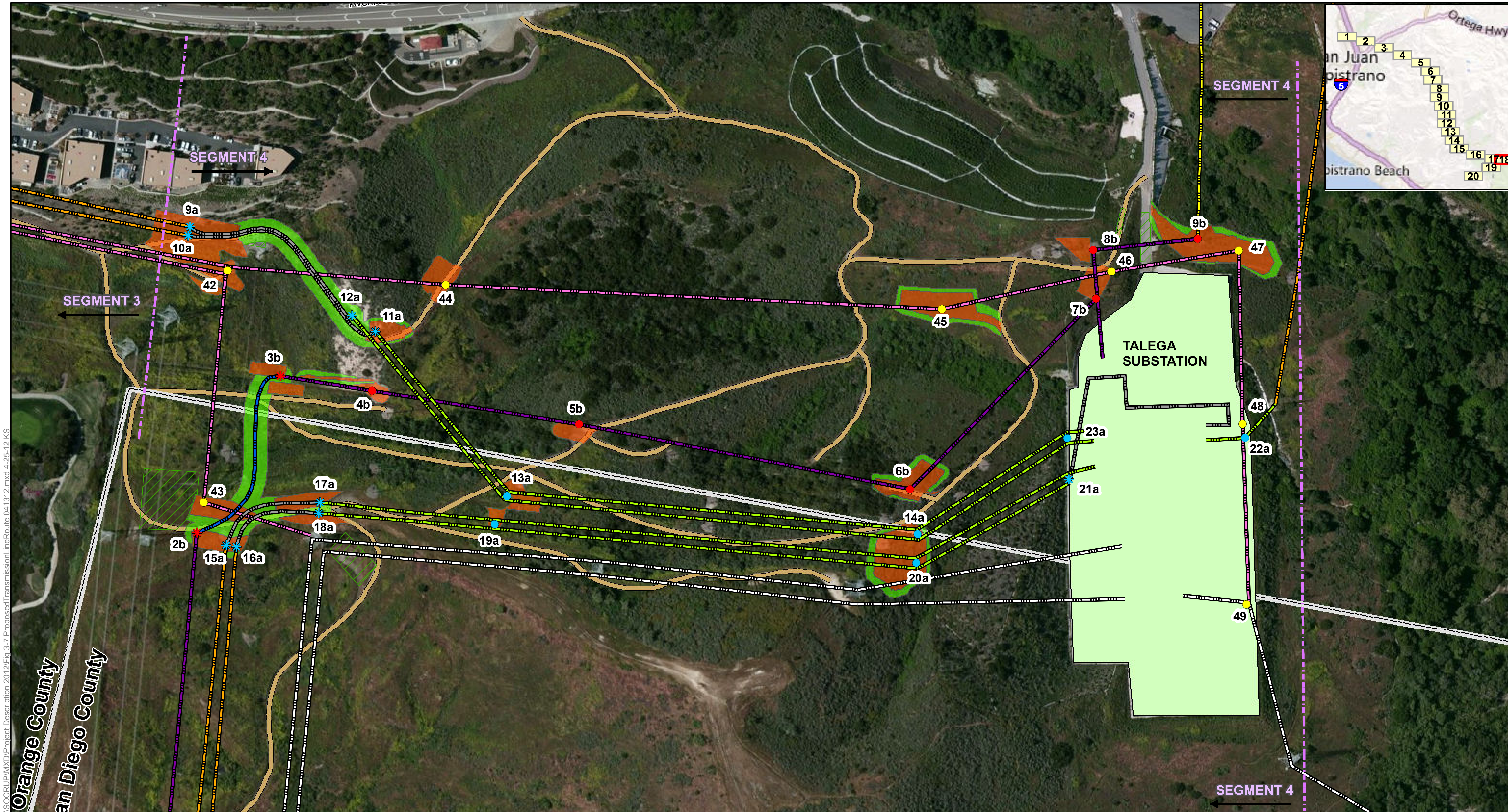
Sheet 17 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 17)



G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 18 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 18)

G:\SOCRUP\MXD\Project Description 2012\Fig 3-7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For:
Mary Turley

Created By:
TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

Project Segment Boundary

Proposed Transmission Lines

230kV Transmission Line - Overhead
138kV Transmission Line - Overhead
69kV Transmission Line - Overhead
230kV Transmission Line - Underground
138kV Transmission Line - Underground
69kV Transmssion Line - Underground

New Poles

230kV Standard Pole
230kV Cable Pole
138kV Standard Pole
138kV Cable Pole
69kV Standard Pole
69kV Cable Pole

Temporary Impact Area
Permanent Impact Area
Stringing Sites
Lay Down Areas
Existing Access Road
Existing138kV Transmission Line
Existing 230kV Transmission Line
Existing 69kV Transmission Line

N

0 100 200 400
Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 19 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE
A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 19)

G:\SOCRUP\MXD\Project Description 2012\Fig 3.7 ProposedTransmissionLineRoute 041312.mxd 4-25-12 KS

Created For: Mary Turley

Created By: TRC

Date: 5/8/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Legend

- Project Segment Boundary

Proposed Transmission Lines

- 230kV Transmission Line - Overhead
- 138kV Transmission Line - Overhead
- 69kV Transmission Line - Overhead
- 230kV Transmission Line - Underground
- 138kV Transmission Line - Underground
- 69kV Transmssion Line - Underground

New Poles

- 230kV Standard Pole
- 230kV Cable Pole
- 138kV Standard Pole
- 138kV Cable Pole
- 69kV Standard Pole
- 69kV Cable Pole

- Temporary Impact Area
- Permanent Impact Area
- Stringing Sites
- Lay Down Areas
- Existing Access Road
- Existing138kV Transmission Line
- Existing 230kV Transmission Line
- Existing 69kV Transmission Line

N

0 100 200 400 Feet

South Orange County Reliability Enhancement Project

Proposed Transmission Line Route

Figure 3-7

Sheet 20 of 20

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-7 (SHEET 20)

For the purposes of this discussion, the transmission line work associated with the Proposed Project has been divided into segments, as defined in Table 3-2, Transmission Line Segments. Table 3-3, Proposed New 230kV Poles provides a list of proposed new 230kV poles by type and height (all new 230kV poles will be steel), Table 3-4, Proposed New 138kV Poles provides a list of proposed 138kV poles by type and height (all new 138kV poles will be steel), Table 3-5, Proposed New 69kV Poles provides a list of proposed new 69kV poles by type and height (all new 69kV poles will be steel), and Table 3-6, Transmission Structures/Poles to be Removed provides the list of transmission poles to be removed (including 230kV, 138kV, and 69kV poles). Typical drawings and/or representative photographs of each type of structure to be removed are included in Appendix 3-B and the location of all of the poles to be removed is included in Appendix 3-A. Table 3-7, Transmission Pole Diameters provides the approximate structure diameters for the transmission poles associated with the Proposed Project.

Table 3-2: Transmission Line Segments

Segment Name	Approximate Mile Post[1]		Approximate Length	230kV Transmission Line Type
	Begin	End		
Segment 1 – San Juan Capistrano Substation to Rancho San Juan	0.0	2.66	2.66 mile (14,100 feet)	Overhead
Segment 2 - Rancho San Juan	2.66	3.02	0.36 mile (1,900 feet)	Underground
Segment 3 - Rancho San Juan to Talega Hub	3.03	7.20	4.19 miles (22,150 feet)	Overhead
Segment 4 – Talega Hub to Talega Substation	7.21	7.91	TL23030 – 0.5 mile (2,600 feet) TL23007 – 0.11 mile (600 feet)	Overhead

Notes: Table contents based upon preliminary engineering.
[1] Mile posts based upon new 230kV transmission lines. Mile post 0.0 is defined to be at the first 230kV structure
Source: SDG&E

The remainder of this page is intentionally left blank.

Table 3-3: Proposed New 230kV Poles

Pole No.[1]	Proposed Pole Type	Proposed Pole Height (feet)	Pole No.[1]	Proposed Pole Type	Proposed Pole Height (feet)
1	DE[2]	80	26	TGT	140
2	DE	80	27	TGT	125
3	DE	120	28	DE	145
4	DE	120	29	DE	150
5	DE	120	30	TGT	155
6	TGT[3]	140	31	TGT	145
7	TGT	155	32	TGT	145
8	TGT	110	33	TGT	115
9	DE	130	34	DE	140
10	DE	130	35	TGT	105
11	TGT	110	36	DE	95
12	TGT	145	37	TGT	115
13	TGT	145	38	TGT	110
14	DE	160	39	TGT	135
15	DE	135	40	TGT	130
16	DE/CP[4]	160	41	TGT	125
17	DE/CP	160	42	DE	120
18	DE/CP	160	43	DE	135
19	DE/CP	160	45	DE	150
20	DE	120	45	DE	140
21	TGT	120	46	DE	120
22	TGT	125	47	DE	140
23	TGT	155	48	DE	130
24	TGT	155	49	DE	120
25	TGT	140			

Notes: Table contents based upon preliminary engineering.
[1]Refer to Figure 3-7 for pole locations
[2]DE = Deadend pole
[3]TGT = Tangent pole
[4]CP = Cable pole
Source: SDG&E

Table 3-4: Proposed New 138kV Poles

Pole No.[1]	Proposed Pole Type	Proposed Pole Height (feet)	Pole No.[1]	Proposed Pole Type	Proposed Pole Height (feet)
1a	DE[2]/CP[3]	125	13a	DE	125
2a	DE/CP	125	14a	DE	115
3a	DE	90	15a	DE/CP	100
4a	DE/CP	90	16a	DE/CP	100
5a	DE/CP	90	17a	DE/CP	100
6a	DE/CP	90	18a	DE/CP	100
7a	DE/CP	90	19a	DE	105
8a	DE/CP	90	20a	DE	150
9a	DE/CP	100	21a	DE/CP	110
10a	DE/CP	100	22a	DE	65
11a	DE/CP	100	23a	DE	100
12a	DE/CP	100			

Notes: Table contents based upon preliminary engineering.
[1]Refer to Figure 3-7 for pole locations
[2]DE = Deadend pole
[3]CP = Cable pole
Source: SDG&E

Table 3-5: Proposed New 69kV Poles

Pole No.[1]	Proposed Pole Type	Proposed Pole Height (feet)	Pole No.[1]	Proposed Pole Type	Proposed Pole Height (feet)
1b	DE	75	6b	DE	90
2b	DE[2]/CP[3]	75.5	7b	DE	55
3b	DE/CP	75.5	8b	DE	50
4b	TGT[4]	56.5	9b	DE	65
5b	TGT	75			

Notes: Table contents based upon preliminary engineering.
[1]Refer to Figure 3-7 for pole locations
[2]DE = Deadend pole
[3]CP = Cable pole
[4]TGT = Tangent pole
Source: SDG&E

Table 3-6: Transmission Structures/Poles to be Removed

Structure/Pole No.[1]	Structure/Pole Type	Structure/Pole Size (in feet)	
		Height above ground	Embedded length
Z228473	138kV Wood Structure	70	10
Z228467	138kV Wood Structure	70	10
Z643274	138kV DE[2] Steel Lattice Tower	90	-
Z223182	138kV DE Steel Lattice Tower	100	-
Z223181	138kV DE Steel Lattice Tower	115	-
Z223180	138kV DE Steel Lattice Tower	135	-
Z327353	138kV DE Steel Pole	135	-
Z327354	138kV DE Steel Pole	90	-
Z327355	138kV DE Steel Pole	90	-
Z630977	138kV DE Steel Pole	100	-
Z198318	3-Structure DE Wood Pole	56.5	8.5
Z198319	2-Structure H-Frame TGT[3]	56.5	8.5
Z198320	2-Structure H-Frame TGT	52	8
Z198321	2-Structure H-Frame TGT	65.5	9.5
Z198322	138 2-Structure Wood H-Frame DE	52	8
Z196606	DC- DE 138kV Steel Pole	125	-
Z203022	DC- DE 138kV Steel Pole	115	-
Z203021	138kV FND Steel DE/CP[4]	95	-
Z203020	138kV FND Steel DE/CP	95	-
Z20318	138kV FND Steel DE/CP	103	-
Z206511	138 2-Structure Wood H-Frame DE	56.5	8.5
Z221660	2-Structure H-Frame TGT	56.5	8.5
Z221659	2-Structure H-Frame TGT	56.5	8.5
Z221658	2-Structure H-Frame TGT	52	8
Z221657	2-Structure H-Frame TGT	61	9
Z221656	2-Structure H-Frame TGT	56.5	8.5
Z221655	2-Structure H-Frame TGT	65.5	9.5
Z221654	2-Structure H-Frame TGT	61	9
Z221653	138 2-Structure Wood H-Frame DE	65.5	9.5
Z221652	2-Structure H-Frame TGT	52	8
Z221651	2-Structure H-Frame TGT	56.5	8.5
Z221650	2-Structure H-Frame TGT	61	9
Z221649	2-Structure H-Frame TGT	52	8
Z221648	2-Structure H-Frame TGT	70	10
Z221647	2-Structure H-Frame TGT	65.5	9.5
Z221646	2-Structure H-Frame TGT	61	9
Z221645	2-Structure H-Frame TGT	61	9
Z221644	2-Structure H-Frame TGT	56.5	8.5
Z221643	2-Structure H-Frame TGT	65.5	9.5
Z221642	2-Structure H-Frame TGT	65.5	9.5

Table 3-6 (Cont.): Transmission Structures/Poles to be Removed

Structure/Pole No.[1]	Structure/Pole Type	Structure/Pole Size (in feet)	
		Height above ground	Embedded length
Z221641	2-Structure H-Frame TGT	47.5	7.5
Z221640	3- Structure DE Wood	79	11
Z327403	2-Structure H-Frame TGT	56.5	8.5
Z221638	3- Structure DE Wood	52	8
Z221637	2-Structure H-Frame TGT	61	9
Z221636	2-Structure H-Frame TGT	61	9
Z221635	2-Structure H-Frame TGT	65.5	9.5
Z221634	2-Structure H-Frame TGT	61	9
Z221633	2-Structure H-Frame TGT	65.5	9.5
Z327416	2-Structure H-Frame TGT	65.5	9.5
Z221631	3- Structure DE Wood	52	8
Z247455	138kV DE Wood Structure	74.5	10.5
Z247439	138kV DE Wood Structure	80	10
Z36515	138kV Wood Structure	61	9
Z36516	138kV Wood Structure	61	9
Z36517	138kV Wood Structure	61	9
Z36518	138kV Wood Structure	74.5	10.5
Z322484	138kV Wood Structure	61	9
Z220837	138kV Wood Structure	65.5	9.5
Z322485	138kV Wood Structure	65.5	9.5
Z220836	138kV Wood Structure	61	9
Z322479	138kV Wood Structure	83.5	11.5
Z247440	138kV DE Wood Structure	52	8
Z247256	138kV DE Wood Structure	79.5	10.5
Z322487	138kV Wood Structure	65.5	9.5
Z322488	138kV Wood Structure	52	8
Z322489	138kV Wood Structure	56.5	8.5
Z322490	138kV Wood Structure	61	9
Z322483	138kV Wood Structure	65.5	9.5
Z322482	138kV Wood Structure	65.5	9.5
Z322481	138kV Wood Structure	65.5	9.5
Z322480	138kV Wood Structure	65.5	9.5
Z322476	138kV Wood Structure	65.5	9.5
Z322477	69kV Wood Structure	52	8
Z327418	69kV Wood Structure	65	9.5
Z322486	138kV Wood Structure	70	10
Z226466	138kV Wood Structure	74.5	10.5
Z220835	138kV Wood Structure	79	11
Z164835	138kV Wood Structure	65	9.5

Table 3-6 (Cont.): Transmission Structures/Poles to be Removed

Structure/Pole No.[1]	Structure/Pole Type	Structure/Pole Size (in feet)	
		Height above ground	Embedded length
Z171166	69kV 2-pole TGT Wood Structure	56.5	8.5
Z220838	69kV Wood Structure	74.5	10.5
Z220839	69kV Wood Structure	70	10
Z105996	69kV Wood Structure	56.5	8.5
Z220840	69kV Wood Structure	79	11
Z225613	138kV Wood Structure	65.5	9.5
Z225614	138kV Wood Structure	70.5	9.5
Z225615	138kV Wood Structure	74.5	10.5
Z227134	138kV Wood Structure	74.5	10.5
Z227576	138kV Wood Structure	79	11
Z228470	138kV Wood Structure	74.5	10.5
Z228466	138kV Wood Structure	74.5	10.5
Z36513	138kV Wood Structure	65.5	9.5
Z228465	138kV Wood Structure	56.5	8.5
Z122016	138kV DE Steel Pole	70	-
Z222799	138kV DE Steel Pole	77.45	12.55
Z228471	138kV Wood Structure	81.7	13.3
Z228472	138kV Wood Structure	81	9
Z228473	138kV Wood Structure	70	10
Z228467	138kV Wood Structure	70	10
Z125642	138kV DE Steel Pole	70	10

Notes: Table contents based upon preliminary engineering.
[1] Refer to the Talega to Capistrano Existing Transmission Lines Map in Appendix 3-A for location of poles to be removed.
[2] DE = Deadend pole
[3] TGT = Tangent pole
[4] CP = Cable pole
Source: SDG&E

Table 3-7: Transmission Pole Diameters

Pole Type	Approximate Diameter (feet)	
	Pole Base	Pole Top
230kV Cable Pole	5 – 6	2 – 3
230kV DE[1]/TGT[2] Pole	5 – 6	2 – 3
138kV Cable Pole	4 – 5	1.5 – 2
138kV DE/TGT Pole	4 – 5	1.5 – 2
69kV Cable Pole	3 – 4	1.5
69kV DE/TGT Pole	3 – 4	1.5

Notes: Table contents based upon preliminary engineering.
[1] DE = Deadend pole
[2] TGT = Tangent pole
Source: SDG&E

The following subsections provide a detailed description of the scope of work for each segment of the transmission line work in the Proposed Project. Refer to tables above for structure/pole heights. In general, for all segments, the new 230kV steel poles will range in height from approximately 100 feet to 160 feet and will be located approximately 600 to 2,000 feet apart depending on the topography of the route.

3.4.3.1 Segment 1 – San Juan Capistrano Substation to Rancho San Juan

Segment 1 will involve construction of a new 230kV double-circuit overhead transmission line between the new 230kV gas insulated substation at the proposed San Juan Capistrano Substation and the Rancho San Juan residential development located at the intersection of La Pata Avenue and Vista Montana. Segment 1 will involve the installation of approximately 15 new 230kV steel poles (refer to Figure 3-7, Sheets 1 through 5). Segment 1 will also include the removal of two 138kV poles. The description of work on Segment 1 is described in detail below for 230kV and 138kV transmission work, respectively. Table 3-8, Scope of Work for Segment 1 summarizes the scope of work for Segment 1 of the Proposed Project.

Table 3-8: Scope of Work for Segment 1

Structure/Pole Type	Installed	Structure/Pole Numbers (refer to Figure 3-7, sheets 1-5)	Removed
230kV double-circuit steel pole	13	3 through 15	--
230kV single-circuit steel pole	2	1 & 2	--
138kV steel cable pole	6	1a, 2a, and 4a through 7a	--
138kV steel pole	1	3a	9
138kV steel lattice towers	--	--	4
138kV wood transmission line poles	--	--	20
138kV Splice Vaults	4	N/A	--
Notes: Table contents based upon preliminary engineering. Source: SDG&E			

Segment 1 – 230kV Work

The San Juan Capistrano Substation to Rancho San Juan Segment of the Proposed Project begins at the new 230kV gas insulated substation at the proposed San Juan Capistrano Substation site located in the city of San Juan Capistrano. The San Juan Capistrano Substation to Rancho San Juan segment of the Proposed Project will involve the installation of approximately 2.66 miles of double-circuit 230kV overhead conductor on approximately 15 new 230kV double-circuit steel poles (refer to the Typical 230kV Steel Tubular Structure Diagram included within Appendix 3-B).

Segment 1 is located entirely within the city of San Juan Capistrano. The two new 230kV steel poles will be installed within SDG&E's existing 150 feet ROW and will require concrete foundations. In addition, all poles require a cleared, flat work space (referred to as a "pad") of varying size on each side of the pole. In some cases a single pad will be utilized due to physical constraints and SDG&E safe working practices. Segment 1 begins at the proposed San Juan Capistrano Substation where the new 230kV transmission lines will leave the substation to the east, spanning over Junipero Serra Park and I-5, and continue general southeast in an overhead position for approximately 2.5 miles until reaching San Juan Hills High School. The new 230kV poles will be installed adjacent to the existing 138kV transmission line poles where possible. The new 230kV transmission lines will be designed for double 900 aluminum-clad steel supported (ACSS/AW) thousand circular mils (kcmil) 54/7 Canary conductor designed pursuant to current carrying capability established by SDG&E Transmission Planning. Insulators will be installed on new 230kV pole using a V-string configuration (refer to the Typical 230kV Steel Tubular Structure Diagram included within Appendix 3-B). All overhead conductors will be sagged and spaced with clearances meeting or exceeding Rule 37, Table-1 and Rule 38, Table-2 in G.O. 95. A single Optical Ground Wire (OPGW) overhead Alumoweld shield wire (approximate ½ inch diameter) with fiber optic inner-core will be installed on top of the pole line. Within this segment, approximately four 138kV steel lattice towers, six 138kV steel poles, and four 138kV wood H-frame poles and all existing 138kV conductor and hardware will be removed.

Segment 1 – 138kV Work

Following the completion of the new San Juan Capistrano 138kV gas insulated substation, six 138kV transmission lines will connect to the new facility (refer to Figure 3-7, Sheet 1). These six 138kV transmission lines will be connected to the new gas insulated substation via underground cables. The description of how these six 138kV transmission lines leave the San Juan Capistrano Substation (getaways) is provided below.

West San Juan Capistrano Substation Getaways

Four of the six 138kV transmission lines will exit the substation site via an underground conduit system and cross Camino Capistrano heading west to four new steel cable poles (Pole Nos. 1a, 2a, 4a, and 5a – refer to Figure 3-7, Sheet 1). One new steel pole (Pole No. 3a) will also be installed west of the San Juan Capistrano Substation site, immediately adjacent to the existing railway line. One steel and six wood 138kV poles will be removed from the same area west of the San Juan Capistrano Substation site. Two of the four lines will then transfer to overhead positions on Pole Nos. 4a and 5a before heading north. The remaining two 138kV transmission lines will be installed under the existing railway line using the jack-and-bore method (refer to Figure 3-7, Sheet 1). Typical jack-and-bore diagrams and photographs have been included within Appendix 3-B. These two 138kV transmission lines will continue west in an underground position through existing private recreational area (within existing SDG&E ROW) until transitioning to an overhead position via Pole Nos. 1a and 2a (located along Avenida de la Vista) before continuing to the west. Three new 138kV splice vaults will be installed west of the railway line and one new 138kV splice vault will be located within Camino Capistrano. The new 138kV trench packages will be approximately three feet wide by six to eight feet deep.

East San Juan Capistrano Substation Getaways

Two of the six 138kV transmission lines will exit the substation site via two new steel cable poles that will be installed in the northeast corner of the substation site. Also within the substation property, approximately nine existing wood and one steel lattice structure will be removed. Typical diagrams of 138kV single-circuit steel cable poles, 138kV wood poles, and 138kV steel lattice towers have been included within Appendix 3-B.

3.4.3.2 Segment 2 – Rancho San Juan

The Rancho San Juan Segment of the Proposed Project will involve the installation of two separate 230kV underground cable systems in conduit packages. The first 230kV transmission line (TL23030) will be located in a franchise position within Vista Montana between Via Pamplona and La Pata Avenue, and is approximately 0.3 mile in length. The second 230kV transmission line (TL23007) will be installed within Vista Montana, on the opposite side of the roadway, within an existing 30-foot easement. Table 3-9, Scope of Work for Segment 2 summarizes the scope of work for Segment 2 of the Proposed Project. The trench packages will be comprised of six eight-inch diameter conduits encased in concrete and will measure approximately three feet wide by six to eight feet deep. The trench package will also carry communication conduit for fiber optic cables for SDG&E's use only. Within this underground segment, cross-linked polyethylene-insulated solid-dielectric, copper-conductor cable will be utilized.

Approximately four underground 230kV concrete splice vaults will be installed in line with the two duct banks. The pre-cast vaults are expected to be approximately 26 feet long by 12 feet wide by 10 feet tall (outside dimensions). Refer to Appendix 3-B for a diagram of a typical splice vault. The 230kV transmission line will transition on both sides of Vista Montana from underground to overhead via two new 230kV steel cable poles at each end of the Rancho San Juan segment for a total of four new 230kV steel cable poles (refer to the Typical 230kV Steel Cable Pole Diagram included within Appendix 3-B). These poles will be set on concrete foundations. It should be noted that this segment removes two existing 138kV steel cable poles, one on each end of Vista Montana, and the associated 138kV cable as they are no longer necessary (refer to the Typical 138kV Steel Cable Pole Diagram included within Appendix 3-B). One existing 138kV double-circuit steel cable pole (TL13833 and TL13816) located near the intersection of Vista Montana and Via Pamplona will be replaced. The replaced pole will be installed just north of the existing pole to make room for the new 230kV (TL23030) underground cable system (refer to Figure 3-7, Sheet 5).

The remainder of this page is intentionally left blank.

Table 3-9: Scope of Work for Segment 2

Structure/Pole Type	Structure/Pole Numbers (refer to Figure 3-7, Sheets 5 and 6)	New	Replaced	Removed
230kV single-circuit steel cable pole	16 through 19	4	0	0
138kV double-circuit steel cable pole	8a	0	1	3
Splice Vault	N/A	4	0	1
Notes: Table contents based upon preliminary engineering. Source: SDG&E				

3.4.3.3 Segment 3 – Rancho San Juan to Talega Hub

Segment 3 of the Proposed Project will include the installation of approximately 4.19 miles of new 230kV transmission line. The specific work associated with Segment 3 is described below for the 230kV and 138kV transmission lines, respectively. Table 3-10, Scope of Work for Segment 3 summarizes the scope of work for Segment 3 of the Proposed Project.

Table 3-10: Scope of Work for Segment 3

Structure/Pole Type	Structure/Pole Numbers (refer to Figure 3-7, Sheets 6 - 17)	Installed	Removed
138kV wood structures	N/A	0	30
230kV double-circuit steel cable pole	20 through 41	22	0
Notes: Table contents based upon preliminary engineering. Source: SDG&E			

Segment 3 of the Proposed Project will include the installation of approximately 4.2 miles of new 230kV overhead on approximately 22 230kV double-circuit steel poles (refer to the Typical 230kV Steel Tubular Structure Diagram included within Appendix 3-B) located within the cities of San Juan Capistrano and San Clemente, as well as within unincorporated Orange County (refer to Figure 3-7, Sheets 5 through 17). Segment 3 begins after Pole Nos. 18 and 19, where the new transmission lines will transition to an overhead position adjacent to the proposed Rancho San Juan residential development. Segment 3 ends where the parallel SDG&E/SCE transmission line corridor turns south, approximately 0.3 mile west of the Talega Substation. This area is referred to as the Talega Hub (refer to Figure 3-7, Sheets 17 and 18). Within Segment 3, approximately 30 138kV wood poles (two and three pole structures currently used to support TL13835) will be removed along with all associated 138kV conductor and hardware to make room for the new 230kV transmission lines and poles (refer to the Typical 230kV Steel Tubular Structure Diagram included within Appendix 3-B).

3.4.3.4 Segment 4 – Talega Hub to Talega Substation

Segment 4 of the Proposed Project will include the installation of approximately 3,230 feet of new single-circuit 230kV transmission line (600 feet for TL23007 and 2,630 feet for TL23030) as well as relocation of existing 138kV and 69kV lines in the area between the Talega Hub and the Talega Substation (this area is referred to as the Talega Corridor) to allow for the construction of the proposed new 230kV transmission lines. The specific work associated with Segment 4 is described below for 230kV, 138kV, and 69kV transmission line work, respectively. Table 3-11, Scope of Work for Segment 4, summarizes the work included within Segment 4 of the Proposed Project.

Table 3-11: Scope of Work for Segment 4

Structure/Pole Type	Structure/Pole Numbers (refer to Figure 3-7, Sheets 17 through 19)	Installed	Removed
69kV wood structure	--	--	13
69kV steel pole	1b, 4b - 9b	7	--
69kV single-circuit steel cable pole	2b & 3b	2	--
138kV wood structure	--	--	21
138kV double-circuit steel pole	13a, 14a, 19a, 20a, & 23a	5	--
138kV single-circuit steel pole	22a	1	1
138kV single-circuit steel cable pole	9a – 12a, 15a – 18a, & 21a*	9	--
138kV double-circuit steel lattice	N/A	--	1
230kV single-circuit steel pole	43 – 49	7	1
230kV double-circuit steel pole	42	1	--
138kV Splice Vault	N/A	4	--
69kV Splice Vault	N/A	1	--

Notes: Table contents based upon preliminary engineering.
*Pole No. 21a is a combination 138kV double-circuit pole with one circuit transitioning underground.
Source: SDG&E

Segment 4 – 230kV Work

Within Segment 4 of the Proposed Project, the two new 230kV transmission lines will follow separate routes. Therefore, each new 230kV transmission line is described separately below by circuit number.

TL23007

The TL23007 will be rerouted to bypass Talega Substation and connect at San Juan Capistrano Substation (refer to Figure 3-8, Sheet 18). This bypass will be accomplished by connecting Poles Nos. 42, 43, and an existing lattice tower located at the southeast corner of the Talega Hub area.

TL23030

Going east from Pole No. 42, the new TL23030 will traverse until turning south at Pole No. 46 (refer to Figure 3-7, Sheet 17). The line will end at the existing TL23030 transmission line at Pole No. 49. Pole No. 49 will replace an existing 230kV deadend steel pole.

Segment 4 – 138kV Relocation Work

Prior to the start of the Proposed Project, four 138kV transmission lines terminate into the Talega Substation (TL13831, TL13835, TL13836, and TL13846). As part of the Proposed Project, a total of five 138kV transmission lines will terminate in the Talega Substation (TL13812, TL13831, TL13835, TL13836, and TL13846). The four transmission lines that currently terminate in the Talega Substation will be relocated within the Talega Corridor to make room for the new 230kV transmission lines. Specifically, work required for each 138kV transmission line is described in the following subsections, organized by transmission line number.

TL13836 and TL13846

Existing lines TL13836 and TL13846 currently enter the Talega Hub in an overhead position from the west. At new Pole Nos. 9a and 10a (refer to Figure 3-7, Sheet 18), both lines will switch to an underground position and head southeast to new Pole Nos. 11a and 12a at which point they return to overhead positions. TL13836 and TL13846 will be relocated to this underground position to allow passage of the new TL23030 extension (refer to Figure 3-7, Sheet 18). Following Pole Nos. 11a and 12a, both lines will head south until they reach new Pole No. 13a, at which point they turn northeast (via Pole No. 14a) and enter the Talega Substation via new Pole No. 23a. From the new Pole No. 23a, the lines terminate at the west side of the Talega Substation. Within Segment 4, the relocation of TL13836 and TL13846 will require the installation of four new 138kV steel cable poles and three 138kV steel double-circuit poles. In addition, one 138kV steel lattice structure and approximately 14 138kV wood poles will be removed. Refer to Appendix 3-B for typical diagrams of 138kV wood and steel poles.

TL13835 and TL13812 (Future)

Existing transmission line TL13835 currently enters the Talega Hub in an overhead configuration from the south (and terminates at the Talega Substation to the east and the Laguna Niguel Substation to the northwest). Following completion of the Proposed Project, TL13835 and TL13812 will terminate at the Talega Substation on common poles. At new Pole Nos. 15a and 16a (refer to Figure 3-7, Sheet 18), both lines will switch to an underground position that routes the lines to the east, towards the Talega Substation, under the new TL23007 extension. After completing the turn to the east, both lines return to an overhead configuration at Pole Nos. 17a and 18a and enter the Talega Substation by new Pole Nos. 19a, 20a, and 21a. TL13812 and TL13835 deadend on a steel pole on the west side of the substation. TL13812 will transition to an underground position upon reaching the substation (Pole No. 21a) and will traverse to the rack position on the east side of the substation. TL13835 will traverse overhead and will terminate at the rack on the west side of the substation (refer to Figure 3-7, Sheet 18). Within Segment 4, the relocation of TL13835 and TL13812 will require the installation of approximately five new 138kV steel cable poles and two 138kV double-circuit steel poles. In addition, approximately seven 138kV wood poles will be removed. Refer to Appendix 3-B for typical diagrams of 138kV wood and steel poles.

TL13831

Existing TL13831 approaches the substation from the north. A new Pole No. 22a will be installed inside the substation (refer to Figure 3-7, Sheet 18), to maintain overhead clearance of TL23030. From Pole No. 22a, the line terminates into the rack on the east side of the substation. TL13831 will be moved over one bay position to the south to make room for the relocated TL13812. One existing steel pole will be removed.

Segment 4 – 69kV Relocation Work

Within Segment 4 of the Proposed Project, one 69kV transmission line (TL695) will have to be relocated to make room for the two new 230kV transmission lines. Existing 69kV transmission line TL695 currently connects to the Talega Substation from the north and continues to the west and south. A total of approximately nine new steel poles (Pole Nos. 1b through 9b) will be installed and approximately 13 wood poles will be removed (refer to Figure 3-7, Sheets 17 through 19 and Appendix 3-A). To alleviate clearance issues with the crossing of TL23007 on the south end of the Talega Hub, a small portion of TL695 will be undergrounded, requiring two new 69kV cable poles and one new splice vault.

3.4.4 Distribution Lines

3.4.4.1 Distribution Overview

Alterations to distribution lines and substation equipment as a result of the Proposed Project are discussed because they are a component of the Proposed Project. Distribution infrastructure is permitted through franchise agreements with individual local municipalities and alterations to distribution facilities are included in this PEA for informational purposes only. The CPUC does not regulate distribution infrastructure; therefore, potential impacts for the following description of distribution work are not analyzed within this document.

3.4.4.2 Distribution Project Description

Distribution facilities that are affected by the San Juan Capistrano Substation rebuild and construction of new 230kV transmission lines will be relocated. Preferred and alternate distribution line routes are discussed, as applicable, in the following subsections. The proposed distribution route is depicted graphically in Appendix 3-C, Proposed Distribution Route Map.

San Juan Capistrano Substation Rebuild

Seven distribution circuits from the existing Capistrano Substation will be relocated to the new 12kV facility. The substation will be designed for an ultimate 120 MVA four transformer bank and ultimately 16 circuits. Initially, three transformer banks will be installed. Grading and site preparation are required for new substation facilities construction as described in Section 3.5.3, Substation Site Development. A few temporary poles may be installed in the existing substation property to allow for temporary re-routing of two 12kV circuits during grading and construction of the lower yard.

Distribution Facilities from the San Juan Capistrano Substation to Rancho San Juan

Circuits 196, 197, and 315 will be relocated outside the San Juan Capistrano Substation to accommodate the new 230kV line connection (refer to Appendix 3-C). The existing distribution getaway from the substation to Junipero Serra Park, east across Calle Santa Rosalia, has Circuits 196 and 197 attached to an existing overhead distribution-only pole line on the south side of Junipero Serra Park. Circuit 315 from the substation east is under-built on 138kV poles in the park and crosses I-5. A section of Circuit 315 will be removed to accommodate the new 230kV line.

The circuits would leave the western side of the San Juan Capistrano Substation, underground for approximately 1,000 feet, traveling from Camino Capistrano south to Calle Bonita, and then travel west to Calle Santa Rosalia at Juniper Serra Park. Approximately 500 feet of conduit installation and cable pulling would occur through the north side of Juniper Serra Park. This work would require temporary closure of that portion of the park during construction for conduit and handhole installation and cable pulling. Construction of this section would last approximately six weeks and would include the installation of six 5-inch conduits, subsurface poles, concrete cover, and backfill and repaving. This work would require partial closure of the roads and/or diversion of traffic. New 1000 kcmil underground cable would then be installed from various underground poles along the route. One new 55 foot tall steel cable pole would be installed at the northeast corner of the park to carry the three circuits across I-5. Existing poles on the south side of the park for Circuits 196 and 197 will be removed. Heavy equipment and vehicles would be set up in the park during construction. The grass areas would be repaired upon completion of construction.

On the east side of I-5, a 55 foot-tall steel cable pole would be required in the area of the existing cable pole for Circuits 196 and 197 along Rancho Viejo Road, to support the three circuits. Circuit 315 would require installation of approximately 6,600 feet of 1000 kcmil cable south from the new cable pole. This 1000 kcmil line would be installed underground in existing conduit along Rancho Viejo Road to connect with a new padmount four way switch at Ortega Highway (also known as State Route [SR] 74).

Construction on this segment would take approximately ten weeks and would require lane closures and/or traffic control. Lay down areas for equipment would be the same as used by transmission. Generally, no night time work is anticipated; however, depending on loading requirements some or all cutovers may occur after normal business hours or on the weekends and/or nights. After the facilities are energized, they will continue to be inspected and maintained on the same schedule as existing facilities. Equipment would include cranes, booms, backhoes, bucket trucks, cable pulling trucks and dollies, and crew trucks. The vehicles would need to be parked in proximity to work areas. Up to two or three crews of usually three or four people and multiple crews may work at one location or in parallel on each segment. Some equipment may be left on site overnight.

Distribution Facilities from Rancho San Juan to Talega Substation

For the preferred route, Circuit 315 will take over existing Circuit 1242 at Ortega Highway/La Pata Avenue and will require upgrading conductor size to 636 aluminum conductor, steel reinforced (ACSR) overhead wire for about 6,000 feet on the existing poles of Circuit 1242 south.

Circuit 204 will be removed from the 138kV pole line from a pole north of Avenida Pico until a pole south and east of Calle Avanzado. Then, a new cable pole will need to be set in the proximity of just south of where Circuit 204 turns south and east again after the east end of Calle Avanzado. Circuit 204 will be attached to new 69kV transmission line poles. Circuit 204 will run underground north towards a new four-way switch adjacent to a transformer and branch south under the new 230kV line to a new cable pole and continues south on Circuit 204 existing lines. This portion will require about 1,300 feet of trench, conduit, and cable, as well as 1,200 feet of 636 ACSR overhead wire.

3.5 CONSTRUCTION METHODS

This section includes an overview of the typical methods that will be used for construction of the Proposed Project. Specifically, this section describes typical construction methods for overhead and underground transmission lines, substation construction and alteration, and temporary construction work areas.

3.5.1 Overhead Transmission Lines

The procedures for bringing personnel, materials, and equipment to each structure site, installing the supporting structure foundations, erecting the supporting structure, and stringing the conductors may vary slightly along each segment or at any particular structure site. However, the following steps provide the general methods used to construct an overhead transmission line.

3.5.1.1 Step 1—Access Road Construction

The first step in constructing the overhead line is to install the new spur roads required to access the new structure sites. These roads will be graded and will generally be 14 feet wide for straight sections and up to 20 feet wide at curves to safely allow movement of construction equipment and vehicles. Due to the fact the Proposed Project will follow an existing transmission corridor; construction access to most new structure sites will be available by way of existing access roads.

3.5.1.2 Step 2—Installing the Support Structure Foundations

Prior to installing the support structure foundations, vegetation at each of the structure sites will be cleared and the area will be graded either flat or in a terraced fashion, as needed. At some sites, soil may be imported as necessary to raise the elevation of the structure pads, and retaining walls may be needed. Material removed during the process will be spread over existing access roads and work pads as appropriate, or disposed of off-site according to all applicable laws.

Steel Poles

A large auger will be used to excavate holes that will typically be nine feet in diameter and approximately 20 to 40 feet deep for the support structure foundation. Following excavation, a reinforcing steel cage and anchor bolt cage will be installed in each hole. The steel cages will be assembled at the materials storage and staging areas and transported to each of the structure sites. The anchor bolt cages will be assembled offsite and delivered to each structure site. Approximately 50 to 100 cubic yards of concrete will be placed into the holes and the foundation will extend two feet above the ground surface. The concrete curing period is approximately one month, during which time workers will remove the concrete forms and place backfill around the foundations.

Some steel poles may be direct buried. This method uses concrete as backfill and as protection against corrosion. It does not require the installation of reinforcing steel or an anchor bolt cage.

It is not currently anticipated that blasting will be required to complete construction of the Proposed Project. However, in some locations where significant or dense rock is present, blasting may be required. Prior to blasting, SDG&E will assess the area, make any required site measurements (e.g., distance to utilities or houses, etc.) and engineer the blast for a safe and effective explosion. Pre-blast notifications to residents, utilities, etc. will be made as appropriate. Once the notifications are complete, the holes will be drilled and the explosive charges loaded into the holes. If the blast is located near sensitive receptors (e.g., houses, power lines, roads, etc.), special protective measures (e.g., gravel or blast mats) will be installed to control flying rock from the blast site. In addition, the area will be secured to avoid inadvertent entry by the public or other personnel. After the area is secured, the appropriate pre-blast warning signals will be given and the blast detonated. After detonation, a post-blast safety inspection will be conducted to ensure that the blast is completely discharged and personnel may enter safely to excavate the blasted material. Compliance with SDG&E's Project Blasting Preparation and Protection Plan Requirements for Review Package Submittal will be required.

Dewatering may also be necessary in some locations. Prior to construction, SDG&E will acquire a National Pollutant Discharge Elimination System (NPDES) permit from the RWQCB and prepare a Storm Water Pollution Prevention Plan (SWPPP). The NPDES permit and the SWPPP will detail project information, dewatering procedures, storm water runoff prevention control procedures, monitoring and reporting procedures, and BMPs.

In general, the following construction dewatering procedures will be implemented during construction:

- A submersible pump will be installed.
- Groundwater will be pumped to a de-siltation tank (baker tank) at one end for sedimentation and filtering. Baffles will be installed in the tank to increase sedimentation. Water in the tank will be allowed to flow out from the opposite end.

- Turbidity testing will be performed periodically to ensure compliance with the NPDES requirements. If turbidity measurements do not meet permit requirements, additional baker tanks or filtering may be required.

3.5.1.3 Step 3 – Structure Erection

Depending on site accessibility and the construction schedule, ground equipment or helicopters may be used to complete some or all of the structure erection activities described below. Permits to operate helicopters for Proposed Project construction will be acquired as necessary.

Steel Poles

The steel poles will be delivered in two or more sections to each site via flatbed truck or helicopter and assembled on-site using a small truck-mounted crane or helicopter. The poles will typically have six crossarms that will support one circuit on each side. The crossarms will be bolted to the pole, and the insulators will be bolted to the crossarms. After assembly, a large crane or helicopter will be used to lift and set the pole sections into place on the anchor bolts embedded in the concrete foundation. The nuts on the foundation will then be tightened and secured.

For pole erection, helicopters may be used to transport, lift, and set the poles. The length of time that this activity will take will depend on whether the poles come preassembled or in sections, but in general the helicopter will spend only a few minutes at each pole location while the ground crew secures the pole onto the foundation. The aircraft may need to make multiple trips for each pole location, but each trip would be short in duration. For the Proposed Project, helicopters may be used during the erection of Pole Nos. 10-14 (refer to Figure 3-7, Sheets 3 through 5).

3.5.1.4 Step 4 – Pole Removal

As previously described, construction of the Proposed Project segments will involve the removal of existing transmission poles (both wood and steel). Refer to Appendix 3-A for the location of all poles to be removed. The old poles and components will be dismantled by cranes, helicopter, or by hand, and will be hauled away by truck. After the poles have been removed, any existing concrete foundations will be jack hammered to below grade, and debris will be removed. The hole will then be backfilled with soil or materials similar to the surrounding area and the site will be restored. All structural removal will be completed from existing work pads (typically 35 feet by 75 feet) located at each existing pole site. No new impact areas will be required. These areas are kept clear of vegetation for operation and maintenance activities.

3.5.1.5 Step 5 – Guard Pole Installation

Prior to installing the new overhead conductor, SDG&E will install temporary wood, H-frame guard poles at road crossings and other locations where the new conductor could come in contact with existing electrical and communication facilities, or vehicular and/or pedestrian traffic in the event the line accidentally falls during stringing operations. An auger will be used to excavate the holes where the guard poles will be installed and a crane will lift the poles into place. No concrete foundations are required to set the guard poles and no grading or other site work is anticipated. The temporary guard poles will be removed following the completion of conductor stringing operations and the holes will be backfilled with excavated soil. As an alternative, SDG&E may use flaggers to temporarily hold traffic for brief periods of time while the overhead line is installed at road crossings. Typically, guard structures are utilized at larger crossings such as large roadways, sensitive waterways, and utility crossings. Traffic control is typically utilized for small roadway crossings. For extremely large crossings such as freeways, both guard structures and traffic control may be used.

3.5.1.6 Step 6 – Conductor Stringing

Conductor stringing operations begin with the installation of travelers or "rollers" on the bottom of each of the insulators using helicopters or aerial manlifts (bucket-trucks). The rollers allow the conductor to be pulled through each structure until the entire line is ready to be pulled up to the final tension position. Following installation of the rollers, a sock line (a small cable used to pull the conductor) is pulled onto the rollers from structure to structure using helicopters or aerial manlifts traveling along the ROW. Once the sock line is in place, it is attached to the conductor and used to pull or "string" the conductor into place on the rollers using conventional tractor-trailer pulling equipment located at pull and tension sites along the line. The conductor is pulled through each structure under a controlled tension to keep it elevated and away from obstacles, thereby preventing third-party damage to the line and protecting the public.

After the conductor is pulled into place, the sags between the poles are adjusted to a pre-calculated level. The line will be installed with a minimum ground clearance of 30 feet (25 feet where there is pedestrian access only). The conductor is then clipped into the end of each insulator, the rollers are removed, and vibration dampers and other accessories are installed.

During the conductor stringing, the shield wire with fiber optics is also strung on top of the transmission line poles in a similar fashion to the conductor stringing.

A helicopter may be used during stringing operations to install the sock line that will be used to pull in the conductor. For stringing operations, it will generally take about half a day to pull in three phases of conductor for approximately 12,000 feet of transmission line. The helicopter would then not be needed again for two to three weeks until the next section of line is ready to be pulled. Helicopter activities will be staged out of existing airports where possible, and helicopter landing/staging areas along the existing ROW will be located away from residences and other land uses (generally at least one mile from sensitive noise receptors). A staging yard will be located at Prima Deshecha Landfill and would likely be used for helicopter operations.

3.5.1.7 Step 7 - Site Cleanup

SDG&E will restore all areas that are temporarily disturbed by the Proposed Project activities (including pull sites, reel sites, structure removal sites, and staging areas) to near preconstruction conditions following the completion of construction. Restoration will include grading and restoration of sites to original contours and reseeding, as appropriate. In addition, all construction materials and debris will be removed from the Proposed Project area and recycled or properly disposed of off-site. SDG&E will conduct a final survey to ensure that cleanup activities are successfully completed as required.

3.5.2 Underground Transmission Lines

The following steps provide the general methods used to construct an underground transmission line.

3.5.2.1 Step 1 – Trenching and Duct Bank Installation

Trenching

Prior to trenching, SDG&E will notify other utility companies (via Underground Service Alert) to locate and mark existing underground utilities along the proposed underground alignment. SDG&E will also conduct exploratory excavations (i.e., potholing) to verify the locations of existing facilities in the field. SDG&E will coordinate with local jurisdictions to secure encroachment permits for trenching in city streets, as required. Where partial or complete road closures are required, proper traffic controls will be implemented as outlined within individual encroachment permits obtained from the local municipality. Specific road closures anticipated during construction of the Proposed Project are discussed in Section 3.5.5, Road Crossings.

The majority of the duct bank will be installed using open-cut trenching techniques. Most of the duct bank will have a double-circuit vertical duct bank configuration, with occasional transitions to a flat configuration to clear substructures in highly congested areas or to fan out to termination structures at the transition area. The typical trench dimensions for installation of a double circuit vertical duct bank will be a minimum of six feet deep and three feet wide, although depth may vary depending on soil stability and the presence of existing substructures. The trench will be widened and shored where necessary to meet California Occupational Safety and Health Administration safety requirements. If trench water is encountered, trenches will be dewatered using a portable pump and disposed of in accordance with acquired permits. General dewatering procedures were previously described for overhead transmission construction in Step 2 – Installing the Support Structure Foundations (Section 3.5.1.2) and similar procedures would be implemented during underground transmission line construction.

Trenching operations will be staged in intervals so that only a maximum of 300 to 500 feet of trench will be left open on each street at any one time or as allowed by permit requirements. This will generate approximately 400 cubic yards per day of excavated material. Steel plating will be placed over the open trenches to maintain vehicular and pedestrian traffic across areas that are not under active construction. Traffic controls will also be implemented to direct local traffic safely around work areas, as stipulated within individual encroachment permit conditions. SDG&E will coordinate provisions for emergency vehicle and local access with local jurisdictions as necessary.

Throughout trench excavation and installation of the duct bank and vaults; asphalt, concrete, and excavated materials will be hauled to a materials storage yard. Excavated materials will be tested and may be used as backfill if the material is suitable as a thermal backfill. All unused, non-hazardous materials would be transported to Prima Deshecha Landfill.

Should hazardous materials be found, SDG&E would transport this material to an approved disposal facility.[1] The number of truck trips to haul excavated materials to storage yards will vary based on the rate of the trenching, the area excavated to install the vaults, and proximity of the storage yards to the ROW. However, approximately one to two truck trips per day will be required during trenching activities at one site. Truck trips for materials hauling will increase for the Proposed Project as a whole when trenching activities occur at multiple locations. Jackhammers will be used sparingly to break up sections of concrete that the saw-cutting and pavement-breaking machines cannot reach. Other miscellaneous equipment will include a concrete saw, back hoe, excavator, roller compactor, water truck, various paving equipment, and standard 1-ton pickup trucks.

Duct Bank Installation

As the trench for the underground 230kV and 138kV duct banks are completed, SDG&E will install the cable conduits (separated by spacers) and pour concrete around the conduits to form the duct banks. The duct banks will typically consist of 8-inch diameter polyvinyl chloride (PVC) conduits, which house the electrical cables. The dimensions of the duct banks will be approximately 3 feet wide by 6 feet in height. Additional ducts for communication cables used for system protection and communication purposes will also be installed in the same trench as the conductor cables.

Once the PVC conduits are installed, engineered backfill will be utilized to fill most of the remainder of the trench. Finally, a road base backfill or slurry concrete cap will be installed and the disturbed road surface will be restored in compliance with local requirements. While the completed trench sections are being restored, additional trench will be opened further down the street. This process will continue until the entire transmission line is in place. Each duct bank will have a minimum of 36 inches of cover. Larger trenches will be excavated where vaults are installed (refer to Section 3.5.2.2 Step 2 - Vault Installation).

Where the duct banks cross or run parallel to other substructures that have operating temperatures at earth temperature, a minimum radial clearance of 18 inches will be required. These substructures include gas lines, telephone lines, water mains, storm drains, and sewer lines. Where the duct banks cross or run parallel to other substructures that have operating temperatures that significantly exceed earth temperature, an increased radial clearance may be required. Such heat-radiating facilities may include other underground transmission circuits, primary distribution cables (especially multiple-circuit duct banks), steam lines, or heated oil lines. In addition, increased radial clearance may be required where the new duct banks cross other heat-radiating substructures at right angles.

3.5.2.2 <u>Step 2 – Vault Installation</u>

SDG&E will excavate and place precast concrete splice vaults during the trenching operation. The vaults will be used initially to pull the cables through the conduits and later to splice cables together. During operation, the vaults will provide access to the underground cables for

[1] SDG&E has identified two potential hazardous waste disposal facilities. The first is the Waste Management Kettleman Hills Facility, located approximately 230 miles north of the Proposed Project in Kettleman City, California. The second facility is Clean Harbor Environmental Services in Buttonwillow, California, which is located approximately 180 miles north of the Proposed Project.

maintenance inspections and repairs. The vaults will be constructed of prefabricated or cast-in-place, steel-reinforced concrete. Each vault will have two manhole covers measuring approximately 36 inches in diameter. Installation of each vault will occur over a one-week period with excavation and shoring of the vault pit followed by delivery and installation of the vault, filling and compacting the backfill, and repaving the excavated area. The backfill may be concrete (not requiring soil backfill).

3.5.2.3 Step 3—Cable Pulling, Splicing, and Termination

After installation of the conduit, SDG&E will install cables in the duct banks. Each cable segment will be pulled into the duct bank, spliced at each of the vaults along the route, and terminated at the transition area where the line converts to overhead conductor. To pull the cable through the ducts, a cable reel is placed at one end of the section and a pulling rig is placed at the other end.

The electric cables and the communication cable will be pulled through the individual ducts at the rate of approximately two segments between vaults per day. A splice trailer will be positioned adjacent to the vault manhole openings to facilitate cable splicing at the vaults after the cables are pulled through the ducts. The vaults must be kept dry at all times to keep the unfinished splices dry and prevent other impurities from affecting the cables. At each end of the underground segment, the cables will rise out of the ground and terminate on equipment within the transition station or substation.

3.5.2.4 Step 5—Jack-and-Bore

The jack-and-bore underground construction method is proposed to install new 138kV transmission line under existing railway line west of the existing Capistrano Substation site. The jack-and-bore method pushes a steel casing through the soil, removing excess soil with a rotating auger. The general method for installing underground transmission lines utilizing the jack-and-bore method is as follows (refer to Appendix 3-B for example diagrams and pictures of jack-and-bore construction):

1. Two pits are excavated at each end of the bore (one bore pit and one receiving pit).
2. The bore equipment is placed within the bore pit (which for the Proposed Project will be approximately 40 feet long and 12 feet wide – per bore pit).
3. The bore equipment is used to insert (or push) the steel casing through the soil.
4. Water may be used (depending upon site-specific soil conditions) to lubricate the casing as it is pushed through the soil.
5. The pieces of casing are welded together in segments, within the bore pit.
6. Once the casing has been inserted to the receiving pit (which for the Proposed Project will be approximately 20 feet long by 12 feet wide), the duct banks are inserted through the casing utilizing plastic spacers to secure the duct banks in place.
7. The depth of the casing will be determined by local and railroad requirements.
8. Once the duct banks are inserted and connected to each end of the standard underground transmission line duct banks, the bore pit and receiving pits are filled in.

3.5.2.5 Step 4—Site Cleanup

As part of the final construction activities, SDG&E will:

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

3.5.3 Substation Site Development

3.5.3.1 Capistrano Substation

The construction of the Proposed Project at the San Juan Capistrano Substation site will occur within the existing property boundary and no adjacent properties or uses will be required to be relocated. At the San Juan Capistrano Substation property, the site development will commence and follow the recommendations contained within the Phase II Environmental Site Assessment completed for the lower yard area in 2009. Any contaminated soils encountered during construction will be excavated and disposed at an appropriately licensed facility, pursuant to all applicable hazardous waste regulations. All building materials (e.g., concrete, steel, and wood) will be recycled or scrapped, also in accordance with all applicable regulations.

Site development will be performed in two phases and will involve regrading most of the existing property resulting in four separate and distinct pads in a terraced configuration from west to east. At the west end will be the lowest pad of approximately 1.1 acre where the 12kV facility and the 138kV transformers will be located. The next pad to the east will be 12 to 14 feet higher and will be approximately 1.4 acres where the 138kV gas insulated substation building and the 230/138kV transformers will be located. The third pad will be nine to 10 feet higher than the second and will be approximately 0.9 acre with the 230kV gas insulated substation building located here. The fourth and uppermost pad will be about seven feet higher and approximately 0.8 acre with the 230kV capacitor banks located here. The far east end of this upper pad will have an eight to 10 feet high embankment at a 2:1 slope to meet the existing sidewalk elevation along Calle Santa Rosalia.

The following steps will occur during Phase One site development:

- Remediate existing structure in lower yard of asbestos and lead paint, as needed. An asbestos investigation was completed in 2008 for the existing abandoned structure and proper asbestos abatement will be required prior to demolition of this structure.
- Demolish the existing abandoned concrete structure and its foundation (approximately 5200 square feet).
- Remove existing miscellaneous items such as remnant foundations, fencing, concrete steps, water lines, sewer lines, septic tanks, paving, and plugging an abandoned well.
- Re-route existing 12kV circuits crossing the lower yard property.
- Develop the lower yard area into two terraced pads to accommodate the new 138/12kV substation on the west half of the property. This lower yard area is underlain by shallow,

undocumented fill soils and loose alluvial sands. To provide uniform support of the new pads and poles the upper three to five feet of these soils will be over excavated and re-compacted prior to placing new fill and grading of the pads. The Phase One grading will result in approximately 38,000 cubic yards of cut and 43,500 cubic yards of fill thus requiring the import of approximately 5,500 cubic yards of fill material.

- Construct a security fence encompassing both the upper and lower yards while the screen walls are being constructed.
- Regrade along the north property line and installation of the relocated north access road off of Camino Capistrano as one of the first activities. The completion of north access road is required to provide 24 hours a day, seven days a week access to the existing substation on the upper yard while the remainder of the lower yard area is being constructed.
- Reconstruct the existing 20 foot wide south access drive into a 30 foot wide access drive.
- Construct an approximately 10 foot high masonry or concrete retaining wall to separate the two lower pads.
- Begin construction on the new masonry screen walls along the north, south, and west borders of the lower yard portion of the property.
- Construct the bioretention facilities.
- Landscape along Camino Capistrano and along the north property line.
- Upon completion of the Phase One site grading, place a 12-inch layer of Class II aggregate throughout the lower yard and pave the access roads.

Once the existing 138kV transmission lines and 12kV circuits are connected to the new substation, the existing 138/12kV substation (in the upper yard) will be de-energized. A Phase II Environmental Site Investigation of the upper yard will be conducted to determine the presence or absence of soil contamination from transformer oil. Any contaminated soil encountered within the upper yard will be excavated and disposed of offsite at an appropriately licensed facility, pursuant to applicable hazardous waste regulations. If soil from the upper yard is disposed of offsite due to contamination, clean imported soil or excess soil from the lower yard will be utilized to replace the contaminated soil. Upon completion of the Phase II Environmental Site Investigation, Phase Two site development will commence.

Phase Two site development (to start after the existing 138/12kV substation is de-energized) will consist of the following:

- Remove all existing structures and foundations in the upper yard.
- Extend the 138kV pad area to the east to accommodate the 230/138kV transformers. Construct an eight feet high masonry or concrete retaining wall across the eastern end of this pad to allow development of the third terraced pad for the 230kV gas insulated substation building. The fourth pad, for the 230kV capacitor banks, will then be graded and the existing embankment at the far east end of the property rebuilt at a 2:1 slope. The Phase Two grading will result in approximately 22,200 cubic yards of cut and 14,400 cubic yards of fill thus requiring the export of approximately 7,800 cubic yards of cut material.

- Complete construction of the north and south screen wall.
- Remove and replace the existing east fence.
- Complete the remainder of the exterior landscaping.
- Upon completion of the Phase 2 site grading, place a 12-inch layer of Class II aggregate throughout this upper yard and pave the remainder of the access roads.

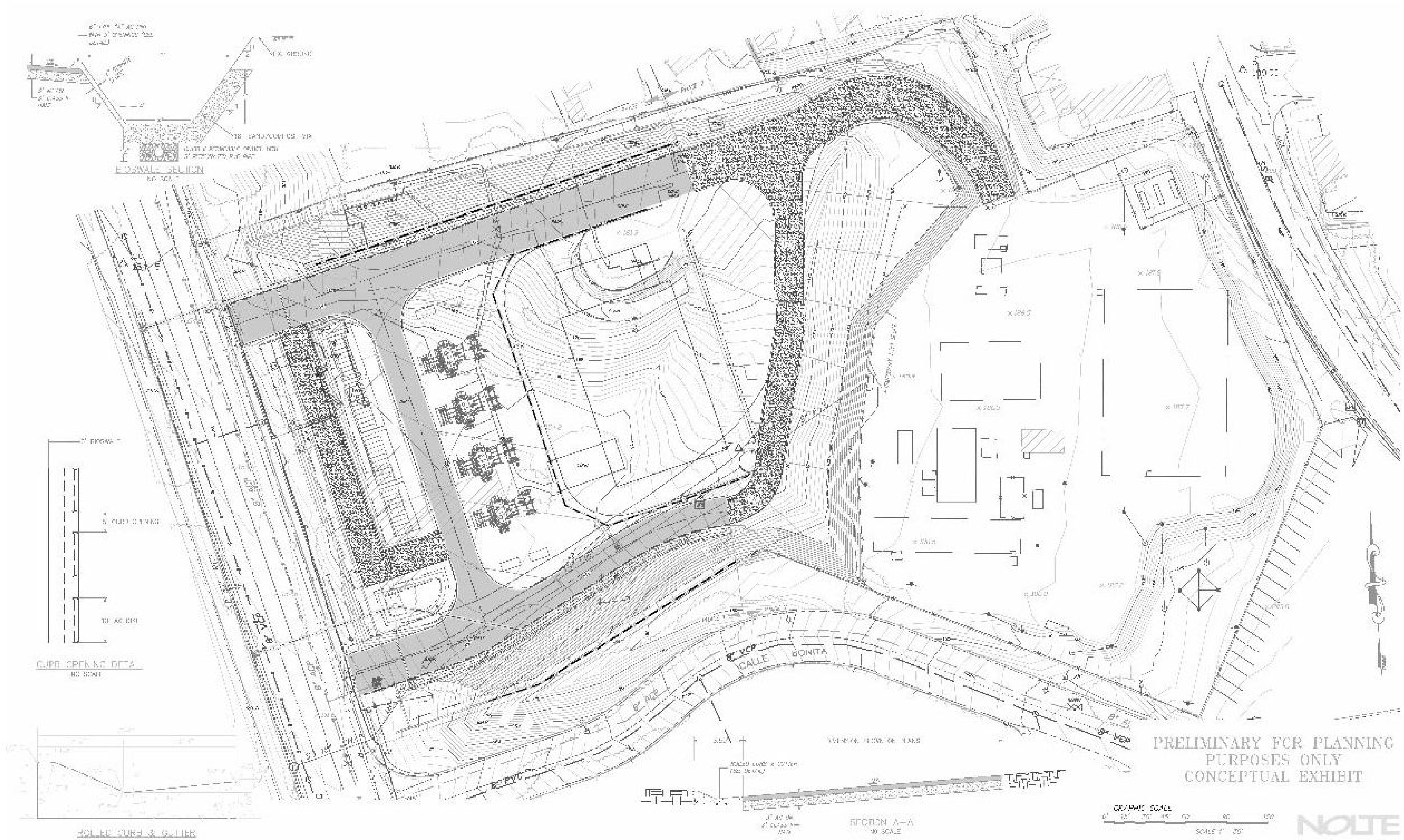
Site storm water drainage will be collected through a series of inlets, culverts, and bioswales and conveyed to the bioretention facilities at the southwest corner of the site. The bioretention facilities will have a controlled discharge to the existing 57-inch storm sewer running underneath Camino Capistrano. There will be no additional sheet flow runoff from the site to the curb and gutters on Camino Capistrano.

All substation site development would be performed on previously disturbed areas within the proposed site. Figure 3-8, San Juan Capistrano Preliminary Grading Plan, depicts the proposed grading.

The ultimate substation design includes a replacement of the existing security fencing along the east side and a new screen wall along the north, west and south sides to enclose both the upper and lower yards as mentioned above. The new screen wall will be 10 feet high and would partially screen the substation equipment from view (refer to Figure 3-6). The new screen walls and access gates will be designed to be consistent with SDG&E's operational and safety guidelines. In addition, a six- to eight foot tall chain link fence would be erected along the north property line to provide separation for the private residences adjacent to the substation property. Figure 3-9, San Juan Capistrano Substation Preliminary Landscape Screening Diagram illustrates a preliminary wall design and vegetative landscaping to soften the visual appearance of the screening wall. SDG&E will work with the local community and a city of San Juan Capistrano ad hoc aesthetics committee as designated by the city of San Juan Capistrano.

Following Phase One site development and grading, construction of the 138/12kV substation will commence with the following steps (refer to Figure 3-6):

- Below grade foundation work will be constructed for all the 138kV equipment including the control shelter, the gas insulated substation building and equipment, 138kV cable poles, and the transformer 138kV termination stands.
- Below grade foundation work will be constructed for the 12kV equipment including the 138/12kV transformers (including oil containment and fire walls), switchgear pads, and capacitor pads.
- Control, telecommunication, and, security ducts will be installed.
- Power ducts (12kV and 138kV) will be constructed and stubbed outside the substation.
- Ground grid will be installed.



G:\SOCRUP\MXD\Project Description 2012\Fig 3-8 Capistrano Concept Grading.mxd 02-24-2012 ks

Created For: Mary Turley

Created By: TRC

Date: 4/25/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Source: Nolte, December 2011

South Orange County Reliability Enhancement Project

San Juan Capistrano Substation Preliminary Grading Plan

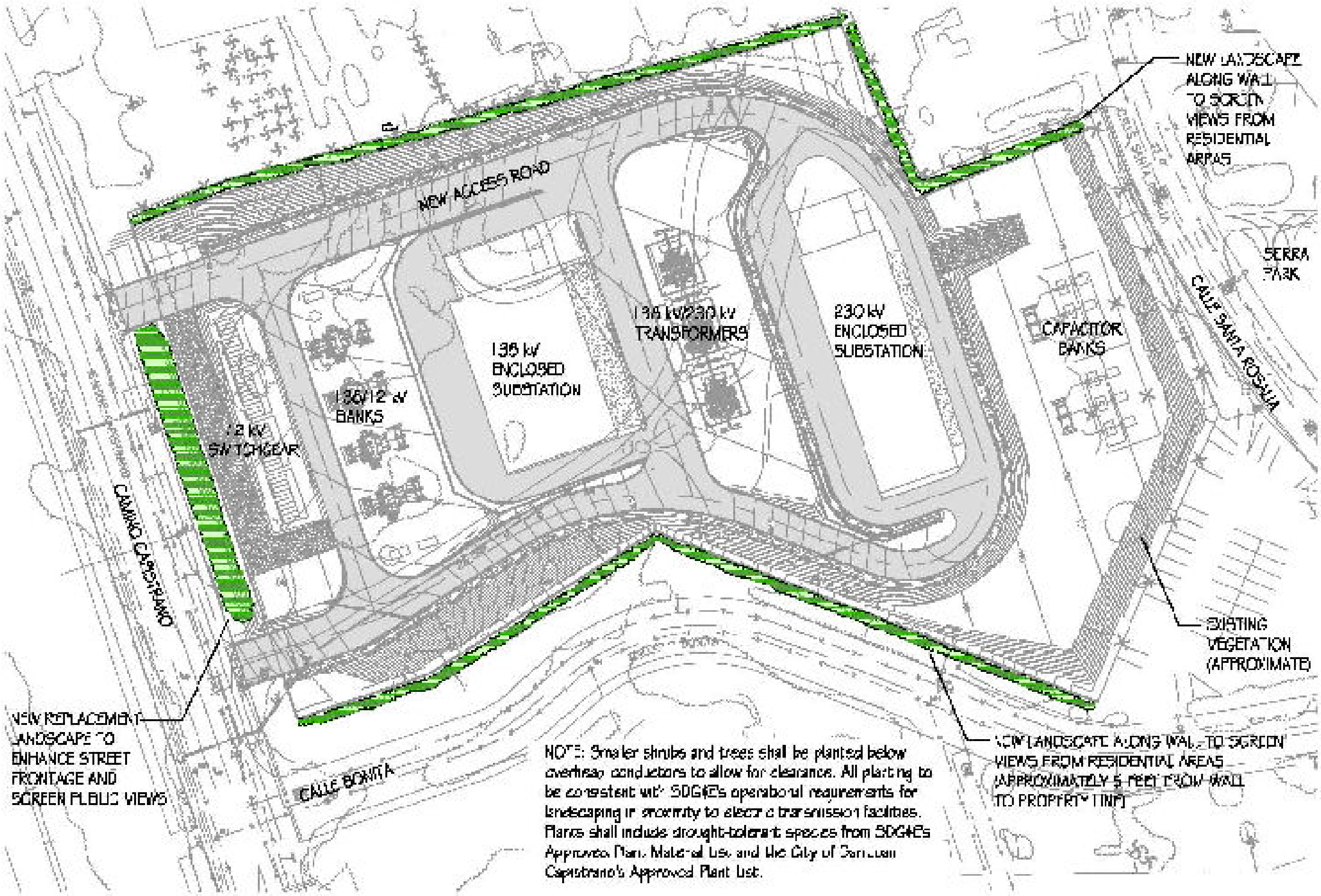
Figure 3-8

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-8



Path: G:\SOCRUP\MXD\Project Description 2012\Figure 3_9.mxd

South Orange County Reliability Enhancement Project

San Juan Capistrano Substation
Preliminary Landscape Screening Diagram

Figure 3-9

Created For: Mary Turley

Created By: TRC

Date: 4/25/2012

SDG&E is providing this map with the understanding that the map is not survey grade.

Source: SDG&E

SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT

SDGE A Sempra Energy utility

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF FIGURE 3-9

138kV above grade work will start construction as foundation work is completed. The gas insulated substation building and masonry block control shelter will be constructed. The wiring of the equipment controls and protection devices is performed concurrently with construction:

- The 138kV equipment will be installed in the new gas insulated substation building consisting with double 138kV busses and eight bays of breaker and a half configuration. Each bay will consist of three breakers, six disconnects, potential transformers, protection equipment, and associated wiring and bus work.
- The control/protection panels, equipment, and batteries will be installed and wired in the control shelter.
- Three 138kV transformer termination stands will be constructed.
- 138kV cable poles will be installed.
- 138kV cable will be installed.
- Station light, power transformers and their associated 12kV and secondary cable will be installed.
- Telecommunications, AT&T, and security cable will be installed.

12kV equipment will be installed as foundation work is completed. The wiring of the equipment controls and protection devices is performed concurrently with construction:

- Two fire walls will be constructed between the 138/12kV transformers.
- Three 138/12kV transformers will be placed on their foundations and assembled.
- Three ¼ sections of switchgear will be installed on their foundations and assembled.
- Three capacitors will be installed on their foundations and assembled.
- Control cable will be installed.
- 12kV cable will be installed.

Equipment testing will be performed following installation of equipment, relay panels, controls, batteries, telecommunication, and station light and power system.

Primary access to the 138/12kV yard will be from Camino Capistrano using the rebuilt south driveway (refer to Figure 3-5). All construction equipment, vehicles, and personnel would be accommodated within the property lines of the SDG&E Capistrano Substation property. Material staging may occur at the existing Capistrano Substation and four existing storage yards located at Miguel Substation, Talega Substation, Peñasquitos Substation, and Kearny Yard.

Upon construction completion, reconfiguration of the 138kV transmission lines and 12kV circuits to the new 138/12kV substation would be done in a manner that maintains minimal interruptions of electric service to customers. The transfer of the 138kV transmission lines and 12kV load from the existing substation to the new substation will commence upon the completion of the final equipment testing and distribution and transmission circuit work.

Depending on loading requirements, some or all of these cutovers may occur after normal business hours or on the weekends and/or nights. Night and weekend work will also be required to accommodate delivery of large equipment and transformer vacuum filing of each transformer. A temporary 138kV TL (Talega to Capistrano) will be installed using an existing position in the new gas insulated substation and existing poles of the previous 138kV TL13835, which connected the Talega and Laguna Niguel Substations.

Following Phase Two site development and grading, actual construction of the 230kV substation will commence with the following steps (refer to Figure 3-6):

- Below grade foundation work will be constructed for all the 230kV equipment including the control shelter, the gas insulated substation building and equipment, and the transformer deadend poles, transformer pads (oil containment and fire walls), capacitor foundations, steel pole foundations.
- Control, telecommunication, and security ducts will be installed.
- Station light and power ducts (12kV) will be constructed.
- Ground grid will be installed.

230kV above grade work will start construction as foundation work is completed. The gas insulated substation building and masonry block control shelter will be constructed. The wiring of the equipment controls and protection devices is performed concurrently with construction:

- The 230kV equipment will be installed in the gas insulated substation building consisting of double 230kV busses and three bays of breaker and a half configuration. Each bay will consist of three breakers, six disconnects, potential transformers, protection equipment, and associated wiring and bus work.
- The control/protection panels, equipment, and batteries will be installed and wired in the control shelter.
- Two 230kV transformer deadend poles will be constructed.
- One fire wall will be constructed between the transformers.
- Two 230kV capacitors will be installed.
- 12kV station light and power cable will be installed from the 138kV yard.
- Three 230kV poles will be installed.

Equipment testing will be performed following installation of equipment, relay panels, controls, batteries, telecommunication, and station light and power system.

During construction of the new 230kV yard, construction access would be from the relocated north access road located along the northern boundary of the Capistrano Substation property. A temporary chain link security fence will be constructed along the south side of the access road to keep construction vehicles and personnel out of the active 138/12kV yard. Construction equipment, vehicles, and personnel, would be accommodated within the property lines of the SDG&E property. Additional equipment storage areas may include existing SDG&E storage yards at Miguel Substation, Clairemont Substation, Peñasquitos Substation, and the Margarita and Kearny Yards and a temporary construction staging yard at an undeveloped portion of a Church-owned property located near Segments 3 and 4 and the Talega Substation (refer to Figure 3-7, Sheet 20).

Once the 230kV substation has been constructed and tested, the new 230kV transmission lines will be connected into the new substation, energizing the 230kV equipment. The 230/138kV transformers will be energized after the 230kV busses are energized. This cutover will be done at a time that will limit exposure and ensure reliability to our customers. This may mean the actual cutover will occur at night or other than normal working hours. The construction of the 230kV gas insulated substation facility is expected to take approximately 15 months. Night and weekend work will also be required to accommodate delivery of large equipment and transformer vacuum filing of each transformer. The temporary 138kV TL13835 will be de-energized prior to energizing the new 230kV transmission lines.

3.5.3.2 Talega Substation

The addition of one new 138kV transmission line will not require any site development work at the Talega Substation. The proposed transmission work will require rearrangements and trenching inside the existing substation but will not require additional grading. All substation construction activities, including foundation work, will be contained within the existing Talega Substation property and no adjacent properties or uses will be required to be relocated.

3.5.4 Temporary Work Areas

A total of approximately 21 acres will be temporarily disturbed for Proposed Project construction (refer to Figure 3-7). Figure 3-7 depicts all of the temporary and permanent work areas required to construct the Proposed Project. This disturbance will include conductor pull and tension sites, splice sites, temporary access roads, structure sites, guard structure sites, and materials storage and staging areas. A working zone around all transmission poles will be kept clear of shrubs and other obstructions for inspection and maintenance (permanent work zone). Table 3-12, Summary of Proposed Project Disturbance Areas, provides a summary of all ground disturbance activities resulting from Proposed Project activities. Temporary work areas will be graded, grubbed, and cleared of vegetation as needed. Mowers and D-9 bulldozers would be used to clear the areas required for structure/structure installation and removal as well as at pull/tension sites and staging areas as needed. Depending on the local topography, these areas may also be graded flat or in a terraced fashion. Soil may be imported, as necessary, to raise the elevation of the work areas. Material removed during the process or the subsequent excavation would be spread over existing access roads and work pads as appropriate, or disposed of offsite in accordance with all applicable laws. All temporary work sites and areas will be restored, reseeded or allowed to re-vegetate, as appropriate, to preconstruction conditions following the completion of the Proposed Project.

Table 3-12: Summary of Proposed Project Disturbance Areas

Proposed Project Component	Temporary Impacts		Permanent Impacts		Total Impact Area
	Land Use	Area (acres)	Land Use	Area (acres)	
Transmission lines	Structure Work Areas (84)[1] and underground installation work areas	9.66	Structure Sites (84)	6.93	16.59
	Stringing Sites[2] (19)	2.02			2.02
	Splice Sites	Splicing will be conducted from other temporary work areas.			
	Guard Structure Sites (10)	0.02			0.02
	Access Roads	Proposed Project will utilized existing access roads. Any impacts from new spur roads are included within permanent.			
	Staging Areas[3] (6)	11.02			11.02
Capistrano Substation	Staging Areas[4]		Substation Rebuild	6.38	6.38
Talega Substation	Staging Areas[4]		Substation Alterations	7.1	7.1
Totals		**22.72**		**20.41**	**43.13**

Notes: Table contents based upon preliminary engineering.
[1]Most of the work area for structure installation will be maintained for operation and maintenance needs, and therefore is only counted as a permanent impact. In addition, temporary and permanent work areas for poles installed within the boundaries of the Capistrano and Talega Substations are counted under the substation disturbance area.
[2]Some stringing will be conducted from within structure work areas. This area represents only stringing areas that are not part of another temporary or permanents disturbance areas.
[3]Materials storage and staging at existing SDG&E facilities are not included within the disturbance area. Only new or temporary staging areas are included. These areas correspond to those included on Figure 3-7.
[4]Materials staging and storage for substation construction will occur from existing SDG&E facilities and from the Capistrano and Talega Substation properties.
Source: SDG&E

3.5.4.1 Materials Storage and Staging Areas

Construction of the Proposed Project will utilize approximately 14 staging and disposal areas (six within or immediately adjacent to the ROW, seven at existing SDG&E owned or leased facilities, and one at a church-owned property approximately 0.7 mile from the ROW) to store materials and construction equipment and dispose of soil and other materials during the construction process. To the extent feasible, SDG&E will store or dispose of soil and materials and stage equipment at existing commercial facilities near the Proposed Project area. However, if the distance between existing facilities and the ROW is too great, temporary staging and disposal areas will be required closer to the Proposed Project ROW. Refer to Figure 3-7, Sheets 1 through 20 for potential staging area locations along the Proposed Project alignment. SDG&E will make attempts to locate previously disturbed areas along the route to temporarily store materials and stage equipment. If the staging areas are located outside of SDG&E's existing ROW or franchise ROW, SDG&E will acquire new rights of entry as required. The staging areas will generally be two acres in size and will only be used temporarily during construction. Land disturbed at the staging areas, if any, will be restored to preconstruction conditions following the completion of Proposed Project activities. Restoration will include, as appropriate, re-contouring and reseeding/re-vegetation.

Each staging area will be enclosed by an approximately six foot high chain link security fence and locking gate. No new permanent power sources will be installed at the staging areas and no additional improvements are anticipated to be required.

Substation construction staging yards are anticipated to be located at existing sites, including the Kearny Yard, Miguel Substation, Clairemont Substation, Peñasquitos Substation, Margarita Yard, Talega Substation, and Capistrano Substations.

3.5.4.2 Pull/Tension Sites and Reel Sites

Installation of the overhead transmission line will require approximately 19 distinct pull and reel sites (not including where existing substation properties or structure sites will be utilized for stringing) to aid in stringing the conductor. These stringing sites are depicted on Figure 3-7. The pull/tension sites are typically required every one to four miles and will be approximately 35 feet by 50 feet in size, but will often vary in size depending upon the amount of space available. However, the number and location of the pull sites may vary slightly based on the alignment of the segment, topography, and span lengths between poles. Reel sites are generally located opposite pull/tension sites and will also be approximately 35 feet by 50 feet in size.

Pull/tension and reel sites are needed to set up the tractors and conductor reel trailers, as well as the trucks with the tensioning equipment. To the extent practical, pull/tension and reel sites will be located within SDG&E's ROW and at historical pull and tension sites (refer to Figure 3-7, Sheets 1-20). However, further engineering study as part of the final design may determine that some sites are required outside the ROW and at non-historical locations. Depending on the topography, some minor grading may be required at pull and tension sites to create level work areas for equipment. These work areas will only be used temporarily to facilitate conductor stringing operations, and the land will be restored following the completion of construction as described preceding section.

The pull and tension equipment that will be used during conductor stringing operations will typically remain in place for up to five days per pull per segment. For any underground work along city streets, materials will be removed from the work area on a daily basis to minimize traffic impacts. However, some larger equipment may be left overnight during active construction.

3.5.4.3 Pole Sites

Installation of the new 230kV steel poles throughout the Proposed Project as described in Section 3.4.3 above will require approximately 150 foot by 150 foot areas of disturbance (this area may be smaller or larger at various locations). All new 138kV and 69kV steel poles typically require an approximately 150 foot diameter work space (75 feet from the pole in each direction). However, because most of the new poles will be located in the immediate vicinity of existing poles, the existing work areas will be utilized (and in some cases expanded) for the construction and maintenance of the new poles. Figure 3-7 depicts the anticipated work areas for transmission line construction. These work spaces provide a safe working area for equipment, vehicles, and materials during pole installation and maintenance. A minimum of 15 feet of clearance (approximately 700 square feet) will be maintained around each new transmission pole for the purposes of maintenance and inspection activities. In addition (and in many cases overlapping), each new pole will require one to two maintenance pads, which are typically 35 by 70 feet in size. These areas are considered a permanent work space and will be kept relatively flat and un-vegetated. It is important to note that the 15 feet of clearance around each pole and the required maintenance pads will often overlap. Any work space not required for safety operation and maintenance will be restored to pre-construction conditions following the completion of the Proposed Project. In addition, because most of the construction of the new poles will occur within existing maintenance pads, much of the required space for construction will be kept for pole maintenance. Figure 3-7 depicts all anticipated temporary (construction) and permanent (operations and maintenance) work areas. All pole removal will be completed from existing operation and maintenance pads and access roads.

3.5.4.4 Splice Sites

Temporary construction areas will be utilized for splicing activities (at underground vault locations). To the extent practical, the splice sites will be located within SDG&E's existing ROW. Splice sites are temporary work areas and, as such, any physically disturbed splice sites will be restored following the completion of the Proposed Project. Refer to Figure 3-7 for the location of potential splice sites.

3.5.4.5 Guard Structures

Temporary wood H-frame guard structures will be utilized for the overhead portion of the Proposed Project at all major road crossings, sensitive waterway crossings, and at overhead utility crossings to protect the new conductor cable, existing utility lines, and to avoid traffic disruption during pulling. Guard structures are comprised of two H-frame structures on each side of the crossing (refer to typical H-frame guard structure photograph included within Appendix 3-B).

Approximately 100 square feet of space is required (10 feet by 10 feet) to install each guard structure and most of this area is typically located along the curb-line of the street immediately adjacent to the guard structure location. Each structure has a diameter of two feet and the guard structures are as wide as the newly strung conductor package. There are approximately 10 major road, utility, and sensitive waterway crossings within the Proposed Project area that will likely require guard structures. Any physically altered guard structure sites will be restored following the completion of the Proposed Project.

3.5.4.6 Temporary Right-of-Way

Construction is anticipated to occur within existing and newly acquired ROW and minimal temporary construction easements are anticipated to be required.

3.5.4.7 Access Roads

Equipment and vehicles will primarily access the transmission line segments, temporary work areas, and substation sites by utilizing existing access roads and a small number of new spur roads to new structure locations and vault locations. Refer to Figure 3-7 for the location of existing access roads and new spur roads. New spur roads will traverse from existing access roads to new structure locations, as needed. The roads will be approximately 14 feet in width. Some construction associated with the Proposed Project may occur within urban areas where public roads will primarily be used to access certain areas of the Proposed Project alignment during construction. Please refer to Section 4.14, Transportation and Traffic, for a list of potential public roads to be utilized by construction vehicle access. In accordance with local requirements, any damage to existing roads as a result of construction will be repaired once construction is complete.

3.5.4.8 Underground Transmission Lines

Construction of new underground transmission line segments will require room for the safe operation of construction equipment and personnel. The majority of the underground transmission line construction included as part of the Proposed Project will utilize the cut and cover construction method, which typically requires 25 feet of space for construction, but can in some cases be limited to less space depending upon physical constraints. Therefore, a 1,000 foot segment of new underground transmission line would require a total of 25,000 square feet of construction area.

3.5.5 Road Crossings

The proposed transmission line route will cross approximately 15 roadways ranging from I-5 to undivided two-lane residential streets. Standard overhead roadway crossings are completed without special permit or other special procedure. Only the utilization of guard structures or traffic control differentiates standard road crossings from overhead transmission line work at other locations. Typically, guard structures are used for larger road crossings and traffic control is utilized for locations where overhead lines cross smaller roads. Where traffic control is utilized at crossings, encroachment permits are required from the applicable municipal agency. Guard structures are discussed in Section 3.5.4.5 above. However, special conditions exist for freeway crossings and underground transmission road crossings. These two cases are discussed below in specific relation to the Proposed Project.

3.5.5.1 Interstate 5 Overhead Crossing

The I-5 is located approximately 1,000 feet from the Capistrano Substation and will be crossed with 230kV overhead conductor replacing existing 138kV conductor. SDG&E will procure a specific permit from the California Department of Transportation (Caltrans) to string the new conductor across the I-5. All guard structure usage, traffic stops, and timing restrictions shall be conducted according to the specific Caltrans permit conditions.

3.5.5.2 Underground Construction within Existing Roadways

The proposed transmission line route will involve the installation of underground transmission lines within one roadway, located within Segment 2 of the Proposed Project. New line segments for TL23030 and TL23007 will be installed within Vista Montana (a public street). During construction, partial closure of Vista Montana roadway will occur. An encroachment permit or equivalent approval from the city of San Juan Capistrano will be required. Also new ROW will need to be obtained from the Rancho San Juan developer (Woodbridge Homes). All traffic control measures implemented for work at these locations will be consistent with the conditions outlined within the encroachment permit from the city. Potential traffic and transportation impacts associated with the closure of these two roadways are discussed in Section 4.14, Transportation and Traffic.

3.5.6 Helicopter Usage During Transmission Line Construction

Helicopters may be utilized as a construction tool during stringing of overhead conductor cable and other transmission line construction activities (such as the setting of new poles) associated with the Proposed Project. Stringing operations will take a total of approximately one year and helicopter use may occur intermittently, at certain locations. Typically, helicopters are utilized to string the sock line that is attached to the conductor to allow the conductor to be strung from pole to pole. In general, the helicopter is used for approximately half of a day to pull in three phases of conductor for approximately 12,000 feet of transmission line. The helicopter would then not be needed again for two to three weeks until the next section of line is ready to be pulled. Depending upon specific site conditions, helicopters may also be utilized to install rollers or even to remove and/or position new transmission structure themselves. Where helicopters are utilized to set new poles (where access is limited for cranes and flatbed trucks), the helicopter is only utilized for a few hours at a time.

Helicopters may also be utilized to remove and install transmission line structures. Each structure site will be evaluated individually during final transmission line construction planning. The transmission line contractor has the authority to utilize helicopter for structure removal and/or installation where it is deemed preferable.

Helicopters will only be utilized during daylight hours, and flight paths will be limited to the existing transmission line ROW except for ingress and egress from the helicopter landing/staging yards. Helicopter utilized for transmission line construction will have a maximum payload of 6,000 pounds.

The final decision on whether or not helicopters are utilized, what type of helicopter is utilized, and to what extent helicopters are used will be made by the transmission line construction contractor. If helicopters are utilized during the construction of the Proposed Project, the fly yard (temporary base where the helicopter flies to and from while carrying out construction activities) will be located at existing airports and landing areas wherever feasible. Helicopters may also be staged and refueled at designated Proposed Project staging and laydown areas located within the transmission line ROW. Typically, a 100 foot by 100 foot fly yard is delineated at an existing laydown area and all helicopter refueling, loading, and unloading is carried out within this designated area. As long as helicopters are being utilized on the Proposed Project, the fly yards will be kept clear of all other activity. All helicopter utilization will be compliant with all applicable usage permits including Federal Aviation Administration (FAA) and Caltrans.

It is currently anticipated that helicopters may be utilized during construction and stringing activities for new 230kV Pole Nos. 11 through 14 (refer to Figure 3-7, Sheets 4 and 5).

3.5.7 Retired Structures/Poles, Materials, and Components

It is SDG&E's policy to re-use or recycle all old structures/poles, materials, and components following the retirement of substations, transmission lines, and structures/poles. Whatever cannot be re-used or recycled is disposed of at an appropriate facility pursuant to all applicable laws. Table 3-13, Common Destination of Retired Project Components, outlines how some major retired project components are often disposed of following construction.

Table 3-13: Common Destination of Retired Project Components

Project Structure, Material, or Component	Common End Use or Destination
Steel transmission and substation structures/poles	Recycled (sold for scrap)
Wood transmission structures/poles	Donated for re-use or sanitary disposal
Conductor cable	Recycled
Insulators	Sanitary disposal
Scrap steel, copper and other metal	Recycled
Concrete	Recycled
Waste oils (substation)	Tested and disposed of pursuant to applicable laws
Soils	Tested and disposed of pursuant to applicable laws
Batteries	Recycled
Source: SDG&E	

3.5.8 Construction Equipment and Personnel

It is estimated that approximately 60 people per day will be required to construct the Proposed Project at its peak, with up to 20 people working at a substation at one time, and the rest working at various points along the transmission line. SDG&E will supplement its workforce as required during construction from a contractor's pool of experienced personnel. Construction work force is discussed in the subsections below in relation to each phase of construction.

3.5.8.1 <u>Transmission Line Construction</u>

Transmission line construction will be conducted utilizing stringing crews to string the conductor, foundation crews that work on the transmission structure construction and preparation for stringing, and grading crews who prepare the structure sites for construction. In addition, construction crews for the installation of underground transmission lines will also be utilized. Typically, the grading crews prepare each structure site and the foundation crews complete all of the required work on the transmission structures prior to any stringing activities. However, foundation crews and stringing crews could work simultaneously on different sections of the transmission line route to complete construction over a shorter period of time. In addition, multiple foundation crews and/or grading crews could be working at different structure sites at the same time. Transmission crews are typically composed of four to five workers and three trucks plus any required stringing/pulling equipment. Foundation crews are also typically comprised of four to five people and one to two trucks plus any required foundation construction equipment (such as a concrete truck, drill rig, and backhoe). For the Proposed Project, up to nine crews (foundation and transmission) and approximately 40 to 45 workers could be utilized at one time during transmission line construction. Refer to Section 3.5.8.3, Construction Equipment, for a complete list of construction equipment, including all equipment utilized during transmission line construction and Appendix 3-D for a detailed construction vehicle use breakdown by Proposed Project Component.

3.5.8.2 Substation Construction

Substation construction will consist of grading and site development (San Juan Capistrano Substation only), below grade construction, above grade construction, and testing/energization. The grading and site development crew (which includes hazards abatement and demolition of existing structures) will consist of approximately nine workers for demolition and 11 workers for grading/site development (San Juan Capistrano Substation only). The below grade construction will be conducted by an average of approximately seven to eight workers, and the above grade construction will be conducted by an average of seven to 16 workers. Finally, relay testing, cutover, and energization will be conducted by an average of six to eleven workers. Construction of the San Juan Capistrano Substation will require more workers than the improvements to the Talega Substation thus corresponding to the higher end of the worker estimates listed above. Refer to Section 3.5.8.3 and Appendix 3-D for a complete list of construction equipment, including all equipment utilized during transmission line construction.

3.5.8.3 Construction Equipment

Table 3-14, Standard Construction Equipment and Usage lists the typical construction equipment and their respective uses with respect to the Proposed Project. A detailed list of construction equipment that will be utilized for construction of the Proposed Project has been included as Appendix 3-D.

Table 3-14: Standard Construction Equipment and Usage

Equipment Type	Equipment Use
2-ton flatbed trucks	Haul materials (including new poles)
25-ton crane	Set guard structures
Aerial bucket trucks	Access poles, string conductor, modify structure arms, and other various uses
Aerial man-lifts	Access poles, string conductor, modify structure arms, tree trimming/removal and other various uses
Air compressors	Operate air tools
Backhoe	Excavate trenches

Table 3-14 (cont.): Standard Construction Equipment and Usage

Equipment Type	Equipment Use
Bulldozer	Prepare structure sites, upgrade or establish new access roads
Cable reel trailers	Transport cable reels and feed cables into conduit
Chipper trailer	Trimming and removal of trees
Compactor	Access road work
Concrete truck	Pour concrete
Condor boom truck	Access structures over 100 feet high
Drill rig with augers	Install fences, excavate foundation holes, and bores
Drilling rig	Excavate for structure foundations
Dual bull-wheel tensioner	Pull conductor
Dump truck	Haul excavated materials/import backfill
Excavator	Earth excavation
Flatbed boom truck	Haul and unload materials
Forklift	Move materials on-site
Helicopter	Transport crews and materials, string conductor, and install and remove travelers, set structures
Hydraulic press	Press together the conductor ends at dead end structures
Bore rig (jack-and-bore)	Install transmission line for jack-and-bore method
Line truck	Install clearance structures
Mechanic truck	Service and repair equipment
Mobile cranes	Load and unload materials
Mobile office trailers	Supervision and clerical office
Motorized scaffolding	Position personnel
Pickup trucks	Transport construction personnel
Pile drivers	Install piles
Portable generators	Operate power tools
Pullers	Pull conductor
Reel winders	Install conductor
Rigging truck	Haul tools and equipment
Road grader	Road construction, maintenance, and upgrading

Table 3-14 (cont.): Standard Construction Equipment and Usage

Equipment Type	Equipment Use
Rollers	Repave streets over trench and manhole locations
Splice trailer	Store splicing supplies/air condition manholes
Take-up trailers (sock line)	Install conductor
Tensioner	Pull conductor
Tool van	Tool storage
Water truck	Dust control
Winch truck	Install and pull rope into position in conduits
Source: SDG&E	

3.6 CONSTRUCTION SCHEDULE

SDG&E estimates that construction of the Proposed Project will take a total of approximately 48 months to complete depending on outages. Construction is scheduled to begin in November 2013 and run through November 2017. The complete construction schedule, outlined by task, is summarized in Table 3-15, Proposed Construction Schedule, below. A detailed construction schedule, organized by project component, has been included within Appendix 3-D.

Table 3-15: Proposed Construction Schedule

Proposed Project Segment/Task	Months	Anticipated Start Date*
Construct 138 and 69kV from Talega Hub to Talega Substation (Segment 4)	8	November 2013
Below grade 138kV addition in Talega Substation	3	November 2013
Construct 138kV addition in Talega Substation	6	February 2014
Energize 138kV addition in Talega Substation	1	July 2014
Obtain San Juan Capistrano City grading permits	4	September 2013
138kV Capistrano Substation getaways (Segment 1)	5	November 2013
Reroute 2-12kV circuits to temporary position	1	November 2013
Remediate & Demo existing buildings in lower yard	2	October 2013
Lower yard site grading (Phase 1)	6	December 2013

Table 3-15 (Cont.): Proposed Construction Schedule

Proposed Project Segment/Task	Months	Anticipated Start Date*
Lower yard site development (walls, drainage, etc)	3	March 2014
Lower yard (138/12kV) below grade construction	8	June 2014
Lower yard 138/12kV substation construction	13	January 2015
Construct 12kV distribution circuits	10	June 2015
Lower yard 138/12kV testing and energizing	6	August 2015
Construct 138kV cable poles and cable into gas insulated substation	5	September 2015
Cutover existing 138/12kVsubstation to new 138/12kV substation	1	February 2016
Construction pad and access road grading for 230kV structure sites between San Juan Capistrano and Talega substations (Segments 1 – 4)	8	September 2015
Construct structure foundations for new 230kV poles (Segments 1 – 4)	7	October 2015
De-energize TL13835 & construct underground 230kV ducts along Vista Montana (Segment 2). Re-energize TL13835	4	March 2016
Construct new 230kV overhead transmission lines (set poles and pull conductor – Segments 1 – 4)	4	March 2016
Construct temporary TL13835 at San Juan Capistrano Substation	1	March 2016
Remove equipment and foundations in upper yard	2	March 2016
Remediate and grade upper yard (Phase 2)	3	May 2016
Upper yard (230kV) substation below grade construction	6	August 2016
Upper yard (230kV) substation construction	10	December 2016
De-energize TL138xx & 13816 and construct underground 230kV ducts along Vista Montana (Segment 2). Re-energize TL138xx and 13816	7	December 2016

Table 3-15 (Cont.): Proposed Construction Schedule

Proposed Project Segment/Task	Months	Anticipated Start Date*
230kV testing and energizing at San Juan Capistrano Substation	5	June 2017
De-energize temporary TL13835 & install Bank 60's 138kV line position	1	November 2017
Proposed Project In Service Date		November 2017
Site and ROW Restoration	4	March 2018
*Dates are dependent on when all permits are obtained. Source: SDG&E		

3.7 PERMANENT LAND AND RIGHT-OF-WAY REQUIREMENTS

The following discussion describes the permanent land and ROW requirements for each Proposed Project component. These requirements are also summarized in Table 3-16, Permanent Land and ROW Requirements.

Table 3-16: Permanent Land and ROW Requirements

Proposed Project Component		Approximate Area (feet)	Approximate Area (acres)
Capistrano Substation Rebuild		None	None
Talega Substation Alterations		None	None
Transmission Line Installation and Re-Location Work	New 230kV Lines – Segment 1	None	None
	New 230kV Lines – Segment 2	4,550	.10
	New 230kV Lines – Segment 3	None	None
	New 230kV Lines – Segment 4	420,000	9.64
	Re-located 138kV and 69kV – Segment 4	17,000	.39
Notes: Table contents based upon preliminary engineering. Source: SDG&E			

3.7.1 San Juan Capistrano Substation Rebuild

The new San Juan Capistrano Substation will be constructed within the existing Capistrano Substation property footprint and no new permanent land or ROW will be required.

3.7.2 Talega Substation Alterations

The alterations to the Talega Substation will all be located within the existing facility footprint and no new permanent land or ROW will be required.

3.7.3 Transmission Line Installation and Re-location

The transmission line work associated with the Proposed Project is discussed herein by segment as defined within Table 3-2.

3.7.3.1 Transmission Line Segment 1 – Capistrano to Rancho San Juan

This segment of the transmission portion of the Proposed Project consists of approximately 2.6 miles of overhead transmission line located within an existing transmission ROW. No new permanent land or ROW will be required for the transmission line installation within this segment.

3.7.3.2 Transmission Line Segment 2 – Rancho San Juan

This segment of the Proposed Project will involve installation of new 230kV cable within an underground position within Vista Montana. TL23030 will be placed within franchise position within Vista Montana. TL23007 will be installed within an existing easement within Vista Montana. Two small sections of new ROW will be required (approximately 0.04 total new ROW) where the new and relocated underground transmission lines will be located within Via Pomplona (private road). This new ROW will be acquired from the property owner, Woodbridge Homes.

3.7.3.3 Transmission Line Segment 3 – Rancho San Juan to Talega Hub

Transmission line work within Segment 4 will include installation of approximately 4.2 miles new overhead 230kV within existing ROW. No new permanent land requirements or ROW will be required for Segment 3 of the Proposed Project.

3.7.3.4 Transmission Line Segment 4 – Talega Hub to Talega Substation

Transmission line work within Segment 4 will include both installation of new overhead and underground transmission lines for the new 230kV lines as well as the re-location of existing 138kV and 69kV transmission lines both within new and existing ROW. The new ROW requirements are outlined below.

New 230kV Transmission Lines

Transmission line work within Segment 4 of the Proposed Project will require approximately 9.64 acres (420,000 feet^2) of new ROW to install new 230kV transmission line TL23030. This new ROW will be acquired from the Talega Home Owners Association and Transportation Corridor Agency (TCA)**.**

Relocation of Existing 138kV and 69kV Transmission Lines

Relocation of existing 138kV and 69kV transmission lines will require approximately 0.39 acres (17,000 feet^2) of new permanent ROW.

3.8 OPERATION AND MAINTENANCE (EXISTING AND PROPOSED)

The Proposed Project will replace and upgrade existing electric transmission, distribution, and substation facilities. SDG&E currently operates and maintains these facilities consistent with SDG&E's standard protocols and procedures, including SDG&E's *Natural Community Conservation Plan* (NCCP), which is described in greater detail in Section 4.4, Biological Resources and below. No change in SDG&E's operations and maintenance protocols and procedures is anticipated or included as part of the Proposed Project. SDG&E's existing protocols and procedures, including SDG&E's *NCCP*, have been incorporated into the design of the Proposed Project and are also reflected in the baseline from which impacts of the Proposed Project have been evaluated. Specific *SDG&E Subregional NCCP* Operation Protocols, Habitat Enhancement Measures and Mitigation incorporated into the Proposed Project include the following:

- Vehicles would be kept on access roads and limited to 15 miles per hour (Section 7.1.1, 1.).
- No plants would be collected (Section 7.1.1, 2.).
- 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 would refer all environmental issues, including questions regarding environmental impacts, to the Environmental Surveyor (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 would conduct preactivity studies for all activities occurring in natural areas, and would complete a preactivity study form including recommendations for review by a biologist and construction monitoring, if appropriate. The form would be provided to CDFG and USFWS but does not require their approval (Section 7.1.3, 13.).
- The Environmental Surveyor would flag boundaries of habitats to be avoided and, if necessary, the construction work boundaries (Section 7.1.3, 14.).
- The Environmental Surveyor would conduct monitoring as recommended in the preactivity study form (Section 7.1.4, 35.).
- Fugitive dust would be controlled by regular watering and speed limits (Section 7.1.4, 39.).
- New access roads would be designed and constructed according to the SDG&E *Guide for Encroachment on Transmission Rights-of-Way (4/91)* (Section 7.1.6, 46.). No wildlife, including rattlesnakes, would be collected or harmed, except to protect life and limb (Section 7.1.1, 2. and 7).

- Feeding of wildlife is not allowed (Section 7.1.1, 4.).
- No pets are allowed within the right-of-way (Section 7.1.1, 5.).
- Littering is not allowed, and no food or waste would be left on the ROW or adjacent properties (Section 7.1.1, 8.).
- Field crews would 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.).
- Supplies, equipment, or construction excavations where wildlife could hide (e.g., pipes, culverts, pole holes, trenches) would be inspected prior to moving or working on/in them (Section 7.1.4, 37. and 38.).
- 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).

SDG&E will continue to regularly inspect, maintain, and repair the transmission lines and substations pending agency review of the Proposed Project and following completion of Proposed Project construction. Operations and maintenance activities would not increase in intensity, frequency or duration with implementation of the Proposed Project and would be substantially similar to existing operations and maintenance activities except where otherwise noted in the PEA. Typical activities involve both routine inspections and preventive maintenance to ensure service reliability, as well as emergency work to maintain or restore service continuity. SDG&E performs aerial and ground inspections of Proposed Project facilities and patrols aboveground components annually. Inspection for corrosion, equipment misalignment, loose fittings, and other common mechanical problems is performed at least every three years (per G.O. 165) for transmission lines.

SDG&E uses helicopters in the visual inspection of overhead facilities. SDG&E patrols each electric transmission line annually or as required via helicopter. SDG&E may also use helicopters to deliver equipment, position poles and structures, string lines, and position aerial markers, as required by FAA regulations. SDG&E's Transmission department uses helicopters for patrolling transmission lines during trouble jobs (e.g., outages/service curtailments) in areas that have no vehicle access or rough terrain. For patrolling during such jobs, the helicopter picks up the patrolman at the district yard. For new construction or maintenance, the helicopter needs a flat staging area for fueling and picking up material, equipment, and personnel. The area required for small helicopter staging is generally 100 feet by 100 feet. The size of the crew needed varies from four to 10 crewmembers, two helicopter staff, and a water truck driver to apply water for dust control at the staging area. Most helicopter operations take only one day.

SDG&E maintains a clear working space area per G.O. 95 around all poles. SDG&E keeps these areas clear of shrubs and other obstructions for inspection and maintenance purposes. In addition, vegetation that has a mature height of 15 feet or taller are not allowed to grow within 10 horizontal feet of any conductor within the ROW for safety and reliability reasons.

Typical transmission line operation and maintenance activities include security and other inspections, ROW and access repairs, pole brushing in accordance with fire break clearance requirements, herbicide application, emergency and non-emergency repairs and replacements, insulator washing, and tree trimming. These activities are performed on an as needed basis.

As to substation operations and maintenance, both the Talega and San Juan Capistrano Substations will continue to be unmanned substations. In general, routine substation operations will be same as what occurs at the existing substations. The new substations will continue to require workers to visit each substation several times a week for switching and several times a year for equipment maintenance. Maintenance activities will include equipment testing, equipment monitoring and repair, and emergency and routine procedures for service continuity and preventive maintenance. Typically, a major maintenance inspection will take place annually for approximately one week.

Routine vegetation clearing 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 to two small maintenance vehicles and one or more employees to clear or trim vegetation to achieve the minimum working space around the substation facilities. Operations and maintenance activities at San Juan Capistrano Substation will vary slightly from existing conditions due to the introduction of additional equipment and gas-insulated design. Using SDG&E's existing protocols, which are consistent with United Stated Environmental Protection Agency (USEPA) guidelines, the new gas insulated portion of the San Juan Capistrano Substation will be electronically monitored remotely from SDG&E's central operations center. All equipment that utilizes sulfur hexafluoride (SF_6) will be monitored for variation in pressure and an automatic alarm system will be utilized to signal substation crews in the event of a significant change in pressure within any piece of gas insulated substation equipment.

An electronic inventory of SF_6 bottles will be maintained by substation operations personnel. Data on bottle weight, number, and SF_6 volume will be included within the inventory. Routine inventory inspections will be conducted to keep track of on-site stock and usage rates. The volume of gas in each piece of gas insulated substation equipment will also be monitored, tracked, and recorded. Inspection sheets will be utilized to document weight and volume of SF_6 gas used, which piece of equipment it is used in, and what storage bottle it came from.

Safety lighting at the substation will be provided inside the substation for the purpose of safe nighttime access inside the substation. Because night activities are expected to occur only infrequently, the safety lighting inside the substation fence will normally be turned off.

3.9 ENVIRONMENTAL PROCEDURES AND PROTOCOLS

In addition to the Proposed Project components previously discussed, SDG&E will incorporate existing procedures, protocols and other requirements into the Proposed Project description. Consistent with its existing operations and maintenance practices, SDG&E will implement these throughout Proposed Project design, construction, operation, and maintenance to avoid and minimize potential environmental impacts.

The following are procedures that are implemented by SDG&E at the program level. These are not project specific and are implemented more or less uniformly throughout SDG&E's various endeavors, operations, and practices. They are not necessarily evaluated and updated based upon project type and/or scope, rather they ensure a consistent level of impact avoidance and minimization relating to any and all work performed by, or for, SDG&E.

3.9.1 SDG&E's Natural Community Conservation Plan

As discussed in Section 4.4, Biological Resources, in December 1995, SDG&E entered into an agreement with the USFWS and the CDFG, establishing *SDG&E's Subregional NCCP*. The Proposed Project would incorporate the standard set of operational protocols and mitigation set forth in *SDG&E's Subregional NCCP*. The *SDG&E's Subregional NCCP* is a Habitat Conservation Plan permitted under Section 10A of the ESA for incidental take and a NCCP permitted under a management authorization pursuant to Section 2835 of the Fish and Game Code. SDG&E entered into an Implementation Agreement with the United States Fish and Wildlife (USFWS) and California Department of Fish and Game (CDFG), respectively, for the management and conservation of multiple species and their associated habitats as established according to the federal and state endangered species acts and the state's NCCP Act. Through the avoidance of resources, application of protective measures and mitigation in the *SDG&E Subregional NCCP*, and habitat enhancement, Proposed Project impacts to biological resources would be less than significant.

SDG&E's NCCP establishes a comprehensive, long-term, habitat-based agreement among SDG&E, the USFWS, and the CDFG for the management and conservation of multiple species covered in the plan and their associated habitat. As such, the NCCP provides protection for those species while allowing SDG&E to develop, install, maintain, operate, and repair necessary electric and gas utility facilities in the region.

The NCCP prescribes as "protocols" various protection, mitigation, and conservation measures SDG&E must implement as part of its covered activities to ensure the survivability and conservation of protected species and their habitat, according to applicable law. SDG&E has successfully completed over 1,000 utility projects under and in compliance with the NCCP, ranging from maintenance to new construction.

Under its NCCP, SDG&E consults with the USFWS and CDFG on certain projects or activities in natural areas by preparing "pre-activity surveys" that evaluate the scope and nature of potential impacts in advance of construction or maintenance activities. The pre-activity survey, when submitted, initiates consultation with the USFWS and CDFG under established timeframes to identify potential impacts and feasible avoidance, minimization, and/or mitigation measures, as described in the NCCP.

The benefits to the public health, safety, and welfare through reliable and cost-effective utility service and the long-term management and conservation of covered species and their habitat made possible by a programmatic conservation plan such as the NCCP are substantial. SDG&E's NCCP directly applies to all components of the Proposed Project, and the management and conservation of the biological resources within the Proposed Project area. The NCCP protocols and mitigation requirements have been incorporated directly into the Proposed Project description to ensure that impacts to biological resources are less than significant.

3.9.2 SDG&E's Water Quality Construction Best Management Practices Manual

SDG&E's *Water Quality Construction BMPs Manual* (*BMP Manual*) was created to organize 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 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, operation, and maintenance of the Proposed Project to ensure that all SDG&E and applicable government-mandated water quality standards are fully complied with.

3.9.3 Fire Prevention and Fire Safety Standards

The Proposed Project will be constructed consistent with Electric Standard Practice 113.1 – Wildland Fire Prevention and Fire Protection. 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 85 miles per hour (mph) winds, and undergrounding of a portion of the transmission line. These design components of the Proposed Project minimize the fire risk through enhanced safety and reliability of the transmission 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. No work will occur during times of high fire threat such as Red Flag Warnings issued by the National Weather Service or other severe fire weather conditions as identified by SDG&E.

3.9.4 Other SDG&E Environmental Procedures and Protocols

SDG&E will also employ the following during construction, operation, and maintenance of the Proposed Project:

- Management of Contaminated Equipment and Materials, Hazardous Materials Business Plan - Addresses the evaluation of potentially hazardous materials that may be present due to former or present on-site uses, as well as hazardous waste that may be generated during construction or operation of proposed land uses.

- Standard Traffic Control Procedures – Measures to address potential disruption of traffic circulation during construction activities and address safety issues.

- SDG&Es Approved Herbicides and Application Procedures – Identification of approved herbicides and measures for the proper application of herbicides during operation and maintenance activities.

- Compliance with applicable state and local regulations covering grading, water quality and erosion.

- Implementation of engineering structural design specifications to withstand physical stresses from wind, geologic conditions and hydrologic conditions.

3.10 APPLICANT PROPOSED MEASURES

In addition to the above protocols and procedures included as part of the Proposed Project description, SDG&E will also incorporate the Applicant Proposed Measures (APMs) that have been identified and developed specifically for the Proposed Project during the preparation of the PEA. Table 3-17, Applicant Proposed Measures by Resource Area identifies the APMs that are applicable to each resource area and Table 3-18, Applicant Proposed Measures, details the complete APMs. The various resource sections of this document outline how and when the APMs will be applied to avoid or minimize impacts to a less than significant level. Where application of APMs to avoid or reduce the effect of a project activity to a less than significant level is not feasible, additional suitable mitigation measures to do so are also proposed within the relevant resource sections.

Linear electric infrastructure projects, such as this one, typically traverse multiple jurisdictional boundaries, natural resource features, and habitat types. Until final design, and in some cases until installation, utility projects remain more flexible in the definition of their ultimate configuration and placement than most non-linear projects. The Proposed Project may encounter unique topographical and natural features or site-specific engineering challenges along the transmission line ROW that could not be reasonably foreseen and specifically planned for through standard mitigation. The APMs take into consideration the potential for the Proposed Project to encounter such features and enhance SDG&E's ability to modify the final design during the installation phase to maximize overall project feasibility, while avoiding or minimizing impacts to sensitive environmental resources.

The APMs are designed to take advantage of project design flexibility by avoiding or minimizing environmental impacts, to the extent feasible. As defined in CEQA, "feasible" is defined as being "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" while attaining the project's basic objectives and its purpose and need.[2]

SDG&E would be responsible for overseeing the assembly of the construction and environmental teams that would implement and evaluate the Proposed Project APMs. SDG&E maintains an environmental compliance management program to allow for implementation of the APMs to be monitored, documented, and enforced during each Proposed Project phase, as appropriate. All of those contracted by SDG&E to perform this work would be contractually bound to properly implement the APMs to ensure their effectiveness in reducing potential environmental effects. Table 3-18, Applicant Proposed Measures, details each of the 22 APMs that will be implemented during construction, operation, and maintenance of the Proposed Project.

[2] Public Resources Code, Section 21061.1 and California Code of Regulations Title 14, Section 15126.6.

Table 3-17: Applicant Proposed Measures by Resources Area

Resource Area	Relevant Applicant Proposed Measures
Aesthetics	AES-1 through AES-3
Air Quality	AIR-1
Cultural Resources	CUL-1 through CUL-9
Geology, Soils, and Mineral Resources	GEO-1 and GEO-2
Hazards and Hazardous Materials	HAZ-1
Noise	NOISE-1
Public Services	PS-1 and PS-2
Transportation and Traffic	TR-1 through TR-3

The remainder of this page is intentionally left blank.

Table 3-18: Applicant Proposed Measures

APM Number	Description	Justification	Applicable Project Component		
			San Juan Capistrano Substation	Talega Substation	Transmission Lines
Aesthetics					
AES-1	Clean Construction Work Areas. SDG&E will make an effort to keep construction activities as clean and inconspicuous as practical.	Ensure that potential aesthetic impacts during construction are less than significant.	**X**	**X**	**X**
AES-2	Restoring Appearance of Disturbed Areas. When Proposed Project construction has been completed, all disturbed terrain will be restored through recountouring and revegetation in order to re-establish a natural appearing landscape and reduce potential visual contrast between disturbed areas and the surrounding landscape.	Ensure that physical alterations during construction do not become long-term aesthetic impacts following the completion of construction.	**X**	**X**	**X**
AES-3	Visual Screening- San Juan Capistrano Substation. Landscaping and a screening wall will be installed in key areas along the perimeter of San Juan Capistrano Substation to partially screen views of substation structures and to visually integrate the new substation facilities with the existing setting. Figure 4.1-4 depicts the general location of new substation landscaping. Plant material will be appropriate to site-specific conditions and the local landscape setting. Landscaping will also be consistent with technical requirements for Proposed Project operations and maintenance and will incorporate input from the City of San Juan Capistrano, local residents, and SDG&E's facility security.	Ensure that the new San Juan Capistrano Substation perimeter is landscaped, where possible, to provide partial screening of the new substation.	**X**		

The remainder of this page is intentionally left blank.

Table 3-18 (Cont.): Applicant Proposed Measures

APM Number	Description	Justification	Applicable Project Component		
			San Juan Capistrano Substation	Talega Substation	Transmission Lines
Air Quality					
AIR-1	Operations Emissions Controls. SDG&E has developed APM AIR-1 as part of the Proposed Project to ensure that sulfur hexafluoride is properly managed. SDG&E will implement its existing sulfur hexafluoride mitigation strategies during the operation and maintenance of sulfur hexafluoride-containing equipment installed as part of the Proposed Project. These strategies include: • Recording company-wide sulfur hexafluoride purchases, use, and emissions rates to comply with the USEPA's requirements for Electrical Transmission and Distribution Equipment Use (Mandatory Reporting of Greenhouse Gases, 40 C.F.R. Part 98, Subpart DD) and the CARB's Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear (Code Regs. tit. 17, § 95350-95359) • Implementing a sulfur hexafluoride recycling program • Training employees on the safety and proper handling of sulfur hexafluoride • Continuing to report GHG emissions with the The Climate Registry. • Implementing SDG&E's sulfur hexafluoride leak detection and repair program. This program includes monthly visual inspections of each GCB, which includes checking pressure levels within the breaker and recording these readings in SDG&E's Substation Management System. During the installation or major overhaul of any GCB, the unit is tested over a 24-hour period to ensure no leaks are present. Minor overhauls of each GCB are conducted every 36 to 40 months to check overall equipment health. This process includes checking gas pressure, moisture ingress, and sulfur hexafluoride decomposition. If the GCB fails any of these checks, the unit is checked for leaks and repaired. In addition, all GCBs are equipped with a gas-monitoring device and alarm that automatically alerts SDG&E's Grid Operations Center. If gas pressure approaches minimum operating levels, an alarm is immediately reported to SDG&E's Substation Construction and Maintenance Department. The GCB is usually inspected for leaks within 24 hours of such an alarm. SDG&E's leak detection practice includes the following three methodologies: o Spraying a leak-detection agent onto common leak points—including O rings, gaskets, and fittings. o Using a field-monitoring device (sniffer) to detect the presence of sulfur hexafluoride gas. o Using a laser-detection camera to detect the presence of sulfur hexafluoride gas when the above two methods are unsuccessful in finding a leak.	Minimize impacts associated with the utilization of sulfur hexafluoride at the new San Juan Capistrano Substation.	**X**		

Table 3-18 (Cont.): Applicant Proposed Measures

APM Number	Description	Justification	Applicable Project Component		
			San Juan Capistrano Substation	Talega Substation	Transmission Lines
Cultural Resources					
CUL-1	Prior to the initiation of construction or ground-disturbing activities, all SDG&E, contractor, and subcontractor personnel would receive training regarding the appropriate work practices necessary to effectively implement the APMs and to comply with the applicable environmental laws and regulations, including the potential for exposing subsurface cultural resources and paleontological resources and to recognize possible buried resources. Training shall inform all construction personnel of the anticipated procedures that would be followed upon the discovery or suspected discovery of archaeological materials, including Native American remains, and their treatment, as well as of paleontological resources.	Ensure that construction workers are educated about the potential cultural and paleontological resources and laws so that potential impacts from unanticipated discovery are minimized.	**X**	**X**	**X**
CUL-2	A qualified archaeologist would attend preconstruction meetings, as needed, and a qualified archaeological monitor would monitor ground disturbing 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.	Ensure that potential impacts to cultural resources from unanticipated discovery are less than significant.	**X**	**X**	**X**
CUL-3	Known cultural resources that can be avoided would be demarcated as Environmentally Sensitive Areas. Construction crews would be instructed to avoid disturbance of these areas.	Ensure that known resources are protected during construction activities to avoid potential adverse effects.	**X**	**X**	**X**
CUL-4	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. 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 cultural resources, a Research Design and Data Recovery Program would be prepared and carried out to mitigate impacts.	Ensure that potential impacts to cultural resources from unanticipated discovery are less than significant.	**X**	**X**	**X**
CUL-5	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.	Ensure that potential impacts to cultural resources from unanticipated discovery are less than significant.	**X**	**X**	**X**

Table 3-18 (Cont.): Applicant Proposed Measures

APM Number	Description	Justification	Applicable Project Component		
			San Juan Capistrano Substation	Talega Substation	Transmission Lines
CUL-6	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 SCCIC or SCIC.	Ensure that potential impacts to cultural resources from unanticipated discovery are less than significant.	**X**	**X**	**X**
CUL-7	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.	Ensure that identified traditional locations or places that could be impacted by project components are appropriately monitored by tribal representatives.			**X**
CUL-8	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 with high paleontological resource sensitivity (i.e., Monterey, Santiago, and Capistrano Formations). A paleontological monitor is defined as an individual who has experience in the collection and salvage of fossil materials.	Ensure that any potential impacts from unanticipated discovery of fossils during construction activities are less than significant.			**X**
CUL-9	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. When 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.	Ensure that any potential impacts from discovery of fossils during construction activities are less than significant.			**X**

Table 3-18 (Cont.): Applicant Proposed Measures

APM Number	Description	Justification	Applicable Project Component		
			San Juan Capistrano Substation	Talega Substation	Transmission Lines
Geology, Soils, and Mineral Resources					
GEO-1	Conduct an Engineering-level Geotechnical Investigation for Liquefaction Potential and Implement Recommended Design Measures. A geologic hazard evaluation was conducted by URS in 2008 to evaluate the pole locations along the Proposed Project transmission line route for the presence of geologic hazards that may affect the new towers and poles The geologic hazard evaluation indicated the presence of geologic conditions potentially susceptible to liquefaction at the locations of proposed Pole Nos. 8, 9 and 10. Prior to construction, an engineering-level geotechnical investigation would be performed at these locations under the supervision of a California Certified Engineering Geologist or California licensed Geotechnical Engineer to further evaluate the liquefaction potential at each of these pole locations and to develop design measures to minimize the potential for damage to Proposed Project structures in the event of strong ground shaking. Recommendations of the geotechnical investigation would be incorporated into the final design for these structures. These recommendations would include augmented grading practices, expanded erosion control measures and deeper foundations.	Ensure that potential liquefaction hazards are accounted for during final design.			**X**
GEO-2	Conduct an Engineering-level Geotechnical Survey for Landslides and Implement Recommended Design Measures to Ensure Slope Stability is not Impacted and the Potential for Damage to Protect Structures is Minimized. A geologic hazard evaluation was conducted by URS in 2008 to evaluate the structure locations along the Proposed Project transmission line route for the presence of geologic hazards that may affect the new towers and poles. The geotechnical hazard evaluation identified areas with recent and ancient landslides along the Proposed Project transmission line route due to unstable slope conditions in portions of both the Capistrano and Monterey formations. Prior to construction, an engineering-level geotechnical investigation would be performed at each pole location along the transmission line route that is in or near a mapped landslide or other unstable slope condition. This investigation would be performed under the supervision of a California Certified Engineering Geologist or California licensed Geotechnical Engineer, and would identify protection measures to be designed and implemented to ensure that the Proposed Project does not materially increase slope stability risks and to minimize potential for damage to Proposed Project structures in the event of landslides. These recommendations would include augmented grading practices, expanded erosion control measures and deeper foundations.	Ensure that potential landslide hazards are accounted for during final design.			**X**
Hazards and Hazardous Materials					
HAZ-1	Prior to the start of earth disturbance activities at the upper yard portion of the existing Capistrano Substation site, a Phase II Environmental Site Assessment (soil sampling) would be performed and, if any contaminated soil is found to be present, contaminated soils would be managed, removed, transported, and disposed of in accordance with all applicable laws, ordinances and safety standards.	Ensure that potential soil contamination is identified so that any potential hazards are removed through adherence to applicable laws, regulations, and SDG&E standards.	**X**		

Table 3-18 (Cont.): Applicant Proposed Measures

APM Number	Description	Justification	Applicable Project Component		
			San Juan Capistrano Substation	Talega Substation	Transmission Lines
Noise					
NOISE-1	Any endeavors during the construction phase wherein nighttime and weekend activities are necessary (such as due to Caltrans transportation constraints for oversized/ overweight loads), will be limited to the extent feasible so that noise will not exceed the pertinent maximum noise level limits or the hourly L_{50} limits when measured at the nearest residential property. For example, to minimize potential noise disturbances during nighttime deliveries of transformers, the Applicant will make every reasonable effort to minimize the duration of trucking activities at the project site. This will entail pulling the delivery vehicle onto the project site, parking it overnight, and unloading/installing the item(s) during normal, daytime construction hours. If nighttime or weekend activities cannot be conducted to meet the city's noise standards, SDG&E will communicate the exception to the City of San Juan Capistrano in advance of conducting the work that may exceed the threshold(s). This APM is consistent with the conditions deemed acceptable by the CPUC for the similar situation at the Silvergate Transmission Substation Project.	Ensure that where nighttime construction is required that impacts are less than significant.	**X**	**X**	**X**
Public Services					
PS-1	Construction within existing public parks would not completely restrict access through the parks. 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.	Minimize potential direct impacts to existing parks and recreational areas during construction of the Proposed Project.			**X**
PS-2	All recreational facilities that are physically impacted during construction activities will be returned to an approximate pre-construction state, allowing for SDG&E operation and maintenance activities, following the completion of the Proposed Project. SDG&E will make replacements of any public damaged or removed equipment, facilities, and infrastructure, in a timely manner.	Ensure that any physically impacted to parks and recreational areas are restored following construction so that no permanent impacts result.			**X**
Transportation and Traffic					
TR-1	Construction generated traffic associated with the San Juan Capistrano Substation and construction of the 138kV getaways (new underground cable packages and new Pole Nos. 1a through 7a) would avoid the start and ending time for the Saddleback Valley Christian School and the JSerra Catholic High School. Workers would arrive at construction sites by 7:30 AM and would not leave prior to 3:30 PM.	Minimize potential traffic congestion impacts associated with construction-related traffic.	**X**		**X**

Table 3-18 (Cont.): Applicant Proposed Measures

APM Number	Description	Justification	Applicable Project Component		
			San Juan Capistrano Substation	Talega Substation	Transmission Lines
TR-2	Construction generated traffic associated with the San Juan Capistrano Substation and construction of the 138kV getaways (new underground cable packages and new Pole Nos. 1a through 7a) would avoid the SR-74 off ramp from I-5. Avoidance of the SR-74 and I-5 interchange would ensure that construction generated traffic would not exacerbate existing conditions on the stretch of road between the intersections of SR-74 and Rancho Viejo Road and SR-74 and Del Obispo.	Minimize potential traffic congestion impacts associated with construction-related traffic.	**X**		**X**
TR-3	SDG&E will coordinate with local emergency response agencies during all construction within existing roadways. Coordination with local emergency response agencies (such as Orange County Sheriff's Department and Orange County Fire Authority) would ensure that impacts to emergency access are less than significant.	Minimize potential impacts to emergency service during construction within existing roadways.			**X**

The remainder of this page is intentionally left blank.

THIS PAGE IS INTENDED TO BE LEFT BLANK

BACK OF TABLE 3-18

3.11 ELECTRIC AND MAGNETIC FIELDS SUMMARY

The following provides an overview of Electric and Magnetic Fields (EMF) information. The specific report for the proposed project can be found in Appendix 3-E, South Orange County Reliability Enhancement Electric and Magnetic Fields Studies.

3.11.1 Electrical Effects

This section describes potential effects from exposure to EMF associated with the proposed South Orange County Reliability Enhancement Project.

EMFs are present wherever electricity flows—around appliances and transmission lines, in offices, schools, and homes. Electric fields are invisible lines of force created by voltage and are shielded by most materials. Magnetic fields are invisible lines of force created by electric current, and magnetic fields are not shielded by most materials. These fields are low-energy, extremely low-frequency, and should not be confused with high-energy or ionizing radiation such as X-rays and gamma rays.

Some studies have reported a weak association between estimates of residential magnetic field exposure and childhood leukemia. These epidemiological (human statistical) studies have not shown that the exposure to magnetic fields from powerlines actually causes leukemia because other explanations for the association, such as study bias, cannot be ruled out. And virtually all controlled laboratory studies on animals, tissues and cells fail to support a causal association. Some studies on workers have also found associations between estimated magnetic field exposure and some forms of cancer and other disorders, but these results have been highly inconsistent.

3.11.2 Background

The transport of electricity is described in terms of both its voltage and current flow. Using these terms, the transport of electricity is analogous to the flow of water through a pipe. The pressure driving the water is the counterpart to the voltage on the powerline, and the amount of water flowing in the pipe is the counterpart to the amount of electric current on the line.

Electrical lines and equipment produce an electric field as a result of the voltage applied to their wiring. The strength of the electric field is expressed in volts per meter (V/m) or kilovolts per meter (kV/m). The electric field strength falls off sharply with distance from the source. Objects such as trees, houses, concrete and other building materials shield electric fields. Thus, even in proximity to powerlines or substations, the electric field in nearby residences is largely a result of internal sources; external sources of electric fields are effectively shielded from indoor environments.

The flow of current in electrical lines and equipment produces a magnetic field. The strength of the magnetic field is measured in units called Gauss (G) or Tesla (T). Because these units are much too large for expressing magnetic field intensities encountered in daily life, magnetic field intensities are most often expressed in milligauss (mG), which is one-thousandth of a Gauss, or microtesla (μT), which is one-millionth of a tesla. Ten mG is equal to 1.0 μT. The unit μT generally is used internationally and in technical literature. The field intensity varies with the amount of current flow. Like electric fields, the intensity of the magnetic field decreases as distance from the source increases. But unlike electric fields, magnetic fields are not shielded by buildings, trees, and most other objects.

Electrical transmission and distribution systems are not the only sources of magnetic fields. Within homes and workplaces, local sources of magnetic fields include building wiring and plumbing, electric blankets, electric stoves, computer terminals, bedside clocks, ceiling fans, and other appliances that people may use for prolonged periods. Indeed, some of the common sources of higher magnetic fields are appliances and electrical devices found within the home. The magnetic field levels from such sources in typical use can range up to thousands of mG or higher; however, the duration of exposure from many appliances is typically much shorter than that from other sources. Thus, exposure to both electric and magnetic fields occurs continuously and is not simply a function of living or working near a powerline or electrical facility. Exposure depends on the many sources and field strength present where a person lives, works, or otherwise spends time.

3.11.3 History

In the late 1960s and early 1970s, the possibility of adverse health effects resulting from exposures to electric fields received considerable attention. This attention was motivated by reports from the Soviet Union of various health complaints among utility workers in high-voltage switchyards. Subsequent research on electrical utility workers in Europe and North America failed to confirm the complaints; Soviet investigators later indicated that their concerns had been "overstated."

In the 1980s, interest shifted primarily to magnetic fields for two major reasons. First, Wertheimer and Leeper in 1979 published a paper reporting a statistical association between childhood cancer and the apparent current-carrying capacity of the powerlines near the study residences. Second, it was recognized that exposure to electric fields from outside sources is limited because of effective shielding by most materials. This was confirmed in studies that failed to find associations between the capacity of outside powerlines and electric fields levels within homes. The shift away from electric field research has been further justified by subsequent residential studies that fail to report an association between measured electric fields and cancer in either children or adults.

3.11.4 Current Research

To assess potential health risks from an environmental agent such as power frequency EMF, interdisciplinary groups of scientist must consider the results from epidemiological investigations and laboratory research on cells, tissues, and a variety of animal species.

3.11.4.1 <u>Epidemiology</u>

Epidemiology investigates the distribution, patterns, and potential causes of disease within human populations. The objective of epidemiology is to evaluate and measure the association between exposures to environmental factors (e.g., asbestos, benzene) and health outcomes (e.g., lung disease, leukemia).

Epidemiological studies look for associations between the exposure of a group of people to an agent (possible risk factor) and the occurrence of disease in that group. Epidemiology deals with people in their natural environments, so exposures cannot be controlled or limited to the factors being studied. Thus, epidemiology addresses associations with disease outcomes; generally, it does not establish whether a particular agent causes disease.

Some documented epidemiological studies conducted in community settings have reported weak associations between childhood cancer and estimates of exposure to magnetic fields. Other epidemiological studies, equally well-designed and well-conducted, have reported no associations between proximity to powerline sources of magnetic fields and cancer. Those studies reporting associations are not consistent with respect to cancer type. Two pooled analyses, which combined data from multiple studies, reported an association between rates of childhood leukemia and measured magnetic fields above three or four mG, but found little or no association with so-called "wire codes" (proximity and current-carrying capacity of nearby powerlines). In earlier individual studies, the opposite pattern seemed to predominate: "wire codes" showed a significant association, while measured fields did not.

Exposure assessment is a universal deficiency in the epidemiological literature. The ability of surrogate measures—such as wire codes, proximity, and current-carrying capacity of powerlines—to predict power-frequency magnetic field exposures is limited. In the occupational setting, some studies have reported weak associations between work in electrical occupations and some health outcomes such as leukemia or brain cancer, but the findings are inconsistent. And, in many occupational studies, exposure is inferred from job title classifications.

3.11.4.2 <u>Laboratory Studies</u>

A wide range of magnetic field intensities at extremely low frequency (ELF) exposures have been studied in the laboratory to attempt to elicit biological responses and identify the conditions and mechanisms under which they can be produced. No accepted biophysical mechanism currently exists that can readily explain how a cell could respond to low-intensity, low-frequency magnetic fields. Any imposed external electric and magnetic fields must compete with fundamental physical fluctuations (e.g., thermal noise) and endogenous background biological fields (e.g., those generated by the normal activity of the heart, brain, skeletal muscle, and smooth muscle in the gut and airways). Most laboratory studies have involved exposures hundreds to thousands of times higher than those typically found in residential backgrounds and some occupational settings. From several thousand studies in the literature, relatively few biological responses are confirmed to occur with exposure to time-varying magnetic fields at intensities of less than 1,000 mG, and those that have been confirmed have not been linked to adverse health effects. Although there is considerable interest in determining whether there is any biological basis for a cause-and-effect relationship between exposure to power frequency magnetic fields and cancer, the available laboratory data have not provided substantive support for this hypothesis.

3.11.4.3 <u>Research Conclusions</u>

Nationally and internationally recognized scientific organizations and independent regulatory advisory groups have been organized to conduct scientific reviews of the EMF research and peer reviewed publications. Their ability to assemble experts from a variety of disciplines to review the full body of research on this complex issue gives their reports credibility. Without exception, these major reviews have reported that the body of data, as large as it is, does not demonstrate that exposure to power-frequency magnetic fields causes cancer or poses other health risks, although the possibility cannot be dismissed. Because of the uncertainty, most reviews recommend further research, and, appropriately, research is ongoing worldwide. The weakness of the reported epidemiological associations, the lack of consistency among studies, and the severe limitations in exposure assessment in the epidemiological studies, together with the lack of support from laboratory research, were key considerations in the findings of the scientific reviews. Examples of these advisory groups and summaries of their findings are provided below.

3.11.4.4 <u>International Reviews</u>

In 2007, the World Health Organization (WHO) released its review of EMF research, *Extremely Low Frequency Fields Environmental Health Criteria (EHC) Monograph No. 238*. In brief, the review updates and affirms the findings of the International Agency for Research on Cancer (IARC) in its 2002 classification of EMF as a "possible human carcinogen" with respect to childhood leukemia. The WHO document also affirms IARC's previous finding that evidence for all other childhood cancers and all adult cancers is "inadequate." Evidence for all other non-cancer diseases studied also is classified "inadequate."

The EHC reports that epidemiology (human statistical) studies show a "consistent" association between childhood leukemia and various surrogate measures of long-term residential exposure to low-level power frequency magnetic fields. This epidemiological evidence is classified as "limited" because other explanations, such as study bias, cannot be ruled out. And, "virtually all" controlled laboratory studies on animals, tissues and cells fail to support a causal association.

While rejecting exposure limits for ordinary residential environments, the WHO does recommend "precautionary approaches" to reduce exposure if it can be done without compromise to the "essential health, social and economic benefits of electric power." The EHC states,

> "*Given the weakness of the evidence for a link between exposure to ELF ['extremely low frequency' includes power frequency] magnetic fields and childhood leukemia and the limited potential impact on public health, the benefits of exposure reduction on health are unclear and thus the cost of reducing exposure should be very low." More specifically, the EHC recommends that: "Changes to engineering practice to reduce EMF exposure from equipment or devices should be considered, provided that they yield other additional benefits, such as greater safety, or involve little or no cost."*

In 2004, the National Radiological Protection Board (NRPB) in the United Kingdom published its *Review of the Scientific Evidence for Limiting Exposure to Electromagnetic Fields (0-300GHz)*. The report states:

> *"It is concluded that currently the results of these [epidemiological and experimental] studies on EMF's and health, taken individually or as collectively reviewed by expert groups, are insufficient either to make a conclusive judgment*

on causality or to quantify appropriate exposure restrictions."

The Health Council of the Netherlands released an Annual Update to the Dutch government in January 2004 on "the possible health effects of ELF electromagnetic fields."

> *The (Health Council of the Netherlands) Committee, like the IARC itself, points out that there is no evidence to support the existence of a causal relationship here. Nor has research yet uncovered any evidence that a causal relationship might exist. Nevertheless, new suggestions for possible mechanisms … are regularly put forward. However, none of these hypotheses can presently explain how ELF magnetic fields exposure might lead to cancer.*

The IARC, a part of the WHO, conducted a major EMF review. The organization's Fact Sheet No. 263 on that review states:

> In *June 2001, an expert scientific working group of IARC reviewed studies related to the carcinogenicity of static and ELF electric and magnetic fields. Using the standard IARC classification that weighs human, animal and laboratory evidence, ELF magnetic fields were classified as possibly carcinogenic to humans based on epidemiological studies of childhood leukemia. Evidence for all other cancer in children and adults, as well as other types of exposures (i.e., static fields and ELF electric fields) was considered not classifiable either due to insufficient or inconsistent scientific information.*
>
> *"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 for carcinogenicity in experimental animals.*
>
> *This classification is the weakest of three categories ("is carcinogenic to humans," "probably carcinogenic to humans," and "possibly carcinogenic to humans") used by IARC to classify potential carcinogens based on published scientific evidence.*
>
> *Examples of "Possibly Carcinogenic to Humans" are: Coffee, styrene, gasoline engine exhaust, and welding fumes.*

In March 2001, an independent advisory group to the NRPB in the United Kingdom published a wide-ranging and thorough review of scientific research on EMF. The review covers work published since the NRPB's first major review of the topic in 1992 and supplementary reports in 1993 and 1994. The report concludes that the possibility of an effect cannot be dismissed:

> *Laboratory experiments have provided no good evidence that extremely low frequency electromagnetic fields are capable of producing cancer, nor do human epidemiological studies suggest that they cause cancer in general. There is, however, some epidemiological evidence that prolonged exposure to higher levels of power frequency magnetic fields is associated with a small risk of leukemia in children. In practice, such levels of exposure are seldom encountered by the general public in the UK. In the absence of clear evidence of a carcinogenic effect in adults, or of a plausible explanation from experiments on animals or*

isolated cells, the epidemiological evidence is currently not strong enough to justify a firm conclusion that such fields cause leukemia in children. Unless, however, further research indicates that the finding is due to chance or some currently unrecognized artifact, the possibility remains that intense and prolonged exposures to magnetic fields can increase the risk of leukemia in children.

3.11.5 Federal Electric and Magnetic Fields Program

In 1992, the United States Congress authorized the Electric and Magnetic Fields Research and Public Information Dissemination Program (EMF-RAPID Program) in the Energy Policy Act (PL 102486, Section 2118). Congress instructed the National Institute of Environmental Health Sciences (NIEHS), National Institutes of Health and the United States Department of Energy (DOE) to direct and manage a program of research and analysis aimed at providing scientific evidence to clarify the potential for health risk from exposure to extremely low-frequency electric and magnetic fields (ELF-EMF). The EMF-RAPID Program had three basic components: 1) a program focusing on health effects research, 2) information compilation and public outreach, and 3) a health assessment for evaluation of any potential hazards arising from exposure to ELF-EMF. This program was completed in December 1998.

In June 1999, NIEHS published its report, *Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields,* with its findings and conclusions from this program of research. The Executive Summary of the report concluded that:

"The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak … The NIEHS concludes the ELF-EMF exposure cannot be recognized an entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern." Panels charged with recommending exposure limits for electric and/or magnetic fields have concluded that there are no meaningful experimental data (e.g., no dose-response information is available) on which to base standards or limits to which the public is exposed.

In 1999, the National Academy of Sciences published a report *Research on Power-Frequency Fields Completed Under the Energy Policy Act of 1992*. In response to a request from the DOE, following the directives of the Energy Policy Act of 1992, the National Research Council (NRC) established a committee of scientists and engineers to review the activities conducted under the EMF-RAPID program.

The 1999 NRC report concluded that:

An earlier Research Council assessment of the available body of information on biologic effects of power-frequency magnetic fields (NRC 1997) led to the conclusion "that the current body of evidence does not show that exposure to these fields presents a human health hazard. Specifically, no conclusive and consistent evidence shows that exposures to residential electric and magnetic fields produce cancer, adverse neurobehavioral effects, or reproductive and developmental effects". The new, largely unpublished contributions of the EMF-

> *RAPID program are consistent with that conclusion. We conclude that no finding from the EMF-RAPID program alters the conclusions of the previous NRC review on the Possible Effects of Electromagnetic Fields on Biologic Systems (NRC 1997).*

3.11.6 California Electric and Magnetic Fields Policy

In January 1991, the CPUC issued an Order Instituting Investigation I.91-01-012 to develop policies and procedures for addressing potential health effect of magnetic fields from utility facilities. The CPUC formed the California Consensus Group (CCG), a committee of 17 stakeholders representing diverse interests and perspectives, to provide guidance on interim EMF measures the CPUC might adopt while waiting for resolution of scientific uncertainties.

In March 1992, the CCG issued its report. In part, the report recommended that the CPUC authorize utilities to implement magnetic field reduction techniques if those techniques could be implemented at little or no cost. In November 1993, the CPUC issued Decision D.93-11-013 adopting an interim policy regarding EMF. The CPUC found that the scientific community had not concluded that an EMF health hazard actually exists.

Further, the CPUC stated, "It is not appropriate to adopt any specific numerical standard in association with EMFs (sic) until we have a firm scientific basis for adopting any particular value." However, "public concern and scientific uncertainty remain regarding the potential health effects of EMF exposure." In response, California's electric utilities were authorized to implement no-cost and low-cost field management techniques to reduce EMF levels from new and upgraded electrical facilities if a noticeable reduction could be achieved.

The CPUC's Commission Advisory and Compliance Division (CACD) set and chaired informational EMF Design Guideline workshops to incorporate concepts and criteria addressed in the Order and to share information on field reduction options. SDG&E's *EMF Design Guidelines for Electrical Facilities* describe engineering techniques for reducing exposure to magnetic fields created by its electrical facilities.

The CPUC acknowledged in its Order that the feasibility and cost of implementing specific magnetic field reduction techniques vary among utility systems and from project to project. Therefore, the CPUC provided that the manner in which individual utilities apply design guidelines must be determined within the constraints of each new construction project.

The CPUC charged the California Department of Health Services (CDHS) with managing the California EMF Program. As a key work product of that program, the CDHS EMF Risk Evaluation report was issued in October, 2002. The report was written by three CDHS staff scientists whose opinions were expressed in terms of the degree to which each "believed" EMF was likely to cause various health effects. They report that "[t]o one degree or another all three of the CDHS 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." The three epidemiologists report that "[t]hey strongly believe that EMFs are not universal carcinogens…" and that "[t]o 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 a sensitivity to EMFs."

The CDHS report is consistent with other agency reviews in that it concludes that an EMF health risk has not been scientifically established and that additional research is necessary to resolve the question. However, the CDHS differs from all other reviewing agencies in the increased likelihood it places on the existence of an EMF health risk for some diseases, and the CDHS report acknowledges this disparity. Other agencies find EMF health risks 'possible' but not 'probable.' Agencies that have expressed an opinion as to the strength of evidence for a risk have neither found EMF risks to be likely, nor the evidence to be strong.

> *In January, 2006, the CPUC issued its Decision D.06-01-042, Opinion On Commission Policies Addressing Electromagnetic Fields Emanating From Regulated Utility Facilities. The decision concludes that "a direct link between exposure to EMF and human health effects has yet to be proven despite numerous studies including a study ordered by this Commission and conducted by [C]DHS."*

The Decision also affirms the CPUC's November 1993 decision on "low-cost/no-cost Policy" to reduce EMF levels from new utility transmission and substation projects. The CPUC's retained cost guidance, stating, "[a]s a measure of low-cost mitigation, we continue to use the benchmark of 4% of transmission and substation project costs for EMF mitigation, and combine linked transmission and substation projects in the calculation of the 4% benchmark." Finally, the ruling "adopted rules and policies to improve utility design guidelines for reducing EMF and called for a utility workshop to implement these policies and standardize design guidelines."

3.11.7 Electric Magnetic Field Summary

After several decades of study regarding potential public health risks from exposure to power line EMF, research results remain inconclusive. Several national and international panels have conducted reviews of data from multiple studies and state that there is not sufficient evidence to conclude that EMF causes cancer or other adverse health effects. The IARC and the CDHS both classified EMF as a possible carcinogen. The WHO review, Environmental Health Criteria Monograph 238, affirms IARC's classification of EMF as a possible carcinogen regarding childhood leukemia and agrees that evidence for all other childhood cancers and all adult cancers is "inadequate." And the WHO classified evidence "inadequate" for all non-cancer diseases studied. Neither California nor the United States Federal government has developed EMF exposure guidelines, standards or regulations related to EMF levels from power lines. The WHO Environmental Health Criteria Monograph 238 recommends that: "changes to engineering practice to reduce EMF exposure from equipment or devices should be considered, provided that they yield other additional benefits, such as greater safety, or involve little or no cost." CPUC Decisions D.93-11-013 and D.06-01-042 implemented rules and policies for low-cost and no-cost magnetic field reduction measures, and this project incorporates measures consistent with these decisions.

3.11.8 California Environmental Quality Act

Given the uncertainty of EMF effects and the inability of scientific investigations to identify any unsafe level or component of EMF exposure, potential EMF impacts are appropriately addressed as speculative in accordance with the *CEQA Guidelines*, Section 15145:

"If after thorough investigation a particular impact is found to be too speculative for evaluation, the conclusion shall be noted, and the discussion terminated."

3.12 REQUIRED APPROVALS

The CPUC is the lead California agency for the Proposed Project. SDG&E must comply with the CPUC's G.O. No. 131-D, which contains the permitting requirements for the construction of the Proposed Project. This PEA is being prepared as part of an application to obtain a CPCN for the Proposed Project.

In addition to the CPCN, SDG&E will be required to obtain other approvals from federal, state and local agencies to implement the Proposed Project. Table 3-19, Anticipated Permit, Approval, and Consultation Requirements identifies other permits, approvals, and licenses that SDG&E anticipates may be required for the Proposed Project.

The remainder of this page is intentionally left blank.

Table 3-19: Anticipated Permit, Approval, and Consultation Requirements

Permit/Approval/Consultation	Agency	Jurisdiction/Purpose
Federal Agencies		
National Environmental Policy Act (NEPA) Compliance	Department of the Navy	The Department of the Navy serves as the Lead NEPA agency for ROW modification on Camp Pendleton
Section 106 Review, National Historic Preservation Act	Advisory Council on Historic Preservation	Construction, operation, and maintenance on land that may affect cultural or historic resources
State Agencies		
CPCN	CPUC	Overall project approval and CEQA review
NPDES–Construction Stormwater Permit	RWQCB	Stormwater discharges associated with construction activities disturbing more than one acre of land
Encroachment Permit	Caltrans	Construction, operation, and maintenance within, under, or over state highway ROW
State Historic Preservation Officer (SHPO) Consultation	SHPO	Cultural resources management (if appropriate)

The remainder of this page is intentionally left blank.

Table 3-19 (cont.): Anticipated Permit, Approval, and Consultation Requirements

Permit/Approval/Consultation	Agency	Jurisdiction/Purpose
Local Agencies		
Demolition Permit	City of San Juan Capistrano (ministerial)	Demolition of the existing abandoned utility structure.
Grading Permit	City of San Juan Capistrano (ministerial)	On-site grading activities at the Capistrano Substation.
Traffic Control Plan	County of Orange San Juan Capistrano and San Clemente	Construction within, under or over city or county road ROW.
Right of Way Encroachment	Southern California Regional Rail Authority	Construction within and under (jack-and-bore) railway ROW.
Building (Substation Perimeter Wall) Permit	City of San Juan Capistrano (ministerial)	Substation perimeter wall construction.
Street Improvements	City of San Juan Capistrano (ministerial)	Sidewalk and curb improvements.

The remainder of this page is intentionally left blank.

3.13 REFERENCES

Ahlbom, A. and Day, N. et al. 2000. “A pooled analysis of magnetic fields and childhood leukemia.” British Journal of Cancer (83):692-698.

American Cancer Society. 1996. *Electromagnetic Field Exposure and Cancer: A Review of Epidemiologic Evidence*.

American Conference of Governmental and Industrial Hygienists. 1991. *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*.

American Medical Association. 1995. *Effects of Electric and Magnetic Fields, Report 7 of the Council of Scientific Affairs*.

American Physical Society. 1995. *Background Paper on Powerline Fields and Public Health.*

California Department of Health Services. 2002. *An Evaluation of the Possible Risks From Electric and Magnetic Fields (EMFs) From Power Lines, Internal Wiring, Electrical Occupations and Appliances.*

California Public Utilities Commission/California Department of Health Services. 1989. *Potential Health Effect of Electric and Magnetic Fields From Electric Power Facilities*.

California Public Utilities Commission. 1993. *Order Instituting Investigation on the Commission's own motion to develop policies and procedures for addressing the potential health effects of electric and magnetic fields of utility facilities.*

California Public Utilities Commission. 2006. *Opinion On Commission Policies Addressing Electromagnetic Fields Emanating From Regulated Utility Facilities.*

Connecticut Academy of Science and Engineering. 1992. *Electromagnetic Field Health Effects*.

Danish Ministry of Health. 1993. *Report on the Risk of Cancer in Children Living in Homes Exposed to 50 Hz Magnetic Fields From High Voltage Lines*.

Health Council of the Netherlands. 2001. *Electromagnetic Fields, Annual Update 2001*.

Institut National de la Santé et de la Recherche Médicale. 1993. *Synthesis of the Literature on Health Effects From Very Low Frequency Electric and Magnetic Fields*.

International Agency for Research on Cancer. 2002. *Static and Extremely Low Frequency Electric and Magnetic Fields*, Vol. 80.

SDG&E (San Diego Gas & Electric). December 15, 1995. *Subregional Natural Community Conservation Plan*.

San Diego Gas & Electric Company. July, 2009. *Electric Standard Practice No. 113.1 – Wildland Fire Prevention and Fire Safety*.