B. Description of Proposed Project

B.1 Introduction

Section B provides a detailed description of the construction and operation of the Project, as proposed by Southern California Edison (SCE). This introduction provides a summary of the proposed Project and its main components. Section B.2 (Proposed Facilities and Modifications) describes the Project components in detail, including the proposed transmission facilities, substation facilities, and information technology facilities. Section B.3 provides a discussion of construction activities associated with these aspects of the proposed Project. Finally, Section B.4 provides a description of the operations and maintenance activities associated with the proposed Project.

The proposed Project includes Segments 2 and 3 of the Antelope Transmission Project, which were addressed together in SCE's application for a Certificate of Public Convenience and Necessity (CPCN) submitted to the CPUC on December 9, 2004 (Application No. 04-12-008). The proposed Project would involve construction of a new transmission line and related infrastructure between the Tehachapi Wind Resource Area, located in southern Kern County, California, and SCE's existing Vincent Substation, located near Acton in unincorporated Los Angeles County, California (see Figure B.1-1). The proposed Project would connect through SCE's existing Antelope Substation in the City of Lancaster, with Segment 2 consisting of the portion of the proposed Project south of Antelope Substation and Segment 3 consisting of the portion of the Project north of Antelope Substation. The proposed Project would consist of the following major components, as shown in Figure B.1-1 and in detail in the Appendix 4 maps:

- Substation Two, a ~~500/~~220/66-kV substation located near SCE's existing Monolith Substation, northwest of ~~the Western Area Power Administration's~~ SCE's existing Cal Cement Substation in the Tehachapi Wind Resource Area, which has been designated by Kern County as the Eastern Wind Resource Area (Segment 3).
- A 220-kV transmission line from Substation Two, traveling 9.6 miles southeast to Substation One in the Tehachapi Wind Resource Area of southern Kern County (Segment 3). This portion of the proposed Project would require 1.7 miles of entirely new ROW and 7.9 miles of adjacent ROW.
- Substation One, a 500/220/66-kV substation located near Cal Cement Substation in the Tehachapi Wind Resource Area (Segment 3A).
- A 500-kV transmission line, initially energized to 220 kV, from Substation One in the Tehachapi Wind Resource Area, traveling 25.6 miles south to the existing Antelope Substation in the City of Lancaster (Segment 3). This portion of the proposed Project would require 23.1 miles of entirely new right of way (ROW) and 2.5 miles of adjacent ROW.
- A 500-kV transmission line from Antelope Substation in the City of Lancaster, traveling approximately 21.0 miles south towards the Vincent Substation near Acton in unincorporated Los Angeles County (Segment 2), initially energized to 220 kV. Two routing options (Options A and B) were also considered for this portion of the alignment. These routing options are discussed in detail in Section B.2. The 500-kV portion (energized at 220 kV) would require approximately 2.5 miles of entirely new ROW and 18.5 miles of adjacent ROW.
- A 0.6-mile 220-kV transmission line providing electrical interconnection of the 500-kV line (energized at 220 kV) to Vincent Substation (Segment 2). The 220-kV line connecting to Vincent Substation would be constructed within an existing, adjacent ROW.
- Installation of associated telecommunication infrastructure (Segments 2 and 3).
- Establishment of 27.3 miles of new utility ROW and 29.5 miles of adjacent utility ROW.

As described, Segment 2 includes the portion of the proposed Project located south of Antelope Substation and Segment 3 includes the portion located north of Antelope Substation. In order to more specifically distinguish different aspects of the proposed Project, the northern portion of Segment 3, which includes Mile S3-0.0 to Mile S3-9.6 (including Substation Two), is referred to as Segment 3B. Segment 3B is a proposed 220-kV line. The southern portion of Segment 3, from Mile S3-9.6 to Mile S3-35.2, is referred to as Segment 3A (including Substation One). Segment 3A is a proposed 500-kV line.

The major components of the proposed Project are summarized below in Table B.1-1 and further described in the following sections.

Table B.1-1. Summary of Proposed Project Components
Overall Project Construction
• Proposed construction duration of 16 months (estimated to begin March 2008) • Transmission facility construction generally scheduled for Monday through Friday, 6:30 a.m. to 5:00 p.m. • Substation construction generally scheduled for Monday through Friday, 6:30 a.m. to 5:00 p.m.; extended hours would require a variance • Workforce ranging from approximately 50 to 300 persons, with daily average workforce of approximately 130 persons • Disturbance of approximately 311.8 acres, with restoration of approximately147.2 acres, resulting in permanent land disturbance of 164.6 acres
Transmission Facility Construction
• Use of one existing primary marshalling yard adjacent to Antelope Substation (to be established during construction of the Antelope Transmission Project Segment 1) (Analyzed in the Antelope-Pardee Transmission Project Draft EIR/EIS, July 2006, Clearinghouse No. 2005061161) • Establishment of secondary marshalling yards located near construction sites • Grading of new and existing access and spur roads, resulting in a total of 68.25 acres of permanent land disturbance • Demolition and relocation of 4.4 miles of 66-kV subtransmission line immediately south of Antelope Substation • Construction of 390 new transmission towers along the length of the proposed Project route, including: 63 single-circuit 220-kV lattice steel towers (LSTs), 150 single-circuit 500-kV LSTs, 79 single-circuit 500-kV tubular steel poles (TSPs), 2 double-circuit ~~500~~220-kV TSPs, and 96 double-circuit 66-kV TSPs • Wire installation onto the lattice steel towers and tubular steel poles using one to two small helicopters • Establishment of approximately 47 new pulling locations, 44 new tensioner locations, and 24 new splicing locations
Segment 3B (Mile S3-0.0 - Mile S3-9.6)
• Initiates at Substation Two and terminates at Substation One • Includes 9.6 miles of new 220-kV transmission line and infrastructure • Constructed within 7.9 miles of adjacent ROW (160-feet wide) and 1.7 miles of entirely new ROW (160 feet wide) • Approximately 57 new 220-kV LSTs would be required • Approximately 13 new pulling locations, 14 tensioner locations, and 6 new splicing locations would be required
Segment 3A (Mile S3-9.6 - Mile S3-35.2)

• Initiates at Substation One and terminates at Antelope Substation
• Includes 25.6 miles of new 500-kV transmission line and infrastructure
• Constructed within 2.4 miles of adjacent ROW (180 feet wide) and 23.2 miles of entirely new ROW (200 feet wide)
• Approximately 123 new transmission towers would be required, including:
  . 44 single-circuit 500-kV LSTs (Mile S3-9.6 to S3-16.3, Mile S3-22.1 to S3-23.2, Mile S3-33.4 to S3-35.2)
  . 79 single-circuit 500-kV TSPs (Mile S3-16.3 to S3-22.1, Mile S3-23.2 to S3-33.4)
• Approximately 15 new pulling locations, 10 tensioner locations, and 9 new splicing locations would be required

Table B.1-1. Summary of Proposed Project Components
Segment 2 (Mile S2-0.0 - Mile S2-21.6)
• Initiates at Antelope Substation and terminates at Vincent Substation • Includes 21.0 miles of new 500-kV transmission line and 0.6 miles of new 220-kV transmission line and associated infrastructure for each • Constructed within 19.1 miles of adjacent ROW (180 feet wide) and 2.5 miles of entirely new ROW (200 feet wide) • Approximately 210 new transmission towers would be required, including: . 2 double-circuit 220-kV TSPs (Mile S2-0.0 to Mile S2-0.2) . 96 double-circuit 66-kV TSPs (see Subtransmission Line Relocation) . 106 single-circuit 500-kV LSTs (Mile S2-0.2 to Mile S2-21.0) . 6 single-circuit 220-kV LSTs (Mile S2-21.0 to Mile S2-21.6) • Approximately 19 new pulling locations, 20 tensioner locations, and 9 new splicing locations would be required
Subtransmission Line Relocation (Mile S2-0.0 - Mile S2-4.4)
• Relocation of 4.4 miles of 66-kV subtransmission line along Segment 2 would include: . Removal and disposal of 96 double-circuit wood 66-kV line structures . Construction of approximately 96 75-foot-tall, light-weight, direct-buried TSPs, 180 feet west of and parallel to existing alignment of the wood structures
Substation Two (Mile S3-0.0)
• The enclosed site area for this new substation facility would be 1,100 feet by 800 feet, or 20.2 acres • Total land disturbance, including grading and access roads, would be approximately 28.3 acres • A 450-foot by 150-foot (1.5-acre) area within the substation boundaries would be initially equipped with the following: . One one-position bus structure . Two line dead-end structures . One 220-kV circuit breaker . Four 220-kV disconnect switches . Three coupling capacitor voltage transformers (CCVTs) . One new Mechanical Electrical Equipment Room (MEER) . New protective relaying equipment
Substation One (Mile S3-9.6)
• The enclosed site area for this new substation facility would be 1,800 feet by 1,300 feet, or 53.7 acres • The total land disturbance, including grading and access roads, would be approximately 62.9 acres • A 400-foot by 200-foot (1.8-acre) area within the substation boundaries would be initially equipped with the following: . One four-position bus structure . Three line dead-end structures . Four 220-kV disconnect switches
Antelope Substation (Mile S2-0.0)
• Upgrade of 220-kV Antelope Substation Line Position No. 6 to 3000 ampere (A) rating for termination of Segment 3A, which would include: . Replace three existing 1033 kcmil tie-downs with new 2B-1590 kcmil aluminum conductor . steel reinforced (ACSR) conductors . Replace two existing 1200A rated disconnect switches with new 3000A rated switches . Replace two existing disconnect switch support structures and foundations with new facilities . Replace all existing 1033 kcmil ACSR conductors (approximately 150 feet) with new 2B-1590 kcmil ACSR (approximately 300 feet) . Leave the three existing CCVTs in place and re-connect to new conductors . Remove the existing wave trap and line tuner . Install all required line protective relays for the new Substation One 500-kV transmission line on existing Line Position No. 6 (Control Room) • Upgrade of Antelope Substation 220-kV switchyard for initiation of Segment 2 at Line Position No. 11, which is included in the construction of Antelope Transmission Project Segment 1 and includes: . Three 60- foot tie-downs with 2B-1590 kcmil conductors per phase each . Three 220-kV capacitor voltage transformers

Table B.1-1. Summary of Proposed Project Components
▪ Two 220-kV 3000A 40 kA circuit breakers and foundations ▪ Four 220-kV group operated, horizontally mounted disconnect switches with support structures and foundations, one equipped with grounding attachments ▪ Three 200-foot segments of 2B-1590 kcmil conductors; total: 600 feet
Vincent Substation (Mile S2-21.6)
• Upgrade of 220-kV Vincent Substation Line Position No. 3 (and 220-kV switchyard) to accommodate the termination of Segment 2, which would include: ▪ One 60-foot-high by 45-foot-wide line dead-end structure and foundations ▪ Three 60- foot tie-downs with 2B-1590 kcmil conductors per phase each ▪ Three 220-kV capacitor voltage transformers ▪ One 220-kV 3000A 40 kA circuit breakers and foundations ▪ Two 220-kV group operated, horizontally mounted disconnect switches with support structures and foundations; one equipped with grounding attachments ▪ Three 100-foot segments of 2B-1590 kcmil conductors; total: 600 feet ▪ Removal of fifteen existing 220-kV bus supports and corresponding steel pedestals and foundations ▪ Install all required line protective relays for the new Antelope 500-kV transmission line on existing Line Position No. 3 (Control Room)
Information Technology Facilities
• Construction of two telecommunication paths along the entire route: (1) Primary path using existing SCE infrastructure; (2) Secondary path provided by optical ground wire (OPGW) installed on all of the new transmission lines • Microwave Facilities include installation of microwave antennas on new towers as follows: ▪ Antelope Substation: 80-ft tower replaced with 120-ft tower ▪ Oak Peak Communication Site: 50-ft tower replaced with 120-ft tower ▪ Substation One: New 100-ft tower ▪ Substation Two: New 100-ft tower

Source: SCE, 2005. Note: The alignment and total number of lattice steel towers for the proposed Project is representative of the data known as of September 2005. Project details are subject to change as the design is finalized.

As part of the proposed Project, SCE presented various measures, referred to as Applicant-Proposed Measures or APMs, in its Proponent's Environmental Assessment (PEA) to reduce the environmental impacts of the Project. These measures are considered part of the proposed Project and it is assumed that they would be implemented as described by SCE. APMs are presented, as applicable, for each environmental issue area in Section C of this EIR prior to each issue area impact analysis.

B.2 Proposed Facilities and Modifications

The proposed Project would include the installation of 9.6 miles of 220-kV transmission line in the Tehachapi area, 46.6 miles of 500-kV transmission line from the Tehachapi area to Vincent Substation, connecting through Antelope Substation in Lancaster, and approximately 0.6 mile of 220-kV transmission line connecting to Vincent Substation (see Figure B.2-1 and Appendix 4 for detailed route maps). In total, the proposed transmission lines would be 56.8 miles long. The proposed Project also includes construction of two substation facilities in the Tehachapi Wind Resource Area (Substation One and Substation Two), as well as modifications to the existing Antelope and Vincent Substations. New or adjacent ROW would be required along the entire length of the 56.8-mile route.

Figure Links

B.2.1 Proposed Transmission Facilities

The proposed transmission facilities include new 220-kV and 500-kV transmission lines (consisting of new towers and conductor), relocation of double-circuit 66-kV subtransmission lines south of Antelope Substation, construction of two new substation facilities, modifications to both Antelope Substation and Vincent Substation, and installation of associated telecommunications infrastructure.

Transmission Infrastructure

SCE proposes to construct a new transmission line between new Substation Two and new Substation One (Segment 3B) consisting of 220-kV single-circuit LSTs (see Figure B.2-2); between new Substation One and the existing Antelope Substation (Segment 3A) consisting of 500-kV single-circuit LSTs (see Figure B.2-2) and 500-kV single-circuit TSPs (see Figure B.2-3); and between the existing Antelope and Vincent Substations (Segment 2) consisting of 220-kV double-circuit TSPs (see Figure B.2-3), 500-kV single-circuit LSTs (see Figure B.2-2), and 220-kV single-circuit LSTs (see Figure B.2-2). The relocated 66-kV subtransmission line south of Antelope Substation would be replaced with 66-kV ~~single~~double-circuit TSPs (see Figure B.2-3). Below is a detailed description of the route for the proposed transmission infrastructure.

Segment 3B: Mile S3-0.0 (Substation Two) to Mile S3-9.6 (Substation One)

A new 220-kV transmission line would exit Substation Two at Mile S3-0.0 and travel south for approximately 4.2 miles and then east for approximately one mile, parallel to the existing Cal Cement-Monolith-Windparks 66-kV subtransmission line (see Figure B.2-4; note: balance of figures are located at the end of this section). The new transmission line would continue east for approximately 2.2 miles parallel to the existing Cal Cement-Monolith-Windparks 66-kV subtransmission line and the Cal Cement-Goldtown-Monolith-Windlands 66-kV subtransmission line (see Figure B.2-5). At this point, the Project would head south towards the existing Cal Cement Substation parallel to the Cal Cement-Monolith-Rosamond-Windfarm 66-kV subtransmission line, the Cal Cement-Goldtown-Monolith-Windland 66-kV subtransmission line, and the Cal-Cement-Monolith-Windpark 66-kV line (see Figure B.2-6). Just before Mile S3-7.9, the new 220-kV transmission line would turn east, cross over Oak Creek Road and the existing 66-kV transmission corridor, and continue along the south side of Oak Creek Road paralleling the existing private Sagebrush-Skyriver 220-kV transmission line (see Figure B.2-7). After crossing 90th Street at Mile S3-9.0 the Project would continue east and then south for 0.1 miles, connecting to Substation One at Mile S3-9.6 (see Figure B.2-8).

From Mile S3-0.0 to Mile S3-7.9 the proposed Project would be built in a 160-foot-wide ROW adjacent to an existing ROW and from Mile S3-7.9 to Mile S3-9.6 within a new 160-foot-wide ROW. The proposed 220-kV transmission line would utilize four-legged single-circuit 220-kV lattice steel towers (LSTs). In areas with an elevation greater then 3,000 feet, SCE is required to use LSTs to design structures for ice-loading, in accordance with CPUC General Order 95 (SCE, 2005). Approximately 57 LSTs would be constructed of dull galvanized steel. The towers would range in heights between 70 feet and 115 feet. Each tower would be constructed on four drilled pier concrete footings, the size of which would depend on topography, tower height, span lengths, and soil properties. A typical footing would have an above-ground projection of approximately 3 feet.

Figure Links

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Segment 3A: Mile S3-9.6 (Substation One) to Mile S3-35.2 (Antelope Substation)

The new 500-kV transmission line would exit Substation One at Mile S3-9.6 and travel south to Mile S3-10.1, turning southwest for approximately 2.4 miles to Mile S3-12.5 of the proposed route. At this point the 500-kV transmission line would turn south and run parallel and west of 103rd Street to Mile S3-16.3 (see Figure B.2-9). From Mile S3-16.3 to Mile S3-22.0 the transmission line would switch from LSTs to TSPs (see Figure B.2-10). This is because LSTs are no longer required at elevations below 3,000 feet and TSPs tend to be preferable in agricultural areas due to their typically smaller footprint (with respect to temporary impacts during construction). In areas where TSPs are installed, LSTs would still be used at points of inflection (PIs) and at points where a dead-end structure would be required (SCE, 2006). A dead-end tower differs from a suspension tower in that it is built to be stronger, often has a wider base, and often has stronger insulator strings. Dead-end towers are used where a transmission line actually ends; where a transmission line turns at a large angle; on each side of a major crossing, such as a large river, highway, or large valley; or at intervals, even if no other reason exists.

At Mile S3-22.0, the new 500-kV transmission line would cross the existing LADWP utility easement, which contains the LADWP Sylmar-Celilo 1000-kV DC transmission line and the Owens Gorge-Rinaldi 220-kV transmission line. Once on the south side of the LADWP easement, the proposed Project would turn southwest and run parallel to the LADWP corridor for slightly more than one mile, from Mile S3-22.1 to Mile S3-23.2 (see Figure B.2-11). The new transmission line would then turn south and run parallel and west of 107th Street for approximately 2.3 miles, then turn south-southeast for about 0.5 miles before turning back south to align itself on the west side of 105th Street for the next 7.4 miles (see Figure B.2-12). At approximately Mile S3-24.5, the proposed line would cross the existing (privately-owned) Sagebrush 200-kV transmission line. The proposed Project would cross from Kern County into Los Angeles County at Mile S3-25.5, approximately 16 miles south of Substation One and 9.6 miles north of Antelope Substation.

At Mile S3-33.4, the proposed Project would again meet the privately-owned Sagebrush 220-kV transmission line, as well as the Midway-Vincent No. 3 500-kV transmission line and the Antelope-Magunden No. 1 and No. 2 220-kV transmission lines. At this point, the proposed Project would turn southeast and run parallel to the existing transmission lines for 0.2 miles, from Mile S3-33.4 to Mile S3-33.6. The proposed Project would then head south, crossing over the existing transmission lines. Once on the south side of the existing lines (Mile S3-33.8), the new transmission line would again turn southeast and continue towards SCE's existing Antelope Substation, running parallel to and south (west) of the Midway-Vincent No. 3 transmission line (see Figure B.2-13). The proposed Project would again cross the existing Antelope-Magunden 220-kV transmission line and the Midway-Vincent No. 3 500-kV transmission line just before connecting to Antelope Substation at Mile S3-35.2, connecting to Line Position No. 6 within Antelope Substation.

From Mile S3-9.6 to Mile S3-22.1 and from Mile S3-23.2 to Mile S3-33.8 the proposed Project would be built within a new 200-foot-wide ROW (23.1 miles entirely new ROW). From Mile S3-22.1 to Mile S3-23.2 (1.1 miles) the proposed Project would be built within a new 200-foot-wide ROW adjacent to an existing ROW, as well as from Mile S3-33.8 to Mile S3-35.2 (1.4 miles) where the proposed Project would be built within a new180-foot-wide ROW adjacent to an existing ROW.

The proposed Project would utilize a combination of 500-kV TSP and LST structures for the 25.6 miles between Substation One and Antelope Substation. As previously mentioned, SCE proposes to use LSTs at elevations greater than 3,000 feet due to ice loading design. TSPs are often preferable to LSTs in agricultural areas due to less temporary land disturbance caused during construction. Therefore, except where required due to the elevation (Mile S3-9.6 to Mile S3-16.3) or to match existing infrastructure (Mile S3-22.1 to Mile S3-23.2 and Mile S3-33.4 and Mile 35.2), TSPs would be used along the proposed route.

An estimated 44 single-circuit 500-kV LSTs would be installed along the following portions of Segment 3A:

- 6.7 miles between Mile S3-9.6 (Substation One) and Mile S3-16.3, with one of these LSTs being situated within the fence line at Substation One.
- 1.1 miles between Mile S3-22.1 and Mile S3-23.2, where the proposed Project would run parallel to the existing LADWP easement; LSTs would be used along this portion for consistency with existing towers and to provide the required dead-end structures and structures with horizontal phase configurations to facilitate crossing of the existing LADWP transmission lines (SCE, 2006).
- 1.8 miles between Mile S3-33.4 and Mile 35.2 (Antelope Substation).

In addition to the LSTs described above, an estimated 79 single-circuit 500-kV TSPs would be installed along the following portions of Segment 3A:

- 5.8 miles between Mile S3-16.3 and Mile S3-22.1
- 10.2 miles between Mile S3-23.2 and Mile S3-33.4

Although estimates of the number of required towers have been made, the exact number and location of structures could vary. The single-circuit 500-kV TSPs would be approximately 135 feet tall. The single-circuit 500-kV LST would range in height between 113 feet and 188 feet. Each four-legged LST would be built on four drilled pier concrete footings and each TSP would be built on one drilled pier concrete footing. Although the dimension of each footing would depend on variables such as topography, tower height, span length, and soil properties, an average footing would have an aboveground projection of approximately 3 feet.

Segment 2: Mile S2-0.0 (Antelope Substation) to Mile S2-21.0 (500-kV)

Segment 2 would leave from Line Position No. 11 within Antelope Substation (Mile S2-0.0) and travel southeast towards SCE's existing Vincent Substation, parallel to the existing Midway-Vincent utility corridor. The proposed 500-kV transmission line would exit Antelope Substation on two double-circuit 220-kV TSPs and cross under the existing Midway-Vincent No. 3 500-kV ROW. From approximately Mile S2-0.2 to Mile S2-1.9, the proposed Project would run parallel and south (west) of the Midway-Vincent ROW, next to the existing Midway-Vincent No. 3 500-kV transmission line (see Figure B.2-14). From Mile S2-1.9 to Mile S2-8.1, the proposed Project would continue southeast towards Vincent Substation, but would instead remain parallel and south (west) of the existing Antelope-Vincent 220-kV transmission line (see Figures B.2-15 and B.2-16).

From Mile S2-8.1 to Mile S2-14.8 of the proposed route, the proposed Project would circumvent the western boundary of the planned Ritter Ranch community development area. At Mile S2-8.1 the new 500-kV transmission line would divert from paralleling the existing Midway-Vincent ROW, which continues in a southwest direction towards Vincent Substation, and be located in an entirely new ROW (see Figure B.2-17). The proposed Project would head south for approximately 0.1 miles, then west for approximately one mile. At Mile S2-9.1, the new line would turn southwest for approximately one mile, from Mile S2-9.1 to Mile S2-10.1, then again turn south for 0.4 miles, from Mile S2-10.1 to Mile S2-10.5. At Mile S2-10.5, the proposed Project would turn southeast and meet up with the existing Midway-Vincent No. 1 500-kV ROW at approximately Mile S2-10.6. From Mile S2-10.6 to Mile S2-14.8, the proposed Project would continue southeast and then east, paralleling the existing Midway-Vincent No. 1 500-kV ROW (see Figures B.2-18 and B.2-19).

At approximately Mile S2-14.8, the proposed Project would again meet the existing Midway-Vincent ROW, which it diverted from at Mile S2-8.1. Turning southeast for approximately 0.1 miles, parallel to the existing transmission corridor, the proposed Project would then connect/cut into the existing, now former, Midway-Vincent No. 3 transmission line and use the ~~existing~~ former Midway-Vincent No. 3 infrastructure from approximately Mile S2-14.8 to Mile S2-21.0 (see Figure B.2-20). The proposed Project would include construction of 220-kV infrastructure necessary for the former Midway-Vincent No. 3 transmission line to complete its route to Vincent Substation once the proposed Project, or the "new Midway-Vincent 500-kV No. 3" transmission line, has connected to the 500-kV switchrack at Vincent Substation (see Figure B.2-21).

From Mile S2-14.8, the new Midway-Vincent No. 3 transmission line would cut east on new infrastructure, starting approximately 650 feet (0.12 miles) north of the point where the proposed Project cuts into the existing line. The new Midway-Vincent No. 3 transmission line, built on new infrastructure, would then travel underneath the other existing transmission lines in the existing Midway-Vincent ROW, including: Midway-Vincent No. 2 500-kV, Antelope-Vincent 220-kV, Antelope-Mesa 220-kV, Sagebrush 220-kV, and LADWP's Adelanto-Rinaldi 500-kV and Victorville-Rinaldi 500-kV. Once on the east side of the Midway-Vincent corridor, the new Midway-Vincent No. 3 500-kV line, built on new infrastructure, would turn southeast and continue towards Vincent Substation, running parallel and east of its former alignment (see Figure B.2-22).

At Mile S2-19.5 of the proposed route, the new Midway-Vincent No. 3 500-kV transmission line would cross over the LADWP's Adelanto-Rinaldi 500-kV and Victorville-Rinaldi 500-kV transmission lines, as well as the privately-owned Sagebrush 220-kV transmission line, to occupy a new ROW between the Sagebrush 220-kV and Antelope-Mesa 220-kV transmission lines, continuing southeast to Vincent Substation (see Figure B.2-23). At Mile S2-20.3, the new Midway-Vincent No. 3 line would turn southwest and cross over two existing 220-kV transmission lines (Antelope-Vincent and Antelope-Mesa) to realign with the existing Midway-Vincent 500-kV ROW. The new Midway-Vincent No. 3 transmission line would then cross Highway 14 at Mile S2-20.5 and would cross over the existing 220-kV ROW at Mile S2-20.8. Finally, the new Midway-Vincent No. 3 500-kV transmission line would end at Mile S2-21.0, where it would connect to the existing 500-kV rack located in the northern portion of Vincent Substation. Thus, the 500-kV connection from Midway Substation to Vincent Substation provided by Midway-Vincent No.3 would be reinstated.

Segment 2 Options: Mile S2-0.0 (Antelope Substation) to Mile S2-21.0 (500-kV)

Two different alignment re-routes, referred to as Options A and B, were considered as part of the Project in addition to the route proposed by SCE. These route options are evaluated in the same level in this EIR allowing the CPUC as the lead agency the advantage of potentially choosing one of these routes, which may offer substantial environmental benefits compared the route proposed by SCE, as described in Section C, Environmental Analysis, of this EIR.

Option A: This option was included in SCE's Amended PEA as Antelope-Vincent 1 (AV1). Option A is identical to the proposed Project except between approximately Mile S2-5.7 and Mile S2-7.87, where the alignment deviates from the proposed ROW to avoid three existing homes located north of Elizabeth Lake Road. As shown in Figure B.2-24, Option A deviates from the proposed Project at Mile S2-5.7 by proceeding east for approximately 0.15 miles, crossing the existing transmission line corridor, including two 66-kV lines, the Antelope-Mesa 220-kV line, the Antelope-Vincent 220-kV line, and Midway-Vincent No. 3 500-kV line, before turning southeast paralleling the proposed Project route until Mile S2-7.6. At this point, the transmission line turns south, again crossing the existing transmission line corridor, rejoining the proposed Project route at Mile S2-7.8 (proposed Project Mile S2-7.7). This minor re-route is 2.1 miles in length and increases the alignment of Segment 2 by 0.1 miles. In other regards, Option A is identical to the proposed Project.

Option B: This option was the proposed Segment 2 route in SCE's December 2004 CPCN filing, and is included in SCE's Amended PEA as Antelope-Vincent 2 (AV2). Option B is identical to the proposed Project except between Mile S2-8.1 and Mile S2-14.9. As shown Figure B.2-25, Option B deviates from the proposed Project at Mile S2-8.1 by continuing in a southeasterly direction parallel to the existing Antelope-Vincent corridor through the Ritter Ranch and Anaverde community development areas, rejoining the proposed Project route at Mile S2-11.2 (proposed Project Mile S2-14.9). Option B would also connect to the existing Midway-Vincent No. 3 transmission line and use the existing Midway-Vincent No. 3 infrastructure that travels towards Vincent Substation (see Figure B.2-20) beginning at approximately Option B-Mile S2-10.0, as well as cut east on new infrastructure, traveling underneath the existing transmission lines in the existing Midway-Vincent ROW, and run parallel and east of its former alignment to Vincent Substation (see Figure B.2-21). This minor re-route is 3.1 miles in length and decreases the Segment 2 alignment by approximately 3.7 miles. In other regards, Option B is identical to the proposed Project.

From Mile S2-0.0 to Mile S2-8.1 and from Mile S2-10.6 to Mile S2-21.0 the proposed Project would be built within a new 180-foot-wide ROW adjacent to existing transmission lines (18.5 miles adjacent ROW). From Mile S2-8.1 to Mile S2-10.6 (2.5 miles) the proposed Project would be built within an entirely new 200-foot-wide ROW. It is currently anticipated that the proposed Project would utilize a combination of 220-kV and 500-kV TSP and LST structures for the 25.6 miles between Substation One and Antelope Substation. Two double-circuit 220-kV TSPs would be required leaving Antelope Substation to allow the proposed Project to cross under the existing Midway-Vincent No. 3 500-kV ROW. An estimated 106 single-circuit 500-kV LSTs would be installed for the 20.8 miles between Mile S2-0.2 and Mile S2-21.0.

For Option A, which deviates from the proposed Project between Mile S2-5.7 and Mile S2-7.7, the 500-kV portion of the Segment 2 alignment would increase by 0.1 miles (21.1 miles total, 18.6 miles of widened existing ROW, 2.5 miles entirely new ROW), and would therefore require one additional LST structure. For Option B, which deviates from the proposed Project between Mile S2-8.1 and Mile S2-14.9, the 500-kV portion of the Segment 2 alignment would decrease by 3.7 miles. Option B would require 17.9 miles of widened ROW adjacent to the existing Antelope-Vincent transmission corridor within Segment 2 (includes 0.6 miles of 220-kV to connect to Vincent Substation). Due to the reduced length of Option B compared to the proposed Project, an estimated 19 fewer single-circuit 500-kV LSTs would be required (87 total). These differences are summarized in Table B.2-1.

Table B.2-1. Comparison of Proposed Project and Options

Component	Proposed Project	Option A	Option B
Total linear distance 500-kV transmission line (miles)	21.0	21.1	17.3
Total linear distance 220-kV transmission line (miles)	0.6	0.6	0.6
Distance of ROW adjacent to existing ROW (miles)	19.1	19.2	17.9
Distance of completely new ROW (miles)	2.5	2.5	0
Towers:			
Number of new double-circuit 500220-kV TSPs	2	2	2
Number of new single-circuit 500-kV LSTs	106	107	87

Table B.2-1. Comparison of Proposed Project and Options

Component	Proposed Project	Option A	Option B
Number of new single-circuit 220-kV LSTs	6	6	6
Total No. of Towers	114	115	95

Segment 2 (Continued): Mile S2-21.0 to Mile S2-21.6 (220-kV)

As described above, the proposed Project would connect to the existing Midway-Vincent No. 3 transmission line at approximately Mile S2-14.8 and use the existing (former) Midway-Vincent No. 3 infrastructure to approximately Mile S2-21.0. In order for the former Midway-Vincent No. 3 to connect to Vincent Substation without occupying the 500-kV connection reserved for the new Midway-Vincent No. 3 500-kV line, the proposed Project would include construction of approximately 0.6 miles of 220-kV transmission line. Beginning at Mile S2-21.0, this 220-kV transmission line would first travel southwest for 0.1 miles crossing both the existing Midway-Vincent No. 1 500-kV transmission line and the Midway-Vincent No. 2 500-kV transmission line. Next, the proposed Project would turn south and continue past Vincent Substation, before turning east and north towards the existing 220-kV racks located on the south side of Vincent Substation. Using a vacant 220-kV rack position, the proposed Project would complete its route from the Tehachapi area at Mile S2-21.6. An estimated 6 single-circuit 220-kV single-circuit LSTs would be installed between Mile S2-21.0 and Mile S2-21.6 (0.6 miles) to allow for interconnection to the Vincent Substation 220-kV switchrack.

The proposed Project would initially be charged to 220-kV; future charging of the line to 500-kV would require upgrades at Vincent Substation, as there would be no available 500-kV rack positions once the new Midway-Vincent No. 3 line connects to Vincent Substation.

Subtransmission Relocation

The proposed Project would include the removal of 4.4 miles of existing 66-kV subtransmission line, from Mile S2-0.0 to Mile S2-4.4, to allow for the establishment of a 180-foot-wide new ROW, as required for construction of the proposed Project. Approximately 96 double-circuit wood 66-kV poles would be removed and re-located 180 feet west of and parallel to its existing location on the westerly edge of the proposed Project ROW (see Figures B.2-14 and B.2-15). The subtransmission line would be re-installed on approximately 96 light-weight, direct-buried steel poles (TSPs), which are expected to bee approximately 75-feet tall. The 4.4 miles of relocated 66-kV subtransmission line would use 954 kcmil stranded aluminum conductor (SAC).

B.2.2 Proposed Substation Facilities

B.2.2.1 Substation Two

Proposed Substation Two would be located in the Tehachapi Wind Resource Area, at Mile S3-0.0 of the proposed Project route. The construction of Substation Two would be included as part of the proposed Project. The enclosed site area for Substation Two would be 1,100 feet by 800 feet, or 20.2 acres. The total area of land disturbance associated with Substation Two would be 28.3 acres. The enclosed area would include a 450-foot by 150-foot (1.5-acre) area of the substation which would be equipped with the following:

- One one-position bus structure
- Two line dead-end structures
- One 220-kV circuit breaker
- Four 220-kV disconnect switches
- Three coupling capacitor voltage transformers (CCVTs)
- A new mechanical electrical equipment room (MEER)
- New protective relaying equipment

Additional equipment would be installed as necessary, such as when additional wind energy projects apply for interconnection and sign interconnection facilities agreements.

Substation Two would be oriented north-to-south, although this orientation may shift to an east-to-west orientation depending on final generation project locations, in order to optimize future 220-kV and 66-kV transmission and subtransmission line routing to generation projects. The initial configuration for the proposed Project requires installation of 220-kV equipment at Substation Two, in order to connect a generator-owned-tie-line through Substation Two to Substation One.

The portion of the overall substation pad to be initially equipped would measure 450 feet by 150 feet (1.5 acres) and would be located in the northeastern quadrant of the substation pad. The proposed site is desert terrain with a 2.5 to 3 percent slope from southwest to northeast that is diagonal to the proposed substation equipment layout. In order to bring the grade to a slope that is parallel with the equipment flow and to reduce the slope to a workable 1 to 1.5 percent, it would be necessary to alter the existing topography through grading. Grading and earthwork activities included in the construction of Substation Two are described in Section B.3.2.1. The main aspects of Substation Two are described below.

220-kV Switchyard. Installation of the following equipment would be required at Substation Two in order to connect a generator-owned tie-line through to Substation One:

- One 94-foot-high by 45-foot-wide line dead-end structure and foundation
- One 64-foot-high by 45-foot-wide line dead-end structure and foundation
- Three tie-downs with 2B-1590 kcmil conductors per phase each
- Three 220-kV capacitor voltage transformers
- One 220-kV 3000A 40 kA circuit breaker and foundation
- Four 220-kV group operated, horizontally mounted disconnect switches with support structures and foundations; one equipped with grounding attachments
- Three 100-foot segments of 2B-1590 kcmil ACSR conductors; total: 300 feet

Mechanical Electrical Equipment Room/Information Technology (MEER/IT). It would be necessary to install one 45-foot by 70-foot MEER/IT space which would include the following equipment:

- Battery charger
- Batteries
- Light and power panel
- AC distribution panel
- DC distribution panel
- Circuit breaker control switch
- Remote control and automation equipment
- Protective relay equipment

The MEER/IT facilities associated with Substation Two would initially be constructed within a 450-foot by 150-foot area surrounded by a temporary fence, within the substation's boundaries.

Substation Lighting. New lighting fixtures would be installed at the new 220-kV switchyard. These fixtures would be shielded and directed towards the grounds, and would be manually operated. Under normal operating conditions, the substations would not be lit at night. Lighting would only be used when required for maintenance outages or emergency repairs occurring at night (SCE, 2006).

See Figure B.2-26 for a diagram of the proposed plot plan for Substation Two.

B.2.2.2 Substation One

Proposed Substation One, in the Tehachapi Wind Resource Area, would be located at Mile S3-9.6 of the proposed Project route. The construction of Substation One would be included as part of the proposed Project. The enclosed site area (pad) for Substation One would be 1,800 feet by 1,300 feet, or 53.7 acres. The total area of land disturbance associated with Substation One would be 62.9 acres. The enclosed area would include a 400-foot by 200-foot (1.8-acre) area of the substation which would be equipped with the following:

- One four-position bus structure
- Three line dead-end structures
- Four 220-kV disconnect switches

As with Substation Two, additional equipment would be installed as necessary, such as when additional wind energy projects apply for interconnection and sign interconnection facilities agreements.

Substation One would be oriented east-to-west, although this orientation may shift to a north-to-south orientation depending on final generation project locations, in order to optimize future 220-kV and 66-kV transmission and subtransmission line routing to generation projects. The initial configuration for the proposed Project (and Options A and B) requires installation of 220-kV equipment at Substation One.

The portion of the overall substation pad to be initially equipped would measure 400 feet by 200 feet (1.8 acres) and would be located in the southeastern quadrant of the substation pad, approximately 900 feet south of the adjacent Oak Creek Road. The proposed site is desert terrain with a 3 to 4 percent slope from northwest to southeast that is diagonal to the proposed substation equipment layout. In order to bring the grade into a slope that is parallel with the equipment flow and to reduce the slope to a workable 1.5 to 2 percent, it would be necessary to alter the existing topography through grading. Grading and earthwork activities included in the construction of Substation One are described in Section B.3.2.2. The main aspects of Substation One are described below.

220-kV Switchyard. Installation of the following equipment would be required as part of the 220-kV switchyard associated with Substation One:

- Two 40-foot-high by 50-foot-wide bus dead-end structures and foundations
- Six insulators dead-end assemblies
- One 195-foot segment of 220-kV Bus equipped with 2B-1590 kcmil ACSR conductors per phase - total: 1,200 feet
- Three 94-foot-high by 45-foot-wide wide line dead-end structures and foundations
- Six tie-downs with 2B-1590 kcmil conductors per phase each
- Twenty- four bus supports with individual steel pedestals and foundations
- Four 220-kV group operated, horizontally mounted disconnect switches with support structures and foundations; one equipped with grounding attachments
- Six 100-foot segments of 2B-1590 kcmil ACSR conductors - total: 600 feet

Mechanical Electrical Equipment Room/Information Technology. Unlike Substation Two, Substation One would not require the installation of a MEER/IT facility at this time.

Substation Lighting. New lighting fixtures would be installed at the new 220-kV switchyard. These fixtures would be shielded and directed towards the grounds, and would be manually operated. Under normal operating conditions, the substations would not be lit at night. Lighting would only be used when required for maintenance outages or emergency repairs occurring at night (SCE, 2006).

See Figure B.2-27 for a diagram of the proposed plot plan for Substation One.

B.2.2.3 Antelope Substation

SCE's existing Antelope Substation, in the City of Lancaster, is located at Mile S3-35.2, as the end point of Segment 3A, and at Mile S2-0.0, as the starting point of Segment 2 of the proposed Project route as shown in Figure B.2-1 and Appendix 4, Map 7 of 10. The new 500-kV transmission line for the proposed Project would connect through Antelope Substation, from Substation One, and continue south to Vincent Substation. As previously discussed, Antelope Substation would provide the termination of Segment 3A as well as the initiation of Segment 2. Following is a description of work that would be required at Antelope Substation in order to accommodate the proposed Project.

220-kV Switchyard. Since Antelope Substation would provide both the end of Segment 3A and the beginning of Segment 2, separate upgrades to the existing 220-kV switchyard would be required for each segment. For Segment 3A, it would be necessary to upgrade the existing Line Position No. 6 to 3000A rating, which would include the following:

- Replace three existing 1033 kcmil tie-downs with new 2B-1590 kcmil ACSR
- Replace two existing 1200A rated disconnect switches with new 3000A rated switches
- Replace two existing disconnect switch support structures and foundations with new facilities
- Replace all existing 1033 kcmil ACSR conductors (approximately 150 feet) with new 2B-1590 kcmil ACSR (approximately 300 feet)
- Leave the three existing CCVTs in place and re-connect to new conductors
- Remove the existing wave trap and line tuner

For Segment 2, it would be necessary to upgrade the existing Line Position No. 11, which would include the following equipment:

- Three 60-foot tie-downs with 2B-1590 kcmil conductors per phase each
- Three 220-kV capacitor voltage transformers
- Two 220-kV 3000A 40 kA circuit breakers and foundations
- Four 220-kV group operated, horizontally mounted disconnect switches with support structures and foundations; one equipped with grounding attachments
- Three 200-foot segments of 2B-1590 kcmil conductors; total: 600 feet

Segment 2 of the proposed Project would utilize facilities at Antelope Substation that would be installed as part of the substation upgrades associated with the Antelope-Pardee 500-kV Transmission Project (Segment 1), including use of Antelope Substation Position No. 11.[1] The upgrades to Antelope Substation installed as a part of the Antelope-Pardee Transmission Project (Segment 1), and utilized by the proposed Project (Segments 2 and 3), include infrastructure required to increase the substation rating from 220-kV to 500-kV. During the initial substation expansion (associated with Segment 1), the following four additional 220-kV line positions would be installed:

[1] Antelope-Pardee Transmission Project Draft EIR/EIS, July 2006, Clearinghouse No. 2005061161.

- Position 10 would accommodate SCE's proposed 26-mile, 500-kV transmission line from Antelope Substation to a proposed substation in the Mojave area;
- Position 11 would accommodate SCE's proposed 17-mile, 500-kV transmission line from Antelope Substation to Vincent Substation;
- Position 12 would accommodate the existing Vincent 220-kV transmission line that would be relocated from Position 6; and
- Position 13 would accommodate the existing Mesa 220-kV transmission line that would be relocated from Position 8.

The installation of these Line Positions at Antelope Substation would also include upgrading the existing 220-kV buses to 3700A, as well as installation of six new 220-kV circuit breakers, four line and eight bus dead-end structures, and 14 220-kV disconnect switches.

See Figure B.2-28 for a diagram of the proposed modifications to the 220-kV switchyard at Antelope Substation.

Mechanical Electrical Equipment Room (MEER). The scope of work for the Antelope-Pardee Transmission Project (Segment 1) included the construction of a new MEER at the Antelope Substation.[2] This MEER would be utilized for the proposed Project, in order to accommodate Segment 2. The initial MEER would be situated adjacent to the east wall of the existing relay room and would house the following equipment: battery charger, batteries, light and power panel, AC and DC distribution panels, circuit breaker control switches, and protection relays and associated equipment. As constructed, the MEER would be equipped with all required protective relays needed for the new connection of Segment 2 to Antelope Substation Line Position No. 11. No additional work associated with the MEER is included as part of the proposed Project.

Control Room. Within the existing Control Room at Antelope Substation, installation of line protective relays would be required in order to accommodate connection of the new 500-kV transmission line from Substation One on the existing Line Position No. 6.

Substation Lighting. The proposed modifications to the Antelope Substation would not require any additional lighting.

B.2.2.4 Vincent Substation

Vincent Substation is an existing 500/220-kV substation which is owned, operated, and maintained by SCE. Segment 2 of the proposed Project would require that the existing 220-kV Line Position No. 3 at Vincent Substation be equipped to terminate the Segment 2 line. The upgrades which would be required at Vincent Substation are described below.

220-kV Switchyard. Within the existing 220-kV switchyard at Vincent Substation, the following equipment would be installed for the 220-kV Line Position No. 3:

- One 60-foot-high by 45-foot-wide line dead-end structure and foundations
- Three 60- foot tie-downs with 2B-1590 kcmil conductors per phase each
- Three 220-kV capacitor voltage transformers
- One 220-kV 3000A 40 kA circuit breakers and foundations

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[2] Antelope-Pardee Transmission Project Draft EIR/EIS, July 2006, Clearinghouse No. 2005061161.

- Two 220-kV group operated, horizontally mounted disconnect switches with support structures and foundations; one equipped with grounding attachments
- Three 100-foot segments of 2B-1590 kcmil conductors; total: 600 feet
- Fifteen existing 220-kV bus supports and corresponding steel pedestals and foundations would be removed.

Existing Control Room. The existing Control Room scope of work would include installation of all required protective relays for termination of the proposed Project (Segment 2) in 220-kV Line Position No. 3. The aforementioned summary of needed substation work associated with Segment 2 assumes the following:

- No capacitor banks are required at the Antelope Substation
- No capacitor banks are required at the Vincent Substation
- There is adequate space for all new relays in the existing Control Room at the Vincent Substation

Substation Lighting. The proposed modifications to Vincent Substation would not require any additional lighting.

See Figure B.2-29 for a diagram of the proposed modifications to the Vincent Substation.

B.2.3 Proposed Information Technology Facilities

The proposed Project would require installation of information technology (IT) facilities for both Segment 3 (north of Antelope Substation) and Segment 2 (south of Antelope Substation). SCE is proposing to install telecommunication infrastructure to operate all new substation infrastructure (including Substation One and Substation Two), as well as to protect new transmission line facilities from electrical faults. The new circuits would include fault protection, Supervisory Control and Data Acquisition (SCADA), telephone, and if necessary, Remedial Action Scheme (RAS).

Two telecommunication paths would be provided for redundancy, as required by the Western Electricity Coordinating Council (WECC) to ensure adequate protection, along the entire length of the proposed Project. The primary path for Segment 3 would use new microwave paths between the following facilities:

- Substation Two and Oak Peak Communication Site, which is located in unincorporated Kern County approximately 2.8 miles southeast of Monolith (see Appendix 4, Map 1 of 10).
- Oak Peak Communication Site and Substation One
- Antelope Substation and Oak Peak Communication Site

The primary path for Segment 2 would use existing SCE infrastructure between the Antelope and Vincent Substations. No additional telecommunication facilities would be installed at Vincent Substation.

The secondary telecommunication path for the proposed Project would be provided by Optical Ground Wire (OPGW), which would be installed on all of the new transmission lines along the length of the proposed Project. Construction requirements and activities associated with these information technology facilities for the proposed Project are described in Section B.3.3.

B.3 Project Construction

Construction Schedule. Construction activities for Segments 2 and 3 (3A and 3B) of the proposed Project are planned to begin concurrently in March of 2008 and end in June of 2009. Total length of the construction schedule is approximately 16 months, assuming that construction of Segment 2 and Segment 3 (3A and 3B) occurs simultaneously. Option B would require one less month to construct due to the noticeably reduced length of Option B. See Table B.3-1 for the proposed Project construction schedule.

Workforce. The combined construction workforce for all proposed project components is anticipated to range from approximately 50 to 300, assuming simultaneous construction of the segments, with an estimated average daily workforce of 130. Table B.3-2 provides a summary of the labor force requirements for the proposed Project.

Table B.3-1. Proposed Project Construction Schedule

Activity	Duration (months)	
	Segment 2	Segment 3 (3A and 3B)
Engineering	16	16
ROW and Substation Site Acquisition	21	21
Procurement	13	13
Construction and Testing:	16 (Option B = 15)	16
Relocation of 66-kV Subtransmission Line	7	--
Transmission Line (220/500-kV)	16 (Option B = 15)	16
Antelope Substation	12	12
Substation One	--	12
Substation Two	--	12
Vincent Substation	12	--
Testing	14	14
In-Service Date	June 2009[1]	

Source: SCE, 2005 (Amended PEA Table 3-1).
[1] Assumes construction begins in March 2008.

Table B.3-2. Project Labor Force Requirements

Construction Element	Description	No. of Crews	Persons per Crew
Segment 3B: Transmission Line Installation (220-kV)			
Survey	1 mile/day	1	3
Marshalling Yards	Project duration	1	4
Road work	1 mile/day	1	10
Foundations	1 structure/day	2	12
Steel[1]	2 structures/day	10	49
Conductor[2]	0.5 mile/day	8	49
Cleanup and Guard Poles	1.5 miles/day	2	6
Segment 3B: Substation Construction			
Substation Two	Grading	1	4
	Civil	1	8
	Electrical	1	26
Segment 3A: Transmission Line Installation (500-kV)			
Survey	1 mile/day	1	3
Marshalling Yards	Project duration	1	4
Road work	1 mile/day	1	10
Foundations	1 structure/day	2	12
Steel[1]	2 structures/day	8	49
Conductor[2]	0.5 mile/day	8	49
Cleanup and Guard Poles	1.5 miles/day	2	6
Segment 3A: Substation Construction			
Substation One	Grading	1	6
	Civil	1	8

Table B.3-2. Project Labor Force Requirements

Construction Element	Description	No. of Crews	Persons per Crew
	Electrical	1	26
Antelope Substation	Civil	1	6
	Electrical	1	8
Segment 2: Transmission Line Installation (500/220-kV)			
Survey	1 mile/day	1	3
Marshalling Yards	Project duration	1	4
Road Work	1 mile/day	1	10
Foundations	2 structures/day	3	18
Steel[1]	2 structures/day	8	61
Conductor[2]	0.3 mile/day	8	49
Cleanup and Guard Poles	1 mile/day	2	6
Segment 2: Subtransmission Line Demolition and Relocation (66-kV)			
Survey	1 mile/day	1	3
Marshalling Yards	Project duration	1	6
Road work	1 mile/day	1	8
Foundations	2 structures/day	4	20
Steel[1]	2 structures/day	8	48
Conductor[2]	0.3 miles/day	8	39
Cleanup and Guard Poles	1 mile/day	2	6
Wreck-Out[3]	0.75 miles/day	4	30
Shu-Fly (Install Structures and Conductors)	0.25 mile/day	2	12
Shu-Fly (Remove Structures and Conductors)	1 mile/day	2	12
Segment 2: Substation Construction			
Antelope Substation	Civil	1	6
	Electrical	1	8
Vincent Substation	Civil	1	6
	Electrical	1	6

Source: SCE, 2005 (Amended PEA, Table 3-2).
[1] Steel requirement includes shake-out, hauling, light assembly, heavy assembly, and erection.
[2] Conductor requirement includes sheaves, insulators, stringing, deadening, clipping and spacing, and anchors.
[3] Wreck-out includes removal of conductors, structures, and foundations

All construction work would be performed with conventional construction techniques in accordance with an SCE construction specification, CPUC General Order 95, Institute of Electrical and Electronic Engineers, American Concrete Institute, and other industry-specific standards. As part of the SCE specification requirements, construction crews would be required to work within the stipulations of documents governing compliance with regional environmental, storm water pollution prevention, and fire prevention criteria (SCE, 2005).

Construction Equipment. A summary of the primary equipment to be used during the various construction activities for the proposed Project is provided in Table B.3-3 (transmission line installation), Table B.3-4 (subtransmission line relocation), and Table B.3-5 (substations). In each of these tables, a checkmark is used to denote the equipment to be used.

Vehicle Trips. Detailed assumptions associated with determining the vehicle trips or vehicle miles traveled are provided in Appendix 3, Air Quality Calculations. In general, the vehicles miles traveled per round trip (annual basis) for the proposed Project and Options A and B are provided in Table B.3-6A. The total vehicle miles traveled on paved and unpaved road surfaces was estimated for the proposed Project, as well as Options A and B, as shown in Table B.3-6B.

Table B.3-3. Construction Equipment for Transmission Line Installation (Segments 3B, 3A, and 2)[1]

Equipment	Survey	Marshalling Yards	Road Work	Foundations	Steel[2]	Conductor[3]	Cleanup and Guard Poles
No. of Crews (Segment 3B / 3A / 2)	3 (1 / 1 / 1)	3 (1 / 1 / 1)	3 (1 / 1 / 1)	7 (2 / 2 / 3)	26 (10 / 8 / 8)	24 (8 / 8 / 8)	6 (2 / 2 / 2)
Back Hoe, w/ Bucket			✓	✓		✓	✓
Compressor, Air					✓		
Crane, Hydraulic, 150-Ton					✓		
Crane, Hydraulic, Rough Terrain, 35-Ton		✓			✓	✓	
Crawler, Track Type, Drill Rig, Pneumatic				✓			
Crawler, Track Type, Sagging (D8 type)						✓	
Crawler, Track Type, w/ Blade (D6 type)			✓	✓	✓		
Crawler, Track Type, w/ Blade (D8 type)			✓		✓	✓	
Digger, Transmission Type, Truck Mount				✓		✓	
Forklift, 10-Ton		✓					
Forklift, 5-Ton		✓					
Loader, Front End w/ Bucket		✓					
Motor Grader			✓				✓
Motor, Auxiliary Power				✓		✓	
Tension Machine						✓	
Trailer, Extendable Pole							✓
Trailer, Flatbed, 40'		✓			✓		
Trailer, Lowboy, 30'			✓	✓	✓		
Trailer, Lowboy & Reel Stand						✓	
Trailer, Office, 40' to 60'		✓					
Trailer, Storage, 40'		✓		✓			
Truck, Concrete, 10-Yd				✓			
Truck, Dump, 10-Ton				✓			
Truck, Flatbed w/ Boom, 5-Ton				✓	✓		✓
Truck, Flatbed w/ Bucket, 5-Ton						✓	✓
Truck, Flatbed, 1-Ton		✓	✓	✓	✓	✓	✓
Truck, Flatbed, 2-Ton				✓	✓		

Table B.3-3. Construction Equipment for Transmission Line Installation (Segments 3B, 3A, and 2)[1]

Equipment	Survey	Marshalling Yards	Road Work	Foundations	Steel[2]	Conductor[3]	Cleanup and Guard Poles
Truck, Mechanics, 1-to 2-Ton				✔	✔	✔	
Truck, Pick-Up	✔	✔	✔	✔	✔	✔	✔
Truck, Semi, Tractor		✔	✔	✔	✔	✔	✔
Truck, Water, 2,000 - 5,000 Gal			✔	✔	✔	✔	
Truck, Wire Puller, 1-Drum						✔	
Truck, Wire Puller, 3-Drum						✔	

Source: SCE, 2005 (Amended PEA, Table 3-2).
[1] The construction equipment indicated for each task would be required for construction of the transmission line associated with each segment of the proposed Project (Segments 3B, 3A, and 2).
[2] Steel requirement includes shake-out, hauling, light assembly, heavy assembly, and erection.
[3] Conductor requirement includes sheaves, insulators, stringing, deadening, clipping and spacing, and anchors.
[4] Wreck-out includes removal of conductors, structures, and foundations.

Table B.3-4. Construction Equipment for 66-kV Subtransmission Line Relocation (Segment 2)

Equipment	Survey	Marshalling Yards	Road Work	Foundations	Steel[1]	Conductor[2]	Cleanup and Guard Poles	Wreck-Out[3]	Shu-Fly (Installation)	Shu-Fly (Removal)
No. of Crews	1	1	1	4	8	8	2	4	2	2
Back Hoe, w/ Bucket			✔	✔		✔	✔	✔	✔	✔
Compressor, Air					✔					
Crane, Hydraulic, 150-Ton					✔					
Crane, Hydraulic, Rough Terrain, 25-Ton		✔			✔	✔				
Crane, Hydraulic, Rough Terrain, 35-Ton								✔		
Crawler, Track Type, Drill Rig, Pneumatic				✔						
Crawler, Track Type, Sagging (D8 type)						✔			✔	
Crawler, Track Type, w/ Blade (D6 type)			✔	✔	✔		✔	✔	✔	✔
Crawler, Track Type, w/ Blade (D8 type)						✔				
Digger, Transmission Type, Truck Mount				✔		✔			✔	
Forklift, 10-Ton		✔								
Forklift, 5-Ton		✔								
Loader, Front End w/ Bucket		✔		✔						
Motor Grader			✔				✔			
Motor, Auxiliary Power				✔		✔		✔	✔	✔
Tension Machine						✔			✔	✔
Trailer, Extendable Pole										
Trailer, Flatbed, 40'		✔			✔			✔	✔	✔
Trailer, Lowboy						✔		✔		
Trailer, Lowboy, 30'			✔	✔	✔		✔		✔	✔
Trailer, Lowboy & Reel Stand										
Trailer, Office, 40' to 60'		✔								
Trailer, Storage, 40'		✔		✔						
Truck, Concrete, 10-Yd				✔						
Truck, Dump, 10-Ton				✔				✔		

Table B.3-4. Construction Equipment for 66-kV Subtransmission Line Relocation (Segment 2)

Equipment	Survey	Marshalling Yards	Road Work	Foundations	Steel[1]	Conductor[2]	Cleanup and Guard Poles	Wreck-Out[3]	Shu-Fly (Installation)	Shu-Fly (Removal)
Truck, Flatbed w/ Boom, 5-Ton				✔	✔		✔		✔	✔
Truck, Flatbed w/ Bucket, 5-Ton						✔	✔	✔	✔	✔
Truck, Flatbed, 1-Ton		✔	✔	✔	✔	✔	✔	✔	✔	✔
Truck, Flatbed, 2-Ton				✔	✔					
Truck, Mechanics, 1-to 2-Ton				✔	✔	✔		✔		
Truck, Pick-Up	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Truck, Semi, Tractor		✔	✔	✔	✔	✔	✔	✔	✔	✔
Truck, Water, 2,000 - 5,000 Gal				✔	✔	✔		✔	✔	✔
Truck, Wire Puller, 1-Drum						✔		✔	✔	✔
Truck, Wire Puller, 3-Drum						✔			✔	

Source: SCE, 2005 (Amended PEA, Table 3-2).

[1] The construction equipment indicated for each task would be required for construction of the transmission line associated with each segment of the proposed Project (Segments 3B, 3A, and 2).

[2] Steel requirement includes shake-out, hauling, light assembly, heavy assembly, and erection.

[3] Conductor requirement includes sheaves, insulators, stringing, deadening, clipping and spacing, and anchors.

Table B.3-5. Construction Equipment for Substation Facilities

	Substation Two			*Substation One*			*Antelope Substation*		*Vincent Substation*	
	Grading	Civil	Electrical	Grading	Civil	Electrical	Civil	Electrical	Civil	Electrical
Crews	1	1	1	1	1	1	1	1	1	1
5-ton Truck		✓	✓		✓	✓		✓		✓
980 Loader/ Scraper	✓			✓						
Compactor	✓			✓						
Crane		✓			✓			✓		
Crane 150-ton			✓			✓				✓
Crew Trucks		✓	✓		✓	✓	✓	✓	✓	✓
Ditch Digger		✓			✓		✓		✓	✓
Driller		✓			✓		✓			
Dump Truck		✓			✓		✓		✓	
Forklift		✓	✓		✓	✓	✓	✓	✓	✓
Grader	✓			✓						
Manlift			✓			✓				
Soils Test Crew Truck	✓			✓						
Support Truck			✓			✓				
Survey Truck	✓			✓						
Tractor/Backhoe		✓			✓		✓	✓	✓	
Truck Crane			✓			✓				
Water Truck	✓			✓						

Sources: SCE, 2005 (Amended PEA, Table 3-2).

Table B.3-6A. Estimated Miles per Round Trip Assumed

	Proposed Project			Option A [1]	Option B [2]	
	MILES / ROUND TRIP			Incremental Addition	Incremental Addition	Incremental Reduction
	Paved	Unpaved (AVAQMD)	Unpaved (KCAPCD)	Unpaved (AVAQMD)	Unpaved (AVQMD)	Unpaved (AVAQMD)
Passenger Vehicles						
Construction Workers	30	0	0	0	0	0
Professionals	30	2.91	1.47	3.73	2.2	6.19
Mid-Size Vehicles - "Delivery Trucks"						
Road Construction	30	2.91	1.47	3.73	2.2	6.19
Foundation Construction	30	2.91	1.47	3.73	2.2	6.19
Steel Construction	30	2.91	1.47	3.73	2.2	6.19
Conductor/Guard Pole	30	2.91	1.47	3.73	2.2	6.19
Heavy-Heavy Duty Vehicles						
Equipment Delivery	120	0	0	3.73	0	0
Equipment Shuttling	0.25	0.25	0.25	0.25	0.25	0.25
Waste Disposal	120	2.91	1.47	3.73	2.2	6.19
Materials Delivery (yards)	120	0	0	3.73	0	0
Materials Delivery (sites)	30	2.91	1.47	3.73	2.2	6.19

Note: See Appendix 3, Air Quality Calculations. These are approximate numbers based on estimates derived from preliminary design concepts. Numbers are subject to change as the design is finalized.
(1) The "incremental addition" associated with Option A accounts for the one additional tower needed for the re-route.
(2) The "incremental addition" associated with Option B accounts for seventeen new towers needed for the re-route. The "incremental reduction" accounts for the 38 towers in the proposed Project that would in effect be replaced by the new towers.

Table B.3-6B. Estimated Vehicle Miles Traveled ~~for the Proposed Project, Options A and B~~

	Proposed Project			Option A			Option B		
	MILES			MILES			MILES		
	Paved	Unpaved	Total	Paved	Unpaved	Total	Paved	Unpaved	Total
Passenger Vehicles									
Construction Workers	611,100	0	611,100	613,080	0	613,080	569,250	0	569,250
Professionals	105,300	8,328	113,628	105,630	8,369	113,999	98,100	6,064	104,164
Mid-Size Vehicles - "Delivery Trucks"									
Road Construction	80,100	6,288	86,388	80,370	6,322	86,692	74,610	4,565	79,175
Foundation Construction	92,640	6,627	99,267	92,940	6,665	99,605	86,280	4,633	90,913
Steel Construction	152,970	11,296	164,266	153,480	11,359	164,839	142,500	8,006	150,506
	68,573	5,248	73,820	68,783	5,274	74,056	63,893	3,775	67,668
Heavy-Heavy Duty Vehicles									
Equipment Delivery	87,840	0	87,840	87,840	0	87,840	87,840	0	87,840
Equipment Shuttling	678	678	1,356	680	680	1,361	632	632	1,263
Waste Disposal	10,800	219	11,019	10,800	219	11,019	10,680	209	10,889
Materials Delivery (yards)	64,800	0	64,800	65,040	7	65,047	60,360	0	60,360
Materials Delivery (sites)	106,080	7,837	113,917	106,440	7,882	114,322	98,820	5,557	104,377
TOTALS	1,380,881	46,520	1,427,401	1,385,083	46,776	1,431,859	1,292,964	33,440	1,326,404

Note: See Appendix 3, Air Quality Calculations. These are approximate numbers based on estimates derived from preliminary design concepts. Numbers are subject to change as the design is finalized.

Land Disturbance. Temporary land disturbance represents all lands disturbed during construction. Some "temporarily disturbed" areas may be restored following construction, such as construction staging areas, as no permanent structures or use would remain on the land. Other "temporarily disturbed" land would result in permanent land disturbance, as the land would remain in use following the completion of construction, such as roads and tower footings. The proposed Project would temporarily disturb a total of approximately 312 acres and result in permanent disturbance of approximately 165 acres. Segment 3B would temporarily disturb a total of approximately 62.8 acres and result in permanent disturbance of approximately 30.3 acres. Segment 3A would temporarily disturb a total of approximately 142.3 acres and result in the permanent disturbance of approximately 99.6 acres. Segment 2, including the primary marshalling yard, would temporarily disturb a total of approximately 106.6 acres and result in the permanent disturbance of approximately 34.7 acres. Estimates of land disturbance for each segment of the proposed Project due to construction activities (temporary and permanent) are presented in Table B.3-7. Option A in Segment 2 would result in virtually the same land disturbance, as it is only 0.1 miles longer and has only one additional 500-kV single-circuit tower (permanent disturbance) and two additional guard poles (temporary disturbance).

Table B.3-7. Estimates of Project Land Disturbance for the Proposed Project (and Option A)

Project Feature	Quantity	Disturbed Acreage Calculation	Acres Disturbed During Construction	Acres to be Restored	Acres Permanently Disturbed
Segment 3B (Substation Two to Substation One)					
Guard Pole Hole[1] (qty street crossings on quad maps)	7	P/4(28"/12)**2/3 locs*1.5	0.01	0.01	0.0
Guard Pole Truck Damage[2] (same above)	7	2 tracks x 10' x 2' x 6 locs	0.04	0.04	0.0
TSP Foundation Hole[3] (qty TSP)	0	P/4 (66"/12)**2	0.0	0.0	0.0
TSP Foundation Hole Truck Damage[4] (same above)	0	2 tracks x 10' x 2'	0.0	0.0	0.0
TSP Laydown Area (same above)	0	175' x 8'	0.0	0.0	0.0
LST Footings Holes[5] (qty LST structures)	57	P/4(2)**3 x 4 locs	0.02	0.0	0.02
LST Footings Truck Damage[6] (same above)	57	2 tracks x 10' x 2' x 4 locs	0.21	0.21	0.0
LST Laydown and Assembly Area (same above)	57	175' x 60'	13.74~~95~~	13.95	0.0
Crane Pad for Erection (qty structures)	57	50' x 50'	3.27	3.27	0.0
Stringing Setups[7, 11] (qty setups) <Puller only D.E.>	13	100' x 100'	0.60	0.60	0.0
Stringing Setups[7, 11] (qty setups) <Tensioner only D.E..>	14	100' x 180'	2.32	2.32	0.0
Stringing Setups[7, 11] (qty setups) <snubs turnaround>	0	500' x 180'	0.0	0.0	0.0
Splicing Set-ups (qty set-ups)	6	125' x 50'	0.86	0.86	0.0
Roads, New Access (qty miles) <60% of Distance C.M.>	0.06	x 16' wide	0.11	0.0	0.11
Roads, New Spur[10] (qty miles)	0.55	x 16' wide	1.07	0.0	1.07
Roads, Existing <impacted areas only>	0	x 16' wide	0.0	0.0	0.0
Radius from access road to spur road	25	50' radius requires 1,464 sq. ft.	0.84	0.0	0.84
Spur road related temporary disturbed areas[8]	25	566 sq. ft. per spur road	0.32	0.32	0.0
Additional Spur Road Radius for TSP Trucks[9]	20	2,285 sq. ft. per spur road	1.05	1.05	0.0
Staging Areas Material and Equipment	2	3 to 5 acres per yard	10.0	10.0	0.0

Table B.3-7. Estimates of Project Land Disturbance for the Proposed Project (and Option A)

Project Feature	Quantity	Disturbed Acreage Calculation	Acres Disturbed During Construction	Acres to be Restored	Acres Permanently Disturbed
Substation Work (Substation Two)	1	1,100-foot x 800-foot pad + grading of side slopes + transmission line passage and vehicular access+ access road corridor	28.3	0.0	28.3
		Subtotal for Segment 3B	62.8	32.5	30.3
Segment 3A (Substation One to Antelope Substation)					
Guard Pole Hole[1] (qty street crossings on quad maps)	66	P/4(28”/12)**2/3 locs*1.5	0.14	0.14	0
Guard Pole Truck Damage[2] (same above)	66	2 tracks x 10’ x 2’ x 6 locs	0.36	0.36	0
TSP Foundation Hole[3] (qty TSP)	79	P/4 (66”/12)**2	0.0431	0.0431	0.0011
TSP Foundation Hole Truck Damage[4] (same above)	79	2 tracks x 10’ x 2’	0.0725	0.0725	0
TSP Laydown Area (same above)	79	175’ x 8’	2.54	2.54	0
LST Footings Holes[5] (qty LST structures)	43[14]	P/4(2)**3 x 4 locs	0.02	0	0.02
LST Footings Truck Damage[6] (same above)	43	2 tracks x 10’ x 2’ x 4 locs	0.16	0.16	0
LST Laydown and Assembly Area (same above)	43	175’ x 60’	10.36	10.36	0
Crane Pad for Erection (qty structures)	122	50’ x 50’	7.0	7.0	0
Stringing Setups[7, 11] (qty setups) <Puller only D.E.>	15	100’ x 100’	0.69	0.69	0
Stringing Setups[7, 11] (qty setups) <Tensioner only D.E..>	10	100’ x 180’	1.66	1.66	0
Stringing Setups[7, 11] (qty setups) <snubs turnaround>	4	500’ x 180’	1.64	1.64	0
Splicing Set-ups (qty set-ups)	9	125’ x 50’	1.29	1.29	0
Roads, New Access (qty miles) <60% of Distance C.M.>	10	x 16’ wide	19.39	0	19.39
Roads, New Spur[10] (qty miles)	4.85	x 16’ wide	9.41	0	9.41
Roads, Existing <impacted areas only> (qty miles)	3	x 16’ wide	5.82	0	5.82
Radius from access road to spur road	61	50’ radius requires 1,464 sq. ft.	2.05	0	2.05
Spur road related temporary disturbed areas[8]	61	566 sq. ft. per spur road	0.79	0.79	0
Additional Spur Road Radius for TSP Trucks[9]	20	2,285 sq. ft. per spur road	1.05	1.05	0
Staging Areas Material and Equipment	3	3 to 5 acres per yard	15.0	15.0	0
Substation Work (Antelope Substation[13])	0	Not applicable	0	0	0
Substation Work (Substation One)	1	1,800-foot x 1,300-foot pad + grading of side slopes + access road + driveway	62.87	0	62.87
		Subtotal for Segment 3A	142.4	42.8	99.6
Segment 2 (Antelope Substation to Vincent Substation)					
Guard Pole Hole[1] (qty street crossings on quad maps)	30	P/4 (28”/12)**2x3 locs*1.5	0.06	0.06	0
Guard Pole Truck Damage[2] (qty street crossings on quad maps)	30	2 tracks x 10’ x 2’ x 6 locs	0.17	0.17	0

Table B.3-7. Estimates of Project Land Disturbance for the Proposed Project (and Option A)

Project Feature	Quantity	Disturbed Acreage Calculation	Acres Disturbed During Construction	Acres to be Restored	Acres Permanently Disturbed
TSP Foundation Hole[3] (qty TSP)	98	P/4 (66"/12)**2	0.054	0	0.054
TSP Foundation Hole Truck Damage[4] (same above)	98	2 tracks x 10' x 2'	0.088	0.088	0
TSP Laydown Area (same above)	98	175' x 8'	2.94	2.94	0
LST Footings Holes[5] (qty LST structures)	112	P/4(2)**3 x 4 locs	0.05	0	0.05
LST Footings Truck Damage[6] (same above)	112	2 tracks x 10' x 2' x 4 locs	0.41	0.41	0
LST Laydown and Assembly Area (same above)	116	175' x 60'	27.0	27.0	0
Crane Pad for Erection of all towers (qty structures)	210	50' x 50'	12.05	12.05	0
Stringing Setups[7, 11] (qty setups) <Puller only D.E.>	19	100' x 100'	0.87	0.87	0
Stringing Setups[7, 11] (qty setups) <Tensioner only D.E..>	20	100' x 180'	3.31	3.31	0 0
Stringing Setups[7, 11] (qty setups) <snubs turnaround>	1	500' x 180'	0.41	0.41	0
Splicing Set-ups (qty set-ups)	9	125' x 50'	1.29	1.29	0
Roads, New Access (qty miles)	2.1	x 16' wide	4.07	0	4.07
Roads, New Spur[10] (qty miles)	4.6	x 16' wide	8.92	0	8.92
Roads, Existing <impacted areas only> (qty miles)	7.19	x 16' wide	13.95	0	13.95
Radius from access road to spur road	84	50' radius requires 1,464 sq. ft.	2.62	0	2.62
Spur road related temporary disturbed areas[8]	7	566 sq. ft. per spur road	1.01	1.01	0
Additional Spur Road Radius for TSP Trucks[9]	45	2,285 sq. ft. per spur road	2.36	2.36	0
Staging Areas Material and Equipment (includes primary marshalling yard)	5	3 to 5 acres per yard	25.00	~~25~~20.00	5.0
Substation Work (Antelope and Vincent Substations[13])	2	Not applicable	0	0	0
		Subtotal for Segment 2	106.6	71.9	34.7
		TOTAL LAND DISTURBANCE	311.8	147.2	164.6

Source: SCE, 2005 (Amended PEA, Table 3-3).

1 Guard pole – assume three upright poles per each side of street thus 6 poles for each crossing for standard "goal post" design, 28"diameter poles, assume that 50% more crossings present (1.5 multiplier) due to preliminary engineering undercrossings not showing mapped distribution includes frontage roads, rural streets, dirt roads and jeep trails.

2 Guard pole-augering process, same as above plus, assume "dualie" type rear axle trucks with two 2' wide tracks backing to location.

3 TSP – assume 96" diameter with 6" overbore for slurry/concrete backfill, thus 66" diameter hole augered.

4 TSP - assume augering equipment backs in off new spur road 10' with two 2' wide tire tracks.

5 LST – assume 3' diameter hole with no overbore for an 'E' series tower.

6 LST – assume 'dualie' type rear axle trucks with two 2' wide tracks backing to four locations per LST approx. 10" from stub road.

7 Approximately every 14,970' and at Points of Inflection or DE structures when convenient. Only 40% of the 180' x 200' site is disturbed.

8 Parking tracks for 3 utility trucks (180 square feet) and one turnaround track on an 18' radius (386 square feet).

9 Difference between 80' radius and 80' radius from access to spur road for access by 80' trailer bed truck.

10 Spur road is required when access road is over 50' from structure site.

11 One end of a stringing setup is 180' x 200' reel and tensioner end, the other is a 180' x 200' puller site. Only 40% of the 180' x 200' sites are disturbed.

12 Total is for stand-alone LSTs only, not overlap LSTs, that is, only those LSTs that would not have new LSTs erected at that location.

13 Substation work at Antelope and Vincent Substations for Segment 2 and at Antelope Substation for Segment 3 would occur on previously disturbed land within the existing substation boundaries.

14 The total estimated number of 500-kV LSTs that would be required for Segment 3A, between Substation One and Antelope Substation is 44. However, only 43 500-kV LSTs are considered to contribute to land disturbance associated with the length of this proposed segment because one of the towers would be located within the fence line at Substation One. The tower located within Substation One has been accounted for in the land disturbance calculation for Substation One.

Option B would be approximately 3.7 miles shorter than the proposed Project and would not require the establishment of 2.5 miles of entirely new ROW. As such, Option B would result in less land disturbance (temporary and permanent) than the proposed Project. The differences in Segment 2 as a result of Option B are highlighted in Table B.3-8, below. Segment 2, following the Option B deviation to the proposed Project, would temporarily disturb approximately 93.0 acres verses 106.6 acres for the proposed Project Segment 2 route, and result in the permanent disturbance of approximately 27.7 acres verses 34.7 acres for the proposed Project Segment 2 route.

Table B.3-8. Estimates of Project Land Disturbance for Option B of the Proposed Project

Project Feature	Quantity	Disturbed Acreage Calculation	Acres Disturbed During Construction	Acres to be Restored	Acres Permanently Disturbed
Segment 3B (Substation Two to Substation One) Subtotal			62.8	32.5	30.3
Segment 3A (Substation One to Antelope Substation) Subtotal			142.4	42.8	99.6
Segment 2 (Antelope Substation to Vincent Substation)					
Guard Pole Hole (qty street crossings on quad maps)	30	P/4 (28"/12)**2x3 locs*1.5	0.06	0.06	0
Guard Pole Truck Damage (qty street crossings on quad maps)	30	2 tracks x 10' x 2' x 6 locs	0.17	0.17	0
LST Footings Holes (qty LST structures)	93	P/4(2)**3 x 4 locs	0.04	0	0.04
LST Footings Truck Damage (same above)	93	2 tracks x 10' x 2' x 4 locs	0.34	0.34	0
LST Laydown and Assembly Area (same above)	93	175' x 60'	22.42	22.42	0
Crane Pad for Erection of all towers (qty structures)	191	50' x 50'	10.96	10.96	0
Stringing Setups (qty setups) <Puller only D.E.>	16	100' x 100'	0.73	0.73	0
Stringing Setups (qty setups) <Tensioner only D.E..>	17	100' x 180'	2.81	2.81	0
Stringing Setups[7, 11] (qty setups) <snubs turnaround>	1	500' x 180'	0.41	0.41	0
Splicing Set-ups (qty set-ups)	8	125' x 50'	1.15	1.15	0
Roads, New Access (qty miles)	0	x 16' wide	0	0	0
Roads, New Spur (qty miles)	3.8	x 16' wide	7.37	0	7.37
Roads, Existing <impacted areas only> (qty miles)	6.74	x 16' wide	13.08	0	13.08
Radius from access road to spur road	65	50' radius requires 1,464 sq. ft.	2.18	0	2.18
Spur road related temporary disturbed areas	6	566 sq. ft. per spur road	0.84	0.84	0
Additional Spur Road Radius for TSP Trucks	45	2,285 sq. ft. per spur road	2.36	2.36	0
Staging Areas Material and Equipment (includes primary marshalling yard)	5	3 to 5 acres per yard	25.00	~~25~~20.00	5.0
Substation Work (Antelope and Vincent Substations[13])	2	Not applicable	0	0	0

Table B.3-8. Estimates of Project Land Disturbance for Option B of the Proposed Project

Subtotal for Segment 2	93.0	65.3	27.7
TOTAL LAND DISTURBANCE	298.2	140.5	157.7

Construction Waste. Construction of the proposed Project would result in the generation of various waste materials and the limited use of hazardous materials that include fuel, lubricants, and cleaning solvents. All hazardous materials would be stored, handled, and used in accordance with applicable regulations, including the Construction Storm Water Pollution Prevention Plan (SWPPP) for the transmission line segments and substation components (SCE, 2005). See Table B.3-9 for an estimate of construction waste that would be generated from the proposed Project.

Table B.3-9. Estimates of Construction Waste

Waste Item	Pounds (Total)	Pounds Reusable at SCE or On Site	Pounds Recyclable Outside SCE or Disposed
Segment 3B: Substation Two			
Grading Element			
Soil Vegetation	4,000	0	4,000
Sanitation Waste	500	0	500
Civil Element			
Wood	2,000	0	2,000
Concrete	2,000	0	2,000
Sanitation Waste	1,000	0	1,000
Miscellaneous	1,000	0	1,000
Electrical Element			
Wood	2,000	0	2,000
Steel/Aluminum/Copper	30,000	0	30,000
Sanitation Waste	1,500	0	1,500
Miscellaneous	2,000	0	2,000
Subtotal	35,500	0	35,500
Segment 3B: 220-kV Transmission Line			
Wood from Cribbing, etc.[9,10,11]	25,000	6,600	18,400
Soil/Veg: Ftgs, Stubs & Crane Pads[12]	246,057	172,240	73,817
Miscellaneous	40,000	0	40,000
Sanitation Waste	58,368	0	58,368
Subtotal	369,425	178,840	190,585
Segment 3A: Substation One			
Grading Element			
Soil Vegetation	13,000	0	13,000
Sanitation Waste	500	0	500
Civil Element			
Wood	2,000	0	2,000
Concrete	2,000	0	2,000
Sanitation Waste	1,000	0	1,000
Miscellaneous	1,000	0	1,000
Electrical Element			
Wood	2,000	0	2,000
Steel/Aluminum/Copper	30,000	0	30,000
Sanitation Waste	1,500	0	1,500
Miscellaneous	2,000	0	2,000
Subtotal	35,500	0	35,500
Segment 3A: 500-kV Transmission Line			

Table B.3-9. Estimates of Construction Waste

Waste Item	Pounds (Total)	Pounds Reusable at SCE or On Site	Pounds Recyclable Outside SCE or Disposed
Wood from Cribbing etc.[5,6,7]	133,000	6,000	127,000
Soil/Veg: Ftgs, Stubs & Crane Pads[8]	602,257	421,580	180,677
Miscellaneous	40,000	0	40,000
Sanitation Waste	58,368	0	58,368
Subtotal	833,625	427,580	406,045
Segment 3A: Antelope Substation			
Civil Element			
Wood	1,000	0	1,000
Concrete	500	0	500
Sanitation Waste	200	0	200
Miscellaneous	200	0	200
Electrical Element			
Wood	1,000	0	1,000
Steel/Aluminum/Copper	5,000	0	5,000
Sanitation Waste	500	0	500
Miscellaneous	500	0	500
Subtotal	8,900	0	8,900
Segment 2: Antelope Substation			
Civil Element			
Wood	2,000	0	2,000
Concrete	2,000	0	2,000
Sanitation Waste	1,000	0	1,000
Miscellaneous	1,000	0	1,000
Electrical Element			
Wood	2,000	0	2,000
Steel/Aluminum/Copper	30,000	0	30,000
Sanitation Waste	1,500	0	1,500
Miscellaneous	2,000	0	2,000
Subtotal	41,500	0	41,500
Segment 2: 500/220-kV Transmission Line			
Wood from Cribbing, etc.[1,2,3]	57,500	14,400	43,100
Soil/Veg: Ftgs, Stubs & Crane Pads[4]	543,222	380,256	162,967
Miscellaneous	40,000	0	40,000
Sanitation Waste	58,368	0	58,368
Subtotal	699,090	394,656	304,435
Segment 2: 66-kV Subtransmission Demolition and Removal (Estimated 96 Poles)			
Wood Pole and X-arm from Removal	150,000	0	150,000
Porcelain from Removal	38,000	0	38,000
Galvanized Steel from Removal	2,400	0	2,400
Copper from Removal	1,000	0	1,000
Aluminum from Removal	1,292,000	0	1,292,000
Subtotal	1,483,400	0	1,483,400
Segment 2: Vincent Substation			
Civil Element			
Wood	1,000	0	1,000
Concrete	500	0	500
Sanitation Waste	200	0	200
Miscellaneous	200	0	200
Electrical Element			

Table B.3-9. Estimates of Construction Waste

Waste Item	Pounds (Total)	Pounds Reusable at SCE or On Site	Pounds Recyclable Outside SCE or Disposed
Wood	1,000	0	1,000
Steel/Aluminum/Copper	5,000	0	5,000
Sanitation Waste	500	0	500
Miscellaneous	500	0	500
Subtotal	8,900	0	8,900
GRAND TOTAL (Segments 2, 3A and 3B)	3,515,840	1,001,076	2,323,365

Source: SCE, 2005 (Amended PEA, Table 3-4).

1 Wood cribbing attained from the job will be approximately 25,000 pounds, 1,000 pounds for TSPs and 24,000 pounds for LSTs, calculated as follows: For LSTs, (106 LSTs @ approx. 45,000 pounds steel per LST divided by 60,000 capacity per truck = 80 truck loads @ 300 pounds cribbing per truck). For TSPs, 1,000 pounds for the two TSPs (500 pounds wood cribbing per truck). Approximately 60% of the cribbing from the LSTs will be cut into 24" lengths for use on the assembly crews and retained by the contractor. This leaves approximately 9,600 pounds of waste.

2 Wood pallets from the job will be approximately 20 trucks with 15 pallets at 75 pounds each for a total of 22,500 pounds.

3 Wood crates from the job will be approximately 10 trucks at 1,000 pounds each for a total of 10,000 pounds.

4 3.14=PI, 102"=diameter TSP with overbore, 144=inch->foot conv, 40' depth hole, 0.4 weight density, 2 TSPs. 42"=diameter LST with overbore, 30' depth LST hole, 106 LSTs total. 100' long stub roads, 16' wide, 4' deep, & 108 total roads estimated. 50' by 50' crane pad, 2' deep, 108 crane pads.

5 Wood cribbing attained from the job will be approximately 106,000 pounds, 96,000 pounds for TSPs and 10,000 pounds for LSTs, calculated as follows: For LSTs, (43 LSTs @ approx. 45,000 pounds steel per LST divided by 60,000 capacity per truck = 33 truck loads @ 300 pounds cribbing per truck). For TSPs, 96,000 pounds for the 79 TSPs (600 pounds wood cribbing per truck). Approximately 60% of the cribbing from the LSTs will be cut into 24" lengths for use on the assembly crews and retained by the contractor. This leaves approximately 4,000 pounds to go to waste.

6 Wood pallets from the job will be approximately 15 trucks with 15 pallets at 75 pounds each for a total of 17,000 pounds.

7 Wood crates from the job will be approximately 10 trucks at 1,000 pounds each for a total of 10,000 pounds.

8 3.14=PI, 102"=diameter TSP with overbore, 144=inch->foot conv, 40' depth hole, 0.4 weight density, 79 TSPs. 42"=diameter LST with overbore, 30' depth LST hole, 43 LSTs total. 100' long stub roads, 16' wide, 4' deep, & 112 total roads estimated. 50' by 50' crane pad, 2' deep, 112 crane pads.

9 Wood cribbing attained from the job will be approximately 11,000 pounds, 0 pounds for TSPs and 11,000 pounds for LSTs, calculated as follows: For LSTs, (49 LSTs @ approx. 45,000 pounds steel per LST divided by 60,000 capacity per truck = 37 truck loads @ 300 pounds cribbing per truck). For TSPs, 0 pounds for the 0 TSPs (500 pounds wood cribbing per truck). Approximately 60% of the cribbing from the LSTs will be cut into 24" lengths for use on the assembly crews and retained by the contractor. This leaves approximately 6,600 pounds to go to waste.

10 Wood pallets from the job will be approximately 8 trucks with 15 pallets at 75 pounds each for a total of 9,000 pounds.

11 Wood crates from the job will be approximately 5 trucks at 1,000 pounds each for a total of 10,000 pounds.

12 3.14=PI, 102"=diameter TSP with overbore, 144=inch->foot conv, 40' depth hole, 0.4 weight density, 0 TSPs. 42"=diameter LST with overbore, 30' depth LST hole, 49 LSTs total. 100' long stub roads, 16' wide, 4' deep, & 49 total roads estimated. 50' by 50' crane pad, 2' deep, 49 crane pads.

SCE contracts with McFarland Cascade for all aspects of disposal including hauling. In the future, SCE may use other landfill facilities that are authorized to accept treated wood waste in accordance with the California Health and Safety Code Section 25143.1.5. Treatment Storage Disposal Facilities (TSDFs) for wastes generated in this area, broken down by classification, are:

- Hazardous Waste:
  - Clean Harbors Buttonwillow
  - Clean Harbors Los Angeles
- Non-Hazardous Waste:
  - Filter Recycling
  - TPS Technologies
  - Crosby & Overton
  - Demenno Kerdoon
- Non-Regulated Municipal Type Waste:
  - Chiquita Canyon Landfill
  - Sunshine Canyon Landfill
  - Simi Valley Landfill
  - Lopez Canyon Landfill
  - Bradley Landfill

B.3.1 Transmission Facility Construction

Construction activities would include establishment of marshalling yards for staging of materials and equipment, and completion of any roadwork. Following this, or in parallel, installation of foundations, steel, guard poles, conductor, then cleanup and demobilization would occur. The exact construction method employed and the sequence with which construction tasks are completed would be dependent upon final engineering, contract award, conditions of permits, and contractor preference.

B.3.1.1 Marshalling Yards

The marshalling yards would be used to stage materials and equipment, such as steel bundles, spur angles, palletized bolts, rebar, wire reels, insulators and hardware, heavy equipment, light trucks, construction trailers, and portable sanitation facilities, and trash and recycle bins. Preparation of the primary and secondary marshalling yards would include the application of road base, installation of perimeter fencing, and implementation of SWPPP conditions (SCE, 2005).

Primary Marshalling Yard. The primary marshalling yard for the proposed Project would be the same marshalling yard established for Segment 1 (Antelope-Pardee) in the 500-kV expansion area at Antelope Substation.[3] This yard location was selected based on its central location and proximity to good access roads. Additionally, proximity to existing phone and power infrastructure has been considered in the selection of this area. An area up to approximately five acres in size would be required. In addition to the materials and equipment already detailed for new construction, the following may be routed through this yard: removed conductor, removed steel, removed concrete, and other debris associated with the removal process.

Secondary Marshalling Yards. Secondary marshalling yards would be established for short-term use near the construction sites. Where possible, suitable sites along the construction corridors would be selected where previously disturbed property, abandoned excavations, operational industrial yards, or abandoned parking areas exist (SCE, 2005). The secondary marshalling yards would be located approximately every five to ten miles along the transmission route depending on topography. Locations would be selected that are parallel to the ROW, near paved roads, and preferably on land that has been previously graded or disturbed. Final siting of these yards would depend upon availability of appropriately zoned property in the Project area that is suitable for this purpose. The number and size of the secondary marshalling yards would depend upon a detailed ROW inspection and would take into account, where practical, suggestions by the successful bidder for the work. Typically, an area approximately 200 feet by 200 feet (approximately 0.9 acre) would be required. Materials and equipment to be staged in secondary marshalling yards would be similar to that described previously for the primary yard. Since the secondary yards have not been identified yet, biological and cultural resource studies may not have been conducted, but would be performed prior to site selection.

B.3.1.2 Access and Spur Roads

Transmission line roads would be classified into two groups for the proposed Project: access roads and spur roads. Access roads are through-roads that run between tower sites and form the main transport route along the transmission line route. Spur roads are roads that lead from the access road and dead-end into one or more tower sites. Wherever possible, existing access and spur roads would be utilized. However, it would also be necessary to construct new access and spur roads along the proposed route.

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[3] Antelope-Pardee Transmission Project Draft EIR/EIS, July 2006, Clearinghouse No. 2005061161.

Grading preparation would be required to provide access for heavy equipment for all aspects of construction. Every effort would be made to utilize previously disturbed areas including existing ROW and patrol roads in order to minimize land disturbances. If new roads are necessary, erosion control measures would be enforced in accordance with SWPPP conditions and existing SCE specifications. In mountainous areas, "benching" may be required to provide access for footing construction, assembly, erection, and wire stringing activities during line construction. Benching is a technique where a tracked earth mover vehicle excavates a terraced access area to tower excavations in extremely steep rugged terrain. An estimated 14.5 miles of Segment 2 and 5.6 miles of Segment 3B would be subject to benching (SCE, 2006). This technique would be used minimally and for the purposes of helping to ensure personnel safety during construction and to control costs in situations where potentially hazardous, manual excavations would be required. Entire slopes would not be benched to accommodate towers in any given terrain. Road building and upkeep would be an ongoing process during the entire construction process on all elements of the work.

For spur roads to new tower locations, grading would be employed in order to establish both temporary and new spur roads to as many new tower locations as possible for new line construction. Grading would be employed in order to establish temporary new spur roads to pulling and stringing locations along the ROW. The number of locations required would be dependent upon final engineering, topographical considerations, and availability of suitable terrain that would be appropriate for stringing set-up.

It may also be necessary to construct access roads to splicing locations. These locations would be used to remove temporary pulling splices and install permanent splices once the conductor is strung through the stringing travelers located on each tower. This may be required, as the permanent splices joining conductor together cannot pass through stringing travelers.

Segment 3: Access Roads and Spur Roads. In total, Segment 3 (3B and 3A) of the proposed Project would require 10.06 miles of new access roads and 5.4 miles of new spur roads. Segment 3B would largely be constructed within adjacent ROW (7.9 of 9.6 miles), which would enable to utilization of existing access roads and spur roads. For Segment 3B, a total of 0.06 miles of new access roads and 0.55 miles of new spur roads would be required, including an estimated 27 new spur roads and nine extended spur roads (SCE, 2006). In comparison, Segment 3A would largely be constructed within entirely new ROW (23.2 of 25.6 miles), which would therefore require the construction of new access roads (where existing access roads do not exist) and spur roads. For Segment 3A, a total of 10.0 miles of new access roads and 4.85 miles of new spur roads would be required, including an estimated 68 new spur roads and four extended spur roads (SCE, 2006). The following items of work would be required for these new access roads and spur roads:

- Re-grading and repair of existing access and spur roads (approximately 3.0 miles in Segment 3A). These roads would be cleared of vegetation, blade-graded to remove surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 12 feet (preferably with 2 feet of shoulder on either side).
- All new road alignments would be cleared and grubbed. Trees and other vegetation would be removed or trimmed to obtain a 12-foot cleared, drivable width (preferably with 2 feet of shoulder on either side).
- New access and spur roads would be built based on the site topography, such that they would be accessible to all construction equipment. New roads would be built such that existing roads near and within the new ROW would be utilized. These new roads would be built with gradients and curvatures that would permit heavy equipment usage and maneuvering. New roads would be built according to SCE's Transmission Construction Standards.
- Drainage structures such as wet crossings, water bars and overside drains, and pipe culverts would be installed to allow for construction traffic usage, as well as prevent road damage due to uncontrolled water flow.

- Depending on the site geology, when big rocks are encountered during the cut-and-fill operations, blasting may be considered, with permission from all governing agencies.
- In areas where the slope is not stable enough to be self-supporting, retaining walls may be necessary. These retaining walls would be selected based on site specific-conditions.

Segment 2: Access Roads and Spur Roads. Segment 2 of the proposed Project would be built adjacent to existing ROWs where access and spur roads already exist, with the exception of the 2.5-mile segment from Mile S2-8.1 to Mile S2-10.6, which circumvents the Ritter Ranch community development area. Therefore, it is assumed that some of the existing access roads and spur roads would be usable, although some tower sites may require new access road extensions. Others may require new spur roads from existing access roads to new tower sites. Short spur road extensions may be required on others, depending on how the new transmission towers are located in relation to the existing roads.

New access and spur roads to the portion of the line between Mile S2-8.1 and Mile S2-10.6 would need to be established. A total of 2.1 miles of new access roads and 4.6 miles of new spur roads would be required for the proposed Project as well as Option A. This would include an estimated 40 new spur roads and 24 extended spur roads (SCE, 2006). For Option B, which would follow the existing Antelope-Vincent corridor, no new access roads would be required within Segment 2; however, approximately 3.8 miles of new spur roads would be required.

In addition to the new access and spur roads noted above, the following items of work may be necessary:

- Re-grading and repair of existing access and spur roads (approximately 7.2 miles for the proposed Project and Option A and 6.7 miles for Option B). These roads would be cleared of vegetation, blade-graded to remove surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 12 feet (preferably with 2 feet of shoulder on either side).
- Drainage structures such as wet crossings, water bars and overside drains, and pipe culverts would be installed to allow for construction traffic usage, as well as prevent road damage due to uncontrolled water flow.
- Slides, washouts, and other slope failures would be repaired and stabilized by installing retaining walls or other means necessary to prevent future failures. The type of structure to be used would be based on specific site conditions.

B.3.1.3 Tower Sites and Associated Structures

SCE proposes to construct the 220-kV and 500-kV towers associated with the proposed Project in three main steps, as defined below:

Step 1: Creation of Level Pads. ~~Each tower site~~ The site for each tower footing would be graded or cleared to provide a reasonably level pad that is free of any vegetation hindering tower footing construction. Level pads for the entire tower would not be required, as tower design allows for legs to be at different elevations; however, some tower sites would require grading~~ to either widen the existing pads or to create new pads, while other sites would be on relatively level areas that only require some weed abatement~~. The graded tower sites would allow water to drain towards the direction of the natural drainage (minimum 2 percent slope). The drainage pattern would be created to prevent ponding and erosive water flow that could damage the tower footings. The graded pad would be constructed to at least 90 percent relative density and would be capable of supporting heavy vehicular traffic. An area of 35 feet by 35 feet would be required for the 220-kV LSTs in Segment 3B, whereas tower sites of 50 feet by 50 feet would be required for LSTs in Segment 3A and Segment 2. In most cases, the level pads could be utilized as part of the crane pads required for tower erection.

Crane pads of approximately 50 feet by 50 feet would be used for assembly and erection of the new towers. All crane pads would be constructed to allow an erection crane to set-up 60 feet from each tower's centerline. The crane pad would be located transversely from the tower location.

Step 2: Footing/Foundation Construction. Each of the new lattice steel towers would be constructed on four drilled pier concrete footings. Each tubular steel pole would be constructed on one drilled pier concrete footing. Footing dimensions would be dependent upon topography, tower height, span length, and soil properties. On average, a typical footing would have an aboveground projection of approximately three feet. Footing work would be constructed using standard "poured-in-place" augered excavation techniques. At the time of construction, elevations would be established, rebar cages set, spur angles and concrete placed, and survey positioning verified. Concrete samples would be drawn at the time of pour and tested to ensure that engineered strengths are achieved. On regular terrain, a single footing crew could excavate, place steel cages and spur angles, and pour in place concrete for one complete tower approximately every two days. Standard SCE 602 concrete requires approximately 20 working days to cure to 3,000 pounds per square inch (psi) compressive break strength, which is required for erection activity to commence.

Step 3: Steel Work. For LSTs, steel work would consist of hauling and stacking bundles of steel at each LST location per engineering drawing requirements. This activity would require several tractors with 40-foot floats and an on-site loader. Follow- up activities would include the assembly of leg extensions, body panels, boxed sections and the bridges. The steel work would be completed by a combined erection and torqueing crew with a lattice boom crane. Ground disturbance would be kept to a minimum to the extent practical. The construction crew may opt to install insulators and wire rollers (travelers) at this time. Depending on the accessibility solution for tower erection site access, helicopter erection may be required. Erection of this sort would be in accordance with SCE specifications and be similar to methods detailed in the Institute of Electrical and Electronics Engineers (IEEE) Guide to the Assembly and Erection of Metal Transmission Structures (Document #951-1996), Section 8.6, Helicopter Methods of Construction.

For TSPs, steel work would consist of hauling the TSPs to their designated sites using semi-trucks with 40-foot trailers and rough terrain cranes. Due to the size of TSPs, each pole would require at least two trucks. At the site, the poles would be set on the foundations once the proper cure time for the concrete had been attained. The poles could either be assembled into a complete structure or be set one piece at a time by stacking them together. This would depend largely on the terrain and available equipment. Stacking the poles one piece at a time would cause the least amount of ground disturbance.

B.3.1.4 Wire Installation

Wire stringing includes all activities associated with the installation of conductors onto the transmission towers (LSTs and TSPs). This activity includes the installation of primary conductor and ground wire, vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Insulators and stringing sheaves ("rollers" or "travelers") would either be attached as part of the wire stringing activity, if the work is part of a reconductor effort, or would be attached during the steel erection process, if the work is part of a new wire installation.

A "wire pull" refers to a continuous wire installation between two specified points along the transmission line. Wire pulls typically occur in 15,000-foot intervals on flat terrain, such as along Segments 3A and 2, and in 9,000-foot intervals in mountainous terrain, such as along parts of Segment 3B. Wire splices typically occur every 4,500 feet. The beginning and end of a wire pull is selected based on a variety of factors, including:

availability of dead-end LSTs at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment set ups. The dimensions of the area needed for stringing set ups varies depending upon the terrain, however, a typical stringing set up is 200 feet by 400 feet (approximately 1.8 acres each). Where necessary due to suitable space limitations, crews can work from within a substantially smaller area.

Once end points are determined, specialized equipment would be positioned at each end of the wire pull. On one side, a puller is positioned and on the other side a tensioner and wire reel stand truck is positioned. Supplemental specialized support equipment (for example, skidders and wire crimping equipment) would be strategically positioned to support the operations.

Wire-stringing activities would be conducted in accordance with SCE specifications, which is similar to process methods detailed in IEEE Standard 524-1992, Guide to the Installation of Overhead Transmission Line Conductors. A standard wire stringing plan would include a sequenced program of events, beginning with the determination of wire pulls and wire pull equipment set-up positions. Advanced planning by supervision would determine circuit outages, pulling times, and safety protocols required to ensure that safe and quick installation of wire is accomplished.

The following four steps describe the wire installation activities proposed by SCE:

Step 1: Threading. A helicopter would fly a lightweight sock line (i.e., braided rope) from tower to tower, which would be threaded through the wire rollers in order to engage a cam-lock device that would secure the pulling sock in the roller. This threading process would continue between all towers through the rollers of a particular set of spans selected for a conductor pull or a pulling section (i.e., the new conductor to be pulled in under tension).

Step 2: Pulling. The sock line would be used to pull in the conductor pulling cable (i.e., braided steel cable). The conductor pulling cable would then be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow it to rotate freely thereby preventing complications from twisting as the conductor unwinds off the reel.

Step 3: Clipping-In. After the conductor has been tensioned to the appropriate initial sag, permanent support hardware would be attached to the conductor and this would then be attached to the end of the insulator, which would then be attached to the tower, completing the wire installation phase.

Step 4: Spacers. Spacers would be attached between the bundled conductors of each phase. For this purpose, a lineman would ride a small spacer cart between the wires, which would periodically stop to attach the spacers. Pulling equipment from one end of the pull would be rotated 180 degrees to face the new pull direction, and the equipment from the other end of the pull would be "leapfrogged" to a new pulling position (i.e., moved ahead to the end of the next pulling section) to repeat the process for the next tower.

Public and Worker Safety. To ensure public and worker safety, safety devices such as traveling grounds, guard structures, and radio-equipped public safety roving vehicles and lineman would be in place prior to the initiation of wire-stringing activities. Guard poles or guard structures would be installed at all transportation, flood control, and utility crossings, and may also be installed at parks or near residences. Guard structures are temporary facilities designed to stop the travel of the conductor should it momentarily drop below a conventional stringing height, and are removed following conductor installation. Typical guard structures are standard wood poles, 60 feet to 80 feet tall, and may in some cases consist of specially equipped boom type trucks with heavy outriggers. If required, temporary netting would also be installed to protect some types of under-built infrastructure (see Figure B.3-1).

For highway and open channel aqueduct crossings, SCE would need to work with the applicable jurisdiction to secure the necessary permits to string conductor across the applicable infrastructure. Permits and approvals, as described in Table A.3-1, Required Permits and Approvals, may be required from the California Department of Water Resources, California Department of Transportation, County of Los Angeles Public Works Department, County of Kern Roads Department, City of Lancaster, and City of Palmdale. For major roadway crossings, one of the following methods would be employed for public safety:

- Erection of a highway net guard structure system;
- Detour of all traffic off the highway at the crossing position;
- Implementation of a controlled continuous traffic break while stringing operations are performed; or
- Establishment of special line trucks with extension booms onto the highway deck at strategic positions.

SCE has estimated that approximately 103 guard poles would be required during construction of the proposed Project: 7 for Segment 3B, 66 for Segment 3A and 30 for Segment 2 (and Option B). For Option A, due to crossing of the existing corridor, two additional guard poles would be required (32 total). As shown in Table B.3-7, approximately 0.23 acres of land would be temporarily disturbed during guard pole construction (guard pole holes and guard pole trucks) for the proposed Project (0.25 acres for Option A), all of which would be restored following removal of the guard poles (SCE, 2005).

B.3.1.5 Pulling and Splicing Locations

Pulling and splicing locations require some reasonably level areas for maneuvering equipment. Similar to the tower site locations, these setup locations would most likely be located on existing level areas and existing roads, and would therefore only require minimal grading and cleanup. Each pulling location would include one tensioner end and one puller end. The pulling and splicing set-up locations would be used to remove temporary pulling splices and install permanent splices once the conductor is strung through the rollers located on each tower, and are necessary as the permanent splices that join the conductor together cannot travel through the rollers. For stringing equipment that cannot be positioned at either side of a dead-end transmission tower, field snubs (i.e., anchoring and dead-end hardware) would be temporarily installed to sag conductor wire to the correct tension (SCE, 2005). The estimated number of pulling, splicing, and snub turnaround locations for the various project segments are listed below:

- **Segment 3B.** It is currently estimated that approximately 13 new pulling locations, 14 new tensioner locations, and 6 new splicing locations would be required between Substation Two and Substation One.
- **Segment 3A.** It is currently estimated that approximately 15 new pulling locations, 10 new tensioner locations, 4 new snub turnaround areas, and 9 new splicing locations would be required between Substation One and Antelope Substation.
- **Segment 2.** It is currently estimated that approximately 19 new pulling locations, 20 new tensioner locations, one new snub turnaround area, and 9 new splicing locations would be required between Antelope Substation and Vincent Substation. Option A would have the same requirements. Option B, as a result of the reduced length (3.7 miles less), would instead require 16 new pulling locations, 17 new tensioner locations, one new snub turnaround area, and 8 new splicing locations between Antelope Substation and Vincent Substation.

The puller, tensioner, stringing, and splicing set-up locations described above for the proposed Project (and Option A) are anticipated to disturb approximately 14.9 acres (see Table B.3-7). Option B, puller, tensioner, stringing, and splicing set-ups would disturb approximately 14.1 acres (see Table B.3-8). These areas would be restored following Project construction (SCE, 2005).

B.3.1.6 Subtransmission Relocation

Construction of the new 500-kV transmission line from Mile S2-0.0 to Mile S2-4.4 would require demolition of approximately 4.4 miles of 66-kV subtransmission line. This segment of the double-circuit wood 66-kV subtransmission line would be re-positioned 180 feet west of and parallel to its existing location to the westerly edge of the proposed ROW. The demolition work would generate waste from removal of approximately 96 wood poles, cross arms, 130,000 feet of conductor, and 575 insulators. Approximately 96 new 75-foot-tall light-weight, direct-buried steel poles (TSPs) would be utilized for the 66-kV relocation. The 4.4 miles of relocated 66-kV subtransmission line would use 954 kcmil stranded aluminum conductor (SAC). As shown in Table B.3-7, approximately 0.5 acres of land would be permanently disturbed as a result of relocating this subtransmission line.

B.3.2 Substation Facility Construction

During substation facility construction, which would include construction of Substation Two (Segment 3B), Substation One (Segment 3A), Antelope Substation (Segments 3A and 2), and Vincent Substation (Segment 2), all construction efforts would occur in accordance with accepted construction industry standards. Work would generally be scheduled in daylight hours (6:30 a.m. to 5:00 p.m.), Monday through Friday. Extended hours or days may be required in order to meet schedule requirements. In the event that construction is required outside of the specified hours, a variance would need to be obtained from the applicable jurisdiction, such as the City of Lancaster or the City of Palmdale. All materials associated with substation construction would be delivered by truck to the individual sites. As applicable, truck traffic would use major streets and would be scheduled for off-peak traffic hours. All construction debris associated with the construction effort would be placed in appropriate onsite containers and periodically disposed of according to all applicable regulations. Following are descriptions of the site-specific construction efforts that would occur at the various substation facilities that would be constructed as part of or would be impacted by the proposed Project.

B.3.2.1 Substation Two

Substation Two would include a 220-kV interconnection facility which would be constructed in a 450-foot by 150-foot area within the 1,100-foot by 800-foot area allocated for the 220/66-kV substation. Construction of grading, perimeter fences, foundations, and underground facilities would be completed followed by installation of the aboveground structures and electrical equipment. Construction materials would be staged along the east perimeter fence during construction.

Site Preparation. The entire 20.2-acre substation site (pad) would be graded, fenced, and covered with a 4-inch thick layer of crushed rock. Additional side-slope grading may be required beyond the substation boundaries in order to blend existing terrain with the new substation pad. Although the substation area is 20.2 acres, total land disturbance associated with site preparation would be 28.3 acres, as described in Table B.3-10.

Table B.3-10. Land Disturbance for Substation Two

Element	Dimensions	Area of Disturbance
Substation pad	1,100 feet x 800 feet	20.2 acres
Side slope grading	-	2.2 acres

Table B.3-10. Land Disturbance for Substation Two

Element	Dimensions	Area of Disturbance
Transmission line passage and vehicular access	-	4.9 acres
Access road corridor	50 feet x 830 feet	1.0 acre
Total		28.3 acres

The following elements of site preparation would be required for Substation Two:

- Grade the entire 1,100-foot by 800-foot substation pad
- Grade the cut and fill side slopes required to blend the existing terrain with the new pad
- Grade and install the substation access road (50-feet wide by 830-feet long)
- Install 3,800 feet of 8-foot high chain link perimeter fence with barbed wire, and one 24-foot wide double drive gate to surround the entire 1,100-foot by 800-foot substation pad
- Install 1,200 feet of 8-feet high chain link fence with barbed wire, and one 24-foot wide double drive gate to enclose the initial 450-foot by 150-foot area that would initially be equipped
- Install new 4/0 copper conductor ground grid to cover the 450-foot by 150-foot area that would be initially equipped

Grading and Earthwork. The proposed grading scheme would establish a high point at the southern end of the substation pad and slope down at a 1.0 to 1.5 percent slope towards the eastern end of the pad. This down-slope would result in an elevation change of between 11 and 16 feet. The precise slope percentage would be selected during final engineering. This slope percentage would be designed to ensure the least quantity of earth movement while meeting physical requirements of the substation and would be no greater than 2 percent.

Prior to the start of grading, the entire area to be graded would be stripped of all organic matter and loose rocks. Waste materials encountered would be removed as required by the environmental and geotechnical investigations. Waste material collected from the stripping operations would be tested for contaminants, if site conditions, such as evidence of prior use involving hazardous materials, warrant additional investigation. An estimated quantity of approximately 6,800 cubic yards of soil mixed with stones and organic matter would be transported from the site (SCE, 2005) and disposed of at an appropriate waste disposal facility (Note: The ultimate disposal location is unknown, although a list of possible locations is provided in Section B.3, under "Construction Waste").

Once the surface has been cleared, the grading operations would begin. An estimated 90,000 cubic yards of soil would be cut from the higher elevations and relocated to the lower elevation as fill (SCE, 2005). A portion of the cut soil would be used to form a protective earthen berm barrier along the upslope boundaries to prevent surface storm water runoff from entering the substation. If excessive cut or fill would result, minor alterations to the site elevation and/or slopes may be needed to achieve an overall balance between the cut and fill quantities. It may be necessary to export excess soil or import new fill soil (SCE, 2005). Watering would be used to control dust during grading operations.

Earthwork Quantities Resulting From Foundation Excavation. Approximately 20 foundations of various sizes would be constructed throughout the proposed substation site. A network of partially buried concrete trenches would also be installed throughout the substation area. Excavation of these foundations and trenches would take one month, and would begin after completion of grading and other yard improvements. The estimated total volume of soil excavated for foundations and trenches is 300 cubic yards, which would be spread on a portion of the substation property (SCE, 2005).

Drainage. The site drainage would be developed during final engineering design to control surface runoff. In compliance with the Clean Water Act, all new site drainage installations would be consistent with the National Pollutant Discharge Elimination System (NPDES) and the SWPPP, which are to be prepared for the site after final engineering design is completed. NPDES requirements focus on the protection of water quality, through such provisions as the definition of allowable discharge materials, monitoring requirements, reporting requirements, and mitigation measures. Typical drainage improvements would consist of concrete swales, ditches, and culverts. Surface runoff from existing upslope areas would be modified to direct the flow around the substation facility. Surface runoff would be mitigated as needed through the use of earthen berms and energy dissipation devices, such as filter cloths, slope drains, and riprap placed near drain openings. All of these methods are designed to minimize the velocity of surface water runoff and protect the landscape from erosion.

Access. The main facility access would be a 30-foot-wide, 1,000-foot-long asphalt concrete paved road connecting a private road, located east of the substation site, to a gate located in the outer substation perimeter fence (SCE, 2005). From the outer perimeter gate, a 20-foot-wide, 400-foot-long asphalt concrete driveway would be constructed across the graded pad to the 450-foot by 150-foot area that would initially be equipped (SCE, 2005).

Geotechnical Testing. A licensed Geotechnical Engineer or Geologist would test and analyze the soil to determine existing soil conditions. The type of soils present would be identified and tested for the following: soil pressure, relative compaction, resistivity, and percolation. If contaminants are encountered during testing, further studies and site remediation would be conducted by qualified professionals. The results of the geotechnical investigation would be utilized during the design of the final engineering (SCE, 2005) (see Section C.5, Geology Soils, and Paleontology).

Paving. Asphalt concrete paving would be applied to the facility access road and to all designated internal driveways over an aggregate base material and a properly compacted sub-grade, as recommended by the geotechnical investigation (SCE, 2005). These paving activities would take place after major construction.

Rock Surfacing. Those areas within the substation perimeter that were not paved or covered with concrete foundations or trenches would be surfaced with a 4-inch layer of untreated, ¾-inch nominal crushed run rock. The rock would be applied to the finished grade surface after all grading and below grade construction has been completed (SCE, 2005).

Spill Prevention Control and Countermeasures (SPCC). An SPCC plan would not initially be required for Substation Two. Under federal regulation by the EPA, the owner of a facility is required to implement an SPCC plan if the facility meets the following three criteria: (1) The facility is not related to transportation; (2) The facility has an aggregate aboveground storage capacity of at least 1,320 gallons (only considering containers that are 55 gallons or more) or an underground storage capacity of at least 42,000 gallons; (3) There is a reasonable expectation of discharge into or upon navigable waters of the United States or adjoining shorelines (SCE, 2006). In addition, more stringent regulations by the State of California independently require than an SPCC plan be implemented for any facility with an aboveground storage capacity of at least 10,000 gallons (SCE, 2006). Storage capacity of the 220-kV interconnection facilities at Substation Two is not anticipated to equal or exceed 10,000 gallons, thereby <u>not triggering the threshold for</u> ~~avoiding~~ the California requirement for an SPCC plan. However, an SPCC plan would be prepared and implemented if SPCC thresholds for oil volume are ever reached (SCE, 2005).

Storm Water Pollution Prevention Plan (SWPPP). During construction, measures would be in place to ensure that contaminates are not discharged from the construction site. A SWPPP would be developed that would define areas where hazardous materials would be stored; where trash would be placed; where rolling equipment would be parked, fueled and serviced; and where construction materials, such as reinforcing bars and structural steel members, would be stored. Erosion control during grading of the unfinished site and during subsequent construction would be in place and monitored as specified by the SWPPP. A silting basin(s) would be established to capture silt and other materials, which might otherwise be carried from the site by rainwater surface runoff. Site improvements at Substation Two would result in impervious areas from all concrete foundations used for equipment and structures, the concrete foundation for the MEER facility, and asphalt and concrete on access driveways. These impervious areas are estimated to total 11,250 square feet, or approximately one percent of the total substation enclosed area (SCE, 2006).

Perimeter Security. The entire site would be enclosed by perimeter gates and fencing. Perimeter chain link fencing would conform to the requirements for electrical substations and have a minimum height of 8 feet above the adjacent finished grade to the outside of the substation. All perimeter fences and gates would be fitted with barbed wire (SCE, 2005).

B.3.2.2 Substation One

Site Preparation. The entire 53.7-acre substation site (pad) would be graded, fenced, and covered with a 4-inch thick layer of crushed rock. Some additional side-slope grading may be required beyond the substation boundaries in order to blend existing terrain with the new substation pad. Although the substation area is 53.7 acres, total land disturbance associated with site preparation would be 62.9 acres, as described in Table B.3-11.

Table B.3-11. Land Disturbance for Substation One

Element	Dimensions	Area of Disturbance
Substation pad	1,800 feet x 1,300 feet	53.7 acres
Side slope grading	-	8.3 acres
Access road	30 feet x 200 feet	0.14 acres
Driveway	20 feet x 1,600 feet	0.73 acre
Total		62.9 acres

The following elements of site preparation would be required for Substation One:

- Grade the entire 1,800-foot by 1,300-foot substation pad
- Grade the cut and fill side slopes to blend the existing terrain with the new pad
- Grade and install the substation access road
- Install 6,200 feet of 8-foot-high chain link perimeter fence with barbed wire, and one 24-foot-wide double drive gate to surround the entire 1,800-foot by 1,300-foot substation pad
- Install ,1200 feet of 8-feet-high chain link fence with barbed wire, and one 24-foot-wide double drive gate to enclose the initial 400-foot by 200-foot area that would initially be equipped
- Install new 4/0 copper conductor ground grid to cover the 400-foot by 200-foot area that would initially be equipped

Grading and Earthwork. The proposed grading scheme would establish a high point at the western end of the substation pad and slope down at a 1.5 to 2.0 percent slope towards the eastern end of the pad. This down-slope would result in an elevation change of between 27 and 36 feet. During final engineering, a slope percentage would be selected that results in the least amount of earth movement while meeting the physical requirement of the substation, which would be no greater than 2 percent.

Prior to the start of grading, the entire area to be graded would be stripped of all organic matter and loose rocks. Any waste materials encountered would be removed as required by the environmental and geotechnical investigations. Waste material collected from the stripping operations would be tested for contaminants, if site conditions, such as evidence of prior use involving hazardous materials, warrant additional investigation. An estimated quantity of approximately 18,000 cubic yards of soil mixed with stones and organic matter would be transported from the site (SCE, 2005) and disposed of at an appropriate waste disposal facility (Note: The ultimate disposal location is unknown, although a list of possible locations is provided in Section B.3, under “Construction Waste”).

Once the surface has been cleared, the grading operations would begin. An estimated 500,000 cubic yards of soil would be cut from the higher elevations and relocated to the lower elevation as fill (SCE, 2005). A portion of the cut soil would be used to form a protective earthen berm barrier along the upslope boundaries to prevent surface storm water runoff from entering the substation. If excessive cut or fill would result, minor alterations to the site elevation and/or slopes might be needed in an attempt to achieve an overall balance. Should it prove impossible or impractical to balance the earthwork quantities, it would be necessary to either export excess soil or import new fill soil. During grading operations, dust would be controlled by watering (SCE, 2005).

Earthwork Quantities Resulting from Foundation Excavation. Approximately 60 foundations of various sizes would be constructed throughout the area to support equipment and steel structures. In addition, a network of partially buried concrete trenches would be installed throughout the substation area. Excavation of these foundations and trenches would commence following completion of grading and other yard improvements, and would continue for several weeks. The estimated total volume of soil that would need to be excavated for foundations and trenches is 600 cubic yards, and would be spread on a portion of the substation property (SCE, 2005).

Drainage. Site drainage for Substation One would be the same as for Substation Two, as described above.

Access. The main facility access would be a 30-foot wide, 200-foot long asphalt concrete paved road connecting Oak Creek Road to a gate located in the outer substation perimeter fence (SCE, 2005). From the outer perimeter gate, a 20-foot wide, 1,600-foot long asphalt concrete driveway would be constructed across the graded pad to the 400-foot by 200-foot area that would initially be equipped (SCE, 2005).

Geotechnical Testing. Soils testing and analysis for Substation One would be the same as for Substation Two, as described above.

Paving. Paving activities would be the same for Substation One as for Substation Two, as described above.

Rock Surfacing. Rock surfacing would be the same for Substation One as for Substation Two, as described above.

Spill Prevention Control and Countermeasures (SPCC). The SPCC plan requirements for Substation One would be the same as for Substation Two, as described above.

Storm Water Pollution Prevention Plan (SWPPP). The SWPPP measures for Substation One would be the same as for Substation Two, as described above.

Perimeter Security. Perimeter security at Substation One would be the same as at Substation Two, as described above.

B.3.2.3 Antelope Substation

During construction efforts at Antelope Substation, materials would be staged in the 500-kV expansion area established as part of the Antelope-Pardee 500-kV Transmission Project (Segment 1).[4] All substation work would occur on this previously disturbed land area, within the existing substation boundaries, which are approximately 72,600 square feet in area, or 220 feet wide by 330 feet long. During construction of Segment 1, a one-foot high earth berm would be installed to control stormwater runoff along the western and southern perimeters of this graded area, which would also be utilized during construction of Segments 2 and 3. No additional grading or earth movement would occur at Antelope Substation in association with the proposed Project.

B.3.2.4 Vincent Substation

During construction efforts at Vincent Substation, materials would be staged along the east perimeter fence. All modifications to Vincent Substation associated with the termination of Segment 2 are described in Section B.2.2.3. Construction activities would include improvements at Position 3 of the existing 220-kV switchrack, in addition to the installation of approximately 15 new foundations. It is estimated that approximately 35 cubic yards of soil would be removed during these construction activities (SCE, 2006). Soil would be sampled and tested for contamination prior to removal from the site and properly disposed of, as required by law. The improvements at Vincent Substation would be limited to the installation of equipment and structures on previously disturbed land within existing substation boundaries. No additional grading or earth movement would occur at Vincent Substation in association with the proposed Project.

B.3.3 Information Technology Facility Construction

As described in Section B.2.3 (Proposed Information Technology Facilities), the proposed Project would include two telecommunication paths for redundancy. The primary path would use both new microwave paths and existing SCE infrastructure, while the secondary path would use Optical Ground Wire (OPGW) installed along all new transmission lines.

Segment 3B (Mile S3-0.0 to Mile S3-9.6)

For Segment 3B of the proposed Project, new microwave paths would be installed between Substation Two and Substation One, connecting through the Oak Peak Communication Site, which is located in unincorporated Kern County approximately 2.8 miles southeast of Monolith (see Appendix 4, Map 1 of 10).

Substation Two. A new microwave radio would be installed in the new communication room at Substation Two. New microwave antennas would be installed on a new 100-foot tall tower, which would be located immediately outside the communication room. With the antennas installed on the top of the new tower, the maximum tower height would be 115 feet. Concrete footings would be installed to support the new tower, which would require approximately 400 square feet of land (SCE, 2005). No new roads or grading, other than those necessary for substation construction, would be required. The laydown area would be located within the proposed substation boundaries.

[4] Antelope-Pardee Transmission Project Draft EIR/EIS, July 2006, Clearinghouse No. 2005061161.

Oak Peak Communication Site. Three new microwave radios would be installed in the existing communication room at the Oak Peak Communication Site. New microwave antennas would be installed on a new 120-foot tall tower located immediately outside the communication room, adjacent to the existing 50-foot tall tower, which would not be sufficient to support the additional antennas. With the antennas installed on the top of the new tower, the maximum tower height would be 135 feet. Concrete footings would be installed to support the new tower, which would require approximately 600 square feet of land (SCE, 2005). To meet this land requirement, it would be necessary to lease additional land[5]. All of the antennas on the existing 50-foot tower would be moved to the new tower and the old tower would be removed. No new roads would be required; however, the road near the gate to the site would probably need to be realigned to accommodate a site configuration that does not block microwave paths. Minimal grading may also be required, in an area of up to 600 square feet. The construction laydown area would be located adjacent to the existing SCE leased area.

Segment 3A (Mile S3-9.6 to Mile S3-35.2)

For Segment 3A of the proposed Project, new microwave paths would be installed between Substation One and the existing Antelope Substation.

Substation One. The telecommunication facilities installed at Substation One would be the same as those installed at Substation Two.

Antelope Substation. At Antelope Substation, a new microwave radio would be installed in the existing communication room. New microwave antennas would be installed on a new 120-foot tall tower located immediately outside the communication room, adjacent to the existing 80-foot tall tower, which would not be sufficient to support the additional antennas. With the antennas installed on the top of the new tower, the maximum tower height would be 135 feet. Concrete footings would be installed to support the new tower, which would require approximately 400 square feet of land (SCE, 2005). All of the antennas on the existing 80-foot tall tower would be moved to the new tower and the old tower would be removed. No new roads or grading would be required. The construction laydown area would be within the substation boundaries.

Segment 2 (Mile S2-0.0 – Mile S2-21.6)

No new microwave paths would be required for Segment 2 of the proposed Project. As with Segments 3B and 3A, described above, OPGW would be installed as part of the new transmission lines associated with Segment 2. At the cut-over of the Midway-Vincent corridor near Mile 14.8, fiber optic cable in underground conduit would be constructed between the two new transmission line sections on either side of the corridor to maintain continuity of the OPGW fibers (see Figure B.2-20). In order to accommodate this portion of underground infrastructure, trenching and grading through the corridor would be required.

Within Antelope Substation and Vincent Substation, fiber optic cable would be constructed in underground conduit to extend the OPGW fibers to the communication room. At all other locations, no new roads, grading, or laydown areas other than those necessary for transmission line and substation construction would be required.

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[5] The Oak Peak Communication Site is on a 50-foot x 50-foot parcel of land. A communication building, a tower, and a propane tank already exist on the parcel. The base of the new 120-foot-tall tower is 21 x 21 feet and will not fit on the existing parcel. SCE plans to increase the site to 70 x70 feet to accommodate the new tower.

B.4 Facility Operations and Maintenance

SCE would operate and maintain all components of the proposed Project, including transmission line facilities and substation facilities, in accordance with existing SCE procedures. Neither Segment 3 (3A and 3B) nor Segment 2 of the proposed Project would require any additional personnel during the operation and maintenance phase. In accordance with existing SCE procedures, operation and maintenance of the proposed 500-kV and 220-kV transmission lines would involve periodic inspection approximately once per year via helicopter and truck. Maintenance of the proposed facilities would be performed on an as-needed basis, including maintenance of the access roads and erosion/drainage control structures (SCE, 2005).

After construction, both Substation Two and Substation One would be unstaffed. There would be no change in manning for the existing Antelope Substation or Vincent Substation. All telecommunications equipment would be operated and maintained by SCE technicians. Preventative maintenance would be scheduled approximately every six months to ensure system reliability and performance (SCE, 2005).

Figure Links

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