Southern California Edison
A.19-07-015 – TLRR IC

DATA REQUEST SET E D - D a t a R e q u e s t - 0 0 7

To: Energy Division
Prepared by: Warnetta Logan
Job Title: Senior Project Manager
Received Date: 11/2/2020

Response Date: 4/13/2021

Question 01:
Southern California Edison Company (SCE) submitted its Amended Permit to Construct (PTC) application and Proponent's Environmental Assessment (PEA) on April 13, 2020.

On October 30, 2020, in response to the CPUC's Data Request #6, SCE submitted a revised package of GIS data for the project. SCE's explanation accompanying the GIS data stated the following:

a. Conductor installation/removal and splice sites were removed/reoriented in Segments 1, 2, 3N and 3S.
b. Construction work areas were resized/reoriented, and structures scheduled for modification were identified along Segment 4.
c. Construction work areas were resized/reoriented to fit within the cultural resources survey area along Segments 1, 2, 3N, and 3S.

Given the explanation presented above, it appears that the data in some or all the following PEA tables is likely to have changed.

• Table 3.7-2: Approximate Laydown/Work Area Dimensions
• Table 3.7-3: Access and Spur Road Land Disturbance Table
• Table 3.7-4: Subtransmission Land Disturbance Table
• Table 3.7-5: Substation Surface Disturbance
• Table 3.7-6: Other Facilities Surface Disturbance
• Table 3.7-7: Project Estimated Land Disturbance

We request that SCE review the PEA data and provide us with all relevant updated tables (and text, if required). Please provide this information within 2 weeks, by November 16, 2020. If no
Ivanpah-Control Project (A.19-07-015)
change is needed, please let us know as soon as possible. Please provide a copy of the response to me and one to Susan Lee at Aspen Environmental Group, in electronic format only.

Response to Question 01:
Please see the attached GIS package, which includes refined Construction Work Areas.

Additionally, SCE has revised the IC Project PEA's Chapter 3 – Project Description to reflect the results of its construction work area refinement exercise. This work area refinement exercise resulted in a net reduction of 620 acres of permanent disturbance. This reduction was realized largely through the reduction in the number of some project features, including conductor stringing sites, splice sites, guard structures and material yards. The reduced number of features and concomitant reduced acreages associated with those features are presented in the attached revised Project Description PDF (*TLRR Ivanpah-Control Updated PEA Project Description.pdf*). See in particular the updated PEA Tables 3.7-1 through 3.7-4 and 3.7-6 through 3.7-7, the edits to which are also shown in the attached redlined Word document (*TLRR Ivanpah-Control Updated PEA Project Description_redlined.docx*).

These reduced acreages and number of features are not anticipated to materially effect any of the impact analyses presented in the PEA document. The reduced number of features and reduced acreages will result in reduced impacts to habitats, waters, and wetlands addressed in Sections 4.4 and 4.10 of the PEA document, and may result in a reduction in the number of potentially effected cultural or historical resources as presented in Section 4.5. These reductions would not alter SCE's determinations of significance for any CEQA impact criterion.

Chapter 3 Project Description

This section provides a detailed description of SCE's Ivanpah-Control Project (IC Project). The IC Project contains five distinct Segments:

- Segment 1 includes the Control-Coso-Haiwee-Inyokern 115 kV circuit and the Control-Haiwee-Inyokern 115 kV circuit. Segment 1 spans approximately 126 miles from the existing Control Substation in the north to the existing Inyokern Substation in the south.
- Segment 2 includes the Kramer-Inyokern-Randsburg No.1 115 kV circuit. This is a 'box loop' circuit, whereby two sets of conductors (six wires) are operated as a single circuit. Segment 2 spans approximately 48 miles from the existing Inyokern Substation in the north to the existing Kramer Substation in the south and includes the existing Randsburg Substation between the two.
- Segment 3 North (3N) includes the Kramer-Coolwater 115 kV circuit. Segment 3N spans approximately 44 miles from the existing Kramer Substation in the west to the existing Coolwater Substation in the east.
- Segment 3 South (3S) includes the Kramer-Tortilla 115 kV circuit and a portion of the Coolwater-SEGS2-Tortilla 115 kV circuit. Segment 3S spans approximately 44 miles from the existing Kramer Substation in the west to the existing Coolwater Substation in the east and includes the existing Tortilla Substation between the two.
- Segment 4 includes the Ivanpah-Baker-Coolwater-Dunn Siding-Mountain Pass 115 kV circuit. Segment 4 spans approximately 96 miles from the existing Coolwater Substation in the west to the existing Ivanpah Substation in the east, and includes the existing Dunn Siding, Baker, and Mountain Pass substations between the two.

These Segments are displayed graphically in Figure 3.1-1, Project Segments.

3.1 Project Location

The IC Project is located in southern California. The subtransmission lines included in the IC Project are located in central Inyo County, northeast Kern County, northern San Bernardino County, and the City of Barstow (see Figure 1.1-1, IC Project Location).

3.1.1 Geographical Location

The IC Project is located within portions of unincorporated Inyo County, Kern County, and San Bernardino County, and in the City of Barstow (see Figure 1.1-1, IC Project Location).

3.1.2 General Land Use

The existing land use along the IC Project alignment is primarily open space, with scattered residential uses. Widely-dispersed industrial uses are found in the eastern portions of Segment 4 (mining and solar electric generating facilities). Institutional uses, primarily military facilities, are located adjacent to all Segments and adjacent to Inyokern Substation and Coolwater Substation. Portions of the IC Project alignment are located on lands managed by the Bureau of Indian Affairs, Bureau of Land Management, China Lake Naval Air Weapons Station, Edwards Air Force Base, and Marine Corps Logistics Base-Barstow.

3.1.3 Property Description

The IC Project would be built within existing and new rights-of-way (ROWs), including existing and new easements, fee-owned property, and public ROWs. The subtransmission lines traverse a diverse topography from the relatively homogenous, flat topography in the bottom of the Owens River Valley to large alluvial fans to mountainous areas. Project elevations range from approximately 930 feet above sea level near Baker Substation to approximately 5,400 feet above sea level near Mountain Pass Substation. The IC Project alignment parallels and spans the perennial Owens River, the Mojave River, and the Los Angeles Aqueduct.

3.1.4 Segment 1

Control Substation, located approximately 5 miles southwest of the City of Bishop near the intersection of California State Route 168 (SR-168) and East Bishop Creek Road in unincorporated Inyo County, defines the northern terminus of the IC Project alignment and Segment 1. From Control Substation, the IC Project alignment runs south through the Owens River Valley to the Haiwee Substation and Coso Substation; both are located in unincorporated Inyo County approximately 1.5 and 3.5 miles, respectively, south of South Haiwee Reservoir. From Coso Substation, the IC Project alignment continues south to Inyokern Substation in unincorporated Kern County, which defines the southern terminus of Segment 1. Segment 1 includes the Control-Haiwee-Inyokern 115 kV Subtransmission Line and the Control-Coso-Haiwee-Inyokern 115 kV Subtransmission Line.

3.1.5 Segment 2

The existing Inyokern Substation defines the northern/western terminus of Segment 2; Inyokern Substation is located approximately 6 miles west-northwest of the City of Ridgecrest at the intersection of US Highway 395 (US 395) and SR-178/West Inyokern Road in unincorporated Kern County. From Inyokern Substation, the IC Project alignment runs south-southeast through unincorporated Kern County to the existing Randsburg Substation (located adjacent to the Randsburg Cutoff Road, east of the unincorporated community of Randsburg) and then through unincorporated San Bernardino County to the existing Kramer Substation (located adjacent to the intersection of US 395 and SR-58/Barstow-Bakersfield Highway in unincorporated San Bernardino County). The existing Kramer Substation defines the southern terminus of Segment 2.

3.1.6 Segments 3N and 3S

The existing Kramer Substation defines the western terminus of Segments 3N and 3S. From the existing Kramer Substation, the IC Project alignment splits into two west-east alignments. The northern alignment (Segment 3N) runs east through unincorporated San Bernardino County to the existing Coolwater Substation (located approximately 1.5 miles east of the unincorporated community of Daggett). The southern alignment (Segment 3S) runs east to the existing Tortilla Substation (located in the southcentral portion of the City of Barstow) and then to the existing Coolwater Substation. The Coolwater Substation defines the eastern terminus of both Segment 3N and Segment 3S.

3.1.7 Segment 4

The existing Coolwater Substation defines the western terminus of Segment 4. From the existing Coolwater Substation, Segment 4 runs northeast, generally paralleling Interstate 15 (I-15) to its eastern terminus at the existing Ivanpah Substation, which is located in Ivanpah Valley approximately 2 miles west of the Primm Valley Golf Club. Between the existing Coolwater Substation and the existing Ivanpah Substation, the alignment in Segment 4 taps off into (from west to east) the existing Dunn Siding Substation (located approximately 0.15 miles south of I-15 midway between Exit 217 and Exit 221 (Afton Road); the existing Baker Substation (located at the intersection of SR-127/Death Valley Road and Silver Lane in the unincorporated community of Baker); and the existing Mountain Pass Substation, located approximately 2 miles north of the unincorporated community of Mountain Pass.

3.2 Existing System

The IC Project-related system is comprised of twelve existing substations: the Control, Haiwee, Coso, Inyokern, Randsburg, Kramer, Tortilla, Coolwater, Dunn Siding, Baker, Mountain Pass, and Ivanpah substations. Figure 3.2-1, Existing System provides a schematic diagram of the existing IC Project-related System; the System would be unchanged by the remediation of discrepancies under the IC Project.[1] The existing 115 kV subtransmission lines do not have telecommunication infrastructure installed; the substations included in the IC Project are connected to SCE's Supervisory Control and Data Acquisition (SCADA) system by a variety of means.

The IC Project consists of addressing clearance infractions on multiple 115 kV subtransmission lines. These lines are grouped into five Segments (Segments 1, 2, 3N, 3S, and 4) and include:

- In Segment 1 the Control-Haiwee-Inyokern 115 kV and Control-Coso-Haiwee-Inyokern 115 kV subtransmission lines.
- In Segment 2 the Kramer-Inyokern-Randsburg No.1 115 kV Subtransmission Line.
- In Segment 3N the Coolwater-Kramer 115 kV Subtransmission Line.
- In Segment 3S the Kramer-Tortilla 115 kV and Coolwater-SEGS2-Tortilla 115 kV subtransmission lines.
- In Segment 4 the Coolwater-Baker-Dunn Siding-Ivanpah-Mountain Pass 115 kV Subtransmission Line.

Details corresponding to each of these lines is provided in the sections below.

3.2.1 Segment 1—Control-Haiwee-Inyokern 115 kV and Control-Coso-Haiwee-Inyokern 115 kV Subtransmission Lines

The Control-Haiwee-Inyokern 115 kV and Control-Coso-Haiwee-Inyokern 115 kV Subtransmission Lines, constructed in 1912, are predominately supported on double-circuit towers and poles. Each subtransmission line is rated at 415A/530A (normal/emergency) in the CAISO Registry, which translates to 82.7/105.6 MVA per line (normal/emergency).

3.2.2 Segment 2—Kramer-Inyokern-Randsburg No.1 115 kV Subtransmission Line

The Kramer-Inyokern-Randsburg No.1 115 kV Subtransmission Line was constructed in 1913. Except for the last few spans into Kramer Substation, this circuit predominately consists of two 115 kV subtransmission lines operated in a box-loop configuration (a total of six phases arranged in three sets of split phase configuration thereby operating as a single circuit) with a combined rating of 830A/1060A (normal/emergency), which translates to 165.4/211.1 MVA (normal/emergency). The box-loop configuration is predominately supported on double-circuit towers and poles.

3.2.3 Segment 3N—Coolwater-Kramer 115 kV Subtransmission Line

The Coolwater-Kramer 115 kV Subtransmission Line was constructed in 1913. The line predominately consists of a single-circuit H-frame structures and is rated at 950A/1280A (normal/emergency), which translates to 189.2/255.0 MVA (normal/emergency).

1 The Kramer-Inyokern-Randsburg No.1 115 kV circuit consists of two 115 kV lines operated in a box-loop configuration (total of six phases arranged in three sets of split phase configuration thereby operating as a single circuit). Therefore, although it is referenced as a single 115 kV circuit, two lines are illustrated on Figure 3.2-1 to represent the two sets of conductors installed on the existing structures.

3.2.4 Segment 3S—Kramer-Tortilla 115 kV Subtransmission Line

The Kramer-Tortilla 115 kV Subtransmission Line, constructed in 1969, predominately consists of single-circuit H-frame structures. The line is rated at 975A/1320A (normal/emergency), which translates to 194.2/262.9 MVA (normal emergency).

3.2.5 Segment 3S—Coolwater-SEGS2-Tortilla 115 kV Subtransmission Line

The Coolwater-SEGS2-Tortilla 115 kV Subtransmission Line was constructed in 1969. This line predominately consists of single-circuit H-frame structures, and is rated at 975A/1320A (normal/emergency), which translates to 194.2/262.9 MVA (normal/emergency).

3.2.6 Segment 4—Coolwater-Baker-Dunn Siding-Ivanpah-Mountain Pass 115 kV Subtransmission Line

The Coolwater-Baker-Dunn Siding-Ivanpah-Mountain Pass 115 kV Subtransmission Line, constructed between 1918 and 1931, predominately consists of single-circuit H-frame structures and is rated at 415A/530A (normal/emergency), which translates to 82.7/105.6 MVA (normal/emergency).

3.3 Project Objectives

As described further in *Chapter 2 – Project Purpose and Need and Objectives*, the IC Project is being proposed to meet the following objectives:

- Ensure compliance with standards contained in CPUC General Order 95 and NERC Facility Ratings for this project.
- Continue to provide safe and reliable electrical service.
- Meet IC Project needs while minimizing environmental impacts.
- Design and construct the physical components of the IC Project in conformance with industry and/or SCE's approved engineering, design, and construction standards for substation and subtransmission system projects.

3.4 IC Project

As described in *Chapter 1 – PEA Summary*, the purpose of the IC Project is to ensure compliance with standards contained in CPUC GO 95 by remediating discrepancies identified through SCE's TLRR Program. The discrepancies in each of the Segments will be remediated as described in the sections below; details regarding the process used by SCE to develop alternatives for the IC Project is provided in Section 5.2.2, Alternatives Development.

3.4.1 Segment 1

The TLRR Program identified 1,681 spans with discrepancies along Segment 1. A full rebuild of the subtransmission lines in Segment 1 is the approach selected by SCE to remediate these discrepancies, while meeting all project objectives.

3.4.2 Segment 2

The TLRR Program identified 335 spans with discrepancies along Segment 2. A full rebuild of the subtransmission lines in Segment 2 is the approach selected by SCE to remediate these discrepancies, while meeting all project objectives.

3.4.3 Segment 3N

The TLRR Program identified 241 spans with discrepancies in Segment 3N. SCE has identified that reconductoring of the subtransmission line, in combination with replacement of a small number of structures, can be utilized to remediate the identified discrepancies while minimizing potential environmental impacts and meeting all project objectives.

3.4.4 Segment 3S

The TLRR Program identified 230 spans with discrepancies in Segment 3S. SCE has identified that reconductoring of the subtransmission line, in combination with replacement of a small number of structures, can be utilized to remediate the identified discrepancies while minimizing potential environmental impacts and meeting all project objectives.

3.4.5 Segment 4

The TLRR Program identified 510 spans with discrepancies in Segment 4. SCE has identified that derating the subtransmission circuit in Segment 4, in combination with the replacement of some existing structures, can be utilized to remediate the identified discrepancies while minimizing potential environmental impacts and meeting all project objectives.

The IC Project description is based on planning-level assumptions. Actual work scope would be refined following completion of final engineering, identification of field conditions, and compliance with applicable environmental and permitting requirements.

3.4.6 Project Capacity

The IC Project is designed to remediate discrepancies; it is not designed to increase the capacity of SCE's electrical system. The ampacity rating of the subtransmission lines will be based on the 2008 CAISO rating. Compared to the capacity offered by the existing conductor, the ACCC subtransmission conductor that would be installed in some Segments would have a higher capacity. However, that higher capacity will be limited by existing substation equipment. Therefore, only limited increased capacity would be realized from installation of the ACCC subtransmission conductor. No future phases are currently anticipated. No future increases to capacity are planned or anticipated within the 10-year forecast window.

3.5 Project Components

The components of the IC Project are described in more detail below.[2]

3.5.1 115 kV Subtransmission Line Description

The IC Project consists of mitigating existing GO 95 discrepancies by rebuilding existing subtransmission lines as described in the sections below.

3.5.1.1 Segment 1

Construction activities for the IC Project within Segment 1 include:

- Install approximately 383 double-circuit TSPs.
- Install approximately 125 multipole TSP structures.

[2] This Proponent's Environmental Assessment document, dated April 2020, supersedes in its entirety the Proponent's Environmental Assessment document, dated July 2019, submitted in conjunction with SCE's Application for a Permit to Construct (PTC) for the Ivanpah-Control Project, filed with the CPUC on July 17, 2019 (Application A.19-07-015).

- Install approximately 391 double-circuit LWS poles.
- Install approximately 6 multipole LWS structures.
- Remove approximately 1,161 existing subtransmission structures.
- Replace existing 4/0 aluminum conductor steel-reinforced (ACSR) and 336.4 ACSR conductor with ACCC conductor along the 126-mile length of Segment 1.
- Install approximately 126 miles of OPGW and/or ADSS fiber optic cable and install system protection and telecommunications-associated equipment at existing substations.
- Disconnect existing conductor from existing positions at substations and connect new conductor to those existing positions.
- Install marker balls on overhead wire where needed in accordance with FAA requirements.

3.5.1.2 Segment 2

Construction activities for the IC Project within Segment 2 include:

- Install approximately 342 double-circuited TSPs.[3]
- Install, and then remove, approximately 108 temporary LWS or equivalent poles with a single circuit installed.
- Install, and then remove, approximately 2 temporary multipole LWS structures.
- Remove approximately 390 existing subtransmission structures.
- Rebuild the split-phased Kramer-Inyokern-Randsburg No.1 115 kV Subtransmission Line by removing existing 4/0 ACSR conductor and installing ACCC conductor along the 48-mile length of Segment 2.
- Install approximately 48 miles of OPGW and/or ADSS fiber optic cable and install system protection and telecommunications-associated equipment at existing substations.
- Install marker balls on overhead wire where needed in accordance with FAA requirements.

3.5.1.3 Segment 3N

Construction activities for the IC Project within Segment 3N include:

- Install approximately 2 wood multipole structures and approximately 43 LWS or wood H-frames.
- Remove approximately 43 existing structures.
- Remove existing 795 stranded aluminum conductor (SAC) and install ACCC conductor along the 44-mile length of Segment 3N.
- Install fault return conductor (FRC) along approximately 2.3 miles of Segment 3N.

3.5.1.4 Segment 3S

Construction activities for the IC Project within Segment 3S include:

- Install approximately 3 multipole TSPs, approximately 32 wood or LWS H-frames, and approximately 7 wood multipole structures.

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[3] The structures installed in Segment 2 would be designed as double-circuited TSPs, but only a single circuit would be installed under the IC Project. The rationale to include structures capable of being double-circuited but equipped with only one circuit is two-fold. First, the current tower design consists predominately of double-circuit towers and poles, so the replacement structures provide a "like-for-like" replacement in terms of design. Secondly, such design would minimize environmental disturbance in the future if the need arose to install a second circuit between the Inyokern and Kramer substations (although SCE does not identify any such need at the present time). If only single-circuited structures were installed as part of the IC Project, and the need later arose to increase capacity between Inyokern and Kramer substations or to improve system reliability, that would necessitate the replacement of single-circuited structures with double-circuited structures.

- Remove approximately 42 existing structures.
- Remove existing 795 SAC conductor and install ACCC conductor along the 44-mile length of Segment 3S.
- Install fault return conductor (FRC) along approximately 3.6 miles of Segment 3S.

3.5.1.5 Segment 4

Construction activities for the IC Project within Segment 4 include:

- Install approximately 2 TSP H-frames, 59 LWS H-frames, and 1 wood H-frame.
- Modify approximately 83 structures adjacent to the replacement structures by, among other activities, installing weights or replumbing the insulators.
- Remove approximately 60 existing structures.

3.5.2 Telecommunications Description

Telecommunications infrastructure—including telecommunications cable (either OPGW or ADSS fiber optic cable) and associated equipment at substations—would be added to connect the IC Project-associated substations in Segments 1 and 2 to SCE's telecommunications system. The telecommunications infrastructure would provide Supervisory Control and Data Acquisition (SCADA), protective relaying, data transmission, and telephone services for the IC Project and associated facilities. Along the majority of Segments 1 and 2, OPGW would be installed overhead on replacement structures; in some locations, ADSS fiber optic cable will be installed overhead on structures or underground. Where installed, OPGW also serves as lightning and grounding protection.

New telecommunications cable and appurtenances would be installed along the length of Segments 1 and 2 and at Control, Coso, Haiwee, Inyokern, Kramer, and Randsburg substations (see Figure 3.1-1). In addition, an approximately 2.5-mile long fiber optic cable tap would be installed between Segment 1 and an existing third-party telecommunications facility in the community of Independence for amplification. The fiber optic cable tap would be installed overhead on approximately 60 new LWS or equivalent poles and underground as it enters the existing facility. Amplification equipment would be installed in the existing facility and connected to the fiber optic cable tap; this equipment is necessary to maintain signal strength in the fiber optic cable line.

The OPGW would be approximately ½-inch in diameter, would be non-specular, and would generally be installed overhead at the top of the replacement structures and new poles. Where the IC Project's subtransmission lines are crossed overhead by other transmission lines, ADSS fiber optic cable may be installed below the conductor on the replacement structures instead of OPGW being installed at the top of the replacement structure; this would be necessary to maintain adequate clearances between the IC Project's infrastructure and the other transmission line's conductor. The ADSS fiber optic cable would be approximately ½-inch in diameter with a dark-colored, non-specular covering. If adequate clearance between the replacement conductor and the ADSS fiber optic cable cannot be achieved at these locations, ADSS fiber optic cable may be installed on new poles adjacent to the subtransmission line alignment; these new poles would carry only the fiber optic cable. Approximately 32 LWS or equivalent poles may be installed to carry ADSS fiber optic cable at line crossings in Segment 1, and approximately 12 may be installed in Segment 2. If neither option is feasible at a given crossing location, fiber optic cable may be installed in new underground facilities at these crossing locations. Telecommunications cable appurtenances include splice boxes and risers, among other infrastructure. Risers are small-diameter (2-5 inch) plastic or galvanized steel conduit attached with strapping to poles or other structures through which fiber optic cable is placed to transition from an overhead to an underground configuration. Splice boxes are metal or plastic enclosures, frequently of dimensions approximating 36 x 36 x 10-inch, that are attached to attached to subtransmission structures with strapping.

Telecommunications-related modifications at the Independence telecommunications facility and at the existing substations would generally include the installation of equipment on existing rack structures; the installation of cable in new or existing underground cable raceways and/or ducts; and the installation of new, or replacement of, existing telecommunications infrastructure within existing buildings or in existing or new telecommunications cabinets. At some substations, fiber optic cable would be installed underground where the cable route enters and exits the substation.

3.5.3 Distribution Description

Distribution circuits are installed on a few existing subtransmission structures; no new distribution circuits would be installed as part of the IC Project. The existing distribution circuits and appurtenances would be removed and new distribution conductor and appurtenances would be installed on replacement structures.

3.5.4 Poles/Towers

3.5.4.1 Transmission Poles/Towers

No transmission poles or towers (i.e., poles or towers designed to support circuits operated at 200 kV or greater) would be removed, modified, or installed as part of the IC Project.

3.5.4.2 115 kV Subtransmission Poles/Towers

The rebuilt 115 kV subtransmission lines included in Segments 1 and 2 of the IC Project would utilize single TSPs and single LWS poles; multipole structures (See Section 3.5.4.2.3 and Section 3.5.4.2.6); and steel and wood H-frames. Replacement structures in Segments 1 and 2 would be located in a new alignment adjacent to the existing alignment. The installation of replacement structures in new alignments in these Segments is necessary due to system outage constraints, which require existing circuits to remain energized while replacement structures are installed; therefore, to maximize worker safety, minimize the number of outages, and reduce cost, the replacement structures would be installed in new alignments.

In Segments 3N and 3S, existing subtransmission structures will be replaced with TSP and wood multipole structures, and steel and wood H-frames. In Segments 3N and 3S, most replacement structures will be installed proximate to existing structures. Two interset structures will be installed in Segment 3N. The approximate dimensions of the proposed structure types are shown in Figureset 3.5-1, Typical Structure Design, and summarized in Table 3.5-1: Typical Subtransmission Structure Dimensions.

In Segment 4, existing subtransmission structures will be replaced with steel and wood H-frames; these replacement structures will mostly be installed proximate to existing structures. One interset structure will be installed in Segment 4. The approximate dimensions of the proposed structure types are shown in Figureset 3.5-1, Typical Structure Design, and summarized in Table 3.5-1: Typical Subtransmission Structure Dimensions.

Subtransmission facilities would be designed consistent with the Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (Avian Power Line Interaction Committee 2006) where feasible. Subtransmission facilities would also be evaluated for potential collision reduction devices in accordance with Reducing Avian Collisions with Power Lines: The State of Art in 2012 (Avian Power Line Interaction Committee 2012).

Guys are typically used when LWS poles, LWS H-frames, wood H-frames, or wood multipole structures are located on angles or corners to provide support to the poles. Guys may also be used on tangent/suspension poles as field conditions dictate. Guying consists of a guy wire (down guy) that is fastened to a pole and attached to a buried anchor, or when there is not adequate space for the required down guy, a shorter guy pole (stub pole) is typically placed with a down guy and buried anchor in a location that has sufficient room for these facilities. The need for and location of guy wires and anchors for LWS poles would be determined during final engineering and construction on a case-by-case basis. Guying across a roadway would be avoided where feasible.

3.5.4.2.1 Lightweight Steel Poles

Approximately 391 permanent LWS poles would be installed under the IC Project.[4] LWS poles would be direct-buried and extend approximately 75 to 124 feet above ground.[5] The diameter of LWS poles would typically be 1 to 4 feet at ground level and tapers to the top of the pole. The LWS poles would be galvanized steel structures with a dulled finish. In Segment 2, approximately 108 temporary LWS poles would be installed and then removed under the IC Project.

3.5.4.2.2 Lightweight Steel Pole H-Frames

Approximately 59 LWS H-frames would be used for the IC Project. Each of the vertical LWS poles would extend approximately 48 to 70 feet above the ground. The diameter of the vertical LWS poles would be approximately 1 to 4 feet at ground level and would taper to the top of the pole. The horizontal member of the H-frame would be approximately 7 inches square. The LWS poles would be galvanized steel structures with a dulled finish.

3.5.4.2.3 Lightweight Steel Pole Multipole Structures

At approximately six locations, LWS multipole structures (which comprise three individual LWS poles installed at a single location, with each pole bearing a single conductor) would be used for the IC Project. Each of the LWS poles would be approximately 1 to 4 feet in diameter at the base and extend approximately 88 to 106 feet above ground. In Segment 2, approximately 2 temporary multipole LWS pole structures would be installed and then removed.

3.5.4.2.4 Tubular Steel Poles

Approximately 727 TSPs, or equivalent structures, would be used for the IC Project. The TSPs would be approximately 1.5 to 6 feet in diameter at the base and extend approximately 57 to 140 feet above ground. TSPs, or equivalent structures, would be either direct-buried, attached to a concrete foundation, or installed on an engineered micro-pile foundation. TSP concrete pile foundations would be approximately 4 to 8 feet in diameter and would extend underground approximately 10 to 30 feet with approximately 1 to 3 feet of concrete visible above ground. Each TSP would use approximately 5 to 56 cubic yards of concrete. The TSPs would be galvanized steel structures with a dulled finish.

3.5.4.2.5 Tubular Steel Pole H-Frames

Approximately 2 TSP H-frame structures would be used for the IC Project. The TSP H-frames would be approximately 6 feet in diameter at the base and extend approximately 100 feet above ground. TSPs, or equivalent structures, would be either direct-buried, attached to a concrete foundation, or installed on an engineered micro-pile foundation. TSP concrete pile foundations would be approximately 8 feet in diameter and would extend underground approximately 10 to 30 feet with approximately 1 to 3 feet of concrete visible above ground. Each TSP would use approximately 19 to 56 cubic yards of concrete. The TSP H-frame structures would be galvanized steel structures with a dulled finish.

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4 During the final engineering process, it may be determined that in some locations a direct-buried TSP will be installed instead of a LWS pole.

5 See Section 3.7.2.2.3.5, LWS Pole/LWS H-Frame Installation, for a description of direct-burial of TSPs and LWS poles.

3.5.4.2.6 Tubular Steel Pole Multipole Structures

At approximately 128 locations, multipole TSP structures (which comprise two or three individual TSPs located at a single site, with each TSP bearing a single circuit or a single conductor) would be used for the IC Project. The TSPs would be approximately 1.5 to 6 feet in diameter at the base and extend approximately 57 to 140 feet above ground. TSPs, or equivalent structures, would be either direct-buried, attached to a concrete foundation, or installed on an engineered micro-pile foundation. TSP concrete pile foundations would be approximately 4 to 8 feet in diameter and would extend underground approximately 10 to 30 feet with approximately 1 to 3 feet of concrete visible above ground. Each TSP would use approximately 5 to 56 cubic yards of concrete. The TSPs would be galvanized steel structures with a dulled finish.

3.5.4.2.7 Wood Pole H-Frames

Approximately 76 wood H-frames would be used for the IC Project. Each of the vertical wood poles would extend approximately 65 to 74 feet above the ground. The diameter of the vertical LWS poles would be approximately 3 feet at ground level and would taper to the top of the pole. The horizontal member of the H-frames would be approximately 7 inches square.

3.5.4.2.8 Wood Pole Multipole Structures

At approximately nine locations, wood multipole structures (which comprise three individual wood poles installed at a single location, with each pole bearing a single conductor) would be used for the IC Project. Each of the wood poles would be approximately 2 to 4 feet in diameter at the base and extend approximately 57 to 77 feet above ground.

SCE will file Federal Aviation Administration (FAA) notifications for structures installed under the IC Project, as required. With respect to structures, the FAA will conduct its own analysis and may recommend no changes to the design of the proposed structures; or may recommend redesigning any proposed structures near an airport to reduce the height of such structures; or marking the structures, including the addition of aviation lighting; or placement of marker balls on wire spans.

SCE will evaluate the FAA recommendations for reasonableness and feasibility, and in accordance with Title 14, Part 77 of the Code of Federal Regulations (CFR), SCE may petition the FAA for a discretionary review of a determination to address any issues with the FAA determination. FAA agency determinations for permanent structures typically are valid for 18 months, and, therefore, such notifications would be filed upon completion of final engineering and before construction commences. The entirety of the IC Project would be built within a combination of existing SCE fee-owned property, SCE ROWs, and/or properties to be acquired and all construction activities would be performed at a distance from airport activity sufficient to minimize safety concerns to construction personnel.

Subtransmission poles/towers/catenaries at heights greater than or equal to 200 feet are anticipated to require FAA notifications, as are subtransmission structures located in the vicinity of airports. SCE will consult with the FAA and consider recommendations, to the extent feasible. Typical recommendations include, but are not limited to, the following: installation of marker balls on spans (on OPGW) between structures, and/or installation of lighting on structures. Generally, marking or lighting is recommended by the FAA for those spans or structures that exceed 200 feet in height above ground level (AGL); however, marking or lighting may be recommended for spans and structures that are less than 200 feet AGL, but located within close proximity to an airport or other high-density aviation environment. FAA recommendations of guidelines and standards for marking and lighting are included in Advisory Circular AC 70/7460-1L.

Table 3.5-1: Typical Subtransmission Structure Dimensions

Pole Type	Number of Structures, IC Project	Approximate Height Above Ground (Feet)	Approximate Pole Diameter (Feet)	Approximate Auger Hole Depth (Feet)	Approximate Auger Diameter (Feet)	Number of Existing Structures	Approximate Height Above Ground, Existing Structures (Feet)
Segment 1							
TSP, Single	383	75-140	2-6	10-30	4-8	—	—
Multipole, TSP	125	65-140	2-6	10-30	4-8	—	—
Multipole, LWS	6	88-106	1-4	11-13	2-5	—	—
Pole, LWS	391	75-124	1-4	9-15	2-5	—	—
LST/TSP	—	—	—	—	—	969	65-81
Pole, LWS or Wood	—	—	—	—	—	192	42-94
Segment 2							
TSP, Single	342	72-137	2-6	10-30	4-8	—	—
Pole, LWS, Temporary	108	52-84	1-4	7-11	2-5	—	—
Multipole, LWS, Temporary	2	38-43	1-4	6-7	2-5	—	—
LST/TSP	—	—	—	—	—	385	66-132
H-Frame, LWS or Wood	—	—	—	—	—	5	58-69
Segment 3N							
H-Frame, LWS or Wood	43	66	1-2	9	2-3	41	61-66
Multipole, Wood	2	60-77	2-3	8-10	3-4	2	58
Segment 3S							
Multipole, TSP	3	57	1.5	10-30	2-3	—	—
H-Frame, LWS or Wood	32	74	1-2	9-10	2-3	32	57-77
Multipole, Wood	7	57-67	2-3	8-9	3-4	10	59-63
Segment 4							
H-Frame, TSP	2	100	6	10-30	8	—	—
H-Frame, LWS	59	48-70	1-4	7-9	2-5	—	—
H-Frame, Wood	1	65	3	9	4-5	—	—
LST						2	91
H-Frame, Lattice or Wood	—	—	—	—	—	58	50-61

3.5.4.3 Telecommunications Poles/Towers

In Segment 1, approximately 60 new LWS poles or equivalents would be installed along Mazourka Canyon Road between the IC Project alignment and the community of Independence. The poles would be direct-buried and extend approximately 25-40 feet above ground. The diameter of the poles would typically be 1-2 feet at ground level and tapering to the top of the pole. Figure 3.5-2, Independence Telecom Tap illustrates this telecommunications route.

Where the IC Project alignment is crossed overhead by other transmission and subtransmission lines, it may be necessary to install ADSS fiber optic cable on new poles that carry only the ADSS fiber optic cable (Figure 3.5-3). If this is necessary, approximately 44 LWS poles or equivalents would be installed at crossing locations in Segments 1 and 2. The poles would be direct-buried and extend approximately 25-40 feet above ground. The diameter of the poles would typically be 1-2 feet at ground level and tapering to the top of the pole.

3.5.4.4 Distribution Poles

No distribution poles are included in the IC Project.

3.5.5 Conductor/Cable

3.5.5.1 Above-Ground Installation

3.5.5.1.1 Transmission

No transmission-level (i.e., > 200 kV) conductor would be installed or removed as part of the IC Project.

3.5.5.1.2 Subtransmission

The approximate distance from the ground to the lowest conductor would comply with CPUC GO 95 standards. The distance between the ground and the lowest conductor would exceed applicable minimum height requirements where the conductor spans roadways and water conveyance structures. The typical configuration of conductor on replacement structures is shown in Figureset 3.5-1, Typical Structure Design.

Conductor span lengths would vary depending upon topography, engineering, and site considerations. Spans would range from approximately 50 feet to 2,000 feet. In all Segments, short sections of OHGW may be installed between the substation racks and getaway or other replacement structures.

3.5.5.1.2.1 Segment 1

Existing subtransmission structures in Segment 1 are generally double-circuited, with single-circuit structures dispersed along the alignment. Replacement structures would generally be double-circuited with ACCC ‘Dove’ conductor; the conductor would be non-specular and would have a diameter of approximately 0.93 inches. At some locations, including where other transmission lines cross over the IC Project subtransmission lines, single-circuited replacement multipole TSP or LWS pole structures may be installed to maintain adequate clearances between lines. OHGW would be installed on some structures for system protection.

3.5.5.1.2.2 Segment 2

Existing subtransmission structures in Segment 2 are generally double-circuited, with single-circuit structures dispersed along the alignment. In Segment 2, replacement TSPs would be designed as double-circuit structures, but only a single circuit with ACCC ‘Dove’ conductor would be installed; depending on location along the alignment, the circuit would be installed on the west or east side of the replacement structures as part of the IC Project. The conductor would be non-specular and would have a diameter of approximately 0.93 inches. At some locations, including where other transmission lines cross over the IC Project subtransmission line, single-circuited replacement TSPs may be installed to maintain adequate clearances between lines. OHGW may be installed on some temporary structures during construction for system protection.

3.5.5.1.2.3 Segment 3N

In Segment 3N, a single circuit of ACCC 'Dove' conductor would be installed on existing, replacement, and interset structures as part of the IC Project. The conductor would be non-specular and would have a diameter of approximately 0.93 inches.

3.5.5.1.2.4 Segment 3S

In Segment 3S, a single circuit of ACCC 'Dove' conductor would be installed on existing and replacement structures as part of the IC Project. The conductor would be non-specular and would have a diameter of approximately 0.93 inches.

3.5.5.1.2.5 Segment 4

In Segment 4, no conductor is anticipated to be installed or replaced.

3.5.5.1.3 Telecommunications

New telecommunications cable—either OPGW or ADSS fiber optic cable—and appurtenances would be installed along the length of Segments 1 and 2, at each of the existing substations along these Segments, and to the Independence amplifier site. New fiber optic cable would be approximately ½-inch in diameter and non-specular; appurtenances would include splice boxes and risers, among other infrastructure. The typical configuration of telecommunications cable on replacement structures is shown in Figureset 3.5-1, Typical Structure Design.

The OPGW would generally be installed at the top of the replacement structures as shown in Figureset 3.5-1, Typical Structure Design. There are several locations along the IC Project alignment where other transmission lines cross over the IC Project subtransmission lines. At these locations, ADSS fiber optic cable may be installed below the conductor on the replacement structures or ADSS fiber optic cable may be installed on new poles adjacent to the subtransmission alignment. If these options are not feasible, fiber optic cable may also be installed underground in new facilities in these locations. At some substations and at the Independence amplifier site, fiber optic cable would be installed underground where the cable route enters and exits the substation.

The telecommunications route would originate at Control Substation (Figure 3.1-1, Project Segments). The fiber optic cable would be routed underground from the mechanical electrical equipment room (MEER) to the first replacement structure outside the fence line (referred to as the getaway structure), and then transition to overhead where OPGW would be installed on replacement structures to a point on the alignment where it crosses Mazourka Canyon road east of the community of Independence.

At a replacement structure adjacent to Mazourka Canyon Road, the OPGW would transition from the Segment 1 alignment to a new tap line to the Independence amplifier site. The OPGW would be installed overhead on new poles along the tap line. At the amplifier site, it would transition to an underground configuration to enter an existing third-party telecommunications facility. From the Mazourka Canyon Road replacement structure, the OPGW would continue overhead on replacement structures to Haiwee Substation.

At Haiwee Substation, the telecommunications route would be routed overhead from the IC Project alignment to the substation on H-frame structures owned by Los Angeles Department of Water and Power (LADWP). The route would transition from overhead to underground via two existing LADWP H-frame structures. A new telecommunications cabinet would be constructed at the substation. From Haiwee Substation, the route would proceed overhead on replacement subtransmission structures to Coso Substation.

At Coso Substation, the telecommunications route would transition from overhead to underground via a replacement TSP located proximate to the substation. From this TSP, fiber optic cable would be placed underground, terminating within the existing MEER building at Coso Substation. The fiber optic circuit would loop through Coso Substation, transitioning back to an overhead configuration. From Coso Substation, the telecommunications route would continue overhead to Inyokern Substation, where just outside the substation it would transition underground via a replacement structure and would terminate at an existing telecommunication building at Inyokern Substation.

In Segment 2, the telecommunications route would originate at the MEER building at Inyokern Substation. The fiber optic cable would be routed underground from the MEER building, beneath SR-178, to a getaway TSP, where it would transition to an overhead configuration and continue to Randsburg Substation. At Randsburg Substation, the fiber optic circuit would transition to underground conduit via a riser on a getaway structure and be routed to an existing telecommunications cabinet inside the substation. The fiber optic circuit would leave Randsburg Substation underground, transitioning to an overhead configuration via a riser on a replacement getaway structure. The fiber optic circuit would then travel overhead to Kramer Substation, where it would again transition to an underground configuration and terminate at an existing telecommunications room.

3.5.5.1.4 Distribution

No distribution conductor would be installed or removed as part of the IC Project.

3.5.5.2 Below-Ground Installation

3.5.5.2.1 Transmission

No below-ground installation of transmission conductor is included in the IC Project.

3.5.5.2.2 Subtransmission

No below-ground installation of subtransmission conductor is included in the IC Project.

3.5.5.2.3 Telecommunications

The IC Project would require the below-ground installation of fiber optic cable near substations in Segments 1 and 2, and at the Independence amplifier site. Below-ground installation would occur both within the fence line of the existing substations and amplifier site, and outside the fence line, as described in Section 3.5.2, Telecommunications Description. In addition, fiber optic cable may be installed underground at locations where the IC Project alignment is crossed overhead by other transmission or subtransmission lines.

3.5.6 Substations

3.5.6.1 New Substations

No new substations are included in the IC Project.

3.5.6.2 Modifications to Existing Substations, Segments 1 and 2

Subtransmission-related work within Control, Coso, Haiwee, Inyokern, Kramer, and Randsburg substations in Segments 1 and 2 would include disconnecting existing conductor from existing substation equipment and connecting new conductor to existing substation equipment. Minor modifications to the existing racks at each of the substations may be required so that OHGW can be installed between the racks and the getaway structures. These minor modifications could include installation of new fittings to which the OHGW would be attached, or structural reinforcement of the existing racks. New and upgraded protection and control equipment would be installed within the control buildings at each of the six substations.

Existing control cables between existing breakers and the existing MEER/communication room/telecommunications relay protection and control racks would be removed and new bundled multi-conductor would be installed where necessary. The new control cable would be installed into existing cable trench and conduit systems within the substation. If a conduit cannot be re-used, then a new conduit would be installed between the equipment and cable trench or MEER building. New relays and relay racks would be installed into existing MEER/communication room/telecommunications buildings as required per the final engineering design.

3.5.6.3 Modifications to Existing Substations, Segments 3N, 3S, and 4

At all existing substations in Segments 3N, 3S, and 4, new and upgraded protection and control equipment would be installed within the substations.[6]

3.6 Right-of-way Requirements

Upon final engineering and receipt of project approvals, SCE would confirm the necessary land rights and acquire the same for the IC Project. A summary of land rights to be acquired is as follows:

- Segment 1. Replacement structures in Segment 1 would be installed outside the existing corridor on which SCE has rights. New rights required for entire 126-mile length; replacement infrastructure would be installed outside of the corridor on which SCE has rights. Rights to be obtained from BLM, BIA, DoD, California State Lands Commission, LADWP, and private landowners.
- Segment 2. Replacement structures in Segment 2 would be installed within the existing corridor on which SCE has rights, with the following exceptions: Existing rights on BLM-managed lands have expired and would be renegotiated; new rights to be obtained from Caltrans and counties for road crossings; new rights to be obtained from private landowners and others; and upgraded rights to be obtained from private landowners.
- Segment 3N. Replacement and interset structures in Segment 3N would be installed within SCE's existing ROW. However, existing rights on BLM- and DoD-managed lands will be amended to reflect the proposed project ROW. Encroachment permits will need to be obtained from Caltrans and counties for highway/roadway crossings. A license and/or railroad clearance will be obtained

[6] As described in SCE's Distribution Substation Plan (DSP), SCE is currently in the process of modifying and modernizing Baker Substation in Segment 4. The modifications to Baker Substation are expected to be completed prior to the start of construction of the IC Project. The work at Baker Substation described in the DSP is a distinct and independent project being separately undertaken by SCE that has independent utility from the IC Project. Completion of the work described in the DSP would result in a modernized Baker Substation; one component of the DSP project is installation of a standard four-breaker ringbus to which the subtransmission line in Segment 4 will be connected. In light of the fact that the work at Baker Substation would be constructed and its infrastructure placed into operation prior to the start of construction for the IC Project, SCE would not need to construct or modify any further substation facilities in Segment 4 to support the IC Project.

from railroads for any railroad crossings. New/upgraded rights may need to be obtained from private landowners.

- Segment 3S. Replacement structures in Segment 3S would be installed within SCE's existing ROW. However, existing rights on BLM- and DoD-managed lands will be amended to reflect the proposed project ROW. Encroachment permits will need to be obtained from Caltrans and counties for highway/roadway crossings. A license and/or railroad clearance will be obtained from railroads for any railroad crossings. New/upgraded rights may need to be obtained from private landowners.
- Segment 4. Replacement and interset structures in Segment 4 would be installed within SCE's existing ROW. However, existing rights on BLM-managed lands will be amended to reflect the proposed project ROW. Encroachment permits will need to be obtained from Caltrans and counties for highway/roadway crossings. A license and/or railroad clearance will be obtained from railroads for any railroad crossings. New/upgraded rights may need to be obtained from private landowners.

The IC Project would be built within existing or new ROWs, including easements, public ROWs, and on existing SCE fee-owned property. The width of these ROWs varies over the length of the IC Project alignment. Existing access roads and spur roads are primarily located within existing ROWs or covered under easements, are public roads, or are open roads on lands administered by the BLM.

New authorizations from the BLM and other federal and state landowners, and new or modified easements from private landowners, would be obtained to accommodate the reconstructed subtransmission lines as necessary. In addition, appropriate permits, licenses, and/or property rights would be obtained for flood control, railroad, and highway crossings. Temporary land rights (e.g., easements, permits, and license) may be required for access roads, construction work areas, conductor stringing sites, helicopter landing zones, material yards and other construction-support areas during construction. This is subject to change based on final engineering and construction requirements.

Easement widths are based on facility types, final design and type of right to be acquired. Upgrading easements may include adding land rights, adding width to existing easements, improving or clarifying access or maintenance rights, etc.

3.7 Construction

The following subsections describe the construction activities associated with the IC Project.

3.7.1 For All Projects

3.7.1.1 Material Yards

Construction of the IC Project would require the establishment of temporary material yards. Material yards would be used as a reporting location for workers, vehicle and equipment parking, and material storage. The yard may also have construction trailers for supervisory and clerical personnel. Material yards may be lit for staging and security. Normal maintenance and refueling of construction equipment would also be conducted at these yards. All refueling—which may include helicopters—and storage of fuels would be in accordance with the site-specific Storm Water Pollution Prevention Plan(s) (SWPPP[s]).

SCE anticipates using locations listed in Table 3.7-1: Potential Material Yard Locations, and shown in Figureset 3.7-1, Material Yards as the materials yard(s) for the IC Project. Typically, each yard would be approximately 1 to 5 acres in size, depending on land availability and intended use. Preparation of the material yard would include temporary perimeter fencing and depending on existing ground conditions at the site, grubbing and/or minor grading may be required to provide a plane and dense surface for the application of gravel or crushed rock. Any land that may be disturbed at the material yard would be returned to preconstruction conditions, or left in its modified condition as agreed to by the landowner, following the completion of construction for the IC Project.

Table 3.7-1: Potential Material Yard Locations

Yard Name	Location	Condition	Approx. Area (Acres)	Project Component
1-1	US 395/Sunland Reservation Rd., Bishop	Disturbed	5.04	Segment 1
1-2	Sunland Ln., Bishop	Disturbed	3.80	Segment 1
1-4	Big Pine Dump Rd./Gregg Rd., Big Pine	Undisturbed	5.06	Segment 1
1-6	US 395/East Elna	Undisturbed	4.94	Segment 1
1-7	US 395/Aberdeen Station Rd.	Undisturbed	4.93	Segment 1
1-8	US 395/North Coloseum Rd.	Undisturbed	4.92	Segment 1
1-9	Mazourka Canyon Rd.	Undisturbed	4.73	Segment 1
1-10	Manzanar Reward Rd.	Disturbed/Asphalted	4.60	Segment 1
1-11	Substation Rd., Lone Pine	Disturbed	4.87	Segment 1
1-12	1800 Block S. Main St., Lone Pine	Disturbed	2.87	Segment 1
1-13	US 395/South of Diaz Lake	Disturbed	5.08	Segment 1
1-14	US 395	Disturbed	4.96	Segment 1
1-15	US 395, Cartago	Disturbed	4.95	Segment 1
1-16	SR-190, Olancha	Disturbed	5.06	Segment 1
1-17	East of Enchanted Lake Rd.	Undisturbed	5.02	Segment 1
1-18	Haiwee Substation	Disturbed	4.95	Segment 1
1-19	Gill Station Coso Rd.	Undisturbed	4.88	Segment 1
1-20	South of Little Lake	Undisturbed	4.94	Segment 1
1-21	US 395/Brown Rd.	Undisturbed	5.01	Segment 1
1-22	East of Inyokern Substation	Disturbed	1.64	Segment 1
2-1A	SR-178 A	Undisturbed	4.73	Segment 2
2-1B	SR-178 B	Undisturbed	4.11	Segment 2
2-2	North Downs St	Asphalted/Paved	5.15	Segment 2
2-3	East Upjohn Ave	Disturbed	4.60	Segment 2
2-4A	South Brown Road A	Disturbed	4.86	Segment 2
2-4B	South Brown Road B	Disturbed	4.93	Segment 2
2-5	Garlock Rd	Disturbed	4.93	Segment 2
2-6	Garlock Rd	Disturbed	5.01	Segment 2
2-7A	Goler Rd B	Disturbed	4.85	Segment 2
2-8	Red Mountain Rd	Disturbed	5.01	Segment 2
2-9	Hoffman Rd	Disturbed	3.77	Segment 2
2-10A	US 395 A	Undisturbed	4.95	Segment 2
2-10B	US 395 B	Undisturbed	4.33	Segment 2
2-11A	AT&SF RR A	Disturbed	1.63	Segment 2
2-11B	AT&SF RR B	Undisturbed	4.72	Segment 2
2-12A	US 395 A	Disturbed	4.07	Segment 2
2-12B	US 395 B	Disturbed	4.67	Segment 2
3S-13A	US 395 A	Undisturbed	3.39	Segment 3S
3S-13B	US 395 B	Undisturbed	4.38	Segment 3S
3N-14A	Harper Lake Rd A	Undisturbed	4.52	Segment 3N
3N-14B	Harper Lake Rd B	Undisturbed	4.50	Segment 3N
3N-15A	Harper Lake Rd	Undisturbed	4.51	Segment 3N
3N-16A	Rainbow Ranch Rd A	Undisturbed	4.78	Segment 3N
3N-16B	Rainbow Ranch Rd B	Disturbed	4.76	Segment 3N

Table 3.7-1: Potential Material Yard Locations

Yard Name	Location	Condition	Approx. Area (Acres)	Project Component
3N-17	Irwin Road	Disturbed	4.76	Segment 3N
3N-18	North Frontage Rd	Disturbed	5.22	Segment 3N
3N-19	County Rd	Undisturbed	4.74	Segment 3N
3N-20	Harper Lake Rd	Undisturbed	5.01	Segment 3N
3S-21	Hinkley Rd	Undisturbed	5.05	Segment 3S
3S-22	Agate Rd	Undisturbed	5.16	Segment 3S
3S-23	Tortilla Substation	Undisturbed	5.22	Segment 3S
3S-24	Ord Mountain Rd	Undisturbed	4.95	Segment 3S
3S-25	Santa Fe St	Disturbed	5.49	Segment 3S
3S-26	Coolwater (Ongen) Substation	Disturbed	4.90	Segment 3S
4-27	Minneola Rd	Undisturbed	4.86	Segment 4
4-28	Harvard Rd	Undisturbed	4.74	Segment 4
4-29	I-15	Undisturbed	4.59	Segment 4
4-30	Afton Canyon Rd	Disturbed	4.49	Segment 4
4-31	Arrowhead Trail	Undisturbed	4.38	Segment 4
4-32	Rasor Rd	Disturbed	2.31	Segment 4
4-33	I-15	Undisturbed	4.92	Segment 4
4-34	Baker Blvd	Disturbed	5.09	Segment 4
4-35	Baker Airport	Disturbed	4.15	Segment 4
4-36	Halloran Springs Rd	Disturbed	0.85	Segment 4
4-37	Halloran Springs Rd	Disturbed	3.80	Segment 4
4-39	Halloran Summit Rd	Disturbed	5.03	Segment 4
4-40	Kingston Rd	Undisturbed	5.08	Segment 4
4-41	Ivanpah Substation	Disturbed	5.05	Segment 4
4-42	Powerline Rd	Disturbed	4.89	Segment 4

Temporary power would be determined based on the type of equipment/facilities being used at the material yards. If existing distribution facilities are available, a temporary service and meter may be used for electrical power at one or more of the yards. If it is determined that temporary power is not needed or available at the material yards full time, a portable generator may be used intermittently for electrical power at one or more of the yards.

Materials commonly stored at the material yards would include, but not be limited to, construction trailers, construction equipment, portable sanitation facilities, steel bundles, steel/wood poles, conductor/OHGW reels, OPGW/ADSS reels, hardware, insulators, cross arms, signage, consumables (such as fuel and filler compound), waste materials for salvaging, recycling, or disposal, and SWPPP Best Management Practices (BMP) materials such as straw wattles, gravel rolls, and silt fences.

A majority of materials associated with the construction efforts would be delivered by truck to designated material yards, while some materials may be delivered directly to the temporary subtransmission construction areas described in Section 3.7.1.2, Work Areas.

3.7.1.2 Work Areas

Subtransmission construction work areas serve as temporary working areas for crews and where project related equipment and/or materials are placed at or near each structure location, within SCE ROW or franchise. Table 3.7-2: Approximate Laydown/Work Area Dimensions, identifies the approximate land disturbance for these construction areas dimensions for the IC Project.

The laydown/work areas for each structure location (Table 3.7-2: Approximate Laydown/Work Area Dimensions) would first be graded and/or cleared of vegetation as required to provide a reasonably level and vegetation-free surface for structure installation. Sites would be graded such that water would run toward the direction of the natural drainage and as directed by the SWPPP requirements. In addition, drainage would be designed to prevent ponding and erosive water flows that could cause damage to footings or poles. The graded area would be compacted to at least 90 percent relative density and would be capable of supporting heavy vehicular traffic. Erection of the structures may also require establishment of a temporary crane pad. The crane pad would typically occupy an area of approximately 50 feet by 50 feet and be located adjacent to each applicable structure within the laydown/work area used for structure assembly. The pad may be cleared of vegetation and/or graded as necessary to provide a level surface for crane operation. The decision to use a separate crane pad would be determined during final engineering for the IC Project and the selection of the appropriate construction methods to be used by SCE or its Contractor.

Benching may be required to provide access for foundation construction, structure assembly and installation, and wire stringing activities during line construction. Benching is a technique in which an earth moving vehicle excavates a terraced access to structure locations in extremely steep and rugged terrain. Benching may also be used on an as-needed basis in areas to help ensure the safety of personnel during construction activities. SCE does not foresee the need for benching as part of the IC Project; however, the physical environment in which the IC Project would be constructed is dynamic, and thus this description of benching is included should the need for benching arise during construction.

Table 3.7-2: Approximate Laydown/Work Area Dimensions

Laydown/Work Area Feature	Number of Features	Preferred Size (L x W, Feet)[1,2,3]	Total Square Footage	Total Acreage
Install TSP	725	200 x 150	21,750,000	499.3
Install Multipole TSP Structure	128	200 x 150	3,840,000	88.2
Install TSP H-Frame	2	200 x 150	60,000	1.4
Install LWS pole (permanent)	391	200 x 100	7,820,000	179.5
Install LWS/Wood H-Frame	135	200 x 125	3,375,000	77.5
Install Multipole LWS Structure (permanent)	15	200 x 125	375,000	8.6
Install LWS pole (temporary)	108	200 x 100	2,160,000	49.6
Install Multipole LWS Structure (temporary)	2	200 x 150	60,000	1.4
Install Multipole Wood Structure (permanent)	9	200 x 200	360,000	8.3
Remove TSP or LST	1,356	200 x 150	40,680,000	933.9
Remove H-Frame (steel or wood)	136	200 x 125	3,400,000	78.1
Remove Multipole (wood)	12	200 x 125	360,000	8.3
Remove wood pole	192	200 x 100	3,840,000	88.2
Modify Existing Structure	83	200 x 125	2,075,000	47.6
Conductor Stringing Site	458	400 x 150	44,400,000	630.9
Conductor Field Snub or Splice Areas	63	400 x 100	4,160,000	57.0
Splice Removal Area	882	75 x 50	3,311,250	75.9
Install/Remove Guard Structure	305	75 x 75	2,716,875	39.4
Telecommunications Pull and Tension Site[4]	—	400 x 150	—	--
Material Yards	69	Varies	14,542,791	296.8
Helicopter Landing Zone	5	Varies	200,376	3.9

Notes:

1 The dimensions listed above are preferred for construction efficiency; actual dimensions may vary.

2 For the purposes of this PEA it is assumed that the entirety of the 'Preferred Size' for each laydown/work area feature would be disturbed during construction. It is also assumed that the entirety of the 'Preferred Size' would be used at every TSP installation site, every LWS H-frame installation site, etc.

Table 3.7-2: Approximate Laydown/Work Area Dimensions

Laydown/Work Area Feature	Number of Features	Preferred Size (L x W, Feet)[1,2,3]	Total Square Footage	Total Acreage

3 Helicopter-assisted construction for a given structure type would utilize a work area of the dimensions presented for that structure type presented in this Table.

4 Telecommunications pull and tension sites along Segments 1 and 2 would be located within conductor stringing sites or conductor field snub areas.

3.7.1.3 Access Roads and/or Spur Roads

Subtransmission line roads are classified into two groups; access roads and spur roads. Access roads are through roads that run between tower sites along a ROW and serve as the main transportation route along line ROWs. Spur roads are roads that lead from access roads and terminate at one or more structure sites.

As discussed earlier, construction and operation and maintenance crews would employ a network of existing roads. The typical subtransmission access road consists of a network of dirt roads accessed from paved public and private roads.

No new permanent access roads would be developed as part of the IC Project. In some locations, new permanent spur roads may be constructed from existing access roads to replacement structures. Approximately 388 miles of existing access and spur roads would be employed for construction of the IC Project. At present, all 388 miles are projected to require minor rehabilitation work, including regrading and repair of the existing roadbed. These roads would be cleared of vegetation; blade-graded to remove potholes, ruts, and other surface irregularities; and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. As part of this minor rehabilitation, vegetation within the road prism would be trimmed or removed to the width of the prism.

Prior to the start of construction, some of the existing 388 miles of existing access and spur roads may require additional rehabilitation. The extent and scope of this rehabilitation is unknown at this time, as field conditions along the IC Project alignment are subject to change. The types of additional rehabilitation that may be required could include:

- Widening of the existing roadbed at curves and other locations.
- Installation of new, or repair of existing, drainage structures such as wet crossings, water bars, overside drains and pipe culverts to allow for construction traffic usage, as well as to prevent road damage due to uncontrolled water flow.
- Repair and stabilization of slides, washouts, and other slope failures 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.

If, during the final engineering process, the need for retaining walls is identified, the location, length, height, and type of such walls would be communicated to the CPUC. If the need for extensive rehabilitation is identified, a Minor Project Refinement and associated environmental effects analysis likely would be developed and submitted to the CPUC.

Where existing access or spur roads cross culverted waterways, temporary plating or matting may be laid over the roadway to protect the culverts and to support the movement of heavy construction equipment. In some instances, a temporary bridge may be placed over a culverted or bridged waterway if plating or matting would not adequately protect the culverts or if an existing bridge is not suitable for the movement of heavy construction equipment. Plating or matting may also be placed in other locations depending on surface conditions at the time of construction.

Table 3.7-3: Access and Spur Road Land Disturbance Table

Project Feature	Site Quantity	Disturbance Acreage Calculation (L x W)	Acres Disturbed During Construction	Acres to be Restored	Acres Permanently Disturbed
Existing Access and Spur Roads	386.2 miles	# of miles x 18 feet	845.5	0	162[1]
New Spur Roads	2.8 miles	#of miles x variable dimensions	4.8	0	4.8

Notes:

1 The width of existing access and spur roads varies across the IC Project alignment. SCE's standard design for access and spur roads is that they have a width of 18 feet (a 14-foot drivable surface and 2-foot shoulders on each side of the road). At present, existing access and spur roads account for 687 acres of disturbance. To bring these access and spur roads up to the SCE standard design, an additional 162 acres would be permanently disturbed. No disturbance outside the 18-foot width (including vegetation trimming) is included in these calculations.

3.7.1.4 Helicopter Access

Helicopters would be used to support construction activities. Helicopter use supporting construction may include, but is not limited to, areas where access is limited (e.g., no suitable access road, limited construction area to facilitate on-site structure assembly, and/or there are environmental constraints to accessing the project area with standard construction vehicles and equipment) or where system outage constraints are a factor.

Specifically, SCE currently anticipates helicopters would be utilized in support of the construction of the IC Project, to include the installation of replacement structures, and removal of existing structures where overland access is not feasible. Project related helicopter activities may include transportation of construction workers, delivery of equipment and materials to structure sites, structure placement, structure removal, hardware installation, marker ball installation (if applicable), and conductor and fiber optic cable stringing operations. SCE would consider IEEE Standards 951-1966, *Guide to the Assembly and Erection of Metal Transmission Structures*, and 524-2003, *Guide to the Installation of Overhead Transmission Line Conductors* in the construction of the IC Project.

The dimensions of the construction work areas required for this work are captured by the dimensions described in Table 3.7-2. Helicopters may be used in other areas to facilitate construction of the IC Project as the exact method of construction employed and the sequence by which construction tasks occur would be dependent on final engineering, contract award, conditions of permits, and contractor preference.

Helicopter operations and support areas typically include helicopter staging and material yards, storage and maintenance sites, and ground locations in close proximity to conductor or OPGW/ADSS pulling, tensioning, and splice sites and/or within previously disturbed areas near construction sites. In addition, helicopters must be able to land within SCE ROWs, which could include landing on access or spur roads. At night or during off days, for safety and security concerns, helicopters and their associated support vehicles and equipment may be based at a local airport(s) or airstrips; helicopters may also be refueled at these airports or airstrips.

Helicopter construction activities would typically be based out of material yards as described above. Material yards would be sited based upon a variety of factors, including the optimization of flight time to work locations. Additionally, operation crews, as well as fueling and maintenance trucks, may be based in the material yards. Material yards may also be used for material storage and pole assembly activities.

Once pole sections are assembled, they would be transported via helicopter or ground-based vehicle to installation sites for final assembly.

SCE anticipates using the possible locations listed in Table 3.7-1: Potential Material Yard Locations, as the helicopter yards for the IC Project. Preparation of the material yard would include temporary perimeter fencing and depending on existing ground conditions at the site, grubbing and/or minor grading may be required to provide a plane and dense surface for include the application of gravel or crushed rock. Any land that may be disturbed at the material yard would be restored to preconstruction conditions or to the landowner's requirements following the completion of construction for the IC Project. Additional helicopter landing zones have been identified along the IC Project alignment where a material yard is not proximate to a location where helicopter-assisted construction will be required.

Flight paths would be determined immediately prior to construction by the helicopter contractor. Flight paths would be filed with the appropriate authorities, where required. As examples, SCE anticipates that medium-duty helicopters would be used for structure removal and installation activities, and light-duty helicopters would be used for conductor, OPGW, and marker ball installation.

3.7.1.5 Vegetation Clearance

Construction of the IC Project would be performed using public roads, SCE's existing access and spur roads, as well as stringing sites, construction work areas, material yards, and helicopter landing zones along the alignment.

During road rehabilitation activities, vegetation would be trimmed and/or removed within the 18-foot wide access or spur road prism as necessary. Vegetation would also be trimmed and/or removed as needed at stringing sites, construction work areas, material yards, and helicopter landing zones. Vegetation removal in some areas would consist of "brushing" (i.e., shrubs and other low-lying vegetation would be trimmed and/or removed within the 18-foot wide access or spur road prism as necessary).

Where overland travel is feasible, vegetation would be trimmed while leaving the root structure intact, or vehicles would drive over the extant vegetation (overland travel). In some locations, temporary matting may be placed on the surface to facilitate access to a work location.

Brushing would generally be accomplished using a mower-type attachment mounted to a tractor; in some instances, areas would be brushed by individuals using heavy-duty "weed whacker" type equipment. Vegetation growing on the road surface would be removed by a motor grader during the blade-grading of roads to remove potholes, ruts, and other surface irregularities.

Trees or portions of trees that encroach upon the 18-foot wide access and spur road prism may be removed to facilitate the safe movement of construction equipment. Similarly, trees or portions of trees within or adjacent to stringing sites, construction laydown areas, construction work areas, material yards, and helicopter landing zones may be trimmed or removed to permit the safe operation of construction equipment; these areas would be preferentially selected to minimize the trimming or removal of trees.

3.7.1.6 Erosion and Sediment Control and Pollution Prevention during Construction

3.7.1.6.1 Storm Water Pollution Prevention Plan (SWPPP)

Construction of the IC Project would disturb a surface area greater than one acre. Therefore, SCE would apply for coverage under a General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order 2009-0009-DWQ as amended by Order 2010-0014-DWQ from the

State Water Resources Control Board (SWRCB). As part of the permitting requirements, SCE or its contractor would prepare one or more Storm Water Pollution Prevention Plan(s) (SWPPP[s]) that includes project information, design features, monitoring and reporting procedures, and Best Management Practices (BMPs). Commonly used BMPs are storm water runoff quality control measures (e.g., boundary protection, erosion and sediment controls, etc.), good housekeeping, dewatering procedures, and concrete waste management. The SWPPP would be based on final engineering design and would include all project components.

3.7.1.7 Dust Control

During construction, migration of fugitive dust from the construction sites would be limited by control measures set forth by the Eastern Kern Air Pollution Control District, Great Basin Unified Air Pollution Control District, and the Mojave Desert Air Quality Management District. These measures may include the use of water trucks and other dust control measures, including the application of non-toxic soil binders. The sources of water to be used for dust control are discussed in Section 4.19, Utilities and Service Systems.

3.7.1.8 Hazardous Materials

Construction of the IC Project would require the limited use of hazardous materials, such as fuels, lubricants, and cleaning solvents. All hazardous materials would be stored, handled, and used in accordance with applicable regulations. Safety Data Sheets would be made available at the construction site for all crew workers.

Based on the anticipated volume of hazardous liquid materials, such as fuel, that would be stored and dispensed at material yards, a Spill Prevention, Control, and Countermeasure (SPCC) Plan could be required (in accordance with 40 C.F.R. Parts 112.1-112.7) depending on contractor requirements.

3.7.1.9 Reusable, Recyclable, and Waste Material Management

Construction of the IC Project would result in generation of various waste materials, including wood, metal, soil, vegetation, and sanitation waste (portable toilets). Sanitation waste (i.e., human generated waste) would be disposed of in accordance with applicable sanitation waste management practices. Material from existing infrastructure that would be removed as part of the IC Project such as conductor, steel, concrete, and debris, would be temporarily stored in one or more material yards as the material awaits salvage, recycling, and/or disposal. Approximately 2,054 tons of metal (consisting of steel from existing towers and metals from existing conductor) would be removed as part of the IC Project, as would approximately 37 tons of concrete from the foundations of existing towers.

The existing wood poles removed under the IC Project would be returned to a material yard, and either reused by SCE, returned to the manufacturer, disposed of in a Class I hazardous waste landfill, and/or disposed of in the lined portion of a Regional Water Quality Control Board (RWQCB)-certified landfill. Approximately 384 poles would be removed and disposed under the IC Project.

Drilling muds would be disposed of off-site at an appropriately licensed waste facility. Material excavated for the IC Project would either be used as fill, backfill for replacement TSPs or LWS poles or other excavations, and/or disposed of off-site at an appropriately licensed waste facility. If contaminated material is encountered during excavation, it would be managed per the Project's Soil Management Plan.

3.7.1.10 Geotechnical Studies

Prior to construction, geotechnical investigations would be initiated to compile information required to complete final engineering. The results of these studies would provide an evaluation of the depth to the water table, liquefaction potential, physical properties of subsurface soils, slope stability, and the presence of hazardous materials and common contaminants; the studies may also include recommendations for the final engineering design.

3.7.1.11 Cleanup and Post-Construction Restoration

SCE would restore all areas that would be temporarily disturbed by construction of the IC Project (which may include the material yards, construction work areas, and stringing sites, among others) to as close to pre-construction conditions as feasible, or to the conditions agreed upon between the landowner and SCE following the completion of construction of the IC Project.

If restoration and/or revegetation occurs within sensitive habitats, a habitat restoration and/or revegetation plan(s) would be developed by SCE with the appropriate resource agencies and implemented after construction is complete. Additional information pertaining to the habitat restoration and/or revegetation plan(s) can be found in Section 4.4, Biological Resources.

3.7.2 Subtransmission Line Construction (Above Ground)

The following sections describe the above ground construction activities associated with installing the subtransmission and telecommunications line infrastructure for the IC Project.

3.7.2.1 Pull and Tension Sites

Conductor stringing sites associated with the IC Project would be temporary. The conductor stringing sites require level areas to allow for safely positioning of the equipment and, when possible, these locations would be located on existing roads and level areas to minimize the need for grading. Approximately 458 conductor pulling sites, and 63 conductor snub sites, are currently proposed. The final number and location of these sites would be determined upon final engineering. The approximate area needed for conductor stringing sites associated with wire installation is variable and depends upon terrain. See Table 3.7-2: Approximate Laydown/Work Area Dimensions for approximate size of conductor stringing sites.

Wire pulls are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected based on a variety of factors, including availability of dead-end structures, conductor size, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment set-up locations. On relatively straight alignments, typical wire pulls occur approximately every 13,000 feet on flat terrain. When the line route alignment contains multiple deflections or is situated in rugged terrain, the length of the wire pull is typically diminished. Generally, pulling locations and equipment set-ups would be in direct line with the direction of the overhead conductors and established at a distance equal to approximately three times the height of the adjacent structure.

Each stringing operation consists of a puller set-up positioned at one end, and a tensioner set-up with wire reel stand truck positioned at the other end of the wire pull. Pulling and wire tensioning locations may also be utilized for splicing and field snubbing of the conductors. Where the existing conductor is spliced, permanent splices may be removed and temporary splices would be installed; this is necessary prior to conductor removal because permanent splices may not easily travel through the rollers. Splicing set-up locations are used to remove temporary pulling splices and install permanent splices once the conductor is strung through the rollers located on each structure. Field snubs (i.e., anchoring and dead-end hardware) would be temporarily installed to sag conductor wire to the correct tension at locations where stringing equipment cannot be positioned in back of a dead-end structure.

3.7.2.1.1 Telecommunications Pull and Tension Sites

Telecommunications pull and tension sites would generally be co-located within the conductor stringing sites described above. Where telecommunications cable is installed in a new alignment (for instance, the Independence tap line), telecommunications pull and tension sites of approximately 60 feet by 30 feet would be established.

The pull and tension sites require level areas to allow for safely positioning of the equipment. Existing, level areas and existing roads would be used to minimize the need for grading when possible. Equipment used to pull the telecommunication line would be similar to the equipment described previously for the subtransmission lines. Within the approximately 60-foot by 30-foot work area, two splice trucks with pulling equipment would be required to complete the splicing.

3.7.2.2 Pole (Structure) Installation and Removal

Structure installation and structure removal would require the use of a variety of equipment as presented in Table 3.7-8 and Table 3.7-9. Construction vehicles and equipment would be moved to pole installation or removal sites along the existing subtransmission access road network and spur roads, over new spur roads, overland, or flown to the installation or removal sites by helicopter. Section 3.7.5, Construction Workforce and Equipment describes the anticipated equipment and workforce required for the IC Project. To get to and from the sites, the crews would use one or more of the construction vehicles listed in Table 3.7-8 and Table 3.7-9. The numbers of anticipated trips are discussed in Section 4.17, Transportation.

3.7.2.2.1 Construction Sequence

The IC Project would involve removing structures, conductor, and associated hardware. The discussions below present information regarding how construction work in each of the Segments may be sequenced; the actual sequence of construction would be determined by the construction contractor. The duration of each of these activities, in terms of estimated production per day and overall estimated schedule, are provided in Table 3.8-1, Construction Equipment and Workforce. The potential work sequence for Segment 1, where the existing structures are double-circuited, may be as follows:

1. Road work – Existing access and spur roads would be used to reach structures, but some rehabilitation and grading may be necessary before removal activities would begin to establish construction access. Where existing access roads and/or spur roads are not present, and where the topography and soil conditions are suitable for overland travel, vegetation would be trimmed to define a route between the nearest access and/or spur road and a construction work area to permit the safe transit of construction vehicles. In some locations where surface conditions are not suitable for overland travel (soft soils, wetland areas, etc.), temporary matting may be placed on the surface from an existing access or spur road to the construction work area, and additional matting laid to form a construction work area. In some locations, new permanent spur roads may be constructed if existing spur roads are not present.
2. Wire-pulling locations – Wire pulling sites would be located approximately every 13,000 feet along the existing utility corridor and could include locations at dead-end structures and inflection points.

3. De-energize circuit – The subtransmission circuit on one side of the existing structures would be deenergized.
4. Conductor removal –Upon placement of the wire pulling equipment, the existing subtransmission conductor on one side of the existing structures would be pulled out with a pulling rope and/or cable attached to the trailing end of the conductor; guard structures or the equivalent might be used during the removal process. The old conductor would be transported to a material yard where it would be prepared for recycling.
5. Pole/tower installation – Replacement structures would be installed as described in Section 3.7.2.2.3.
6. Conductor installation – Replacement conductor would be installed on one side of the replacement structures as described in Section 3.7.2.3.
7. Fiber optic cable installation – Fiber optic cable would be installed on the replacement structures as described in Section 3.7.2.3.
8. Energize /deenergize circuits – The newly-installed circuit on replacement structures would be energized, and the remaining existing circuit on the existing structures would be deenergized.
9. Conductor removal – The remaining deenergized subtransmission conductors on the existing structures would be removed as described above.
10. Wood pole/wood pole H-frame removal, surface construction – Wood poles and wood pole H-frames would be removed utilizing a line truck or similar equipment with an attached boom. The removal would consist of above and below-ground portions of the pole. A ground crew would hand excavate around the wood pole; a boom would be attached to the pole, and the pole would then be lifted out and placed on the ground or on a trailer. The wood pole would be transported by truck to a material yard, and then to an SCE facility for reuse or recycling. The holes left from removing the poles would be backfilled and compacted with soils that may be available as a result of the excavation for new poles, with excess soil from the area, or using imported fill as needed.
11. Wood pole/wood pole H-frame removal, helicopter construction – Wood poles and wood pole H-frames would be removed utilizing a helicopter and sling. The removal would consist of the above and below-ground portions of the pole. Ground crew would access the pole location overland by vehicle or would walk to the location. The ground crew would hand excavate around the wood pole; a sling would be attached to the pole, and the pole would then be lifted out by the helicopter and placed on the ground or on a trailer or flown to a helicopter landing zone. The wood pole would then be transported by truck or helicopter to a material yard, and then to an SCE facility for reuse or recycling. The holes left from removing the poles would be backfilled and compacted with soils that may be available as a result of the excavation for new poles, with excess soil from the area, or using imported fill as needed.
12. LST removal, surface construction – For each structure to be removed, a work area would be required. Most structure removal activities would use the equipment pad or other previously disturbed areas established for structure installation. If previously disturbed areas adjacent to the structure are not available, an area would be cleared of vegetation and could be graded if the ground is not level. A crane could be positioned up to approximately 60 feet from the tower location to dismantle the tower. Structures would be dismantled down to the footings and the materials would be transported to a material yard where they would be prepared for recycling.
13. LST removal, helicopter construction – At some locations, existing LSTs may be removed using a helicopter if overland access for equipment is not feasible. Ground crew would unbolt portions of the LST and would attach a sling to the unbolted portion. The portion of the LST would then be lifted out by the helicopter and placed on the ground or on a trailer. The material would be transported to a material yard where it would be prepared for recycling.

14. LST footing removal – Footings would typically be removed 2-3 feet below grade and the holes would be filled with excess soil from the area and smoothed to match the surrounding grade. Footings may be left in-place in locations where their removal may cause slope or soil instability and thus could contribute to localized erosion. Footings may also be left in place if requested by the landowner. Footings would not be left in-place in locations that could pose a hazard to the public.
15. Conductor installation – Replacement conductors would be installed on the other side of the replacement structures as described in Section 3.7.2.3.
16. Energize circuit – The second replacement circuit would be energized.

The potential work sequence for Segment 2, where the existing double-circuited structures would be replaced with double-circuited structures that would have only a single circuit installed on them may be as follows:

1. Road work – Existing access and spur roads would be used to reach structures, but some rehabilitation and grading may be necessary before removal activities would begin to establish construction access. Where existing access roads and/or spur roads are not present, and where the topography and soil conditions are suitable for overland travel, vegetation would be trimmed to define a route between the nearest access and/or spur road and a construction work area to permit the safe transit of construction vehicles. In some locations where surface conditions are not suitable for overland travel (soft soils, wetland areas, etc.), temporary matting may be placed on the surface from an existing access or spur road to the construction work area, and additional matting laid to form a construction work area. In some locations, new permanent spur roads may be constructed if existing spur roads are not present.
2. Temporary pole installation – Install temporary poles to restrict blow-out of existing conductor into to-be-constructed new structures.
3. Wire-pulling locations – Wire pulling sites could be located approximately every 13,000 feet along the existing utility corridor and could include locations at dead-end structures and inflection points.
4. Deenergize circuit – The subtransmission circuit on one side of the existing structures would be deenergized.
5. Conductor removal – Upon placement of the wire pulling equipment, the existing subtransmission conductor on one side of the existing structures would be pulled out with a pulling rope and/or cable attached to the trailing end of the conductor; guard structures or the equivalent might be used during the removal process. The arms on that side of the existing structures would be removed as well. The old conductor would be transported to a material yard where it would be prepared for recycling.
6. Pole/tower installation – Replacement subtransmission structures and temporary structures would be installed as described in Section 3.7.2.2.3. All new infrastructure in Segment 2 would be installed prior to removal of the existing structures.
7. Conductor installation – Replacement conductors would be installed on one side of the replacement structures as described in Section 3.7.2.3.
8. Fiber optic cable installation – Fiber optic cable would be installed on the replacement structures as described in Section 3.7.2.3 below.
9. Energize/deenergize circuits – The newly-installed circuit on replacement structures would be energized and the remaining existing subtransmission circuit would be deenergized.
10. Conductor removal – The remaining deenergized subtransmission conductors on the existing structures would be removed as described above.
11. Existing and temporary structure removal – The existing LSTs and footings, poles, and H-frames, and temporary poles, would be removed through surface construction and helicopter construction as described for Segment 1 above.

The work in Segment 3N, where existing conductor would be replaced with new conductor, some of the existing structures would be replaced with new structures, and interset structures would be installed, may be as follows:

1. Road work – Existing access roads would be used to reach structures, but some rehabilitation and grading may be necessary before removal activities would begin to establish construction access. Where existing access roads and/or spur roads are not present, and where the topography and soil conditions are suitable for overland travel, vegetation would be trimmed to define a route between the nearest access and/or spur road and a construction work area to permit the safe transit of construction vehicles. In some locations where surface conditions are not suitable for overland travel (soft soils, wetland areas, etc.), temporary matting may be placed on the surface from an existing access or spur road to the construction work area, and additional matting laid to form a construction work area. In some locations, new permanent spur roads may be constructed if existing spur roads are not present.
2. Wire-pulling locations – Wire pulling sites could be located approximately every 13,000 feet along the existing utility corridor and could include locations at dead-end structures and inflection points.
3. Deenergize circuit – The subtransmission circuit would be deenergized.
4. Conductor removal – Upon placement of wire pulling equipment, the existing subtransmission conductor would be pulled out with a pulling rope and/or cable attached to the trailing end of the conductor; guard structures or the equivalent might be used during the removal process. The old conductor would be transported to a material yard where it would be prepared for recycling.
5. Existing structure removal – The existing structures slated for removal would be removed through surface construction as described for Segment 1 above.
6. Pole/tower installation – Replacement subtransmission structures and interset structures would be installed as described in Section 3.7.2.2.3.
7. Conductor installation – Replacement conductor would be installed as described in Section 3.7.2.3.
8. Energize circuit – The newly-installed circuit would be energized.

The work in Segment 3S, where existing conductor would be replaced with new conductor and some of the existing structures would be replaced with new structures, may be as follows:

1. Road work – Existing access roads would be used to reach structures, but some rehabilitation and grading may be necessary before removal activities would begin to establish construction access. Where existing access roads and/or spur roads are not present, and where the topography and soil conditions are suitable for overland travel, vegetation would be trimmed to define a route between the nearest access and/or spur road and a construction work area to permit the safe transit of construction vehicles. In some locations where surface conditions are not suitable for overland travel (soft soils, wetland areas, etc.), temporary matting may be placed on the surface from an existing access or spur road to the construction work area, and additional matting laid to form a construction work area. In some locations, new permanent spur roads may be constructed if existing spur roads are not present.
2. Wire-pulling locations – Wire pulling sites could be located approximately every 13,000 feet along the existing utility corridor and could include locations at dead-end structures and inflection points.
3. Deenergize circuit – The subtransmission circuit would be deenergized.
4. Conductor removal – Upon placement of wire pulling equipment, the existing subtransmission conductor would be pulled out with a pulling rope and/or cable attached to the trailing end of the

conductor; guard structures or the equivalent might be used during the removal process. The old conductor would be transported to a material yard where it would be prepared for recycling.

5. Existing structure removal – The existing structures slated for removal would be removed through surface construction as described for Segment 1 above.
6. Pole/tower installation – Replacement subtransmission structures and interset structures would be installed as described in Section 3.7.2.2.3.
7. Conductor installation – Replacement conductor would be installed as described in Section 3.7.2.3.
8. Energize circuit – The newly-installed circuit would be energized.

The work in Segment 4, where existing single-circuited structures would be replaced with single-circuited structures, may be as follows:

1. Road work – Existing access roads would be used to reach structures, but some rehabilitation and grading may be necessary before removal activities would begin to establish construction access. Where existing access roads and/or spur roads are not present, and where the topography and soil conditions are suitable for overland travel, vegetation would be trimmed to define a route between the nearest access and/or spur road and a construction work area to permit the safe transit of construction vehicles. In some locations where surface conditions are not suitable for overland travel (soft soils, wetland areas, etc.), temporary matting may be placed on the surface from an existing access or spur road to the construction work area, and additional matting laid to form a construction work area. In some locations, new permanent spur roads may be constructed if existing spur roads are not present.
2. Deenergize existing circuit.
3. Pole/tower installation – Replacement subtransmission structures and new structures would be installed as described in Section 3.7.2.2.3.
4. Conductor transfer – Transfer existing conductor from existing structures to replacement structures.
5. Existing structure removal – The existing LSTs and H-frames would be removed through surface construction as described for Segment 1 above.
6. Energize circuit – The circuit would be energized.

Any remaining facilities that are not reused by SCE would be removed and delivered to a facility for disposal as described in Section 3.7.1.9, Reusable, Recyclable, and Waste Material Management.

3.7.2.2.2 Top Removal

No existing poles would be topped as part of the IC Project.

3.7.2.2.3 Pole/Tower Installation

3.7.2.2.3.1 Foundation Installation

TSPs would be either installed on a drilled, poured-in-place, concrete footing that would form the structure foundation, installed on drilled micro-piles, or direct-buried. If a single concrete footing is used, the hole would be drilled using truck or track-mounted excavators. Excavated material would be used as described in Section 3.7.1.9, Reusable, Recyclable, and Waste Material Management.

Following excavation of the foundation footings, steel-reinforced cages would be set, positioning would be survey verified, and concrete would then be poured. Foundations in soft or loose soil or those that extend below the groundwater level may be stabilized with drilling mud slurry. In this instance, mud slurry would be placed in the hole during the drilling process to prevent the sidewalls from sloughing. Concrete would then be pumped to the bottom of the hole, displacing the mud slurry. Depending on site conditions, the mud slurry brought to the surface would typically be collected in a pit adjacent to the foundation or vacuumed directly into a truck to be reused or discarded at an appropriate off-site disposal facility. TSP foundations typically require an excavated hole approximately 4 feet to 8 feet in diameter and approximately 10 feet to 30 feet deep. TSPs would require approximately 5 to 56 cubic yards of concrete delivered to each structure location.

Where necessary, foundations may also be installed utilizing micropiles. Installation of micropiles would require the drilling of several smaller diameter holes (approximately 7-10, 8-inch holes) for each footing. The holes would be drilled by a drilling rig or drilling attachment on an excavator or similar equipment. After drilling all the holes, each hole would be flushed with water or air to remove drill cuttings and loose material. Micropiles would then be installed by placing rebar in each hole with cement grout injected through grout tubes at the lowest point of each micropile, and the hole filled until viscous grout reaches the top of the casing. The micropiles would then be tied together, to act as a single unit foundation, in a reinforced concrete cap. Grout could be brought to each tower site dry and mixed at the site, requiring a reduced amount of concrete required and associated transportation requirements and limitations (delivery within 90 minutes to 2 hours).

In some locations, TSPs may be direct-buried. In these locations, a hole would be excavated using either an auger or excavated with a backhoe. Excavated material would be used as described in Section 3.7.1.9, Reusable, Recyclable, and Waste Material Management.

Conventional construction techniques would generally be used as described above for new foundation installation; no alternative foundation installation methods are anticipated to be used. In certain cases, equipment and material may be deposited at structure sites using helicopters or by workers on foot, and crews may prepare the foundations using hand labor assisted by hydraulic or pneumatic equipment, or other methods.

During construction, existing concrete supply facilities would be used where feasible. However, due to the remote location of many structure locations, a temporary concrete batch plant could be set up in one or more established material yards. Equipment would include a central mixer unit (drum type); three silos for injecting concrete additives, fly ash, and cement; a water tank; portable pumps; a pneumatic injector; and a loader for handling concrete additives not in the silos. Dust emissions would be controlled by watering the area and by sealing the silos and transferring the fine particulates pneumatically between the silos and the mixers.

Prior to drilling for foundations, SCE or its Contractor would contact Underground Service Alert to identify any existing underground utilities in the construction zone.

Should groundwater be encountered during excavation or drilling for foundations, it would be discharged to the surface or pumped into a tank and disposed of at an off-site disposal facility in accordance with applicable laws.

3.7.2.2.3.2 LST Installation

No lattice steel towers would be installed as part of the IC Project.

3.7.2.2.3.3 TSP Installation

TSP structures typically consist of multiple sections. The TSP sections would be placed in temporary laydown areas at each pole location. See Table 3.7-2: Approximate Laydown/Work Area Dimensions for approximate laydown dimensions. Depending on conditions at the time of construction, the top sections may come pre-configured, may be configured on the ground, or configured after pole installation with the necessary cross arms, insulators, and wire stringing hardware. A crane would then be used to set each

TSP base section on top of the previously prepared concrete pier or micro-pile foundation. Direct-buried TSPs would be installed similarly to LWS poles as described below. If existing terrain around the TSP location is not suitable to safely support crane activities, a temporary crane pad would be established within the construction work area. Alternately, TSPs may be set by helicopter. When the base section is secured, the subsequent section(s) of the TSP would be slipped together into place onto the base section by crane or helicopter. Hydraulic jacks may be temporarily mounted between pole sections in order to jack the pole sections together. The TSP sections may then be spot welded together for additional stability. Depending on the terrain and available equipment, the pole sections could also be pre-assembled into a complete structure prior to setting the poles. Each TSP in a multipole TSP structure would be installed as described above.

3.7.2.2.3.4 Wood Pole/Wood Multipole Structure Installation

Wood poles and wood multipole structures (which comprise three individual wood poles installed at one location, with each pole bearing a single conductor) installed as part of the IC Project would be installed as described in Section 3.7.2.2.3.5 below.

3.7.2.2.3.5 LWS Pole/LWS H-Frame Installation

Most LWS poles would be installed using a direct-buried approach. Direct-buried LWS poles would require a hole to be excavated using either an auger or excavated with a backhoe. In some locations, corrugated steel or plastic forms may be placed to stabilize the excavation walls prior to installation of the pole. Excavated material would be used as described in Section 3.7.1.9, Reusable, Recyclable, and Waste Material Management. LWS poles consist of separate base and top sections and may be placed in the construction work area at each pole location. Depending on conditions at the time of construction, the top sections may come preconfigured, may be configured on the ground, or configured after pole installation with the necessary cross arms, insulators, and wire-stringing hardware. The LWS poles would then be installed in the holes, typically by a line truck with an attached boom. When the base section is secured, the top section(s) would be installed on top of it. Depending on the terrain and available equipment, the pole sections could also be assembled into a complete structure on the ground prior to setting the poles in place within the holes. LWS poles may also be installed by helicopter depending upon existing field conditions at the time of construction. The vertical components of LWS H-frames would be installed as described above. Following installation of the vertical components, the horizontal member of the LWS H-frame would be installed on the vertical poles using the same types of equipment utilized for installation of the vertical components.

3.7.2.2.3.6 Microwave Installation

No microwave equipment would be installed as part of the IC Project.

3.7.2.2.3.7 LST Installation

No lattice steel towers would be installed as part of the IC Project.

3.7.2.2.3.8 Subtransmission Land Disturbance Table

The estimated land disturbances associated with subtransmission work are presented in Table 3.7-4.

Table 3.7-4: Subtransmission Land Disturbance Table

Project Feature	Site Quantity	Disturbance Acreage Calculation (L x W, feet)	Acres Disturbed During Construction[4]	Acres to be Restored	Acres Newly and Permanently Disturbed[5]
Install TSP	725	200 x 150	499.3	0	499.3
Install Multipole TSP Structure	128	200 x 150	88.2	0	88.2
Install TSP H-Frame	2	200 x 150	1.4	0	1.4
Install LWS pole (permanent)	391	200 x 100	179.5	0	179.5
Install LWS/Wood H-Frame	135	200 x 125	77.5	0	77.5
Install Multipole LWS Structure (permanent)	15	200 x 125	8.6	0	8.6
Install LWS pole (temporary)	108	200 x 100	49.6	0	49.6
Install Multipole LWS Structure (temporary)	2	200 x 150	1.4	0	1.4
Install Multipole Wood Structure (permanent)	9	200 x 200	8.3	0	8.3
Remove TSP or LST	1,356	200 x 150	933.9	0	933.9
Remove H-Frame (steel or wood)	136	200 x 125	78.1	0	78.1
Remove Multipole (wood)	12	200 x 125	8.3	0	8.3
Remove wood pole	192	200 x 100	88.2	0	88.2
Modify Existing Structure	83	200 x 125	47.6	0	47.6
Conductor Stringing Site	458	400 x 150	630.9	0	630.9
Conductor Field Snub or Splice Areas	63	400 x 100	57.0	0	57.0
Splice Removal Area	882	75 x 50	75.9	0	75.9
Install/Remove Guard Structure	305	75 x 75	39.4	0	39.4
Telecommunications Pull and Tension Site[1]	—	400 x 150	--	--	—
Material Yards	69	Varies	296.8	152	0[2]
Helicopter Landing Zone	5	Varies	3.9	3.9	0[3]
Existing Access and Spur Roads	386.2 miles	# of miles x 18 feet	845.5	0	162
New Spur Roads	2.8 miles	#of miles x variable dimensions	4.8	0	4.8
TOTAL			**4,434.9**	**155.9**	**3,409.4**
TOTAL, MINUS OVERLAPS			**2,730.6**[4]	**155.9**	**1,891.2**[5]

Notes:

1 Telecommunications pull and tension sites along Segments 1 and 2 would be located within conductor stringing sites or conductor field snub areas.

2 152 acres of material yards located on undisturbed areas; remainder of material yard acreage (144.8 acres) is previously disturbed.

3 0.4 acres of helicopter landing zones overlap with access roads; these overlapping areas would not be restored, but area is included in Existing Access and Spur Roads row.

4 Total Acres Disturbed During Construction reflects the sum of the disturbance areas with overlaps between and among structure installation, removal, and modification work areas, conductor stringing sites, conductor field snub or splice areas, splice removal areas, guard structure installation and removal areas, telecommunications pull and tension sites, material yards, helicopter landing zones, and access roads removed; therefore, columns do not sum.

5 Total Acres Newly and Permanently Disturbed calculated as follows: Total Acres Disturbed During Construction (2,730) <minus> Acres to be Restored (155.9 acres) <minus> Area of Currently-Disturbed Access Roads (683.5 acres).

3.7.2.3 Conductor/Cable Installation

3.7.2.3.1 Above Ground

Wire stringing activities would be in accordance with SCE common practices and similar to process methods detailed in the IEEE Standard 524-2003, *Guide to the Installation of Overhead Transmission Line Conductors*. To ensure the safety of workers and the public, safety devices such as traveling grounds, guard structures, radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire stringing activities. Advanced planning is required to determine circuit outages, pulling times, and safety protocols to ensure that the safe installation of wire is accomplished.

Wire stringing includes all activities associated with the installation of the primary conductors onto transmission line structures and the existing racks at substations. These activities include the installation of conductor, OHGW, OPGW/ADSS fiber optic cable, insulators, stringing sheaves (rollers or travelers), vibration dampeners, weights, suspension and dead-end hardware assemblies for the entire length of the route. The following five steps describe typical wire stringing activities:

- Step 1 – Planning: Develop a wire stringing plan to determine the sequence of wire pulls and the set-up locations for the wire pull/tensioning/splicing equipment.
- Step 2 – Sock Line Threading, Ground Access: A bucket truck is typically used to install a lightweight sock line from structure to structure. The sock line would be threaded through the wire rollers in order to engage a camlock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a conductor pull.
- Step 2 – Sock Line Threading, Helicopter Access: In areas where a bucket truck is unable to install a lightweight sock line, a helicopter would fly the lightweight sock line from structure to structure. The sock line would be threaded through the wire rollers in order to engage a camlock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the roller of a particular set of spans selected for a conductor pull.
- Step 3 – Pulling: The sock line would be used to pull in the conductor pulling rope and/or cable. The pulling rope or cable would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel.
- Step 4 – Splicing, Sagging, and Dead-Ending: Once the conductor is pulled in, if necessary, all mid-span splicing would be performed. Once the splicing has been completed, the conductor would be sagged to proper tension and dead-ended to structures.
- Step 5 – Clipping-In: After the conductor is dead-ended, the conductors would be secured to all tangent structures in a process called clipping-in.

3.7.2.3.2 Below Ground

No electrical conductor would be installed below ground as part of the IC Project. Installation of fiber optic cable below ground is described in Section 3.7.3.1.4, Fiber Optic Installation.

3.7.2.3.3 Guard Structures

Guard structures are temporary facilities that would typically be installed at transportation, flood control, and utility crossings for wire stringing/removal activities. These structures are designed to stop the movement of a conductor should it momentarily drop below a conventional stringing height. SCE estimates that 305 guard structures may need to be constructed along the proposed route.

Typical guard structures are standard wood poles. Typically, burial diameters range from 12 to 18 inches and burial depths range from 5 to 7 feet for each pole. Depending on the overall spacing of the conductors being installed, approximately three to five guard poles would be required on either side of a crossing. In some cases, the wood poles could be substituted with the use of specifically equipped boom trucks or, at highway crossings, temporary netting could be installed if required. The guard structures would be removed after the conductor is secured into place.

For crossings of railroads and highways, SCE would work closely with the applicable agencies to secure the necessary permits to string conductor over the applicable infrastructure.

3.7.3 Subtransmission Line Construction (Below Ground)

The following sections describe the below ground construction activities associated with installing fiber optic cable for the IC Project. No electrical conductor would be installed underground as part of the IC Project. Along the IC Project alignment, overhead fiber optic cable would be installed as described in Section 3.7.2.3, Conductor/Cable Installation.

3.7.3.1 Trenching

The following sections describe the construction activities associated with installing fiber optic cable for the IC Project.

3.7.3.1.1 Subtransmission Survey

Construction activities would begin with the survey of existing underground utilities along the proposed underground route. SCE would notify all applicable utilities via underground service alert to locate and mark existing utilities and conducting exploratory excavations (potholing) as necessary to verify the location of existing utilities. SCE would secure ministerial encroachment permits for trenching in public streets, as required.

3.7.3.1.2 Subtransmission Trenching

No electrical conductor would be installed underground as part of the IC Project.

3.7.3.1.3 Subtransmission Vault Installation

No electrical conductor would be installed underground as part of the IC Project.

3.7.3.1.4 Fiber Optic Installation

Short sections of fiber optic cable would be installed underground in the vicinity of Control, Coso, Haiwee, Kramer, Inyokern, and Randsburg substations (Figureset 3.7-2, Telecommunications Underground Routes). Fiber optic cable would transition from an overhead configuration to an underground configuration through risers installed on TSPs or LWS poles (known as getaway poles). The approximate length of undergrounding at each of the substations is shown in Table 3.7-5: Substation Surface Disturbance.

Where existing conduit or cable raceways within the substations are available, underground fiber optic cable would be installed in these structures. If existing conduit or raceways are not available within the substation, new conduit would be installed in trenches. New conduit would also be installed in trenches between the getaway pole(s) and the MEERs/telecommunications rooms/telecommunications cabinets within or adjacent to each substation. Conduit trenches would be approximately 12 inches wide and 36 inches deep. New underground conduit and structures would typically be installed with a backhoe. PVC conduit would be placed in the trench and covered with a minimum of approximately 30 inches of concrete slurry, then backfilled and compacted. (Figure 3.7-3, Conduit Install Details) The fiber optic cable would be installed in an innerduct that protects and identifies the cable within the underground conduit and structures. To install the innerduct, it would first be pulled in the conduit using a pull rope and pulling machine or truck-mounted hydraulic capstan. Then the fiber optic cable would be pulled inside the innerduct using the same procedure.

Undergrounding would require excavation for installation of vaults or pull boxes at each end of the underground conduit (Figure 3.7-4, Vault/Pull Box Detail). For each vault or pull box, a hole is excavated approximately 8 feet deep by approximately 6 feet long by approximately 6 feet wide. The vault or pull box would be lowered into place, connected to the conduits, and the hole would be backfilled with concrete slurry. One or more splice boxes would also be required on each getaway pole. SCE would install the fiber optic cable at the vaults and pull boxes and splice the cable segments, where it would transition from underground to overhead.

Approximately 35 vaults or pull boxes would be installed under the IC Project at or in the vicinity of the existing substations, resulting in the excavation of approximately 375 cubic yards of material. An additional approximately 400 cubic yards of material may be excavated for installation of underground fiber optic cable at or in the vicinity of the existing substations. Excavated material would be managed as described in Section 3.7.1.9, Reusable, Recyclable, and Waste Material Management.

As described in Section 3.5.2, the IC Project’s subtransmission lines are crossed overhead by other transmission lines (see Figure 3.5-3). ADSS fiber optic cable may be installed on new poles adjacent to the subtransmission line alignment or in new underground facilities at these crossing locations. Approximately 12 vaults or pull boxes would be installed under the IC Project at these crossings, resulting in the excavation of approximately 128 cubic yards of material. An additional approximately 320 cubic yards of material may be excavated for installation of underground fiber optic cable. Excavated material would be managed as described in Section 3.7.1.9, Reusable, Recyclable, and Waste Material Management.

3.7.3.2 Trenchless Techniques: Microtunnel, Bore, Horizontal Directional Drilling

Unless alternate methods are required, telecommunications duct banks would be installed using open-cut trenching techniques. In the event that trenchless techniques are required, SCE would utilize one of the methods described in the following subsections. It is anticipated that the jack-and-bore construction technique would be used to install fiber optic cable beneath SR-178 south of Inyokern Substation in Segment 2. Additional locations may be identified during final engineering or construction. Typical stormwater/water quality BMPs would be installed and would be implemented to prevent water quality impacts during the execution of trenchless techniques.

3.7.3.2.1 Jack-and-Bore

SCE may use a horizontal boring (referred to as jack-and-bore) construction technique to install telecommunications conduit at locations along the underground route where open-cut trenching may not be permitted or may not be otherwise feasible or preferred, such as at highway crossings.

Jack-and-bore is an augering operation that simultaneously pushes a casing under an obstacle and removes the spoil inside the casing with a rotating auger. Boring operations would begin with excavating bore pits at the sending and receiving ends of the bore. Boring and receiving pits would typically measure approximately 20 feet by 40 feet. The depth of the proposed bore pits would be between 10 and 20 feet, depending on the facilities that would be crossed. It is anticipated that between 590 and 1,180 cubic yards of material would be excavated to facilitate each jack-and-bore installation required for the IC Project.

Following the duct bank installation, the bore pits would be backfilled using native material, and the duct bank would be covered with at least 36 inches of native fill. Soil not used for backfill would be handled as described in Section 3.7.1.9, Reusable, Recyclable, and Waste Material Management.

After establishing the bore pits, boring equipment would be delivered to the site and then installed into the bore pit at the sending end. Jack-and-bore crossings involve pushing or boring a steel casing through the earth and under the obstacle being crossed. Depending on soil conditions, water is often used to lubricate the auger during the boring process. The casings would typically be installed at least 3 to 4 feet below the obstacle, or as required by the relevant permitting agency. Once the casing is in place, the conduit would be installed within the casing by using spacers to hold them in place, and then the remaining space would be backfilled with a slurry mix. The casings would be left in place to protect the conduit once it has been installed.

3.7.3.2.2 Horizontal Directional Drilling

Horizontal directional drilling (HDD) technology is an underground boring technique that uses hydraulically powered, horizontal drilling equipment. It involves drilling along a vertical arc that passes beneath a surface or shallow-subsurface feature. HDD technology utilizes lubrication containing water and bentonite clay (i.e., drilling mud) to aid the drilling, coat the walls of the bore hole, and maintain the open hole. The HDD technology uses a hydraulically powered horizontal drilling rig supported by a drilling mud tank and a power unit for the hydraulic pumps and mud pumps. A variable-angle drilling unit would initially be adjusted to the proper design angle for the particular drill. A 6- to 8-inch-diameter drill would typically be used.

The first step would be to drill a fluid-filled pilot bore. The first and smallest of the cutting heads would begin the pilot hole at the surveyed entry point. The first section of the drill stem has an articulating joint near the drill-cutting head that the HDD operator can control. Successive drill stem sections would be added as the drill head bores under the crossing. The drill head would then be articulated slightly by the operator to follow a designed path under the crossing and climb upward toward the exit point. Once the pilot hole is completed, a succession of larger cutting heads and reamers would be pulled and pushed through the bore hole until it is the appropriate size for the steel casing. Once the steel casing is in place, ducts would be installed within the steel casing using spacers to maintain the needed separation, and then the remaining space would be backfilled with a slurry mix. The fiber optic cable would then be pulled through the ducts.

Infrequently, the geologic strata above the bore may be weaker than anticipated and/or unconsolidated. As the HDD passes under these locations, the high pressure of the drilling mud may result in a fracture of these strata, allowing drilling mud to rise to the surface. This situation is termed a “frac-out” and is usually resolved by reducing the mud system pressure or increasing the mud viscosity. If a frac-out occurs, the boring operation would be stopped immediately, and a frac-out contingency plan would be implemented to contain and remove the drilling mud. Drilling muds would be handled in accordance with federal and state regulations, and disposed of as described in Section 3.7.1.9, Reusable, Recyclable, and Waste Material Management.

3.7.4 Substation Construction

No new substations would be constructed as part of the IC Project.

3.7.4.1 Below-Grade Construction

At Control, Coso, Haiwee, Inyokern, Randsburg, and Kramer substations, new underground fiber optic cable conduit and structures would be installed as described in Section 3.7.3.1.4, Fiber Optic Installation.

3.7.4.2 Above-Grade Construction

Minor modifications to the existing racks at Baker, Control, Coso, Haiwee, Inyokern, Randsburg, and Kramer substations may be required so that new OHGW, or replacement OHGW, can be installed between the racks and the getaway structures. These minor modifications could include installation of new hardware on the existing steel racks to which the OHGW would be attached. Where suitable hardware is currently installed on the racks, structural reinforcement of the racks may be necessary. Any surface disturbance would be within the existing currently-disturbed footprint of the substation.

3.7.4.3 Telecommunications Equipment Installation

Telecommunications-related modifications at Control, Coso, Haiwee, Inyokern, Randsburg, and Kramer substations would generally include the replacement of protection equipment on existing subtransmission rack structures, the installation of fiber optic cable in new or existing cable raceways or conduit, and the installation of new or replacement of existing telecommunications infrastructure within existing MEERs, telecommunication buildings, telecommunication rooms, control room, or within existing or new telecommunications cabinets.

SCE would install new terminal equipment, channel multiplexer equipment, equipment cabling, and other telecommunication equipment devices within the existing MEERs, telecommunications buildings, telecommunications rooms, or control building, or within existing communications cabinets at Control, Coso, Inyokern, Randsburg, and Kramer substations; a new communication cabinet would be installed at Haiwee Substation. This work would provide the required telecommunication circuit connection for subtransmission line protection relay equipment within the substations. This work would occur generally within the substation fence line on previously-disturbed surfaces; new communication cabinets may be installed outside, but immediately proximate to, the substation fence line. SCE would also install cabling between existing breakers to the existing MEER/communication room/telecommunications cabinet at each of the substations and install new relays and relay racks in those facilities.

3.7.4.4 Substation Land Disturbance Table

The land disturbance anticipated at each of the substations included in the IC Project is presented in Table 3.7-5.

Table 3.7-5: Substation Surface Disturbance

	Underground Length (feet)		Number of Vaults/ Pull Boxes		Area Disturbed (acres)	
Substation	**Inside Substation**	**Outside Substation**	**Inside Substation**	**Outside Substation**	**Inside Substation**	**Outside Substation**
Control	200	700	0	3	0.05	0.16
Haiwee	10	210	0	7	0.00	0.05
Coso	100	120	1	2	0.02	0.03
Inyokern (N)	20	500	2	1	0.00	0.11
Inyokern (S)	50	250	0	4	0.01	0.06
Randsburg	10	400	0	9	0.00	0.09
Kramer	1000	10	6	0	0.23	0.00
Substation Total	**1,390**	**2,190**	**9**	**26**	**0.31**	**0.5**

3.7.4.5 Modifications at Other Facilities

3.7.4.5.1 Independence Amplifier Site

Due to the distance between Control Substation and Haiwee Substation, an amplifier would need to be located between these two substations to maintain strength of signal. An existing telecommunications facility in the community of Independence has been identified as a potential location for installation of the amplification equipment (Figure 3.5-2, Independence Telecom Tap).

Where the IC Project alignment crosses Mazourka Canyon Road in Inyo County, the OPGW would be routed down a TSP structure to a splice box. ADSS fiber optic cable would then run from the splice box overhead on approximately 60 new LWS (or equivalent) poles to be located on the north side of the road. The new LWS (or equivalent) poles would be installed as described in Section 3.7.2.2.3.5, LWS Pole/LWS H-Frame Installation. At the telecommunications facility, fiber optic cable would be routed underground through new conduit to an existing telecommunication building owned by a third party. The underground portion would be installed as described above. The amplification equipment would be installed within the building. The disturbance associated with this work is presented in Table 3.7-6: Other Facility Surface Disturbance.

Approximately three vaults or pull boxes would be installed under the IC Project for the Independence amplifier telecommunication tap, resulting in the excavation of approximately 32 cubic yards of material. An additional approximately 5 cubic yards of material may be excavated for installation of underground fiber optic cable for the Independence amplifier telecommunication tap. Excavated material would be managed as described in Section 3.7.1.9, Reusable, Recyclable, and Waste Material Management.

3.7.4.5.2 Haiwee Substation

At Haiwee Substation, the installation of fiber optic cable may require the replacement of approximately four wood poles and three wood pole H-frames on the tap lines that connect the subtransmission lines in Segment 1 to the substation. These poles and H-frames are owned by LADWP. The new poles and H-frames would be installed as described in Section 3.7.2.2.3.5, LWS Pole/LWS H-Frame Installation. The disturbance associated with this work is presented in Table 3.7-6: Other Facilities Surface Disturbance.

Table 3.7-6: Other Facilities Surface Disturbance

Facility	Underground Length (feet)	Number of Vaults/ Pull Boxes	Area Disturbed (acres)	
			Temporary	Permanent
Independence Amplifier Site Trench	40	3	0.02	0.02
Independence Amplifier Line, 60 poles	—	—	4.4	**4.4**
Independence Amplifier Line, Pull Sites	—	—	2.5	2.5
Haiwee Substation, LADWP pole replacements	—	—	3.56	3.56
Other Facility Total	**40**	**3**	**10.5**	**10.5**

3.7.4.6 Land Disturbance Summary

Land disturbance would include all areas affected by construction of the IC Project. It is estimated that the total permanent land disturbance for the IC Project would be approximately 1,902 acres. It is estimated that the IC Project would temporarily disturb 2,742 acres. The estimated amount of land disturbance for each project component is summarized in Table 3.7-7: Project Estimated Land Disturbance.

Table 3.7-7: Project Estimated Land Disturbance

Project Feature	Acres Disturbed During Construction	Acres to be Restored	Acres Permanently Disturbed
Subtransmission (From Table 3.7-4)	2,730.7	155.9	1891.2[1]
Substations (From Table 3.7-5)	0.5	0.5	0
Other Facilities (From Table 3.7-6)	10.5	0	10.5
TOTAL	**2,741.6**	**156.4**	**1,901.7**

1 As stated above in the notes to Table 3.7-4, Acres Permanently Disturbed calculated as follows: Acres Disturbed During Construction (2,730) <minus> Acres to be Restored (155.9 acres) <minus> Area of Currently-Disturbed Access Roads (683.5 acres).

3.7.5 Construction Workforce and Equipment

The estimated elements, materials, and number of personnel and equipment required for construction of the IC Project are summarized in Table 3.7-8: Construction Equipment and Workforce Estimate.

Construction would be performed by SCE construction crews and/or contractors. If SCE construction crews are used, they typically would be based at SCE's local facilities, (e.g., service centers, substation, transmission ROW, etc.) or temporary material yards set up for the IC Project. Contractor construction personnel would be managed by SCE construction management personnel and based out of the contractor's existing yard or temporary material yards set up for the IC Project. SCE anticipates a total of approximately 200 construction personnel working on any given day. SCE anticipates that crews would work concurrently whenever possible; however, the estimated deployment and number of crew members would vary depending on factors such as material availability, resource availability, and construction scheduling. In general, construction efforts would occur in accordance with accepted construction industry standards.

Construction would generally be performed from 7:00 a.m. and 7:00 p.m., Monday through Saturday; however, at limited times some construction along the Project alignment may be required or finished after these hours, and on Sundays. Some activities may require lighting for safety. Any necessary lighting would be confined to an individual work area and would be temporary in nature. Material yards may be lit for staging and security; this lighting would be directed internally and on-site.

3.7.5.1 Equipment Description

Table 3.7-9: Construction Equipment Description lists the equipment SCE expects to use during construction and a brief description of the use of that equipment.

Table 3.7-9: Construction Equipment Description

Type of Equipment	Use(s)
1-Ton Truck, 4x4	Transport workers and small tools, towing
3/4-Ton Truck, 4x4	Transport workers and small tools, towing
Auger Truck	Drill holes for LWS poles and TSP foundations
Backhoe/Front Loader	Trenching, moving materials
Boom/Crane Truck	LWS pole installation, wood pole removal, guarding during stringing
Bull Wheel Puller	Conductor stringing
Chipper	Tree removal/trimming
Compressor Trailer	Powering compressed air tools
Concrete Truck	Delivery of concrete
Drum Type Compactor	Compacting soils along access and spur roads, construction work sites, and laydown areas
Dump Truck, 4x4	Hauling excavated soils, broken concrete, removed LST sections, and other materials
Excavator	Excavation
Extendable Flat Bed Pole Truck	Hauling poles
Flat Bed Pole Truck	Hauling poles
Flat Bed Truck/Trailer	Moving construction equipment and materials
Lowboy Truck/Trailer	Moving construction equipment
Manlift/Bucket Truck	Lifting workers
Motor Grader	Grading soils along access and spur roads, construction work sites, and laydown areas
R/T Crane (M)	Structure installation and removal
R/T Forklift	Moving materials
Sock Line Puller	Conductor stringing
Static Truck/ Tensioner	Conductor stringing
Stump Grinder	Tree removal/trimming
Track Type Dozer	Grading/blading soils along access and spur roads, construction work sites, and laydown areas
Truck, Semi-Tractor	Hauling materials
Water Truck	Dust control
Medium-duty Helicopter	Structure installation/removal
Light-duty Helicopter	Conductor installation/removal; marker ball installation
Fuel, Helicopter Support Truck	Helicopter refueling/support

Table 3.7-8: Construction Equipment and Workforce

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs./Day)**	**Estimated Production Per Day**
Survey				**4**	**358**		**358 Miles**
1-Ton Truck, 4x4	300	Diesel	2		358	10	1 Mile
Material Yards				**5**	**DOP**		
1-Ton Truck, 4x4	300	Diesel	1		Duration of Project	4	
R/T Forklift	350	Diesel	1			5	
Boom/Crane Truck	350	Diesel	1			5	
Water Truck	300	Diesel	2			10	
Jet A Fuel Truck	300	Diesel	1			4	
Truck, Semi-Tractor	500	Diesel	1			6	
Road Work				**6**	**47**		**388 Miles**
1-Ton Truck, 4x4	300	Diesel	2		47	5	
Backhoe/Front Loader	350	Diesel	1		47	7	
Track Type Dozer	350	Diesel	1		47	7	
Motor Grader	350	Diesel	1		47	5	
Water Truck	300	Diesel	2		47	10	
Drum Type Compactor	250	Diesel	1		47	5	
Excavator	300	Diesel	1		28	7	
Lowboy Truck/Trailer	500	Diesel	1		28	4	
Wet Crossing Installation				**6**	**80**		**40 Crossings**
1-Ton Truck, 4x4	300	Diesel	1		80	8	0.5 crossing
Tracked Excavator	250	Diesel	1		80	8	
Rubber Tire Backhoe	125	Diesel	1		80	8	
Wheel Loader	250	Diesel	1		80	8	
Dump Truck	350	Diesel	2		80	8	
Water Truck	300	Diesel	1		80	10	
Concrete Truck	350	Diesel	3		80	4	
Flatbed Trailer	--	Diesel	1		80	8	
Install TSP Foundations				**5**	**1,454**		**727 TSPs**
3/4-Ton Truck, 4x4	275	Gas	2		1,454	5	0.5 TSP
Boom/Crane Truck	350	Diesel	1		1,454	7	
Backhoe/Front Loader	200	Diesel	1		1,454	10	
Auger Truck	500	Diesel	1		1,091	10	
Water Truck	350	Diesel	1		1,454	10	
Dump Truck	350	Diesel	1		1,454	10	
Concrete Mixer Truck	425	Diesel	2		1,091	6	
TSP Haul				**5**	**182**		**727 TSPs**
3/4-Ton Truck, 4x4	275	Gas	2		182	8	4 TSPs

Table 3.7-8: Construction Equipment and Workforce

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs./Day)**	**Estimated Production Per Day**
Boom/Crane Truck	350	Diesel	1		182	8	
Flat Bed Pole Truck	400	Diesel	2		182	10	
Water Truck	350	Diesel	1		182	10	
TSP Assembly				**5**	**727**		**727 TSPs**
3/4-Ton Truck, 4x4	275	Gas	2		727	6	1 TSP
1-Ton Truck, 4x4	300	Diesel	2		727	6	
Water Truck	350	Diesel	1		727	10	
Compressor Trailer	60	Diesel	1		727	6	
Boom/Crane Truck	350	Diesel	1		727	7	
TSP Erection				**5**	**727**		**727 TSPs**
3/4-Ton Truck, 4x4	275	Gas	1		727	6	1 TSP
1-Ton Truck, 4x4	300	Diesel	1		727	6	
Water Truck	350	Diesel	1		727	10	
Compressor Trailer	60	Diesel	1		727	6	
R/T Crane	350	Diesel	1		727	7	
Medium-duty Helicopter		Jet A	1		73	6	
Install TSP Multipole Foundations				**5**	**753**		**128 Multipole TSPs**
3/4-Ton Truck, 4x4	275	Gas	2		753	5	0.17 Multipole TSPs
Boom/Crane Truck	350	Diesel	1		753	7	
Backhoe/Front Loader	200	Diesel	1		753	10	
Auger Truck	500	Diesel	1		376	10	
Water Truck	350	Diesel	1		753	10	
Dump Truck	350	Diesel	1		753	10	
Concrete Mixer Truck	425	Diesel	2		376	6	
TSP Multipole Haul				**5**	**128**		**128 Multipole TSPs**
3/4-Ton Truck, 4x4	275	Gas	2		128	8	1 Multipole TSP
Boom/Crane Truck	350	Diesel	1		128	8	
Flat Bed Pole Truck	400	Diesel	2		128	10	
Water Truck	350	Diesel	1		128	10	
TSP Multipole Assembly				**5**	**384**		**128 Multipole TSPs**
3/4-Ton Truck, 4x4	275	Gas	2		384	6	0.3 Multipole TSP
1-Ton Truck, 4x4	300	Diesel	2		384	6	
Water Truck	350	Diesel	1		384	10	
Compressor Trailer	60	Diesel	1		384	6	
Boom/Crane Truck	350	Diesel	1		38	7	
TSP Multipole Erection				**5**	**384**		**128 Multipole TSPs**
3/4-Ton Truck, 4x4	275	Gas	1		384	6	0.3 Multipole TSP

Table 3.7-8: Construction Equipment and Workforce

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs./Day)**	**Estimated Production Per Day**
1-Ton Truck, 4x4	300	Diesel	1		384	6	
Water Truck	350	Diesel	1		384	10	
Compressor Trailer	60	Diesel	1		384	6	
R/T Crane	350	Diesel	1		384	7	
Medium-duty Helicopter		Jet A	1		38	6	
Install TSP H-Frame Foundations				**5**	**8**		**2 TSP H-Frames**
3/4-Ton Truck, 4x4	275	Gas	2		8	6	0.25 TSP H-Frames
1-Ton Truck, 4x4	300	Diesel	2		8	6	
Water Truck	350	Diesel	1		8	10	
Compressor Trailer	60	Diesel	1		8	6	
Boom/Crane Truck	350	Diesel	1		1	7	
TSP H-Frame Haul				**5**	**1**		**2 TSP H-Frames**
3/4-Ton Truck, 4x4	275	Gas	2		1	6	2 TSP H-Frames
1-Ton Truck, 4x4	300	Diesel	2		1	6	
Water Truck	350	Diesel	1		1	10	
Compressor Trailer	60	Diesel	1		1	6	
Boom/Crane Truck	350	Diesel	1		1	7	
TSP H-Frame Assembly				**5**	**4**		**2 TSP H-Frames**
3/4-Ton Truck, 4x4	275	Gas	2		4	6	0.5 TSP H-Frame
1-Ton Truck, 4x4	300	Diesel	2		4	6	
Water Truck	350	Diesel	1		4	10	
Compressor Trailer	60	Diesel	1		4	6	
Boom/Crane Truck	350	Diesel	1		1	7	
TSP H-Frame Erection				**5**	**4**		**2 TSP H-Frames**
3/4-Ton Truck, 4x4	275	Gas	2		4	6	0.5 TSP H-Frame
1-Ton Truck, 4x4	300	Diesel	2		4	6	
Water Truck	350	Diesel	1		4	10	
Compressor Trailer	60	Diesel	1		4	6	
Boom/Crane Truck	350	Diesel	1		1	7	
Existing Pole Removal[1]				**5**	**96**		**384 Poles**
1-Ton Truck, 4x4	300	Diesel	2		96	10	4 Poles
Compressor Trailer	60	Diesel	1		96	5	
Manlift/Bucket Truck	250	Diesel	1		96	8	
Boom/Crane Truck	350	Diesel	1		96	8	
Flat Bed Pole Truck	400	Diesel	1		96	10	
Water Truck	300	Diesel	1		96	10	

Table 3.7-8: Construction Equipment and Workforce

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs./Day)**	**Estimated Production Per Day**
Existing Lattice Structure/TSP Removal				**5**	**2,712**		**1,356 TSPs/ Lattice Structures**
1-Ton Truck, 4x4	300	Diesel	2		2,712	10	0.5 TSPs or Lattice Steel Structures
Compressor Trailer	60	Diesel	1		2,712	5	
Manlift/Bucket Truck	250	Diesel	1		2,712	8	
Backhoe/Front Loader	125	Diesel	2		2,712	10	
Boom/Crane Truck	350	Diesel	1		2,712	8	
Flat Bed Pole Truck	400	Diesel	1		2,712	10	
Water Truck	300	Diesel	1		2,712	10	
Medium-duty Helicopter		Jet A	1		271	6	
Dump Truck	350	Diesel	1		2,712	10	
Excavator	250	Diesel	1		2,712	10	
R/T Crane (M)	215	Diesel	1		2,712	5	
R/T Crane (L)	300	Diesel	1		2,712	7	
LWS Pole Haul[3]				**5**	**100**		**391 LWS Poles**
3/4-Ton Truck, 4x4	275	Gas	1		100	10	4 Poles
Water Truck	300	Diesel	1		100	10	
Boom/Crane Truck	350	Diesel	1		100	8	
Flat Bed Pole Truck	400	Diesel	1		100	10	
LWS Pole Assembly[3]				**5**	**100**		**391 LWS Poles**
3/4-Ton Truck, 4x4	275	Gas	2		100	6	4 Poles
Compressor Trailer	60	Diesel	1		100	6	
1-Ton Truck, 4x4	300	Diesel	2		100	10	
Water Truck	350	Diesel	1		100	10	
Boom/Crane Truck	350	Diesel	1		100	8	
LWS Pole Install[3]				**5**	**100**		**391 LWS Poles**
1-Ton Truck, 4x4	300	Diesel	1		100	6	4 Poles
Manlift/Bucket Truck	350	Diesel	1		100	10	
Boom/Crane Truck	350	Diesel	1		100	7	
Auger Truck	210	Diesel	1		100	8	
Water Truck	300	Diesel	1		100	10	
Backhoe/Frontloader	125	Diesel	1		100	10	
Extendable Flat Bed Pole Truck	400	Diesel	1		100	6	
Medium-duty Helicopter		Jet A	1		10	6	
LWS/Wood Multipole Haul[4]				**5**	**15**		**15 LWS/Wood Multipole Structures**
3/4-Ton Truck, 4x4	275	Gas	1		15	10	

Table 3.7-8: Construction Equipment and Workforce

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs./Day)**	**Estimated Production Per Day**
Water Truck	300	Diesel	0.5		15	10	1 LWS/Wood Multipole Structure
Boom/Crane Truck	350	Diesel	1		15	8	
Flat Bed Pole Truck	400	Diesel	1		15	10	
LWS/Wood Multipole Assembly				**5**	**15**		**15 LWS/Wood Multipole Structures**
3/4-Ton Truck, 4x4	275	Gas	2		15	6	1 LWS/Wood Multipole Structure
Compressor Trailer	60	Diesel	1		15	6	
1-Ton Truck, 4x4	300	Diesel	2		15	10	
Water Truck	350	Diesel	1		15	10	
Boom/Crane Truck	350	Diesel	1		15	8	
LWS/Wood Multipole Structure Install				**5**	**15**		**15 LWS/Wood Multipole Structures**
1-Ton Truck, 4x4	300	Diesel	1		15	6	1 LWS/Wood Multipole Structure
Manlift/Bucket Truck	350	Diesel	1		15	10	
Boom/Crane Truck	350	Diesel	1		15	7	
Auger Truck	210	Diesel	1		15	8	
Water Truck	300	Diesel	1		15	10	
Backhoe/Frontloader	125	Diesel	1		15	10	
Extendable Flat Bed Pole Truck	400	Diesel	1		15	6	
LWS/Wood H-Frame Structure Haul[4]				**5**	**68**		**135 H-Frames**
3/4-Ton Truck, 4x4	275	Gas	1		68	10	2 H-Frames
Water Truck	300	Diesel	0.5		68	10	
Boom/Crane Truck	350	Diesel	1		68	8	
Flat Bed Pole Truck	400	Diesel	1		68	10	
LWS/Wood H-Frame Structure Assembly				**5**	**68**		**135 H-Frames**
3/4-Ton Truck, 4x4	275	Gas	2		68	6	2 H-Frames
Compressor Trailer	60	Diesel	1		68	6	
1-Ton Truck, 4x4	300	Diesel	2		68	10	
Water Truck	350	Diesel	1		68	10	
Boom/Crane Truck	350	Diesel	1		68	8	
LWS/Wood H-Frame Structure Install				**5**	**68**		**135 H-Frames**
1-Ton Truck, 4x4	300	Diesel	1		68	6	2 H-Frames
Manlift/Bucket Truck	350	Diesel	1		68	10	
Boom/Crane Truck	350	Diesel	1		68	7	
Auger Truck	210	Diesel	1		56	8	
Water Truck	300	Diesel	1		68	10	
Backhoe/Frontloader	125	Diesel	1		68	10	

Table 3.7-8: Construction Equipment and Workforce

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs./Day)**	**Estimated Production Per Day**
Extendable Flat Bed Pole Truck	400	Diesel	1		68	6	
Temporary LWS Multipole Haul[4]				**5**	**4**		**2 Temporary LWS Multipole Structures**
3/4-Ton Truck, 4x4	275	Gas	1		4	10	0.5 LWS Multipole Structure
Water Truck	300	Diesel	0.5		4	10	
Boom/Crane Truck	350	Diesel	1		4	8	
Flat Bed Pole Truck	400	Diesel	1		4	10	
Temporary LWS Multipole Assembly				**5**	**2**		**2 Temporary LWS Multipole Structures**
3/4-Ton Truck, 4x4	275	Gas	2		2	6	1 LWS Multipole Structure
Compressor Trailer	60	Diesel	1		2	6	
1-Ton Truck, 4x4	300	Diesel	2		2	10	
Water Truck	350	Diesel	1		2	10	
Boom/Crane Truck	350	Diesel	1		2	8	
Temporary LWS Multipole Structure Install/Removal				**5**	**4**		**2 Temporary LWS Multipole Structures**
1-Ton Truck, 4x4	300	Diesel	1		4	6	0.5 LWS Multipole Structure
Manlift/Bucket Truck	350	Diesel	1		4	10	
Boom/Crane Truck	350	Diesel	1		4	7	
Auger Truck	210	Diesel	1		4	8	
Water Truck	300	Diesel	1		4	10	
Backhoe/Frontloader	125	Diesel	1		4	10	
Extendable Flat Bed Pole Truck	400	Diesel	1		4	6	
Temporary LWS Pole Haul[3]				**5**	**54**		**108 Temporary LWS Poles**
3/4-Ton Truck, 4x4	275	Gas	1		54	10	2 Poles
Water Truck	300	Diesel	1		54	10	
Boom/Crane Truck	350	Diesel	1		54	8	
Flat Bed Pole Truck	400	Diesel	1		54	10	
Temporary LWS Pole Assembly[3]				**5**	**27**		**108 Temporary LWS Poles**
3/4-Ton Truck, 4x4	275	Gas	2		27	6	4 Poles
Compressor Trailer	60	Diesel	1		27	6	
1-Ton Truck, 4x4	300	Diesel	2		27	10	
Water Truck	350	Diesel	1		27	10	
Boom/Crane Truck	350	Diesel	1		27	8	

Table 3.7-8: Construction Equipment and Workforce

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs./Day)**	**Estimated Production Per Day**
Temporary LWS Pole Install/Removal3				**5**	**216**		**108 Temporary LWS Poles**
1-Ton Truck, 4x4	300	Diesel	1		216	6	0.5 Poles
Manlift/Bucket Truck	350	Diesel	1		216	10	
Boom/Crane Truck	350	Diesel	1		216	7	
Auger Truck	210	Diesel	1		216	8	
Water Truck	300	Diesel	1		216	10	
Backhoe/Frontloader	125	Diesel	1		216	10	
Extendable Flat Bed Pole Truck	400	Diesel	1		216	6	
Medium-duty Helicopter		Jet A	1		22	6	
Install/Remove Conductor and Install OPGW				**20**	**873**		**262 Linear Miles**
¾-Ton Truck, 4x4	275	Gas	1		873	10	0.3 Miles/day
1-Ton Truck, 4x4	300	Diesel	2		873	10	
Manlift/Bucket Truck	250	Diesel	1		873	10	
Boom/Crane Truck	350	Diesel	1		873	10	
Dump Truck	350	Diesel	1		873	10	
Wire Truck/Trailer	350	Diesel	2		603	10	
Sock Line Puller	300	Diesel	1		236	10	
Bull Wheel Puller	350	Diesel	1		463	10	
Hydraulic Rewind Puller	350	Diesel	1		873	10	
Static Truck/ Tensioner	350	Diesel	1		873	10	
Backhoe/Front Loader	125	Diesel	1		175	8	
Truck, Semi-Tractor	400	Diesel	2		873	10	
Lowboy Truck/Trailer	450	Diesel	2		873	10	
Water Truck	300	Diesel	1		873	10	
Light Helicopter		Jet A	1		698	7	
Conductor Splicing Rig	350	Diesel	1		236	10	
Fiber Splicing Lab	300	Diesel	1		291	10	
Install/Remove Guard Structures				**5**	**61**		**305 Structures**
3/4-Ton Truck, 4x4	275	Gas	2		61	8	5 Structures
1-Ton Truck, 4x4	300	Diesel	2		61	8	
Compressor Trailer	60	Diesel	2		61	7	
Backhoe/Front Loader	125	Diesel	1		61	10	
Water Truck	300	Diesel	1		61	5	
Manlift/Bucket Truck	250	Diesel	1		61	8	
Boom/Crane Truck	350	Diesel	1		61	10	
Auger Truck	500	Diesel	1		61	8	

Table 3.7-8: Construction Equipment and Workforce

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs./Day)**	**Estimated Production Per Day**
Extendable Flat Bed Pole Truck	400	Diesel	1		61	8	
Telecommunications Underground Infrastructure Installation				**6**	**29**		**3,580 Feet**
1-Ton Truck, 4x4	300	Diesel	2		29	4	125 Feet/Day
Backhoe/Front Loader	125	Diesel	1		29	6	
Dump Truck	350	Diesel	2		29	6	
Pipe Truck/Trailer	275	Diesel	1		29	8	
Concrete Mixer Truck	350	Diesel	3		29	2	
Water Truck	300	Diesel	1		29	6	
Compressor Trailer	60	Diesel	1		29	4	
Lowboy Truck/Trailer	450	Diesel	1		29	4	
Telecommunications Pole Haul Independence Tap and Crossings				**5**	**15**		**60 LWS Poles**
3/4-Ton Truck, 4x4	275	Gas	1		15	10	4 Poles
Water Truck	300	Diesel	0.5		15	10	
Boom/Crane Truck	350	Diesel	1		15	8	
Flat Bed Pole Truck	400	Diesel	1		15	10	
Telecommunications Pole Assembly Independence Tap and Crossings				**5**	**15**		**60 LWS Poles**
3/4-Ton Truck, 4x4	275	Gas	2		15	6	4 Poles
Compressor Trailer	60	Diesel	1		15	6	
1-Ton Truck, 4x4	300	Diesel	2		15	10	
Water Truck	350	Diesel	1		15	10	
Boom/Crane Truck	350	Diesel	1		15	8	
Telecommunications Pole Installation Independence Tap and Crossings				**5**	**15**		**60 LWS Poles**
1-Ton Truck, 4x4	300	Diesel	1		15	6	4 Poles
Manlift/Bucket Truck	350	Diesel	1		15	10	
Boom/Crane Truck	350	Diesel	1		15	7	
Auger Truck	210	Diesel	1		15	8	
Water Truck	300	Diesel	1		15	10	
Backhoe/Frontloader	125	Diesel	1		15	10	
Extendable Flat Bed Pole Truck	400	Diesel	1		15	6	
Restoration					**387**		**387 Miles**
1-Ton Truck, 4x4	300	Diesel	2		387	4	1 Mile
Backhoe/Front Loader	125	Diesel	1		387	4	
Motor Grader	250	Diesel	1		387	6	
Water Truck	300	Diesel	1		387	8	
Drum Type Compactor	100	Diesel	1		387	4	
Lowboy Truck/Trailer	450	Diesel	1		387	4	

Table 3.7-8: Construction Equipment and Workforce

Work Activity				Activity Production			
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Duration of Use (Hrs./Day)**	**Estimated Production Per Day**

Notes:
1 Includes removal of existing poles and temporary poles.
2 Includes removal of existing H-frames and temporary multipole LWS structures.
3 Includes permanent and temporarily-installed LWS poles.
4 Includes permanent and temporarily-installed LWS H-frames and permanent and temporarily-installed multipole LWS structures.

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3.7.6 Construction Schedule

SCE anticipates that construction of the IC Project would take approximately 36 months.[7] Construction would commence following CPUC approval, final engineering, procurement activities, land rights acquisition, and receipt of all applicable permits.

Table 3.7-10: Proposed Construction Schedule

Project Activity	Approximate Duration (Months)	Approximate Start Date
PTC	—	July 2019
Revised PEA Submission	22	April 2020
Final Engineering	8	September 2022
Right-of-Way/ Property Acquisition	18	March 2022
Acquisition of Required Permits	16	April 2021
Subtransmission Line Construction	39	January 2023
Cleanup	8	August 2025
Project Operational	—	April 2026

3.7.7 Energizing Subtransmission Lines

Energizing the rebuilt, reconductored, and derated lines is the final step in completing the subtransmission construction. Portions of the existing lines would be de-energized during the construction period in order to connect the new conductor in that portion to the existing system. To reduce the need for electric service interruption, de-energizing and re-energizing the existing lines may occur at night when electrical demand is low.

3.8 Operation and Maintenance

SCE currently performs operation and maintenance (O&M) activities as described below along the subtransmission lines that would be rebuilt under the IC Project. No material changes in the O&M activities described below, or the locations of these activities, are anticipated with implementation of the IC Project.

Ongoing operation and maintenance activities are necessary to ensure reliable service, as well as the safety of the utility worker and the general public, as mandated by the CPUC. SCE facilities are subject to Federal Energy Regulatory Commission jurisdiction. SCE transmission facilities are under operational control of the California Independent System Operator.

The subtransmission lines would be maintained in a manner consistent with standards reflected in CPUC General Order (GO) 95 and GO 128 as applicable, and the National Electrical Safety Code (NESC) for those circuits that are located outside of California. Normal operation of the lines would be controlled remotely through SCE control systems, and manually in the field as required. SCE inspects the subtransmission overhead facilities in a manner consistent with CPUC GO 165 a minimum of once per year via ground and/or aerial observation, but usually occurs more frequently based on system reliability. Maintenance would occur as needed and could include activities such as repairing conductors, washing or replacing insulators, repairing or replacing other hardware components, replacing poles and towers, tree

7 As displayed in Table 3.7-10, the Project Operational date exceeds the date by which SCE agreed to remediate discrepancies along the IC Project subtransmission lines. SCE will seek means to reduce the permitting/licensing and construction schedules to meet the timeline reflected in Table 3.7-10. The proposed construction schedule may exceed the planned duration due to delays including but not limited to those associated with inclement weather and stoppages necessary to protect biological resources (e.g., nesting birds).

trimming, brush and weed control, and access road maintenance. Most regular O&M activities of overhead facilities are performed from existing access roads with no surface disturbance. Repairs done to existing facilities, such as repairing or replacing existing poles and towers, could occur in undisturbed areas. Existing conductors could require re-stringing to repair damages. Some pulling site locations could be in previously undisturbed areas and at times, conductors could be passed through existing vegetation on route to their destination.

Routine access road maintenance is conducted on an annual and/or as-needed basis. Road maintenance includes maintaining a vegetation-free corridor (to facilitate access and for fire prevention) and blading to smooth over washouts, eroded areas, and washboard surfaces as needed. Access road maintenance could include brushing (i.e., trimming or removal of shrubs) approximately 2 to 5 feet beyond berms or road's edge when necessary to keep vegetation from intruding into the roadway. Road maintenance would also include cleaning ditches, moving and establishing berms, clearing and making functional drain inlets to culverts, culvert repair, clearing and establishing water bars, and cleaning and repairing over-side drains. Access road maintenance includes the repair, replacement and installation of storm water diversion devices on an as-needed basis.

Insulators could require periodic washing with water to prevent the buildup of contaminants (dust, salts, droppings, smog, condensation, etc.) and reduce the possibility of electrical arcing which can result in circuit outages and potential fire. Frequency of insulator washing is region specific and based on local conditions and build-up of contaminants. Replacement of insulators, hardware, and other components is performed as needed to maintain circuit reliability.

Some pole locations and/or lay down areas could be in previously undisturbed areas and could result in ground and/or vegetation disturbance, though attempts would be made to utilize previously disturbed areas to the greatest extent possible. In some cases, new access is created to remove and replace an existing pole.

Existing conductors could require re-stringing to repair damages. Some pulling site locations could be in previously undisturbed areas and at times, conductors could be passed through existing vegetation on route to their destination.

Regular tree pruning must be performed to be in compliance with existing state and federal laws, rules, and regulations and is crucial for maintaining reliable service, especially during severe weather or disasters. Tree pruning standards for distances from overhead lines have been set by the CPUC (GO 95, Rule 35), California Public Resource Code 4293, California Code of Regulations Title 14, Article 4, and other government and regulatory agencies. SCE's standard approach to tree pruning is to remove at least the minimum required by law plus one years' growth (species dependent).

In addition to maintaining vegetation-free access roads, helipads and clearances around electrical lines, clearance of brush and weeds around structures, and as may be required by applicable regulations on fee owned ROWs, is necessary for fire protection. A 10-foot radial clearance around non-exempt poles (as defined by California Code of Regulations Title 14, Article 4) and a 25 to 50-foot radial clearance around non-exempt towers (as defined by California Code of Regulations Title 14, Article 4) are maintained in accordance with Public Resource Code 4292.

In some cases, structures do not have existing access roads and are accessed on foot, by helicopter, or by creating temporary access areas. O&M related helicopter activities could include transportation of transmission line workers, delivery of equipment and materials to structure sites, structure placement, hardware installation, and conductor and OHGW/OPGW stringing operations. Helicopter landing areas could occur where access by road is infeasible. In addition, helicopters must be able to land within SCE ROWs, which could include landing on access or spur roads.

In addition to regular O&M activities, SCE conducts a wide variety of emergency repairs in response to emergency situations such as damage resulting from high winds, storms, fires, and other natural disasters, and accidents. Such repairs could include replacement of downed structures, or lines or re-stringing conductors. Emergency repairs could be needed at any time.

The telecommunications equipment would be subject to maintenance and repair activities on an as needed or emergency basis. Activities would include replacing defective circuit boards, damaged radio antennas or feedlines and testing the equipment. Telecommunication equipment would also be subject to routine inspection and preventative maintenance such as filter change-outs or software and hardware upgrades. Most regular O&M activities of telecommunications equipment are performed at substation or communication sites and inside the equipment rooms and are accessed from existing access roads with no surface disturbance; helicopter transportation may be required to access remote Communications Sites for routine or emergency maintenance activities. Access road maintenance is performed as described above.

The fiber optic cables would be maintained on an as needed or emergency basis. Maintenance activities would include patrolling, testing, repairing and replacing damaged cable and hardware. Most regular maintenance activities of overhead facilities are performed from existing access roads with no surface disturbance. Repairs done to existing facilities, such as repairing or replacing existing cables and re-stringing cables, could occur in undisturbed areas. Access and habitat restoration, as mentioned in the Project Operations Transmission and Subtransmission section above may be required for routine or emergency maintenance activities.

3.9 Applicant Proposed Measures

As part of the IC Project, SCE has identified APMs that it proposes to implement during construction to reduce or avoid impacts. SCE would conduct the design and construction in accordance with its APMs. The proposed APMs are listed in Table 5.1-1: Applicant Proposed Measures, in Chapter 5 of this PEA document.

3.10 Generator Interconnection Facilities Description

No interconnection facilities are included in the IC Project.

3.11 Generator Interconnection Facilities Construction

No interconnection facilities are included in the IC Project.

3.12 Other Major Components Description

No other major components are included in the IC Project.

3.13 Other Major Components Construction

No other major components are included in the IC Project.

3.14 Decommissioning

Prior to removal or abandonment of the facilities that would be permitted to be constructed on or over BLM, BIA, DoD, other government lands, and private lands or within a reasonable time following termination of these governmental entities, SCE would prepare a removal and restoration plan. The removal and restoration plan would address removal of SCE's facilities from the permitted area, and any requirements for habitat restoration and revegetation (refer to Biological Resources Section 4.4 of this PEA). The removal and restoration plan would then be approved by the permitting agency before implementation.

3.15 Project Alternatives Components Description

Whereas the components of the IC Project are contained in this Chapter 3, the components of the Alternatives to the IC Project are addressed in detail in Chapter 5.