B. Description of the Proposed Project

B.1 Introduction and Overview

This section provides a description of Southern California Edison's (SCE) proposed West of Devers Upgrade Project (Proposed Project), including the proposed route, facilities and equipment, construction methods and schedule, and operations. As shown in Figure B-1, Proposed Project and Project Vicinity, the Proposed Project would be located primarily within the existing West of Devers (WOD) right-of-way (ROW) in incorporated and unincorporated parts of Riverside and San Bernardino Counties. Note that all figures are presented at the end of this section. The Proposed Project upgrades would:

- Replace the existing 220 kV transmission lines and associated structures with higher-capacity 220 kV transmission lines and new 200 kV structures. Upgrades would occur on approximately 30 miles of the Devers–El Casco line, approximately 14 miles of the El Casco–San Bernardino line, approximately 43 miles of the Devers–San Bernardino line, approximately 45 miles of the Devers-Vista No. 1 and No. 2 lines, approximately 3.5 miles of the Etiwanda–San Bernardino line, and approximately 3.5 miles of the San Bernardino–Vista line;
- Upgrade substation equipment at Devers, El Casco, Etiwanda, San Bernardino, and Vista Substations to accommodate increased power transfer on the 220 kV lines;
- Upgrade substation equipment at Timoteo and Tennessee Substations to accommodate 66 kV subtransmission line relocations;
- Remove and relocate approximately 2 miles of existing 66 kV subtransmission lines;
- Remove and relocate approximately 4 miles of existing 12 kV distribution lines; and
- Install telecommunication lines and equipment for the protection, monitoring, and control of transmission lines and substation equipment.

The existing WOD corridor traverses a combination of residential, commercial, agricultural, recreation, and open space land uses. The existing structures and existing conductor would be removed and replaced within the existing ROW, except for an approximately 3-mile portion of Segment 5 on the Morongo Band of Mission Indians (Morongo) Reservation that would be in new ROW.

B.1.1 Historical Background in Project Area

Originally, the upgrades west of Devers Substation were planned as part of the Devers–Palo Verde No.2 Project (DPV2). Proposed by SCE in 2005, DPV2 involved construction of a new 230-mile 500 kV line from the Harquahala Substation in Arizona to the Devers Substation in North Palm Springs, California, as well as upgrading an additional 50 miles of 220 kV transmission lines west of Devers Substation. The original WOD proposed upgrades included replacing two existing single-circuit 220 kV lines with a new double-circuit 220 kV line and reconductoring a third 220 kV line between Devers Substation and San Bernardino Junction; reconductoring of 4.8 miles of 220 kV transmission line between San Bernardino Junction and Vista Substation; and reconductoring of 3.4 miles of 220 kV transmission line between San Bernardino Junction and San Bernardino Substation located in San Bernardino County, California.

The currently Proposed Project expands on the original WOD Upgrades. As listed in Section B.1 (Introduction and Overview), existing 220 kV lines would be removed and replaced with two new double-circuit 220 kV lines between Devers, El Casco, Vista, and San Bernardino Substations. One of these new lines would be a portion of the San Bernardino-Etiwanda transmission line between San Bernardino

Substation and San Bernardino Junction. In addition, the Proposed Project includes substation modifications, removal and relocation of 66 kV and 12 kV lines, and upgrades to telecommunications facilities. SCE would also install temporary tower structures, called shoo-flies, to facilitate construction and minimize interruptions to existing electrical and telecommunication facilities.

The main differences between the DPV2 Project and the current West of Devers Upgrade Project include the following:

- *Replacement Structures Due to Heavier Conductor*: SCE's proposes to use heavier (higher capacity) conductors. The existing 220 kV structures would not support the greater weight and SCE is proposing to remove and replace all structures in the corridors.
- *New Structures Installed in Different Locations*: The proposed new structures would be a pair of matching double-circuit 220 kV structures, taller than the existing 220 kV structures. SCE would locate the replacement structures in new locations because project construction is proposed to take place while the existing lines remain in service.
- *Modified Route through Morongo Lands*: Based on an agreement between the Morongo Tribe and SCE,[1] a 3-mile segment of the existing route east of Banning would be relocated to the south, near I-10 (SCE, 2014a).

Construction of the Proposed Project would upgrade the existing transmission lines between Devers, El Casco, San Bernardino, and Vista Substations to increase the system transfer capacity from 1,600 MW to 4,800 MW (SCE, 2014a). Until the recent installation of SCE's West of Devers Interim Project, the transmission transfer capability of the existing WOD 220 kV corridor was limited to approximately 550 MW.

West of Devers Interim Project. As discussed in Section A, several generators have requested interconnection earlier than the Proposed Project's estimated completion date in 2020. Therefore, SCE recently completed the West of Devers Interim Project, which added approximately 1,050 MW of additional transfer capability, yielding a total of approximately 1,600 MW of capability.

Since the Proposed Project would not be completed by the generators' interconnection need date, the California Independent System Operator (CAISO) and SCE developed an interim solution to partially address the requested full capacity deliverability needs on a temporary basis. The temporary upgrades include construction of a temporary "West of Devers Substation" located on SCE's Devers Substation fee-owned property on the west side of Diablo Road. Within the site, SCE has installed series reactors on the four 220 kV transmission lines that extend west of Devers Substation and a Special Protection System (SPS) to prevent overloading of the existing WOD transmission lines.

The temporary upgrade better uses existing transmission capacity by balancing line loading on the existing WOD transmission lines and redirecting some flows onto the 500 kV system to Valley Substa-

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1 Under the Agreement Related to Grant Easements and Rights-of-Way for Electric Transmission Lines and Appurtenant Fiber-Optic Telecommunications Lines and Access Roads On and Across Lands of the Morongo Indian Reservation (the "ROW Agreement") entered into November 27, 2012, by and between the Morongo Band of Mission Indians ("Morongo") and SCE, Morongo consented to the grant to SCE by the U.S. Department of the Interior Bureau of Indian Affairs (BIA) of certain easements and ROWs on and across the lands of the Morongo Indian Reservation. The ROW Agreement provides the ROWs and easements necessary for SCE to continue operating its existing 220 kV facilities on the Morongo Reservation and to replace and upgrade those facilities with the WOD Upgrade Project for 50 years. This 2012 ROW agreement between SCE and the Morongo Tribe would permit SCE to construct the portion of the Proposed Project on tribal land. However, the replacement and upgrade project is subject to BIA approval.

tion. The interim project was approved by the CPUC in Advice Letter 2643-E (dated October 21, 2011) and was put in service on October 11, 2013. Once the WOD Upgrade Project is completed, the WOD Interim Project facilities will be removed and the site will be restored. Purpose and Need and Project Objectives are discussed in Section A of this EIR/EIS.

B.2 Description of Proposed Project Components

B.2.1 220 kV Transmission Line Improvements

The Proposed Project would include the removal and upgrade of approximately 181 circuit miles of existing 220 kV line facilities (approximately 48 corridor miles) primarily within existing WOD corridor. The proposed transmission line elements have been divided into the following six segments:

- Segment 1 – San Bernardino (Milepost [MP] SB0 to MP SB3.5)
- Segment 2 – Colton, Grand Terrace and Loma Linda (MP 0 to MP 5.2)
- Segment 3 – San Timoteo Canyon (MP 5.2 to MP 15.2)
- Segment 4 – Beaumont and Banning (MP 15.2 to MP 27.4)
- Segment 5 – Morongo Tribal Lands and Surrounding Areas (MP 27.4 to MP 36.9)
- Segment 6 – Whitewater and Devers (MP 36.9 to MP 45)

Figures B-2 through B-7 (at the end of this section) show the proposed route through each of the segments, as well as a profile of the existing and proposed corridor. Appendix 2 presents detailed maps of the entire proposed route.

The Proposed Project would ensure sustained transmission capacity while system upgrades are undertaken and would include removal and rebuilding of all or portions of these existing 220 kV lines, shown in Figure B-8:

- Devers-Vista No. 1
- Devers-Vista No. 2
- Devers–El Casco
- El Casco–San Bernardino
- Devers–San Bernardino
- San Bernardino–Vista
- Etiwanda–San Bernardino

The Proposed Project would primarily be constructed on a combination of 220 kV double-circuit lattice steel towers (LSTs), double-circuit tubular steel poles (TSPs), and single-circuit TSPs. Each of the proposed 220 kV transmission lines would consist of overhead wires (conductors), which form three electrical phases. These conductors would be supported by LSTs and/or TSPs and would be electrically isolated from the structures by insulators. In addition to the conductors, structures, and insulators, the proposed transmission structures would be equipped with overhead ground wires (OHGW) and/or optical fiber ground wires (OPGW) for shielding and/or telecommunication purposes.

B.2.1.1 220 kV Transmission Line Segments

The Proposed Project would include the following six 220 kV transmission line segments.

Segment 1: San Bernardino (MP SB0 to MP SB3.5)

Segment 1, which extends from San Bernardino Substation (MP SB0) to San Bernardino Junction (MP SB3.5) would be approximately 3.5 miles in length and would extend due south from San Bernardino Substation in the City of Redlands, across Interstate 10 (I-10), to the San Bernardino Junction in the City of Loma Linda, see Figure B-2a.

The San Bernardino Substation is located on the northwest side of the city of Redlands. It is in area zoned open space/light industrial, immediately east of the Mountainview Power Plant. The newly rebuilt 220 kV transmission lines in this segment would connect to the existing 220 kV switchrack inside San Bernardino Substation. Transmission line work within Segment 1 would include removal of approximately 45 220 kV LSTs, installation of approximately 49 220 kV structures, and modifications to 1 existing LST within the existing ROW.

As shown in Figure B-2b, the Segment 1 ROW consists of two existing lattice 220 kV towers, which include the following 220 kV transmission circuits: Devers–San Bernardino, Etiwanda–San Bernardino, San Bernardino–Vista, and El Casco–San Bernardino. There are three sets of 66 kV towers supporting six separate 66 kV lines in the corridor near the substation and these 66 kV lines diverge from the corridor as the corridor extends to the south. Two of these 66 kV lines would be relocated in order to accommodate the proposed WOD Upgrade Project (see Section B.2.3, 66 kV Subtransmission Line Improvements).

North of the I-10 crossing, the ROW is mostly in a corridor of agricultural land, but there are residences adjacent to Segment 1 in several areas south of the I-10 crossing, including: (a) immediately adjacent to the corridor near mission Road; (b) north of Beaumont Avenue where the corridor has homes on both sides and a park within the corridor; and(c) its southernmost segment between San Timoteo Wash and Beaumont Avenue. Figure B-9a shows representative photographs of Segment 1.

In addition to the 220 kV transmission line upgrades, 66 kV subtransmission line improvements, 12 kV distribution line improvements, and telecommunications system upgrades would occur in this segment. These components are discussed in Section B.2.3, Section B.2.4, and Section B.2.5.

Segment 2: Colton, Grand Terrace and Loma Linda (MP 0 to MP 5.2)

Segment 2, which extends from Vista Substation (MP 0) to San Bernardino Junction (MP 5.2) would leave Vista Substation and cross I-215 heading east for approximately 5 miles through the Cities of Colton and Grand Terrace to San Bernardino Junction in the City of Loma Linda, see Figure B-3a.

As shown in Figure B-3b, the Segment 2 ROW has three existing lattice structures, but the Proposed Project includes upgrades only to the existing Devers-Vista No. 1 and No. 2 220 kV transmission lines. The newly rebuilt 220 kV transmission lines in this segment would connect to the existing 220 kV switchrack inside Vista Substation. Transmission work within Section 2 would include removal of approximately 25 double-circuit LSTs, installation of approximately 28 structures, and modifications to 4 existing structures.

There are 5 existing structures located along the Grand Terrace/Colton boundary (just north of Vista Grande Way). Three of these existing towers would be retained and slightly modified, minimizing ground disturbance and visual impacts of new structures. Two of the 5 existing structures would be replaced.

Most of the corridor in Segment 2 is in the hills south of Loma Linda and is not visible from public roads. The westernmost 1.5 miles, nearest the Vista Substation, goes through the City of Grand Terrace and passes residences along Grand Terrace Road, east of I-215. There are several residences northwest of the substation on Grand Terrace Road and across from the substation entrance on Newport Avenue. Figure B-9a shows photographs that are representative of Segment 2.

In addition to the 220 kV transmission line upgrades, telecommunications system upgrades would occur in this segment, which are discussed in Section B.2.5.

Segment 3: San Timoteo Canyon (MP 5.2 to MP 15.2)

Segment 3 would be approximately 10 miles in length and extends east from the San Bernardino Junction (MP 5.2) to El Casco Substation (MP 15.2). San Bernardino Junction, where the transmission lines diverge, is south of Loma Linda in nearly inaccessible open space. Along the western several miles of the San Timoteo Canyon, the corridor is not visible or barely visible on the ridgelines south of the canyon. The corridor in Segment 3 roughly parallels San Timoteo Canyon Road for much of its length where it crosses from San Bernardino County into Riverside County, see Figure B-4a.

As shown in Figure B-4b, in this segment, there is generally a set of three existing structures at varying distances of separation: one double-circuit steel lattice 220 kV structures and two single-circuit 220 kV structures (steel or wood; each with the circuits arranged horizontally). The 3 structures include the following existing 220 kV transmission lines: (1) Devers-Vista No. 1 and Devers-Vista No. 2; (2) El Casco–San Bernardino; and (3) Devers–San Bernardino. SCE plans to remove the 3 existing structures and replace most of the structures with 2 double-circuit steel lattice towers (see Appendix 1A for structure heights table and Figure B-10, Typical 220 kV Transmission Structures). Replacement structures would include both lattice steel tower and tubular steel poles. Project work within Segment 3 would include removal of approximately 118 LSTs, installation of approximately 104 structures, and modifications to 4 existing structures.

Along Oak Valley Parkway just south of Woodhouse Road, the newly rebuilt El Casco–San Bernardino 220 kV transmission line in this segment would loop into El Casco Substation and connect to the existing 220 kV switchrack. There are residential developments near the El Casco Substation, and scattered agricultural and residential properties along the route. Figure B-9b shows photographs that are representative of Segment 3.

In addition to the 220 kV transmission line upgrades, telecommunications system upgrades would occur in this segment, which are discussed in Section B.2.5.

Segment 4: Beaumont and Banning (MP 15.2 to MP 27.4)

Segment 4 would be approximately 12 miles in length and extends east from the El Casco Substation (MP 15.2) through unincorporated Riverside County and a southern portion of the City of Calimesa, crossing I-10 to the northeast into the City of Beaumont. Passing about 2 miles north of central Beaumont and I-10, the corridor continues due east, paralleling Oak Valley Parkway to the north. There are some residential areas south of the corridor until the east end of Beaumont at Cherry Avenue where the route would pass through open fields. From this point east through Banning, the corridor is in open space in the hills north of Banning with no adjacent residences. Segment 4 ends at San Gorgonio Avenue in the City of Banning (MP 27.4), see Figure B-5a.

As shown in Figure B-5b, in this segment, there is generally a set of three existing structures at varying distances of separation: one double-circuit steel lattice 220 kV tower and two single-circuit 220 kV structures (steel or wood; each with the circuits arranged horizontally). The 3 structures include the following existing 220 kV transmission lines: (1) Devers-Vista No. 1 and Devers-Vista No. 2; (2) Devers–El Casco; and (3) Devers–San Bernardino. SCE plans to remove the three existing structures and replace most of the structures with two double-circuit steel lattice towers that look similar to the existing double-circuit lattice tower, but would be taller. However, approximately 14 double-circuit tubular steel poles would be constructed as replacement structures. Project work within Segment 4 would include removal of 161 structures, installation of approximately 112 structures, and modifications to 5 existing structures. Figure B-9b shows photographs that are representative of Segment 4.

In addition to the 220 kV transmission line upgrades, telecommunications system upgrades would occur in this segment, which are discussed in Section B.2.5.

Segment 5: Morongo Tribal Lands and Surrounding Areas (MP 27.4 to MP 36.9)

Segment 5, which extends from the City of Banning (MP 27.4) across the Morongo Band of Mission Indians Reservation to MP 36.9 would be approximately 9.5 miles in length and extends east from San Gorgonio Avenue in the City of Banning. The route would cross through the existing gravel mine, across the eastern limit of the Morongo Indian Reservation[2] at Rushmore Avenue. Within this segment, approximately 3 miles of existing WOD ROW through the Morongo Reservation would be abandoned and replaced with a new 3-mile alignment south of the current alignment pursuant to the SCE-Morongo ROW agreement, which is included in Appendix 3 (see also Section A.1.3 and Figure B-6a).

As shown in Figures B-6b and B-6c, Segment 5 includes the following existing 220 kV transmission lines: (1) Devers-Vista No. 1 and Devers-Vista No. 2, (2) Devers–El Casco, and (3) Devers–San Bernardino. The three existing structures would be replaced with two structures. Project work within Segment 5 includes removal of 137 structures and installation of 98 structures. Most of the new structures would be double-circuit LSTs, but some would be tubular steel poles, as specified in the SCE-Morongo ROW agreement. Figure B-9c shows photographs that are representative of Segment 5.

Segment 6: Whitewater and Devers (MP 36.9 to MP 45)

Segment 6, which extends from the eastern boundary of the Morongo Reservation at Rushmore Avenue (MP 36.9) to Devers Substation (MP 45), would be approximately 8 miles in length. From the Morongo Band Reservation, the line would extend east along the foothills of the San Bernardino Mountains passing residences off Haugen-Lehmann Way and crossing Whitewater Canyon Road. The proposed route would travel past scattered residences and through wind generation projects, crossing Highway 62 into the Devers Substation. The newly rebuilt 220 kV transmission lines in this segment would connect to the existing 220 kV switchrack inside Devers Substation, see Figure B-7a.

As shown in Figure B-7b, in general, the transmission corridor has 3 separate structures that are at varying distances of separation, and include the existing 220 kV transmission circuits: (1) Devers-Vista No. 1 and Devers-Vista No. 2, (2) Devers–El Casco, and (3) Devers–San Bernardino. Project work within Segment 6 includes removal of 112 structures, installation of 79 structures, and modifications to 5 existing structures. Figure B-9c shows photographs that are representative of Segment 6.

B.2.1.2 Transmission Line Infrastructure

The 220 kV transmission line segments of the Proposed Project would utilize a combination of LSTs and TSPs. The approximate dimensions of the proposed structure types are shown in Figure B-10, Typical 220 kV Transmission Structures, and summarized in Table B-1, Typical Transmission Structure Dimensions.

[2] Under the Proposed Project, approximately 3 miles of existing ROW would be abandoned and replaced with a new 3-mile alignment pursuant to the SCE-Morongo ROW agreement. In addition, this segment consists of an alternative to a new 3-mile alignment (220 kV Transmission Line Route Alternative 1), which is further explained in Appendix 5 (Alternatives Screening Report) and has been eliminated from consideration in light of an agreement between SCE and the Morongo regarding the proposed route.

Table B-1. Typical Transmission Structure Dimensions

Type of Structure	Proposed Number of Structures	Approximate Height Above Ground	Approximate Pole Diameter	Approximate Auger Hole Depth	Approximate Auger Diameter
LST	394	110–189 feet	N/A	15–50 feet	3.0–7.0 feet at each leg
TSP	76 [1]	110–200 feet	3.0–7.0 feet	30–60 feet	5–12 feet

Source: SCE, 2013.
Note: Specific structure type, foundation type, quantities, height, and spacing would be determined upon final engineering, and would be constructed in compliance with CPUC General Order 95.
1 - Includes 38 TSPs in Segment 5 per agreement between SCE and Morongo.

The existing 220 kV transmission lines within the six geographically defined segments currently utilize a mixture of LSTs, TSPs, and wood structures. As part of the entire Proposed Project, approximately 5 TSPs, 153 H-frame structures, 408 LSTs, 29 three-pole structures, and approximately 562 miles of conductor would be removed, as shown in Table B-2. See Appendix 1A for detailed structures location and height tables. The average difference between existing and proposed double-circuit structures would be a minimum of 20 feet, depending on elevation differences in structure locations.

The Proposed Project 220 kV transmission line removals and installations are summarized in Table B-2, Transmission 220 kV Removal and Installation per Segment. The types and quantities of proposed structure, groundwire, and conductor to be removed and installed described are approximate and subject to change following the completion of final engineering.

Table B-2. Transmission 220 kV Removal and Installation Per Segment

	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6	Total
Proposed Project Removals							
Double-circuit lattice steel tower	44	25	33	37	33	28	200
Single-circuit lattice steel tower	1	0	85	61	34	30	211
H-frame	0	0	0	53	55	45	153
Three-pole structure	0	0	0	10	10	9	29
Single-circuit TSP	0	0	0	0	5	0	5
Conductor (miles)	59	31	120	148	108	96	562
OHGW (miles)	7	5	50	63	45	40	210
Proposed Project Installation							
Double-circuit lattice steel tower	46	19	94	98	60	77	394
Double-circuit tubular steel pole	1	7	10	14	38	2	72
Single-circuit tubular steel pole	2	2	0	0	0	0	4
Circuit length (miles)	14	10	40	48	36	32	180
Conductor (miles)	87	67	264	320	250	211	1,199
OPGW (miles)	7	6	22	26	20	18	99
Proposed Project Existing Structures To Be Modified							
Double-circuit lattice steel tower	1	4	4	5	0	5	19

Source: SCE, 2013.

B.2.1.3 Transmission Insulators and Conductors

Each transmission circuit typically includes three separate electrical phases. Each phase would consist of double-bundled (bundle of two conductors for each phase) 1,590 kcmil (one thousand circular mils) aluminum conductor steel reinforced (ACSR) conductor, which is made of aluminum strands with internal steel reinforcement and would have a non-specular finish. Polymer insulators would typically be used on all structures.

All transmission facilities would be designed consistent with Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006 (SCE, 2013). All transmission facilities would be evaluated for potential collision risk and in high-risk areas, lines would be marked with collision reduction devices in accordance with Mitigating Bird Collisions with Power Lines: The State of the Art in 2012 (SCE, 2013).

B.2.1.4 Transmission Ground Wires

Overhead ground wires (OHGW), including optical ground wire (OPGW), would be installed on 220 kV transmission structures at or near the top of each structure. Where required, OHGW may also be utilized in addition to OPGW for more shielding. The overhead steel ground wire would typically be half-inch-diameter extra-high-strength galvanized steel.

B.2.2 Substation Improvements

There are no new substations proposed as part of the Proposed Project. Modifications to existing substation equipment would be performed to accommodate continuous and emergency power on the WOD 220 kV transmission lines between Vista, San Bernardino, El Casco, Etiwanda, and Devers Substations. Figure B-11a, Existing Substation Locations, shows the general locations of each of these substations. Figures B-11b to B-11h show the boundary of the fence lines surrounding each substation on aerial photographs. Modifications to existing substations associated with telecommunications activities are described in Section B.2.5, Telecommunications System Upgrades.

Under the Proposed Project, upgrades would occur at Vista, San Bernardino, Etiwanda, El Casco, and Devers Substations, including replacement of disconnect switches, circuit breakers, foundations, and reconductoring line positions. Circuit breakers and disconnect switches would be replaced with higher-rated equipment. All impacted 220 kV circuit breakers at Devers, El Casco, Vista, and San Bernardino Substations are SF_6 gas type and would be replaced with new higher amperage SF_6 gas type circuit breakers. The dimensions of the new 220 kV circuit breakers would be similar to the existing 220 kV circuit breakers. See Figure B-12, 220 kV Substation Profile, for a typical profile view of a 220 kV switchrack position with circuit breaker and disconnect switches highlighted (SCE, 2014a).

Work at Etiwanda Substation would occur within the existing Mechanical and Electrical Equipment Room (MEER) and involve installation of new protection relay equipment.

Additionally, SCE would replace the circuit breakers and foundations at the Timoteo and Tennessee substations to accommodate the 66 kV subtransmission line relocations. The required substation modifications would not result in any change to the height or width of the existing substation facilities.

All substation-related work would be conducted within the existing substation walls or fence lines. The Proposed Project would not result in changes to access, parking, drainage patterns, or modifications to perimeter walls or fencing at the existing substations. Improvements to the existing substations are described below.

B.2.2.1 Devers Substation

Devers Substation is an existing 500/220/115/12 kV substation located north of I-10 and northwest of the City of Palm Springs in Riverside County, as shown on Figure B-11b. While Devers Substation contains 500 kV, 220 kV, 115 kV, and 12 kV equipment, the Proposed Project would modify only 220 kV equipment in the existing switchrack and protective relay equipment inside the MEER.

The 220 kV switchrack currently has 12 positions. Two of the existing positions would be upgraded to higher capacity by installing new ACSR conductor. Proposed upgrades at Devers Substation include the following:

- Replacement of two existing 220 kV circuit breakers (CBs) with new CBs;
- Replacement of 10 group operated disconnect switches;
- Installation of six bus supports on new foundations;
- Replacement of up to 12 existing bus supports, as needed;
- Replacement of existing equipment foundations to accommodate new equipment and reconnect to existing conduit and grounding; and
- Replacement of protective relaying equipment inside the MEER.

B.2.2.2 El Casco Substation

The El Casco Substation is an existing 220/115/12 kV substation located off of San Timoteo Canyon Road, west of the City of Beaumont in Riverside County, as shown on Figure B-11c. While El Casco Substation contains 220 kV, 115 kV, and 12 kV equipment, the Proposed Project would modify only 220 kV equipment in the existing switchrack and protective relay equipment inside the MEER.

The 220 kV switchrack currently has seven positions. The conductor for two positions would be replaced with new higher capacity ACSR conductor. Proposed work at El Casco Substation includes the following:

- Replacement of five existing 220 kV CBs with new CBs;
- Replacement of 10 group operated disconnect switches; and
- Replacement of existing equipment foundations to accommodate new equipment and reconnect to existing conduit and grounding.

B.2.2.3 Vista Substation

Vista Substation is an existing 220/115/66 kV substation located west of Interstate 215 and north of Newport Avenue in the City of Grand Terrace, as shown on Figure B-11d. While Vista Substation contains 220 kV, 115 kV, and 66 kV equipment, the Proposed Project would modify only 220 kV equipment within the existing switchrack and protective relay equipment inside the MEER.

The 220 kV switchrack currently has 12 positions. The conductor for two positions would be replaced with new higher capacity ACSR conductor. This work would include the following:

- Replacement of four existing 220 kV CBs with new CBs;
- Replacement of eight group operated disconnect switches;
- Installation of four bus supports on new foundations;
- Replacement of up to four existing bus supports, as needed;

- Replacement of existing equipment foundations to accommodate new equipment and reconnect to existing conduit and grounding;
- Modification of the existing ground grid to accommodate installation of new transmission structures; and
- Replacement of protective relaying equipment inside the MEER.

B.2.2.4 San Bernardino Substation

San Bernardino Substation is an existing 220/66/12 kV substation located north of San Bernardino Avenue and east of Mountain View Avenue in the City of Redlands, as shown on Figure B-11e. While San Bernardino Substation contains 220 kV, 66 kV, and 12 kV equipment, the Proposed Project would modify only 220 kV equipment within the existing switchrack and protective relay equipment inside the MEER.

The 220 kV switchrack currently has 7 positions. The conductor for two positions would be replaced with new higher capacity ACSR conductor. This work would include the following:

- Replacement of six existing 220 kV CBs with new CBs;
- Replacement of 12 group operated disconnect switches;
- Installation of eight bus supports on new foundations;
- Replacement of existing equipment foundations to accommodate new equipment and reconnect to existing conduit and grounding;
- Modification of the existing ground grid to accommodate installation of new transmission structures; and
- Replacement of protective relaying equipment inside the MEER.

B.2.2.5 Etiwanda Substation

Etiwanda Substation is an existing 220/66/12 kV substation located north of Sixth Street and west of Etiwanda Avenue in the City of Rancho Cucamonga, as shown on Figure B-11f. Work at Etiwanda Substation would be limited to replacement of protective relaying equipment inside the MEER.

B.2.2.6 Timoteo Substation

Timoteo Substation is an existing 66/12 kV substation located near the intersection of Redlands Boulevard and Mountain View Avenue in the City of Loma Linda, as shown on Figure B-11g. The Proposed Project would modify 66 kV equipment within the existing switchrack and protective relay equipment inside the MEER.

The 66 kV switchrack has six positions. The following work would be carried out at two positions:

- Replacement of two oil-type 66 kV CBs with new SF_6 gas-type CBs;
- Installation of 12 surge arresters; and
- Replacement of existing equipment foundations to accommodate new equipment and reconnect to existing conduit and grounding.

B.2.2.7 Tennessee Substation

Tennessee Substation is an existing 66/12 kV substation located at Avenue E and 18th Street in the City of Yucaipa, as shown on Figure B-11h. The Proposed Project would modify 66 kV equipment within the existing switchrack and protective relay equipment inside the MEER.

The 66 kV switchrack has six positions. The following work would be conducted at one position:

- Replacement of one oil-type 66 kV CB with a new SF_6 gas-type CB;
- Installation of six surge arresters; and
- Replacement of existing equipment foundations to accommodate new equipment and reconnect to existing conduit and grounding.

B.2.2.8 Substation Lighting

Approximately 10 new and 30 replacement lights would be installed on the switchracks for upgraded line positions at Devers, El Casco, Vista, San Bernardino, Timoteo, and Tennessee Substations. Under normal operating conditions, the substations would not be illuminated at night. Lighting would be manually operated and used only when required for maintenance outages or emergency repairs. The lighting would typically consist of low intensity Light Emitting Diode (LED) lights located in the switchyard around the circuit breakers and in areas where operating and maintenance activities may take place during evening hours. Maintenance lights would be directed downwards to reduce glare outside the facility.

B.2.3 66 kV Subtransmission Line Improvements

The Proposed Project would require relocation of portions of the existing San Bernardino–Redlands-Timoteo and the San Bernardino–Redlands-Tennessee 66 kV subtransmission lines, located within Segment 1 and shown on Figure B-13. These portions of 66 kV subtransmission lines would be relocated to new routes within existing ROW or franchise (newly acquired ROW) that are outside of the existing WOD corridor, but generally within the vicinity of the geographic area defined as Segment 1 (see Section B.2.1.1). These two existing 66 kV subtransmission lines are currently located on approximately nine double-circuit LST and 28 double-circuit wood poles, which would be removed from the existing Segment 1 ROW.

Removal and reconstruction of the existing San Bernardino–Redlands-Timoteo and San Bernardino–Redlands-Tennessee 66 kV subtransmission lines from within the existing WOD right-of-way (ROW) would occur as follows:

- The relocated San Bernardino–Redlands-Timoteo 66 kV Subtransmission Line would be approximately 2 miles in length and would reconnect to the San Bernardino–Redlands-Timoteo 66 kV Subtransmission Line inside Timoteo Substation.
- The relocated San Bernardino–Redlands-Tennessee 66 kV Subtransmission Line would be approximately 3.5 miles in length and would reconnect to the San Bernardino–Redlands-Tennessee 66 kV Subtransmission Line at Barton Road.

B.2.3.1 San Bernardino–Redlands-Timoteo Line

Removal and relocation of one portion of the existing San Bernardino–Redlands-Timoteo 66 kV Subtransmission Line would occur outside of the existing WOD corridor. The relocated single-circuit San Bernardino–Redlands-Timoteo 66 kV Subtransmission Line would be approximately 2 miles in length, constructed within new ROW or existing franchise[3] and would include the following components:

[3] Franchise is a right or privilege conferred by agreement between SCE and local jurisdictions.

- Installation of approximately 45 subtransmission lightweight steel (LWS) or wood poles, with associated guying, and approximately 7 TSPs;
- Installation of approximately 4,000 circuit feet of 3,000 kcmil underground conductor, approximately six vaults (10 feet × 20 feet × 11 feet) and approximately 4,000 feet of new duct bank;
- Installation of approximately 7,100 circuit feet of 954 Stranded Aluminum Conductor (SAC) overhead conductor; and
- Removal of 6 wood poles.

The relocated single-circuit San Bernardino–Redlands-Timoteo 66 kV Subtransmission Line would exit San Bernardino Substation on existing poles, and then transition underground to the east for approximately 800 feet within a new duct bank requiring the installation of two new vaults. The relocated 66 kV subtransmission line would then rise to an overhead position via a TSP riser pole, which would be located along West San Bernardino Avenue. From the TSP riser pole, the 66 kV subtransmission line would transition to the south side of San Bernardino Avenue and extend approximately 1,350 feet along San Bernardino Avenue in a double-circuit configuration with the existing Calectric–Homart–Mentone 115 kV line. This portion of the line would extend to the corner of Marigold Avenue and would include the installation of approximately 3 TSPs, 9 LWS/wood poles, and the removal of 6 wood poles.

The 66 kV subtransmission line would then extend south for approximately 1,350 feet along a private property line to Almond Avenue and would include the installation of approximately 1 TSP and 8 LWS/wood poles. Then, the 66 kV subtransmission line would extend west on Almond Avenue for approximately 1,100 feet. This portion of the subtransmission line would include the installation of approximately one TSP and six new LWS/wood poles. From here, the 66 kV subtransmission line would then extend south for 1,250 feet along the east side of Research Drive to Lugonia Avenue, where it would turn east for approximately 500 feet, which would require the installation of approximately one TSP and four new LWS/wood poles. From this location, the 66 kV subtransmission line would then proceed south overbuilt with existing distribution for about 1,200 feet to Interstate 10, which would require the installation of approximately one TSP and seven new LWS/wood poles. In order to accommodate the crossing of Interstate 10, the new 66 kV subtransmission line would require the installation of 2 new TSPs.

From the south side of Interstate 10, the subtransmission line would extend south along Bryn Mawr Avenue for approximately 1,200 feet on approximately five new LWS/wood poles and would then transition from overhead to underground via a TSP riser pole. The 66 kV subtransmission line would be underground for approximately 3,200 feet from the TSP riser pole, south along a portion of Bryn Mawr Avenue (includes installation of one vault), and east along Redlands Boulevard (includes installation of one vault). Then the subtransmission line reaches an alley where it would proceed south (includes installation of one vault) and then west along the alley (includes installation of one vault) until it reaches Mountain View Avenue, where it would then rise to an overhead position via a TSP riser and extend overhead south for 160 feet to connect to the existing Timoteo Substation. This portion of the subtransmission line would include three LWS/wood poles.

B.2.3.2 San Bernardino–Redlands-Tennessee Line

A portion of the San Bernardino–Redlands-Tennessee 66 kV Subtransmission Line would be removed and relocated from the existing WOD corridor. The relocated single-circuit San Bernardino–Redlands-Tennessee 66 kV Subtransmission Line would be approximately 3.5 miles in length, constructed within a new ROW or existing franchise and would include the following components:

- Installation of approximately 90 subtransmission LWS or wood poles, with associated guying, and approximately 12 TSPs;
- Installation of approximately 800 circuit feet of 3,000 kcmil underground conductor, approximately two vaults (10 feet × 20 feet × 11 feet) and approximately 800 feet of new duct bank;
- Installation of approximately 18,400 of circuit feet 954 SAC overhead conductor; and
- Removal of 44 wood poles.

The relocated single-circuit San Bernardino–Redlands-Tennessee 66 kV Subtransmission Line would exit San Bernardino Substation on existing poles and then transition underground to the east for approximately 800 feet in a new duct bank requiring the installation of two new vaults. The relocated 66 kV subtransmission line would then rise to an overhead position via a TSP riser pole, which would be located along West San Bernardino Avenue.

From the TSP riser pole, the 66 kV subtransmission line would then extend approximately 1,350 feet along the north side of San Bernardino Avenue to the corner of Marigold Avenue and would include the installation of approximately one TSP and nine LWS/wood poles. There are two rows of existing trees along the north side of San Bernardino Avenue east of the substation. There is approximately 40 feet between the existing subtransmission poles and the first row of trees. The poles would be set adjacent to the existing poles allowing SCE to place the two pole lines closer together such that no trimming or removal of trees is expected at this time.

The 66 kV subtransmission line would then transition to the south side of West San Bernardino Avenue in a double-circuit configuration with the Calectric-Homart-Mentone 115 kV line and continue east for approximately 3,600 feet on approximately 18 LWS/wood poles and two TSPs and then turn south for approximately 1,350 feet along a private property line to Almond Avenue and would include the installation of approximately 1 TSP and 8 LWS/wood poles. Then the 66 kV subtransmission line would extend east on Almond Avenue for approximately 1,100 feet. This portion of the subtransmission line would include the installation of approximately 1 TSP and 6 new LWS/wood poles. The 66 kV subtransmission line would then extend south on Nevada Avenue for approximately 2,500 feet on approximately 11 LWS/wood poles and 4 TSPs to Interstate 10. In order to accommodate the crossing of Interstate 10, the new 66 kV subtransmission line would require the installation of 3 new TSPs. From the south side of Interstate 10, the subtransmission line would extend south along Nevada Street for approximately 4,000 feet on approximately 20 LWS/wood poles and 2 TSPs to Citrus Avenue. The 66 kV subtransmission line would then extend east on Citrus Avenue for approximately 1,300 feet on approximately 11 LWS/wood poles and 1 TSP to Iowa Street. From Iowa Street, the 66 kV subtransmission line would extend south along Iowa Street for 2,700 feet on approximately 16 LWS/wood poles and 1 TSP where it would connect to the existing San Bernardino–Redlands-Tennessee 66 kV Subtransmission Line on the south side of Barton Road.

Additional minor subtransmission relocations and associated work may be required after the completion of final engineering of the 220 kV upgrades. The exact locations and extent of such work is not known at this time.

B.2.3.3 Subtransmission Structure Types

The 66 kV subtransmission segment of the Proposed Project would utilize a combination of LWS poles, wood poles, and TSPs. See Figures B-14a and B-14b for profile drawings of various combinations of subtransmission construction with underbuilt facilities.

B.2.3.4 Subtransmission Insulators and Conductors

The Proposed Project would use non-specular conductor with polymer insulators on all suspension/dead end structures.

A fault return conductor (FRC) would typically be installed along LWS poles. Due to the combination of proposed wood poles, TSPs, and LWS poles that may be utilized, FRC may be installed on all poles for the entire length of subtransmission line route relocations. The FRC would be located approximately 1 to 2 feet above the telecommunications facilities, and approximately 4 to 6 feet below the distribution facilities. To maintain proper clearances, the telecommunication facilities and distribution facilities may need to be rearranged. Approximately 25,580 circuit feet of FRC would be installed on subtransmission structures.

The 66 kV subtransmission structures would be designed following the intent of the Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 2006 (SCE, 2013).

B.2.3.5 Subtransmission Underground Facilities

In order to accommodate both the San Bernardino–Redlands-Timoteo 66 kV Subtransmission Line relocation and the San Bernardino–Redlands-Tennessee 66 kV Subtransmission Line relocation, underground 66 kV subtransmission facilities for both lines would be installed from San Bernardino Substation for approximately 800 feet along West San Bernardino Avenue. The underground 66 kV subtransmission facilities portion of the San Bernardino–Redlands-Timoteo 66 kV Subtransmission Line route would be approximately 3,200 feet from Bryn Mawr Avenue to Mountain View Avenue and would be located near Timoteo Substation. The final determination on the number of required underground subtransmission vaults would be made during final engineering; however, nine vaults have been estimated for purposes of the project description.

Trenches approximately 20 to 24 inches wide by a minimum of 63 inches deep would be required for installation of underground facilities. Following completion of trench excavation, duct banks would be installed in the trench, including conduit, spacers, ground wire, and concrete encasement. The duct bank typically consists of six 5-inch diameter polyvinyl chloride (PVC) conduits fully encased with a minimum of 3 inches of concrete all around. Typical subtransmission (66 kV) duct bank installations would accommodate six cables. The Proposed Project would utilize all six conduits for the first 800 feet (at San Bernardino Substation) and, for the remaining 2,300 feet, only three conduits would be utilized (near Timoteo Substation), leaving three spare conduits for any potential future circuit. The subtransmission duct banks would typically be installed in a vertically stacked configuration and each duct bank would be approximately 21 inches high by 20 inches wide.

Vaults are below-grade concrete enclosures that would be installed where the duct banks terminate. The inside dimensions of the underground vaults would be approximately 10 feet wide by 20 feet long with an inside height of 9.5 feet. The vaults would be placed no more than 1,500 feet apart along the proposed underground route. TSP riser poles, located at the ends of each underground segment, would be required so the cables can transition from the underground duct bank to the overhead pole. The transition structure would support cable terminations, lightning arresters, and dead-end hardware for overhead conductors.

B.2.4 12 kV Distribution Line Improvements

Under the Proposed Project, SCE would remove a portion of the existing Dental and Intern 12 kV distribution circuits within the WOD ROW in the City of Loma Linda and would relocate the circuits as described below and shown on Figure B-13, Proposed Relocated Subtransmission and Distribution Line Routes.

- **Dental 12 kV Distribution Circuit** relocation would be approximately 1.0 mile in length and would reconnect in a new underground system, which would originate on the north side of mission Road and east of Mountain View Avenue and extend southeasterly for approximately 1.0 mile to California Street. The 12 kV underground system would then extend south along California Street for approximately 500 feet to Barton Road. At this location, the 12 kV circuit would transition from underground to overhead via a distribution riser pole and reconnect to the existing Dental 12 kV circuit.
- **Intern 12 kV Distribution Circuit** relocation would be approximately 2.0 miles in length and would be relocated in the same new underground system described for the Dental 12 kV circuit. The Intern 12 kV circuit would transition from underground to overhead via a distribution riser pole at Barton Road, then continue west from California Street for 0.5 miles to Mayberry Street as underbuild (installing distribution circuit facilities under the 66 kV subtransmission circuit on the same structure) on an existing subtransmission pole. The new underbuild may require approximately 11 subtransmission structures be replaced.

B.2.5 Telecommunications System Upgrades

Within the scope of the Proposed Project, telecommunications infrastructure would be installed to provide for continued operation of SCE's Supervisory Control and Data Acquisition (SCADA) network, protective relaying, data transmission, and telephone services during the Proposed Project construction, and for the continued operation of these services following construction.

New Telecommunications Infrastructure. The new telecommunications infrastructure would include additions and modifications to the existing telecommunications system. Those modifications would include work needed to maintain telecommunications operations during and after construction of the Proposed Project, work needed to facilitate the connection of existing substations to the new OPGW located on the new 220 kV structures, and ancillary work due to the modifications to accommodate the new OPGW and other modifications necessary to facilitate construction.

As shown on Figures B-15a through B-15e (Proposed Telecommunication Routes), the following work is associated with maintaining telecommunications operations during and after construction of the Proposed Project:

1. Connect the existing Vista-Moreno fiber optic cable to the MEER in El Casco Substation.
   - Install approximately 42,000 feet of fiber optic cable on existing poles from a splice location on San Timoteo Canyon Road (near 12584 San Timoteo Road) to an existing riser pole located outside of El Casco Substation.
   - Install approximately 2,300 feet of fiber optic cable in existing conduit and cable trench between the riser pole and the El Casco MEER.
2. Connect the existing Devers-Valley OPGW to the MEER in Banning Substation.
   - Install approximately 690 feet of fiber optic cable in a new underground conduit between the existing Devers-Valley No. 2 500 kV structure M21-T3 to an existing distribution pole on Coyote Trail approximately 3,200 feet west of Old Idyllwild Road. From this existing distribution pole on Coyote Trail, install approximately 4,100 feet of new fiber optic cable east on existing distribution poles (combination of public and private lands) to a location 350 feet south of Old Idyllwild Road. From this location, install approximately 470 feet of fiber optic cable in new underground conduit to cross under the existing Devers-Valley 500 kV ROW to an existing distribution pole. From this location, install fiber optic cable overhead on a combination of distribution and subtransmission

poles for approximately 2,100 feet to Wesley Street. The fiber optic cable would then extend east along Wesley Street for approximately 1,300 feet to existing SCE ROW and then north for approximately 3,300 feet to East Lincoln Street. It would transition underground at this location and install approximately 230 feet of fiber optic cable and new underground conduit into the MEER at Banning Substation.

3. Connect the existing Devers-Valley OPGW to the MEER in Maraschino Substation.

- Install approximately 1,500 feet of fiber optic cable and new underground conduit from the existing Devers-Valley No. 2 500 kV structure M24-T3 to an existing distribution pole on Highland Springs Avenue approximately 300 feet south of Breckenridge Avenue. From this location, install approximately 1,700 feet of fiber optic cable on existing distribution poles along Highland Springs Avenue to approximately 190 feet south of Crooked Creek. At this location, the fiber optic cable would transition underground and extend 2,900 feet in existing underground conduit north to an existing vault approximately 300 feet north of Potrero Boulevard. From the existing vault, approximately 1,000 feet of fiber optic cable and new conduit would be installed to East First Street. From East First Street, the fiber optic cable and conduit would extend west for approximately 600 feet to an existing manhole. From the existing manhole, the fiber optic cable would extend west within existing underground conduit for approximately 12,600 feet to a distribution riser pole 200 feet west of Beaumont Avenue. The fiber optic cable would be installed overhead for approximately 3,200 feet on First Street to Veile Avenue. The fiber optic cable would then extend north on Veile Avenue on existing subtransmission poles for approximately 1,600 feet. From this location, the fiber optic cable would transition underground for 400 feet in an existing underground conduit and cable trench to the MEER located in Maraschino Substation.

4. Connect the Redlands Inland Empire District Office-San Bernardino fiber optic cable through proposed conduit and on proposed and existing poles.

- From the MEER located inside San Bernardino approximately 2,000 feet of fiber optic cable would be installed in an existing conduit and cable trench to a riser pole located outside of San Bernardino Substation on San Bernardino Avenue. From this location, approximately 1,260 feet of fiber optic cable would be installed on existing subtransmission poles extending east to Marigold Avenue. From this location, the telecommunications facilities would then be co-located on the newly relocated San Bernardino–Redlands-Timoteo 66 kV Subtransmission Line. The co-location of telecommunications would require approximately 6,140 feet of fiber optic cable be installed on new subtransmission structures in private and public rights-of-way to the first structure on Bryn Mawr Avenue just north of the proposed subtransmission TSP riser pole. The telecommunications facilities would transition underground at this location which would require the installation of approximately 560 feet of new conduit and fiber optic cable to an existing pole on the south side of Redlands Boulevard just west of Bryn Mawr Avenue. At this location, the new fiber optic cable would then transition overhead via a telecommunications riser and would connect to the existing fiber optic cable.

5. Connect the Timoteo-Redlands District Office fiber optic cable through existing underground conduit and on existing poles.

- Install approximately 420 feet of fiber optic cable overhead from an existing pole on the south side of Timoteo Substation crossing to the east side of Mountain View Avenue then extending 160 feet south. The fiber optic cable would transition underground for 850 feet in existing conduit south on Mountain View and 1,550 feet east on mission Road to existing manhole.

The following work would be conducted in order to facilitate the connection of existing substations to the new OPGW located on the new 220 kV structures. Temporary fiber optic jumpers would be used within each MEER to redirect and route the fiber optic systems and services during the Proposed Project's construction phase. The new fiber optic terminal equipment is needed to compensate for the losses created by the redirected fiber optic routes.

6. Connect Devers-Vista OPGW to the MEER in Banning Substation
   - From the new 220 kV structure (Structure 5S54), install approximately 500 feet of fiber cable and new underground conduit to an existing distribution pole located approximately 660 feet north of Summit Drive on San Gorgonio Avenue. The new fiber optic cable would connect on that pole to an existing fiber optic cable that extends to the MEER in Banning Substation.
7. Connect Devers-Vista OPGW to the MEER in Maraschino Substation
   - From the new 220 kV structure (Structure 4S37), install approximately 350 feet of fiber optic cable and new underground conduit to an existing manhole located on Oak View Drive approximately 320 feet north of Parkview Street. The new fiber optic cable would connect in that manhole to an existing fiber optic cable that extends to the MEER in Maraschino Substation.
8. Connect the Devers-Vista OPGW to the MEER in El Casco Substation
   - From the new 220 kV structure (Structure 3S02), install approximately 200 feet of fiber optic cable and new underground conduit to an existing manhole located in the existing SCE ROW immediately south of the El Casco Substation. The new fiber optic cable would connect in that manhole to an existing fiber optic cable that extends to the MEER in El Casco Substation.
   - From the new 220 kV structure (Structure 3S25), install approximately 200 feet of fiber optic cable and new underground conduit to an existing distribution pole located nearby. The new fiber optic cable would connect on that pole to an existing fiber optic cable that extends to the MEER in El Casco Substation.
9. Connect the Devers-Vista OPGW and Devers–El Casco OPGW to the MEER in Devers Substation.
   - From the new 220 kV structure (Structure 6N07), install approximately100 feet of fiber optic cable and new underground conduit to an existing telecommunications manhole located inside Devers Substation.
   - From the new 220 kV structure (Structure 6S07), install approximately350 feet of fiber optic cable and new underground conduit to an existing cable trench located inside Devers Substation.
10. Connect the Devers–El Casco OPGW and El Casco–San Bernardino OPGW to the MEER in El Casco Substation.
    - From the new 220 kV structure (Structure 4N65), install approximately 850 feet of fiber optic cable and new underground conduit to an existing distribution manhole located outside El Casco Substation.
    - From the new 220 kV structure (Structure 3N02), install approximately 200 feet of fiber optic cable and new underground conduit to an existing telecommunications manhole located outside El Casco Substation.
11. Connect the El Casco–San Bernardino OPGW and San Bernardino–Vista OPGW to the MEER in San Bernardino Substation.

- From the new 220 kV structure (Structure 1E26), install approximately 350 feet of fiber optic cable and new underground conduit to an existing manhole. Install approximately 1,550 feet of fiber optic cable in existing conduit and 60 feet of fiber optic cable in an existing cable trench to the MEER inside San Bernardino Substation.
- From the new 220 kV structure (Structure 1W26), install approximately 350 feet of fiber optic cable and new underground conduit. Install approximately 315 feet of fiber optic cable in an existing cable trench to the MEER inside San Bernardino Substation.

12. Connect the Devers-Vista OPGW to the MEER in Vista Substation.
    - From the new 220 kV structure (Structure 2N37), install approximately 1,000 feet of fiber optic cable and new underground structures to the MEER inside Vista Substation.

Fiber Optic Cable Removal. The removal of the existing fiber optic cable (located on the OHGW) from the existing 220 kV structures is described in Section B.2.1.1, 220 kV Transmission Line Segments. Additionally, removal of the fiber optic portions from the 220 kV existing structures to connections in the field and/or at existing substations would be required and are described below:

- Removal of approximately 250 feet of fiber optic cable from conduit and 600 feet from a cable trench within Vista Substation.
- Removal of approximately 325 feet of fiber optic cable from conduit between existing Structure M17-T2 (existing Devers-Vista No. 2 220 kV structure) and a riser pole 660 feet north of Summit Drive on San Gorgonio Avenue.
- Removal of approximately 225 feet of fiber optic cable from conduit between existing Structure M24-T2 (existing Devers-Vista No. 2 220 kV structure) and the manhole located on Oak View Drive approximately 320 feet north of Parkview Street.
- Removal of approximately 120 feet of fiber optic cable from conduit between existing Structure M29-T2 (existing Devers-Vista No. 2 220 kV structure) and existing manhole located in the SCE ROW immediately south of El Casco Substation.
- Removal of approximately 100 feet of fiber optic cable from existing conduit between Structure M32-T3 (existing Devers-Vista No. 2 220 kV structure) and riser pole nearby.
- Removal of approximately 60 feet of fiber optic cable from conduit between existing Structure M1-T1 (existing Devers–San Bernardino 220 kV structure) and riser pole on Redlands Boulevard.
- Removal of approximately 4,810 feet of fiber optic cable from overhead poles between Timoteo Substation and a pole on the south side of mission Road at the SCE ROW.

Ancillary Telecommunications Work. The following ancillary work would be conducted to accommodate the new OPGW and other modifications necessary to facilitate construction of the Proposed Project:

- New telecommunication equipment would be installed in the MEERs at Vista, El Casco, Banning, Devers, San Bernardino, Maraschino, and Timoteo Substations and the Redlands Inland Empire District Office.
- During construction, temporary fiber optic jumpers (i.e., connectors) would be installed between the equipment inside the MEERs at Vista, El Casco, San Bernardino, Banning, Devers, Maraschino, Purewater, Mentone, Zanja, and Yucaipa Substations to maintain telecommunication services, systems, and circuits. Temporary fiber optic jumpers would be used within a substation's telecommunication facility to redirect and route the fiber optic systems and services during the Proposed Project's construction phase. The new fiber optic terminal equipment is needed to compensate for the losses created by the redirected fiber optic routes.

B.2.6 Right-of-Way Requirements

Table B-3 lists ROW widths of SCE's existing West of Devers corridor.

SCE would acquire property rights to support the Proposed Project as required. The Proposed Project lines would be built on a combination of existing and new ROW. This would require upgrading existing rights and acquiring new land rights. The land rights SCE would acquire may include a combination of grants, leases, licenses, franchise, and easements over public and private lands.

Temporary land rights (e.g., easements, permits, and license) may be required for access roads, laydown areas, pulling sites, helicopter staging yards, construction yards and shoo-fly corridors during construction.

Table B-3. Existing SCE Right-of-Way Widths

WOD Segment	Range of ROW Width (feet)
Segment 1	150' to 245'
Segment 2	115' to 500'
Segment 3	400' throughout
Segment 4	400' throughout
Segment 5	150' to 450'
Segment 6	100' to 450'

B.2.6.1 Tribal Lands: Morongo Band of Mission Indians

Within Segment 5, the Proposed Project would cross approximately 8 miles of the Trust Lands (reservation) of the Morongo. SCE and Morongo entered into a ROW agreement that covers the entire Segment 5 ROW, as further explained in Section A (Introduction). Based on the SCE-Morongo ROW agreement, approximately 3 miles of existing WOD ROW would be abandoned and replaced with a new 3-mile alignment. SCE would apply to the Federal Bureau of Indian Affairs (BIA) for the grant of ROW across the new 3-mile alignment and Morongo would consent to SCE's application[4] for a new 50-year ROW Agreement.

As part of the ROW agreement, on November 27, 2012, SCE entered into a Development and Coordination Agreement (DCA) with Morongo Transmission LLC[5] that provides Morongo Transmission the option to invest up to $400 million at the time of commercial operation in exchange for 30-year lease rights to a pro rata portion of the proposed facilities. SCE has stated that this investment option was a key factor in the negotiation of a new ROW agreement that allows the Proposed Project be built across the Morongo tribal-trust lands. However, Morongo Transmission's transmission transfer capability rights lease is contingent upon receipt of regulatory approvals from the Federal Energy Regulatory Commission (FERC)[6] and the CPUC. Under the terms of the ROW agreement, if such FERC and CPUC regulatory approvals are not obtained, the Morongo Tribe would have the right to terminate the ROW agreement.

As part of its Application A.13-10-20, SCE requested an Interim Decision from the CPUC for authority to lease transfer capability rights in a portion of the Proposed Project's upgraded and reconfigured transmission lines to Morongo Transmission. SCE has stated that approving an Interim Decision early in

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4 Pursuant to 25 U.S.C. § 323.

5 Morongo Transmission LLC is a venture between the Morongo Band of Mission Indians and Coachella Partners LLC, a Delaware limited liability company formed for the purposes of the Proposed Transaction, for which the Morongo Tribe owns the majority of interest.

6 On May 31, 2013, SCE and Morongo Transmission filed a joint application at FERC pursuant to Section 203 of the Federal Power Act requesting authorization to lease transfer capability in a portion of the WOD-UP by SCE to Morongo Transmission. On September 3, 2013, FERC issued Order Authorizing Disposition of Jurisdictional Facilities, 144 FERC 61,178 (2013) granting SCE's and Morongo Transmission's joint 203 Application, as being consistent with the public interest.

the process would be important because the ROW agreement is contingent on the CPUC approval of the proposed transaction. However, at the Prehearing Conference on March 4, 2015, SCE stated that it was no longer requesting the Interim Decision.

Without a ROW agreement, SCE would have to restart and develop a new project that bypasses the Morongo tribal-trust lands. The terms of the proposed transaction set forth in the DCA and the ROW agreement are included in Appendix J of SCE's Application A.13-10-020 (dated October 25, 2013) and Appendix 3 in this EIR/EIS.

B.2.6.2 BLM-Administered Public Lands

Within Segment 6, the Proposed Project would cross approximately 3.5 miles of lands managed by the Federal Bureau of Land Management (BLM) as a designated utility corridor. The Proposed Project would be located primarily within the BLM ROW for the existing WOD transmission lines, although some disturbance may occur outside the existing ROW. Disturbance beyond the existing ROW within BLM would be both temporary and permanent. Temporary disturbance that may occur outside of the ROW includes areas, such as construction work areas, temporary access roads, cut/fill slopes, and pulling locations. Permanent disturbance would include areas of new access road construction, crane pads, and existing access roads to be continually maintained.

SCE will seek a revised ROW grant from the BLM to accommodate the Proposed Project. The BLM's consideration of the ROW grant would trigger environmental review under the National Environmental Policy Act (NEPA), and the BLM would act as the NEPA lead agency. Because the Proposed Project is within a designated utility corridor, the revised ROW would not require a land use plan amendment.

B.2.6.3 Transmission Line Right-of-Way Requirements

In addition to the rights that would be acquired through the SCE-Morongo ROW Agreement (see Section B.2.6.1), the following acquisitions may be required for the 220 kV transmission lines:

- Subject to completion of final engineering, 10 miles of existing ROW would require an upgrade of land rights and approximately 6 miles would require new acquisition from private property owners for additional ROW, totaling a combined approximate of 194 acres. Approximately 33 acres, of new access and spur roads leading to the new structure locations, which is approximately 33 acres may need to be acquired from private property owners.

For the 66 kV Subtransmission line relocations, the following acquisition may be required:

- The total distance for both relocated 66 kV subtransmission lines is approximately 6.0 miles, of which 2.8 miles would be located in franchise area,[7] 1.5 miles would require approximately 9 acres of new acquisition, 1.3 miles would be located within existing easement, and 0.9 miles may be converted to underground within franchise area.

B.2.6.4 Federal Aviation Administration Considerations

The alignment of the lines and terrain in the region may require Federal Aviation Administration (FAA) notification due to the above ground height of the conductor or OPGW between structures or the height of the transmission, subtransmission and shoo-fly structures. After considering the information provided by SCE, the FAA will make formal determinations as to which line segments should be installed with lights or marker balls to minimize or eliminate any potential hazards.

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[7] Franchise is a right or privilege conferred by agreement between SCE and local jurisdictions.

220 kV Transmission Line. SCE anticipates that over the entire length of the Proposed Project (220 kV transmission lines component) approximately 220 structures and spans would be submitted to the FAA in order that the FAA could make the ultimate determinations for potential hazards. The structures requiring notification are more likely to trigger appurtenances that make structures or conductor spans more visible to aircraft. FAA's recommendations could include installation of lights on proposed new structures, or they could suggest installation of orange, yellow and white marker balls on certain conductor spans.

Due to the proximity to the Banning Airport and potential feasibility issues with the route preferred by the Morongo Tribe, SCE submitted early FAA notification and received determinations from the FAA for the structures in the western most portion of Segment 5. FAA has indicated that 18 structures on the west end of the Morongo Reservation would benefit from lighting on the west end of the Morongo Reservation in order to consider them as "no hazard" facilities (see EIR/EIS Appendix 1B) (SCE, 2014).

In order to illustrate the remaining general locations where structure and conductor height would be more visible, SCE expects FAA to make determinations on the following structures (for lighting) and spans (for marker balls):

- 46 structures and 0 spans in Segment 1
- 6 structures and 14 spans in Segment 2
- 0 structures and 46 spans in Segment 3
- 14 structures and 22 spans in Segment 4
- 60 structures and 2 spans in the eastern portion of Segment 5
- 0 structures and 10 spans in Segment 6

The specific structures and spans that would likely require FAA notification and determinations are listed in Appendix 1B. Except for the western portion of Segment 5, the FAA has not conducted its review of the Proposed Project and thus has not issued any lighting or marker ball recommendations to date. The number of structures requiring FAA notifications would be updated following completion of final engineering. SCE would file the necessary FAA Form 7460 for structures or lines upon completion of final engineering and prior to construction, as outlined in Federal Aviation Regulations (FAR) Part 77. To the extent practicable, FAA recommendations would be implemented into the design of the Proposed Project.

If a span requires three or fewer marker balls, then the marker balls on the span would all be aviation orange. If a span requires more than three marker balls, then the marker balls would alternate between aviation orange, white, and yellow. Marker balls would be 36 inches in diameter. If a structure requires lighting, SCE would comply with FAA Advisory Circular 70/7460 which, depending on the structure height, could require either one steady light at the top of the structure or one red flashing light at the peak/top and two red steady lights at the middle height of the structure.

66 kV Subtransmission Line. The relocated 66 kV subtransmission lines could also require FAA notification for certain subtransmission structures because of the proximity to the San Bernardino Airport and terrain in the region. The FAA notification process and installation of marker ball and structure lighting is the same as described above. At this time, SCE has neither determined nor been informed by the FAA as to whether marking and/or lighting of the 66 kV subtransmission line route spans or poles would be recommended. SCE would submit all relevant information, including any required Form 7460 to the FAA, for the 66 kV subtransmission line routes.

Shoo-Flies. Depending on the height and location of the temporary shoo-flies (described in Section B.3.3.13), FAA hazard marking could be required by the FAA. SCE has stated that specific shoo-fly locations cannot be determined until final design and engineering efforts are completed and the construction sequencing plans are finalized. However, whenever specific shoo-fly locations are determined, SCE would perform the same level of analysis to determine appropriateness for FAA filing as would be performed for any and all permanent structures. SCE would submit all relevant information including any required Form 7460 to the FAA for the shoo-fly structures.

B.3 Construction of Proposed Project

B.3.1 General Construction

If approved by the CPUC, BLM, and other permitting agencies, construction of the Proposed Project is currently estimated to commence early 2016 with a proposed operational date of December 2020. Work would take place on multiple Project components at a time, but, in general, efforts related to telecommunications relocations, subtransmission (66 kV) line relocations, and distribution (12 kV) line relocations would need to occur in the initial stages of construction. Bulk transmission (220 kV) line upgrades and substation upgrades would occur throughout the duration of construction. Shoo-fly facilities would be erected to provide a structure upon which to place the live wire while permanent structures were being built. SCE's construction schedule and sequence is further described in Section B.3.10.

Table B-4, Approximate Land Disturbance Summary for the Proposed Project, presents the approximate acres of temporary and permanent disturbance associated with the Proposed Project. The acres of disturbance include access roads and other land disturbance associated with the transmission and subtransmission work.

Table B-4. Approximate Land Disturbance Summary for the Proposed Project

Project Element	Approximate Total Acres Temporarily Disturbed	Approximate Total Acres to be Restored	Approximate Total Acres Permanently Disturbed
Transmission and subtransmission	4,817.8	4,301	516.8
Distribution	9	9	0
Telecommunication system	6	6	0
Total	4,832.8	4,316	516.8

Source: SCE, 2013.

It is not anticipated that lighting would be used at construction sites unless a permit condition, an outage requirement, critical work activity and/or an emergency situation would require work to be conducted during off hours. In those instances, lighting would consist of temporary construction lighting systems that utilize shielding to direct the light away from sensitive receptors, to the extent feasible.

In populated areas, SCE would post notices on the ROW or at other sites where the public would be affected by construction activities. Notices would be posted approximately one month prior to commencement of work.

B.3.1.1 Staging Areas and other Work Areas

Construction of the Proposed Project would require the establishment of temporary staging yards. Staging yards would be used as reporting locations for workers, vehicle and equipment parking, and material storage. The yards may also have construction trailers for supervisory and clerical personnel. Staging yards may be lighted for staging and security.

Sites were selected based on proximity to the project, having existing useable areas of reasonably level terrain, and vehicular access. Some of the yards listed are currently in use by other projects and are projected to be vacated by the time of need for this project. The in-use yards would be reused as an effort to reduce environmental impacts.

SCE anticipates using one or more of the possible locations listed in Table B-5, Potential Staging Yard Locations and seen in Figure B-16, Proposed Staging Yard Locations, as the staging yard(s) for the Proposed Project. Typically, each yard would be 3 to 20 acres in size, depending on land availability and intended use. Table B-6 provides the estimated land disturbance at the potential staging yards.

Table B-5. Potential Staging Yard Locations

Yard Name*	Location	Condition	Approximate Area (acres)
Mountain View No. 1 Material and Equipment Staging Area	West of Mountain View Avenue & North of San Bernardino Avenue, Redlands	Previously disturbed, vacant (fenced)	2.8
Lugonia Material and Equipment Staging Area	South of Lugonia Avenue & West of Segment 1 Corridor, Redlands	Recently used as staging area for a pipeline project (fenced)	3.9
Beaumont No. 1 Material and Equipment Staging Area	Northeast Corner of South California Avenue & East Third Street, Beaumont	Currently in use as a staging area for an electrical project (fenced, gravel)	3.9
Beaumont No. 2 Material and Equipment Staging Area	853 E. Third Street, East of Maple Avenue, Beaumont	Currently in use as a staging area for an electrical project (fenced, gravel)	5.0
Hathaway No. 1 Material and Equipment Staging Area	600 N. Hathaway Street, Banning	Previously disturbed, buildings, (concrete, fenced)	30.0
Hathaway No. 2 Material and Equipment Staging Area	Northeast side of East Williams Street and North Hathaway, Banning	Unimproved	15.7
San Timoteo Material and Equipment Staging Area	30595 San Timoteo Canyon Road, Redlands	Previously disturbed, vacant	17.0
Poultry Material and Equipment Staging Area	Directly in front of MCM Poultry, San Timoteo Canyon Road, Redlands	Previously disturbed, vacant	13.0
Devers Material and Equipment Staging Area	East of SCE's Devers Substation	Currently in use as staging area for an electrical project (fenced, gravel)	9.5
Grand Terrace Material and Equipment Staging Area	Northeast corner of Mt. Vernon Avenue and Canal Street, Grand Terrace	Vacant, previously disturbed SCE utility corridor	4.4

Source: SCE, 2013.
*Transmission line materials have been identified as the project component for use at each of the yards; however, subtransmission, distribution, and telecommunications materials may also be stored at each of these yards.

Preparation of the staging yards would include temporary perimeter fencing and, depending on existing ground conditions at the site, grubbing any existing vegetation, and the application of gravel or crushed rock.

Table B-6. Potential Staging Yard Approximate Land Disturbance

Project Feature	Site Quantity	Disturbed Acreage Calculation (L × W)	Acres Disturbed During Construction	Acres to be Restored (Temporary)	Acres Permanently Disturbed
Grand Terrace Material and Equipment Staging Area	1	n/a	4.5	0	4.5
Mountain View No. 1 Material and Equipment Staging Area	1	n/a	2.8	0	2.8
Lugonia Material and Equipment Staging Area	1	n/a	3.7	0	3.7

Table B-6. Potential Staging Yard Approximate Land Disturbance

Project Feature	Site Quantity	Disturbed Acreage Calculation (L × W)	Acres Disturbed During Construction	Acres to be Restored (Temporary)	Acres Permanently Disturbed
Beaumont No. 1 Material and Equipment Staging Area	1	n/a	0*	0	0
Beaumont No. 2 Material and Equipment Staging Area	1	n/a	0*	0	0
Hathaway No. 1 Material and Equipment Staging Area	1	n/a	0*	0	0
Hathaway No. 2 Material and Equipment Staging Area	1	n/a	14.0	0	14.0
San Timoteo Material and Equipment Staging Area	1	n/a	17.0	0	17.0
Poultry Material and Equipment Staging Area	1	n/a	13.0	0	13.0
Devers Material and Equipment Staging Area	1	n/a	0*	0	0
Total Estimated Disturbance Area				0	55.0

Source: SCE, 2013.

The disturbed acreage calculations are estimates based upon SCE's preferred area of use for the described project feature, the width of the existing ROW, or the width of the proposed ROW. They do not include any new access/spur road information. They are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or contractor awarded the project. In summary, the disturbance calculations are based on preliminary calculations and are expected to change.

*The yard has previously been improved to a condition where the project can use it without further modifications. Therefore, no disturbance acreage is included for this location.

Staging yards would have lighting installed for security purposes, and this lighting system would utilize a shielding system to limit glare to surrounding areas (SCE, 2014a). Power and telecommunications would be needed at the staging areas for office trailer(s) and lighting at the site. These connections would be established from the nearest existing facilities (e.g., distribution pole) and/or service provider connection.

Any land that may be disturbed at the staging yards would be restored to preconstruction conditions or to conditions agreed upon between SCE and the landowner following the completion of construction for the Proposed Project. Fencing and other improvements at the staging yard locations may stay in place post-construction per the landowner's request. The potential staging yard locations identified as previously disturbed would be returned to pre-existing conditions.

Substation staging areas would be located at the existing substations where modifications for this project would occur. This project does not include the construction of any new substations; however, there would be modifications to existing substations as described in Section B 2.2, Substation Improvements. Modifications or upgrades to the existing Vista, San Bernardino, El Casco, Etiwanda, Timoteo, Tennessee, and Devers Substations would be confined inside each existing site boundary fence for all the facilities. Substation staging areas would typically be accessed by construction vehicles utilizing existing access roads, walk-ins, and by helicopter if necessary.

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

Fuel and hydraulic fluids would be located at the construction staging yards. Normal maintenance and refueling of construction equipment would be conducted at these yards. All refueling and storage of fuels would be performed in accordance with the Storm Water Pollution Prevention Plan (SWPPP). It would include Best Management Practices (BMPs) to address the handling of hazardous materials during construction activities. Fuel from the construction staging yards may be transported to other portions of the project area (e.g., structure locations, access roads, ROW, etc.) via mobile refuelers. When not in use (e.g., parked) mobile refuelers would be subject to general containment provisions (e.g., parking area with berms) to contain potential leaks or spills.

A majority of materials associated with the construction efforts would be delivered by truck to designated staging yards, while some materials may be delivered directly to the temporary transmission and subtransmission construction areas.

Transmission and subtransmission construction areas serve as temporary working areas for crews and where project-related equipment and/or materials would be placed at or near each structure location, within SCE ROW or franchise. Table B-7, Approximate Laydown/Work Area Dimensions, identifies the approximate land disturbance for these construction area dimensions (for both removal and installation) for the Proposed Project.

Table B-7. Approximate Laydown/Work Area Dimensions

Laydown/Work Area Feature[1]	Preferred Size (L × W)[2]	Acreage
Temporary guard structures	150 feet × 50 feet	0.2
Lattice steel towers	220 feet × 220 feet	1.1
TSPs	200 feet × 150 feet	0.7
H-Frames	175 feet × 125 feet	0.5
LWS / wood poles	175 feet × 100 feet	0.4
Wood guy poles	175 feet × 100 feet	0.4
Stringing, pulling/tensioning setup areas	600 feet × 150 feet	2.0
Stringing setup areas: splices, pulling/tensioning	200 feet × 150 feet	0.7
Underground vaults	100 feet × 100 feet	0.2

Source: SCE, 2013.

1 - Field and safety conditions may dictate that wire-sites, structure pads, or access roads may be used to stage certain types of helicopter-installed materials (including, but not limited to, travelers, insulators, and light tools) to limit the distance external loads are carried.

2 - The acreage of disturbance per laydown/work area would remain consistent with those numbers represented in this table. However, the preferred width and length of these laydown/work areas are provided for reference only and would likely change based on field conditions. For temporary guard structures, the preferred length may increase depending on the angle of crossing.

Any structure construction activities performed by helicopter would be based out of local airports/ airfields located within the vicinity of the ROW and staging yards, where possible. Otherwise, the helicopter would be located along the ROW and existing access roads, as needed. Mobile fueling apparatus would be required where helicopters would be staged along the ROW during construction. Use of the mobile fueling equipment would be operated in accordance with proper spill containment requirements.

B.3.1.2 Storm Water Pollution Prevention Plan

Construction of the Proposed Project would disturb a surface area greater than 1 acre. Therefore, SCE would be required to obtain coverage under the State Water Resources Control Board’s (SWRCB’s) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, as amended by Order Nos. 2010-0014-DWQ and 2012-0006-DWQ. Commonly used BMPs are stormwater runoff quality control measures (boundary protection), erosion and sediment controls, good housekeeping measures, dewatering procedures, and concrete waste management. A SWPPP would be based on final engineering design. It is anticipated that there would be multiple SWPPPs for the Proposed Project.

B.3.1.3 Dust Control

During construction, migration of fugitive dust from the construction sites would be limited by control measures set forth by the South Coast Air Quality Management District (SCAQMD) Rule 403 and Rule 403.1. These measures may include the use of water trucks and other dust control measures. Existing water sources within the project area would be utilized for dust suppression.

Water tanks needed for dust suppression may be required in multiple areas in order to support construction activities. Water tanks typically hold 10,000 gallons and would be filled by water trucks or local fire hydrants on a regular basis during construction. Water tanks during construction would be placed in areas identified for disturbance (e.g., access roads, temporary laydown/work areas, and the ROW).

B.3.1.4 Water Usage

SCE developed an estimate of the amount of water needed to support construction activities related to fugitive dust mitigation, vegetation restoration, and soil compaction/concrete placement for the West of Devers Upgrade Project. This estimate was based on assumptions related to the area of land disturbance, project duration, seasonal timing of work (which would result in varying amounts of evapotranspiration), type of construction activity, and roadway access/conditions (SCE, 2014b).

SCE estimated it would use up to a maximum of 250 acre-feet of water on an annual basis for construction purposes. Table B-8 indicates the water purveyors that may be asked to provide water for construction use. After final engineering is completed, SCE will contact these water purveyors to determine the availability of water in each jurisdiction. Water would be obtained at the locations closest to the locations of need, in order to minimize the distance traveled by water trucks (to reduce air emissions).

Table B-8. Potential Water Providers to WOD Upgrade Project

Location	Water Provider	Type (City, ID, Private)	Total Supply AF (2010)	Total Use AF (2010)
San Bernardino County				
Colton, CA	City of Colton Water Division	City	15,000	11,169
Grand Terrace, CA	Riverside Highland Water Company	Corporation	Unknown	Unknown
Loma Linda, CA	City of Loma Linda Water Division	City	4,530	5,490
San Bernardino, CA	San Bernardino Municipal Water Department	City	55,940	52,627
Highlands, CA	East Valley Water District	Organization	22,722	22,570
Riverside County				
Redlands, CA	Redlands Municipal Utilities & Engineering Department	City	31,479	27,902
Calimesa, CA	South Mesa Water Co.	Public agency	Unknown	Unknown
Calimesa, CA	Yucaipa Valley Water District	Public agency	18,969	12,128
Beaumont, CA	Beaumont Cherry Valley Water District	Public agency	11,399	11,023
Banning, CA	City of Banning Water Division	City	9,553	7,587
Cabazon, CA	Cabazon Water District	Muni. Water District	Unknown	Unknown
Palm Springs, CA	Desert Water Agency	Irrigation District	61,000	50,500

Table B-8. Potential Water Providers to WOD Upgrade Project

Location	Water Provider	Type (City, ID, Private)	Total Supply AF (2010)	Total Use AF (2010)
Coachella Valley and East Palm Springs, CA	Coachella Valley Water District	Regional Water District	109,488	109,488
Desert Hot Springs, CA	Mission Springs Water District	Water District	8,665	8,664

Source: SCE, 2014b, CPUC Data Request #1; and DWR, 2014.

B.3.1.5 Traffic Control

Construction activities completed within public-street ROWs would require the use of a traffic control service, and any lane closures would be conducted consistent with local ordinances and ministerial city permit conditions. These traffic control measures would be consistent with those published in the California Joint Utility Traffic Control Manual (SCE, 2013).

B.3.2 Modifications to Existing Substations

The following section describes the construction activities associated with installing the components described in Section B.2.2, Substation Improvements.

Work at Vista, San Bernardino, El Casco, and Devers Substations would occur on the Proposed Project-related 220 kV facilities and would include replacement of disconnect switches, circuit breakers, foundations, and reconductoring line positions. Circuit breakers and disconnect switches would be replaced with higher-rated equipment. Work at Etiwanda Substation would occur within the existing Mechanical and Electrical Equipment Room (MEER) and include replacement of protective relay equipment. Work at Tennessee and Timoteo Substations would include replacement of circuit breakers and foundations.

All substation-related work would be conducted within the existing substation walls or fence lines. The Proposed Project would not result in changes to access, parking, drainage patterns, or modifications to perimeter walls or fencing at the existing substations.

Below-grade facilities, such as new equipment foundations, ground grid, and conduits, would be installed at existing substations. All work would restore grade back to original condition.

Above-grade work related to the substation modifications would be conducted only within the perimeter fence of the existing substations.

B.3.2.1 Substation Ground Surface Improvements

The import and/or export of soil and the import of concrete would be required for new equipment foundations installed at several existing substation locations. A summary of substation soil and concrete quantities is provided in Table B-9, Substation Cut/Fill Grading and Surface Improvements Summary.

Table B-9. Substation Cut/Fill Grading and Surface Improvements Summary

Element	Material	Approximate Surface Area (square feet)	Approximate Volume (cubic yards)
Devers Substation			
Substation equipment foundations, cut	Concrete	1,200	110
Substation equipment foundations, import	Concrete	1,000	210
Site fill	Soil	200	—
Site cut	Soil	—	100

Table B-9. Substation Cut/Fill Grading and Surface Improvements Summary

Element	Material	Approximate Surface Area (square feet)	Approximate Volume (cubic yards)
El Casco Substation			
Substation equipment foundations, cut	Concrete	800	50
Substation equipment, import	Concrete	1,000	60
Site cut	Soil	200	10
Vista Substation			
Substation equipment foundations, cut	Concrete	1,200	110
Substation equipment foundations, import	Concrete	1,000	200
Site fill	Soil	200	—
San Bernardino Substation			
Substation equipment foundations, cut	Concrete	2,900	330
Substation equipment foundations, import	Concrete	1,600	260
Site Fill	Soil	1,300	60
Timoteo Substation			
Substation equipment foundations, cut	Concrete	70	5
Substation equipment foundations, import	Concrete	60	4
Site fill	Soil	10	1
Tennessee Substation			
Substation equipment foundations, cut	Concrete	30	2
Substation equipment foundations, import	Concrete	40	2
Site cut	Soil	10	—

Source: SCE, 2013.

Excess soil excavated from the substation locations may be used as fill for other project elements or disposed of off-site at a properly licensed waste facility. Similarly, excess soil excavated from other project elements may be used as fill at other substation locations.

B.3.3 Transmission and Subtransmission Line Construction Process

The following sections describe the construction activities associated with installing the transmission and subtransmission line components for the Proposed Project.

B.3.3.1 Access, Spur, and Temporary Roads

SCE intends to use approximately 220 miles of new and existing access/spur roads for the Proposed Project; of that, it is estimated that 130 miles of those roads would require rehabilitation, and 20 miles of planned new access/spur roads would require more extensive construction activities. Both scenarios are described below.

Access Roads. Typical construction activities associated with rehabilitation of existing dirt access roads include vegetation clearing, blade-grading and recompacting to fill potholes, remove ruts, and other surface irregularities in order to provide a smooth dense riding surface capable of supporting heavy construction and maintenance equipment. Existing dirt roads may also require additional upgrades such as protection for underground utilities and widening existing roads that are too narrow for safe vehicle operation. Repair and stabilization of slides, washouts, and other slope failures may be necessary to prevent future failures. The type of structure to be utilized would be based on specific site conditions to be determined during final engineering.

Typical construction activities for new roads are similar to those described for the rehabilitation of existing dirt roads, but may also include the following additional construction requirements that depend upon the existing land terrain.

- *Existing relatively flat terrain approximately 0 to 4 percent grade:* Construction activities are generally similar to rehabilitation activities to existing dirt roads, and in addition may require activities such as grubbing and constructing drainage improvements (e.g., wet crossings, water bars, and/or culverts).
- *Existing rolling terrain approximately 5 to 12 percent grade:* Construction activities generally include activities typical to flat terrain and in addition may require activities such as cut and fill in excess of 2 feet in depth, benched grading, drainage improvements (e.g., v-ditches, down drains, and energy dissipaters), and slope stability improvements such as retaining walls and mechanically stabilized earth walls. Figure B-17, Typical Retaining and Mechanically Stabilized Earth Walls, shows the types of retaining and mechanically stabilized earth walls typically used by SCE. The extent of slope stability improvements and structure type is determined after site-specific geotechnical investigations and final engineering are performed.
- *Existing mountainous terrain over 12 percent grade:* Construction activities would include similar activities as rolling terrain construction activities and may likely require significant cut and fill depths, benched grading, drainage improvements, and slope stability improvements. In some cases, paving of the road may be necessary.

Generally, dirt access roads would have a minimum 14-foot drivable width with 2 feet of shoulder on each side to accommodate required drainage features depending on the existing topography. Curves would generally have a minimum radius of curvature of 50 feet measured from the center line of the drivable road width. Along a curved section, the drivable road width would be typically widened an additional 1 to 8 feet depending on the radius of the curvature to accommodate construction and maintenance vehicles. Access road gradients may be modified so that sustained grades do not generally exceed 12 percent. Grades greater than 12 percent would be permitted when such grades do not exceed 40 feet in length and are located more than 50 feet from any other excessive grade. In some instances, SCE may deviate from mitigating grades greater than 12 percent.

Retaining walls may be required along some of the access roads. Retaining wall locations are preliminarily assumed to occur within areas identified for proposed grading. For the purposes of the environmental analysis, it is estimated that the project will have approximately 4,010 linear feet of retaining wall structures spread amongst the various project segments. The specific number of retaining wall structures and locations would be identified during final engineering. Retaining walls could range between 5 and 20 feet in exposed height.

The estimated length of new retaining walls for each segment is summarized in Table B-10, Approximate Length of New Retaining Wall per Segment, and shown in Figure B-17.

Table B-10. Approximate Length of New Retaining Wall Per Segment

	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6	Total
Retaining wall (feet)	0	810	2,050	350	400	400	4,010

Source: SCE, 2013.

Spur Roads. New spur roads would be constructed similar to how access roads are described above. The new spur roads would typically have circle-type turnaround areas around the structure location. Where a circle-type turnaround is not practical, an alternative turnaround configuration would be constructed to provide safe ingress/egress of vehicles to access the structure location. It is common to use access roads and turnaround areas for structure access, parking, laydown areas, and as a crane pad set-up area during construction activities. In some instances, the turnaround area would remain as a permanent feature.

Temporary Roads. Temporary construction roads may be required for construction of the 220 kV transmission portion of the Proposed Project. These roads would be separate from the access and spur roads. These temporary roads would be constructed solely for the purpose of facilitating construction activities when use of existing or proposed permanent roads would not be feasible. Approximately 15 miles of new roads would be used for temporary construction access. Temporary and permanent road-ways would be a minimum of 12 feet wide. In areas where the existing road width is greater than 18 feet, the entire road width would be used for the Proposed Project.

Land disturbance related to access/spur roads and retaining walls includes temporary construction work areas and permanent areas to be maintained for ongoing operations and maintenance. Additional information related to land disturbance for this portion of the Proposed Project is included in Section B.3.3.15, Transmission and Subtransmission Land Disturbance.

Project-related foot travel between structures and along the SCE ROW may be necessary during construction. Crews walking from structure to structure at times may be more efficient than utilizing vehicle or helicopter travel to and from structure sites. Project-related foot travel would occur in areas identified for temporary and/or permanent disturbance (e.g., access roads, temporary laydown/work areas, or the ROW).

B.3.3.2 Structure Site Preparation

The new structure pad locations and laydown/work areas (previously referenced in Table B-7, Approximate Laydown/Work Area Dimensions in Section B.3.1.1) would first be graded and/or cleared of vegetation as required to provide a vegetation-free surface for structure installation. Sites would be graded to enable water to flow in the direction of the natural drainage, which would be designed to prevent ponding and erosion that could cause damage to the structure footings. The graded area would be compacted to be capable of supporting heavy vehicular traffic.

Erection of the structures typically requires establishment of a crane pad. The crane pad would 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 and erection. It would remain for operations and maintenance activities. The pad may be cleared of vegetation and/or graded as necessary to provide a relatively level surface for crane operation. The decision to use a separate crane pad within the laydown/work areas would be determined during final engineering for the Proposed Project.

Benching may be required to provide access for footing construction, assembly, erection, 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 would also be used on an as-needed basis in areas to help ensure the safety of personnel during construction activities.

Prior to ground disturbance activities, SCE, or its contractor, would contact Underground Service Alert to identify any underground utilities in the construction zone. If an underground utility is identified as being potentially affected by SCE's construction or operation procedures, a method to mitigate conflicts would be implemented as agreed to by SCE and the affected underground utility owner/operator.

B.3.3.3 Foundation Installation

Structure foundations for each LST would typically consist of four poured-in-place concrete footings, whereas foundations for each TSP would require a single drilled poured-in-place concrete footing. Actual footing diameters and depths for each of the structure foundations would depend on the structure design as well as the soil conditions and topography at each site and would be determined during final engineering. Table B-11 lists the estimated land disturbance for the Proposed Project transmission structures. Table B-12 lists the estimated land disturbance for the Proposed Project for subtransmission structures.

Table B-11. Transmission Approximate Land Disturbance

Project Feature	Site Quantity	Approximate Disturbed Acreage Calculation (L × W)	Approximate Total Acres Disturbed During Construction	Approximate Total Acres to be Restored (Temporary)	Approximate Total Acres Permanently Disturbed
Guard structures	667	150 feet × 50 feet	114.8	114.8	0.0
Remove existing lattice steel tower[1]	408	220 feet × 220 feet	453.3	453.3	0.0
Remove existing tubular steel pole[1]	5	220 feet × 150 feet	3.8	3.8	0.0
Remove existing 220 kV wood H-frame & wood 3 pole structures[1]	182	175 feet × 125 feet	91.4	91.4	0.0
Construct new lattice steel tower[2]	413	220 feet × 220 feet	458.9	355.6	103.3
Construct new tubular steel pole[2]	76	220 feet × 150 feet	57.6	53.0	4.6
Conductor stringing setup area[3]	123	600 feet × 150 feet	254.1	254.1	0.0
Conductor splicing setup areas[3]	14	200 feet × 150 feet	9.6	9.6	0.0
Existing access roads to be improved[4]	130.0	linear miles × 18 feet'	283.6	0.0	283.6
New access roads[4]	20	linear miles × 18 feet	43.6	0.0	43.6
Crane pads, walls, cut slopes	—	—	2919.7	2840.5	79
Total Estimated Disturbance Acreage			4690.6	4176.3	514.3

Source: SCE, 2013.

1 - Includes the removal of existing conductor, teardown of existing structure, and removal of foundation 2' below ground surface.

2 - Includes structure assembly& erection conductor& OPGW installation. Area to be restored after construction. Portion of ROW within 20' of ALL structures to remain cleared of vegetation. Permanently disturbed areas for LST = 0.25 acres, TSP=0.06 acres, LWS=0.05 acres, and H-Frame=0.06 acres.

3 - Based on 9,000' standard conductor reel lengths, conductor size, number of circuits, route design, and terrain.

4 - Based on approximate length of road in miles x driveable road width of 14'–22' with 2' of berm on each side of road.

The disturbed acreage calculations are estimates based upon SCE's preferred area of use for the described project feature, the width of the existing right-of-way, or the width of the proposed right-of-way and, they do not include any new access/spur road information; they are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or Contractor awarded project.

Footing/Base Volume and Area Calculations (approximate):

- Average TSP depth 30 feet deep, 7-foot diameter, quantity 1 per TSP: earth removed for footing = 42.8 c.y.; surface area = 38.5 sq.ft.
- Average LWS/Wood pole depth 12 feet deep, 2.5-foot diameter, quantity 1 per LWS/wood pole; earth removed for pole base 2.2 c.y.; surface area = 4.9 sq.ft.
- Average Wood H-Frame depth 12 feet deep, 2.5-foot diameter, qty 2 per H-Frame: earth removed for pole base= 4.4 c.y.; surface area = 9.8 sq.ft.

Permanent areas of disturbance were calculated based on the footprint of the structures with an additional 20-foot buffer around the structures reserved for operation and maintenance purposes and the utilization of the crane pad for O&M activities.

Acres permanently disturbed are assumed to be project areas where the disturbance will continue to be used during Operations and Maintenance (O&M) Activities post construction. Areas that would be stabilized or revegetated per requirements identified in Section 4.4 Biological Resources and not used for O&M have been assumed to be temporarily impacted (Acres to be Restored).

Table B-12. Subtransmission Approximate Land Disturbance

Project Feature	Quantity	Disturbed Acreage Calculation (L × W)	Approximate Total Acres Disturbed During Construction	Approximate Total Acres to be Restored (Temporary)	Approximate Total Acres Permanently Disturbed
Guard structures	70	75 feet × 50 feet	6.0	6.0	0.0
Remove existing lattice steel tower[1]	9	220 feet × 220 feet	10.0	10.0	0.0
Remove existing wood pole[1]	28	175 feet × 100 feet	11.2	11.2	0.0
Construct new tubular steel pole[2]	18	220 feet × 150 feet	13.6	12.5	1.1
Construct new lightweight steel/ wood pole[2]	135	175 feet × 100 feet	54.3	52.9	1.4
Guying structures[3]	8	100 feet × 75 feet	1.4	11.4	0.0
Conductor stringing setup area[4]	28	400 feet × 100 feet	25.7	25.7	0.0
Install underground cable in conduit	5,280 (linear feet)	Linear feet × 24-inches wide	2.9	2.9	0.0
Install underground vault	9	100 feet × 100 feet	2.1	2.1	0.0
Total Estimated Disturbance Acreage[4]			127.2	124.7	2.5

Source: SCE, 2013.

1 - Includes the removal of existing conductor, teardown of existing structure, and removal of foundation 2' below ground surface.

2 - Includes structure assembly & erection, conductor & OPGW installation. Area to be restored after construction. Portion of ROW within 20' of ALL structures to remain cleared of vegetation. Permanently disturbed areas for TSP = 0.06, LWS/Wood = 0.05, and H-Frame = 0.06 acres.

3 - Permanent disturbance around a guy stub pole would be 10-foot radial, centered on the pole.

4 - Based on 7,500' standard conductor reel lengths, conductor size, number of circuits, route design, and terrain.

The disturbed acreage calculations are estimates based upon SCE's preferred area of use for the described project feature, the width of the existing right-of-way, or the width of the proposed right-of way, and they do not include any new access/spur road information; they are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or Contractor awarded project.

Footing/Base Volume and Area Calculations (approximate):

- Average TSP depth 30 feet deep, 7-foot diameter, quantity 1 per TSP: earth removed for footing = 42.8 c.y.; surface area = 38.5 sq.ft.
- Average LWS/Wood pole depth 12 feet deep, 2.5-foot diameter, quantity 1 per LWS/wood pole; earth removed for pole base 2.2 c.y.; surface area = 4.9 sq.ft.

The foundation process begins with the drilling of the holes using truck- or track-mounted excavators with various diameter augers to match the diameter requirements of the structure type. LSTs typically require an excavated hole approximately 3 feet to 7 feet in diameter and approximately 15 feet to 50 feet deep; TSPs typically require an excavated hole approximately 5 feet to 12 feet in diameter and approximately 30 feet to 60 feet deep. On average, each footing for a LST structure would project approximately 2 to 5 feet above ground level; TSP footings would project approximately 1 to 3 feet above ground level within franchise areas and approximately 2 to 4 feet above ground level in uninhabited areas.

The excavated material would be distributed at each structure site, used to backfill excavations from the removal of nearby structures (if any), used in the rehabilitation of existing access roads, or used as fill at existing substations. Depending on the quality of the native soils extracted from the foundations, up to approximately one-third of that material could be used as backfill and the remainder would be disposed of at an off-site disposal facility in accordance with all applicable laws.

Following excavation of the foundation footings, steel-reinforced rebar cages and stub angles (for LSTs) or anchor bolts (for TSPs) would be set, survey positioning would be verified, and concrete would then be placed. The steel-reinforced rebar cages may be assembled at staging yards or vendor facilities and delivered to each structure location by flatbed truck or they may be delivered loose and assembled at the job site. Depending upon the type of structure being constructed, soil conditions, and topography at each site, LSTs would require approximately 20 to 310 cubic yards of concrete delivered to each structure location and, TSPs would require approximately 25 to 270 cubic yards of concrete delivered to each structure location.

Slight to severe ground caving is anticipated along the project route during the drilling of the LST/TSP foundations due to the presence of loose soils or groundwater levels. The use of water, fluid stabilizers, drilling mud, and/or casings would be made available to control ground caving and to stabilize the sidewalls from sloughing. If fluid stabilizers are utilized, mud slurry would be added in conjunction with the drilling. The concrete for the foundation would then be pumped to the bottom of the hole, displacing the mud slurry. Mud slurry brought to the surface is typically collected in a pit adjacent to the foundation and/or vacuumed directly into a truck to be reused or discarded at an off-site disposal facility in accordance with all applicable laws.

During construction, existing commercial concrete supply facilities would be used. Concrete samples would be drawn at time of pour and tested to ensure engineered strengths were achieved. A normally specified SCE concrete mix typically takes approximately 20 working days to cure to an engineered strength. This strength is verified by controlled testing of sampled concrete. Once this strength has been achieved, crews would be permitted to commence erection of the structure.

Conventional construction techniques would generally be used as described above for new foundation installation. Alternative foundation installation methods would be used where conventional methods are not practical. 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.

B.3.3.4 Lattice Steel Tower Installation

LSTs would primarily be assembled within the construction areas at each tower site. See Table B-7, Approximate Laydown/Work Area Dimensions, for approximate laydown dimensions. Structure assembly begins with the hauling and stacking of steel bundles, per engineering drawing requirements, from a material staging yard to each structure location. This activity requires use of several trucks with 40-foot trailers and a rough terrain forklift. After steel is delivered and stacked, crews would proceed with assembly of leg extensions, body panels, boxed sections, and the cages/bridges. Assembled sections would be lifted into place with a crane and secured by a combined erection and torquing crew. When the steel work is completed, the construction crew may opt to install insulators and wire rollers (travelers) at this time.

If the LST is located in terrain inaccessible by a crane, it is anticipated that a helicopter may be used for the installation of the structure. The use of helicopters for the erection of structures would be similar to methods detailed in Institute of Electrical and Electronic Engineers (IEEE) 951-1996, Guide to the Assembly and Erection of Metal Transmission Structures, Section 9, Helicopter Methods of Construction. See Section B.3.3.16, Helicopter Use, for detailed information on helicopter usage and Attachment D.16-1 (at the end of Section D.16) for SCE's Preliminary Helicopter Use Plan.

B.3.3.5 Tubular Steel Pole Installation

Each TSP would require a drilled, poured-in-place concrete footing that would form the structure foundation. The hole would be drilled using truck or track-mounted excavators. Excavated material may be used as backfill. 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.

TSPs consist of multiple sections. The pole sections would be placed in temporary laydown areas at each pole location. See Table B-7, 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 steel pole base section on top of the previously prepared foundations. If existing terrain around the TSP location is not suitable to support crane activities, a crane pad would be constructed within the laydown area. When the base section is secured, the subsequent section of the TSP would be slipped together into place onto the base section. The pole sections may also 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.

B.3.3.6 Wood Pole Installation

Each wood pole would require a hole to be excavated using either an auger, backhoe, or with hand tools. Excavated material may be used as backfill. Depending on the quality of the native soils extracted from the excavation, up to approximately one-third of that material could be used as backfill and the remainder would be disposed of off-site. The wood poles would be placed in temporary laydown areas at each pole location. While on the ground, the wood poles may be configured (if not preconfigured) with the necessary cross arms, insulators, and wire-stringing hardware before being set in place. The wood poles would then be installed in the holes, typically by a line truck with an attached boom.

If deemed necessary based on field conditions, wood guy stub poles[8] would be installed by direct bury similar to wood poles. Wood poles would not be used for bulk (220 kV) transmission work.

B.3.3.7 Lightweight Steel Pole Installation

Each LWS pole would require a hole to be excavated using either an auger or excavated with a backhoe. Excavated material may be used as backfill. LWS poles consist of separate base and top sections and may be placed in temporary laydown areas at each pole location. 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. 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 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.

If deemed necessary depending on field conditions, lightweight steel guy stub poles would be direct buried and installed similarly to LWS poles. Lightweight steel poles would not be used for permanent bulk (220 kV) transmission purposes.

8 A guy stub is a short wood pole used in lieu of an anchor in locations where the use of anchors is not feasible.

B.3.3.8 Counterpoise

Transmission structures located within the substation boundary would be grounded to the substation ground grid. Foundations for 220 kV structures located more than 700 feet outside a substation would require separate grounding.

If adequate foundation-to-ground resistance criteria cannot be met with ground rods, a counterpoise system would be installed. A counterpoise is an additional ground wire installed below ground adjacent to and attached to the structure to increase conductivity between the structure and the ground so that adequate grounding can be achieved. This additional ground wire would be installed within the approximate laydown/work area.

B.3.3.9 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 keep a conductor above a minimum height should it momentarily drop too far below a conventional stringing height. SCE estimates that approximately 663 guard structure locations may need to be constructed along the proposed 220 kV ROW. For the 66 kV subtransmission line relocations, SCE estimates approximately 70 guard structure locations may need to be constructed. Guard structures would be located within the disturbance footprint identified in Table B-7, Approximate Laydown/Work Area Dimensions, but exact locations cannot be identified until further engineering is completed. Additional guard structures may also be needed at the time of construction based upon changes in field conditions (e.g., newly identified environmental resources, additional transportation, flood control and utility crossings).

Typical guard structures are standard wood poles. Depending on the overall spacing of the conductors being installed, approximately two to four guard poles would be required on either side of a road 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 by the governing transportation agency. The guard structures would be removed after the conductor is secured into place.

For highway and flood control crossings, SCE would work closely with the applicable jurisdiction agency to secure the necessary permits to string conductor over the affected infrastructure.

B.3.3.10 Wire Stringing

Wire stringing activities would be in accordance with SCE common practices and similar to process methods detailed in the IEEE Standard 524-2003 (SCE, 2013).

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 by supervision is required to determine circuit outages, pulling times, and safety protocols for ensuring 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. These activities include the installation of conductor, ground wire (OHGW/OPGW), insulators, stringing sheaves (rollers or travelers), vibration dampeners, weights, and suspension or 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, Option 1: Sock Line Threading (Transmission):* A helicopter would fly a lightweight sock line from structure to structure, which would be threaded through rollers in order to engage a camlock device[9] 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 wire pull.
- *Step 2, Option 2: Sock Line Threading (Subtransmission):* 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, Option 3: Sock Line, Threading (Subtransmission):* 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 rollers 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; a process called clipping in. Once this is complete, spacers would be attached between the bundled conductors of each phase to keep uniform separation between each conductor.

B.3.3.11 Transmission Wire Pulling and Splicing Locations

The puller, tensioner, and splicing set-up locations associated with the Proposed Project would be temporary and the set-up locations require reasonably level areas to allow for maneuvering of the equipment. When possible, these locations would be located on existing roads and level areas to minimize the need for grading and cleanup. The number and location of these sites would be determined during final engineering. For purposes of the environmental analysis, it is estimated that approximately 135 pulling, tensioning and splicing equipment set-up areas would be required for the 220 kV transmission line construction, and approximately 28 set up areas for the 66 kV subtransmission relocation. The approximate area needed for stringing set-ups associated with wire installation is variable and depends upon terrain. See Table B-7, Approximate Laydown/Work Area Dimensions, in Section B.3.1.1 for approximate size of pulling, tensioning and splicing equipment set-up areas and laydown dimensions.

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 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 for transmission occur approximately every 3 miles and wire splices every 1.5 miles on flat terrain. Typical wire pulls for sub-

9 A camlock is a fastening mechanism that incorporates a cam or tab that is turned to engage a catch or slot and secure the device that is to be locked.

transmission occur approximately every 6,000 feet. When the line route alignment contains multiple deflections or is situated in rugged terrain, the length of the wire pull is diminished. Generally, pulling locations and equipment set-ups would be in direct line with the direction of the overhead conductors and established approximately a distance of three times the height away from the adjacent structure. These assumptions were used to develop the estimates for land disturbance areas that are provided in Table B-11 and Table B-12 in Section B.3.3.3.

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. Temporary splices (e.g., pulling socks), may be necessary since permanent splices that join the conductor together typically cannot 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.

B.3.3.12 Transfer/Removal of Existing Structures/Facilities

The land disturbance tables and workforce estimate tables provide specific information related to specific activities, summarized below:

Removal of Wood Poles

The existing wood poles would typically be removed after the subtransmission, distribution, and telecommunication lines are transferred to the new structures. The removal would consist of the above and below-ground portions of the pole. Any holes left from removing the poles would be backfilled with spoils that may be available as a result of the excavation for new poles and using imported fill as needed.

Topping Off of Existing Poles

Where necessary to support existing underbuild (e.g., distribution, and/or third-party communication facilities), the top portion of the existing poles would be removed and existing underbuild would remain.

Removal of LSTs and TSPs

Removal of both LSTs and TSPs would involve removing structures, conductor, and associated hardware. The following would be removed in the sequence below:

- *Road Work:* Existing access roads would be used to access structures, but some rehabilitation and grading may be necessary before removal activities would begin to establish temporary crane pads for structure removal.
- *Wire-pulling Locations:* Wire pulling sites for wire removals would be located according to a Pulling Plan. The Pulling Plan would be completed after final engineering and would be as described in Section B.3.3.11.
- *Conductor Removal:* After the wire pulling equipment is in place, rollers would be installed on structures, the old conductor would be unclipped from the supporting structures, placed into the rollers, and pulled out with a pulling rope and/or cable attached to the trailing end of the conductor. The old conductor wire would be transported to a construction yard where it would be prepared for recycling.

- *Structure Removal:* For each structure to be removed, a laydown/work area equivalent to the structure type being removed would be required. Most structure removal activities would use the crane pad or other previously disturbed area established for structure installation. If previously disturbed areas adjacent to the structure site are not available, an area would be cleared of vegetation and graded if the ground is not level. The crane would be positioned approximately 60 feet from the LST or TSP location to dismantle the structure. LSTs and TSPs would be dismantled down to the foundations and the materials would be transported to a recycling center. In the event that constructing a crane pad is not feasible, then a helicopter would be utilized for removal of the structure.
- *Footing/Foundation Removal:* Foundations/footings would typically be crushed by mechanical means such as a pneumatic hammer. Footings would be removed to a depth approximately 1 to 2 feet below grade[10] and the holes would be filled with excess soil and smoothed to match the surrounding grade. Footing materials would be transported to a construction yard where they would be prepared for disposal or reuse.

Existing transmission lines, subtransmission lines, distribution lines, and telecommunication lines (where applicable) would be transferred to the new structures prior to removal of existing structures. Any remaining facilities that are not reused by SCE would be removed and delivered to an authorized facility for recycling and/or disposal.

Tables B-11 and Table B-12 in Section B.3.3.3 provide temporary and permanent land disturbance required for the removal of structures for the Proposed Project.

B.3.3.13 Shoo-Flies

Construction of the Proposed Project would require the use of temporary shoo-fly facilities in order to maintain continuous power flow in the WOD corridor/ROW during construction. A shoo-fly is a temporary electrical line on temporary poles that is used during construction to maintain electrical service to the area while allowing portions of a permanent line to be taken out of service, ensuring safe working conditions during construction activities. The shoo-fly facilities would be removed after construction is completed.

A variety of shoo-fly facilities would need to be installed in order to accommodate the installation of the new 220 kV structures within the existing ROW. Locations of individual shoo-fly facilities would be developed as part of final engineering. SCE estimates approximately 300 shoo-fly structure locations would be necessary for construction. Shoo-fly structures could consist of steel and/or wood poles that may be guyed for stability. These structures would range in height from approximately 40 to 145 feet above ground.

Specific shoo-fly locations cannot be determined until final design and engineering efforts are completed and the construction sequencing plans are finalized. Section B.2.6.4 discusses potential FAA hazard marking of shoo-fly structures.

Shoo-fly structures would typically be direct buried and would be installed similar to wood poles. Removal of the shoo-fly facilities would be similar to the removal of wood poles, as explained in Section B.3.3.12, Transfer/Removal of Existing Structures/Facilities. Table B-13 provides the approximate ground disturbance associated with the shoo-fly structures and Figure B-18 shows a photograph of a typical shoo-fly structure.

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[10] Where necessary, footings may be removed at a greater depth than 1 to 2 feet below grade.

Table B-13. Transmission Shoo-Fly Approximate Land Disturbance

Project Feature	Quantity	Disturbed Acreage Calculation (L × W)	Approximate Total Acres Disturbed During Construction	Approximate Total Acres to be Restored (Temporary)	Approximate Total Acres Permanently Disturbed
Installation and removal of shoo-fly structure[1]	300	100' × 100'	68.9	68.9	0.0
Conductor stringing setup area[2]	7	600' × 150'	14.5	14.5	0.0
Conductor splicing setup areas[2]	6	200' × 150'	4.1	4.1	0.0
Temporary construction roads[3]	17.0	linear miles × 18'	37.1	0.0	37.1
Total Estimated Disturbance Acreage[4]			124.6	87.5	37.1

Source: SCE, 2013.

1 - Includes structure assembly & erection, conductor& OPGW installation. Area to be restored after construction. Structures would be removed once permanent structures were erected, new conductors were strung and energized.

2 - Based on 9,000' standard conductor reel lengths, conductor size, number of circuits, route design, and terrain.

3 - Based on approximate length of road in miles x driveable road width of 14'–22' with 2' of berm on each side of road. With an average of 300 feet of new road assumed per structure

The disturbed acreage calculations are estimates based upon SCE's preferred area of use for the described project feature, the width of the existing right-of-way, or the width of the proposed right-of-way and, they do not include any new access/spur road information; they are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or Contractor awarded project.

Removals, existing roads to be improved and guard structures are not accounted for in this table considering these counts will not fluctuate with selection of either alternative. These areas are accounted for in Tables B-10 and B-11.

B.3.3.14 Idle Facilities

A portion of the existing San Bernardino–Redlands-Tennessee 66 kV Subtransmission Line would be idled from the existing WOD corridor east along Barton Road to Iowa Street, and a portion of the existing San Bernardino–Redlands-Timoteo 66 kV Subtransmission Line would be idled from the existing WOD corridor west along Barton Road to Mountain View Avenue.

Though the subtransmission lines will be idled as a result of the Proposed Project, the poles will remain in place because a significant majority of them also support existing distribution, telecommunications, and cable television lines that will remain in service after the completion of the Proposed Project.

B.3.3.15 Helicopter Use

Project-related helicopter activities for the construction of the transmission lines could include delivery of equipment and materials from staging yards to structure sites, structure placement, hardware installation, and conductor and/or optical ground wire (OPGW) stringing operations, and conductor and structure deconstruction and removal. The specific helicopter models assumed to be used include the Bell 500 (MD 500), Hughes and Kaman Kmax. It is also assumed that the total time within any given hour of the day that the helicopters would be used at one location outside of the staging areas is approximately 15 minutes. The helicopters may travel back and forth between sites and staging yards multiple times within that hour. Depending upon the specific needs, project-related helicopter activities for the construction of the transmission lines could occur across the entire project area. Prior to the start of construction, SCE and the selected construction contractor would create a detailed Project Specific Helicopter Use Plan describing all planned usage of helicopters or other aircraft in the performance of this work. This plan will be reviewed by SCE to ensure FAA regulations/guidance and/or industry best management practices are met. It would also include flight routes and altitudes in order to minimize flight into sensitive areas and to avoid aircraft congestion.

The operations area of the helicopters would be limited to the Proposed Project area, including staging areas, ground locations in close proximity to conductor and/or OPGW pulling, tensioning, and splice sites, including locations in 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. All helicopter refueling in the staging areas, ROWs or access or spur roads, would be in accordance with the SWPPP. It is also assumed that 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.

Helicopter-based construction of the structures themselves is not anticipated. However, if a structure is located in terrain inaccessible by a crane, it is anticipated that a helicopter may be used for the installation of the structure. Helicopters will also be used for installation of aerial safety markers (see Section B.3.3.16). In the event that helicopter-based structure construction is deemed necessary, the following would apply:

1. Structure sections would be assembled at the construction staging yards and hauled by helicopter to the designated structure sites and lowered into place,
2. Structure site and foundation preparation equipment and materials would be ferried to the site by helicopter or delivered by vehicle,
3. SCE may temporarily stage materials and/or assemble structure sections at previously approved structure and wire pull sites that are road-accessible, and
4. SCE will provide CPUC monitors a list of the areas to be used for this temporary purpose and identify the material or assemblages to be staged at each site and the structure sites where the materials or assemblages would be used.

The majority of deconstruction would be performed with ground based equipment (i.e., cranes and hauling vehicles); however, helicopters would also be used across the entire project area to remove transmission hardware, poles, structural assemblies, conductor and ground wire. In addition, helicopters would be used to stage materials and personnel required to support deconstruction. Project-related helicopter activities for the deconstruction of the existing transmission lines and towers (including poles) would include the removal of equipment and materials from structure sites to laydown areas (previously established disturbance areas) for removal by locally staged hauling vehicles. Helicopters may land in any approved disturbance area, including structure sites, pull sites, and access or spur roads.

Prior notice would be given in the daily helicopter flight information provided to agency monitors regarding the specific sites that will be used for helicopter picks that day and the destination of the materials being lifted out. Dust control measures will be implemented to assure that fugitive dust is not generated during picking operations. Fly Yard Coordinators (FYCs) will be responsible for coordinating all helicopter activities at yards, and all pilots entering an area of operations will communicate with both the FYCs and other pilots to establish the location of other helicopter traffic, establish traffic patterns, and yard and worksite conditions. See Attachment D.16-1 (at the end of Section D.16) for SCE's Preliminary Helicopter Use Plan.

B.3.3.16 Aerial Safety Markers

As presented earlier in Section B.2.6.3, Federal Aviation and Administration Considerations, to the extent practicable, FAA recommendations, including the installation of marker balls on appropriate infrastructure where necessary, would be incorporated into the design of the Proposed Project. In most cases, marker balls would be installed by helicopter because of this method's efficiency, minimal ground disturbance, and ability to operate in rugged terrain. In limited circumstances, marker balls may be installed using a spacer cart, but this method is generally less efficient and may result in additional ground disturbance.

SCE would select the most suitable installation method for a particular span. SCE would generally use a light-duty helicopter to install the marker balls. Installation by helicopter may require a short-term outage to nearby energized subtransmission lines and transmission lines.

Helicopter installation requires staging at a landing zone where the helicopter would pick up the construction worker and a marker ball(s), and travel to the installation location. To minimize ground disturbance, SCE would propose to use previously disturbed areas as landing zones.

In limited circumstances, SCE may employ a spacer cart to install marker balls and associated hardware. The spacer cart would be installed on the overhead wire by installation crews, either by helicopter or by using a crane placed on an existing crane pad created during the construction of the structure. Because any installation of spacer carts by crane would take place during construction, it is not expected that installation or use of spacer carts would cause any additional ground disturbance.

Due to the terrain in the areas where marker balls may be required, installation by crane would likely be infeasible, and may entail significant additional ground disturbance. For these reasons, crane installation would not be considered for the Proposed Project. FAA structure lighting, if necessary, would be installed on the appropriate transmission structures during construction of the structure using similar equipment.

B.3.3.17 Protection Measures for Irrigation Infrastructure

The Proposed Project would be constructed and operated in areas that may contain existing irrigation systems and other private infrastructure. In coordination with landowners, these systems and infrastructure may be temporarily removed, relocated, and/or replaced to facilitate the safe and efficient construction of the Proposed Project and to protect the current uses of private lands.

Irrigation infrastructure, including pumps, sprinklers, supply lines, and other equipment, may need to be removed, relocated, and/or replaced to facilitate construction of the project. Prior to construction, SCE would consult with property owners to locate irrigation infrastructure and determine appropriate protection measures. Actions could include the marking of agricultural infrastructure, installation of steel or wood plating on access roads to distribute the weight of construction vehicles and protect shallow-buried irrigation piping, or the installation of temporary protection structures (e.g., bollards, jersey walls) adjacent to infrastructure along access roads. Protection, replacement, or relocation measures would be accomplished using conventional construction equipment. Where infrastructure cannot be protected in place, SCE would temporarily relocate infrastructure to prevent damage, and would then re-site the infrastructure following completion of construction. Infrastructure damaged during construction or relocation would be repaired or replaced 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 Proposed Project.

B.3.3.18 Protection Measures for Existing Underground Utilities

Table B-14 lists underground utilities that are in proximity to the proposed structure locations and could potentially require the installation of new or modification of existing cathodic protection equipment. However, it is not known at this time if the Proposed Project would result in the need for cathodic protection to be installed on any of the pipelines listed Table B-14. A detailed engineering study must still be performed to evaluate the long-term operational impacts of the Proposed Project's resultant electrical system on those pipelines as it relates to corrosion and maintenance safety issues. Once final engineering design is completed, which would provide the necessary horizontal and vertical clearance dimensions required as inputs to the analysis, SCE would engage the services of a professional firm that specializes in these evaluations, which would include discussions with the owners of these pipelines to verify their locations, sizes, and existing cathodic protections systems in place (or if they even currently exist) (SCE, 2014b).

Table B-14. Existing Underground Pipelines in Project Area Potentially Requiring Protection Measures

Owner	Description	Location(s)
Southern California Gas	16-inch mainline	Meanders between Structures 6N25-6N26, 6S27-6S28, and 6S30-6S31
Southern California Gas	30-inch transmission (L2001)	Generally parallels transmission line alignment from Structures 5X23-5X28; crosses between Structures 5X29-5X30
Kinder-Morgan	High pressure fuel line	Various transmission line crossings near Structures 3S03, 3N04-3N06, 3X13-3X14, and 3X17-3X19
Kinder-Morgan	High pressure fuel line	Crosses transmission line route between Structures 1X11-1X12 (parallels existing railroad tracks)
Kinder-Morgan	High pressure fuel line	Crosses transmission line route at Structures 2N01 and 2N12
Southern California Gas	12-inch mainline	Crosses transmission line route at Structure 2N02
Department of Water Resources	108-inch aqueduct	Crosses transmission line route between Structures 2N28 and 2N29

Source: SCE, 2014b, CPUC Data Request #7.

There are three potential results from such a study, any of which could be applicable for a specific location: (1) cathodic protection is not needed; (2) cathodic protection is needed, but a system is already present and is sufficient for the new electrical configuration; or (3) cathodic protection is needed, and new or upgraded facilities must be installed as a result of the Proposed Project. Any cathodic protection that may be required to be installed on existing pipelines in conjunction with the Proposed Project would consist of a range of options, such as the following most likely methods (SCE, 2014b):

- **Deep Ground Rods.** A single deep ground rod (DGR) would be placed underground, approximately 5 feet from the existing gas pipeline. A 6-inch diameter hole would be drilled from approximately 50 feet to 500 feet deep depending on the ground rod location, as specified in the design. Ground rod pipes ranging from 0.5 to 1.5 inches in diameter would be placed in the hole for the entire depth of the hole. The top of the pipe would then be connected to the existing gas pipeline with #6 AWG wire.[11] Finally, the hole would be backfilled with a bentonite clay-based, electrically conductive material, and a 50-pound bentonite plug would be placed at the top of the hole. The top of the hole would then be covered with native soil, leaving no obvious indication of its presence.
- **Zinc Ribbon Mitigation Wire.** Zinc ribbon mitigation wire (ZR) or a Faraday Shield would be installed underground approximately 5 feet from an existing gas pipeline where deemed most appropriate in the analysis. The zinc ribbon wire would be connected to a number of ground rods (depending on the overall length of zinc ribbon wire installed) with #2 AWG (wire) and would also be connected to the existing pipeline with 4/0 AWG (wire). These mitigation features would be installed approximately 2 to 3 feet below grade.

[11] American Wire Gauge (AWG) wire is a standardized wire gauge system used for the diameters of round, solid, nonferrous, electrically conducting wire.

- **Gradient Control Mats.** Gradient control mats (GCM) function to provide a safe, uniform voltage gradient at the surface of the earth in the immediate vicinity of above ground appurtenances (i.e., gas valves, fences, above ground pipes) on an influenced pipeline. These mats would be installed near any such features identified in the analysis by SCE following final engineering. Specifically, there is an extreme concern for potential differences between above ground pipeline appurtenances and adjacent chain link security fencing. These fences would be bonded to the pipeline in order to avoid hazardous touch potential differences between pipeline and fence.

B.3.4 Installation of Underground Subtransmission Line

The following sections describe the construction activities associated with installing the underground 66 kV subtransmission lines for the Proposed Project.

B.3.4.1 Survey

Prior to the start of construction, SCE would survey existing underground utilities along the proposed underground subtransmission source line route, and survey proposed structure locations. In accordance with California law, SCE would notify all applicable utilities via Underground Service Alert to locate and mark existing utilities and would conduct exploratory excavations (potholing) as necessary to verify the location of existing utilities. SCE would secure encroachment permits for trenching in public streets.

B.3.4.2 Trenching

The Proposed Project includes a total of approximately 3,100 feet of new underground 66 kV subtransmission lines and associated transition and support structures. An approximately 20- to 24-inch-wide by 60-inch-deep trench would be required to place the 66 kV subtransmission line underground. This depth is required to meet the minimum 36 inches of cover above the duct bank. Trenching may be performed by using the following general steps, including but not limited to: mark the location and applicable underground utilities, lay out trench line, saw cut asphalt or concrete pavement as necessary, dig to appropriate depth with a backhoe or similar equipment, and install duct bank. Once the duct bank has been installed, the trench would be backfilled with a two-sack sand slurry mix. Approximately 1,800 cubic yards of material would be removed from the trenches. Depending on the quality of the native soils extracted from the trenches, up to approximately one-third of that material could be used as backfill or fill on other project elements and the remainder would be disposed of at an off-site disposal facility in accordance with all applicable laws. Should groundwater be encountered, it would be disposed of in accordance with all applicable laws.

The trench for underground construction would be widened and shored where appropriate to meet California Occupation and Safety Health Administration (OSHA) requirements. Trenching would be staged so that open trench lengths would not exceed that which is required to install the duct banks. Where needed, open trench sections would have steel plates placed over them in order to maintain vehicular and pedestrian traffic. Provisions for emergency vehicle access, where necessary, would be incorporated into the construction plan.

B.3.4.3 Duct Bank Installation

As trenching for the underground 66 kV subtransmission line is completed, SCE would begin to install the underground duct bank. Collectively, the duct bank is comprised of conduit, spacers, ground wire, and concrete encasement. The duct bank typically consists of six 5-inch diameter polyvinyl chloride (PVC) conduits fully encased with a minimum of 3 inches of concrete all around. Typical 66 kV subtransmission duct bank installations would accommodate six cables. The Proposed Project would utilize three conduits and leave three spare conduits for any potential future circuit pursuant to SCE's current standards for 66 kV underground construction. See Figure B-19, Typical Subtransmission Duct Bank, for the standard subtransmission duct bank configuration.

The majority of the 66 kV duct banks would be installed in a vertically stacked configuration and each duct bank would be approximately 21 inches in height by 20 inches in width. In areas where underground utilities are highly congested or areas where it is necessary to fan out the conduits to reach termination structures, a flat configuration duct bank may be required. However, for the Proposed Project it is not anticipated that a flat underground duct bank configuration would be required.

In instances where a subtransmission duct bank would cross or run parallel to other substructures that operate at normal soil temperature (e.g., gas lines, telephone lines, water mains, storm drains, sewer lines), a minimal radial clearance of 6 inches for crossing and 12 inches for paralleling these substructures would be required, respectively. Where duct banks cross or run parallel to substructures that operate at temperatures significantly exceeding normal soil temperature (e.g., other underground transmission circuits, primary distribution cables, steam lines, heated oil lines), additional radial clearance may be required. Clearances and depths would meet requirements set forth within Rule 41.4 of CPUC General Order 128.

B.3.4.4 Vault Installation

Vaults are below-grade concrete enclosures where the duct banks terminate. The vaults are constructed of prefabricated steel-reinforced concrete and designed to withstand heavy truck traffic loading. The inside dimensions of the underground vaults would be approximately 10 feet wide by 20 feet long with an inside height of 9.5 feet. The vaults would be placed no more than 1,500 feet apart along the underground portion of the subtransmission source line. Initially, the vaults would be used as pulling locations to pull cable through the conduits. After the cable is installed, the vaults would be utilized to splice the cables together. During operation, the vaults would provide access to the underground cables for maintenance, inspections, and repairs. See Figure B-20, Typical Subtransmission Vault, for the standard subtransmission vault configuration.

The vault pit would be excavated and shored; a minimum of 6 inches of mechanically compacted aggregate base would be placed to cover the entire bottom of the pit, followed by delivery and installation of the vault. Once the vault is set, grade rings and the vault casting would be added and set to match the existing grade. The excavated area would be backfilled with a 2-sack concrete/sand slurry mix to a point just below the top of the vault roof. Excavated materials, if suitable, would be used to backfill the remainder of the excavation. Finally, the excavated area would be restored as required.

B.3.4.5 Cable Pulling, Splicing, Termination

Following vault and duct bank installation, SCE would pull the electrical cables through the duct banks, splice the cable segments at each vault, and terminate cables at the transition structures where the subtransmission line would transition from underground to overhead. To pull the cables through the duct banks, a cable reel would be placed at one end of the conduit segment, and a pulling rig would be placed at the opposite end. The cable from the cable reel would be attached to a rope in the duct bank, and linked to the pulling rig, which would pull the rope and the attached cable through the duct banks. A lubricant would be applied as the cable enters the ducts to decrease friction and facilitate travel through the PVC conduits. The electrical cables for the 66 kV subtransmission line circuit would be pulled through the individual conduits in the duct bank.

After cable pulling is completed, the electrical cables would be spliced together. A splice crew would conduct splicing operations at each vault location and continue until all splicing is completed.

B.3.4.6 Transition Structures

At each end of an underground segment, the cables would rise out of the ground at transition structures, which accommodate the transition from underground to overhead subtransmission lines. Transition structures constructed as part of the Proposed Project would consist of engineered TSP structures (TSP riser poles). The transition structure would support cable terminations, lightning arresters, and dead-end hardware for overhead conductors. Construction methods for these structures would be substantially similar to those described in Section B.3.3.5, Tubular Steel Pole Installation.

B.3.5 Construction of Distribution Systems

The following sections describe the construction activities associated with installing the 12 kV distribution lines for the Proposed Project.

B.3.5.1 Access

For those portions of the subtransmission route where existing distribution facilities would be relocated to new subtransmission structures, access to the sites would be via the existing paved streets. Transfer of existing distribution conductor and equipment would typically be performed using a line truck.

For the new underground distribution system along mission Road and California Street in the City of Loma Linda, access will be via the existing paved streets. Excavation would occur in the existing paved streets and would be approximately 20 inches wide and 1.5 miles long. The work area for the trenching would be approximately 15 feet wide and 1.5 miles long. The excavated soil would temporarily be placed next to the trench on previously disturbed area. Construction activities would typically include the use of a backhoe, dump trucks, crew trucks, concrete trucks and asphalt trucks. Soil excavated would be used to refill the trench and area surrounding the vaults, and excess soil would be trucked to an approved disposal facility. New asphalt would be placed over the top of the trench to match the existing asphalt in the street. Once the underground infrastructure is in place, the crews would install cable in two of the four conduits. See Figure B-21, Typical Distribution Duct Bank, for the standard distribution duct bank configuration. See Figure B-22, Typical Distribution Vault, for the standard vault configuration.

For the portion of distribution underbuild that may result in up to 21 subtransmission structures being replaced along Mayberry Street and Barton Road, access to the site will be via the existing paved streets. Activities associated with structure installation and removal is discussed in Sections B.3.3.6, Wood Pole Installation and Section B.3.3.12 Transfer/Removal of Existing Structures/Facilities.

B.3.5.2 Distribution Land Disturbance

Land disturbance for the Proposed Project would include structure installation and removal activities and installation of new conductor. The estimated land disturbance for these project features are summarized below in Table B-15, Approximate Land Disturbance of Distribution Line Construction.

Table B-15. Approximate Land Disturbance of Distribution Line Construction

Project Feature	Site Quantity	Disturbed Acreage Calculation (L × W)	Approximate Total Acres Disturbed During Construction	Approximate Total Acres to be Restored	Approximate Total Acres Permanently Disturbed
Underground conduit Installation	7,920 linear feet	Linear feet × 15'	2.7	2.7	0
Vault	10	55' × 40'	0.5	0.5	0
Distribution pole removal	34	5' × 5'	<0.1	<0.1	0
Potential replacement of existing subtransmission wood poles with LWS poles	21	150' × 75'	5.3	5.3	0
Total Estimated Disturbance Acreage			8.6	8.6	0

Source: SCE, 2013.

B.3.6 Energizing Transmission and Subtransmission Lines

To safely conduct work on an existing transmission line, the transmission line must be de-energized. Temporary de-energizing of the circuits involved with the Proposed Project will take place throughout the duration of this project. Energizing the new lines is the final step in completing the transmission and subtransmission construction. 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.

B.3.7 Telecommunications

Telecommunication infrastructure would be installed for the Proposed Project to provide for continued operation of SCE's Supervisory Control and Data Acquisition (SCADA) network, protective relaying, data transmission, and telephone services during the Proposed Project construction, and for the continued operation of these services following construction.

The new telecommunications infrastructure would include additions and modifications to the existing telecommunications system. Those modifications would include work needed to maintain telecommunications operations during and after construction of the Proposed Project, work needed to facilitate the connection of existing substations to the new OPGW located on the new 220 kV structures, and ancillary work due to the modifications to accommodate the new OPGW and other modifications necessary to facilitate construction.

B.3.7.1 Telecommunications Equipment Installation

All new communications equipment installations and upgrades at the existing substations would occur within the existing MEERs, therefore no additional ground disturbance is associated with this work.

Installation of new telecommunication equipment would consist of fiber optic terminals (with increased optical range), multiplexers, and other telecommunication equipment devices installed at each of the identified substations as described in Section B.2.5, Telecommunications Upgrades.

Temporary fiber optic jumpers would be used within each MEER to redirect and route the fiber optic systems and services during the Proposed Project's construction phase. The new fiber optic terminal equipment is needed to compensate for the losses created by the redirected fiber optic routes.

B.3.7.2 Fiber Optic Cable Installation

Overhead Telecommunications Facilities Installation

Overhead telecommunications facilities would be installed by attaching cable to structures in a manner similar to that described above for wire stringing. A truck with a cable reel would be set up at one end of the section to be pulled, and a truck with a winch would be set up at the other end. Typically, fiber optic cable pulls vary between 6,000 feet to 10,000 feet in length. Fiber optic cable pulls are the length of any given continuous cable installation process between two selected points along the existing overhead or underground structure line. The dimensions of the area needed for stringing set ups varies depending upon the terrain; however, a typical stringing set up is 40 feet by 60 feet. Cable would be pulled onto the pole and permanently secured. Fiber strands in the cable from one installed section of cable would be spliced to fiber strands in the cable from the next installed section to form one continuous path.

Fiber Optic Cables within the WOD Corridor

OPGW fiber optic cable would be installed on the 220 kV structures as described in Section B.3.3.10 Wire Stringing. All fiber optic cable splicing and testing would be completed by SCE or contract crews using industry and SCE accepted practices.

Underground Telecom Facilities Installation – Fiber Optic Cable

New underground conduit and structures would typically be installed using a backhoe. The trench would be excavated to approximately 12 to 18 inches wide and a minimum of approximately 36 inches deep. The ground disturbance area for the trenching would be approximately 25 feet wide by the specific length of the excavation. PVC conduit would be placed in the trench and covered with approximately 8 inches of concrete slurry, then backfilled and compacted. For manholes and pull boxes, a hole is excavated between approximately 4 to 10 feet deep, 5 to 8 feet long, and 4 to 8 feet wide. The ground disturbance area for the manhole installation is approximately 40 feet wide by 50 feet long. The disturbance is due to activities associated with the conduit and structure installation and concrete encasement. The manhole or pull box would be lowered into place, connected to the conduits, and backfilled with 2-sack concrete/sand slurry. Excess soil would be hauled to an approved disposal facility in accordance with all applicable laws or may be used as fill material for transmission, subtransmission, distribution, or substation project elements. Construction activities would typically include the use of a backhoe, dump trucks, crew trucks, and concrete trucks. See Figure B-23, Typical Telecommunications Duct Bank, for the standard telecommunications duct bank configuration. See Figure B-24, Typical Manhole Design, for the standard manhole configuration.

The fiber optic cable would be installed throughout the length of the underground conduit and structures by first installing an innerduct, which provides for protection and identification of the cable. The innerduct would be pulled in the conduit from structure to structure using a pull rope and pulling machine, or truck-mounted hydraulic capstan. After installation of the innerduct, the fiber optic cable would be pulled through the innerduct using similar equipment.

B.3.7.3 Road Access for Telecommunications Installation

Existing and new roads for the 220 kV transmission line as described in Section B.2.1.1, 220 kV Transmission Line Segments, and Section B.3.3.1, Access and Spur Roads, would provide access for telecommunications during construction, operation, and maintenance. Additionally, existing public and SCE access and spur roads for locations that are specifically not along the WOD corridor would be utilized for telecommunications construction, operations, and maintenance.

B.3.7.4 Telecommunication System Land Disturbance

Land disturbance for the new telecommunication system would include OPGW installation, wire stringing, and new conduit installation. The estimated land disturbance for these project features are summarized below in Table B-16, Telecommunication System Approximate Land Disturbance.

Table B-16. Telecommunication System Approximate Land Disturbance

Project Feature	Site Quantity	Disturbed Acreage Calculation (L × W)	Approximate Total Acres Disturbed During Construction	Approximate Total Acres to be Restored	Approximate Total Acres Permanently Disturbed
New Cable to Banning Substation					
Devers-Valley No. 2 M21-T1, trenching	1	690' × 25'	0.40	0.40	0
Old Idyllwild Road Crossing 500 kV, trenching	1	470' × 25'	0.27	0.27	0
Crossing Lincoln Street to Banning MEER, trenching	1	230' × 25'	0.13	0.13	0
New Cable to Maraschino Substation					
Devers-Valley No. 2 M24-T1, trenching	1	1,460' × 25'	0.84	0.84	0
4×4 manholes	3	40' × 50'	0.14	0.14	0
SCE vault to ECS manhole, trenching	1	1,550' × 25'	0.89	0.89	0
Connect Devers-Vista OPGW to Banning Substation					
Structure 5S54, trenching	1	560' × 25'	0.32	0.32	0
Connect Devers-Vista OPGW to Maraschino Substation					
Structure 4S37, trenching	1	800' × 25'	0.46	0.46	0
Connect Devers-Vista OPGW to El Casco Substation East					
Structure 3S02, trenching	1	120' × 25'	0.07	0.07	0
Connect Devers-Vista OPGW to El Casco Substation West					
Structure 3S25, trenching	1	100' × 25'	0.06	0.06	0
Fiber Optic Cable Entrance at Devers					
D-EC 136, D-V 243 Trenching	2	80' × 25' 329' × 25'	0.24	0.24	0
Fiber Optic Cable Entrance at El Casco					
Tie between Structures 4N65, 3N02, Trenching	3	200' × 25' 840' × 25' 200' × 25'	0.71	0.71	0
Fiber Optic Cable Entrance at San Bernardino					
Structure 1E26 Structure 1W26, trenching	2	350' × 25' 350' × 25'	0.40	0.40	0
Connect San Bernardino to Inland District Office					
SB-V 7, trenching	1	200' × 25'	0.11	0.11	0

Table B-16. Telecommunication System Approximate Land Disturbance

Project Feature	Site Quantity	Disturbed Acreage Calculation (L × W)	Approximate Total Acres Disturbed During Construction	Approximate Total Acres to be Restored	Approximate Total Acres Permanently Disturbed
Option: Connect San Bernardino to Inland District Office					
Redlands Blvd at Bryn Mawr Trenching	1	560' × 25'	0.3	0.5	0
Fiber Optic Cable Entrance at Vista					
Structure 2N37 trenching	1	1,000' × 25'	0.57	0.57	0
New Cable to Banning Substation					
Devers-Valley No. 2 M21-T1, trenching	1	690' × 25'	0.4	0.4	0

Source: SCE, 2013.

B.3.7.5 Telecommunication System Workforce and Construction Equipment Estimates

The estimated number of personnel and equipment required for construction activities related to the Telecommunications System for the Proposed Project are summarized in Table B-17, Telecommunication System Construction Equipment and Workforce Estimates.

Table B-17. Telecommunication System Construction Equipment and Workforce Estimates

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (days)	Duration of Use (hours)
Telecommunications Work for OPGW and Work to Accommodate Construction						
Bucket Truck	300	Diesel	6	12	27	7
Crew Truck	300	Diesel	3	3	27	8
Backhoe	200	Diesel	2	4	40	7
Dump truck	350	Diesel	2	3	17	3
Material Transport	350	Diesel	1	1	4	4
Forklift	200	Diesel	1	1	4	1
Splice Lab	300	Diesel	6	12	40	7
Telecommunications Work Inside the MEER						
Crew Truck	300	Gas	3	3	30	8

Source: SCE, 2013.

Construction would be performed by either SCE construction crews or contractors. Contractor personnel would be managed by SCE construction management personnel. SCE anticipates that crew members would work concurrently whenever possible; however, the estimated deployment and number of crew members would be dependent upon local jurisdiction permitting, material availability, and construction scheduling.

SCE anticipates a total of up to approximately 14 construction personnel working on any given day on this project component.

B.3.8 Site Restoration

All work associated with below grade activities would restore the grade back to its original condition. A Revegetation Plan, as described under APM BIO-1, would be prepared and implemented to reduce or mitigate temporary impacts to habitat for special status species and foraging raptors. The Revegetation Plan would provide guidelines and specifications for the replacement of vegetation in areas affected by construction, where special status species occur or have a reasonable potential to occur, in order to reduce or mitigate temporary loss or degradation of habitat. The overall goal of implementing the revegetation plan would be to re-establish vegetation that is approximately equivalent to pre-construction conditions in terms of coverage and composition of the native and non-native component species in particular areas.

B.3.9 Construction Workforce and Equipment

The estimated total number of personnel required for construction activities on any given day for the following components would be:

- Transmission and Subtransmission Lines – up to approximately 300 construction personnel;
- Substation Modifications – approximately 15-20 construction personnel at each substation site; and
- Distribution Lines – up to approximately 20 construction personnel.

The estimated workforce, as well as materials and equipment required for construction of the Proposed Project, are detailed for each project component in Appendix 1C.

Construction would be performed by either SCE construction crews or contractors. If SCE construction crews are used, they typically would be based at SCE's local facilities, (e.g., service centers, substations, and transmission ROW) or a temporary material staging yard set up for the project. Contractor construction personnel would be managed by SCE construction management personnel and based out of the contractor's existing yard or temporary material staging yard set up for the project.

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, construction scheduling, and local jurisdiction requirements, if applicable.

In general, construction efforts would occur in accordance with accepted construction industry standards. To the extent possible, SCE would comply with local ordinances for construction activity. Should the need arise to work outside the local ordinances, SCE would request a variance from the applicable local jurisdictions. For example, it may be necessary to work during nighttime or outside normal work hours to facilitate major crossings, or when loads on the lines are reduced.

B.3.10 Construction Schedule and Sequence

SCE anticipates that construction of the Proposed Project would take approximately 36-48 months following receipt of CPUC and BLM approvals, completion of final engineering and procurement activities, acquisition of any necessary property rights, and receipt of other applicable permits.

Given that the existing WOD transmission lines are a necessary component of the CAISO-controlled grid, they must remain operational for the majority of the Proposed Project construction duration in order to accommodate existing electric system operational requirements. Any short- or long-term transmission line outages that would be needed to facilitate construction of any of the individual transmission lines for the Proposed Project would typically be scheduled through and subject to the approval of the CAISO. As such, construction of the Proposed Project would be complex, given the need to keep existing WOD facilities operational during construction and the need to construct safely when in proximity to energized transmission lines.

In addition to uncertain transmission line outage availability, the construction schedule duration would vary depending on other items such as, but not limited to, the following: the availability of substation and subtransmission line outages, the ability to construct needed critical telecommunications facilities in advance of transmission line construction, environmental constraints (e.g., nesting birds) during construction, permit limitations, weather, and construction resource and material availability.

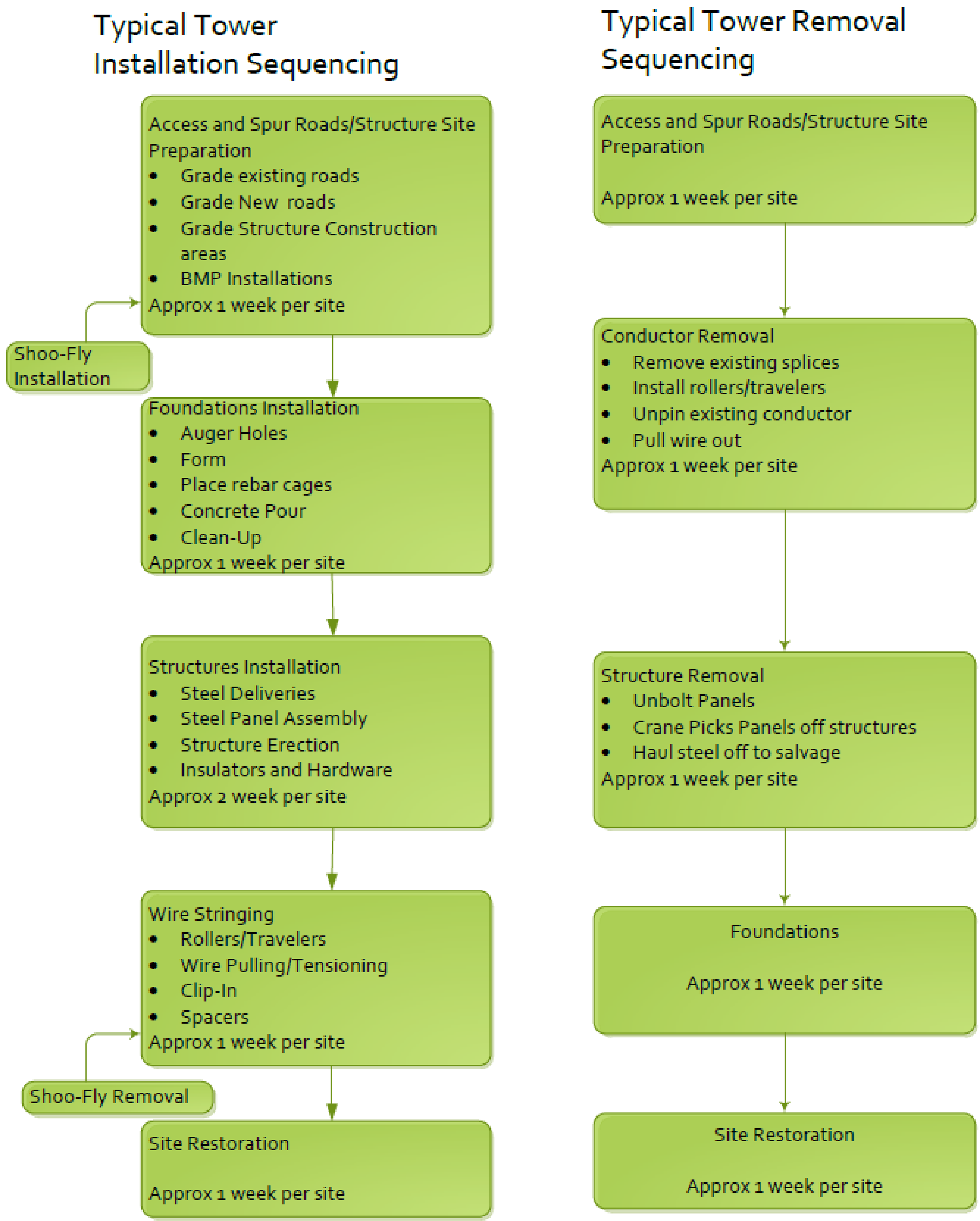
Finally, the Proposed Project estimated construction schedule does not reflect scope modifications that may be recommended during the agency application review phase that: (1) are needed to accommodate requirements identified during final engineering and material procurement; (2) are needed to accommodate compliance with environmental restrictions during construction; (3) are needed to keep enough of the existing WOD transmission lines operational during construction; or (4) are otherwise needed for safety or electric system reliability.

The diagram on page 52 includes a typical sequence of construction activities for structure installation and structure removal at any given location. In general, it is estimated that new structure installation could range from four to six weeks and that structure removal could range from two to four weeks of overall construction duration, though these efforts would generally be spread out over a larger period of time in any one location. For sites requiring retaining wall construction, an additional four to five weeks of active construction is expected. Each segment of the Proposed Project would generally require the sequence for structure installation to occur two times and for structure removal up to three times.

As seen in the diagram, access and spur road construction as well as civil upgrades, such as retaining walls, would be the first activity to occur on the ROW. This would then be followed closely by structure site preparation where vegetation clearing can be performed without the need for outages on existing lines. Upon completion of roads and structure site preparation, foundation installation would commence. Due to available clearances between drilling equipment and existing conductor, some foundation installation may not be able to proceed until existing line segments are de-energized or re-routed using temporary shoo-fly structures.

New structure construction would not typically begin until site specific foundation installation is completed, and the foundation construction equipment de-mobilized from the defined structure disturbance area. The specific sequence in which new structures and conductor would be installed and existing structures and conductor would be removed cannot be fully defined at this time due to factors such as final tower locations to be determined upon final engineering, line outage duration and availability, extent of shoo-fly configurations, construction contractor resource availability, and potential environmental constraints.

Table B-18 provides preliminary construction durations for the respective Project components, noting that transmission is referenced by Segment. The construction durations shown for each work scope element represent the anticipated time required to complete all elements of construction associated with specific work scope with the exception of long-term site restoration. The specified construction durations represent an estimate of time needed to complete defined work scope uninterrupted from planned start to finish for each Project component. Typical of a linear transmission construction project, it is anticipated that along the length of a given Project segment, multiple construction crews would be working concurrently on each of the construction elements. In addition, it is anticipated that construction activities would be occurring concurrently at up to four Project Segments at a time if no construction delays occur, and up to all six Project Segments if delays occur that result in a given Segment not being completed by the planned finish date.



Durations shown are typical and site specifics such as terrain, structure type, working constraints, environmental sensitivities and other such site specific difficulties would change the amount of time.

Source: SCE, 2015

The approximate time frames in Table B-18 are inclusive of the use of shoo-flies to address the need for keeping most of the existing circuits energized during construction. However, the construction durations do not factor in constraints for the relatively short-duration circuit outages that would be necessary for switching shoo-flies and new line segments in and out of the CAISO-controlled grid. Other project activities, such as ROW procurement, design, and material procurement are assumed to occur in advance of construction, or in parallel and have also not been factored into the construction durations. Additionally, the time frames do not reflect time impacts from non-work windows that could result from addressing sensitive environmental areas, weather delays or other work-related restrictions.

Table B-18. Preliminary Construction Durations

Project Component	Approximate Duration (months)
Subtransmission Relocations	14
Distribution Relocations	12
Telecommunications	6
Substations[1]	36[1]
Segment 1	14
Segment 2	14
Segment 3	24
Segment 4	16
Segment 5	24
Segment 6	12

1 - Substation work is intermittent and would be based on scheduled outages that would occur throughout the duration of Project construction.

B.4 Operations and Maintenance

Ongoing Operations and Maintenance (O&M) activities are necessary to ensure reliable service, as well as the safety of the utility workers 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 transmission, subtransmission, and distribution lines would be maintained in a manner consistent with CPUC General Order 95 and General Order 128, as applicable. It is not anticipated that additional workforce would be necessary for the operation and or maintenance of the Proposed Project, because the project is proposed within an existing transmission corridor and substations. Normal operation of the lines would be controlled remotely through SCE control systems, and manually in the field as required. SCE inspects the transmission, subtransmission, telecommunications and distribution overhead facilities in a manner consistent with CPUC General Order 165, a minimum of once per year via ground and/or aerial observation.

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 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. However, repairing or replacing poles and structures 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 road way (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 towers and 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 towers and poles. Wood pole testing and treating is a necessary maintenance activity conducted to evaluate the condition of wood structures both above and below ground level. Intrusive inspections require the temporary removal of soil around the base of the pole, usually to a depth of approximately 12 to 18 inches, to check for signs of deterioration. Roads and trails are utilized for access to poles. For impact prevention, all soil removed for intrusive inspections would be reinstalled and compacted at completion of the testing.

Regular tree pruning would 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 (General Order-95, Rule 35), 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 poles and transmission tower pads, and as required by local jurisdictions 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 structures (as defined by California Code of Regulations Title 14, Article 4) are maintained in accordance with Public Resource Code 4292.

In some cases, towers and poles 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 or 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 poles, transmission towers, or lines or re-stringing conductors. Emergency repairs could be needed at any time. SCE would notify the applicable agencies as soon as feasible of any emergency repairs. The notice would include a description of the work, location of the transmission facilities, and cause of the emergency, if known. The applicable agencies and SCE would work together to agree upon habitat restoration needs after the emergency.

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 mentioned above.

The telecommunications 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 may be required for routine or emergency maintenance activities.

For the West of Devers project, SCE would conduct an environmental review of all O&M activities that involve ground disturbance to determine potential risks to resources. This review, which would include cultural and biological analysis, may result in additional permitting. Following this review, SCE Environmental would issue an Environmental Clearance, which O&M work crews would review and adhere to during preconstruction and construction for O&M. Risk levels for activities on public lands were developed based on the O&M activity type and the potential effect to a sensitive environmental resource. These risk levels pertain to environmental review for O&M activities that have been proposed as part of an adaptive management approach to facilitate notification or receive approval of O&M activities within BLM's authorization (i.e., ROW Authorization or Easement). SCE would follow a similar environmental review process, including the implementation of applicable avoidance and minimization measures, for O&M activities on privately owned lands based on the type of activity and potential to affect sensitive environmental resources.

Risk levels will generally be categorized by SCE as follows:

Low Risk Level Environmental Impact – Activities may include:

- Repair or maintenance-type activities that will not require any ground or vegetation disturbing activity.
- The activity is not located in an area of any known sensitive cultural or biological resource, and/or the activity will occur in a previously disturbed location.
- Impact prevention measures for Low Risk activities may include removing all materials, leaving the project area clean and safe, keeping all vehicles within the existing road prism or designated work area, ensuring that all personnel remain on existing roads and trails, or other measures.
- The work would generally proceed after notification to the public land agency and does not generally require a monitor.

Medium / High Risk Level Environmental Impact – Activities may include

- Ground and/or vegetation disturbance.
- Special Status Species likely or known to be present.
- Additional field review by an SCE approved subject matter expert.
- Impacts can be reduced or avoided with the implementation of avoidance and minimization measures.
- Impact prevention measures for Medium/High Risk activities may include clearance surveys, monitoring, avoidance and minimization, or other measures.

- SCE Environmental Staff will perform tailboards as necessary.
- The work may be allowed to proceed after notification to the public land agency, but may require approval, depending on the extent of ground disturbance.

B.5 Electric and Magnetic Fields Management

B.5.1 Electric and Magnetic Fields

Recognizing that there is public interest and concern regarding potential health effects that could result from exposure to electric and magnetic fields (EMF) from power lines, this document provides information regarding EMF associated with electric utility facilities and the potential effects of the Proposed Project related to public health and safety. Potential health effects from exposure to ***electric fields*** from power lines (produced by the existence of an electric charge, such as an electron, ion, or proton, in the volume of space or medium that surrounds it) are typically not of concern since electric fields are effectively shielded by materials such as trees, walls, etc. Therefore, the majority of the following information related to EMF focuses primarily on exposure to ***magnetic fields*** (invisible fields created by moving charges) from power lines.

Magnetic fields can be reduced either by cancellation or by increasing distance from the source. Cancellation is achieved in two ways. A transmission line circuit consists of three "phases": three separate wires (conductors), usually on an overhead tower. The configuration of these three conductors can reduce magnetic fields. When the configuration places the three conductors closer together, the interference, or cancellation, of the fields from each wire is enhanced, and the magnetic field is reduced. This technique has practical limitations because of the potential for short circuits if the wires are placed too close together. Close conductor spacing can also create worker safety concerns because there is a risk of workers contacting energized conductors during maintenance.

This EIR/EIS does not consider magnetic fields in the context of CEQA and determination of environmental impact. This is because (a) there is no agreement among scientists that EMF does create a potential health risk, and therefore, (b) there are no defined or adopted CEQA standards for defining health risk from EMF. As a result, EMF information is presented for the benefit of the public and decisionmakers.

After several decades of study regarding potential public health risks from exposure to power line EMF, research results remains inconclusive. Several national and international panels have conducted reviews of data from multiple studies and state that there is not sufficient evidence to conclude that EMF causes cancer. The International Agency for Research on Cancer (IARC), an agency of the World Health Organization (WHO), and the California Department of Health Services (DHS) both classified EMF as a possible carcinogen (WHO, 2001; DHS, 2002).

In addition, the 2007 WHO [Environmental Health Criteria (EHC) 238] report concluded that:

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

Currently, there are no applicable regulations related to EMF levels from power lines or substations. However, following a CPUC decision from 1993 (Decision [D.]93-11-013) that was reaffirmed by the CPUC on January 27, 2006 (D.06-01-042), the CPUC requires utilities to incorporate “low-cost” or “no-cost” measures to mitigate EMF from new or upgraded electrical utility facilities up to approximately 4 percent of total project cost. To comply with this requirement, SCE developed and included a Field Management Plan (FMP) as part of the application for the Proposed Project to reduce magnetic field levels in the vicinity of the transmission line.

B.5.2 EMF in the Proposed Project Area

Magnetic field strength is a function of both the electric current carried by the wires, and the configuration and design of the three conductors that together form a single circuit of an electric transmission line. Magnetic field strengths for typical transmission power line loads at the edge of an *overhead* transmission system right-of-way generally range from 10 to 30 milligauss (mG) (NIEHS, 2002). Exposure to EMF occurs in the community from sources other than electric transmission lines. Research on ambient magnetic fields in homes indicates that levels below 0.6 mG could be found in half of the studied homes in the centers of rooms, and that the average levels in the homes away from electrical appliances was 0.9 mG. Immediately adjacent to appliances (within 12 inches), field values are much higher, for example: 4 to 8 mG near electric ovens and ranges, 20 mG for portable heaters, or 60 mG for vacuum cleaners (NIEHS, 2002). Outside of the home, the public also experiences EMF exposure from the electric distribution system that is located throughout all areas of the community. Existing EMF levels along SCE’s existing 220 kV corridor are indicated in Table B-19 and are discussed in greater detail in SCE’s EMF Field Management Plan (see EIR/EIS Appendix 4). These calculated EMF levels were based on peak loading condition and a set of assumptions. They were used to compare various design options and not meant to be indicators of real levels because magnetic field levels vary with time of the day, season of the year, and operating conditions.

Table B-19. Magnetic Field Levels along Existing 220 kV Transmission Corridor

Segment	West or North Edge of ROW (mG)	East or South Edge of ROW (mG)
Segment 1, Model 1	28.5	67.0
Segment 1, Model 2	30.5	54.1
Segment 1, Model 3	50.9	66.7
Segment 1, Model 4	32.1	67.6
Segment 2, Model 1	74.8	53.4
Segment 2, Model 2	75.0	36.1
Segment 3	16.5	34.0
Segment 4, Model 1	36.8	21.6
Segment 4, Model 2	74.3	21.0
Segment 5, Model 1	74.3	21.0
Segment 5, Model 2	33.9	64.4
Segment 5, Model 3	22.3	64.1
Segment 6, Model 1	27.0	72.6
Segment 6, Model 2	27.3	31.9
Segment 6, Model 3	Northern ROW – 27.2 Southern ROW – 67.2	Northern ROW – 32.4 Southern ROW – 35.2

Source: SCE’s Field Management Plan (see EIR/EIS Appendix 4).

B.5.3 Field Management Plan for the Proposed Project

This section discusses SCE's general practices regarding EMF and the specific EMF reduction measures proposed by SCE for the Proposed Project. SCE's Field Management Plan is included in this EIR/EIS as Appendix 4. SCE's Field Management Plan also includes design calculations of estimated EMF levels for the proposed 220 kV and 66 kV lines with and without implementation of these EMF reduction measures and conductor phasing (i.e., arranging conductors of the proposed transmission lines for magnetic field reduction). These design calculations are shown in Table B-20. For additional details on SCE's set of assumptions and calculated magnetic field levels for the Proposed Project, see EIR/EIS Appendix 4.

Table B-20. Calculated Magnetic Field Levels along Proposed 220 kV Transmission Corridor

Segment	Proposed without EMF Reduction: West or North Edge of ROW (mG)	Proposed with Phasing and Increased Conductor Heights: West or North Edge of ROW (mG)	Proposed without EMF Reduction: East or South Edge of ROW (mG)	Proposed with Phasing and Increased Conductor Heights: East or South Edge of ROW (mG)
Segment 1, Model 1	83.9	29.0	72.5	68.6
Segment 1, Model 2	123.0	56.1	61.5	57.1
Segment 1, Model 3	119.2	53.6	89.4	54.9
Segment 1, Model 4	119.2	53.6	89.4	54.9
Segment 2, Model 1	158.3	54.3	125.1	45.1
Segment 2, Model 2	157.6	55.5	56.5	58.4
Segment 3	127.5	37.5	15.0	2.2
Segment 4, Model 1	158.3	54.3	13.3	2.3
Segment 4, Model 2	9.3	0.4	186.5	53.6
Segment 5, Model 1	9.3	0.4	186.5	53.6
Segment 5, Model 2	190.5	45.0*	211.2	67.4*
Segment 5, Model 3	190.5	35.5	211.2	53.6
Segment 6, Model 1	18.0	0.7	180.4	60.7
Segment 6, Model 2	13.0	0.9	137.2	54.8
Segment 6, Model 3	Northern ROW – 13.3 Southern ROW – 162.0	Northern ROW – 0.8 Southern ROW – 50.7	Northern ROW – 135.5 Southern ROW – 23.6	Northern ROW – 54.4 Southern ROW – 29.3

Source: SCE's Field Management Plan (see EIR/EIS Appendix 4).

* The proposed with EMF reduction calculations indicate phasing only. Because the proposed design already includes no cost field reduction measures in the preliminary design, no low-cost field reduction measures, such as raising structure heights or conductor ground clearance near populated areas, are recommended in SCE's Field Management Plan for this segment of the Proposed Project.

SCE's EMF Design Guidelines. In accordance with Section X (A) of CPUC General Order 131-D, Decision No. D.06-01-042, and SCE's EMF Design Guidelines prepared in accordance with the EMF Decision, SCE will incorporate "no cost" and "low cost" magnetic field reduction steps in the design of the proposed transmission line and switchyard.

SCE's guidelines call for implementation of measures to reduce magnetic fields based on the land uses surrounding each project, in the following priority:

- Schools, day care centers, hospitals
- Residential properties
- Commercial/industrial land uses
- Recreational sites

- Agricultural lands
- Undeveloped land

The options in SCE's EMF Design Guidelines include the following measures, any or all of which may be selected to reduce the magnetic field strength levels from the proposed transmission line:

- Arranging the conductors in a triangular configuration to maximize field cancellation.
- Placing the conductors for the transmission line in the right-of-way at the greatest distance from buildings housing priority land uses to reduce magnetic field exposure along the entire route, except where the location of existing utilities prevent strategic line placement.
- Moving the conductors further from the edge of the right-of-way near high priority groups including school, day care, hospital and residential land uses.

Proposed EMF Reduction Measures. The Preliminary Field Management Plan for the Proposed Project (EIR/EIS Appendix 4) includes each of these measures, as "no cost" and "low cost" magnetic field reduction steps:

- Utilize subtransmission structure heights that meet or exceed SCE's EMF preferred design criteria,
- Utilize underground subtransmission construction for crossing other transmission structures and other engineering reasons,
- Utilize double-circuit construction that reduces spacing between circuits as compared with single-circuit construction,
- Utilize taller structure heights or increased conductor ground clearance where the proposed transmission lines run adjacent to populated areas, and
- Arrange conductors of the proposed transmission lines for magnetic field reduction ("phasing").

Final engineering and selection of the alignment of the line would include seeking opportunities to strategically place the line farther from priority land uses, where feasible.

Additional information regarding EMF and Proposed Project can be found in Appendix B of SCE's CPCN application (A.13-10-020). SCE's CPCN application and Proponent's Environmental Assessment are available for public review at the CPUC Energy Division CEQA Unit and on the project website at:

http://www.cpuc.ca.gov/environment/info/aspen/westofdevers/westofdevers.htm

If the project or an alternative is approved by the CPUC, SCE would prepare and submit to the CPUC a Final EMF Management Plan containing the precise EMF measures to be employed for the project.

B.6 Applicant Proposed Measures

SCE proposes to implement certain measures to ensure the Proposed Project would occur with minimal environmental impacts in a manner consistent with applicable rules and regulations. SCE proposes to implement these measures during the design, construction, and operation of the Proposed Project in order to avoid or minimize potential environmental impacts (SCE, 2013 and 2014a).

Applicant Proposed Measures (APMs) listed in Table B-21 are considered part of the Proposed Project and are considered in the evaluation of environmental impacts (see Section D). CPUC approval would be based upon SCE adhering to the Proposed Project as described in this document, including this project description and the APMs, as well as any adopted mitigation measures identified by this EIR/EIS.

Table B-21 lists each APM by environmental issue area. In some cases, mitigation measures presented in Section D either expand upon or add detail to the APMs presented in Table B-21 as necessary, to ensure that potential impacts would be reduced to less than significant levels.

Table B-21. Applicant Proposed Measures (APMs)

APM	Description
Air Quality	
APM AIR-1	SCE would prepare an Exhaust Emissions Control Plan to establish a target goal of a project-wide fleet average reduction of 20 percent NO_X compared to the estimated unmitigated emissions as presented in the PEA for applicable diesel-fueled off-road construction equipment of more than 50 horsepower. Acceptable options for reducing emissions could include, but are not limited to: the use of newer model engines meeting USEPA Tier 3 standards if available (or better), low emissions diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other similar available options.
APM AIR-2	SCE would prepare a Fugitive Dust Control Plan to reduce fugitive dust emissions (fugitive PM_{10} and $PM_{2.5}$). Acceptable control measures for reducing emissions described within the Fugitive Dust Control Plan may include, but are not limited to: limit traffic speeds on unpaved roads to 15 mph; apply water as needed to comply with SCAQMD Rule 403 requirements, or apply soil stabilizers (e.g., gravel for substation area) on active unpaved access roads, the substation area, and staging areas if construction activity causes persistent visible emissions of fugitive dust beyond the work area; apply soil stabilizers to inactive construction areas as described in the SWPPP; where applicable, install gravel, shaker plates, or other BMPs at the point of intersection with public paved surfaces. The Fugitive Dust Control Plan would describe how the measures would be implemented and monitored during Project construction. Furthermore, as construction details become available, the Fugitive Dust Control Plan would include site-specific mitigation measures for Project areas that could be more likely to generate dust near sensitive receptors.
Biology	
APM BIO-1	Revegetation Plan. Prior to starting construction, a draft revegetation plan would be prepared to guide the revegetation of those areas subject to temporary project impacts during construction and that are not included within either the WR-MSHCP or CV-MSHCP (e.g., land areas within the Morongo Reservation or San Bernardino County), and where dominant land cover consists of native vegetation. The objective of revegetation would be to re-establish vegetation back to pre-construction conditions (e.g., by maintaining roughly equivalent or comparable native to non-native dominance patterns) with consideration of adjacent community composition. Areas dominated primarily by non-native vegetation and that are temporarily disturbed by construction activities may also be revegetated; however, the primary objective for those areas would be to stabilize soils to minimize erosion potential in accordance with any applicable SWPPP requirements. Prior to completing construction activities, the revegetation plan would be finalized to address site-specific conditions, methodology and technique, implementation schedule, monitoring and maintenance, and success criteria. The revegetation plan would also direct revegetation of temporarily impacted native-dominated vegetation areas located in the WR-MSHCP and the CV-MSHCP plan areas consistent with MSHCP standards and pursuant to any agreements negotiated between SCE and the MSHCP management entities (e.g., RCA and CVCC) regarding SCE's obligations as a PSE receiving coverage for impacts to various resources. If SCE does not gain PSE status under either MSHCP, the draft revegetation plan to re-establish native-dominated vegetation back to pre-construction conditions (as noted above) would include native dominated areas within MSHCP areas also. The draft revegetation plan would be submitted to the CPUC, BLM, and applicable wildlife agencies for approval after completion of final engineering and prior to the start of construction. The Revegetation Plan will include the following elements: (a) A statement of revegetation goals for different areas within the project (e.g., to mitigate project impacts to specific resources) based on the administrative land jurisdiction particular areas fall in and also based on the different vegetation types and the constituent elements therein. In particular, revegetation objectives for areas supporting native vegetation may differ substantially from the objectives for revegetation in other areas. Revegetation objectives will be specified for different habitat and vegetation types and for the following administrative areas: 1) San Bernardino County, including specific reference to goals for revegetation within USFWS-designated Critical Habitat for California gnatcatcher and areas deemed occupied by Stephens' kangaroo rat; 2) WRC MSHCP areas, including Public/Quasi-Public conservation areas and Additional Reserve Lands;

Table B-21. Applicant Proposed Measures (APMs)

APM	Description
	3) CVMSHCP areas; and 4) areas to be re-vegetated on land within the Morongo Reservation. Examples of likely goals may include preventing or minimizing further site degradation; stabilizing soils; promoting passive vegetation recovery over time; replacing degraded natural vegetation and habitat value with equivalent vegetation cover and composition as compared to pre-construction conditions; and minimizing soil erosion, dust generation, and weed invasions. (b) Quantitative success criteria. Because restoration goals will differ according to location, success criteria shall be tailored appropriately to areas in different administrative jurisdictions (please see above) and will also be defined specifically for areas containing habitat for listed species and other special-status species for which habitat value is being replaced along the route. (c) Implementation. The Plan will describe SCE's proposed implementation measures, including: (a) pre-construction characterization of specific areas subject to temporary construction impacts; (b) soil preparation measures, including locations of recontouring, decompacting, soil amendments, imprinting, or other treatments; (c) details for top soil salvage and storage, as applicable; (d) plant material collection and acquisition guidelines, including guidelines for obtaining plants or seed from vendors; (e) scheduling and methods for planting or seeding; (f) proposed irrigation methods. (d) Maintenance. The Plan will include scheduling and methods for proposed maintenance activities such as weeding, trash removal, etc. (e) Monitoring and Reporting. The Restoration Plan will include a detailed monitoring and reporting program, commensurate with the goals and success criteria for each revegetation site. The monitoring and reporting program will be designed to evaluate progress toward success criteria at appropriate milestones, provide an objective determination whether each site meets success criteria at the end of the monitoring period, and report this information to the relevant agencies. (f) Contingency. The Plan will include contingency measures for implementation if revegetation efforts make insufficient progress toward success criteria at specified milestones
APM BIO-2	Biological Monitoring. Where special-status species (e.g., reptiles, birds, mammals, and bat roosts) or unique resources (defined by regulations and local conservation plans) are known to occur, biologists would monitor construction activities, unless otherwise mitigated for or as appropriate actions are described in species-specific APMs.
APM BIO-3	Nesting Birds. SCE would prepare and implement a Nesting Bird Management Plan to address nesting birds undertaken in collaboration with the CDFW, USFWS, and BLM. The Plan would be an adaptive management plan that may be updated as needed if improvements are identified or conditions in the field change. The Plan would include the following: nest management and avoidance, field approach (survey methodology, reporting, and monitoring), and the Project avian biologist qualifications. The avian biologist would be responsible for oversight of the avian protection activities including the biological monitors. In order to minimize impacts to nesting birds during nesting season, pre-construction surveys and regular sweep surveys of active construction areas by a qualified biologist would focus on breeding behavior and a search for active nests within 500 feet of the project disturbance areas where survey access is not limited. (a) For vegetation clearing that needs to occur during the typical nesting bird season (February 1 to August 31; as early as January 1 for raptors) qualified biologists would conduct nesting bird surveys. If an active nest (e.g., nests with eggs or chicks) was located, the appropriate avoidance and minimization measures from the management plan would be implemented. If it is determined that removal of an active nest is required, the project avian biologist will evaluate the appropriate level of consultation with CDFW, USFWS, and BLM; (b) During the typical nesting bird season, SCE would conduct pre-construction clearance surveys no more than 14 days prior to initial start of construction and in accordance with the adaptive management plan, to determine the location of nesting birds and territories; (c) Nest monitoring would be conducted by Project biological monitors with knowledge of bird behavior under the direction of a BLM and/or CDFW approved avian biologist; (d) Nesting deterrents (e.g. mooring balls, netting, etc.) could be used for inactive nests where appropriate at the direction of the Project avian biologist; (e) A Project avian biologist would determine the appropriate buffer area around active nest(s) and provisions for buffer exclusion areas (e.g. highways, public access roads, etc.) along with construction activity limits. Unless restricted by the Project avian biologist, construction vehicles would be allowed to move through a buffer area

Table B-21. Applicant Proposed Measures (APMs)

APM	Description
	with no stopping or idling. The Project avian biologist would determine, evaluate, and modify buffers as appropriate based on species tolerance and behavior, the potential disruptiveness of construction activities, and existing conditions; and (f) The Project biological monitor would observe and document implementation of appropriate buffer areas around active nest(s) during project activities. The active nest site and applicable buffer would remain in place until nesting activity concluded. Nesting bird status reports would be submitted according to the management plan.
APM BIO-4	Burrowing Owl. A pre-construction, focused burrowing owl survey would be conducted no more than 30 days prior to commencement of ground-disturbing activities within suitable habitat to determine if any occupied burrows are present. If occupied burrows are found, adequate buffers shall be established around burrows. Adequate buffers would be determined by a Project Avian biologist based upon field conditions and resource agency guidelines for wintering burrows and breeding season burrows. SCE would develop a Burrowing Owl Management Plan for the Project. The Plan would include information related to construction monitoring, avoidance and minimization measures, relocation strategy, exclusionary devices, and reporting requirements.
APM BIO-5	Desert Tortoise. In desert tortoise habitat in Segments 5 and 6, from Deep Creek Road east to Devers Substation, project personnel in non-desert tortoise exclusion fenced areas would be required to inspect for desert tortoises under vehicles prior to moving the vehicle. If a desert tortoise is found beneath a vehicle, the vehicle would not be moved until the tortoise leaves on its own accord, or if necessary, the tortoise may be moved by an Authorized Biologist. If a vehicle must be moved in the event of an emergency, placing a tortoise in harm's way, a USFWS Authorized Biologist may move the tortoise to an appropriate location. All burrows suitable for desert tortoise found during clearance surveys within project ground disturbance areas within desert tortoise habitat, whether occupied or vacant, that would be subject to construction-related disturbance, would be excavated by a Biologist authorized by USFWS, and collapsed or blocked to prevent desert tortoise reentry. All desert tortoise handling, including excavations of nests, would be conducted by a Biologist authorized by USFWS, in accordance with USFWS-approved protocol in compliance with appropriate regulatory permits. Desert tortoise exclusion fencing shall be installed around staging yards within suitable, occupied habitat according to USFWS recommended specifications (USFWS, 2005) and in compliance with appropriate regulatory permits. Trash and food items would be contained in closed containers during construction to discourage attracting opportunistic predators such as ravens.
APM BIO-6	Least Bell's Vireo, Southwestern Willow Flycatcher, & Western Yellow-billed Cuckoo. *Pre-construction:* In areas of potentially suitable riparian habitat for the least Bell's vireo (or other listed riparian birds), which occurs in Segment 3 and may occur in limited areas in Segment 4, SCE would conduct non-protocol pre-construction surveys no more than 7 days prior to commencing construction activities to determine the location of nests and territories. Survey areas would include potentially suitable habitat within a 500-foot buffer around project disturbance areas unless property access is not allowed. *Buffer:* If active least Bell's vireo (or other listed riparian bird) nesting activity is identified, SCE's avian biologist would establish a buffer area where construction activities are prohibited around active least Bell's vireo nest(s) and would monitor construction activities to evaluate the adequacy of the buffer. The buffer would be established and may be subsequently adjusted based on construction activities, noise and disturbance levels in the area not attributable to construction, and observed behavior of individual vireos (or as specified by conditions established under a Biological Opinion issued by the U.S. Fish & Wildlife Service or as directed by provisions established under the WR-MSHCP if SCE obtains PSE status). As SCE intends to apply for PSE status, if granted, potential impacts to the least Bell's vireo would be mitigated by participation in the WR-MSHCP. SCE's participation would include following provisions and measures outlined in the WR-MSHCP. SCE would prepare a Determination of Biological Equivalent or Superior Preservation (DBESP) that would include conservation recommendations similar to those that would be established under a Biological Opinion. The Riverside Conservation Authority (RCA) would request USFWS and CDFW concurrence with the MSHCP "findings of consistency," as well as DBESP approval. Subsequent coordination on any biological issues would be handled through consultation with the RCA. The RCA would determine the need for additional consultation with the USFWS and CDFW.

Table B-21. Applicant Proposed Measures (APMs)

APM	Description
	If SCE does not participate in the WR-MSHCP, then any temporary and permanent impacts to least Bell's vireo and its habitat that may occur in Segments 3 and 4 would be mitigated by obtaining an incidental take authorization under the Federal and State Endangered Species Acts and implementing relevant permit conditions.
APM BIO-7	**Special Status Plants.** Pre-construction surveys for plant species assigned a State Rare Plant Rank of 1B would be performed during the appropriate season and observed populations compared to impact area limits associated with final design. If substantial adverse impacts to a population are unavoidable then replacement or translocation of equivalent numbers of plants would be planned and implemented. (Substantially adverse impacts are defined as damage or loss of at least 20 percent of the total number of individuals in a local population within the Project Area or 20 percent of the total area occupied by a population of special status plants. Potential impacts to species ranked 2 or 4 would not be considered significant but may still be avoided to the extent practicable). Special status plants designated on List 1B that are substantially adversely affected would be salvaged and relocated. SCE will prepare plan to accomplish salvage and relocation/replacement that states methods of salvage, storage, and replacement planting of seeds or plants, and to identify receptor sites, set target numbers to be established, describe monitoring methods, and define requirements for maintenance and annual monitoring reports. List 1B species observed in project area include: Yucaipa onion, smooth tarplant, Parry's spineflower, white-bracted spineflower, and chaparral sand verbena.
APM BIO-8	**Coachella Valley Milk-vetch.** Focused surveys for Coachella Valley milk-vetch would be conducted during the appropriate season within designated Critical Habitat along the Whitewater River during the season immediately preceding proposed construction activities in that area. This species was not found during focused surveys conducted in 2011 and 2012. If this species is located and occurs within areas potentially subject to impacts during construction, a plan to avoid impacts, protect specimens in place, and/or salvage and replace affected specimens would be developed in consultation with the CVCC, USFWS, and CDFW.
APM BIO-9	**Jurisdictional Water Permits.** Jurisdictional waters permits would be obtained from CDFW under Cal. Fish & Game Code Section 1602, and from USACE, and the appropriate Regional Water Quality Control Boards in accordance with Sections 404 and 401 of the Clean Water Act, to address unavoidable impacts to State and Federal jurisdictional waters. Impacts would be mitigated based on the terms of the permits. The applicant would develop a Habitat Mitigation and Monitoring Plan (HMMP) for affected jurisdictional areas within established riparian areas, as needed, for review and approval by the USACE, CDFW, and the Regional Boards as appropriate. The plan would describe measures to accomplish restoration, provide criteria for restoration success, and specify compensation ratios. Monitoring and reporting requirements and the duration of post-construction monitoring would be specified. A copy of the final HMMP would be provided to the CPUC, USACE and CDFW. Regarding any affected Riparian/Riverine drainages and habitat areas in Segments 3 and 4 in Western Riverside County, if SCE participates in the WR-MSHCP, SCE would prepare a DBESP that would include mitigation measures consistent with the HMMP as previously described. The RCA would request USFWS and CDFW concurrence with the MSHCP "findings of consistency," as well as DBESP approval. Subsequent coordination on any biological issues would be addressed through consultation with the RCA. The RCA would determine the need for additional consultation with the USFWS and CDFW.
APM BIO-10	**Coastal California Gnatcatcher and Designated Critical Habitat.** In San Bernardino County, SCE would develop construction minimization measures and habitat conservation measures to be incorporated into Section 7 consultation, with the intent to obtain take authorization for the expected minimal impact (based on negative surveys to date), as well as a finding of no adverse modification to Critical Habitat. Expected measures would include: pre-construction protocol surveys to identify the locations of any gnatcatchers; monitoring of all vegetation clearing in coastal sage scrub habitat or designated Critical Habitat in San Bernardino County; restoration of temporarily impacted coastal sage habitat; and additional restoration of degraded areas within the SCE right-of-way as compensation for permanent impacts to coastal sage scrub habitat, such that there is no net loss of habitat value for coastal California gnatcatcher in San Bernardino County.

Table B-21. Applicant Proposed Measures (APMs)

APM	Description
APM BIO-11	Stephens' Kangaroo Rat. For portions of the Proposed Project within SKR habitat in Segments 2 and 3, from the San Bernardino Junction to the Riverside County line, avoidance and mitigation measures would be incorporated into conditions established in a Biological Opinion issued through Section 7 consultation with USFWS, which would be required to obtain incidental take authorization for the expected minimal impact (based on surveys to date). Expected measures would include: pre-construction protocol surveys to identify the locations of any SKR present and delineate extent of suitable habitat: monitoring by a qualified biologist during all vegetation clearing and ground disturbance in suitable habitat; flagging of potential burrows for avoidance where possible; covering all excavated, steep-walled holes or trenches more than 2 feet deep at the close of each working day with plywood or provide one or more escape ramps constructed of earth fill or wooden planks to prevent entrapment of SKR during construction; thorough inspection of construction pipes, poles, culverts, or similar structures with a diameter of 1.5 inches or greater stored at a construction site for one or more overnight periods shall be done by a qualified biologist for the presence of SKR before the construction pipes, poles, culverts, or similar structures is subsequently buried, capped, or otherwise used or moved in any way; where construction traffic over identified burrows is unavoidable, covering burrows during daytime operations with 1-inch plywood or steel plates to avoid collapsing burrow; restoration of all temporarily affected areas within suitable habitat; and additional restoration of degraded areas within the SCE right-of-way as compensation for permanent impacts to suitable habitat, such that there is no net loss of habitat value for SKR, as agreed upon by USFWS.
APM BIO-12	Los Angeles Pocket Mouse; Palm Springs Pocket Mouse. SCE would develop construction minimization measures and habitat conservation measures, as necessary through MSHCP participation, or, in the absence of such participation, in consultation with USFWS and CDFW. Habitat mitigation measures would be a combination of revegetation of temporarily impacted areas (see APM-BIO-1) and restoration of degraded areas as necessary to conserve the equivalent of 90 percent of the long-term conservation value habitat for LAPM, as determined by the RCA and/or USFWS and CDFW.
APM BIO-13	In areas where foot travel is necessary outside of already identified temporary or permanent disturbance areas. Biological Monitors, present in areas as required by APM BIO-2, would assist construction crews in determining the most appropriate foot path having the least potential to disturb sensitive biological resources.
Cultural/Paleontological	
APM CUL-1	Potential Project effects to Historical Resources/Historic Properties may be mitigated or reduced to a less than significant level by utilizing one, or a combination of standard-practice mitigation scenarios potentially including, but not limited to: Prehistoric Resources: a. avoid (avoidance by design, preserve in place, capping); b. minimize (reduction of Area of Direct Impact/Effect); c. mitigate (data recovery). Historic Resources: a. avoid (avoidance by design, preserve in place, capping); b. minimize (reduction of Area of Direct Impact/Effect); c. mitigate (historic context statement, data recovery). Historic Architecture/Utility Infrastructure: a. avoid (avoidance by design, preserve in place); b. minimize (reduction of Area of Direct Impact/Effect); c. mitigate (historic context statement, Historic American Engineering Record, Historic American Building Survey, advanced DPR recordation). Traditional Cultural Property: a. consult with Native American stakeholders on perceived impacts/effects and negotiate mutually agreeable treatment.

Table B-21. Applicant Proposed Measures (APMs)

APM	Description
APM CUL-2	During construction, it is possible that previously unknown archaeological or other cultural resources or human remains could be discovered. Prior to construction, SCE would prepare a Construction Monitoring and Unanticipated Cultural Resources Discovery Plan or similar document to be implemented if an unanticipated discovery is made. At a minimum the Plan would detail the following elements: Worker and supervisor training in the identification of cultural remains that could be found in the Proposed Project area, and the implications of disturbance and collection of cultural resources per applicable federal and state laws. Worker and supervisor response procedures to be followed in the event of an unanticipated discovery, including appropriate points of contact for professionals qualified to make decisions about the potential significance of any find. Identification of persons authorized to stop or redirect work that could affect the discovery, and their on-call contact information. Procedures for monitoring construction activities in archaeologically sensitive areas. A minimum radius around any discovery within which work would be halted until the significance of the resource has been evaluated and mitigation implemented as appropriate. Procedures for identifying and evaluating the historical significance of a discovery. Procedures for consulting Native Americans when identifying and evaluating the significance of discoveries involving Native American cultural materials. Procedures to be followed for treatment of discovered human remains per current state law on non-Federal land, Federal law (including the Native American Graves Protection and Repatriation Act) on Federal land and protocol developed in consultation with Native Americans.
APM PAL-1	Potential effects of the Proposed Project to sensitive paleontological resources may be mitigated or reduced to a less-than-significant level by implementing a Paleontological Resource Mitigation and Monitoring Plan, which would identify monitoring and treatment requirements for sensitive paleontological resources of significance.
Hydrology	
APM HYDRO-1	Installation of drainage improvements would be designed to maintain the existing flow patterns as practicable.
APM HYDRO-2	Soil disturbance at structures and access roads would be minimized and designed to prevent long-term erosion through revegetation or construction of permanent erosion control structures.
APM HYDRO-3	Erosion control and hazardous material plans will be incorporated into the construction bidding specifications to ensure compliance.
Minerals	
APM MIN-1	To minimize interference with mining operations at Robertson's Ready Mix Banning Rock Plant #66, SCE will coordinate with the owner/operator to avoid critical mining periods and high volume earthmoving days and will document said coordination.
Recreation	
APM REC-1	SCE would coordinate temporary closures with recreational facility managers and would post a public notice at recreation facilities indicating that the facilities would be closed or have limited use during construction.
APM REC-2	SCE would prepare a construction notification plan identifying procedures for notifying the public of the location and duration of construction.
Transportation	
APM TRANS-1	SCE would prepare a project specific helicopter use plan to describe anticipated helicopter activities. The helicopter plan will include information related to the types of activities to be conducted by helicopters, locations of and activities to be conducted at helicopter yards, flight and data management procedures, and safety information.

B.7 Connected Actions

B.7.1 Definition of Connected Action Projects

The CPUC and BLM have evaluated a range of projects to determine whether they are so closely related to the Proposed Project as to be considered "connected actions" under the National Environmental Policy Act (NEPA). Projects that are considered "connected actions" under NEPA (40 C.F.R. 1508.25(a)(l)) include actions that:

> *(i) are automatically triggered by the proposed action,*
>
> *(ii) cannot or will not proceed unless the proposed action occurs first or simultaneously, or*
>
> *(iii) are interdependent parts of a larger action and depend upon the larger action for their justification.*

The second category (ii) is relevant for the generation projects considered to be "connected." The approach to identifying connected actions for the Proposed Project has been driven by an analysis of generator interconnection agreements and transmission studies prepared by the California Independent System Operator (CAISO). A number of solar generation projects appear to depend on the WOD Upgrade Project in order to move to construction and operation, because there is currently inadequate transmission capacity west of Devers Substation.

Table B-22 lists the generation projects that are analyzed as actions connected to the WOD Project and includes a brief explanation of why each project is considered to be connected. These projects are described in more detail in Sections B.7.2.1 and B.7.2.2. The total generation capacity of the projects in Table B-22 is 1,324 MW.

Table B-22. Connected Actions – Solar Generation Projects

Project Name (if known)[1]	MW / Type	Rationale for Consideration as a "Connected Action"
Known Projects with Interconnection Agreements		
Palen SEGS II, LLC (Palen) subsidiary of BrightSource Energy (CAISO Queue 365)	500 MW Solar Power Tower	Project deliverability via Red Bluff Substation modeled in CAISO "transition cluster" that presumes implementation of WOD Upgrade Project, and this project's interconnection agreement was executed in February 2011 that presumes implementation of the WOD Upgrade Project. Potentially connected to Proposed Project because this project may not be able to achieve deliverability without WOD Upgrade Project, and it may not be possible to be made deliverable by the 1,050 MW of additional deliverability within the existing West of Devers Interim Project (due to lack of capacity or lack of financial ability).
Desert Harvest, LLC EDF Renewable Energy (CAISO Queue 643AE)	150 MW Solar Photovoltaic (PV)	Project has an interconnection agreement that was executed in October 2014 that presumes implementation of WOD Upgrade Project and achieving deliverability via Red Bluff Substation. Potentially connected to Proposed Project, because this project may not be able to achieve deliverability without WOD Upgrade Project, and it may not be possible to be made deliverable by the 1,050 MW of additional deliverability within the existing West of Devers Interim Project (due to lack of capacity or lack of financial ability).

Table B-22. Connected Actions – Solar Generation Projects

Project Name (if known)[1]	MW / Type	Rationale for Consideration as a "Connected Action"
Confidential Projects Requesting Interconnection		
Project 1: Connecting to Blythe-Eagle Mountain 161 kV line (CAISO Queue 421)	50 MW Solar PV	Project 1 deliverability modeled in CAISO "transition cluster" that presumes implementation of WOD Upgrade Project.
Project 2: Connecting at Red Bluff Substation 230 kV (CAISO Queue 1070)	250 MW Solar PV	Projects 2 through 6 entered the CAISO interconnection process after the CAISO determined that the WOD Upgrade Project would allow additional generators in Eastern Riverside County to achieve "full capacity deliverability" status. These projects may not meet their financial or economic goals without the proposed WOD Upgrade Project being online.
Project 3: Connecting at Colorado River Substation 230 kV (CAISO Queue 576)	224 MW Solar PV	
Project 4: Connecting at Colorado River Substation 230 kV (CAISO Queue 970)	150 MW Solar PV	
Project 5: Connecting at Colorado River Substation 230 kV (CAISO Queue 1071)	150 MW Solar PV	
Total this table: 1,474 MW		

1 - The CAISO queue position indicates when the generator requested interconnection, and at that time, the CAISO can commence studies to determine the transmission upgrades that might be needed to integrate the generator with the remainder of the system.

Each of these connected actions is described below, to the extent that information is available. The environmental impacts of these connected actions are described in Section D of this EIR/EIS, following the discussion of the Proposed Project impacts. It is important to note that each of these projects will have its own project-level impact analysis under CEQA and/or NEPA. The analysis presented in this EIR/EIS is intended to disclose the range of potential impacts to the public and to decision-makers, since these projects are all made more likely to occur by the construction of the WOD Upgrade Project.

B.7.2 Descriptions of Connected Action Projects

Two categories of projects are defined here. Section B.7.2.1 describes known projects, and Section B.7.2.2 presents analysis assumptions for projects that are not yet publicly defined.

B.7.2.1 Known Projects

Palen Solar Power Project

The Palen Solar Power Plant (PSPP) was first proposed in August 2009 by Solar Millennium as a 500 MW solar trough project. Project review was completed by the California Energy Commission (CEC) and BLM, and a slightly smaller project was approved in December 2010, incorporating an alternative layout. Subsequently, Solar Millennium filed for bankruptcy and sold the project to BrightSource (CEC, 2015), and a new proceeding was initiated at the CEC and BLM. The CEC published its Final Staff Assessment (FSA) in several parts, completing it in November 2013. In September 2014, the CEC published a revised Presiding Member's Proposed Decision (PMPD), recommending approval of a single power tower with 250 MW capacity, rather than the two tower 500 MW proposed project (CEC, 2014), and the addition of thermal storage capacity. In late September 2014, BrightSource withdrew its application to the CEC and the proceeding was terminated. At this time, one of the Palen owners, Abengoa, is considering pursuing approval for a 250 MW power tower project with thermal storage capacity, but no application has been filed with the CEC or BLM (CSP, 2014).

Because of the CEC's PMPD indicating that only a 250 MW project would be acceptable at this location, this analysis assumes that the impacts associated with only one 250 MW power tower would be a connected action to the WOD Upgrade Project.

PSPP would be located entirely on public land managed by the BLM (Right-of-Way No. CACA-048810). The project site is located approximately 0.25 miles north of I-10and 10 miles east of Desert Center, approximately halfway between the Cities of Indio and Blythe, in Riverside County, California. The amended 250 MW project would occupy the same location as the 2010 approved project, but would reduce the project footprint from approximately 4,366 acres to approximately 1,960 acres. Figure B-25 (at the end of this section) illustrates the location and configuration of the PSPP.

The PSPP configuration evaluated in this EIR/EIS is called the “Reduced Acreage Alternative” in the CEC’s FSA and PMPD. It would reduce the total project acreage of the originally proposed two-tower project and retain the solar tower unit and heliostat array from Unit 1 (the western solar field). The power tower technology for the Reduced Acreage Alternative would be the same as described for the project approved in 2010. This alternative includes approximately 70 acres from Unit 2 (the eastern solar field). The additional acreage would allow a small expansion of the Unit 1 solar field while avoiding an extensive area of desert dry wash woodland habitat in the eastern solar field. This alternative would avoid a portion of the sand transport corridor that extends into the northeast portion of the proposed PSPP solar fields. With the addition of acreage from Unit 2, the solar field area for the Reduced Acreage Alternative would cover approximately 1,742 acres. The adjacent 218-acre common area and construction lay-down area adjacent to PSPP Unit 1 would be retained for an approximate project total of 1,960 acres. A generation tie-line would connect at the north side of the heliostat array field. A natural-gas pipeline would require rerouting for this alternative.

The impact analysis presented in Section D of this EIR/EIS is based primarily on the CEC’s FSA, published in three parts in September and November of 2013.

EDF Desert Harvest Solar Project

This 150 MW alternating current solar PV energy generating project holds CAISO Queue position 643AE. The project would be located 5 miles north of Desert Center on lands administered by the BLM, Palm Springs–South Coast Field Office in Riverside County. The project would be located entirely on land administered by BLM, but with generation tie-in (gen-tie) transmission line encroachment permits for roadway crossings and rights-of-way required from Riverside County.

BLM issued its Final EIS in November 2012 with EIS Alternative 4 as the Environmentally Preferred Alternative. Riverside County used this EIS to support its issuance of encroachment permits, under CEQA Guidelines Section 15221 (BLM, 2012). The project (Alternative 4) was approved by the BLM in a Record of Decision signed on March 6, 2013, and a ROW grant was issued on September 13, 2013. The impact analysis presented in Section D of this EIR/EIS is based primarily on the BLM’s 2012 Final EIS.

The approved Desert Harvest Solar Project analyzed in BLM’s Final EIS as Alternative 4 is comprised of two separate parcels separated by a desert wash. The northern parcel consists of 1,053 acres and the southern parcel consists of 155 acres for a total of 1,208 acres, or about 8 acres per MW. Figure B-26 illustrates the project layout and its location.

The main components of the Desert Harvest solar facility would consist of:

- Main generation area—PV arrays, switchyard, inverters, overhead lines, and access corridors;
- O&M Facility – either on or off site;
- On-site electrical substation and switch gear; and
- Site security, fencing, and lighting.

B.7.2.2 Confidential Projects

Six projects listed in Table B-22 are considered to be connected actions because the CAISO has determined that the WOD Upgrade Project is required to provide them with "full capacity deliverability" status. These generation projects may not meet their financial or economic goals without the proposed WOD Upgrade Project being online. Several of these generators submitted confidential letters of support to SCE, requesting that the CPUC expedite approval of the Proposed Project in order that they could attain deliverability for their generation (SCE, 2014c).

Because the locations of these confidential projects is not defined in public documents and CEQA/NEPA documents are not available for all projects, the impact analysis presented in this EIR/EIS in Section D is based on the defined impacts of solar PV projects in similar nearby areas and habitats. Table B-23 summarizes size and analysis assumptions for the confidential solar PV projects. Each project is described below.

Table B-23. Analysis Assumptions for Confidential Connected Action Projects, All Solar PV

Project No. and Interconnection Location	MW	Acres (Est.)	CEQA/NEPA Analysis Model
1. Blythe-Eagle Mountain 161 kV line	50	400	Desert Harvest Solar Project Final EIS
2. Red Bluff Substation	250	2,000	
3. Colorado River Substation	224	1,800	Blythe Mesa Solar Project Draft EIR/EA
4. Colorado River Substation	150	1,200	
5. Colorado River Substation	150	1,200	
TOTAL	824 MW	6600 acres	

Project 1: Connecting to Blythe-Eagle Mountain 161 kV Line

Project 1 is a 50 MW solar PV project with CAISO Queue position 421. Given its interconnection to a transmission line connecting Blythe with the Desert Center area, this analysis assumes that it would be located in the Desert Center area, so its impacts would be comparable to those of the Desert Harvest Solar Project (described in Section B.7.2.1), located north of Desert Center and south of Eagle Mountain. At 8 acres per MW, Project 1 would require about 400 acres.

Project 2: Connecting at Red Bluff Substation

Project 2 is a 250 MW solar PV project with CAISO Queue position 1070. Given its interconnection at the Red Bluff Substation in the Desert Center area, this analysis assumes that it would be located in the vicinity of Desert Center. Its impacts would be comparable to those of the Desert Harvest Solar Project (described in Section B.7.2.1), which is proposed to be located north of Desert Center and south of Eagle Mountain. At 8 acres per MW, Project 2 would require about 2,000 acres.

Projects 3, 4, and 5: Connecting at Colorado River Substation

As shown in Table B-23, these three projects would total 524 MW and would be solar PV projects. Given their interconnection at the Colorado River Substation, southwest of the City of Blythe, this analysis assumes that they would be located in vicinity of Blythe. Their impacts would be comparable to those of the Blythe Mesa Solar Project, which is proposed to be located west of central Blythe and northeast of the Colorado River Substation (see description below). At 8 acres per MW, these three projects would require about 4,200 acres.

As listed in Table B-23, the impact analysis for solar PV projects connecting with the Colorado River Substation considers as a model for impacts the EIR/Environmental Assessment (EIR/EA) prepared for Riverside County Planning Department and BLM for the Blythe Mesa Solar Project (BLM and Riverside County, 2014).

Blythe Mesa Solar Project. The proposed Blythe Mesa Solar Project encompasses 3,660 acres and consists of two primary components:

- A solar facility site (3,587 total acres) including a solar array field that would use single-axis solar PV trackers. It would have a system of interior collection power lines located between inverters and substations. There would be up to three on-site substations (each approximately 90,000 square feet), up to two O&M buildings (approximately 3,500 square feet each), and associated communication facilities and site infrastructure.
- Offsite facilities would include two primary off-site access roads and approximately 8.4 miles of 230 kV gen-tie transmission line (with approximately 3.6 miles located within the solar facility, which would connect all on-site substations). Approximately 4.8 miles of the gen-tie line would extend outside of the solar facility and would be placed within a 125-foot-wide ROW and occupy 73 acres. Of this, 3.8 miles would traverse BLM-managed lands with 53 acres within the Riverside East Solar Energy Zone (SEZ) designated by BLM's Solar Programmatic EIS (PEIS).

The fenced-in solar PV electric generation facility would occupy approximately 3,587 acres on privately owned land (approximately 3,253 acres are within the County of Riverside and approximately 334 acres are within the City of Blythe). The portion of the gen-tie line outside the solar facility site, from the southernmost substation to the Colorado River Substation, would traverse 3.8 miles of BLM-managed lands and approximately 1 mile of private land. Figure B-27 illustrates the Blythe Mesa solar facility site, gen-tie line location, and jurisdictions within the project vicinity.

B.7.2.3 Impact Analysis Approach Summary

Based on the descriptions presented in Sections B.7.2.1 and B.7.2.2, the analysis of the known and confidential solar projects considered to be connected actions is presented in this EIR/EIS using the analysis parameters and data sources defined in Table B-24. Each discipline's analysis in Section D considers the potential impacts based on two different solar technologies, three general locations, and varying land ownership characteristics.

Table B-24. Analysis Assumptions for Connected Actions

Project Type and Location	MW	Acres (est.)	CEQA/NEPA Analysis Model; Land Ownership
Solar Power Tower in Desert Center Area	250	1,960	▪ CEC Palen FSA – BLM land
Solar PV in Desert Center Area	450	3,600	▪ Desert Harvest Solar Project Final EIS – Mix of BLM land and private land
Solar PV in Blythe Area	524	4,200	▪ Blythe Mesa Solar Project Draft EIR/EA – Primarily private land; BLM land for gen-ties
TOTAL	1,224 MW	9,760 acres	

B.8 References

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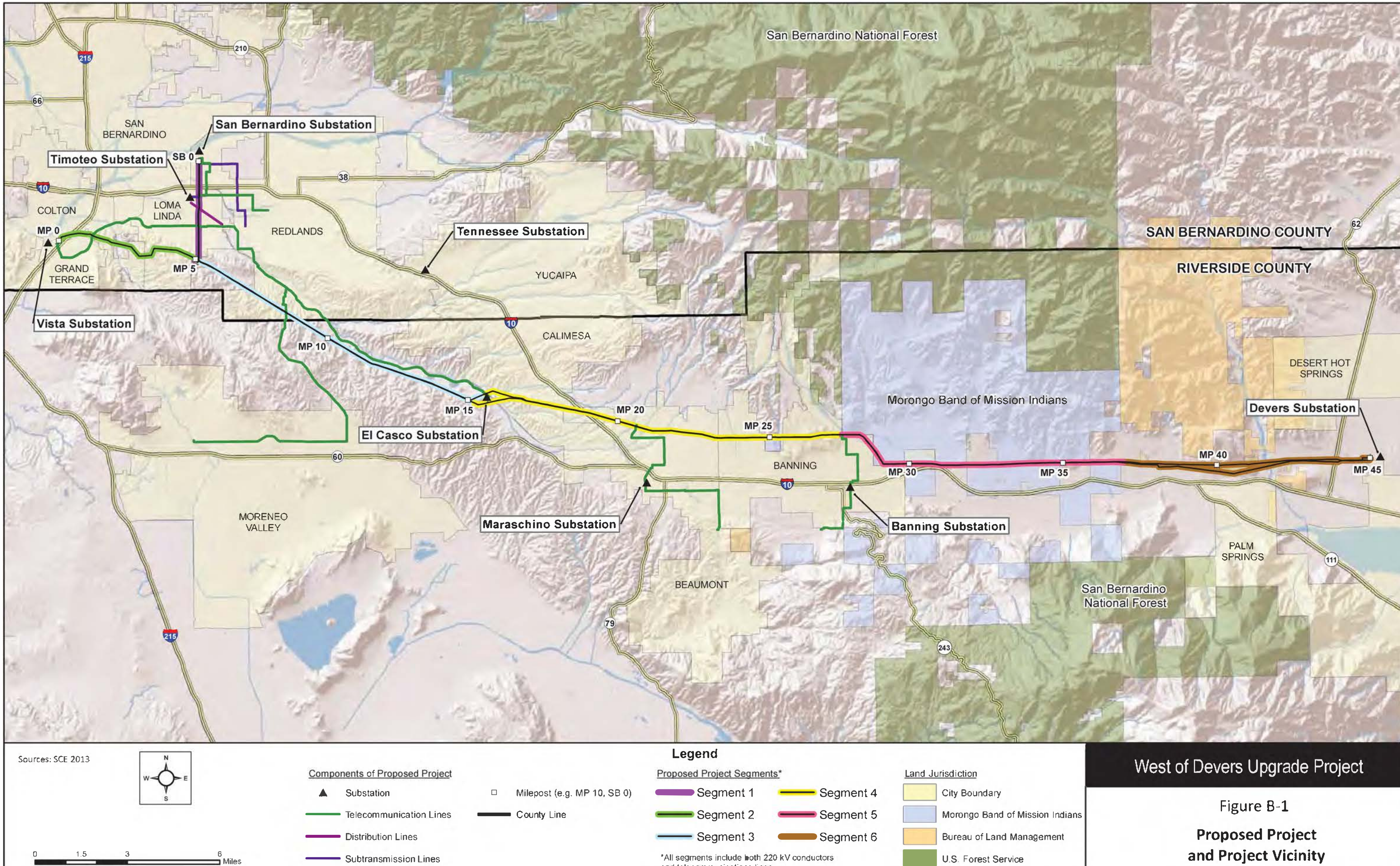

Figure B-1
Proposed Project and Project Vicinity

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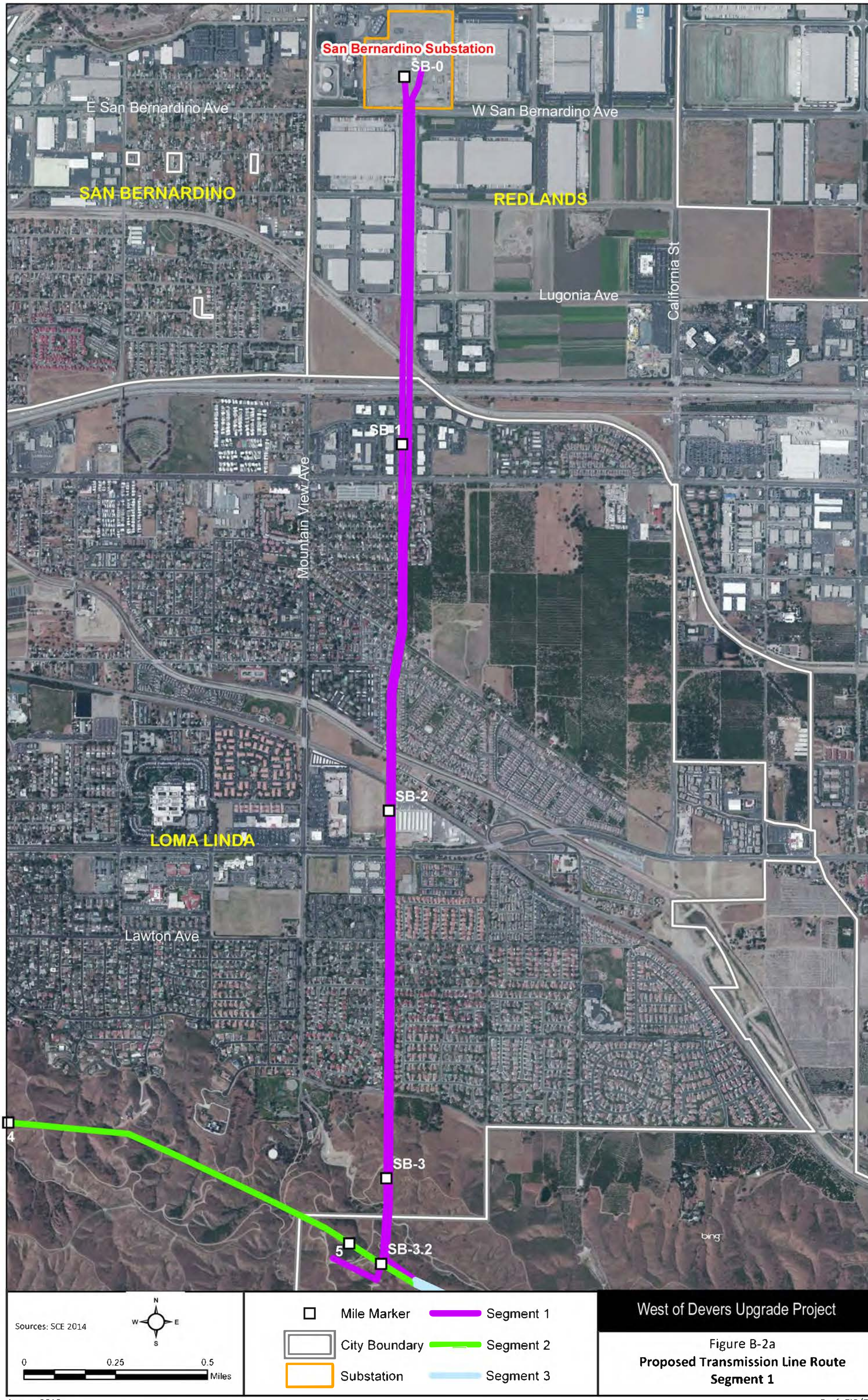

West of Devers Upgrade Project

Figure B-2a
Proposed Transmission Line Route
Segment 1

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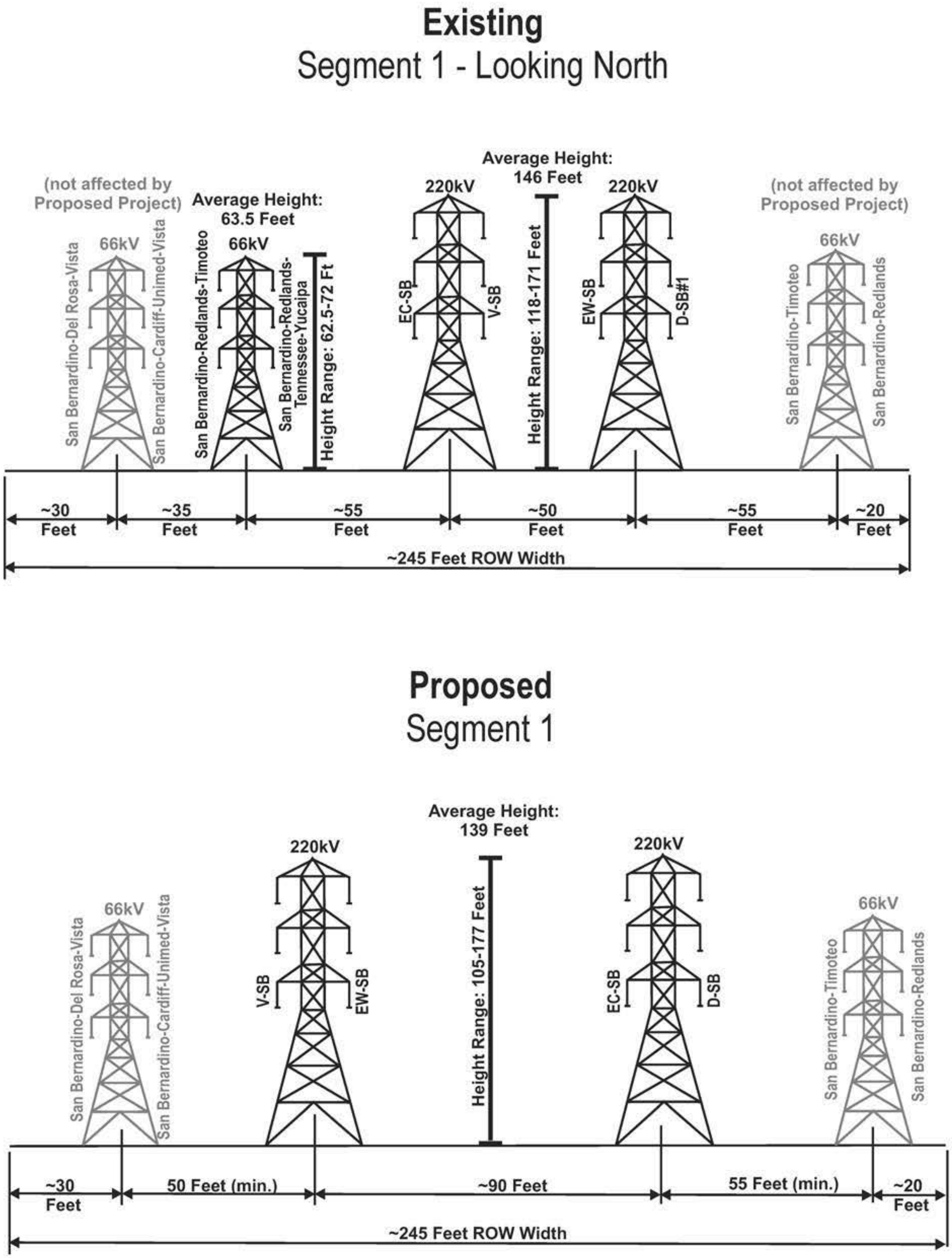

Source: SCE, 2014.

Not to Scale

West of Devers Upgrade Project

Figure B-2b
Existing and Proposed Corridor Profile - Segment 1

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West of Devers Upgrade Project

Figure B-3a
Proposed Transmission Line Route Segment 2

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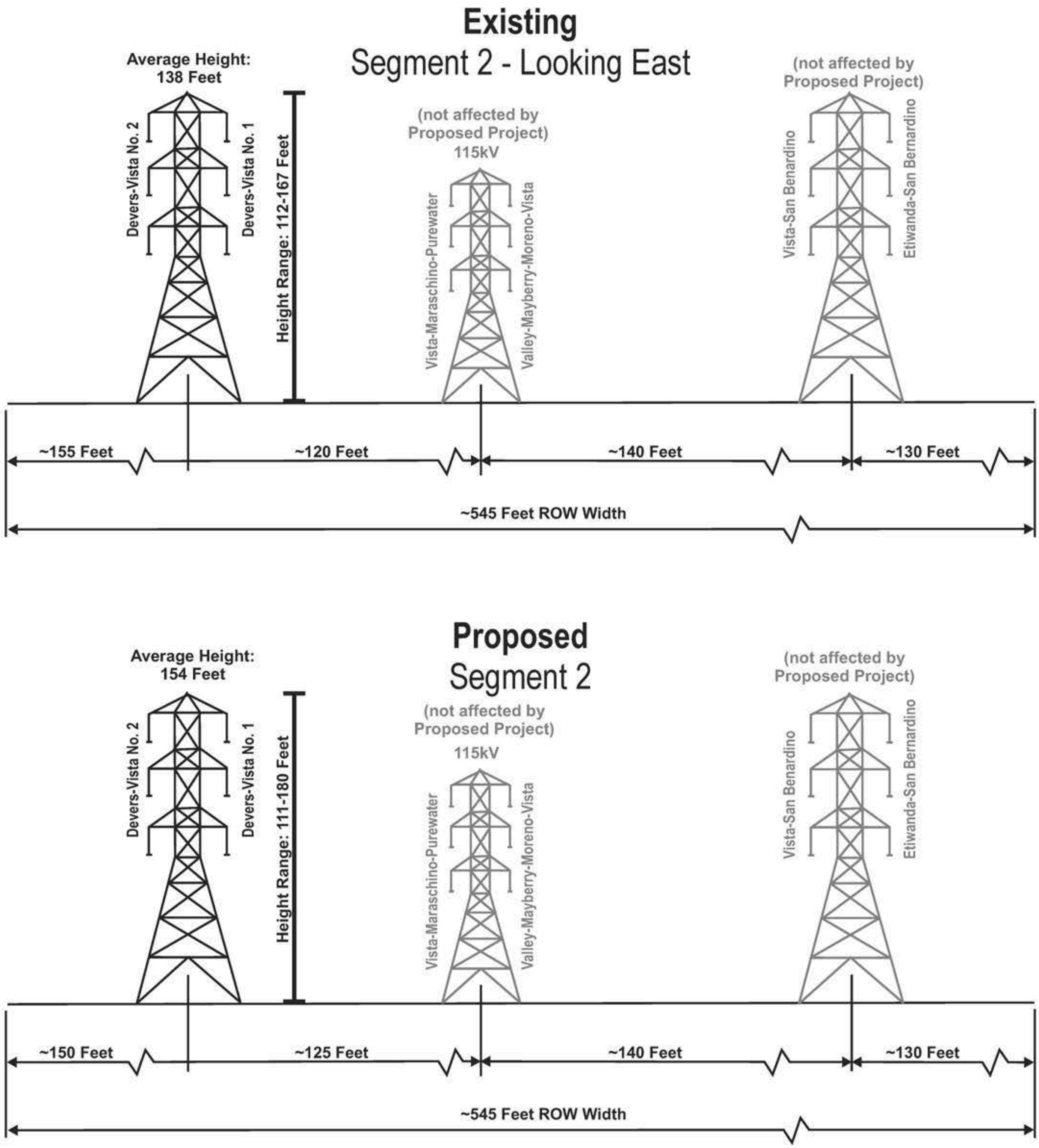

Source: SCE, 2014.

Not to Scale

West of Devers Upgrade Project

Figure B-3b
Existing and Proposed Corridor Profile - Segment 2

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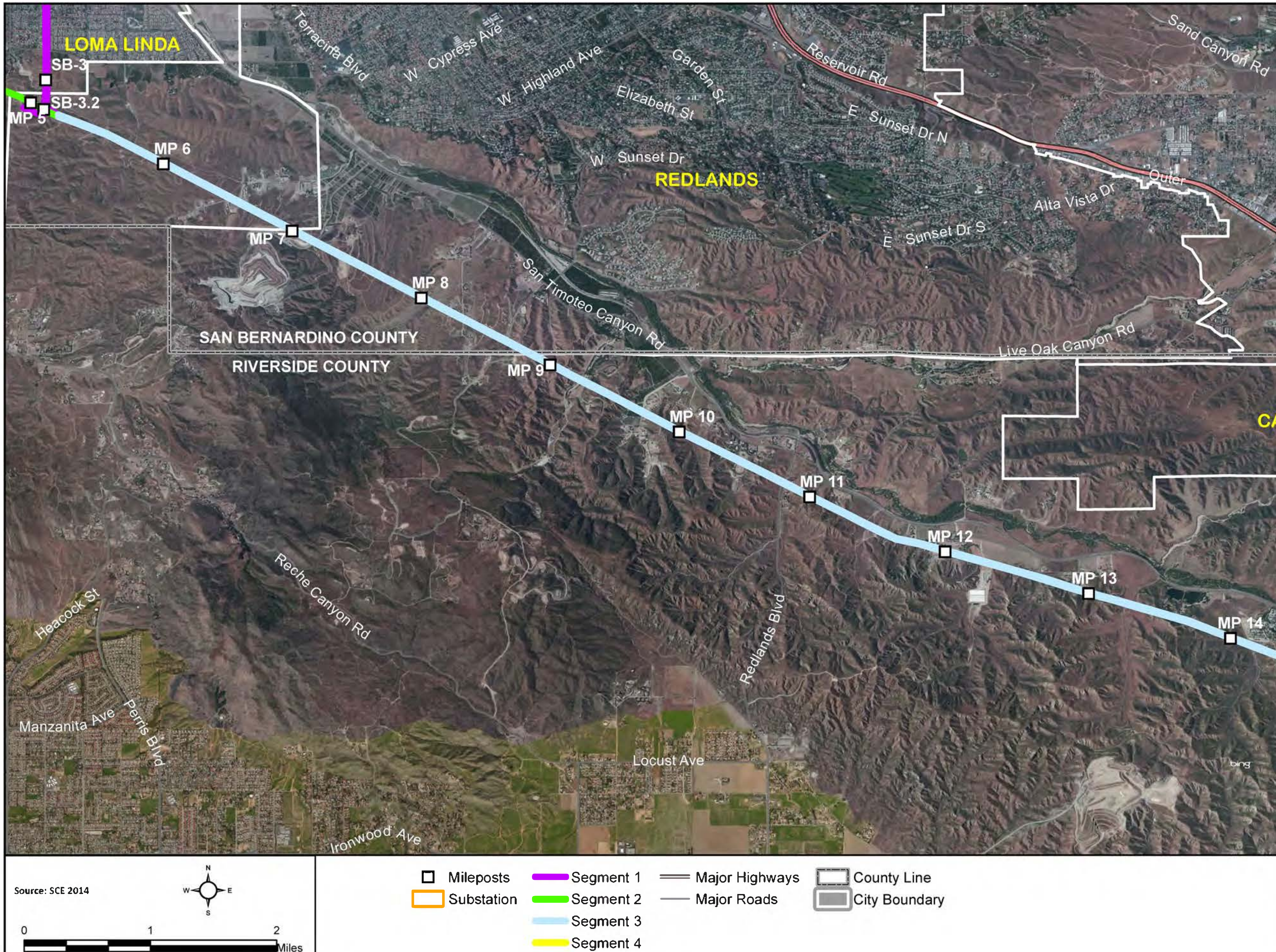

West of Devers Upgrade Project

Figure B-4a
Proposed Transmission Line Route Segment 3

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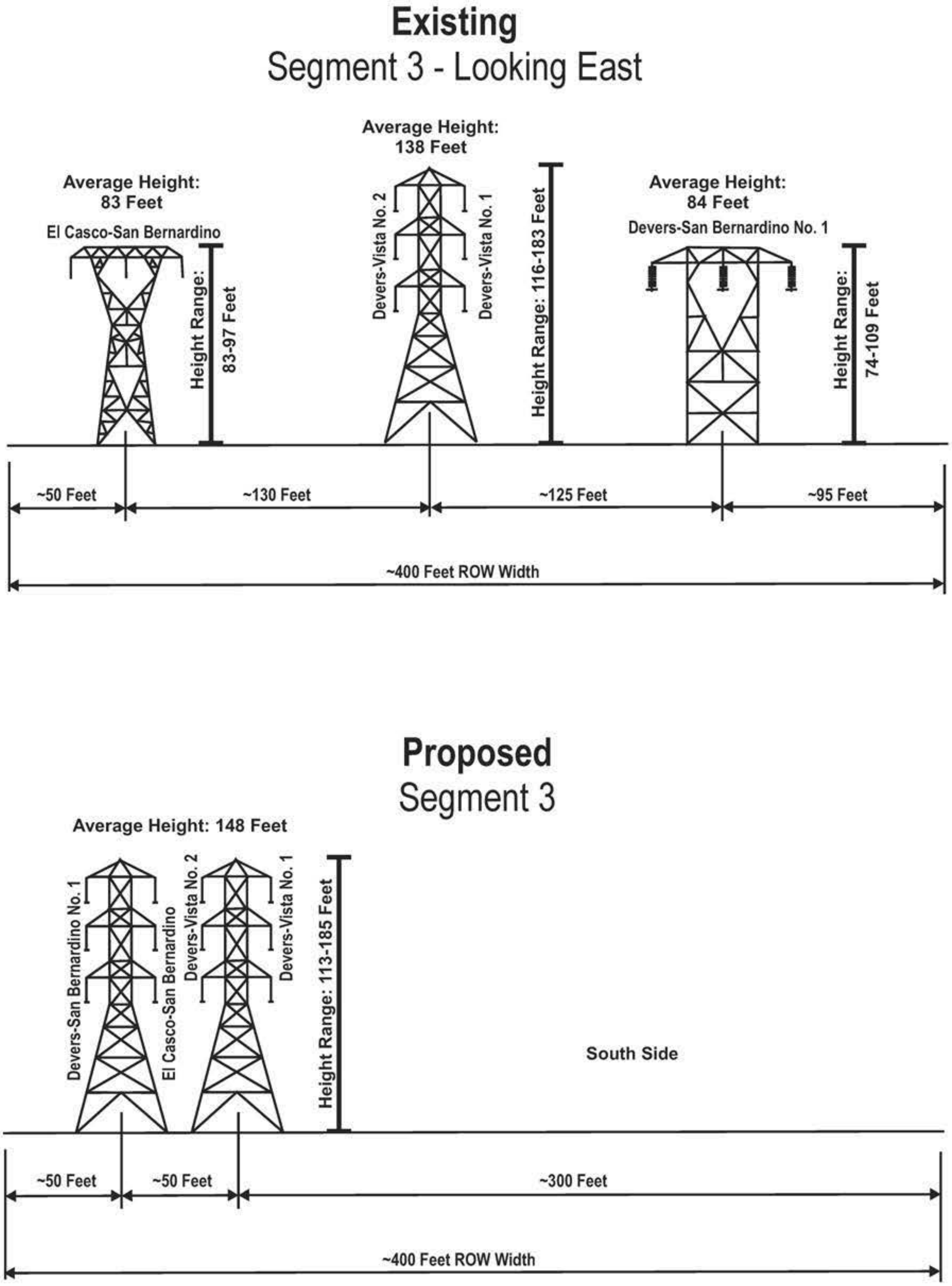

Source: SCE, 2014.

Not to Scale

West of Devers Upgrade Project

Figure B-4b
Existing and Proposed Corridor Profile - Segment 3

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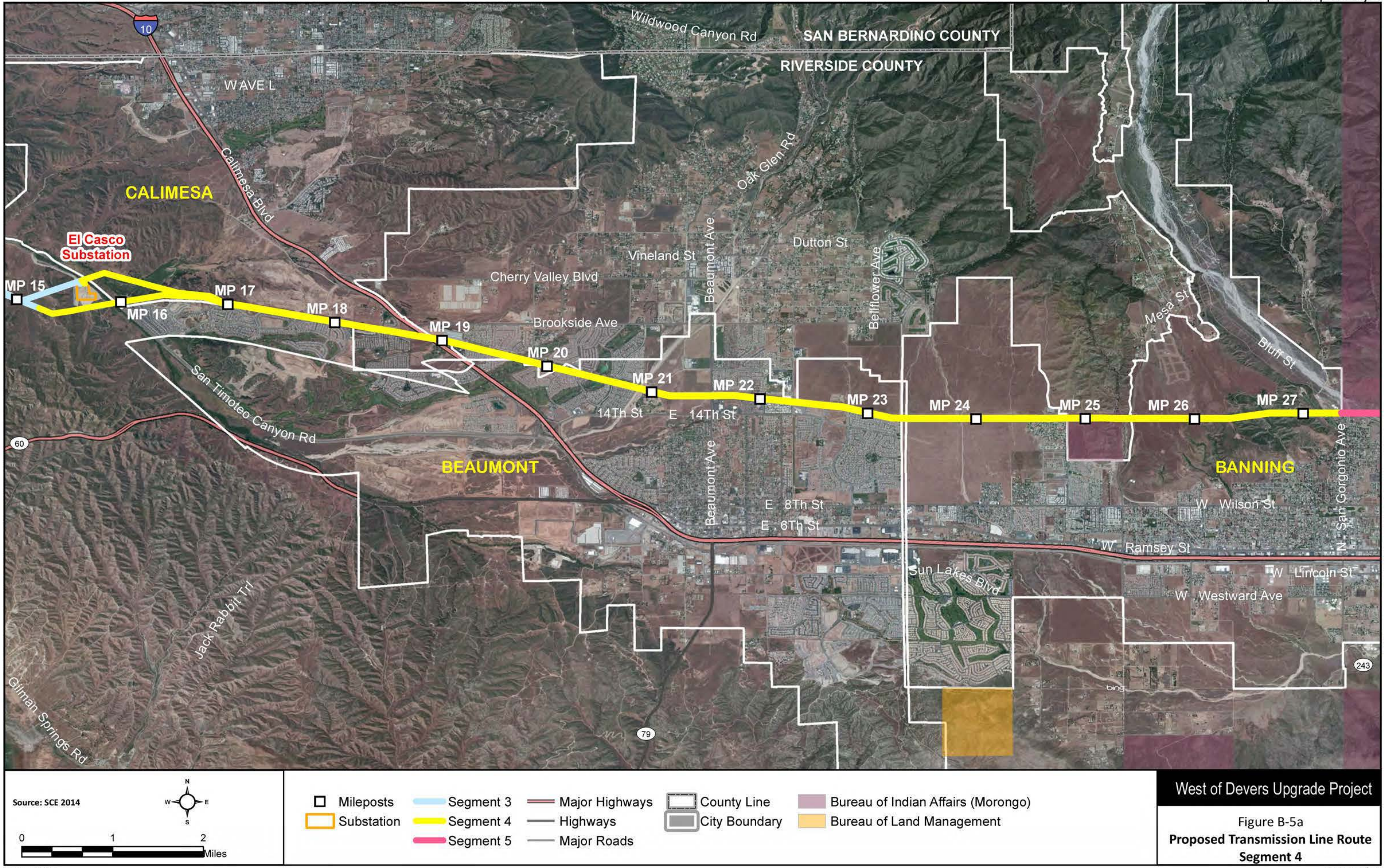

West of Devers Upgrade Project

Figure B-5a
Proposed Transmission Line Route Segment 4

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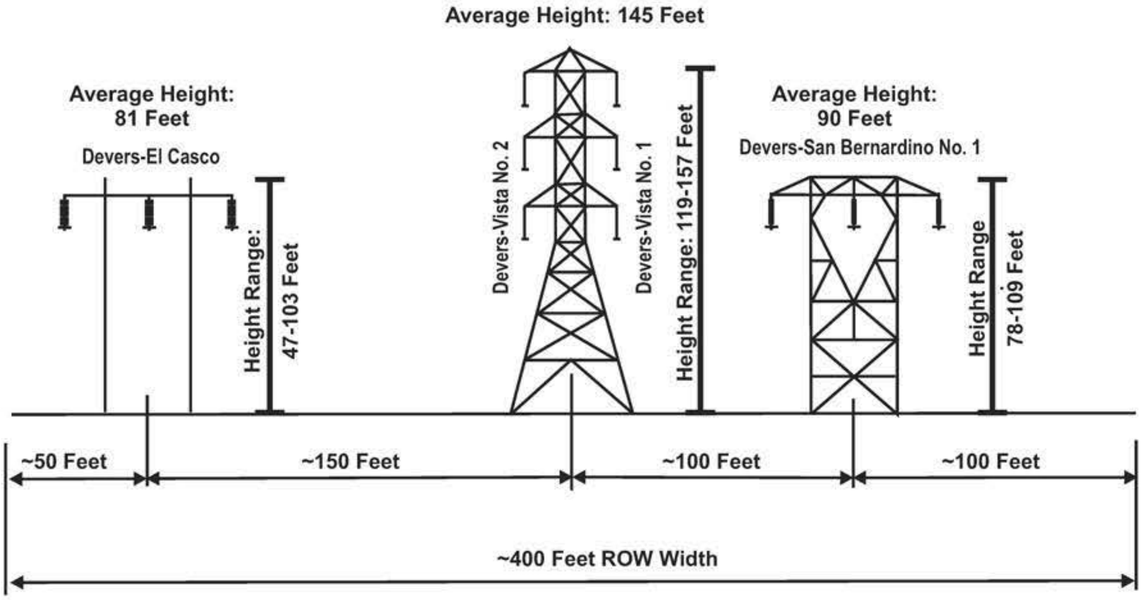
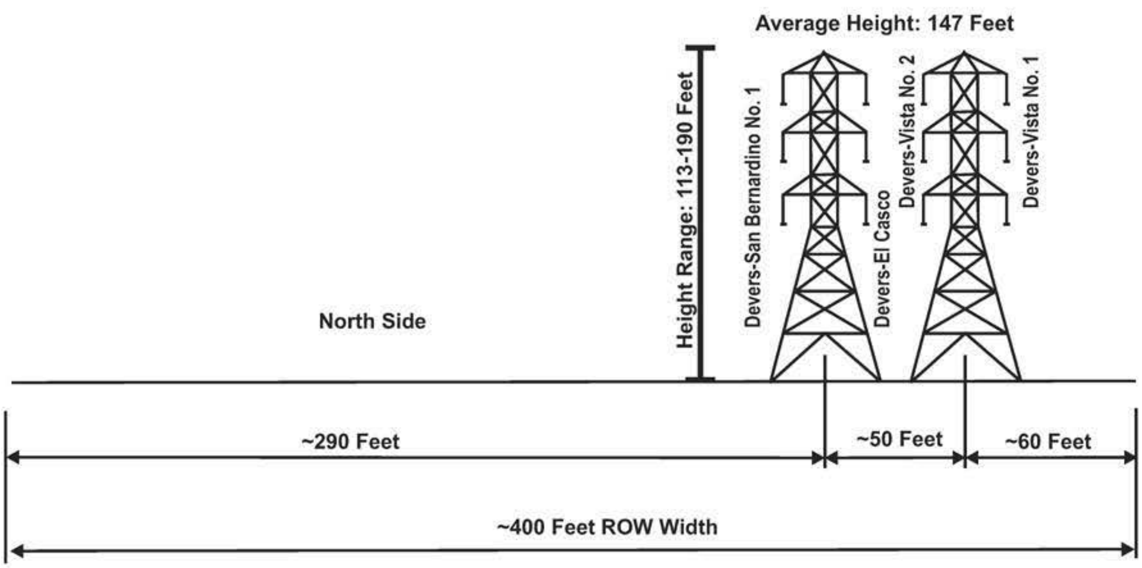
Existing
Segment 4 - Looking East



Proposed
Segment 4



Source: SCE, 2014.

Not to Scale

West of Devers Upgrade Project

Figure B-5b
Existing and Proposed Corridor Profile - Segment 4

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Source: SCE 2014

0 1 2 Miles

Mileposts
Segment 4
Segment 5
Segment 6
Major Highways
Major Roads
City Boundary
Bureau of Indian Affairs (Morongo)
Bureau of Land Management

West of Devers Upgrade Project

Figure B-6a
Proposed Transmission Line Route Segment 5

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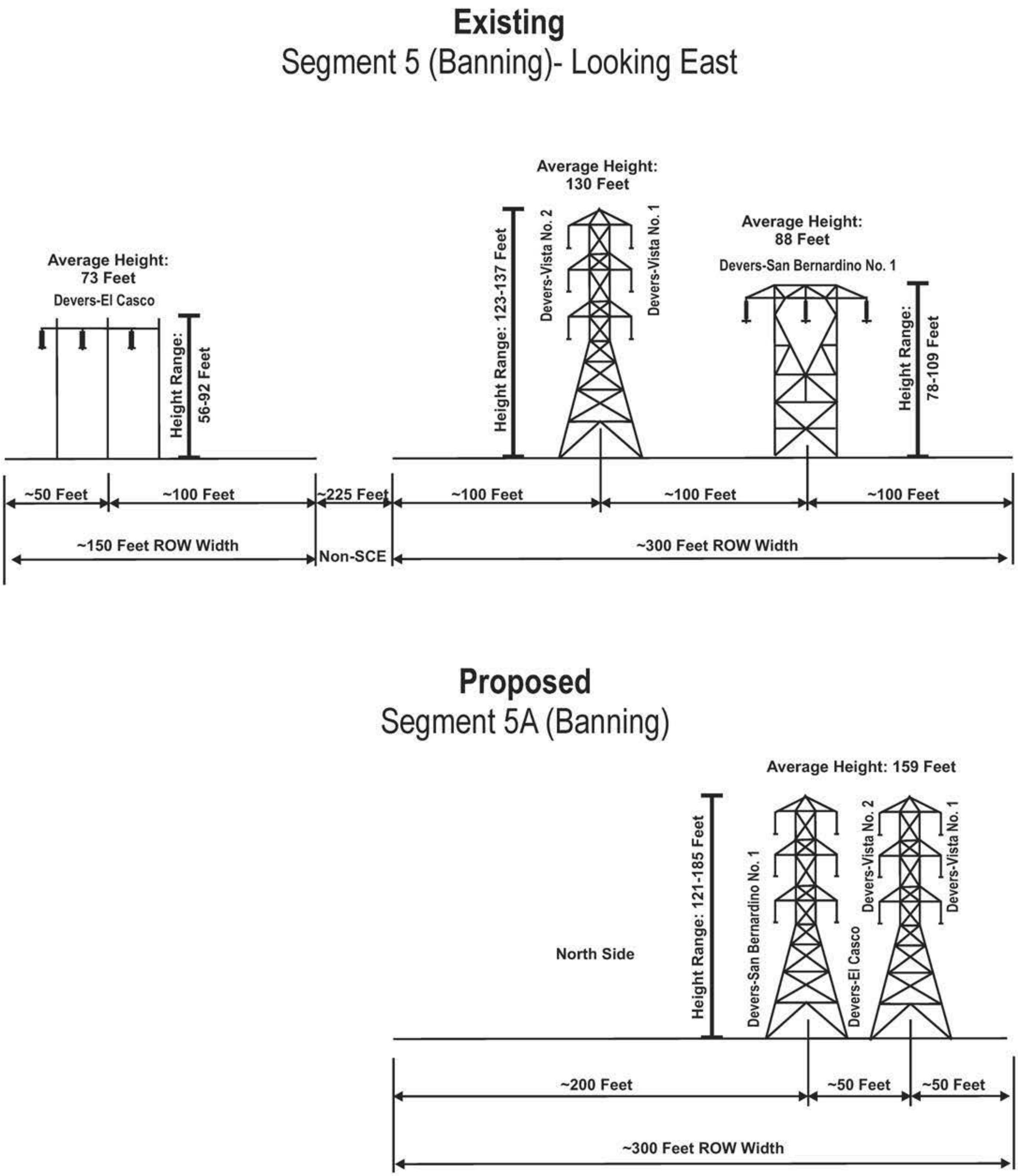


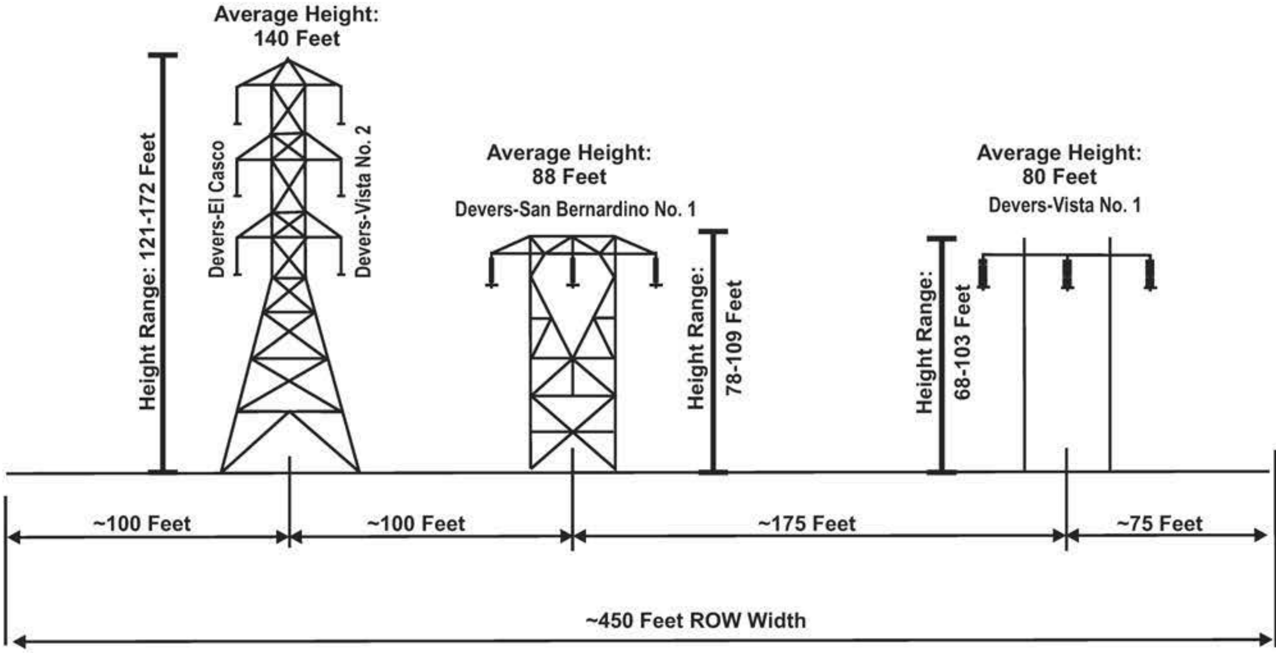
Source: SCE, 2014.

Not to Scale

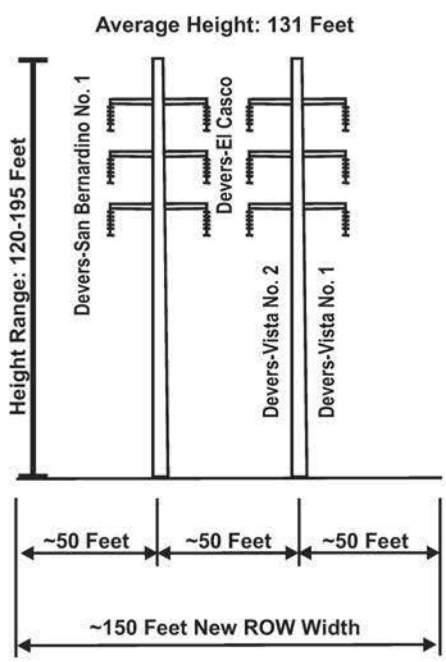
West of Devers Upgrade Project

Figure B-6b
Existing and Proposed Corridor Profile - Segment 5

Existing
Segment 5 (Morongo) - Looking East



Proposed
Segment 5B (Morongo)

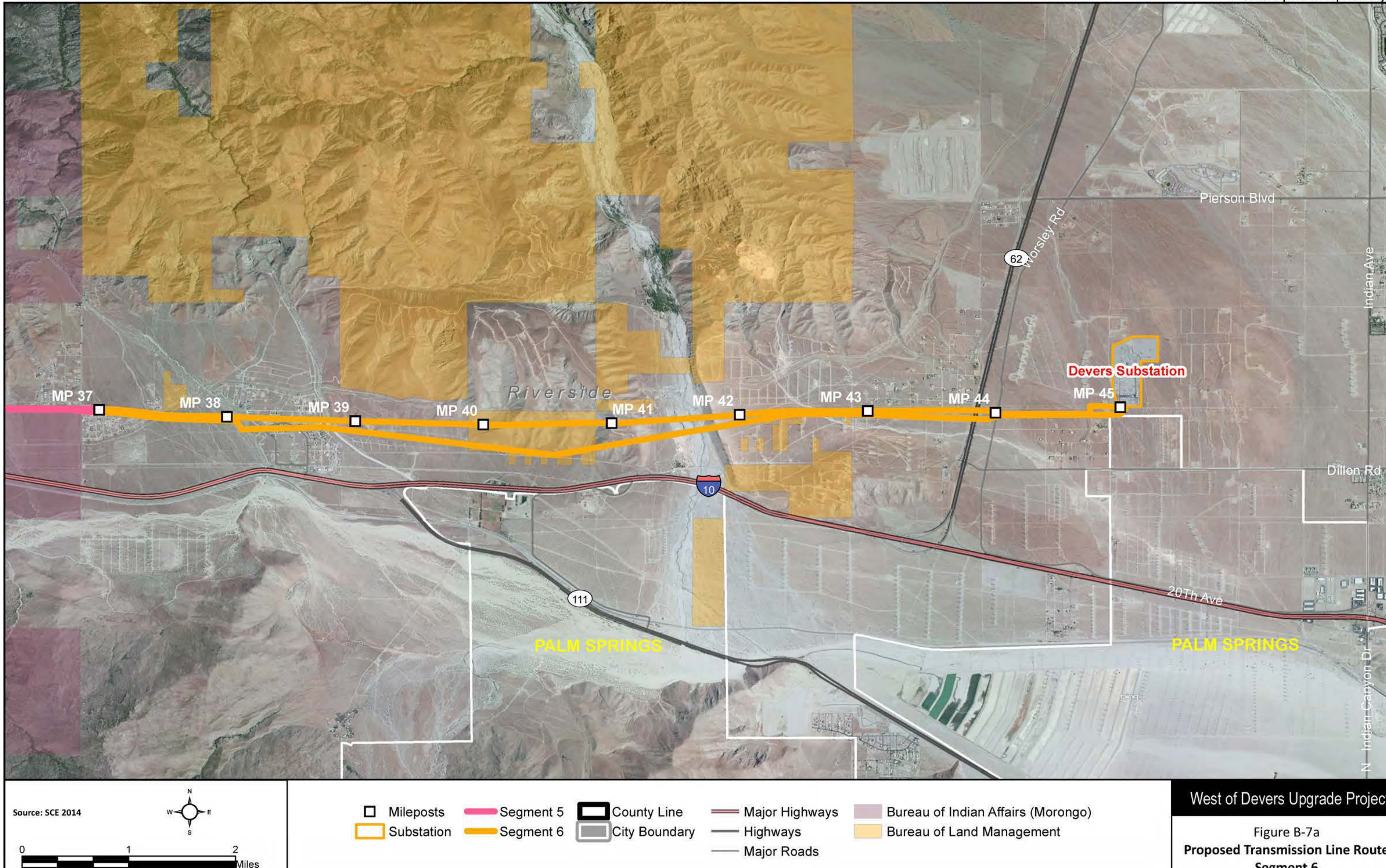


Source: SCE, 2014.

Not to Scale

West of Devers Upgrade Project

Figure B-6c
Existing and Proposed Corridor Profile - Segment 5



West of Devers Upgrade Project

Figure B-7a
Proposed Transmission Line Route Segment 6

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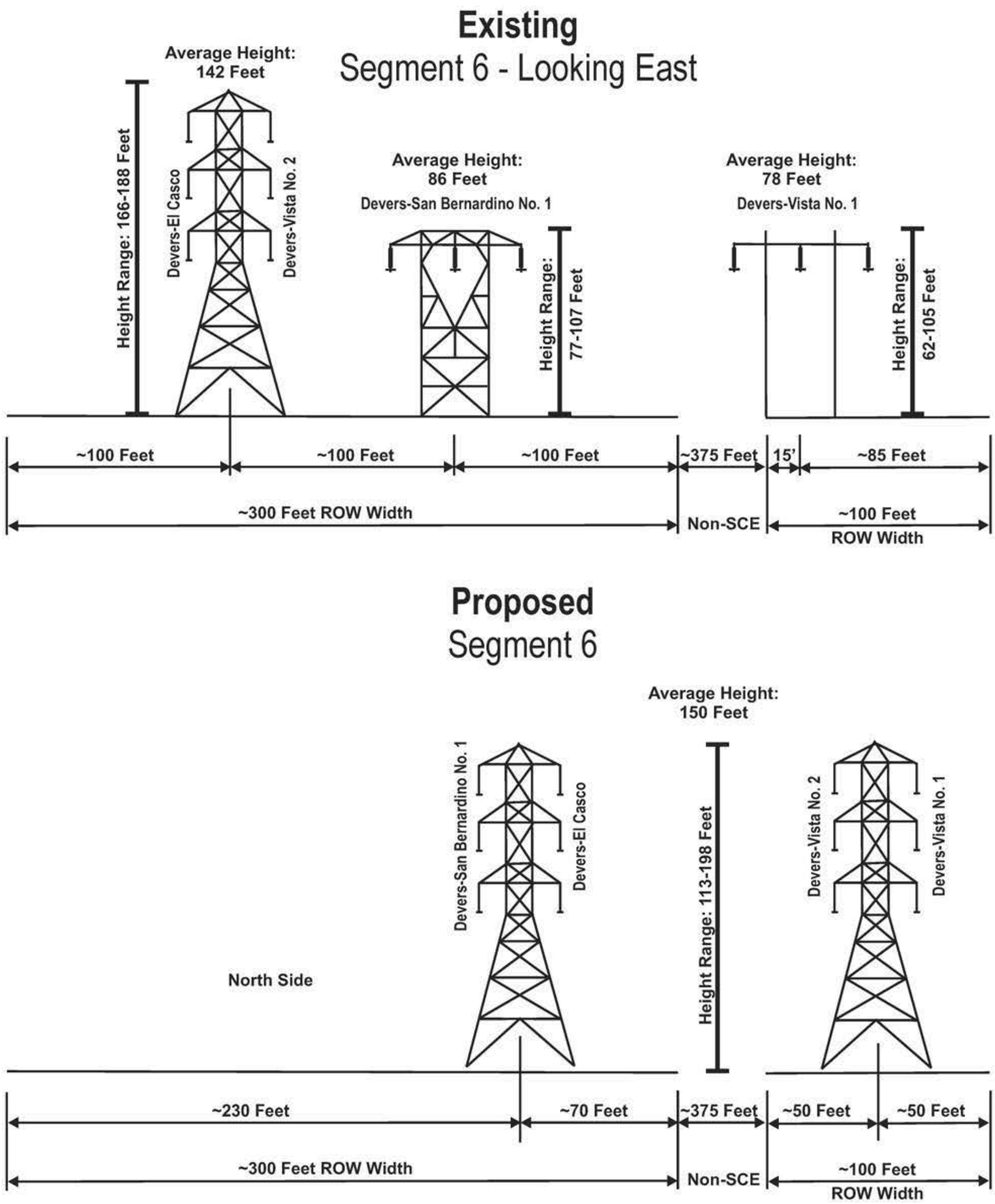
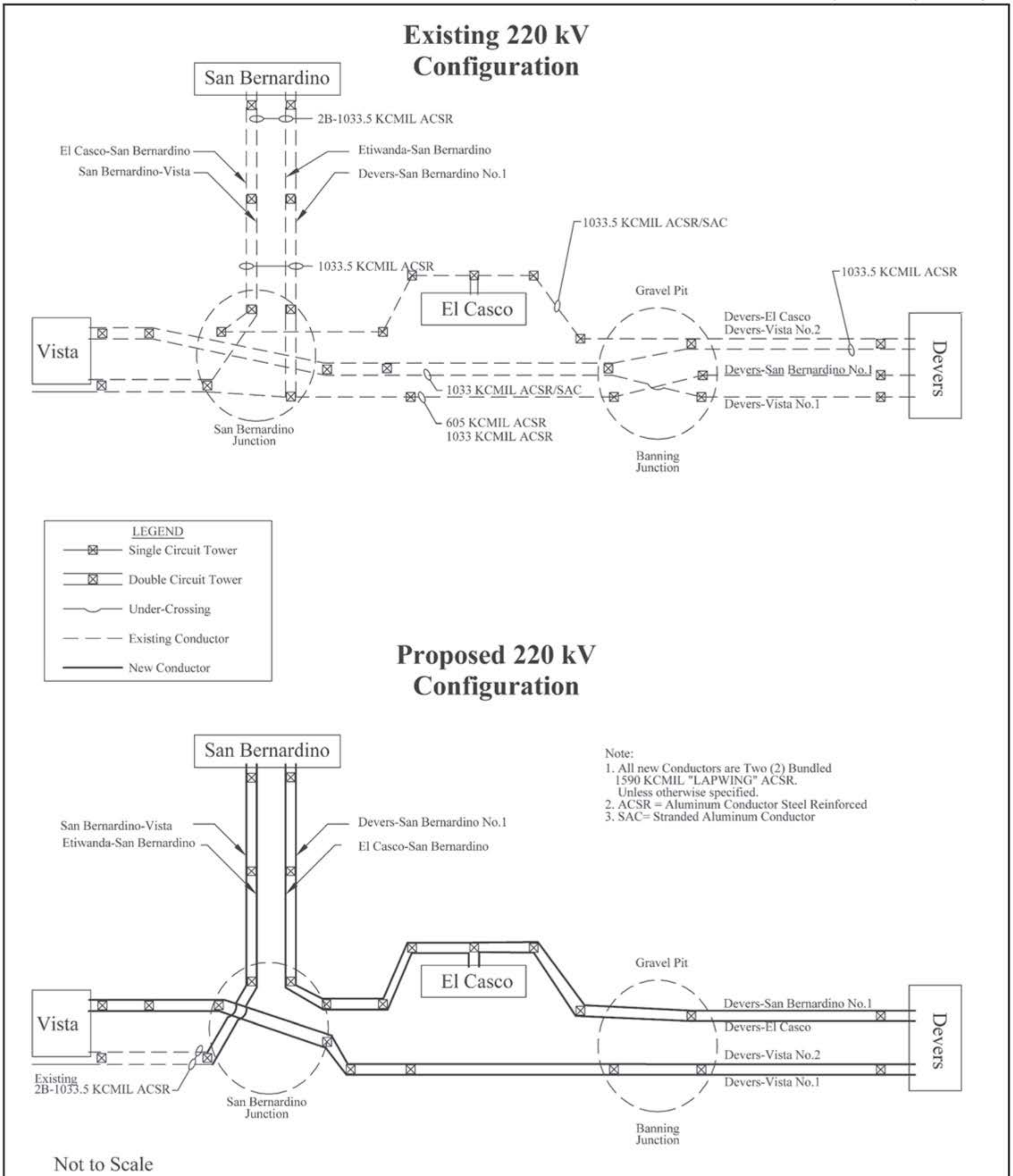


Source: SCE, 2014.

Not to Scale

West of Devers Upgrade Project

Figure B-7b
Existing and Proposed Corridor Profile - Segment 6



Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-8

Existing and Proposed 220 kV Configuration

Photo 1. Segment 1 looking south from San Bernardino Substation

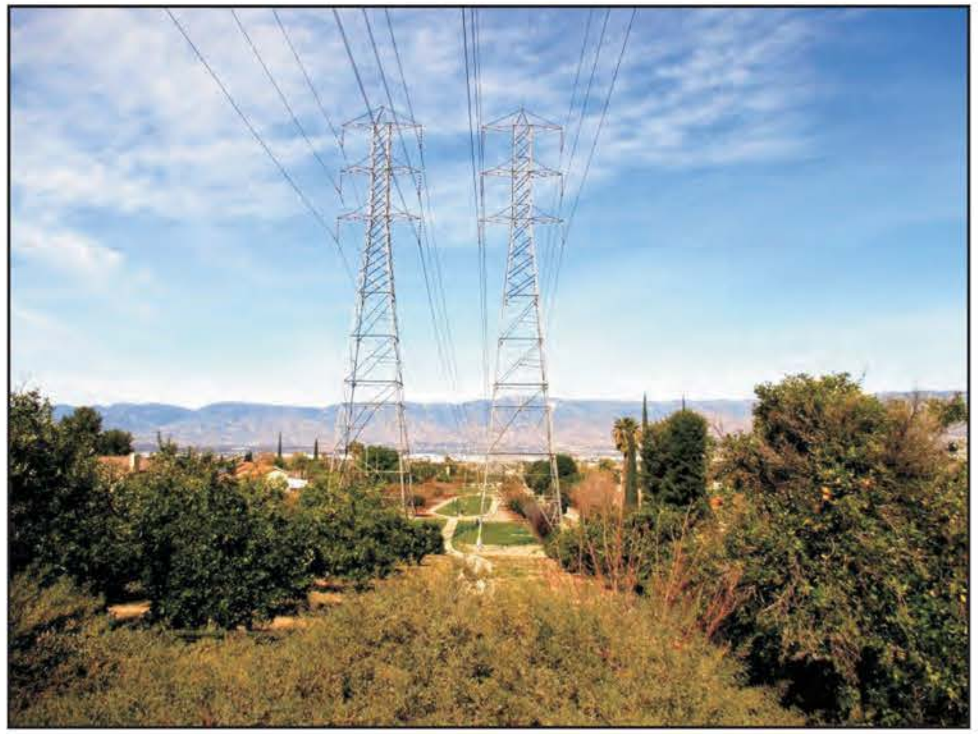


Photo 2. Segment 1 looking north from Beaumont Avenue

Photo 3. Segment 1 in Loma Linda

Photo 4. Segment 2 in Colton by Vista Grande Way

Photo 5. Segment 2 in Loma Linda by Prado Lane

Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-9a

Photos of Existing West of Devers Corridor Segments 1 and 2

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Photo 6. Segment 3 in San Timoteo Canyon

Photo 7. Segment 3 west of El Casco Substation from San Timoteo Canyon Road

Photo 8. Segment 4 in Beaumont

Photo 9. Segment 4 in Banning

Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-9b

Photos of Existing West of Devers Corridor Segments 3 and 4

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Photo 10. Segment 5 on Morongo Reservation

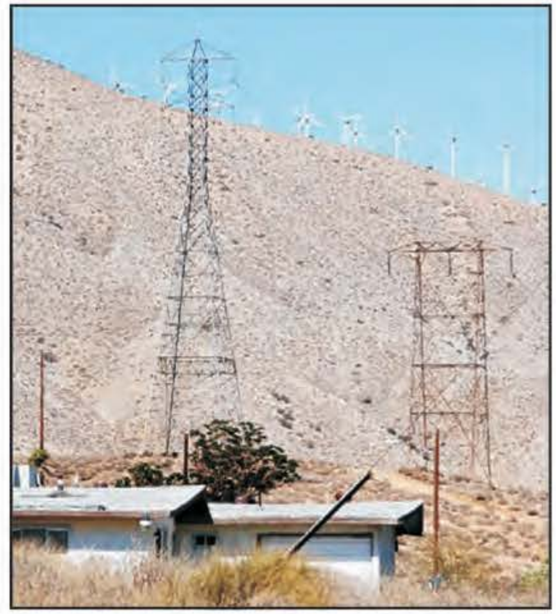

Photo 11. Segment 6 by Haugen-

Photo 12. Segment 6 crossing Whitewater River (desert wash)

Photo 13. Segment 6 by Devers Substation

Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-9c

Photos of Existing West of Devers Corridor Segments 5 and 6

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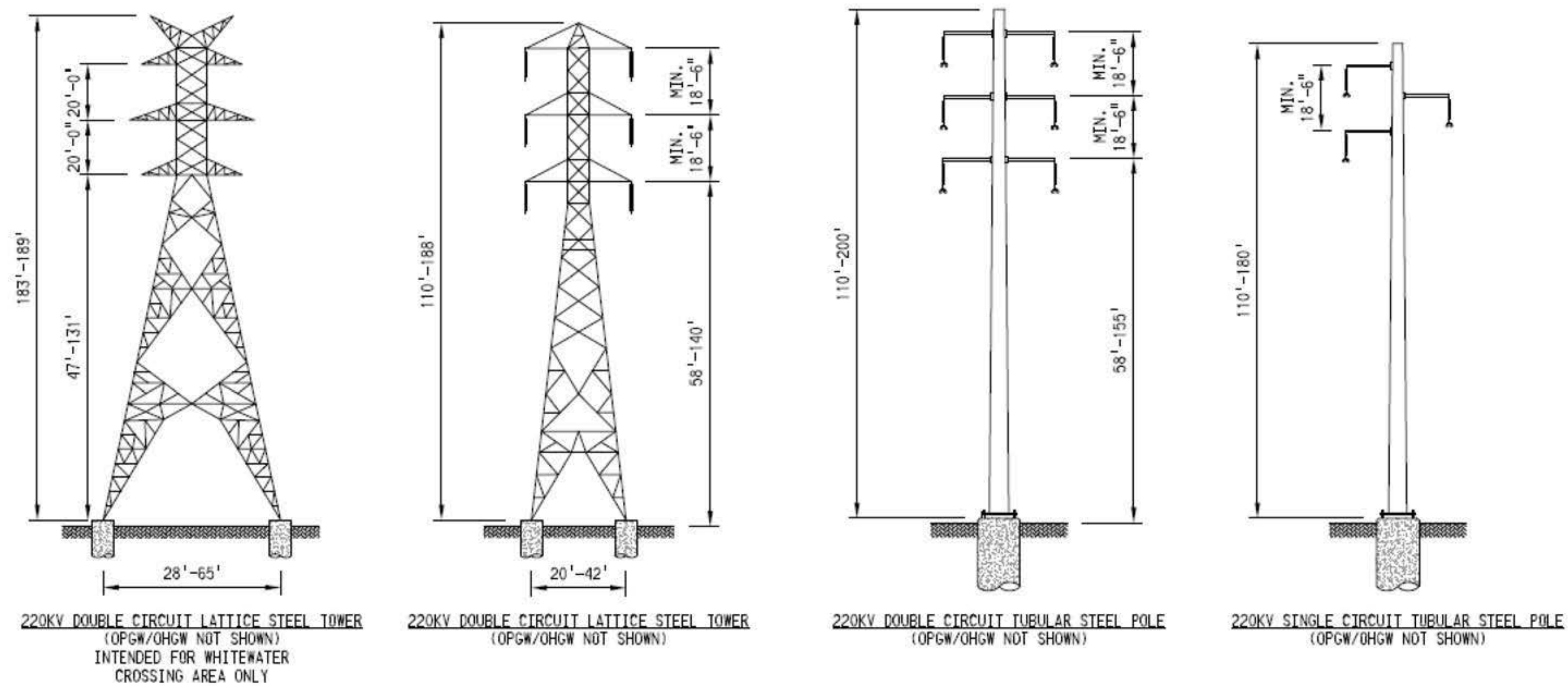

Source: SCE, 2015

West of Devers Upgrade Project

Figure B-10

Typical 220 kV Transmission Structures

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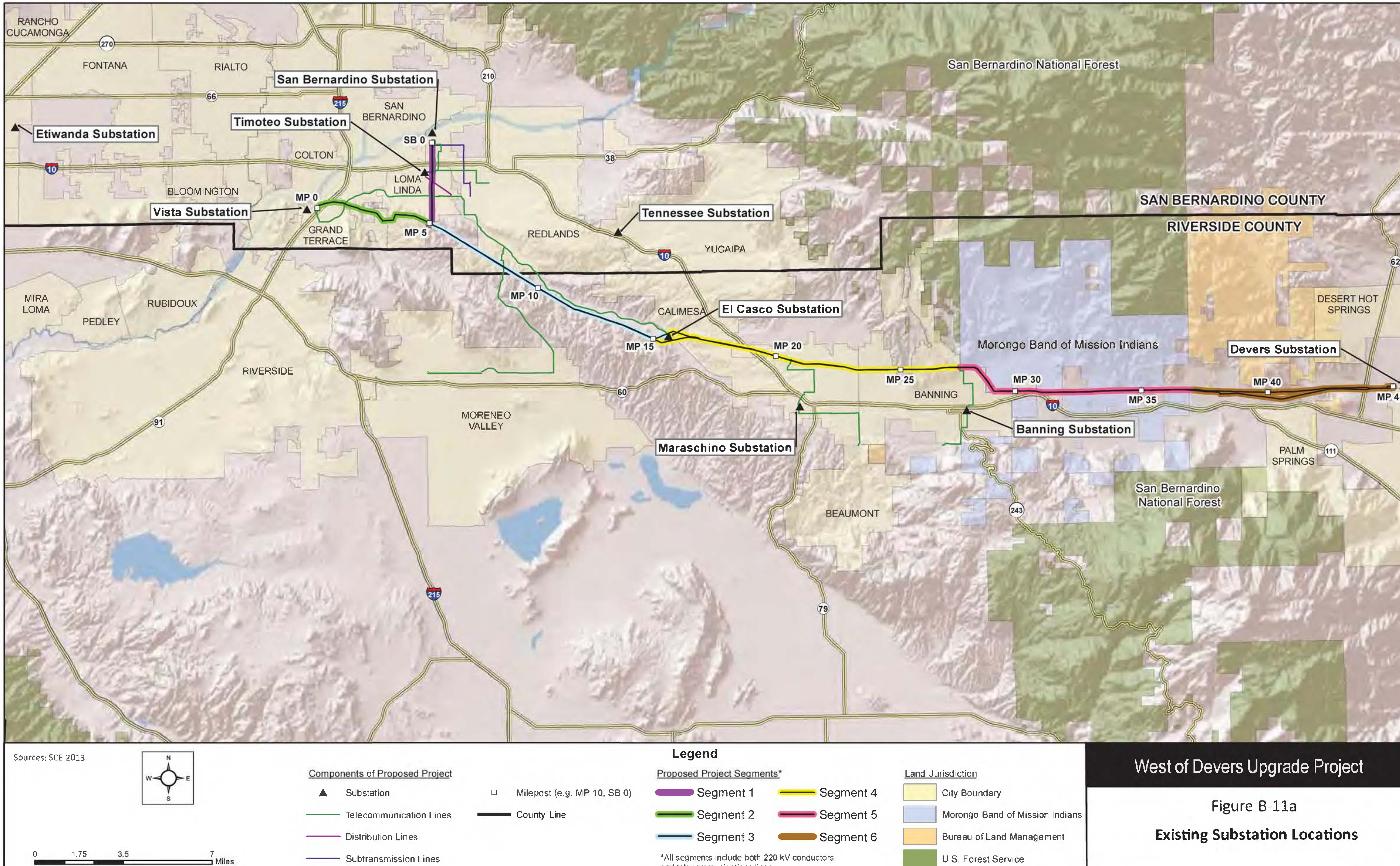

West of Devers Upgrade Project

Figure B-11a

Existing Substation Locations

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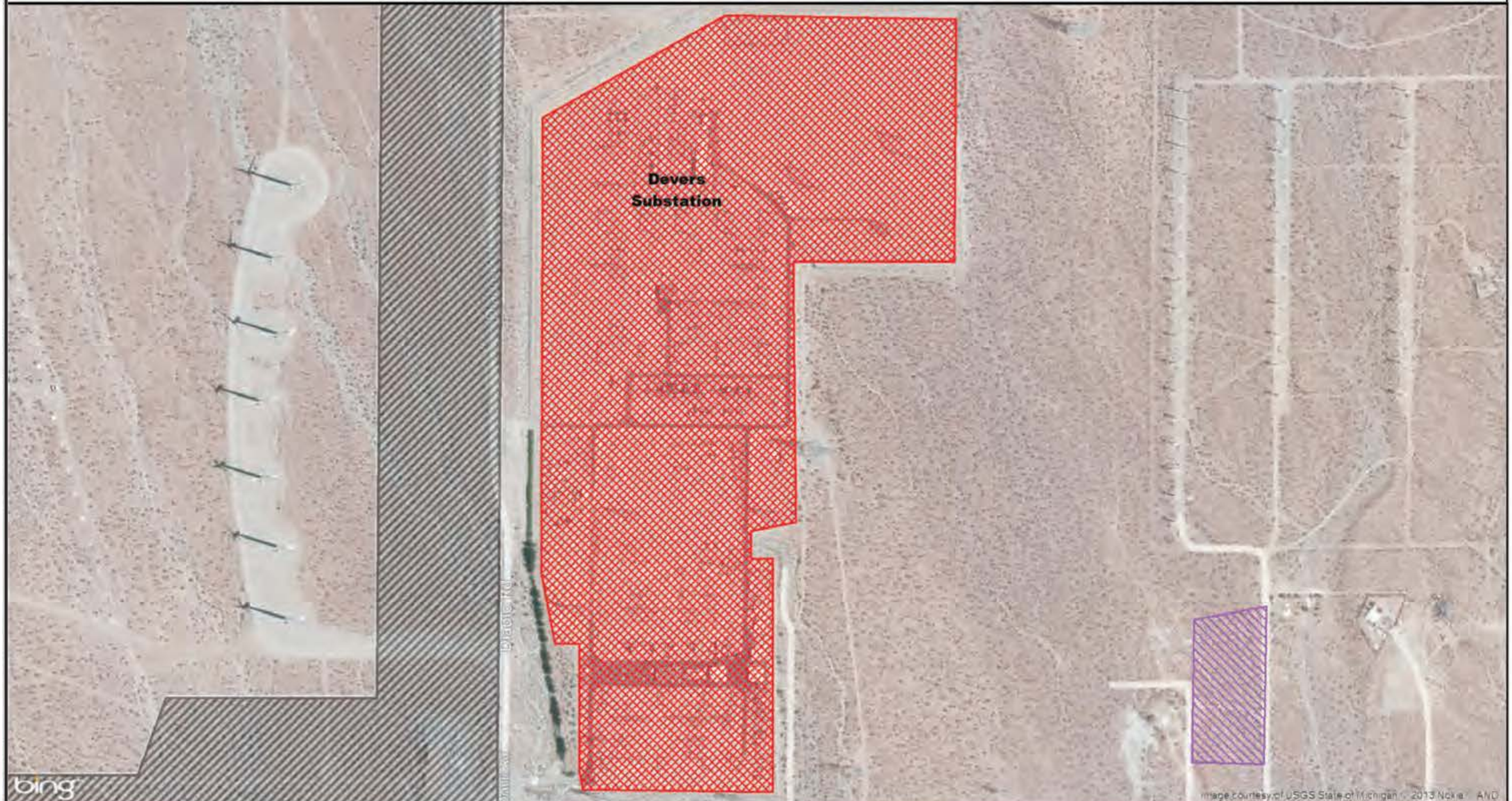

Source: SCE, 2013.

Area Within Substation Fence Line

Transmission Line Right-of-Way

US Bureau of Land Management

West of Devers Upgrade Project

Figure B-11b

Existing Devers Substation Boundary

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Source: SCE, 2013.

Area Within Substation Fence Line

Transmission Line Right-of-Way

West of Devers Upgrade Project

Figure B-11c

Existing El Casco Substation Boundary

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Source: SCE, 2013.

Area Within Substation Fence Line

Transmission Line Right-of-Way

West of Devers Upgrade Project

Figure B-11d

Existing Vista Substation Boundary

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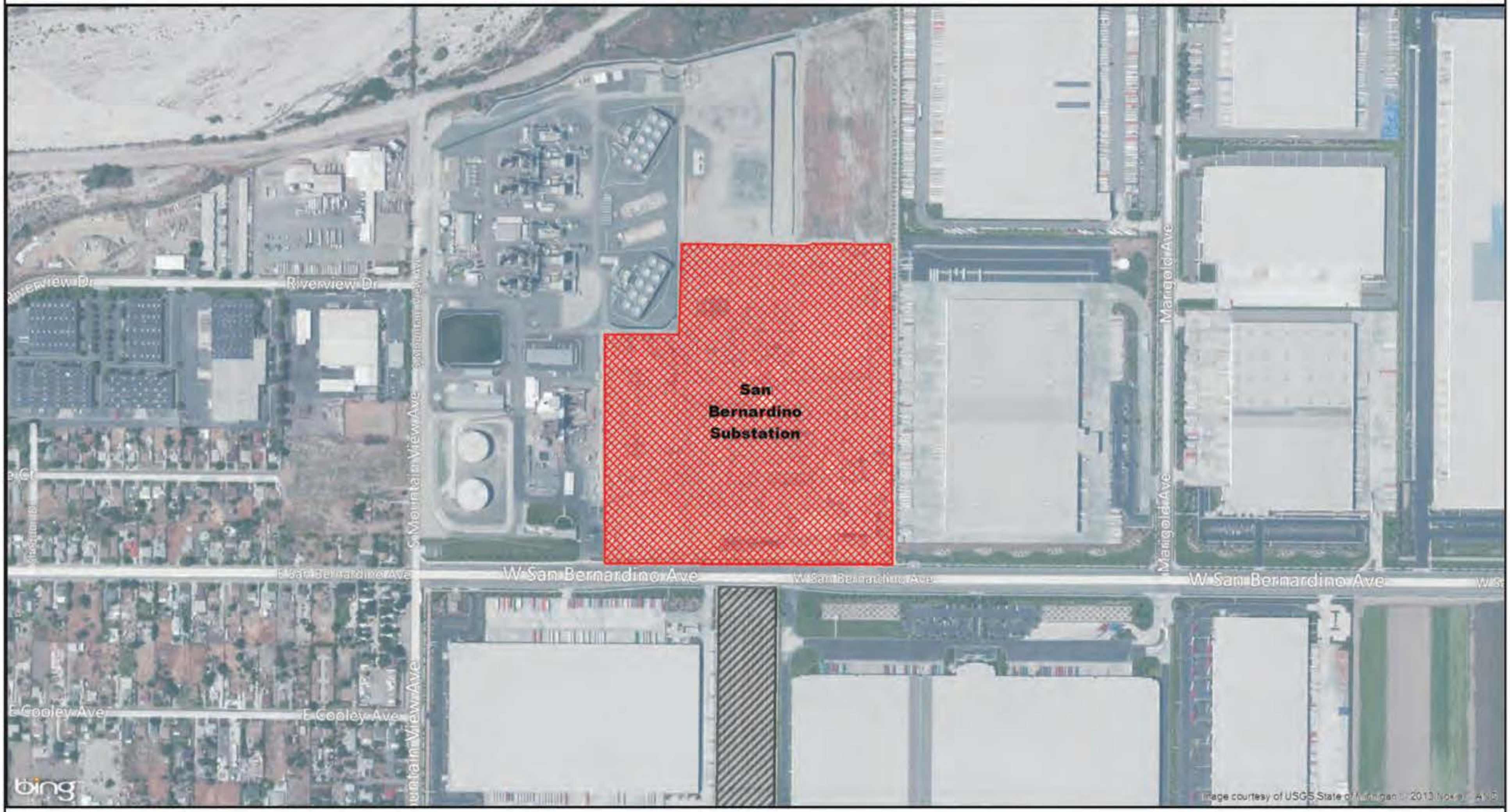

Source: SCE, 2013.

Area Within Substation Fence Line

Transmission Line Right-of-Way

West of Devers Upgrade Project

Figure B-11e
Existing San Bernardino Substation Boundary

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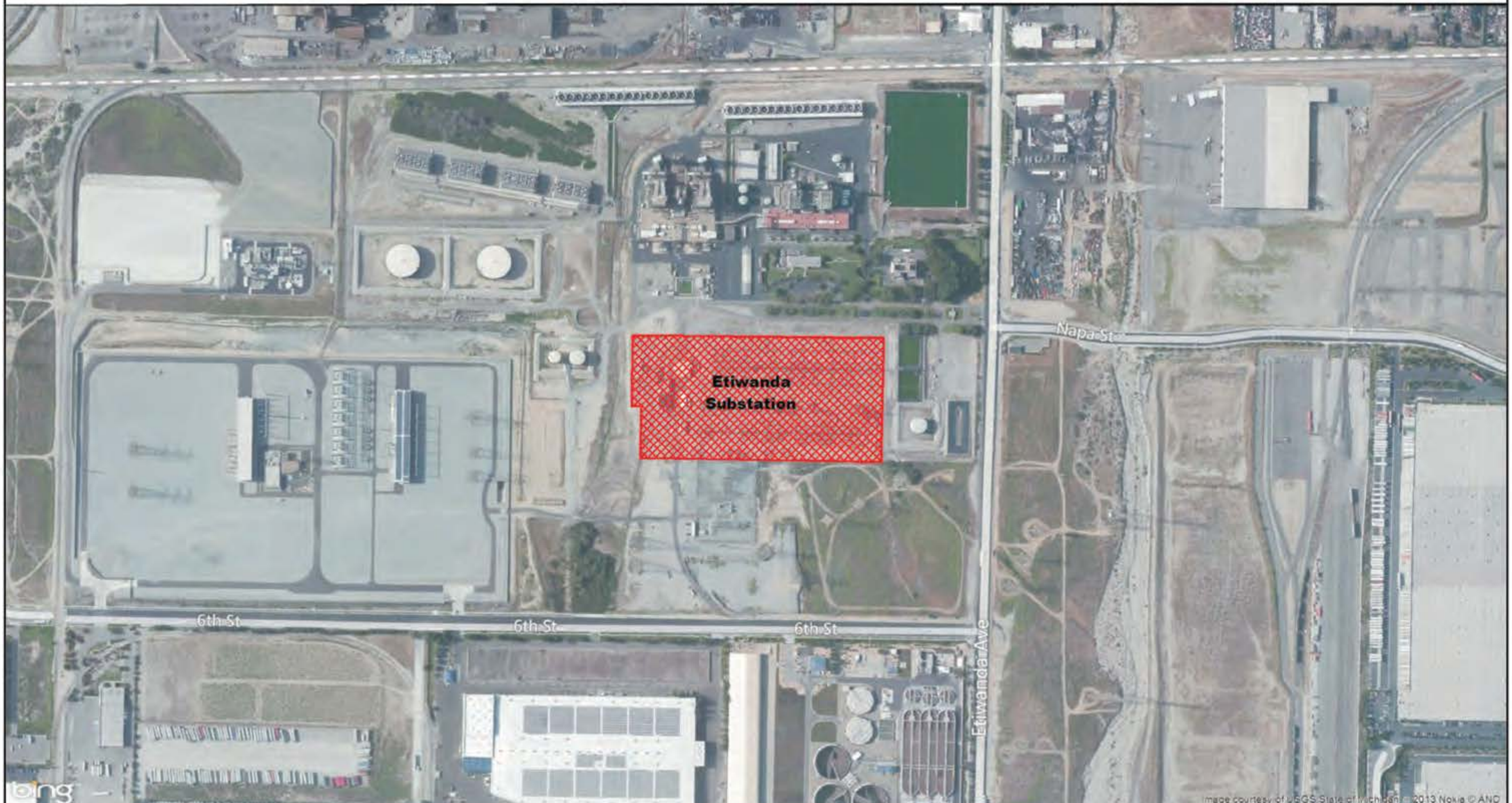

Source: SCE, 2013.

Area Within Substation Fence Line

Transmission Line Right-of-Way

West of Devers Upgrade Project

Figure B-11f

Existing Etiwanda Substation Boundary

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Source: SCE, 2013.

Area Within Substation Fence Line

Transmission Line Right-of-Way

West of Devers Upgrade Project

Figure B-11g
Existing Timoteo Substation Boundary

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Source: SCE, 2013.

Area Within Substation Fence Line

Transmission Line Right-of-Way

West of Devers Upgrade Project

Figure B-11h
Existing Tennessee Substation Boundary

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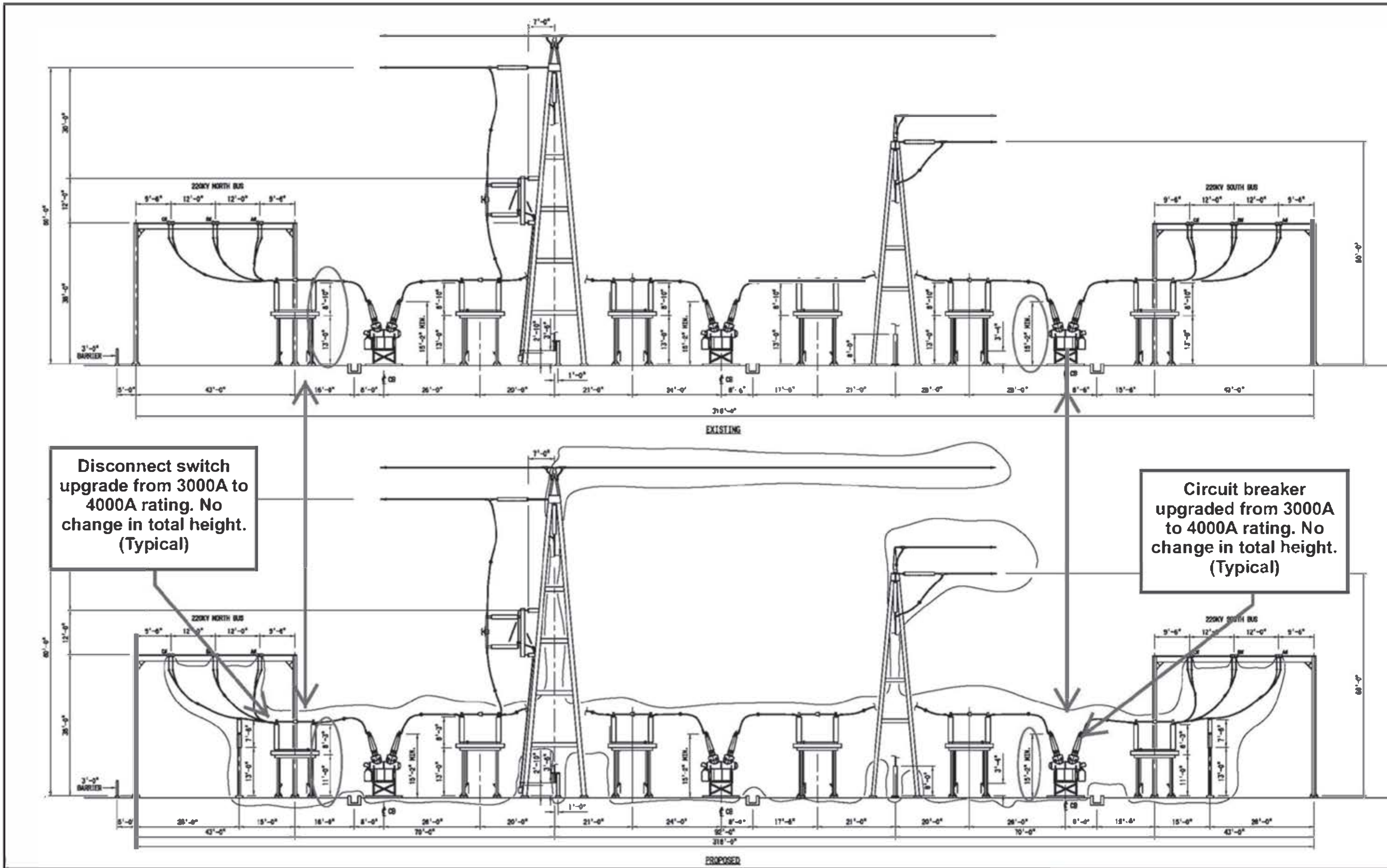

Source: SCE, 2014a.

West of Devers Upgrade Project

Figure B-12

220 kV Substation Profile

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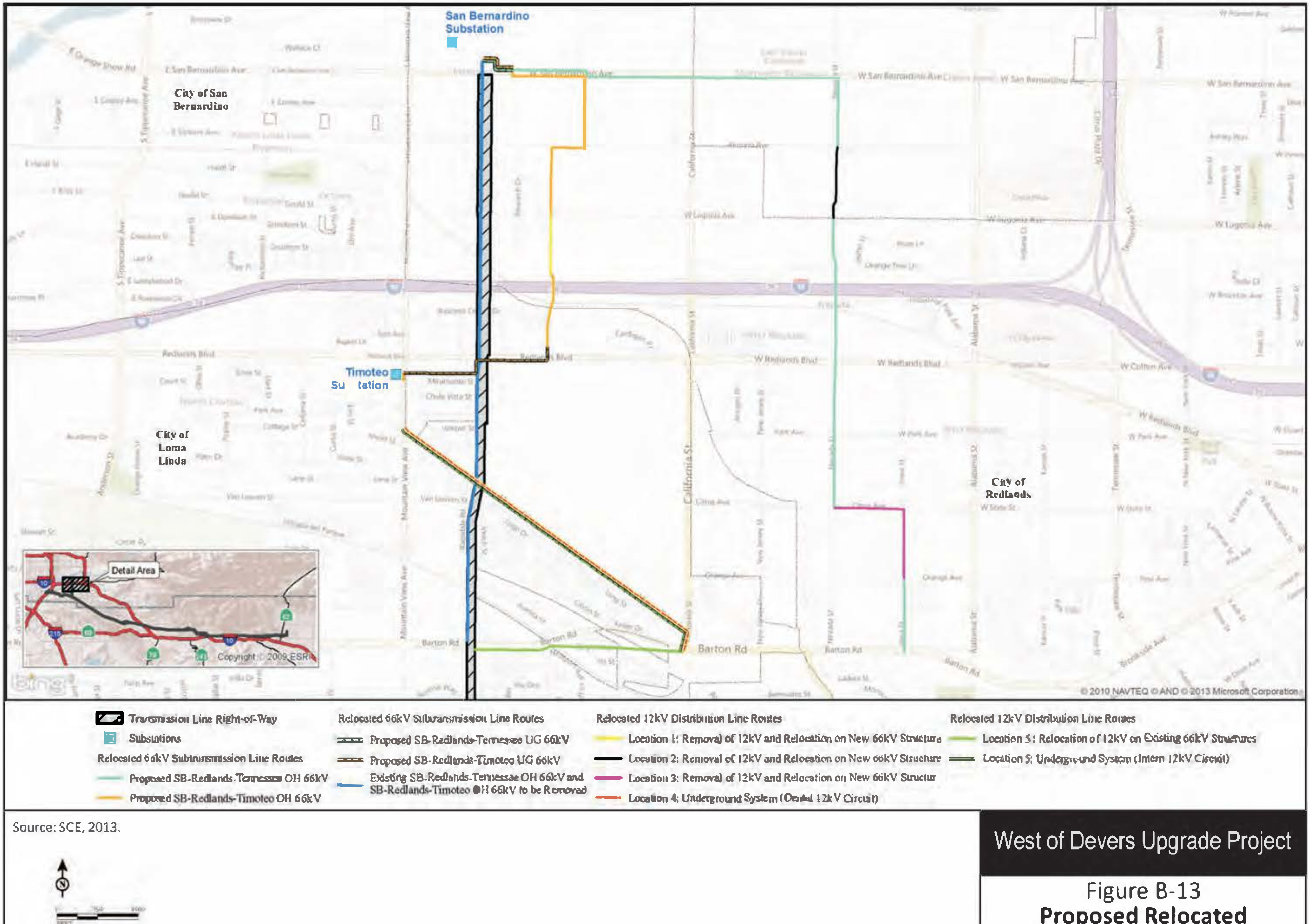

Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-13
Proposed Relocated Subtransmission and Distribution Line Routes

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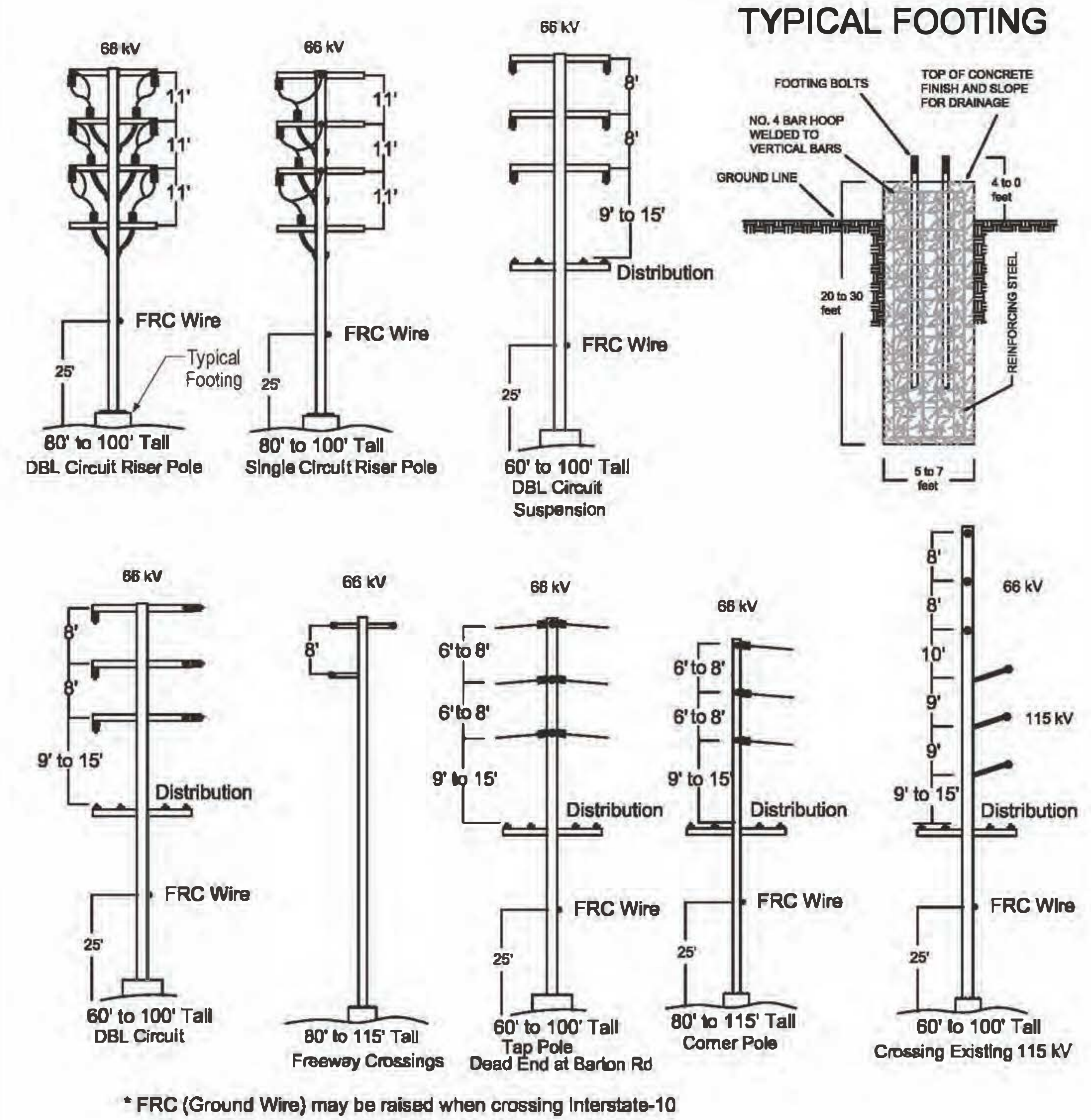


Notes: This diagram is based on engineering which is subject to change as a result of the CPUC permit process, final engineering, and any necessary adjustments during construction.

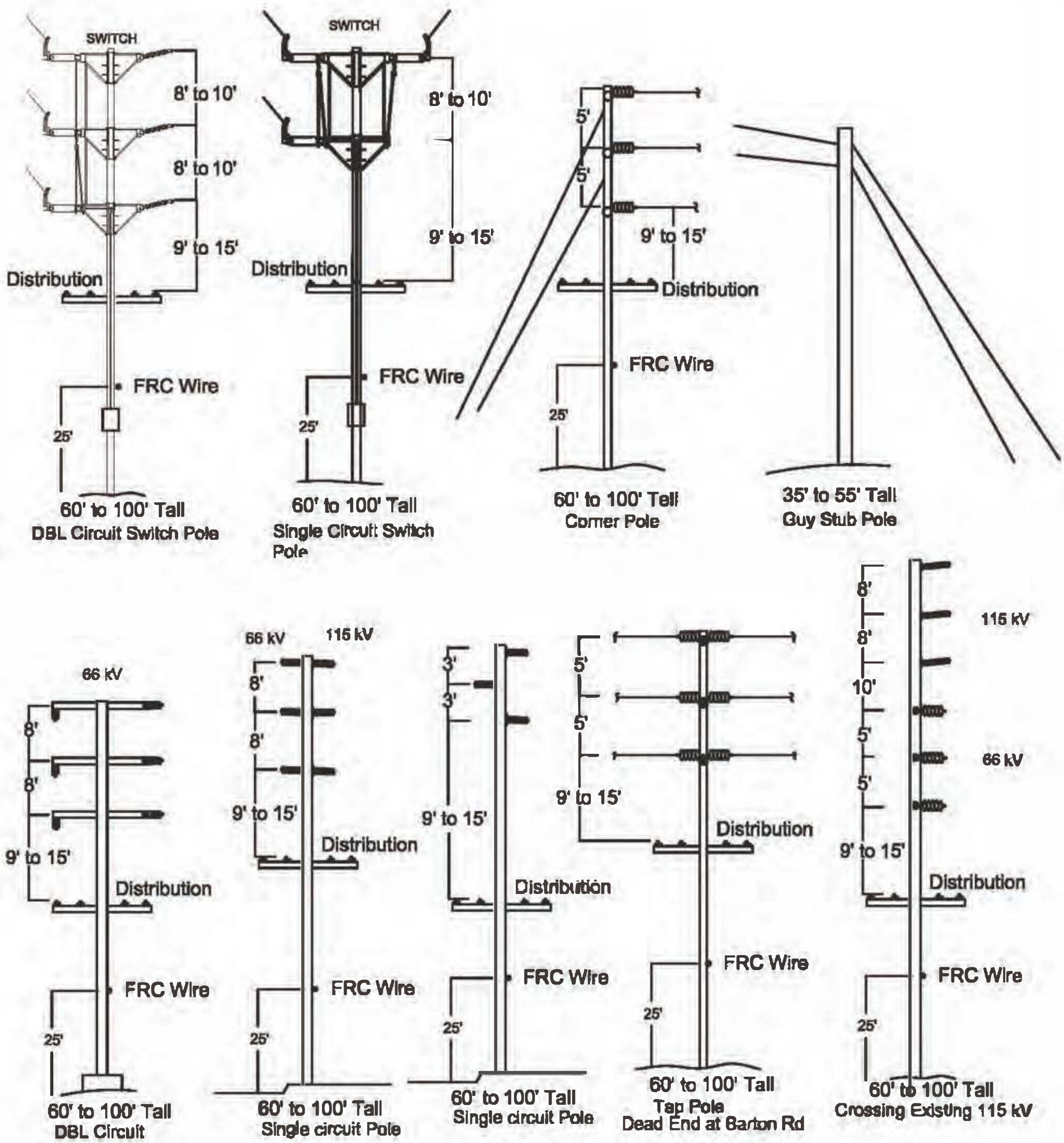
The height of each TSP will vary depending on the elevation at the top of each footing. The TSP configurations shown in these diagrams depict both direct buried and projected footings. Any TSP configuration could have a buried or projected footing, depending on terrain or other engineering considerations.

Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-14a

Typical 66 kV Tubular Steel Pole Structures

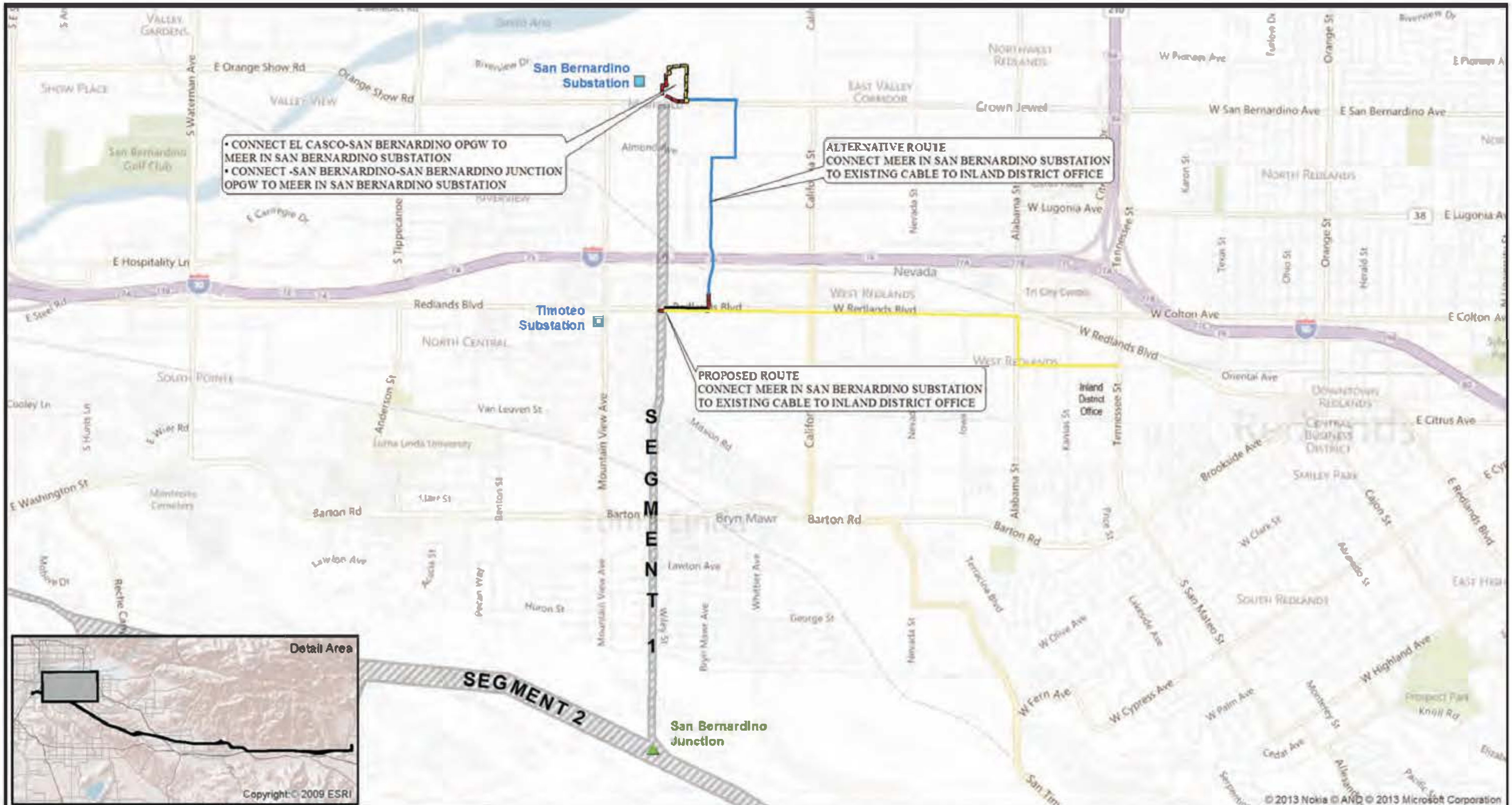


Note: This diagram is based on engineering which is subject to change as a result of the CPUC permit process, final engineering, and any necessary adjustments during construction.

Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-14b
Typical Light-Weight Steel and Wood Poles



Source: SCE, 2013.

- Existing Transmission Line Right-of-Way
- Substations
- Junctions

Telecommunication Line Routes

- Existing OH
- Existing UG
- Proposed OH Fiber
- Proposed UG
- Remove Existing OH

West of Devers Upgrade Project

Figure B-15a
Proposed Telecommunication Routes - Sheet 1 of 5

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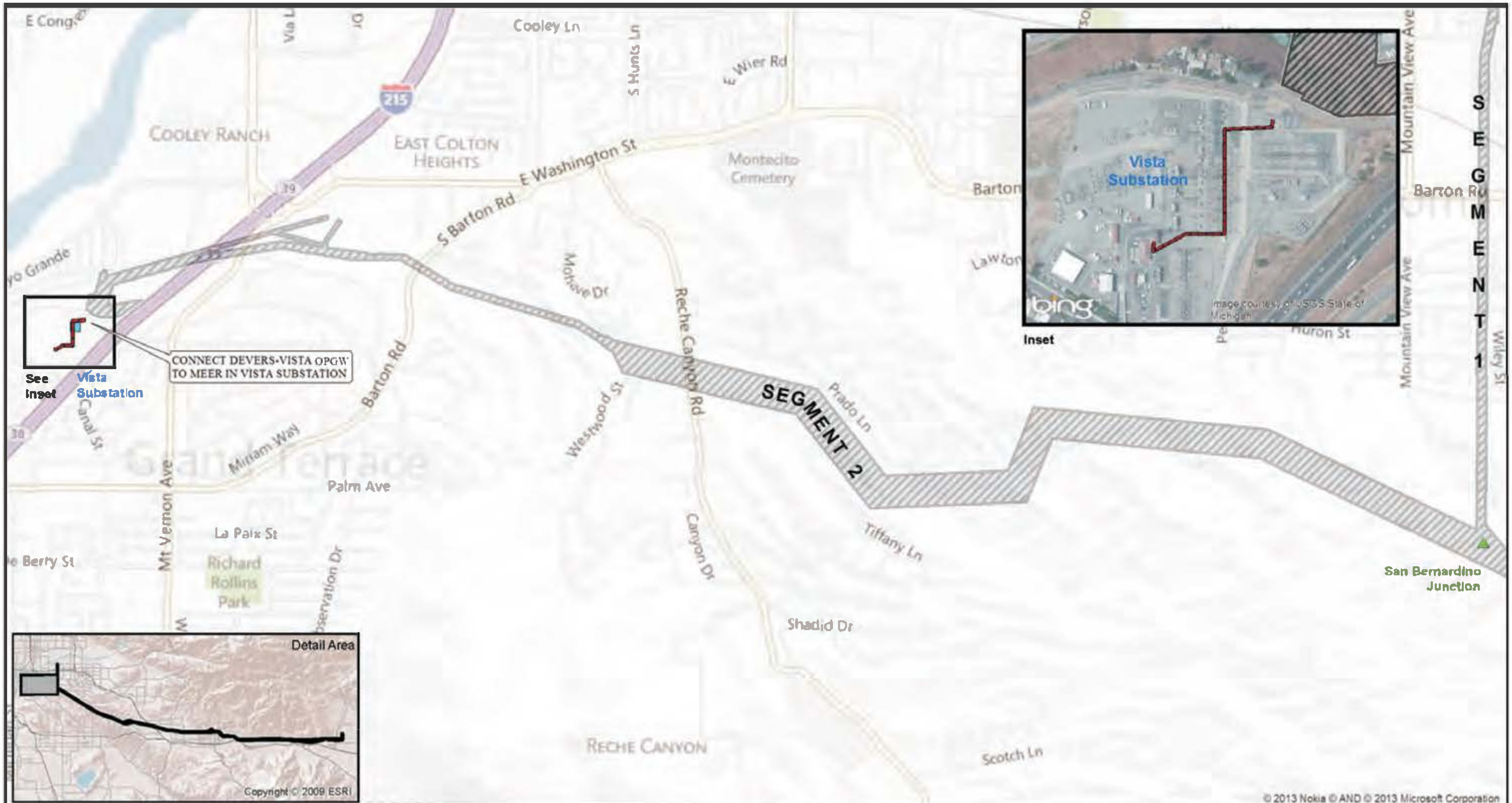
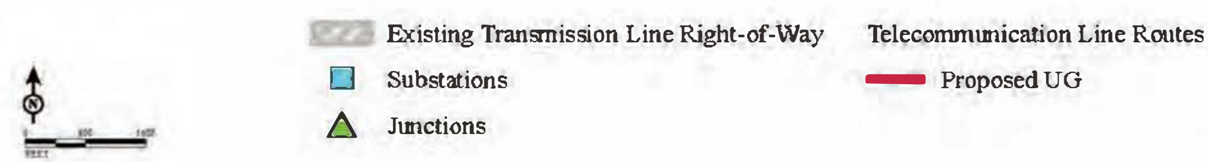


Source: SCE, 2013.



West of Devers Upgrade Project

Figure B-15b
Proposed Telecommunication Routes - Sheet 2 of 5

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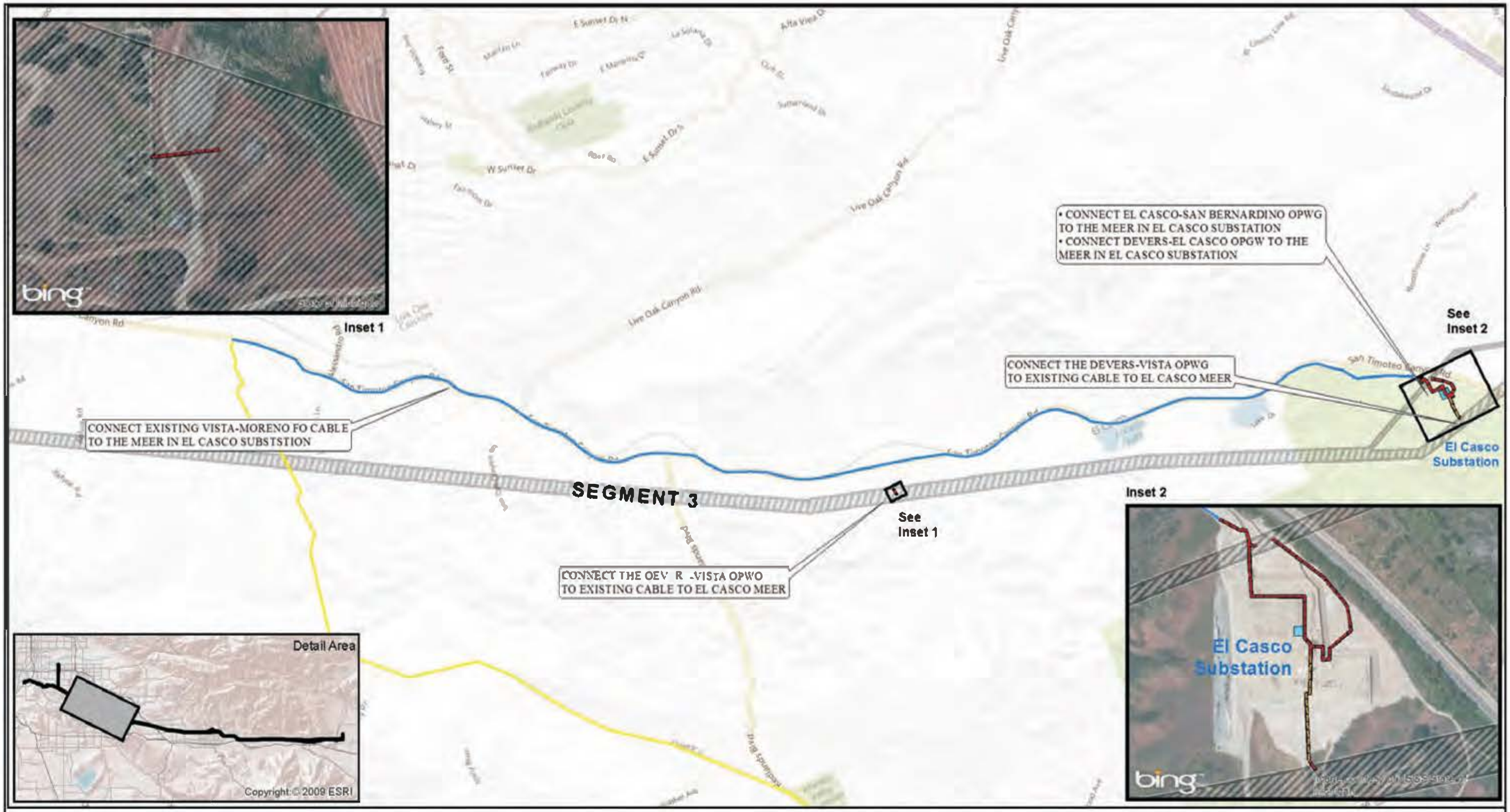

Source: SCE, 2013.

Existing Transmission Line Right-of-Way

Substations

Telecommunication Line Routes

- Existing OH
- Proposed OH ADSS
- Proposed UG
- Existing UG OFNR

West of Devers Upgrade Project

Figure B-15c
Proposed Telecommunication Routes - Sheet 3 of 5

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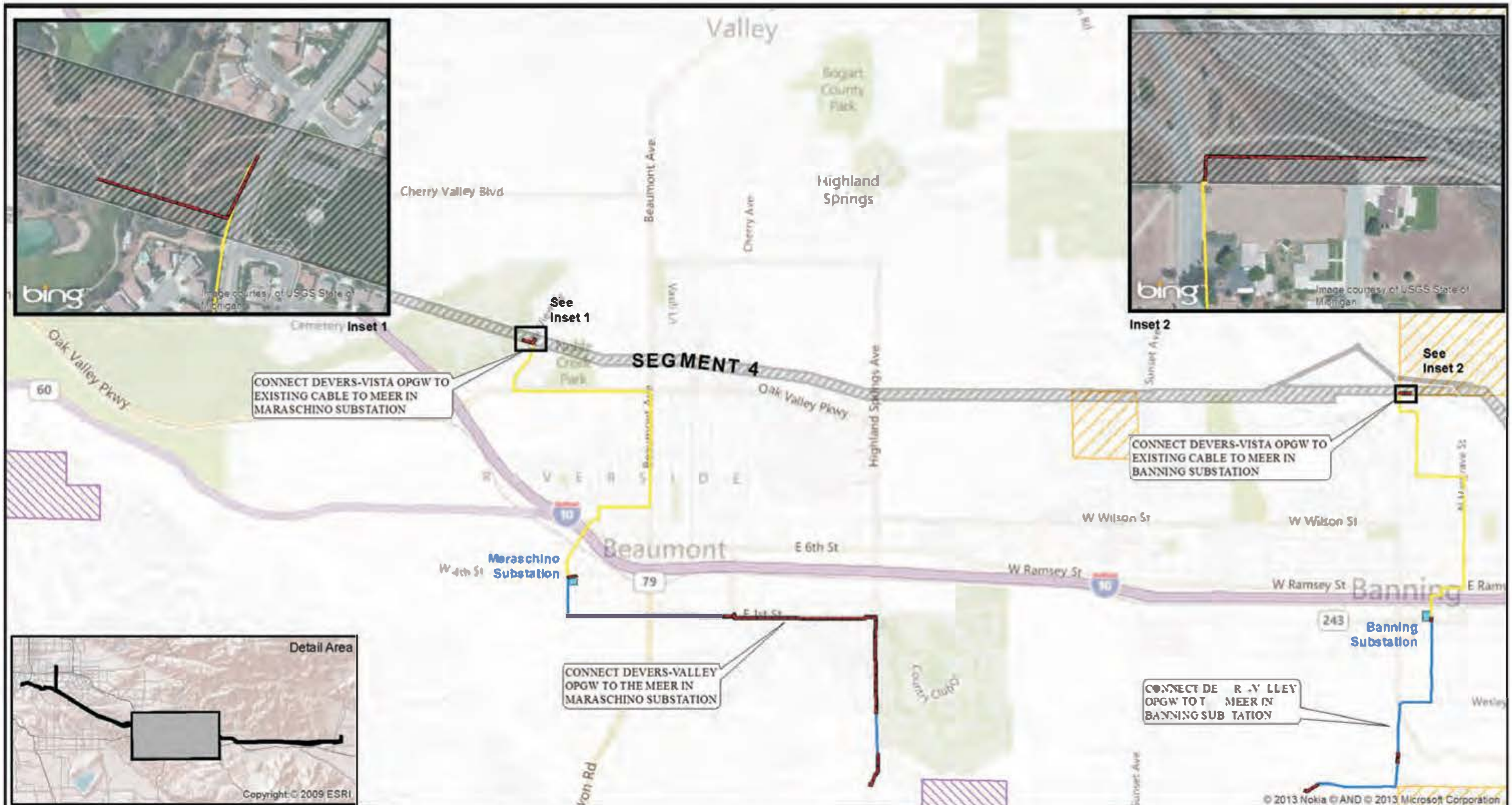

Source: SCE, 2013.

Existing Transmission Line Right-of-Way
Substations
U.S. Bureau of Land Management
Morongo Reservation

Telecommunication Line Routes
Proposed OH
Proposed UG
Existing OH

West of Devers Upgrade Project

Figure B-15d
Proposed Telecommunication Routes - Sheet 4 of 5

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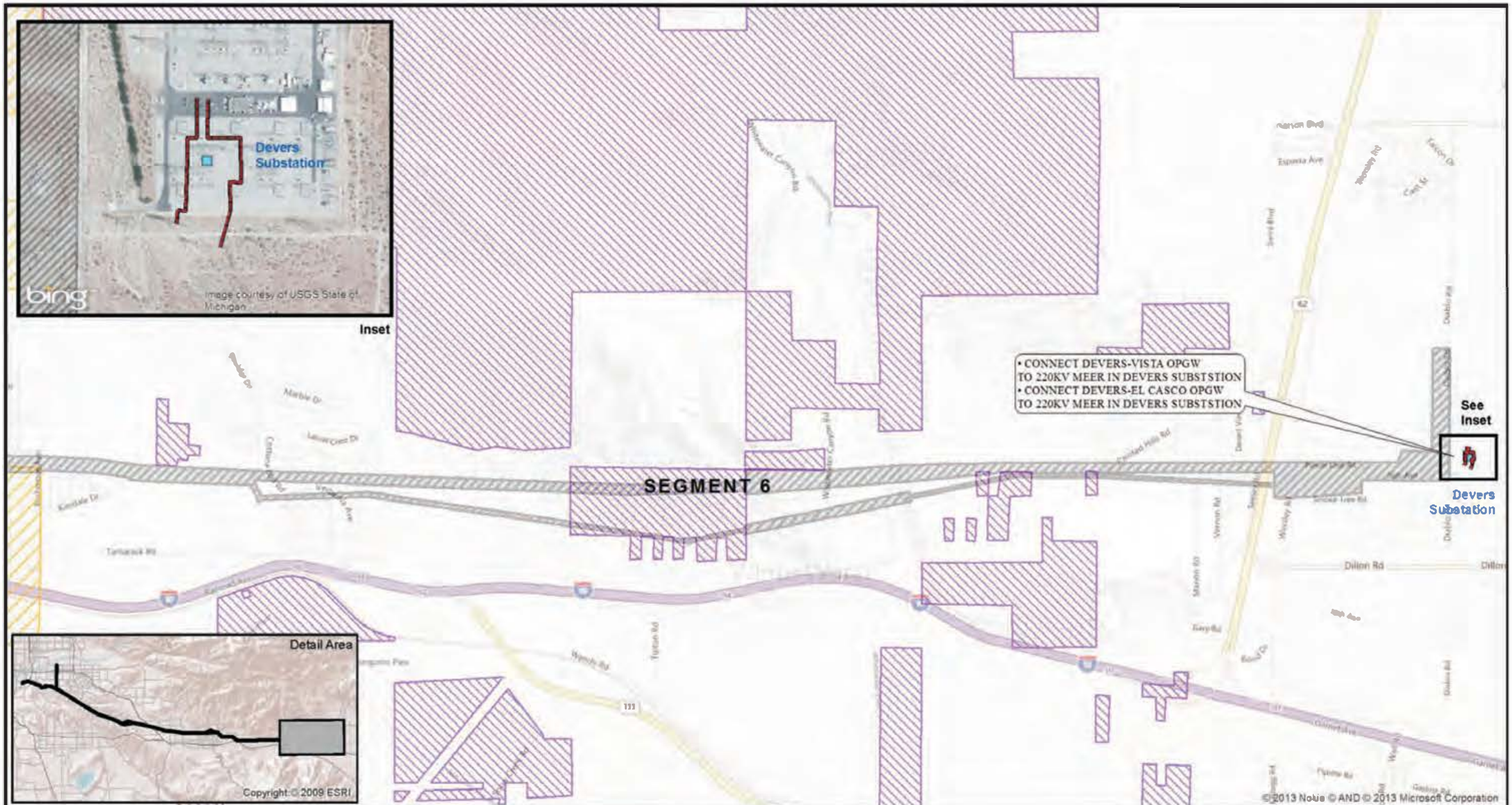

Source: SCE, 2013.

Existing Transmission Line Right-of-Way

Substations

Telecommunication Line Routes

Proposed UG

U.S. Bureau of Land Management

Morongo Indian Reservation

West of Devers Upgrade Project

Figure B-15e
Proposed Telecommunication Routes - Sheet 5 of 5

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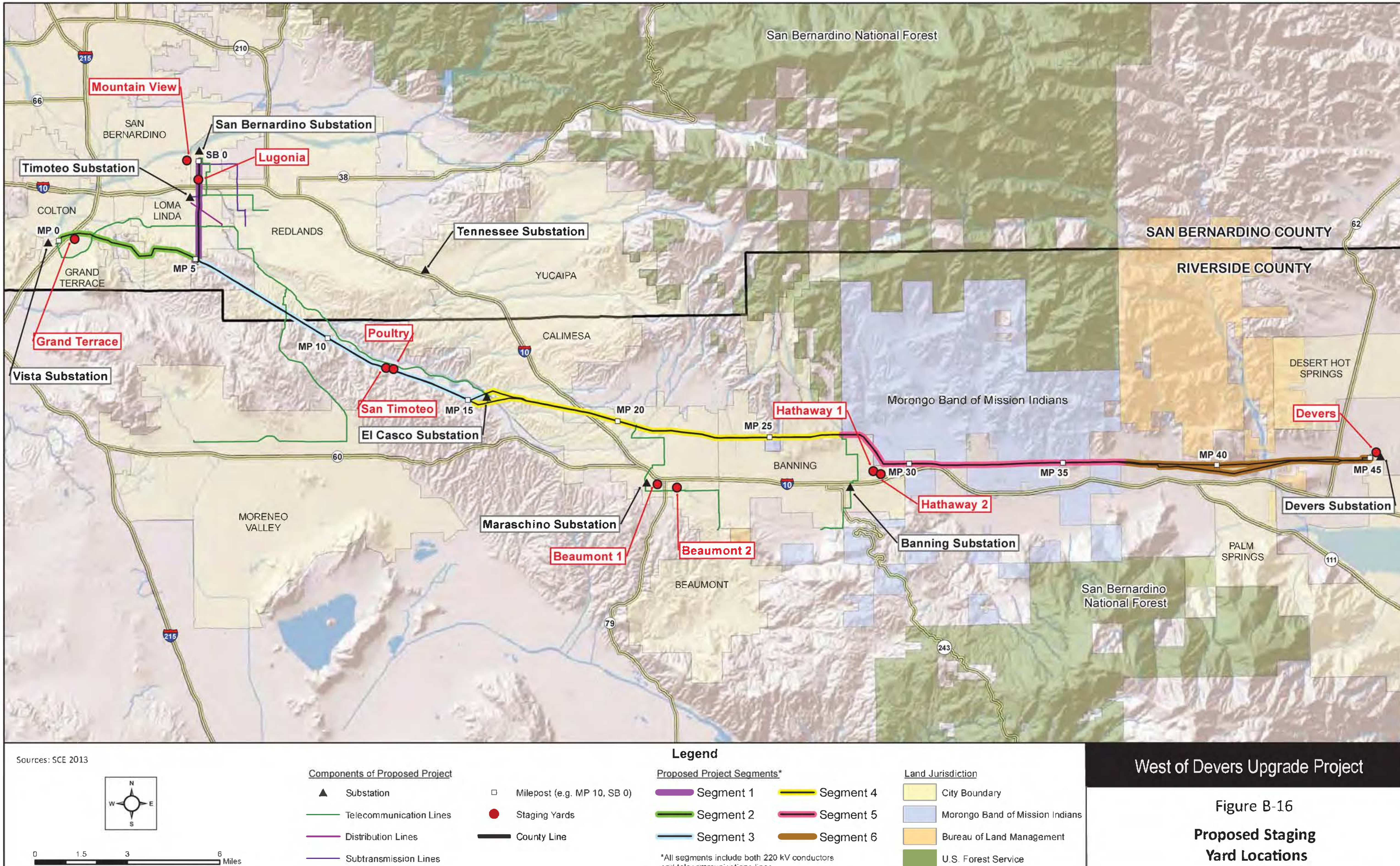

West of Devers Upgrade Project

Figure B-16

Proposed Staging Yard Locations

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Typical concrete crib wall.

Typical gabion wall.

Typical soldier pile wall.

Typical welded wire wall.

Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-17

Typical Retaining and Mechanically Stabilized Earth Walls

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Photo 1. Wire installation on a shoo-fly pole.

Photo 2. Shoo-fly in use during 220 kV tower removal.

West of Devers Upgrade Project

Figure B-18
Typical Shoo-Fly Structures

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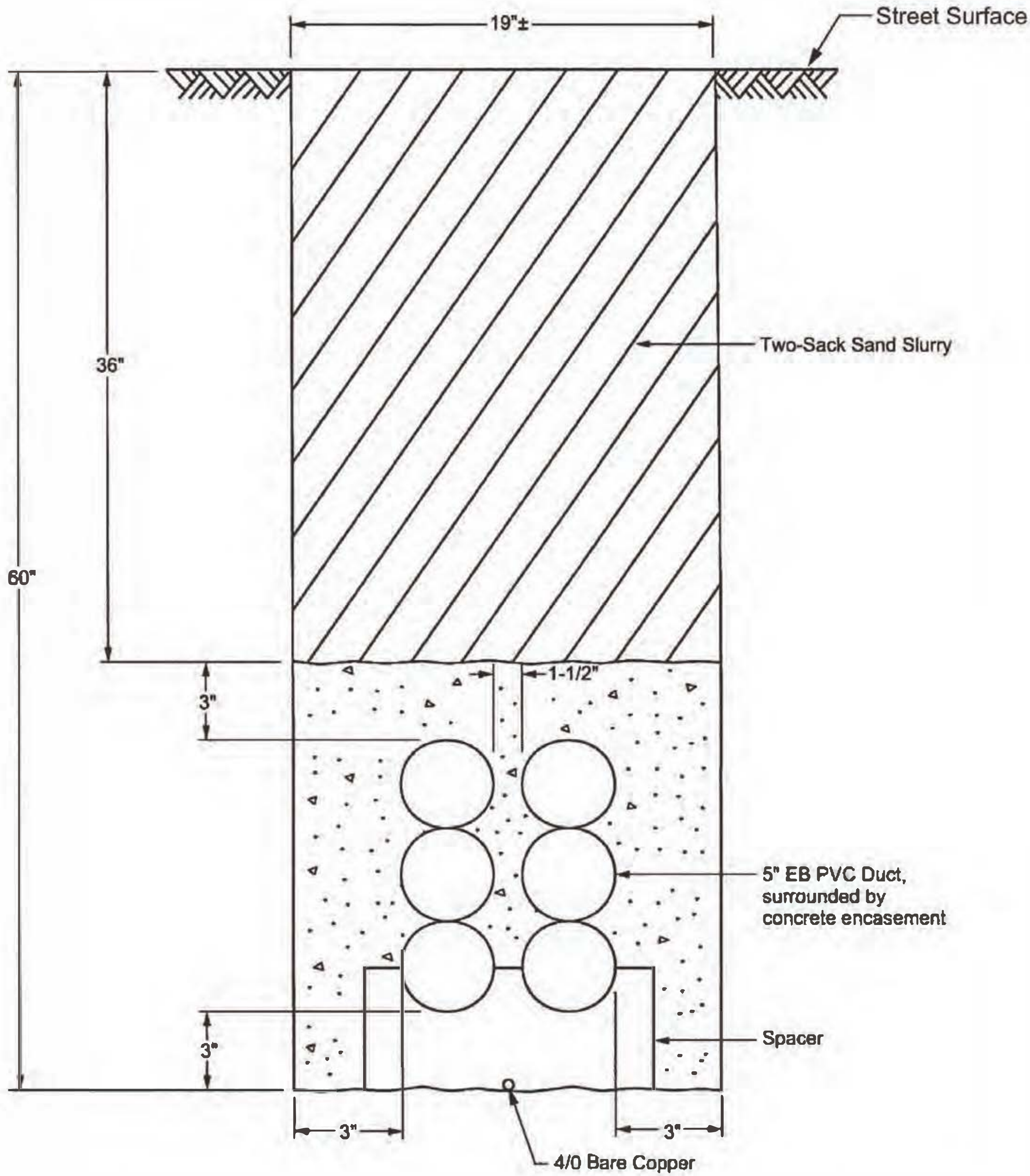
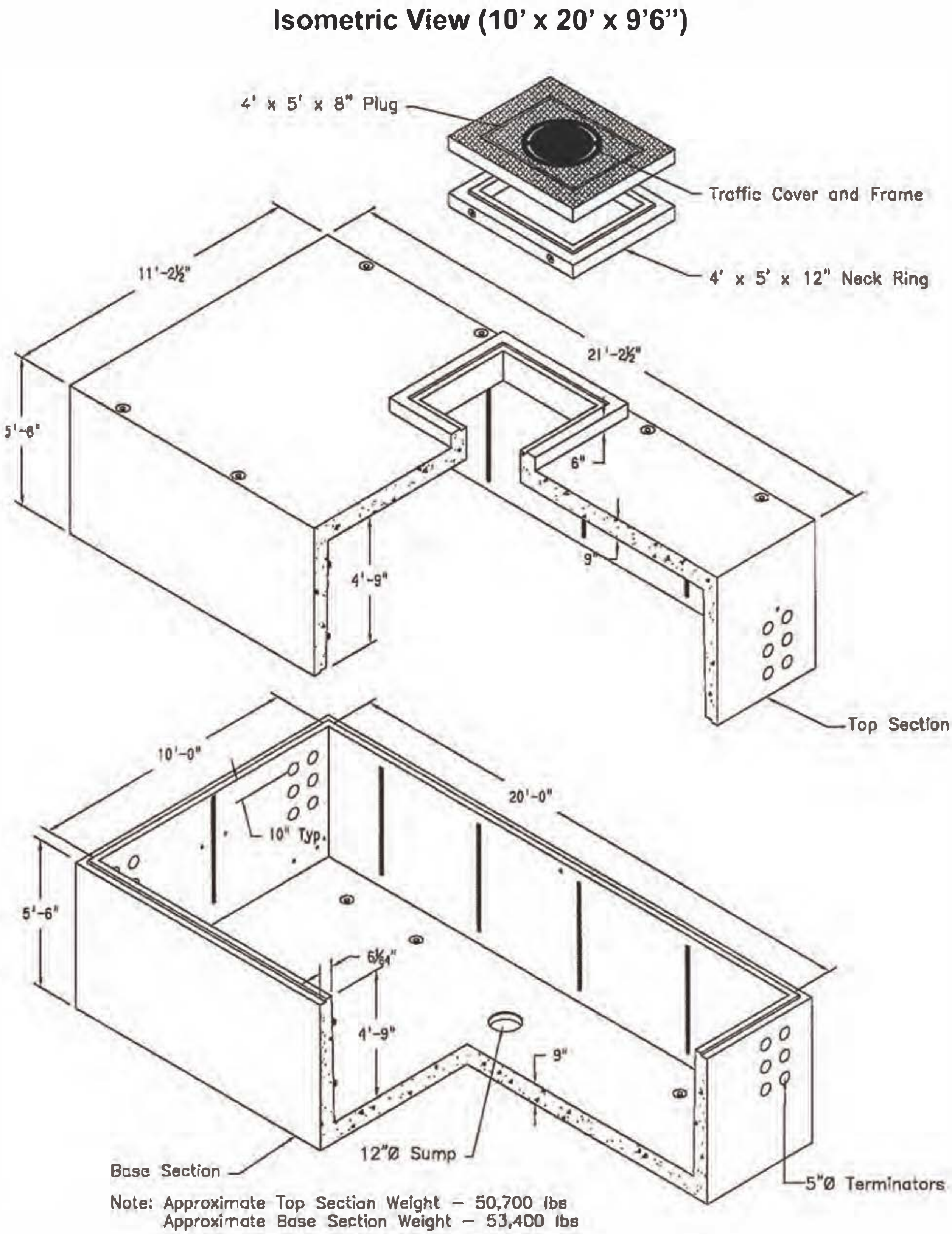


Source: SCE, 2013.

West of Devers Upgrade Project

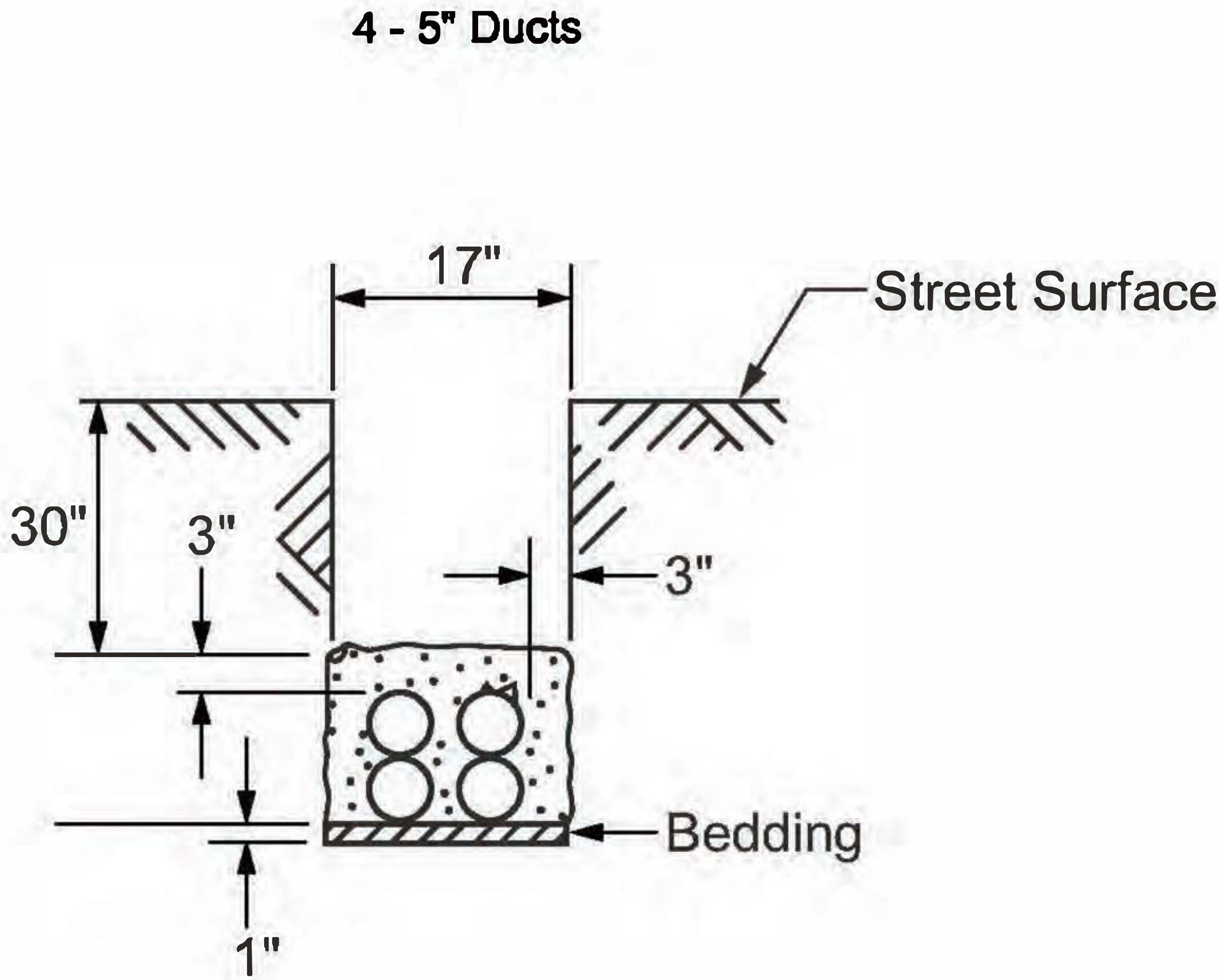
Figure B-19
Typical Subtransmission Duct Bank



Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-20
Typical Subtransmission Vault

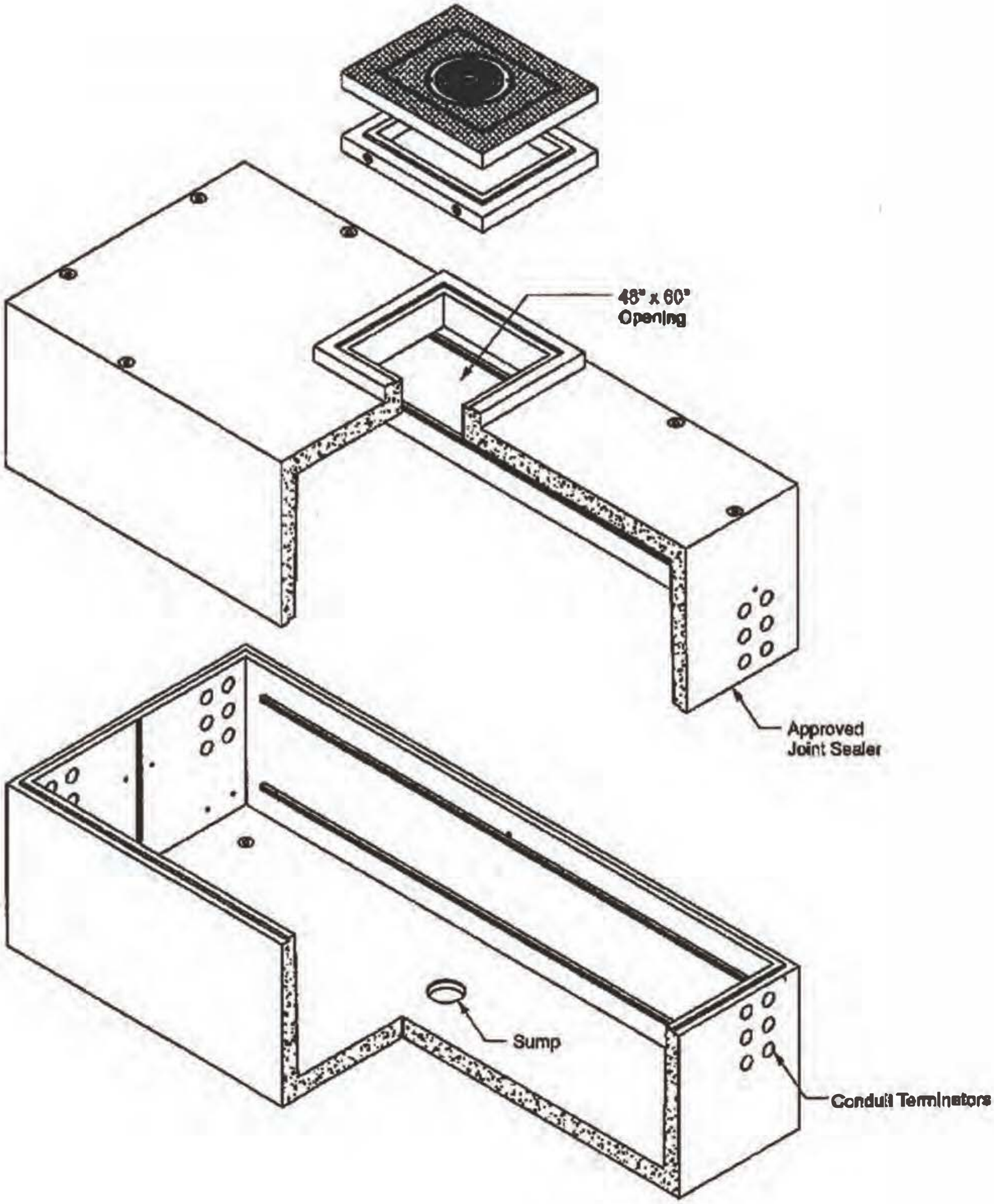


Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-21

Typical Distribution Duct Bank

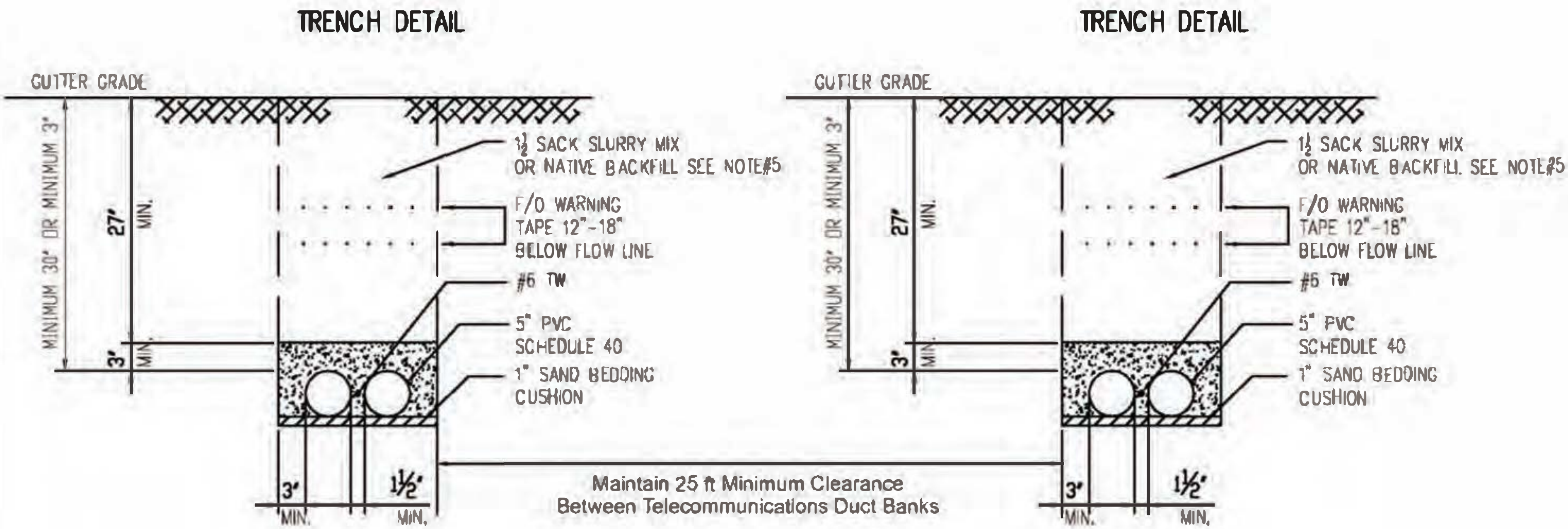


Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-22

Typical Distribution Vault



Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-23
Typical Telecommunications Duct Bank

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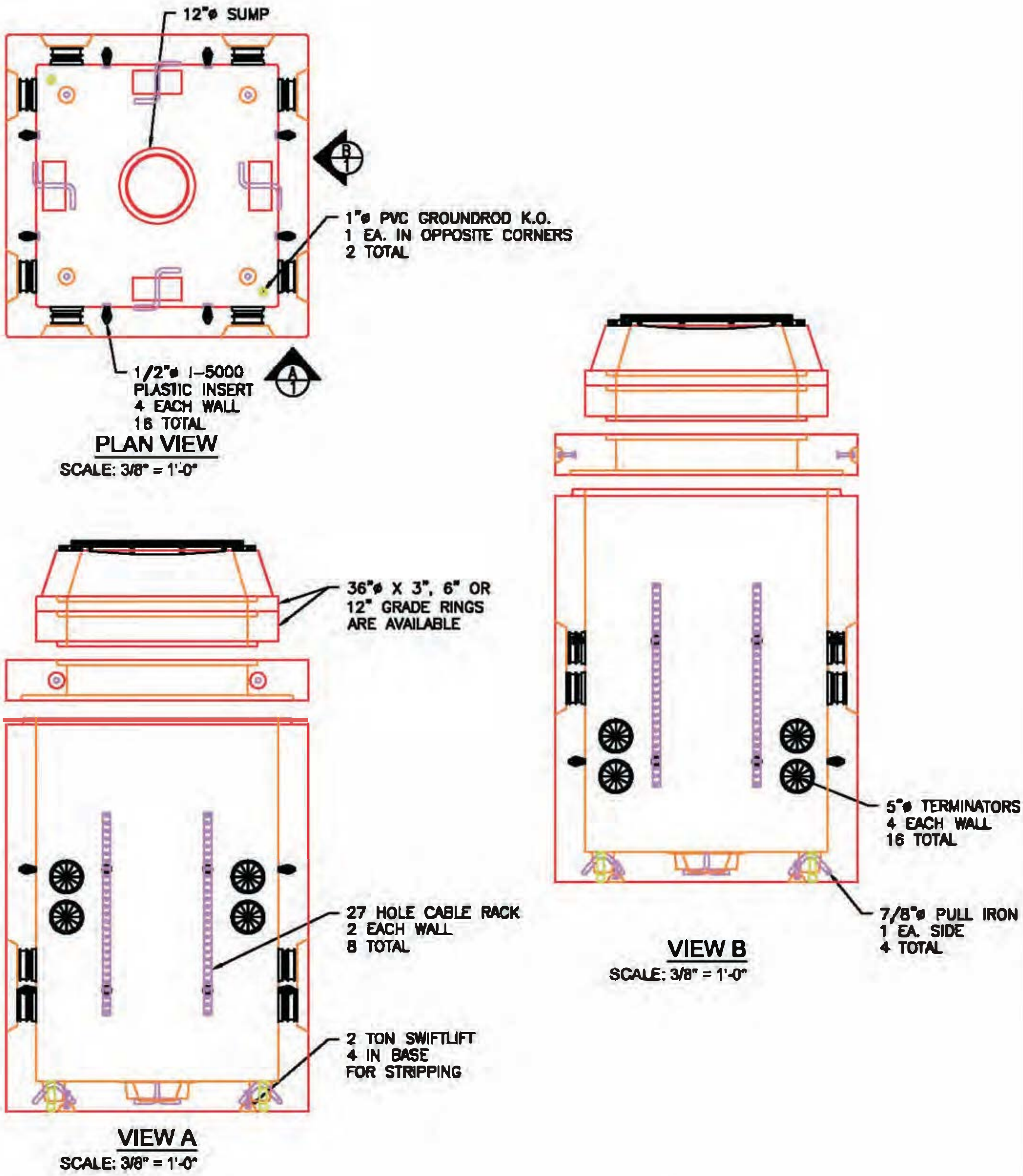

Source: SCE, 2013.

West of Devers Upgrade Project

Figure B-24
Typical Manhole Design

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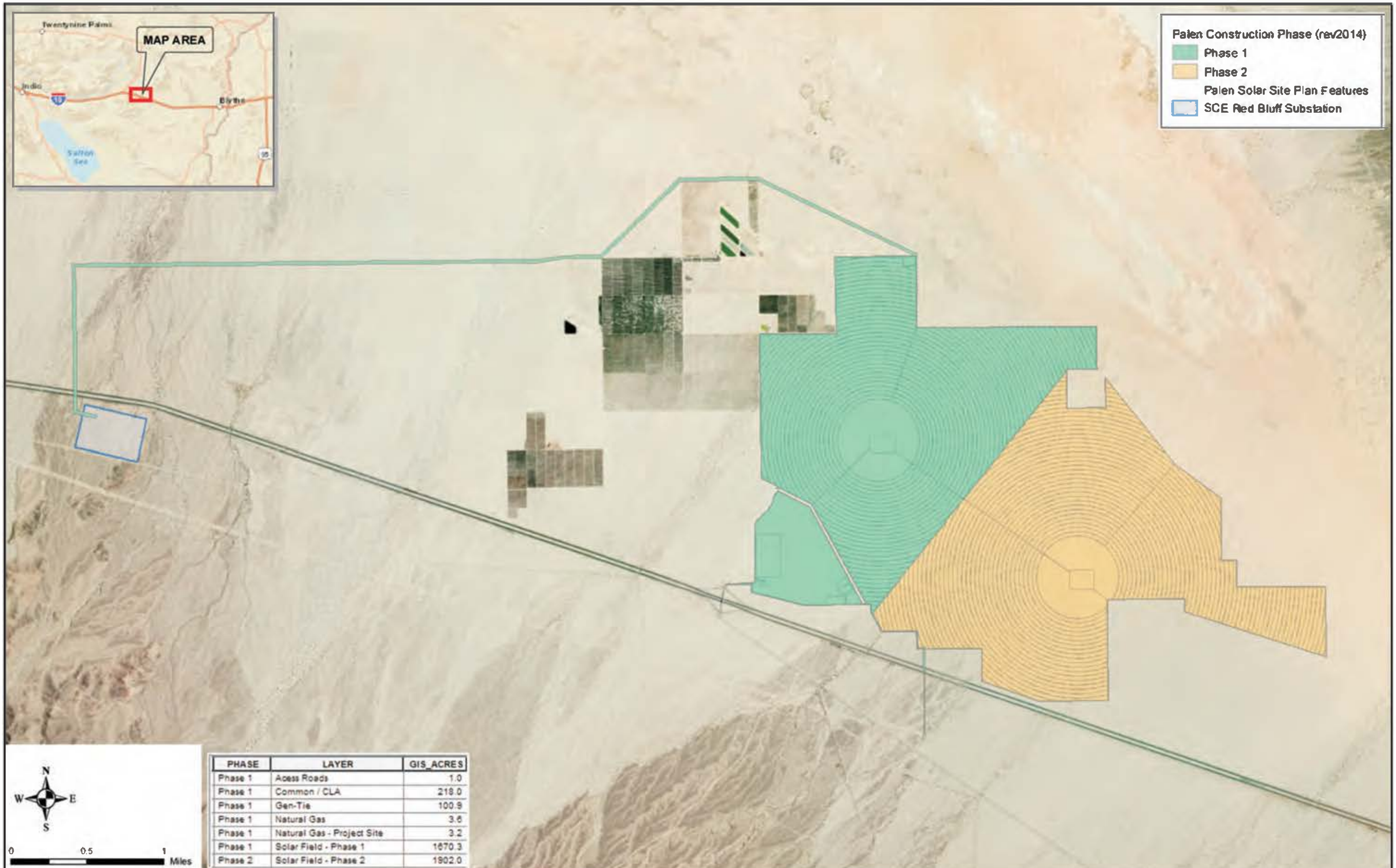

PHASE	LAYER	GIS_ACRES
Phase 1	Acess Roads	1.0
Phase 1	Common / CLA	218.0
Phase 1	Gen-Tie	100.9
Phase 1	Natural Gas	3.6
Phase 1	Natural Gas - Project Site	3.2
Phase 1	Solar Field - Phase 1	1670.3
Phase 2	Solar Field - Phase 2	1902.0

West of Devers Upgrade Project

Figure B-25

Palen Solar Power Project

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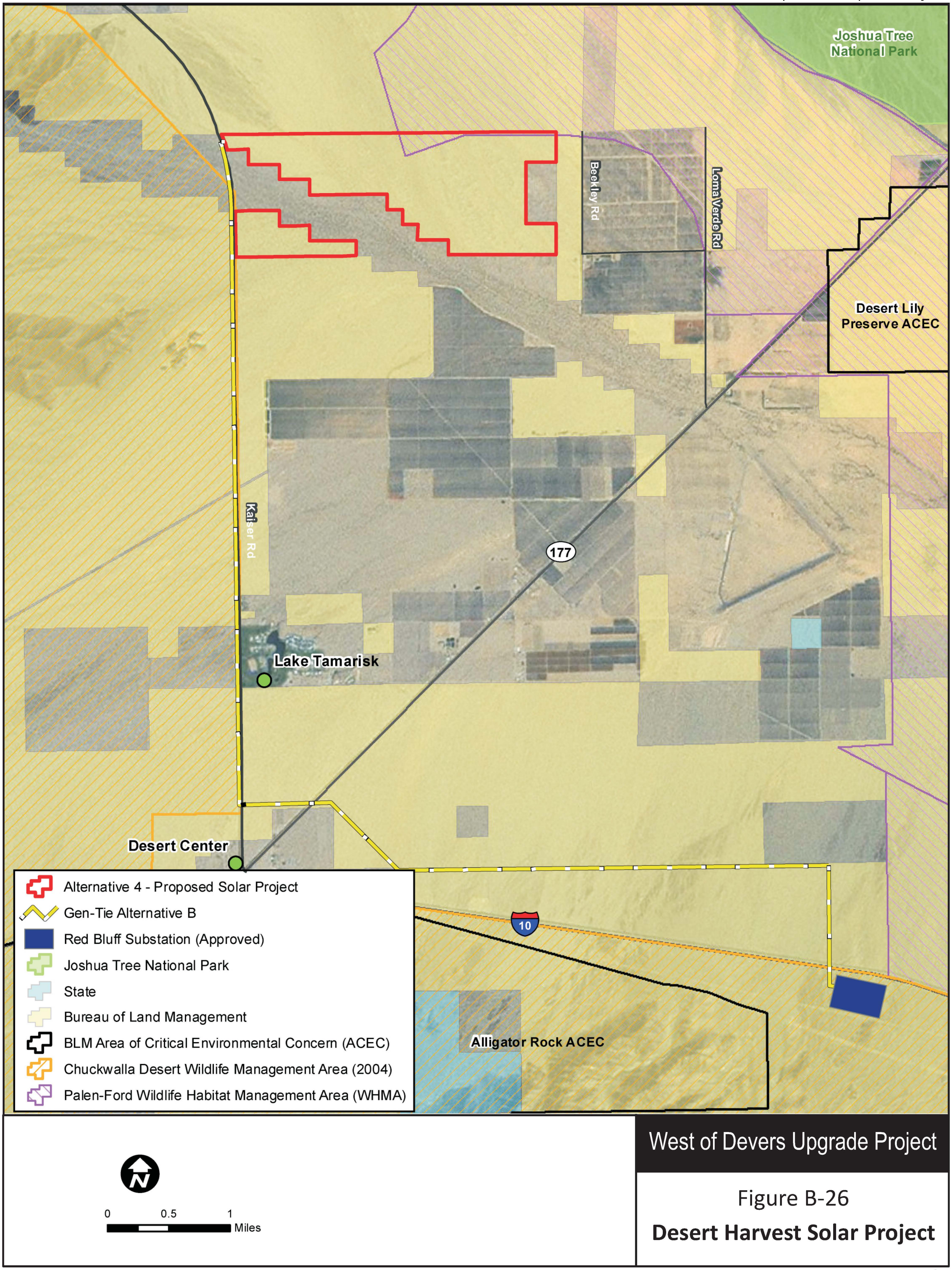

West of Devers Upgrade Project

Figure B-26

Desert Harvest Solar Project

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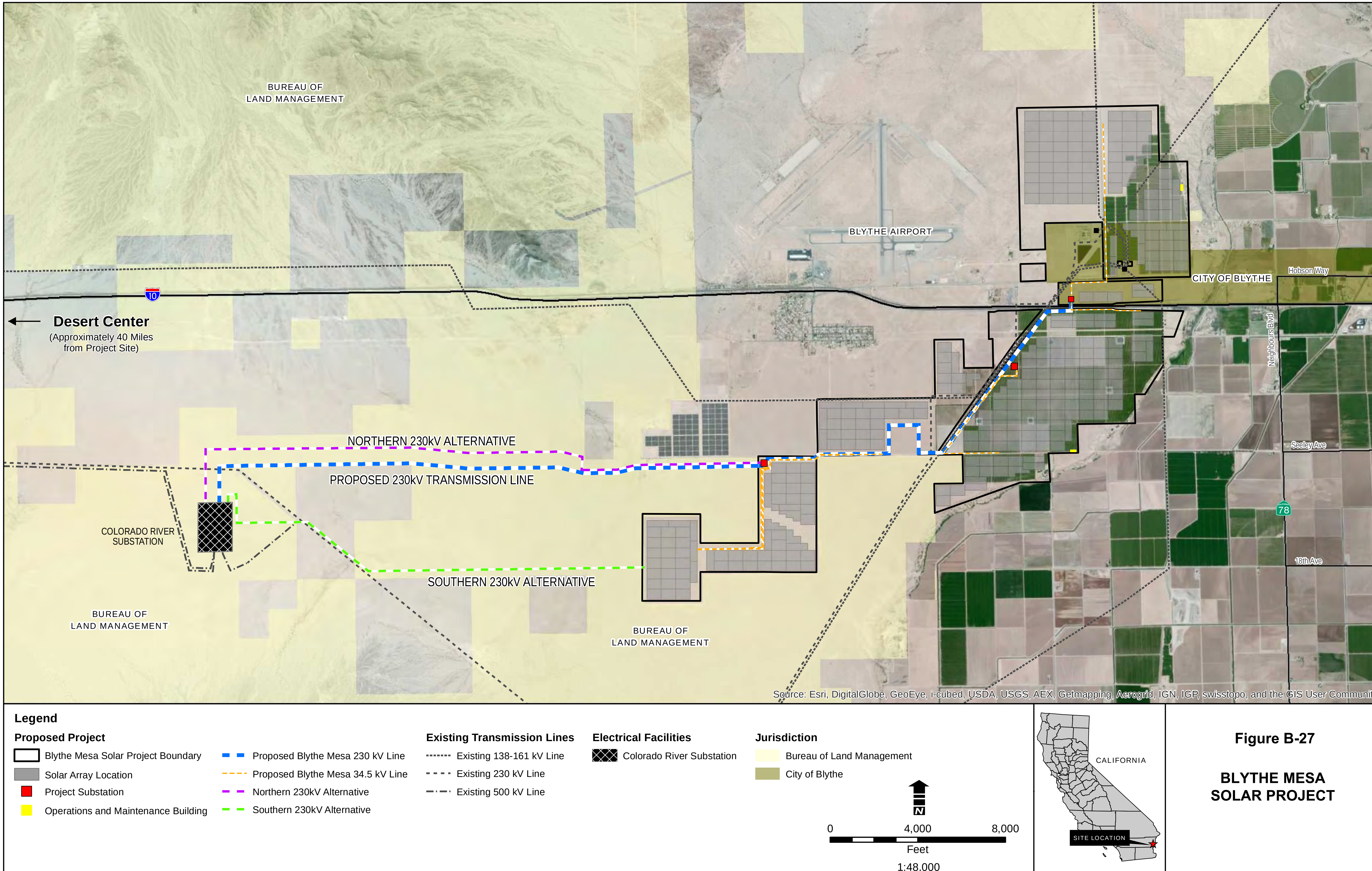

Figure B-27

BLYTHE MESA SOLAR PROJECT

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