2.0 Description of the Proposed Projects

Southern California Edison (SCE or the applicant) proposes to construct the proposed Valley–Ivyglen 115-kilovolt (kV) Subtransmission Line Project (proposed Valley–Ivyglen Project) and the proposed Alberhill System Project (proposed Alberhill Project) in western Riverside County. Both of the proposed projects would be constructed within and in proximity to the City of Lake Elsinore, California, in an area between the applicant's Valley Substation to the east and Ivyglen Substation to the west (Figure 2-1). This section describes the proposed Alberhill Project and the proposed Valley–Ivyglen Project. Unless otherwise specified in a heading, subheading, or text, descriptions of project activities and components apply to both proposed projects.

2.1 Overview of the Proposed Projects

This section provides general overviews of the proposed Valley–Ivyglen Project and proposed Alberhill Project.

2.1.1 Valley–Ivyglen Project Overview

The proposed Valley–Ivyglen Project would involve:

- Construction of a new, single-circuit 115-kV subtransmission line[1] and fiber optic line. The route of the proposed Valley–Ivyglen Project would be approximately 27 miles long and constructed within approximately 23 miles of new ROW.[2]
- Installation of overhead fiber optic lines on the proposed structures and underground in new (approximately ~~(~~10,000 feet) and existing (approximately ~~(~~13,200 feet) conduit.
- Transfer of existing distribution circuits along portions of the proposed substransmission line to new 115-kV structures or to underground positions.
- Installation of new 115-kV switching and protective equipment at Valley and Ivyglen Substations.

The applicant estimates that construction of the proposed Valley–Ivyglen Project would take approximately 28~~27~~ months. It is anticipated that the proposed Valley–Ivyglen Project would be operational by Q4 2019~~the summer or fall 2018~~. Project features of the proposed projects are shown in Figures 2-2a through 2-2i.

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[1] *Transmission lines* are designed to operate at or above 200 kV (CPUC 1995). For the purposes of this document, the term *subtransmission line* refers to powerlines designed to operate at between 50 kV and 200 kV. The proposed single-circuit subtransmission line would have three 115-kV conductor cables. Three-phase, alternating-current electrical transmission systems use at least three conductors to transmit electricity. By comparison, a double-circuit 115-kV line would typically have six 115-kV conductor cables. Double-circuit 115-kV lines would be constructed as part of the proposed Alberhill Project.

[2] For the purposes of this document, the term *ROW* refers to an area that the applicant would have legal access to for construction and operation of the proposed utility facilities. Legal access may be acquired in various ways, including by purchase, easement, or franchise agreement.

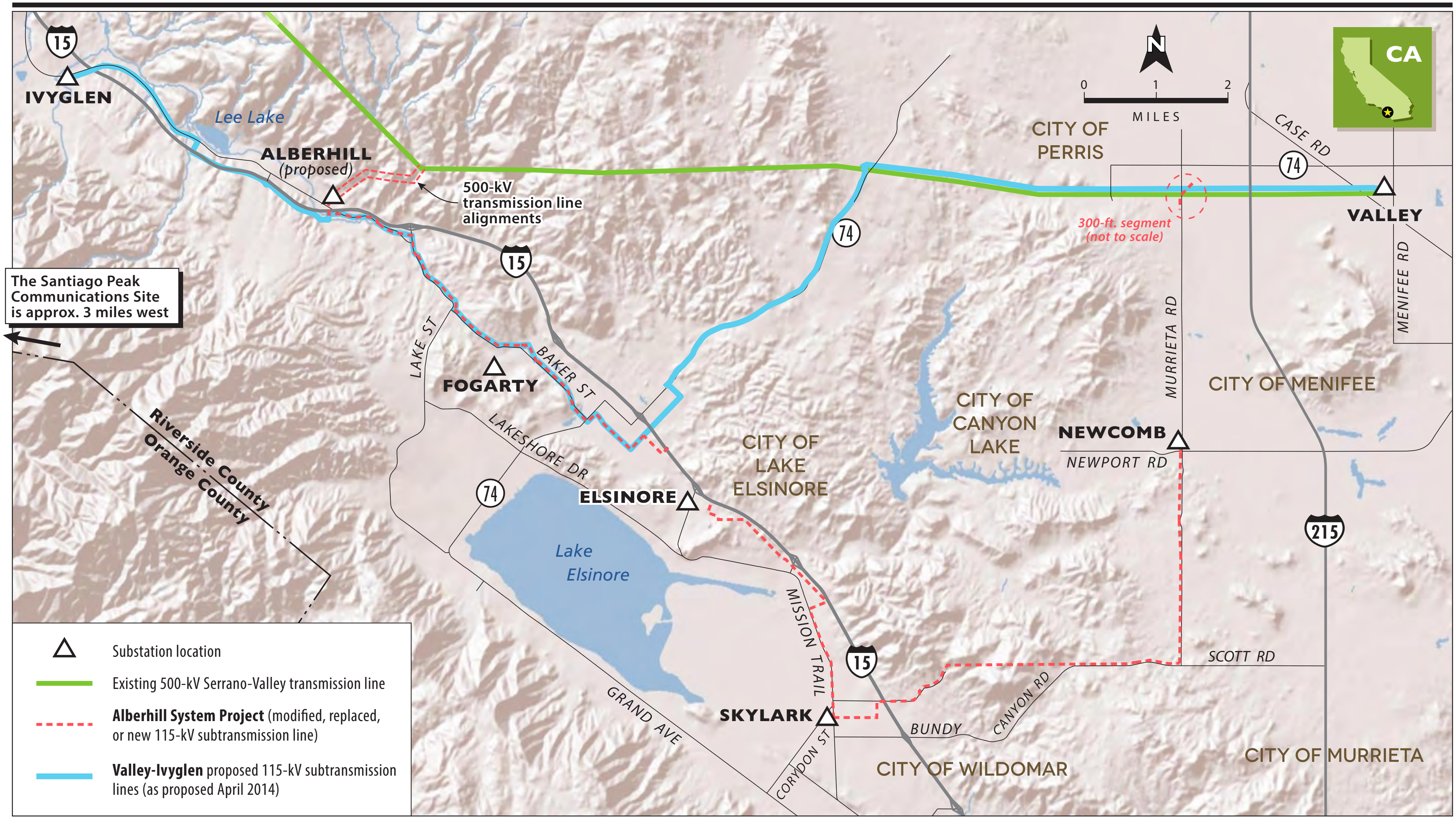

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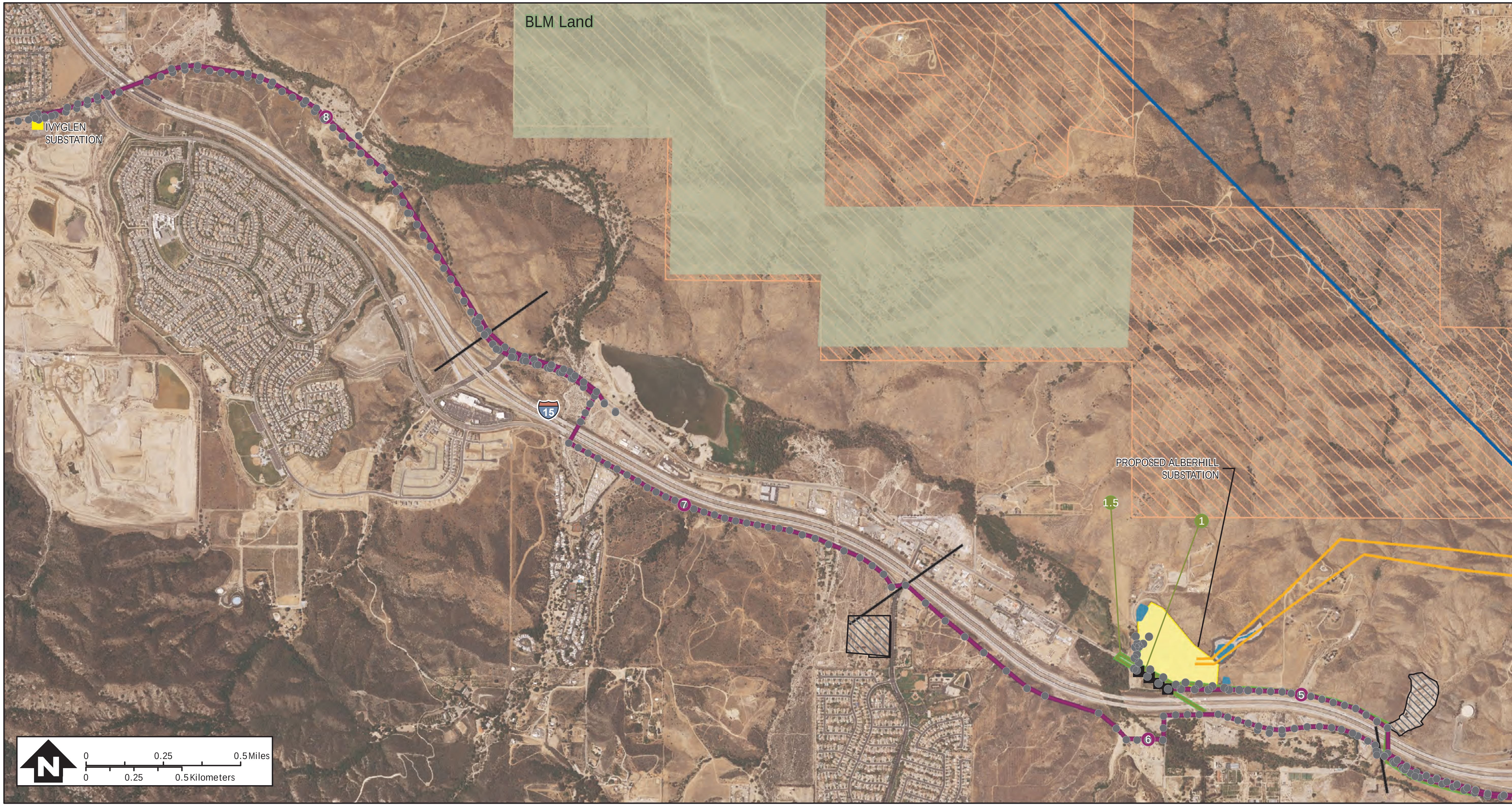
Figure 2-1

Overview of the Proposed Projects

Alberhill and Valley-Ivyglen Projects



Source: ESRI 2010, SCE 2011, 2013

1 VIG1
2 VIG2
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4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4
5 ASP5
6 ASP6
7 ASP7
8 ASP8

New Poles
Poles to Remove
Staging Areas
Import soil source area

Existing Substations
Proposed Alberhill Substation
Substation Basins
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end

BLM Land
Riverside County Habitat Conservation Agency core reserve

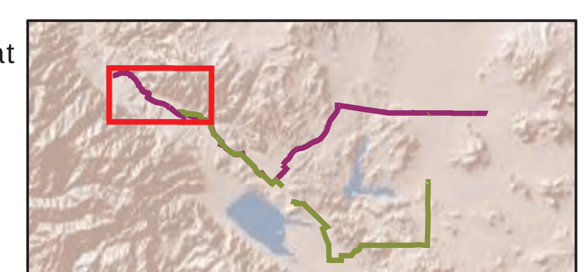

Figure 2.2a

Project Features

Alberhill and Valley–Ivyglen Projects

Riverside County, California

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Source: ESRI 2010, SCE 2011, 2013

1 VIG1
2 VIG2
3 VIG3
4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4
5 ASP5
6 ASP6
7 ASP7
8 ASP8

New Poles
Poles to Remove
Staging Areas

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end

BLM Land
Riverside County Habitat Conservation Agency core reserve

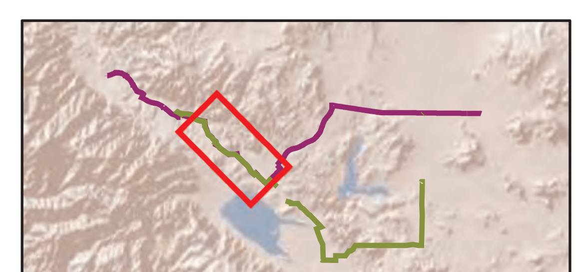

Figure 2.2b

Project Features

Alberhill and Valley–Ivyglen Projects

Riverside County, California

Source: ESRI 2010, SCE 2011, 2013

1 VIG1
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3 VIG3
4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4

5 ASP5
6 ASP6
7 ASP7
8 ASP8

- New Poles
- Poles to Remove
- Staging Areas
- Existing Substations
- Proposed Alberhill Substation
- Proposed 500-kV transmission lines
- 500-kV Serrano Valley Transmission Line
- Segment begin / end
- Riverside County Habitat Conservation Agency core reserve

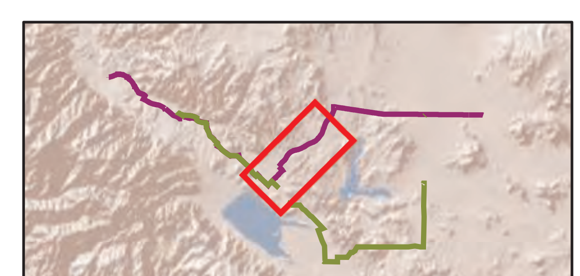
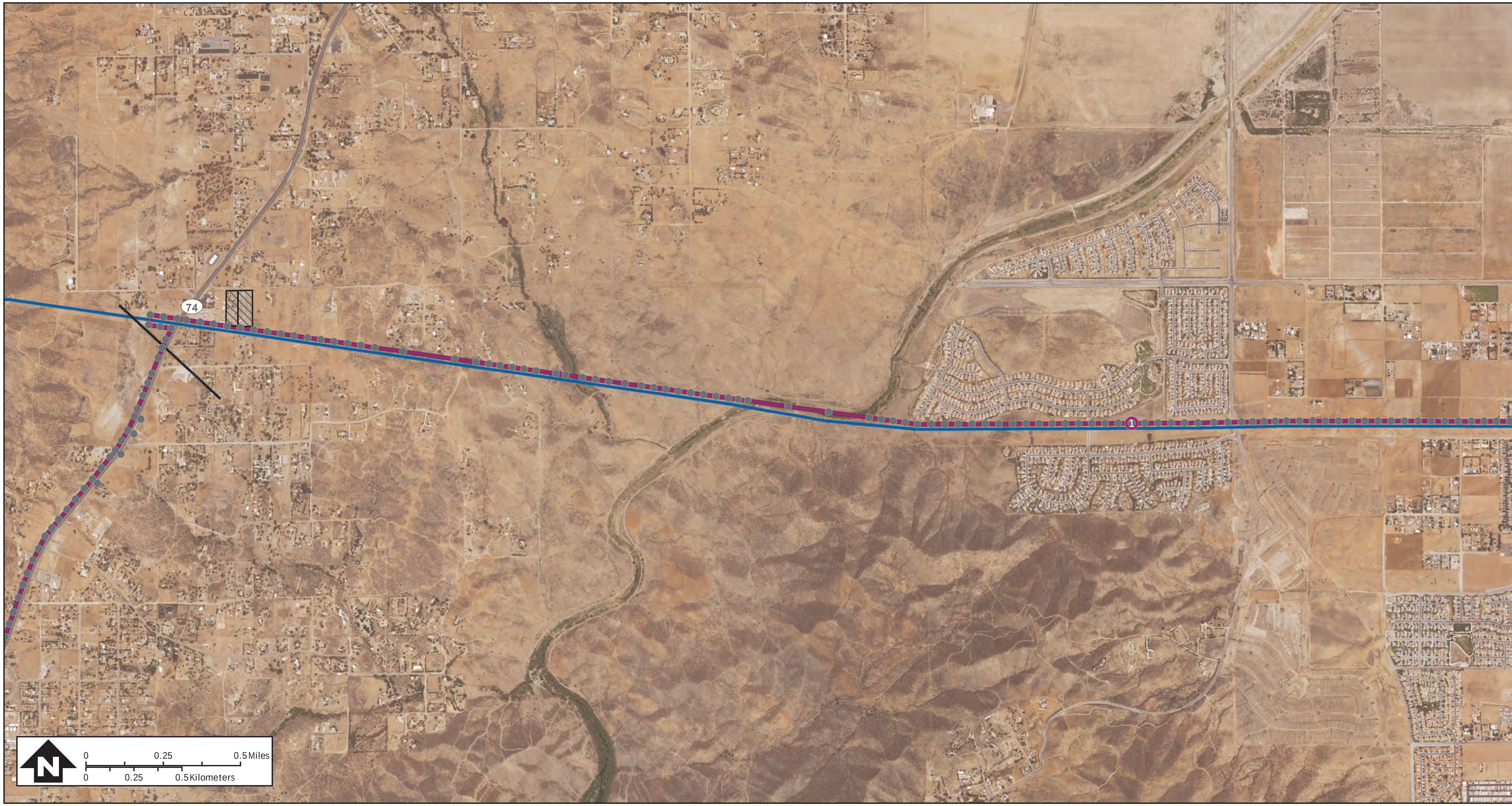


Figure 2.2c

Project Features

Alberhill and Valley–Ivyglen Projects

Riverside County, California



Source: ESRI 2010, SCE 2011, 2013

1 VIG1
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4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4
5 ASP5
6 ASP6
7 ASP7
8 ASP8

New Poles
Poles to Remove
Staging Areas

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end

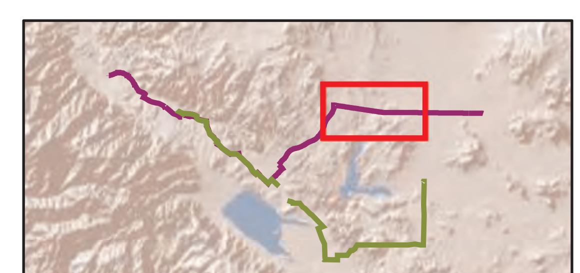

Figure 2.2d

Project Features

Alberhill and Valley–Ivyglen Projects

Riverside County, California

Source: ESRI 2010, SCE 2011, 2013

1 VIG1
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3 VIG3
4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4

5 ASP5
6 ASP6
7 ASP7
8 ASP8

New Poles
Poles to Remove

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end

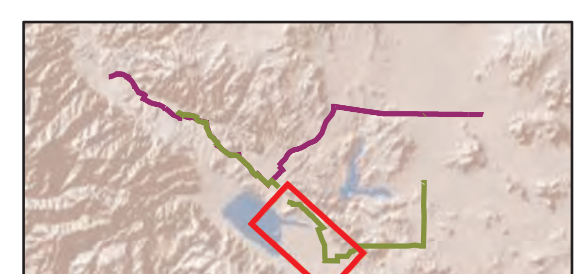
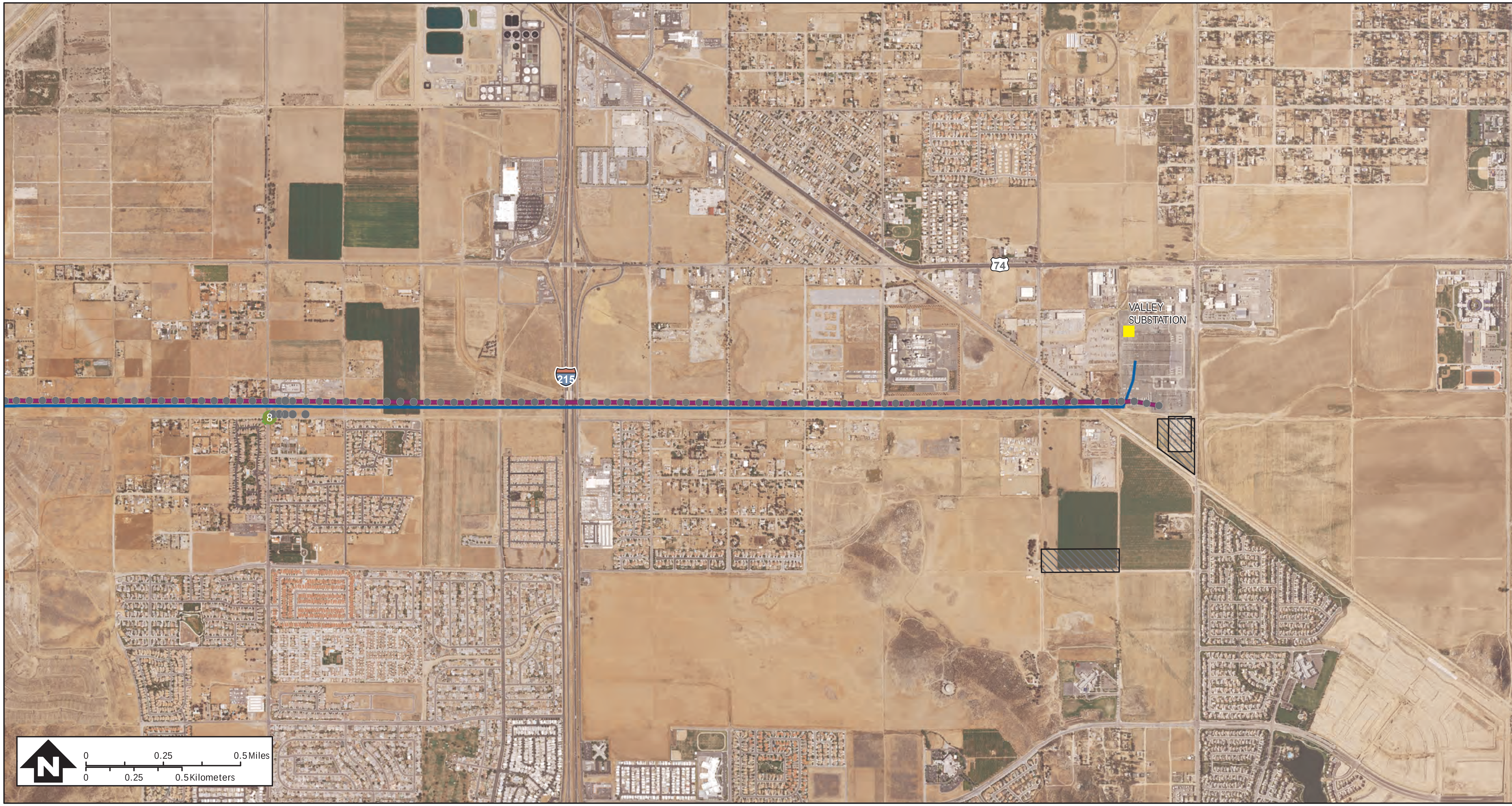


Figure 2.2e

Project Features

Alberhill and Valley–Ivyglen Projects

Riverside County, California



Source: ESRI 2010, SCE 2011, 2013

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5 VIG5
6 VIG6
7 VIG7
8 VIG8

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4

5 ASP5
6 ASP6
7 ASP7
8 ASP8

New Poles
Poles to Remove
Staging Areas

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end

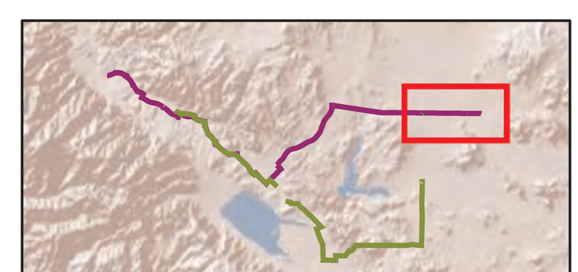
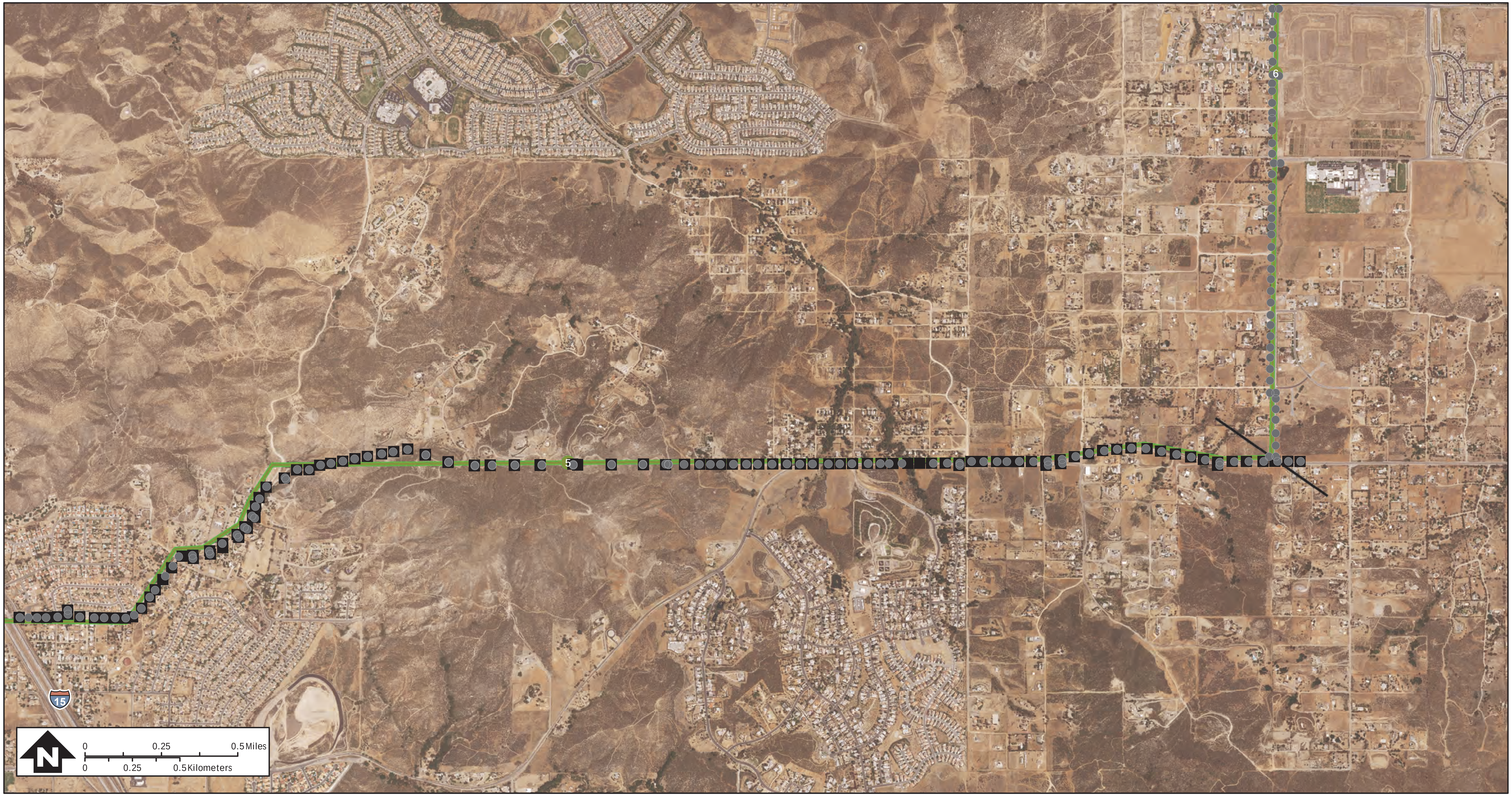


Figure 2.2f

Project Features

Alberhill and Valley–Ivyglen Projects

Riverside County, California



Source: ESRI 2010, SCE 2011, 2013

1 VIG1
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4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4

5 ASP5
6 ASP6
7 ASP7
8 ASP8

New Poles
Poles to Remove

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end

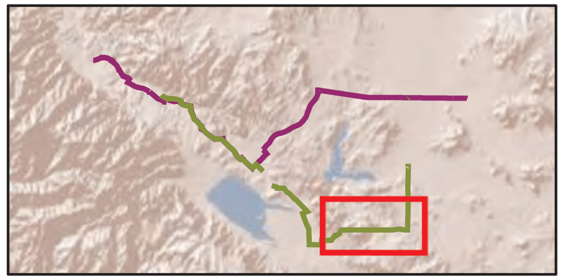
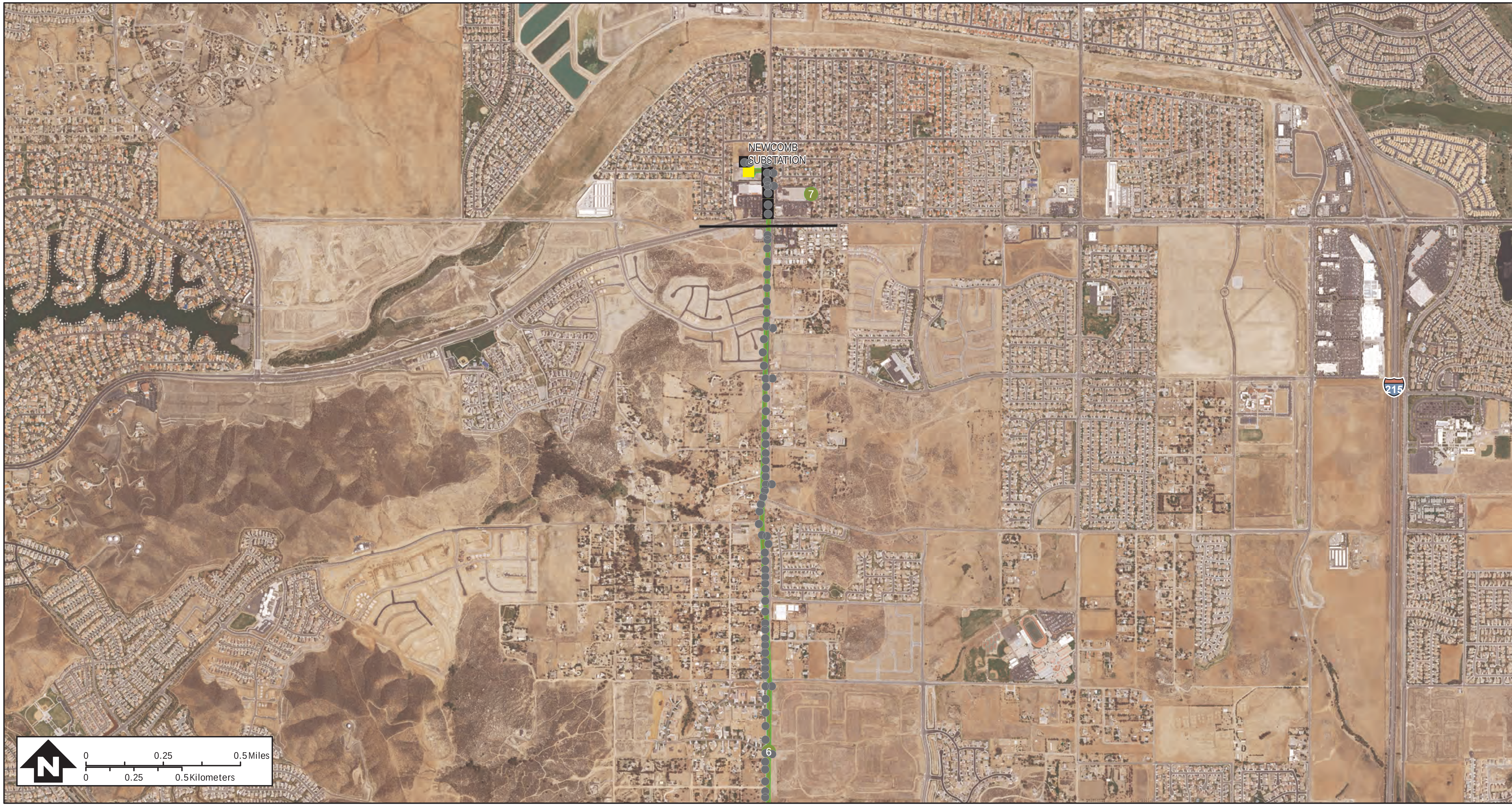


Figure 2.2g

Project Features

Alberhill and Valley–Ivyglen Projects

Riverside County, California



Source: ESRI 2010, SCE 2011, 2013

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4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4
5 ASP5
6 ASP6
7 ASP7
8 ASP8

New Poles
Poles to Remove

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end

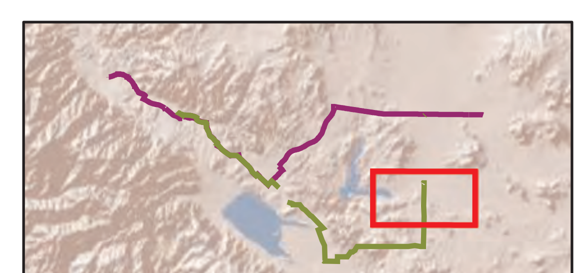

Figure 2.2h

Project Features

Alberhill and Valley–Ivyglen Projects

Riverside County, California

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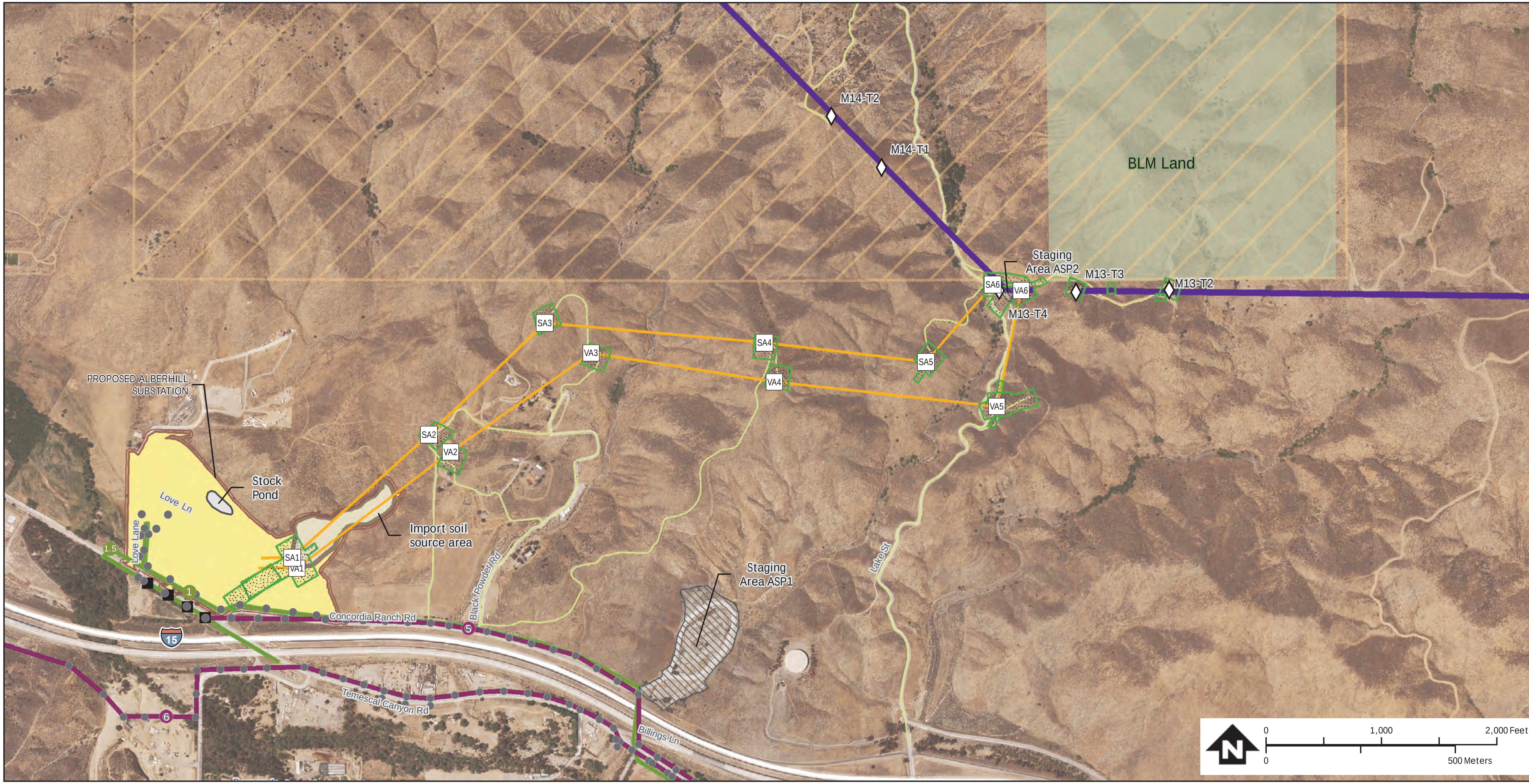

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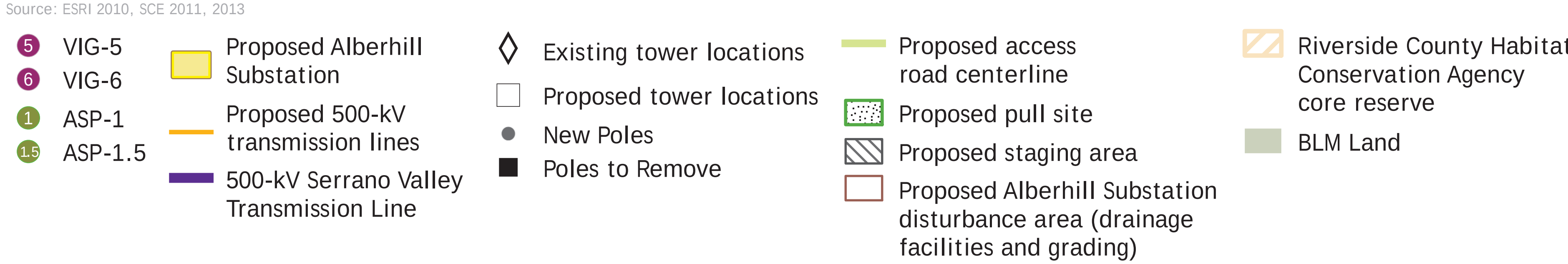

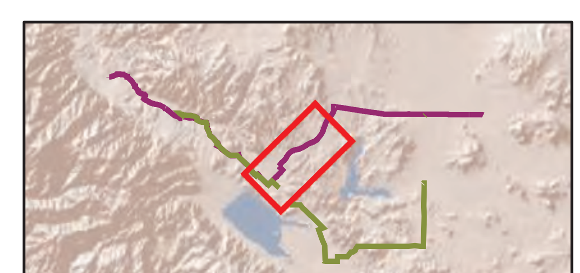

Figure 2.2i

Project Features

Alberhill and Valley–Ivyglen Projects

Riverside County, California

2.1.2 Alberhill Project Overview

The proposed Alberhill Project would include construction of a new 1,120 megavolt ampere (MVA) 500/115-kV substation (Alberhill Substation), which would be expandable to a maximum of 1,680 MVA depending on future need. In addition to construction of a new Alberhill Substation, the proposed Alberhill Project would include the following:

- Construction of two new 500-kV transmission lines (approximately 3.3 miles, combined) within a new ROW to connect the proposed Alberhill Substation to the existing Serrano–Valley 500-kV Transmission Line;
- Double-circuit ~~Construction of~~ approximately 11.75 miles of ~~new double-circuit 115-kV subtransmission lines and removal of 11 miles of~~ existing single-circuit 115-kV subtransmission lines with structure replacement primarily in the existing ROW;
- Construction of about 3 miles of single-circuit 115-kV subtransmission lines with distribution lines underbuilt on the subtransmission line structures and removal of about 3 miles of electrical distribution lines within the existing ROW;
- Installation of a second 115-kV circuit on approximately 6.5 miles of single-circuit 115-kV subtransmission lines (the single-circuit line is to be constructed as part of the proposed Valley–Ivyglen Project);
- Installation of fiber optic lines overhead (9 miles) on sections of the new or modified subtransmission lines and underground (1 mile) in proximity to the proposed Alberhill Substation and several of the existing 115/12-kV substations;
- Construction of an approximately 120-foot microwave antenna tower at the proposed Alberhill Substation site; installation of microwave telecommunications dish antennas at the proposed Alberhill Substation, the existing Santiago Peak Communications Site, and Serrano Substation; and other telecommunications equipment installations at existing and proposed substations; and
- Transfer of 5 of the 14 Valley South 115-kV System substations to the proposed Alberhill 115-kV System: the Ivyglen, Fogarty, Elsinore, Skylark, and Newcomb 115/12-kV substations.

The applicant estimates that construction of the proposed Alberhill Project would take approximately 28 months. It is anticipated that the proposed Alberhill Project would be operational by Q4 2020.~~spring or summer 2019.~~ Figure 2-3 presents a technical schematic of the existing and proposed systems.

2.2 Locations of the Proposed Projects

The applicant proposes to construct both of the proposed projects within unincorporated and incorporated areas of western Riverside County. This section summarizes the various jurisdictions that proposed project components would traverse.

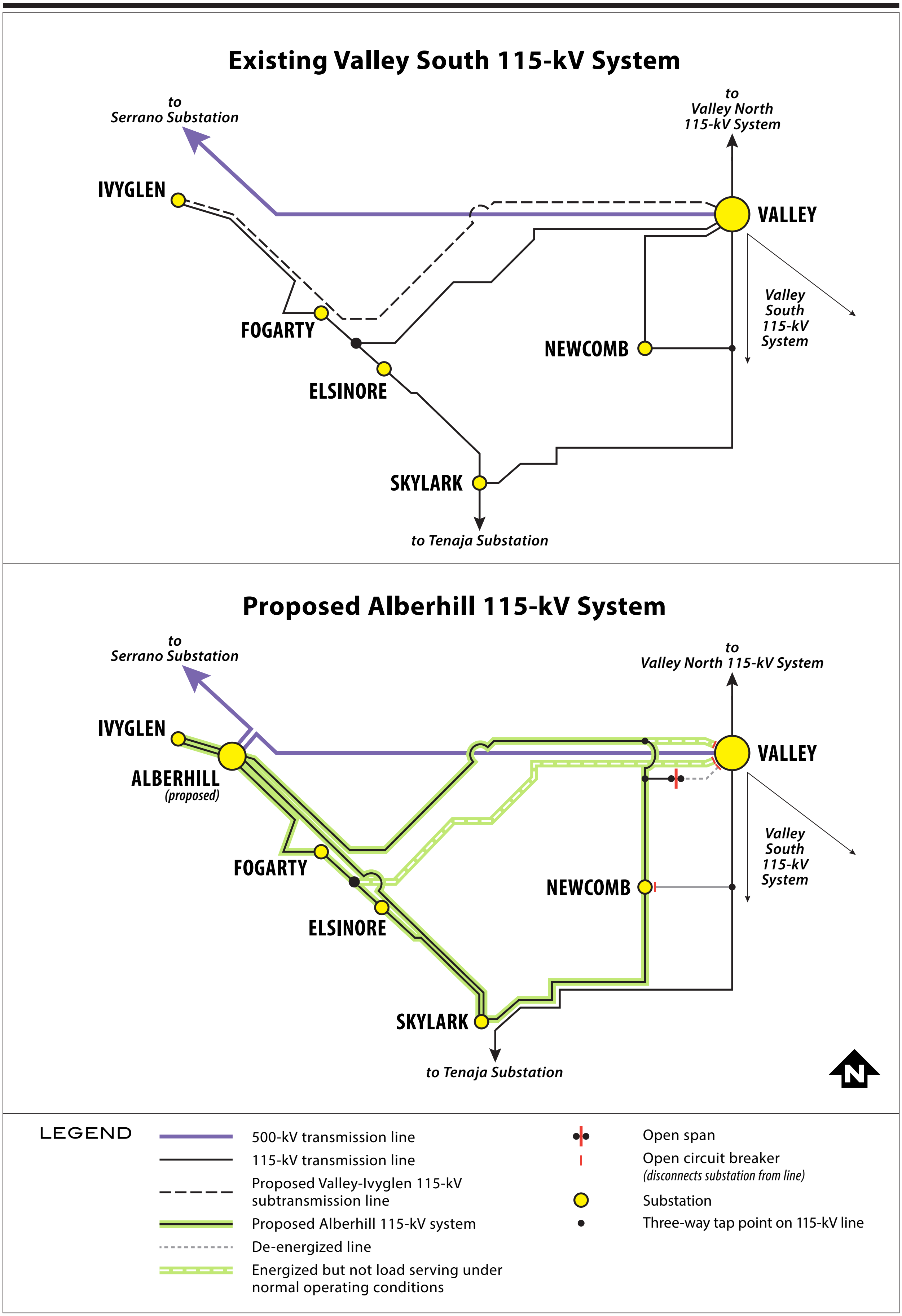

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Figure 2-3

Technical Schematic of Existing and Proposed Systems

Alberhill and Valley-Ivyglen Projects

Riverside County, California

2.2.1 Valley–Ivyglen Project Location

From the existing Valley Substation, in the City of Menifee, the proposed 115-kV line would traverse in a generally west direction through areas within the City of Menifee, City of Perris, City of Lake Elsinore, and unincorporated areas of western Riverside County to the existing Ivyglen Substation (Figure 2-1). The proposed route would cross Interstate 215 (I-215), State Route 74 (SR-74), and Interstate 15 (I-15). Fiber optic lines would be installed overhead on the proposed structures and underground in new and existing conduits.

2.2.2 Alberhill Project Location

The Alberhill Substation is proposed to be built on 34 to 40 acres of a 124-acre property located north of I-15 and the intersection of Temescal Canyon Road and Concordia Ranch Road in unincorporated western Riverside County (Figure 2-1).[3] The two new 500-kV transmission lines would each extend approximately 1.5 miles northeast to connect the proposed Alberhill Substation to the existing Serrano–Valley 500-kV Transmission Line. The two 500-kV transmission lines would be constructed primarily in unincorporated Riverside County, although the transmission lines would pass through the City of Lake Elsinore.

The proposed 115-kV line modifications and construction would occur southeast from the proposed Alberhill Substation to Skylark Substation (approximately 11.5 miles) and from Skylark Substation to Newcomb Substation (approximately 9 miles). The subtransmission lines would be modified or constructed in unincorporated Riverside County and in the Cities of Lake Elsinore, Wildomar, and Menifee.

Fiber optic lines would be installed overhead on the structures modified or constructed as part of the proposed Alberhill Project. In a few locations, fiber optic lines would also be installed in a new underground conduit. Telecommunications equipment would be installed within the telecommunications rooms at the applicant's Barre, Fogarty, Ivyglen, Mira Loma, Newcomb, Serrano, Skylark, Tenaja, Valley, and Walnut Substations (Figure 1-1). Telecommunications systems would also be upgraded at the Box Springs Communications Site, which is located northwest of the City of Moreno Valley, California, and the applicant's Irvine Operations Center in southeastern Irvine, California.

One new approximately 120-foot microwave antenna tower would be installed at the proposed Alberhill Substation; one new microwave dish antenna would be installed at Serrano Substation in the City of Orange in Orange County; and two new dish antennas would be installed at the Santiago Peak Communications Site, which is located on land managed by the United States Forest Service within the Cleveland National Forest.

2.3 Components of the Proposed Projects

This section details the various components of the proposed projects.

[3] If the applicant elects to excavate 5.2 acres of land adjacent to the northeast corner of the proposed substation site to obtain fill required for grading under Import Soil Option 1, then the land required for construction of the proposed substation would increase from 34 acres to approximately 40 acres (Section 2.4.6.2).

2.3.1 Components of the Proposed Valley–Ivyglen Project

The components of the proposed Valley–Ivyglen Project are summarized in Table 2-1. Locations of the proposed Valley–Ivyglen Project's components are shown on Figures 2-2a through 2-2d, 2-2f, and 2-2i. Structures and underground conduit are shown in Figure 2-4.

Table 2-1 Components of the Proposed Valley–Ivyglen Project

Component	Approximate Quantity	Dimensions / Specifications
Subtransmission Line Segments (Overhead and Underground)		
Segment VIG1: New single-circuit 115-kV subtransmission line	• 145 LWS poles • 20 TSPs / riser poles [a] • 1 underground vaults [b]	• 7.5 miles (300 feet new underground conduit) • 30-foot-wide existing ROW on northern side of existing 260- to 390-foot-wide ROW
Segment VIG2: New single-circuit 115-kV subtransmission line	• 118 LWS poles • 2 TSPs • 18 guy poles [c]	• 4.2 miles • 20- to 50-foot-wide new ROW (4.2 miles), partially within existing distribution-line ROW [d]
Segment VIG3: New single-circuit 115-kV subtransmission line ~~along~~	• 28 LWS poles • 6 TSPs • 2 guy poles • 1 wood pole	• 1.0 mile • 30-foot-wide new ROW (1.0 mile), partially within existing distribution-line ROW [d]
Segment VIG4: New single-circuit 115-kV subtransmission line	• 2 wood poles • 63 LWS poles • 8 TSPs • 4 hybrid poles [e] • 3 guy poles	• 2.5 miles • 30-foot-wide new ROW (0.3 miles), partially within existing distribution-line ROW [d]
Segment VIG5: New single-circuit 115-kV subtransmission line	• 1 wood poles • 100 LWS poles • 49 TSPs	• 5.11 miles • 30- to 60-foot-wide new ROW (3.9 miles), partially within existing distribution and 115-kV ROW [d, f]
Segment VIG6: New single-circuit 115-kV subtransmission line	• 30 LWS poles • 12 TSPs • 3 guy poles	• 1.83 miles • 30-foot-wide new ROW (1.1 miles), partially within existing distribution and 115-kV ROW [d, f]
Segment VIG7: New single-circuit 115-kV subtransmission line	• 10 wood poles • 30 LWS poles • 20 TSPs • 10 wood shoofly poles (temporary) • 1 Riser	• 2.3 miles [h] • 30-foot-wide new ROW (1.8 miles), partially within existing distribution and 115-kV ROW [d, f]
Segment VIG8: New single-circuit 115-kV subtransmission line	• 2 wood poles • 4 TSPs / riser poles [g] • 8 underground vaults	• 1.9 miles • 10- to 30-foot-wide new ROW (1.9 miles)

Table 2-1 Components of the Proposed Valley–Ivyglen Project

Component	Approximate Quantity	Dimensions / Specifications
Modifications at Existing Substations		
New telecommunications equipment installed at Valley and Ivyglen substations	n/a	n/a
New circuit breakers, disconnect switches, and one dead-end structures installed at Valley and Ivyglen substations	Valley Sub: Equip existing vacant 115kV Position • (2) 115kV Circuit Breaker • (4) 115kV Disconnect Switches Ivyglen Sub: Equip existing vacant 115kV Position • 115kV Circuit Breaker • 115kV Disconnect Switches	n/a
Totals		
New 115-kV subtransmission line	n/a	• 26.4 miles (1.9 miles in new underground conduit, 0.0 miles in existing underground conduit) [(g)]
Fiber optic line	n/a	• 26.1 miles (1.9 miles in new underground conduit, 2.5 miles in existing underground conduit)
New ROW to be acquired	n/a	• 23 miles (10 to 60 feet wide)
Maximum number of overhead structures that would be installed by structure type [(h)]	• 16 wood poles installed • 514 LWS poles installed • 121 TSPs installed • 4 hybrid poles installed • 26 guy poles • 1 riser	• 35 to 100 feet tall, 1.5 to 2.5 feet in diameter at ground level • 65 to 115 feet tall, 1.5 to 2.5 feet in diameter at ground level • 80 to 135 feet tall,[(i)] 5 to 8 feet in diameter at ground level (including foundation) • 75 to 80 feet tall, 5 to 6 feet in diameter at ground level • 40 to 60 feet tall, 1 to 2 feet in diameter at ground level
	682 overhead structures permanently installed 10 wood shoofly poles temporarily installed	• 75 to 100 feet tall, 1.5 to 2.5 feet in diameter at ground level
Number of vaults installed [(h)]	9 underground vaults installed	Excavated pit would be 12 feet wide by 24 feet long by 14 feet deep

Table 2-1 Components of the Proposed Valley–Ivyglen Project

Component	Approximate Quantity	Dimensions / Specifications
Number of overhead structures removed [h]	• 280 wood distribution-line poles removed [d] • 90 wood subtransmission-line poles removed [f]	• 12-kV poles: 30 to 80 feet tall, 0.7 to 1.6 feet in diameter at ground level • 33-kV poles: 30 to 65 feet tall, 0.8 to 1.6 feet in diameter at ground level • 35 to 90 feet tall, 0.8 to 2 feet in diameter at ground level
	370 structures removed	

Sources: SCE 2013, 2014

Key: kV = kilovolt, LWS = lightweight steel, n/a = not applicable, ROW = right-of-way, TSP = tubular steel pole

Notes:

a At each end of the proposed underground 115-kV line, the conductor would rise out of the ground up a riser pole. The proposed riser poles would be TSPs.

b Vaults are below-grade concrete enclosures where underground electrical or telecommunications lines terminate, are spliced together, or transition to or from overhead positions. During operations, vaults are used to access underground lines for inspection, maintenance, and repair.

c A guy pole is a pole to which a steel cable (a guy wire) is attached and extended to an adjacent LWS pole or other utility structure. Guy poles and guy wires are installed to add stability to a utility structure.

d Existing overhead electrical distribution lines would be relocated to and underbuilt on the proposed overhead 115-kV structures.

e The lower section of a hybrid pole (Figure 2-4) is composed of concrete and the upper section of steel. Hybrid poles are direct-buried into the ground (without poured-in-place foundations) in areas with corrosive soil conditions.

f In some areas, where the proposed route would follow an existing 115-kV ROW, the single-circuit 115-kV structures would be replaced with double-circuit 115-kV structures (e.g., along the temporary, shoofly line section of 115-kV Segments VIG7 and VIG8). In other areas (e.g., along sections of 115-kV Segment 5), the existing single-circuit 115-kV structures would remain in operation as currently configured. The precise number of existing 115-kV structures that would be converted into double-circuit structures would be determined during final engineering.

g The distance presented includes 0.5 miles of temporary 115-kV structures that would be installed as part of the shoofly construction proposed along 115-kV Segments VIG7 and VIG8, which are described in Section 2.4.5.4. The length of the new underground conduit (Figure 2-4) presented includes 525 feet of trenching for the replacement of 35 distribution-line riser poles.

h The numbers of structures and vaults to be installed may change based on final engineering.

i Two TSPs up to 135 feet tall would be needed along 115-kV VIG Segment 1 to span a cultural site. All other TSPs proposed along the segment would be up to 115 feet tall.

The applicant provided approximate structure locations (Figures 2-2a through 2-2d, 2-2f, and 2-2i). Although it is assumed the structures would be installed, in general, within the linear orientation of the proposed Valley–Ivyglen 115-kV line route, final engineering has not been completed. For the purposes of this analysis, it is assumed that the proposed 115-kV structures could be installed anywhere along the proposed route.

Span length would range between 80 feet and 1,000 feet in some locations to minimize impacts on various resources.

2.3.1.1 115-kV Subtransmission Lines (Segments VIG1 through VIG8)

The proposed Valley–Ivyglen Project would involve the construction of a new 115-kV subtransmission line. The route of the proposed Valley–Ivyglen 115-kV line is identified as Segments VIG1 through VIG8 on Figures 2-2a through 2-2d, 2-2f, and 2-2i. Wood poles, guy poles, lightweight steel (LWS) poles, hybrid poles, tubular steel poles (TSPs), underground duct banks and underground vaults would be used for construction of the new 115-kV subtransmission lines (Figure 2-4).

Reference: SCE

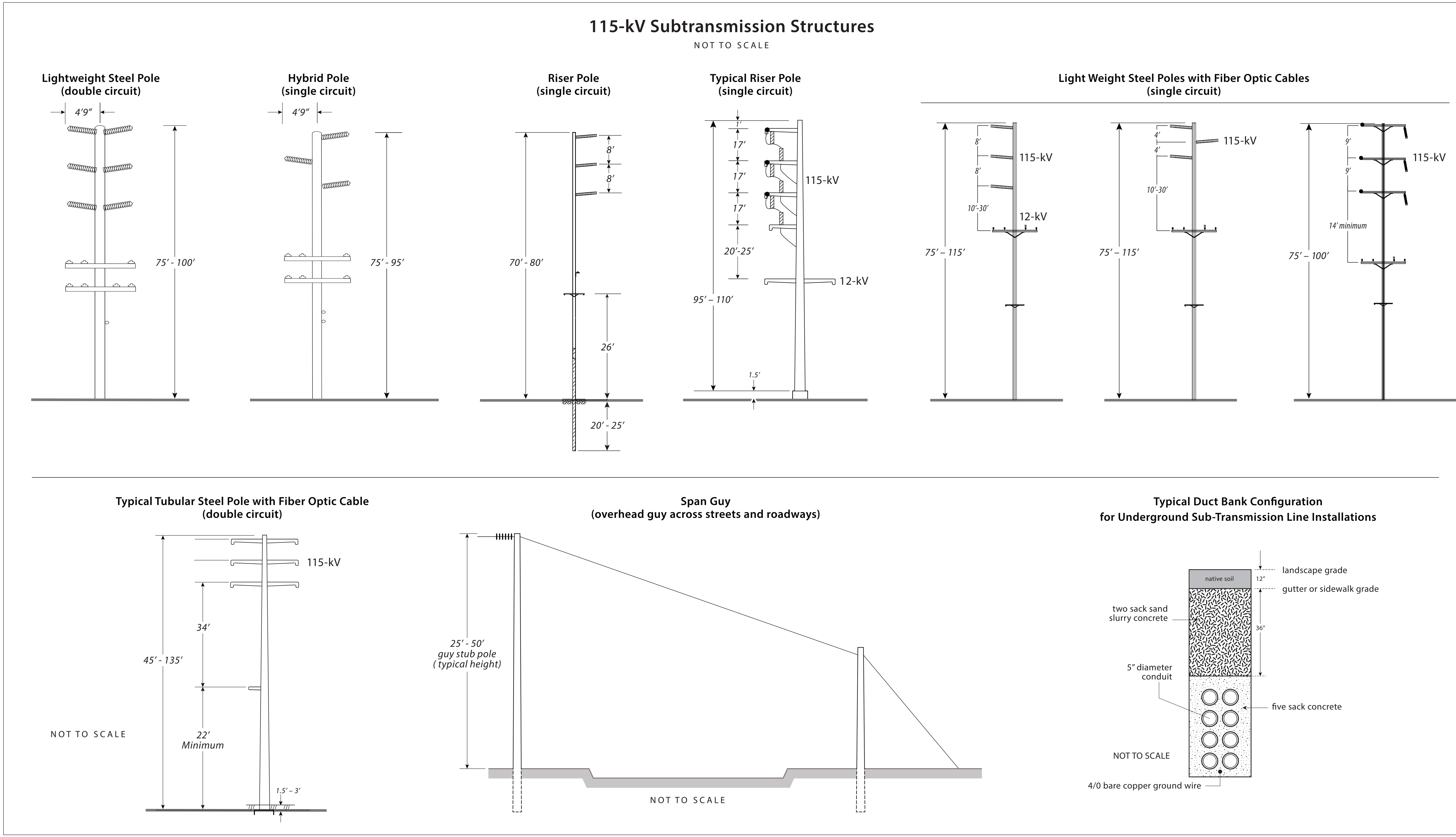

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Figure 2-4

Subtransmission Structures and Underground Duct Bank Configuration

Valley-Ivyglen Project

Each of the proposed 115-kV overhead structures would support polymer insulators, a 954-kcmil[4] stranded aluminum conductor (SAC), and a 336.4-kcmil stranded aluminum conductor steel-reinforced fault-return conductor. Grounding would be provided through a clamp attachment installed to the proposed metal 115-kV structures to bond the fault return conductor structures. The proposed wood and hybrid poles would have a 4/0 aluminum steel-reinforced conductor installed for grounding. The normal rating (in clear atmospheric conditions, with an ambient temperature of 104 degrees Fahrenheit, at an elevation of 500 feet, and with a wind speed of 4 feet per second) of the proposed 954-kcmil conductor is 1,090 amps when in continuous operation. The emergency rating, assuming 4 hours of operation, is 1,470 amps. Under the same conditions, the normal rating of the proposed 336.4-kcmil fault-return conductor is 605 amps and emergency rating is 820 amps.

115-kV Segment VIG1

The 115-kV Segment VIG1 would exit the Valley Substation from the southwest and extend west along the north side of the existing Serrano–Valley 500-kV Transmission Line ROW to SR-74. The segment would span I-215, SR-74, and a number of roadways and cross through the City of Menifee, City of Perris, and unincorporated Riverside County. Approximately 0.5 mile west of the Valley Substation, a 300-foot portion of 115-kV Segment VIG1 would be installed in new underground duct banks. Portions of the existing distribution line would be relocated to an overhead position on a lower section of the new 115-kV structures.

115-kV Segment VIG2

This segment would follow SR-74 south, passing from unincorporated Riverside County into the City of Lake Elsinore. The segment would then follow along the western side of SR-74 to Conard Avenue. Sections of 115-kV Segment VIG2 would follow an existing distribution line ROW, and in these areas, the existing distribution line would be relocated to an overhead position on a lower section of the new 115-kV structures. A number of guy poles would be installed on the east side of SR-74 in locations where the proposed 115-kV structures require additional support (Figures 2-2c and 2-2d). Guy wires would span SR-74 between the proposed 115-kV structure and the guy poles.

115-kV Segment VIG3

This segment would cross SR-74 and follow Conard Avenue southeast to Third Street. It would follow Third Street southwest across I-15 and then continue southwest to Collier Avenue. 115-kV Segment VIG3 would follow an existing distribution line ROW, and the distribution line would be relocated to an overhead position on a lower section of the new 115-kV structures. Guy poles would be installed in locations where the proposed 115-kV structures require additional support. Guy wires would span Third Street and Conard Street between the proposed 115-kV structure and the guy poles in several locations.

115-kV Segment VIG4

This segment would continue along Third Street from Collier Avenue southwest to Pasadena Avenue and then follow Pasadena Avenue northwest until the road ends. From there, it would pass over land to

[4] A circular mil (cmil) is a standard unit of measure used for electrical systems that refers to the area of the cross section of larger conductor sizes. One cmil is equal to the area of a circle with a 1-mil diameter, and 1 kcmil is equal to 1,000 cmils. Large conductor sizes rated for use on electrical transmission lines are generally 0.6 inches to 2 inches in diameter. Aluminum steel-reinforced 2,156-kcmil conductor is approximately 1.8 inches in diameter. In general, larger diameter conductor is capable of greater electrical carrying capacity than smaller diameter conductor (Grigsby 2001).

Riverside Drive (SR-74), extend southwest to Baker Street, and then follow Baker Street northwest to Pierce Street. It would pass under the Valley–Elsinore–Fogarty 115-kV line as it approaches Pierce Street. Sections of 115-kV Segment VIG4 would follow an existing distribution line ROW, and in these areas, the existing distribution line would be relocated to an overhead position on a lower section of the new 115-kV structures. Guy poles would be installed in locations where the proposed 115-kV structures require additional support.

Additionally, approximately 600 feet of construction would occur along the Valley–Elsinore–Fogarty 115-kV line where the proposed Valley–Ivyglen 115-kV line would cross under the existing 115-kV line (Figure 2-2b) approximately 650 feet south of the Pierce Street and Baker Street intersection. Four Valley–Elsinore–Fogarty 115-kV line wood poles would be replaced with two new TSPs and two new wood poles.

115-kV Segment VIG5

This segment would continue from Pierce Street across Nichols Road and then extend west along Nichols Road to the abandoned section of Lake Street ("Old Lake Street"). It would extend northwest along Old Lake Street toward I-15. At this point, the applicant would construct the 115-kV line along Lake Street in one of two alignments—Utility Corridor Option or West of Lake Street Option:

- **Utility Corridor Option:** Under this option, 115-kV Segment VIG5 would continue parallel to and east of Lake Street. The segment would continue north on the east side of Lake Street for about 900 feet.[5] The segment would then cross to the west side of Lake Street and continue north to approximately 800 feet south of Temescal Canyon Road then cross to the east side of Lake Street and continue north to the I-15 on- and off-ramps.
- **West of Lake Street Option:** Under this option, 115-kV Segment VIG5 would cross Lake Street at its intersection with the abandoned portion of Old Lake Street. The segment would then continue parallel to and west of Lake Street. The segment would continue north on Lake Street to approximately 800 feet south of Temescal Canyon Road then cross to the east side of Lake Street and continue north to the I-15 on- and off-ramps for Lake Street.

From the east side of Lake Street, the segment would turn west along the south side of an I-15 off-ramp and then along both sides of Temescal Canyon Road for approximately 0.3 miles. From there, it would cross I-15 to the north and then continue west along Concordia Ranch Road to the proposed Alberhill Substation site. A number of guy poles would be installed in locations where the proposed 115-kV structures require additional support.

Structures along sections of the existing Fogarty–Ivyglen 115-kV line would be replaced and, in some cases, relocated along the existing ROW to allow for installation of the proposed Valley–Ivyglen 115-kV line. These sections, combined, would be approximately 0.5 miles long. Sections of 115-kV Segment VIG5 would follow existing distribution line ROWs, and in these areas, the existing distribution line would be relocated to an overhead position on a lower section of the new 115-kV structures.

[5] This area east of Lake Street is the location of a planned utility corridor. The utility corridor has not yet been prepared to accommodate utilities. All necessary work, including relocation of a Temescal Wash tributary, would be as part of the Alberhill Ridge Specific Plan (a separate developer project from applicant's Valley–Ivyglen Project) prior to construction of the proposed Valley–Ivyglen Project if the applicant selects this option.

115-kV Segment VIG6

This segment would continue along Temescal Canyon Road west to Hostettler Road from where 115-kV Segment VIG5 crosses I-15. From there, it would extend over land northwest along I-15. Sections of 115-kV Segment VIG6 would follow an existing distribution line ROW or the 115-kV ROW. The existing distribution line would be relocated to an overhead position on a lower section of the new 115-kV structures. Existing single-circuit 115-kV structures would likely be replaced with 115-kV structures capable of supporting two circuits (i.e., double-circuit 115-kV structures), but this would be determined during final engineering.

115-kV Segment VIG7

This segment would cross Horse Thief Canyon Road and continue along De Palma Road for approximately 1.2 miles. From there, it would cross I-15 to the north and extend to Temescal Canyon Road. It would continue northwest on Temescal Canyon Road to a point approximately 700 hundred feet northwest of the intersection of Temescal Canyon Road and Indian Truck Trail. For approximately 0.5 miles prior to transitioning into 115-kV Segment VIG8, Segment VIG7 would be constructed within the existing Fogarty–Ivyglen 115-kV line ROW. The existing single-circuit 115-kV structures would be replaced with double-circuit 115-kV structures. Sections of 115-kV Segment VIG7 would follow existing distribution line ROWs, and the existing overhead distribution line would be relocated to an overhead position on a lower section of the new 115-kV structures. Approximately 0.5 miles of temporary 115-kV structures would be installed as part of the proposed shoofly construction activities described in Section 2.4.5.4.

115-kV Segment VIG8

This segment would continue northwest along Temescal Canyon Road from the end of 115-kV Segment VIG7 in a new underground conduit. It would be installed underground along Temescal Canyon Road, which crosses under I-15, to a point located across from Ivyglen Substation. From there, it would transition to an overhead position prior to entering the substation.

Vaults and duct banks would be installed along the proposed underground route. Vaults are below-grade concrete enclosures where underground electrical or telecommunications lines terminate, are spliced together, or transition to or from overhead positions. Two of the temporary 115-kV shoofly structures would be installed along 115-kV Segment VIG8.

2.3.1.2 Telecommunications

A new fiber optic line would be installed along the 115-kV Segments, as shown in Figures 2-5a through 2-5d, and as described below. Land disturbance estimates for the proposed trenching activities along all Valley–Ivyglen 115-kV segments are presented in Table 2-5.

115-kV Segment VIG1

Along 115-kV Segment VIG1, the fiber optic line would primarily be installed overhead on the proposed 115-kV structures, with the exception of the following proposed underground locations:

- Approximately 2,530 feet in an existing underground conduit within Valley Substation;
- Approximately 315 feet in a new underground conduit adjacent to Valley Substation; and
- Approximately 1,331 feet in new underground conduit approximately 0.5 miles west of Valley Substation.

115-kV Segment VIG2

Along 115-kV Segment VIG2, a fiber optic line would primarily be installed overhead on the proposed 115-kV structures, with the exception of approximately 410 feet in a new underground conduit along SR-74 from Ethanac Road to Festus Circle.

115-kV Segment VIG3

Along 115-kV Segment VIG3, a fiber optic line would primarily be installed overhead on the proposed 115-kV structures with the exception of approximately 338 feet in a new underground conduit along Third Street and across Collier Avenue.

115-kV Segment VIG4

Along 115-kV Segment VIG4, the fiber optic line would primarily be installed overhead on the proposed 115-kV structures, with the exception of approximately 210 feet in a new underground conduit along Collier Avenue and Third Street, and approximately 200 feet in a new underground conduit along Baker Street southeast of Pierce Street.

115-kV Segment VIG5

Along 115-kV Segment VIG5, the fiber optic line would primarily be installed overhead on the proposed 115-kV structures, with the exception of approximately 613 feet in an existing underground conduit across Nichols Road to Old Lake Street.

115-kV Segment VIG6

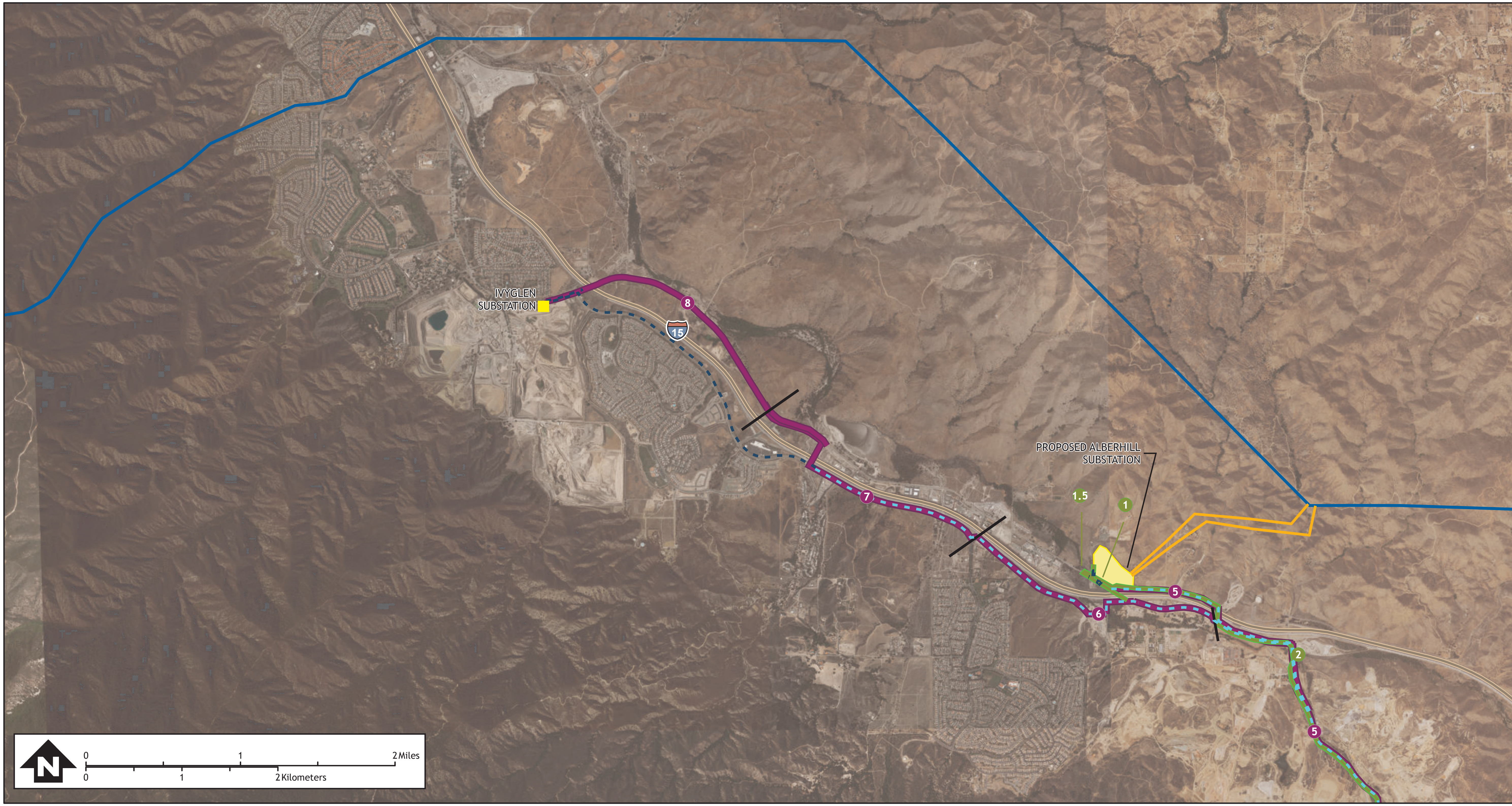
Along 115-kV Segment VIG6, the fiber optic line would be installed overhead on the proposed 115-kV structures.

115-kV Segment VIG7

Along 115-kV Segment VIG7, the fiber optic line would primarily be installed overhead on the proposed 115-kV structures, with the exception of approximately 1,330 feet in a new telecommunications underground conduit along De Palma Road east of the intersection of Campbell Ranch Road and Santiago Canyon Road.

115-kV Segment VIG8

Along 115-kV Segment VIG8, the fiber optic line would primarily be installed underground along this segment. Approximately 10,670 feet of fiber optic cable would be installed in an existing underground conduit along Campbell Ranch Road, beginning approximately 850 feet east of Santiago Canyon Road, to Ivyglen Substation. An additional approximately 1,497 feet of fiber optic cable would be installed in a new underground conduit along Temescal Canyon Road from Campbell Ranch Road to Ivyglen Substation.



Source: ESRI 2010, SCE 2011, 2013

1 VIG1
2 VIG2
3 VIG3
4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4
5 ASP5
6 ASP6
7 ASP7
8 ASP8

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end
Aboveground fiber optic lines
Underground fiber optic lines

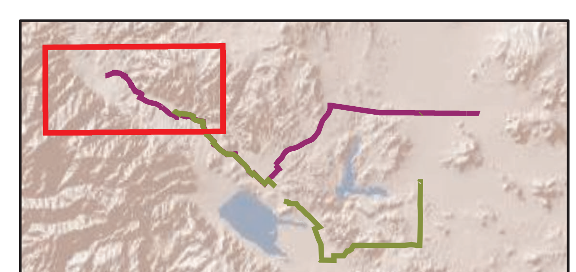


Figure 2.5a

Fiber Optic Lines and Project Alignment

Alberhill and Valley–Ivyglen Projects

Riverside County, California

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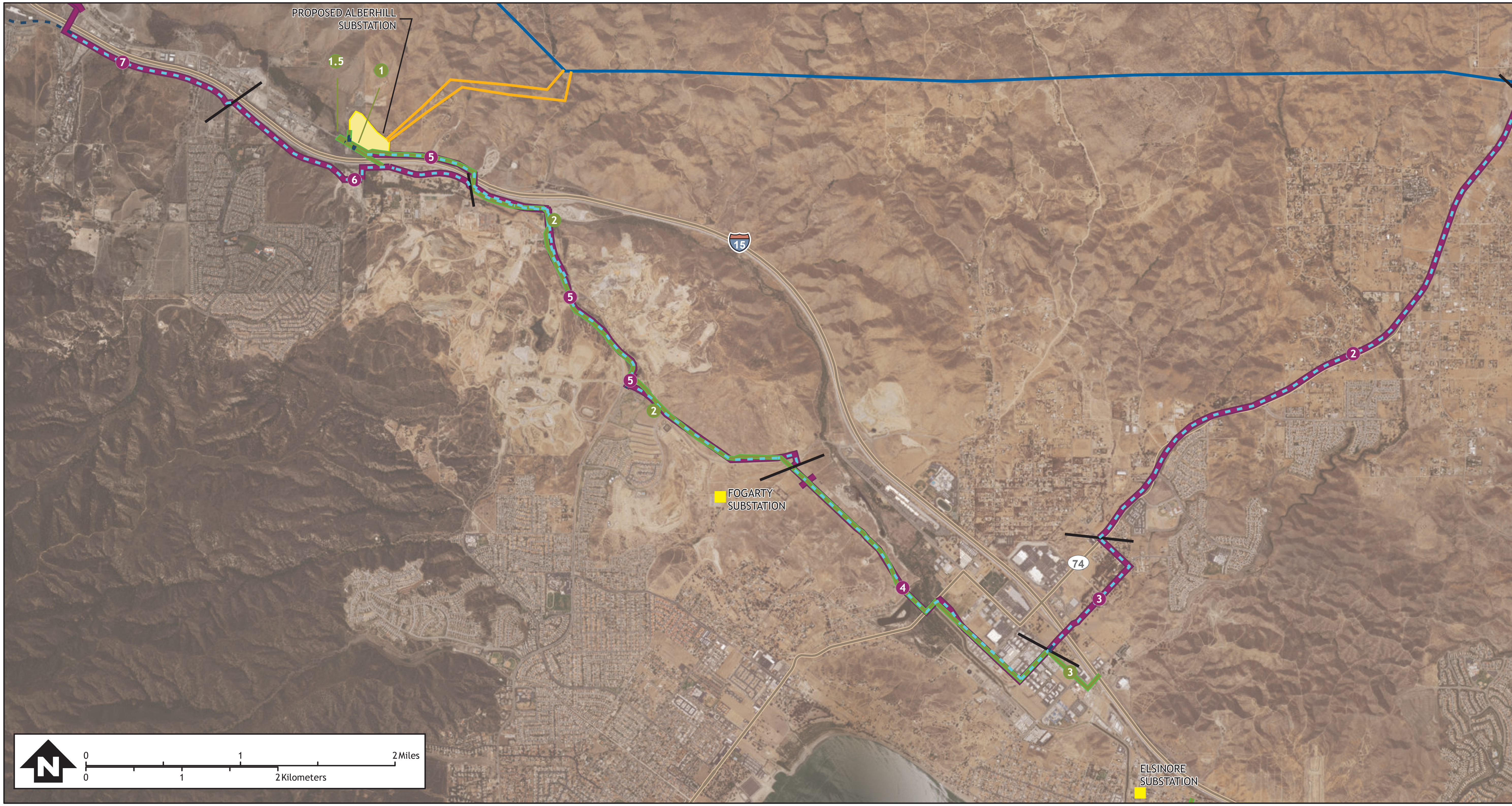

Source: ESRI 2010, SCE 2011, 2013

1 VIG1
2 VIG2
3 VIG3
4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4
5 ASP5
6 ASP6
7 ASP7
8 ASP8

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end
Aboveground fiber optic lines
Underground fiber optic lines

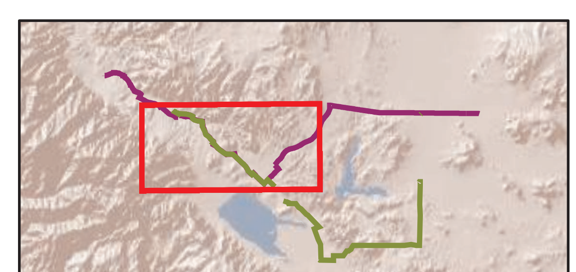

Figure 2.5b

Fiber Optic Lines and Project Alignment

Alberhill and Valley–Ivyglen Projects

Riverside County, California

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Source: ESRI 2010, SCE 2011, 2013

1 VIG1
2 VIG2
3 VIG3
4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4
5 ASP5
6 ASP6
7 ASP7
8 ASP8

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end
Aboveground fiber optic lines
Underground fiber optic lines

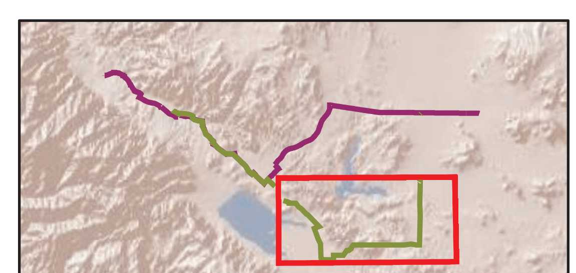
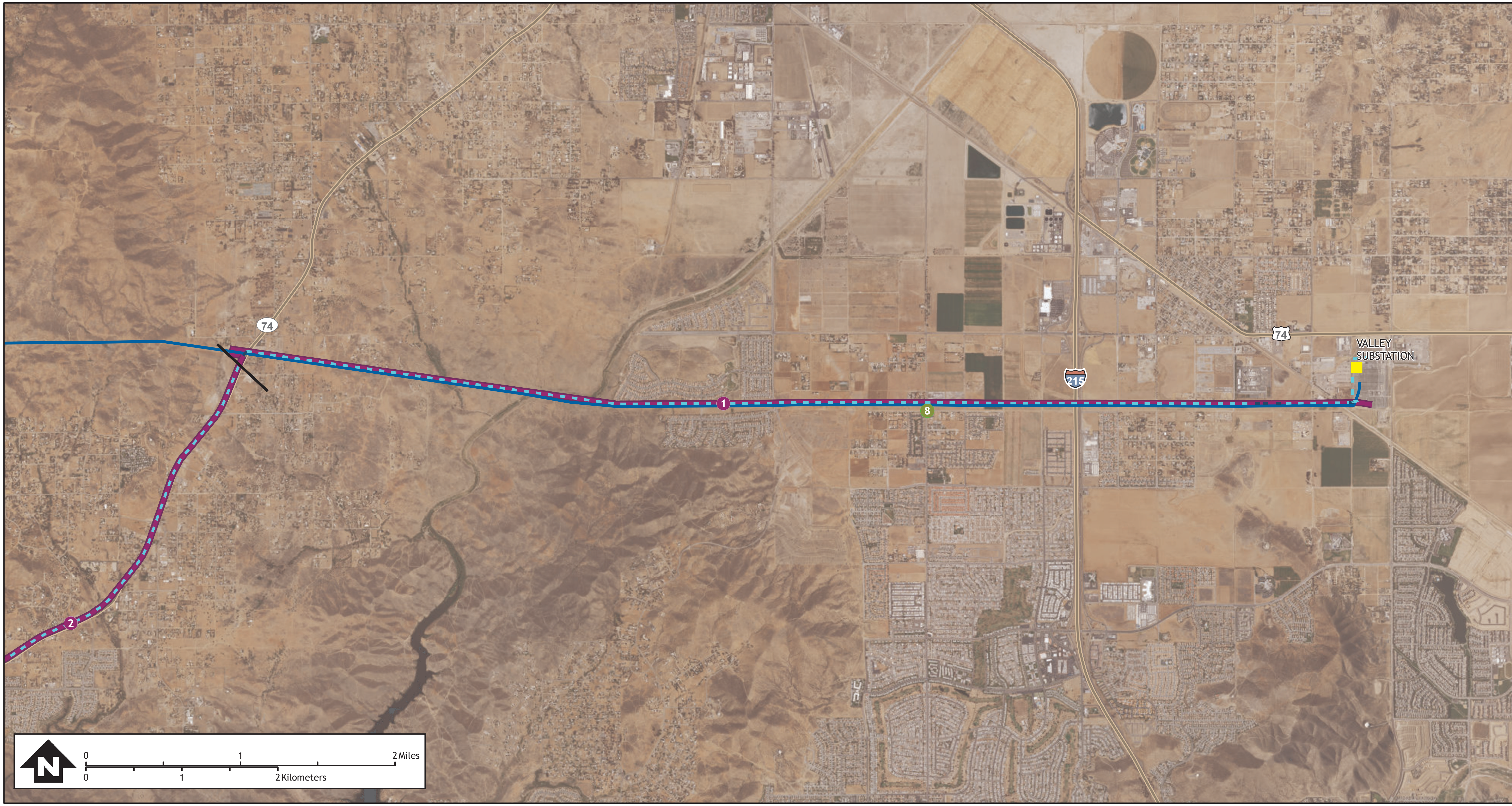


Figure 2.5c

Fiber Optic Lines and Project Alignment

Alberhill and Valley–Ivyglen Projects

Riverside County, California



Source: ESRI 2010, SCE 2011, 2013

1 VIG1
2 VIG2
3 VIG3
4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4

5 ASP5
6 ASP6
7 ASP7
8 ASP8

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end

Aboveground fiber optic lines
Underground fiber optic lines

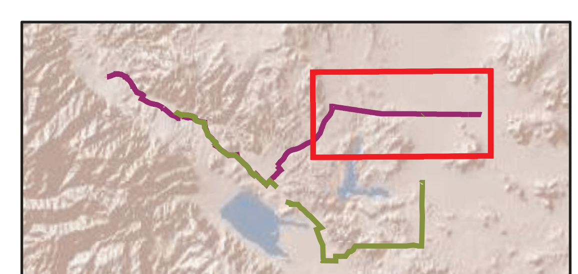


Figure 2.5d

Fiber Optic Lines and Project Alignment

Alberhill and Valley–Ivyglen Projects

Riverside County, California

2.3.1.3 Access Roads

The proposed Valley–Ivyglen Project includes widening and creation of a total of approximately 14 miles of roads. The new access roads could be located anywhere within the Valley–Ivyglen 115-kV General Disturbance Area (Figures 2-6a through 2-6d). The drivable area of the proposed access roads would generally be 24 feet wide with an additional 2 feet on each side if drainage *berms* or *swales* are required.[6] In addition, hilly terrain along sections of 115-kV Segments VIG1 and VIG6 may require additional permanent and temporary disturbance areas for vehicle turnaround and positioning during access road construction. In some locations, the permanent, graded disturbance areas may be as wide as 100 feet, and the temporary disturbance areas may be as wide as 200 feet. The access roads constructed to accommodate construction would be permanent. They would be maintained after construction to facilitate future access for operations and maintenance purposes. Excess soil and vegetation from access road construction would be distributed within the permanent, graded disturbance areas adjacent to the proposed access roads or disposed of as described in Section 2.4.4.8. Refer to the disturbance calculations in Table 2-5 for additional detail related to access road construction.

2.3.1.4 Valley and Ivyglen Substation Telecommunications Modifications

At Valley Substation, a 19-inch wide rack would be installed in the existing communications room to hold the telecommunications equipment. The communications and control rooms would have conduits for fiber optic cables and conduits to protect relaying equipment. At Ivyglen Substation, minor additions to existing channel equipment would be made.

2.3.2 Components of the Proposed Alberhill Project

The components of the proposed Alberhill Project are summarized in Table 2-2 and shown on Figure 2-2a through 2-2c, 2-2e, and 2-2g through 2-2i.

Table 2-2 Components of the Proposed Alberhill Project

Component	Quantity	Dimensions / Specifications
Alberhill Substation		
New 1,120 MVA 500/115-kV substation expandable to 1,680 MVA	• Up to three 500 MVA transformers in service and one spare transformer (a)	• 34 to 43 acres (b) • 33,550 gallons of oil per transformer • 37-foot-high transformers
500-kVA backup generator	1	• 960 gallons of diesel fuel
500-kV switchrack	• One gas-insulated switchrack • Space for second 500-kV switchrack and enclosure • Space for two~~three~~ future 500~~115~~-kV capacitor banks	• One 350-foot-long, 49-foot-high steel enclosure • Up to 50,000 pounds of SF_6
115-kV switchrack and future 12-kV switchrack	• One open-air insulated switchrack • Space for additional positions on switchrack • Space for future 12-kV switchrack and 115/12-kV transformers • One 115-kV capacitor bank	• One 60-foot-high dead-end structure • One 43-foot-high dead-end structure • Space for additional dead-end structures • Up to 1,200 pounds of SF_6 (circuit breakers)

[6] *Berms* are low earthen walls constructed to help retain and direct surface water runoff. *Swales* are depressions that collect surface water runoff.

Table 2-2 Components of the Proposed Alberhill Project

Component	Quantity	Dimensions / Specifications
	• Space for three future 115-kV capacitor banks	
Control building	• Substation monitoring equipment	• 20-feet high, 7,040 square feet
Parking area and multiple driveways	n/a	• 7,600-square-foot parking area • 30-foot to 45-foot-wide driveways • 156,000 square feet of road surface (c)
Agricultural water pipe relocation	n/a	• 27-inch-diameter pipe • 1,700 feet long
Transmission Lines (Overhead)		
Line SA: New 500-kV transmission line to connect the proposed Alberhill Substation to existing Serrano–Valley 500-kV Transmission Line	• 6 LSTs (1 LST removed) (d)	• 1.6 miles long • 250-foot to 2,100-foot spans between LSTs • 200-foot-wide ROW (new) (e)
Line VA: New 500-kV transmission line to connect the proposed Alberhill Substation to existing Serrano–Valley 500-kV Transmission Line (overhead)	• 6 LSTs No structures removed	• 1.7 miles long • 250-foot to 2,100-foot spans between LSTs • 200-foot-wide ROW (new) (e)
New overhead ground wires installed on 500-kB Lines AS and VA	n/a n/a	• 3.3 miles
Subtransmission Line Segments (Overhead)		
Segment ASP1: New double-circuit 115-kV subtransmission line at proposed substation site	• 7 TSPs • 3 LWS poles No structures removed	• 0.22 miles • On proposed substation site
Segment ASP1.5: New double-circuit 115-kV subtransmission line and removal of existing single-circuit section of Valley–Elsinore–Fogarty 115-kV line	• 4 LWS poles • 8 TSPs • 2 existing TSPs to be modified (4 wood poles,)	• 0.5 miles • 60-foot to 100-foot-wide ROW (existing) • Existing distribution line underbuild to be relocated to new 115-kV structures (f)
Segment ASP2: Double-circuit Valley–Ivyglen 115-kV line segment (g)	• 4 LWS • 2 TSP (4 LWS removed)	• 6.27 miles • 60-foot to 100-foot-wide ROW (existing). Existing distribution line underbuilt to be relocated to new 115-kV structures.)
Segment ASP3: New double-circuit 115-kV line segment and removal of existing single-circuit section of Valley–Elsinore–Fogarty–Ivyglen 115-kV line	• 13 LWS poles • 3 TSPs • 2 existing TSPs to be modified • 1 LWS guy stub (13 wood poles and 1 TSP)	• 0.48 miles • 60-foot to 100-foot-wide ROW (existing) • Existing distribution line underbuild to be relocated to new 115-kV structures (f)
Segment ASP4: New double-circuit 115-kV subtransmission line and removal of existing single-circuit sections of Elsinore–Skylark 115-kV lines	• 101 LWS poles • 12 TSPs • 12 LWS guy stubs • 3 Wood (modified) (112 wood poles, 1 LWS, and 1 TSP removed)	• 4.24 miles • 60-foot to 100-foot-wide ROW (existing) • Existing distribution line underbuild to be relocated to new 115-kV structures (f)

Table 2-2 Components of the Proposed Alberhill Project

Component	Quantity	Dimensions / Specifications
Segment ASP5: New double-circuit 115-kV subtransmission line segment and removal of existing single-circuit section of Valley–Newcomb–Skylark 115-kV line	• 109 LWS poles • 11 TSPs • 10 H-frame structures [h] • 1 TSP (modified) • 13 LWS guy stubs (119 wood, 2 LWS, 2 wood H-frame[h], 8 LWS H-frame[h])	• 5.5 miles • 60-foot to 100-foot-wide ROW (existing) • Existing distribution line underbuild to be relocated to new 115-kV structures [f]
Segment ASP6: New single-circuit 115-kV subtransmission line segment along existing distribution line route	• 100 LWS poles • 1 TSP (modified) • 7 LWS guy stubs (3 wood poles removed)	• 3 miles • 60-foot to 100-foot-wide ROW (existing) • Existing distribution line to be relocated to new 115-kV structures
Segment ASP7: New double-circuit 115-kV subtransmission line segment and removal of existing single-circuit section of Valley–Newcomb–Skylark 115-kV line	• 9 LWS poles • 4 TSPs • 3 LWS guy stubs (6 wood poles and 2 TSPs removed)	• 0.25 miles • 60-foot to 100-foot-wide ROW (existing) • Existing distribution line underbuild to be relocated to new 115-kV structures [f]
Segment ASP8: Connect Valley–Ivyglen and Valley–Newcomb single-circuit 115-kV lines	• 3 LWS poles • 4 TSPs • (3 wood poles removed)	• 0.06 miles or 300 feet • 260-foot to 390-foot-wide ROW (existing) • Existing distribution line underbuild to be relocated to new 115-kV structures [f]
Telecommunications Equipment and Fiber Optic Lines (Overhead and Underground)		
New microwave tower at Alberhill Substation	• 1 antenna tower	• 120 feet tall
New dishes at the proposed Alberhill Substation (one), Serrano Substation (one), and the Santiago Peak Communications Site (two)	• 4 microwave dish antennas	• 10 feet wide (each)
~~New overhead ground wires installed on 500-kV Lines SA and VA [i]~~	~~n/a~~	• ~~3.3 miles~~
New fiber optic telecommunication line installed on two 115-kV line taps into the proposed Alberhill Substation	n/a	• 2,000 feet • 650 feet underground
New fiber optic telecommunication line installed on 115-kV Segments ASP1, ASP 1.5, ASP5, ASP6, and ASP7	n/a	• 8.66 miles • 1.11 miles underground
New telecommunications equipment installed inside existing substations (e.g., microwave radios)	n/a	n/a
Totals		
New 500-kV transmission line	n/a	3.3 miles
New or modified 115-kV subtransmission line	n/a	20.42 miles
New fiber optic line	n/a	8.66 miles (1.11 miles in new underground conduit)
New 500-kV ROW to be acquired	n/a	3.3 miles (200 feet wide)
Number of transmission and subtransmission structures by structure	• 12 LSTs installed • 3 Wood Poles (modified)	• 95 feet to 190 feet tall, four concrete footings

Table 2-2 Components of the Proposed Alberhill Project

Component	Quantity	Dimensions / Specifications
type	• 346 LWS poles installed • 10 H-frame structures installed • 51 TSPs installed • 36 LWS guy stubs installed • 4 existing TSPs to be modified • 2 TSPs (modified)	• 75 feet to 100 feet tall, 1.5 to 2.5 feet in diameter at ground level • 70 feet to 80 feet tall, two 1.5 to 2.5 feet diameter LWS poles at ground level 70 feet to 115 feet tall, 5 to 8 feet in diameter at ground level (including foundation)
	(1 LST, 260 wood poles, 7 LWS poles, 3 TSPs, 2 wood H-frames and 8 LWS H-frames removed)	

Source: SCE 2011

Key: kV = kilovolt, kVA = kilovolt ampere, LST = lattice steel tower, LWS = lightweight steel, MVA = megavolt ampere, n/a = not applicable, SF_6 = sulfur hexafluoride gas, ROW = right-of-way, TSP = tubular steel pole

Notes:

[a] The initial build would include the installation of two transformers, with one of the two a spare. Space would be available for the installation of two additional transformers, for a maximum of three in-service transformers and a spare, if needed in the future.

[b] Approximately 34 acres would be needed for construction of the Alberhill Substation, including landscaping and access roads. If the applicant elects to excavate 5.2 acres of land adjacent to the northeast corner of the proposed substation site to obtain fill under Import Soil Option 1, then the land required for construction of the proposed substation would increase from 34 acres to approximately 40 acres (Section 2.4.6.2).

[c] Road surfaces inside and surrounding the proposed Alberhill Substation would be asphalt, concrete, or gravel (Class II Aggregate).

[d] One 500-kV tower would be removed from the Serrano–Valley 500-kV Transmission Line.

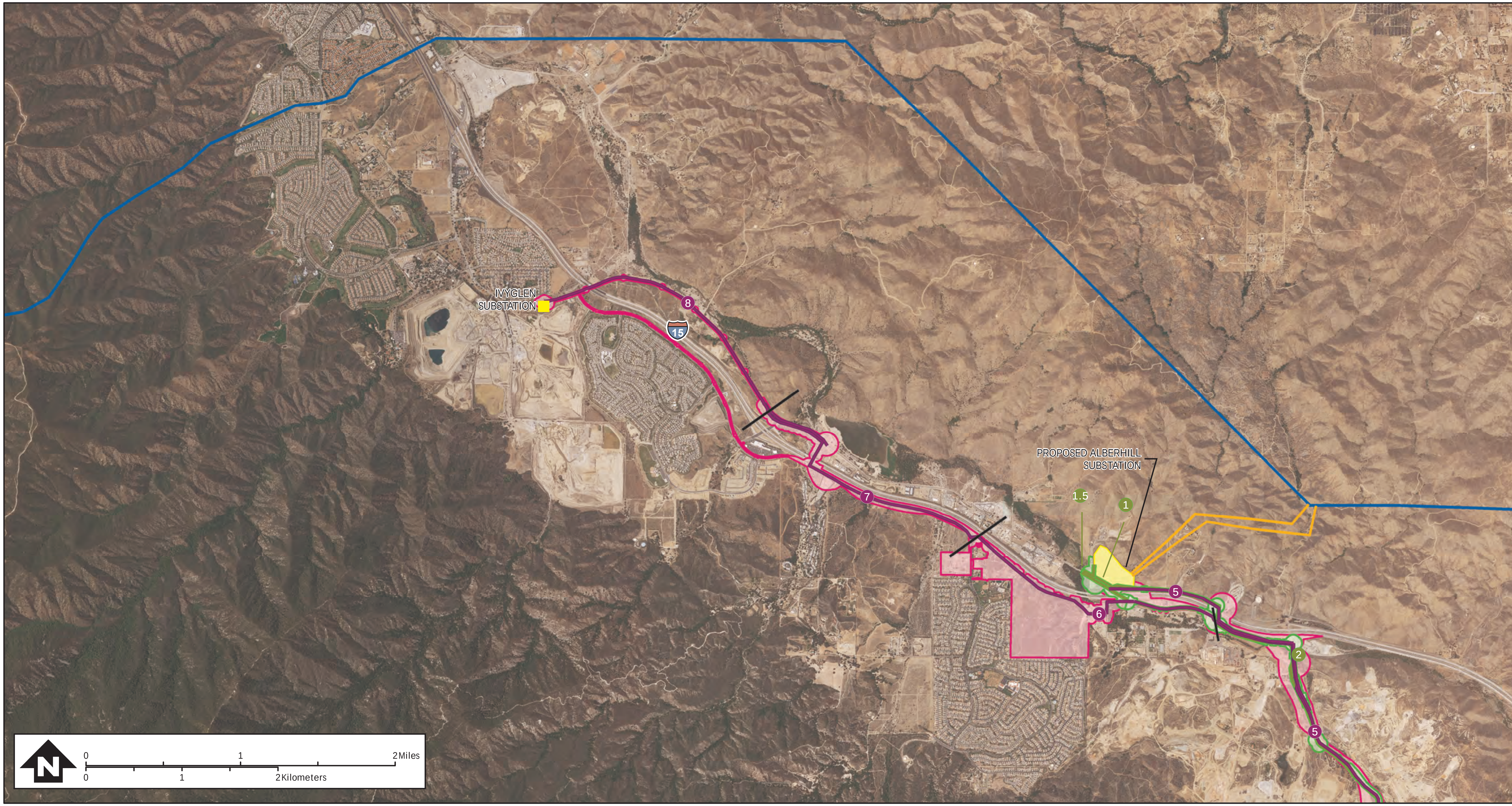
[e] Refer to Tables 2-6 and 2-7 for disturbance area by project component.

[f] A number of the existing single-circuit 115-kV structures to be replaced with double-circuit 115-kV structures have existing distribution and telecommunications lines underbuilt on (installed on the lower position of) the single-circuit 115-kV circuit structures. The existing distribution and telecommunications lines would be relocated to and underbuilt on the proposed double-circuit 115-kV structures.

[g] Placing a second circuit on this proposed Alberhill Project 115-kV segment requires that proposed Valley–Ivyglen Project 115-kV Segments VIG4 and VIG5 are constructed.

[h] H-frame structures are constructed using two LWS poles. Existing H-frame structures to be removed consist of two wood poles or two LWS poles. See figure 2-8 for a diagram of the H-frame structure.

[i] Two parallel overhead ground wires would be installed on the top of each of the proposed 500-kV towers.



Source: ESRI 2010, SCE 2011, 2013

1 VIG1
2 VIG2
3 VIG3
4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8
VIG Disturbance Area

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4
5 ASP5
6 ASP6
7 ASP7
8 ASP8
ASP Disturbance Area

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end

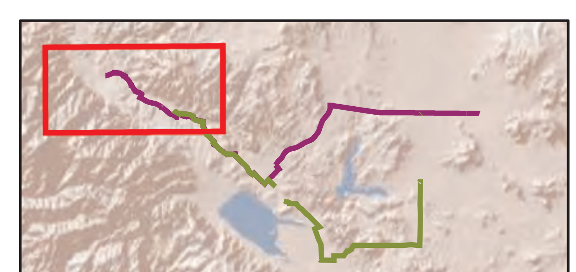


Figure 2.6a

General Disturbance Area and Project Alignment

Alberhill and Valley–Ivyglen Projects

Riverside County, California

Source: ESRI 2010, SCE 2011, 2013

1 VIG1
2 VIG2
3 VIG3
4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8
VIG Disturbance Area

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4
5 ASP5
6 ASP6
7 ASP7
8 ASP8
ASP Disturbance Area

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end

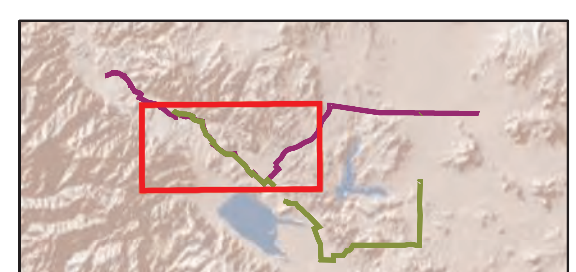


Figure 2.6b

General Disturbance Area and Project Alignment

Alberhill and Valley–Ivyglen Projects

Riverside County, California

Source: ESRI 2010, SCE 2011, 2013

1 VIG1
2 VIG2
3 VIG3
4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8
VIG Disturbance Area

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4
5 ASP5
6 ASP6
7 ASP7
8 ASP8
ASP Disturbance Area

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end

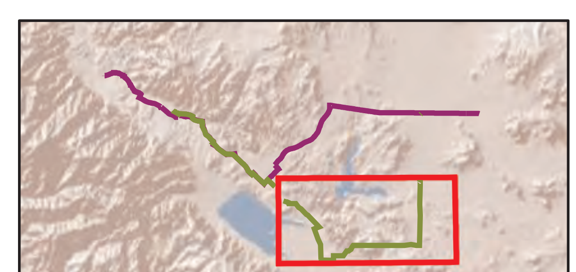
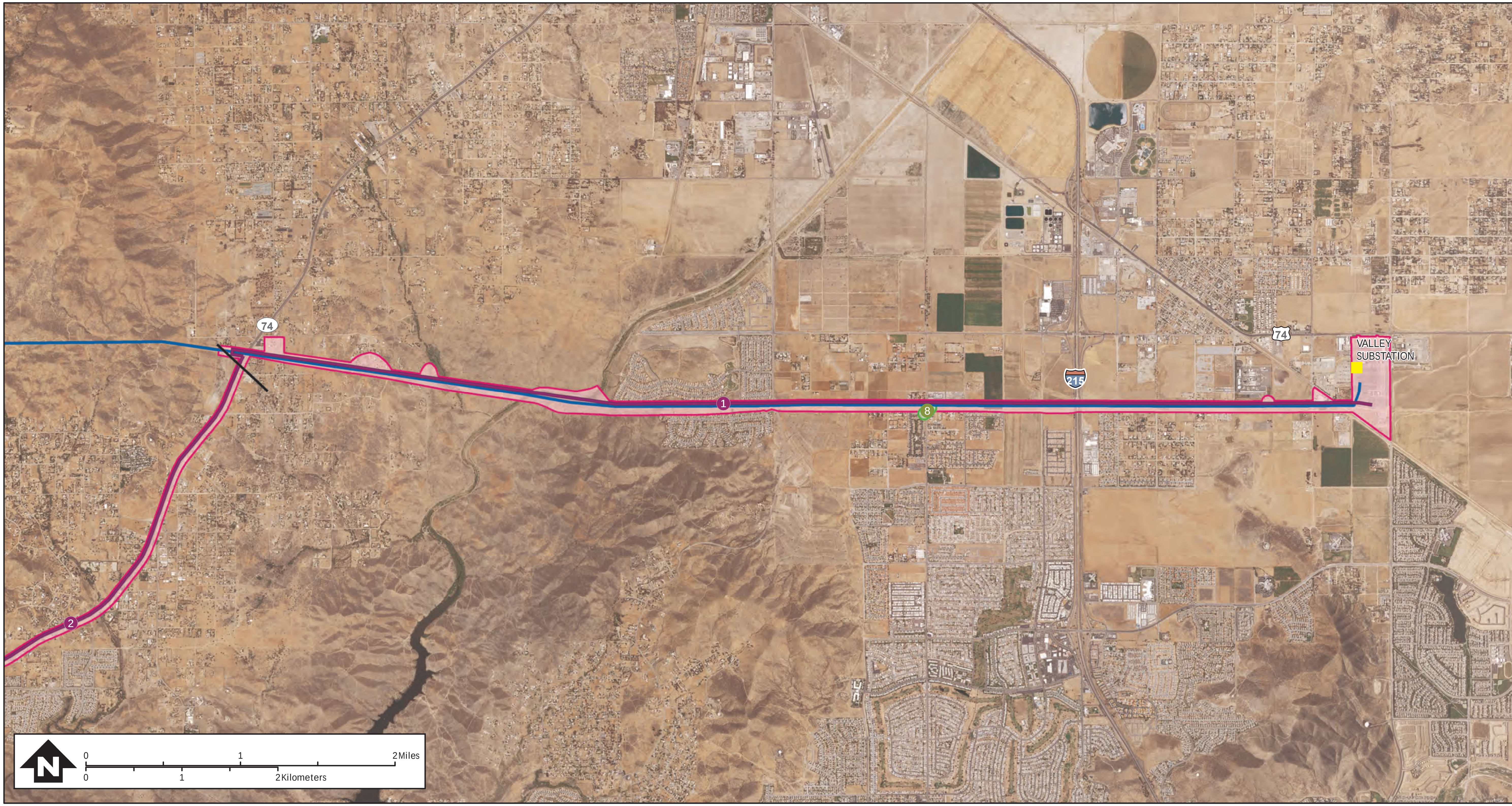


Figure 2.6c

General Disturbance Area and Project Alignment

Alberhill and Valley–Ivyglen Projects

Riverside County, California



Source: ESRI 2010, SCE 2011, 2013

1 VIG1
2 VIG2
3 VIG3
4 VIG4
5 VIG5
6 VIG6
7 VIG7
8 VIG8
VIG Disturbance Area

1 ASP1
1.5 ASP1.5
2 ASP2
3 ASP3
4 ASP4
5 ASP5
6 ASP6
7 ASP7
8 ASP8
ASP Disturbance Area

Existing Substations
Proposed Alberhill Substation
Proposed 500-kV transmission lines
500-kV Serrano Valley Transmission Line
Segment begin / end

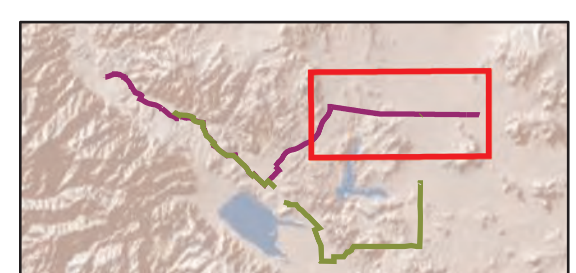


Figure 2.6d

General Disturbance Area and Project Alignment

Alberhill and Valley–Ivyglen Projects

Riverside County, California

2.3.2.1 Alberhill Substation

The proposed 1,120 MVA 500/115-kV Alberhill Substation would be expandable to a maximum of 1,680 MVA, with space for three in-service 560 MVA 500/115-kV transformers and one spare, depending on future need. Up to five 500-kV transmission lines may connect to the final build of the substation, as needed. The substation would be unstaffed and automated. The initial build of the proposed Alberhill Substation would connect to an existing 500-kV transmission line via new segments and include the following (Figure 2-7):

- Two 560 MVA 500/115-kV transformers with one used as a spare;
- 500-kV switchrack with gas-insulated switchgear;
- 115-kV switchrack;
- 115-kV capacitor bank;
- Control building with basement;
- Electrical power sources including a backup generator;
- Lighting;
- Entrance, gates, driveways, parking, and a perimeter wall that is a minimum of 8 feet tall and a maximum of 14 feet tall; and
- Restroom, septic system, water supply, and landscaping irrigation.

Five 115-kV lines would extend from the initial build of the proposed Alberhill Substation. If the proposed substation is expanded in the future and two or up to three load-serving 500/115-kV transformers are installed, up to 10 115-kV lines may ultimately extend from the proposed substation. To allow for construction of the substation, a 27-inch agricultural water pipeline would be relocated to the perimeter of the proposed Alberhill Substation property (Figure 2-7).

Transformers

The proposed Alberhill Substation would include the installation of two 560 MVA 500/115-kV transformers as part of the initial build. Because the total load that would be transferred initially from the Valley Substation to the proposed Alberhill Substation would be less than the capacity of one of the installed transformers (560 MVA), the second transformer would be energized and available for service as the spare for the purposes of the initial build.

The proposed Alberhill Substation would be constructed with enough space for two additional 560 MVA 500/115-kV transformers. When the electrical load exceeds 560 MVA, the first two transformers would serve the load and a third transformer would be installed as a spare. Based on the applicant's projections, the load may exceed 560 MVA between 2024 and 2029. A fourth transformer would be installed as a spare and the first three transformers would serve the load when the electrical load exceeds 1,120 MVA. The applicant projects that the load may exceed 1,120 MVA between 2037 and 2050, depending on annual growth in electrical demand. Each of the 560 MVA 500/115-kV transformers would be approximately 37 feet high and contain approximately 33,550 gallons of transformer oil (mineral oil). There would also be space reserved for the future installation of 115/12-kV transformers (Figure 2-7).

Switchracks

The flat portion of the proposed 124-acre Alberhill Substation site is suitable for substation construction, but it is not large enough for construction of an all *open-air insulated substation*—a substation where insulation between all common circuits of the same voltage is provided by distance and air in the environment. Instead, for the 500-kV switchracks, the applicant would use *gas-insulated switchgear*—switchgear that uses gas held within pipes for insulation between common circuits. Gas-insulated switchgear would contain sulfur hexafluoride (SF_6), which would allow for a smaller substation footprint (approximately half the size of an open-air insulated substation), requiring less grading.

The applicant has stated that the removal of more than one million cubic yards of rock and soil would be required to obtain the additional 6 acres of flat land necessary to construct an open-air insulated substation at the proposed site. Hills surrounding the proposed Alberhill Substation site would need to be excavated, which may substantially decrease slope stability. The proposed site is bounded to the north and northeast by the Gavilan Hills; to the west by Love Lane; and to the south by Temescal Canyon Road, Concordia Ranch Road, and I-15. To the east there is a depression in the land, a relatively flat area, and rolling hills.

500-kV Switchrack (Gas Insulated)

The 500-kV switchgear would be housed in a steel enclosure that is approximately 350 feet long, 60 feet wide, and 49 feet high. There would be space reserved at the proposed Alberhill Substation for a future 500-kV switchrack (Figure 2-7). The 500-kV switchrack would consist of six positions with two operating buses arranged in a breaker-and-a-half configuration. The operating buses would have six 500-kV gas-insulated potential-transformers. Initially, four positions would be installed. Three positions would be equipped for two 500-kV line positions and two transformer bank positions. The two 500-kV line positions and two bank positions would be equipped with line/bank dead ends. The 500-kV transmission lines and transformer bank leads would have twelve 500-kV lightning arresters.

115-kV Switchrack and Future 12-kV Switchrack (Open-Air Insulated)

The 115-kV switchrack would use open-air-insulated switchgear. Five 115-kV lines would extend from the proposed 115-kV switchrack. There would be space reserved at the proposed Alberhill Substation for an extension of the 115-kV switchrack. If the proposed substation is expanded in the future and up to three load-serving 500/115-kV transformers are operational, it is estimated that up to 10 115-kV lines may ultimately extend from the 115-kV switchrack. The 115-kV operating buses would have eighteen 115-kV lightning arresters. The initial-build of the 115-kV switchrack would connect to two *dead-end structures*.[7] Space would be reserved at the proposed Alberhill Substation for a future 12-kV switchrack.

Capacitor Banks

One 115-kV capacitor bank would be installed in the initial build of the proposed Alberhill Substation with a circuit breaker and a disconnect switch. The capacitor bank would be approximately 14 feet high. Space would be reserved for three additional 115-kV capacitor banks and two 500-kV capacitor banks.

[7] *Dead-end structures* are higher-strength structures used at the termination point of powerlines that are designed to support the high-tension forces associated with the length of the line leading up to the termination point. Higher-strength structures are also installed where powerlines change direction.

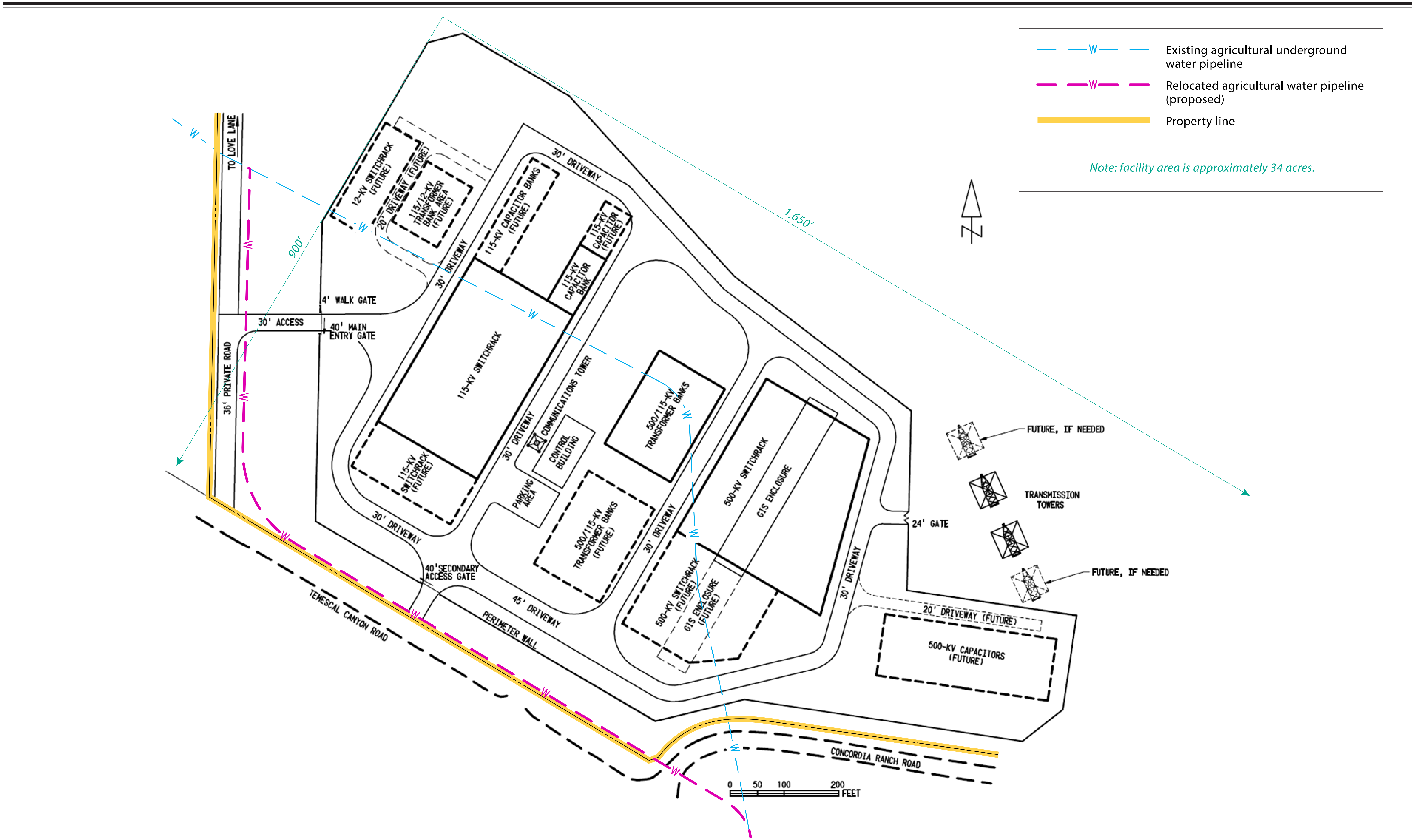


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Figure 2-7

Alberhill Substation Layout and Water Pipeline Relocation

Alberhill and Valley-Ivyglen Projects

Riverside County, California

Control Building

Monitoring equipment for the proposed Alberhill Substation would be located in a permanent control building that would be constructed of prefabricated metal and include a full basement. The control building (7,040 square feet) would be approximately 64 feet wide, 110 feet long, and 20 feet high. It would be equipped with air conditioning, control and relay panels, battery and battery charger, and communication equipment. Approximately 150 pounds of hydrofluorocarbon refrigerant (HFC-410ACE) would be used for the air conditioning system. The applicant would install an early-detect smoke and fire detection system. Handheld fire extinguishers rated for electrical fire would be available in the control building and within the proposed substation boundary. No other fire suppression systems would be installed at the proposed Alberhill Substation.

Electrical Power

The proposed Alberhill Substation would have three sources of electrical power for the control building and other ancillary facilities. The primary source of power would be an output of one of the proposed substation's main transformers. A secondary source would be a nearby distribution line that would be connected to the proposed Alberhill Substation site. For emergency use, one 500-kVA, 120/240 volt, 3-phase, stationary backup generator would be installed at the proposed substation site. It would have a diesel tank capable of storing approximately 960 gallons of diesel fuel.

Lighting

The proposed Alberhill Substation would have access and maintenance lighting. The lighting would conform to Riverside County Ordinance 655, which regulates and specifies criteria for light pollution with regard to the Palomar Observatory.

The access lighting would be low-intensity and controlled by a photo sensor. Each gate at the proposed Alberhill Substation would have a beacon light installed for safety and security purposes. The beacon lights would be illuminated only while the gates are open or in motion. The applicant typically uses double-flash strobe lights as beacon lights on substation gates.

Maintenance lights would be controlled by a manual switch that would normally be in the "off" position. Maintenance lights would be used only when required for switching, maintenance or emergency repairs that occur at night. The lights would be located in the switchracks, around the transformer banks, and in areas of the proposed Alberhill Substation where maintenance activity may take place, and would be directed downward and shielded to reduce glare outside of the proposed substation.

Entrance, Love Lane, Gates, Driveways, Parking, and Perimeter Wall

Love Lane, sections of which would be within the footprint of the proposed Alberhill Substation site, would be relocated from 130 to 180 feet west to the location shown in Figure 2-7. The relocated section of road would be paved, 36 feet wide, and extend approximately 250 feet north of Temescal Canyon Road. A 30-foot-wide access driveway would be constructed to the east of the relocated road that would lead to the proposed substation's main entry gate. To the north, the section of relocated road would be unpaved and join the existing, unpaved Love Lane, approximately 400 feet north of the proposed substation access driveway.

Four gates would be installed. A 40-foot-wide, electrically operated main entrance gate would allow two-way traffic access into the proposed Alberhill Substation (Figure 2-7). A similar, 40-foot-wide, secondary access gate would be located facing Temescal Canyon Road. A 24-foot-wide, manually operated gate would be located at the eastern end of the proposed substation to provide access to the 500-kV transmission lines. A walk-in gate would be installed either on the west wall facing Love Lane or the south wall facing Temescal Canyon Road. The walk-in gate location would be determined during final design of the proposed Alberhill Project. All of the gates would be at least 8 feet high and a maximum of 14 feet high.

Within the proposed Alberhill Substation, a series of driveways would be constructed to facilitate vehicular movement and access to substation equipment. Space would also be reserved for a driveway to access the future 500-kV capacitors. In addition, a parking area would be constructed. Refer to Table 2-2 for driveway and parking area dimensions.

The applicant would install a temporary chain-link fence around the proposed Alberhill Substation site after existing vegetation and facilities are cleared and a permanent perimeter wall is constructed. The chain-link fence would be removed upon perimeter wall completion. The perimeter wall would be a minimum height of 8 feet and a maximum height of 14 feet. It would be constructed of concrete panels or decorative block would be constructed to surround the proposed Alberhill Substation. The wall would be constructed to safety standards and may need to comply with the current version of NERC/CIP requirements for major electrical facilities. It would be designed to be consistent with the surrounding community's construction standards. A band of at least three strands of barbed wire and/or a top guard (e.g., barbed wire or spiked strips) would be affixed to~~near~~ the ~~top of the~~ perimeter wall of~~inside~~ the proposed Alberhill Substation~~. The barbed wire would not be visible from outside the substation.~~ Landscaping and irrigation would be installed after the proposed Alberhill Substation wall is constructed.

Substation Setback

The minimum setback from the proposed Alberhill Substation wall to the road ROW for Temescal Canyon Road would be between approximately 48 and 63 feet. This would be a setback of between approximately 88 and 103 feet from the wall to the existing pavement edge. If County of Riverside road improvement plans are constructed on Temescal Canyon Road, the minimum setback from the proposed substation wall to the future road curb face would be between approximately 69 and 84 feet. The minimum setback from the proposed Alberhill Substation wall to the road ROW for Concordia Ranch Road would be about 33 feet, which would be about 53 feet from the existing pavement edge.

Restroom, Septic System, and Landscaping

A stand-alone, prefabricated, permanent restroom would be installed within the proposed Alberhill Substation perimeter. The proposed Alberhill Substation site is not served by a public sewer system. A new septic system or holding tank would be installed in accordance with all Riverside County Department of Environmental Health permit requirements. The restroom would be approximately 10 feet wide, 10 feet long, and 10 feet high.

Landscaping for the proposed Alberhill Substation would be designed to filter views from the surrounding community while maintaining substation security and safety standards. Irrigation and landscaping installation would occur after construction of the proposed substation perimeter wall and after water service has been established.

Water Pipeline Relocation

A 27-inch agricultural water pipeline, owned and operated by the Elsinore Valley Municipal Water District, crosses the proposed Alberhill Substation site. The existing gravity-fed water pipeline is located on a 1.3-acre parcel that runs across the middle of the proposed substation site. A 32-inch pipeline would be installed to replace the existing water pipeline. The new pipeline would be rerouted to the perimeter of the substation property prior to construction of the proposed Alberhill Substation (Figure 2-7).

Currently, the water line is not in use. If needed, it is available for local agricultural and industrial uses. The new water line would be located underground within new easement on the proposed Alberhill Substation property. It would be constructed prior to disturbing the existing water line, allowing connections on the upstream and downstream ends to occur toward the end of the line's construction schedule to minimize service disruption. The Elsinore Valley Municipal Water District anticipates that the line would be out of service for one workday, approximately eight hours, and no more than two days (Baiyasi 2011).

The new pipeline would be buried and would connect to the existing pipeline at the western edge of the proposed substation property, follow the new substation access road south to the Temescal Canyon Road ROW, turn southeast parallel to the Temescal Canyon Road ROW, and then connect to the existing pipeline at a point across Concordia Ranch Road southeast of the proposed Alberhill Substation property (Figure 2-7). The trench excavated to install the new pipeline alignment would be approximately 4 feet wide and 6 feet deep. The length of relocated water pipeline would be approximately 1,700 feet, which would extend the existing length by approximately 50 feet.

2.3.2.2 500-kV Transmission Lines

The applicant proposes to construct two new 500-kV transmission lines (500-kV Line SA and 500-kV Line VA) to connect the proposed Alberhill Substation to the existing Serrano–Valley 500-kV Transmission Line (Figure 2-2i). Line SA would be 1.6 miles long and Line VA would be 1.7 miles long. Construction of the 500-kV transmission lines would require the removal of one 500-kV lattice steel tower (M13-T4) and installation of 12 new lattice steel towers (500-kV towers SA1 to SA6 and VA1 to VA6).

The lattice steel tower footings would require four excavated holes 3 feet to 6 feet in diameter and 20 feet to 45 feet deep. On average, footings extend above the ground between 1 and 4 feet. The two lattice steel towers installed nearest to the proposed Alberhill Substation would be taller, double-circuit towers, but the conductor would be installed only on one side of the towers as part of the proposed Alberhill Project. The other 10 lattice steel towers installed would be single-circuit towers (Figure 2-8).

The lattice steel towers would have a dull galvanized steel finish. They would support 2,156-kcmil non-specular aluminum steel-reinforced conductors, polymer insulators, and overhead ground wires. The rating of the proposed aluminum conductor steel-reinforced (ACSR) would be the same as the existing conductor used on the Serrano–Valley 500-kV Transmission Line. The normal rating (in clear atmospheric conditions, with an ambient temperature of 104 degrees Fahrenheit, at an elevation of 500 feet, and with a wind speed of 4 feet per second) of the existing and proposed 2,156-kcmil (ACSR) is 3,950 amps when in continuous operation. The emergency rating, assuming 4 hours of operation, is 5,330 amps.

Lake Mathews/Estelle Mountain Reserve

The existing Serrano–Valley 500-kV Transmission Line ROW is adjacent to land managed by the Bureau of Land Management (BLM) and traverses areas managed by the Riverside County Habitat Conservation Agency within the Lake Mathews/Estelle Mountain Core Reserve (Core Reserve; Figures 2-2a and 2-2i). Along the Serrano–Valley 500-kV Transmission Line ROW, construction of the proposed Alberhill Project would occur within the existing ROW with the exception of areas near the proposed sites for

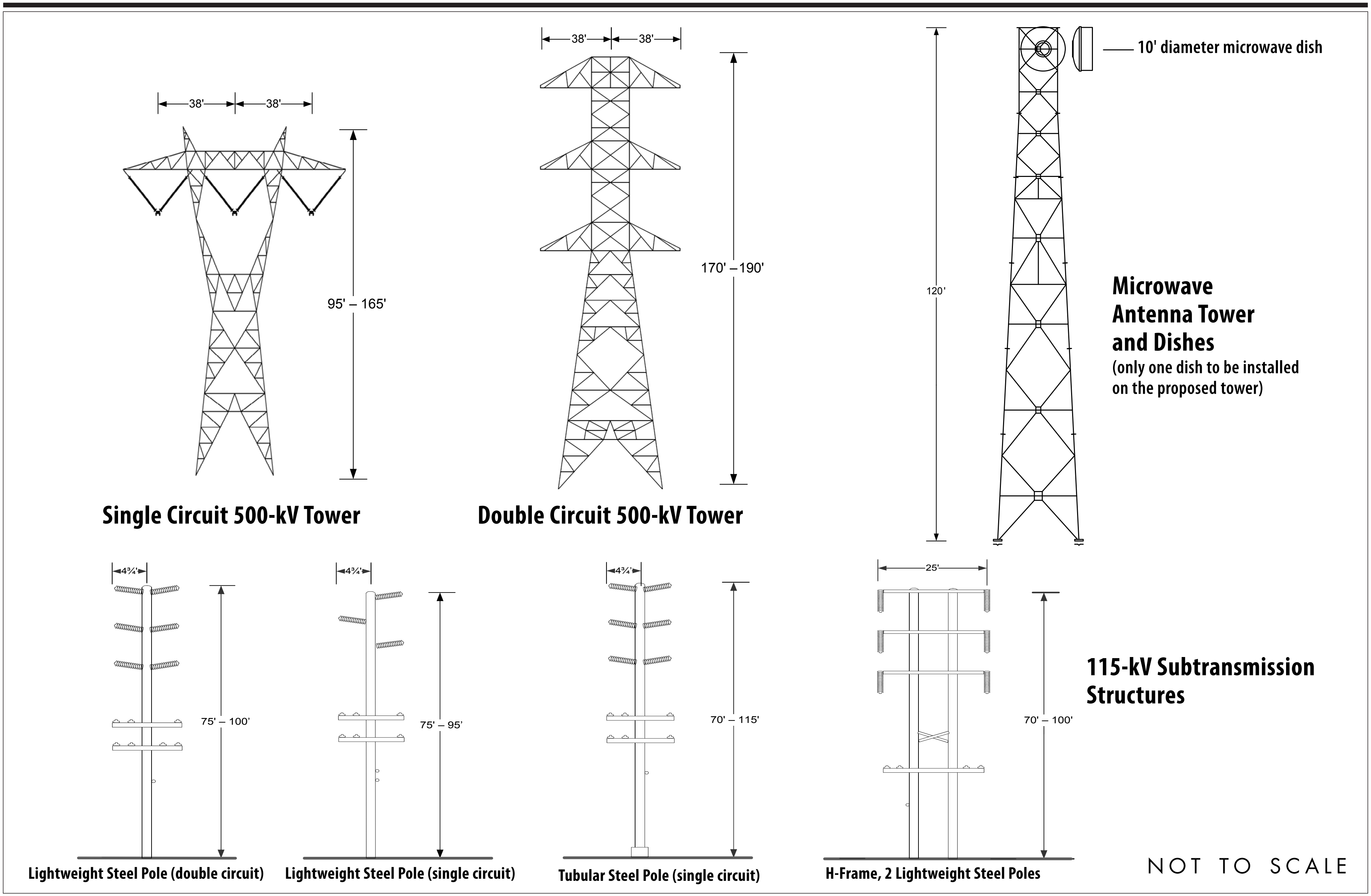

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Figure 2-8

Transmission and Subtransmission Structures and Microwave Antenna Tower (Alberhill Project)

Alberhill and Valley-Ivyglen Projects

Riverside County, California

500-kV Towers SA6 and VA6 and existing 500-kV tower sites M13-T4, M13-T3, and M13-T2. Wire-stringing equipment and vehicles may be required to back up onto an existing access road and other areas within the Core Reserve adjacent to proposed tower sites SA6 and VA6 and existing tower site M13-T4, as shown in Figure 2-2i.Land managed by the BLM within the Core Reserve would not be disturbed for construction uses other than by construction vehicles that would drive on an existing access road to tower sites M13-T3 and M13-T2 (Figure 2-2i), which traverses BLM land for a few hundred feet. Construction activities within the Core Reserve are further described in Section 2.4.5.5, under the heading "Grounding and Snubbing: Core Reserve Access," and in Section 2.4.5.6, under the heading, "500-kV Transmission Line Wire Stringing." Work may occur within the Core Reserve during a period that would last up to 4 weeks (USFWS and CDFW 2013a). No earth moving, road widening, or nighttime activities are proposed within the Core Reserve (USFWS and CDFW 2013b).

2.3.2.3 115-kV Subtransmission Lines (Segments ASP1 through ASP8)

The proposed Alberhill Project would involve the construction of new 115-kV subtransmission lines and modification of existing 115-kV subtransmission lines. The routes of the proposed 115-kV lines area identified by Segments ASP1 through ASP8 on Figures 2-2a through 2-2c, 2-2e, and 2-2g through 2-2i. LWS poles, TSPs, guy stubs and H-frames would be used for construction of the new 115-kV subtransmission lines (Figure 2-8). Each of the proposed 115-kV structures would support polymer insulators, 954-kcmil stranded aluminum conductor (SAC), and 4/0 ACSR for grounding. If needed, 954-kcmil ACSR would be used at locations requiring higher tension.[8] The normal rating (in clear atmospheric conditions, with an ambient temperature of 104 degrees Fahrenheit, at an elevation of 500 feet, and with a wind speed of 4 feet per second) of the proposed 954-kcmil SAC is 1,090 amps when in continuous operation. The emergency rating, assuming 4 hours of operation, is 1,470 amps. The 115-kV lines that would be replaced along 115-kV Segments ASP3, ASP4, ASP5, and ASP7 use 653-kcmil ACSR with a normal rating of 920 amps and emergency rating of 1,240 amps under the same conditions identified for the proposed 954-kcmil SAC previously described.

For the purposes of this document, it is assumed that the 115-kV structures to be replaced~~removed~~ could be located at any point along 115-kV Segments ASP1.5 through ASP8 and that new 115-kV structures could be installed anywhere along 115-kV Segments ASP1, ASP1.5, and ASP3 through ASP8. Similarly, replacement of the four structures along an approximately 1,000-foot section of 115-kV Segment ASP2 that extends east of the intersection of Concordia Ranch Road and Temescal Canyon Road could occur at any location within an approximately 1,000-foot-long section east of the proposed Alberhill Substation site. The precise location of each 115-kV structure to be installed would be determined during final engineering. Wood poles, guy poles, LWS poles, hybrid poles, and TSPs would be used for construction of the new 115-kV subtransmission lines (Figure 2-8).The location of switches and open spans that may be needed in addition to those indicated for 115-kV Segment ASP8 would also be determined during final engineering.

The estimated number of structures to be removed and installed and the length of each 115-kV segment are provided in Table 2-2. Each of the following segments are shown in more detail in Figures 2-2a through 2-2c, 2-2e, and 2-2g through 2-2i.

8 Stranded aluminum 954-kcmil conductor has a diameter of approximately 1.1 inches. The American Wire Gauge conductor size 4/0 is equivalent to 212-kcmil conductor, which is approximately 0.5 inches in diameter. Aluminum steel-reinforced 954-kcmil conductor, which is composed of strands of aluminum on the outer shell of the conductor cable and strands of steel in the core, is generally a few millimeters in diameter wider than 954-kcmil stranded aluminum conductor, which does not contain a steel core (Grigsby 2001).

115-kV Segment ASP1

115-kV Segment ASP1 would be a new double-circuit 115-kV subtransmission line at the proposed Alberhill Substation site that would connect the substation to 115-kV Segment ASP2. New TSPs and LWS poles would be installed (Table 2-2). The new double-circuit 115-kV line would connect to the 115-kV switchrack at the western end of the proposed Alberhill Substation (Figure 2-7). The line would exit the proposed substation near the main entry gate, turn south, and then parallel the substation perimeter south to Temescal Canyon Road. The line would continue southeast along Temescal Canyon Road to Concordia Ranch Road.

115-kV Segment ASP1.5

The 115-kV Segment ASP1.5 would connect to the new 115-kV switchrack at the western end of the proposed Alberhill Substation (Figure 2-7). The segment would exit the proposed substation near the main entry gate, turn south/southwest, and then cross Temescal Canyon Road to a point along the existing Fogarty–Ivyglen 115-kV line alignment. The 115-kV Segment ASP1.5 would then extend southeast along Temescal Canyon Road and cross I-15 (Figure 2-2a). The 115-kV Segment ASP1.5 would be a double-circuit subtransmission line.

Note that an additional single-circuit 115-kV subtransmission line would extend from the proposed Alberhill Substation. Five 115-kV lines would extend from the initial build of the proposed Alberhill Substation. The additional single-circuit line would likely follow the alignment of either 115-kV Segment ASP1 or ASP1.5 after exiting the proposed substation's 115-kV switchrack. The alignment of the additional single-circuit line would be determined during final engineering for the proposed Alberhill Project.

115-kV Segment ASP2

The 115-kV Segment ASP2 would place a second circuit on an approximately 6.3-mile section of the proposed Valley–Ivyglen 115-kV line (115-kV Segments VIG4 and VIG5; Figures 2-2a and 2-2b). As part of the proposed Valley-Ivyglen Project, four LWS poles would be installed on the south side of Concordia Ranch Road to avoid conflicts that would occur during construction of the proposed Alberhill Substation. As part of the proposed Alberhill Project, three replacement LWS poles and two~~one~~ TSP would be installed on the north side of Concordia Ranch Road (Table 2-2). The final location of the five~~four~~ poles on the north side of Concordia Ranch Road would accommodate 115-kV circuits that would exit Alberhill Substation to the east on poles constructed as part of the Valley–Ivyglen Project. No other structure installation or replacement would be required along 115-kV Segment ASP2 as part of the proposed Alberhill Project. The proposed Valley–Ivyglen 115-kV line is designed to support two circuits. To add the second circuit along 115-kV Segment ASP2, the proposed Valley–Ivyglen 115-kV line structures would require the addition of crossarms, anchors, insulators and conductor.

Double-circuiting would begin at the southeastern end of 115-kV Segment ASP1 and follow Concordia Ranch Road east to its terminus. From there it would cross I-15 south to Temescal Canyon Road and then continue east to Lake Street. From Lake Street, it would continue south to Nichols Road. The line would then follow Nichols Road to Pierce Street and then turn southeast on Baker Street and continue to Riverside Avenue (SR-74). The line would follow Riverside Avenue northeast and then pass southeast over land to Pasadena Avenue. It would continue along Pasadena Avenue and then turn northeast onto Third Street and continue to Collier Avenue.

115-kV Segment ASP3

Along 115-kV Segment ASP3, a second circuit along a section of the Valley–Elsinore–Fogarty 115-kV line would be installed and the existing single-circuit section of the line would be removed. New structures capable of supporting two circuits would be installed. The new LWS poles and several TSPs would be installed to enable the crossing of I-15 (Table 2-2). Wood poles and the existing TSPs adjacent to I-15 would be replaced in the City of Lake Elsinore between the intersections of Third Street and Collier Avenue and Second Street and Camino del Norte.

115-kV Segment ASP4

115-kV Segment ASP4 includes installation of new double-circuit LWS poles along a section of the Elsinore-Skylark 115-kV lines as well as removal of the existing single-circuit sections of the lines (Table 2-2). From East Hill Street southwest to East Pottery Street, structures would be constructed and removed along a section of the Elsinore–Skylark 115-kV line. From East Pottery Street east to East Franklin Street and then southeast to Skylark Substation, structures would be constructed and removed on the Elsinore–Skylark 115-kV line. The line would continue from East Franklin Street over land and then along Auto Center Drive, Casino Drive, Malaga Road, and Mission Trail to Skylark Substation.

115-kV Segment ASP5

115-kV Segment ASP5 includes installation of new double-circuit LWS poles and H-frame structures along a section of the Valley–Newcomb–Skylark 115-kV line (Table 2-2). The existing 115-kV LWS poles, H-frame structures, and wood poles would be removed. This segment would pass through the cities of Wildomar and Menifee.

Starting at Skylark Substation, the double-circuit lines would continue east across Mission Trail Road to Waite Street. It would follow Waite Street and then turn north onto Almond Street and continue to Lemon Street. It would cross I-15 and continue east along Lemon Street to where the street turns into Lost Road. It would continue northeast on Lost Road and then turn east and cross open land and multiple roads to Beverly Street. It would follow Beverly Street and then continue east along Bundy Canyon Road to Scott Road.

115-kV Segment ASP6

115-kV Segment ASP6 includes construction of LWS poles for a new single-circuit 115-kV subtransmission line north from the intersection of Scott Road and Murrieta Road to Newport Road. An existing distribution line with wood poles along Murrieta Road would be removed, and the distribution line conductor would be transferred to and underbuilt on the new 115-kV structures (installed below the new 115-kV circuit).

115-kV Segment ASP7

115-kV Segment ASP7 includes installation of new double-circuit LWS poles and TSPs along a section of the Valley–Newcomb–Skylark 115-kV line north of the intersection of Newport Road and Murrieta Road to Newcomb Substation in Menifee. Existing 115-kV wood structures would be removed. In addition, the circuit breaker at Newcomb Substation that connects the substation to Valley Substation would be opened, which would disconnect Newcomb Substation from Valley Substation (Figure 2-3).

115-kV Segment ASP8

115-kV Segment ASP8 includes installation of new LWS poles and TSPs along a 300-foot section at the intersection of Murrieta Road and McLaughlin Road in Menifee to connect the Valley–Newcomb 115-kV line to the proposed Valley–Ivyglen 115-kV line (Figure 2-2f). Existing 115-kV wood structures would be removed. The circuit breaker that connects the proposed Valley–Ivyglen 115-kV line to Valley Substation would be opened to ensure that the line is deenergized from Valley Substation (Figure 2-3).

The Valley–Newcomb 115-kV line from Valley Substation would be disconnected by creating an *open span*.[9] The open span would be located near Murrieta Road. The circuit breaker that connects the Valley–Newcomb 115-kV line to Valley Substation would be opened to ensure that the line is deenergized (Figure 2-3).

2.3.2.4 Telecommunications

The proposed Alberhill Substation would require the installation of new telecommunication infrastructure to provide protective relaying, data transmission, and telephone services to the substations served by the proposed Alberhill System. These new facilities include modifications to the applicant's existing microwave system and the addition of new fiber optic cable. The proposed Alberhill Project would include the installation of new telecommunication infrastructure required for communication with the substations served by the proposed Alberhill 115-kV System. New microwave components, fiber optic cable, and other telecommunications equipment installations would be part of the proposed Alberhill Project.

Microwave System: Alberhill Substation, Santiago Peak, and Serrano Substation

To connect the proposed Alberhill Substation to the applicant's microwave communications system, a 120-foot-tall microwave antenna tower would be built at the proposed Alberhill Substation site (Figure 2-7). The applicant would install one microwave dish antenna on the new tower and three microwave dish antennas on two existing antenna towers. One of the existing antenna towers is located at the Santiago Peak Communications Site, which is located approximately 7 miles west of the proposed Alberhill Substation site (Figure 2-1). The second existing antenna tower is located at Serrano Substation in the City of Orange in Orange County. One dish antenna at the Santiago Peak Communications Site would be directed toward the microwave antenna tower at the proposed Alberhill Substation and the other toward Serrano Substation, which is west of the Santiago Peak Communications Site. The dish antenna at Serrano Substation would be directed toward the Santiago Peak Communications Site. All four microwave dish antennas would be 10 feet in diameter. A typical 120-foot-tall microwave antenna tower is shown in Figure 2-9.

In addition, new microwave radios and channel equipment would be installed inside existing telecommunications control rooms at the Santiago Peak Communications Site and Serrano Substation and the control room at the proposed Alberhill Substation.

[9] The creation of an *open span* does not indicate that a span of conductor would be removed between two poles. Instead, only the jumper loop wire that provides electrical connectivity to the line would be disconnected and secured. By disconnecting, folding back, and securing the jumper loop wire, a permanent physical and electrical separation is made. The disconnected jumper loop wire would also be grounded by connecting it to a ground wire that runs the length of the pole. According to the applicant, creating a permanent physical and electrical separation effectively creates a break in the connectivity of the line such that personnel would not inadvertently cause a switching error or an unsafe situation.

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Figure 2-9

Typical Microwave Antenna Tower

Alberhill and Valley-Ivyglen Projects

The Santiago Peak Communications Site is located in the Cleveland National Forest on Santiago Peak in the Santa Ana Mountains, approximately 11 miles south of Corona, California. One section of the Santiago Peak Communication Site is located in Riverside County and the other in Orange County. Only the Orange County section of the Santiago Peak Communications Site would be accessed for proposed Alberhill Project activities. The applicant would access the communications site from Indian Truck Trail Road, which intersects with I-15 near Lee Lake, about 2.5 miles northwest of the proposed Alberhill Substation site.

Fiber Optic Lines and Telecommunications Equipment

The proposed Alberhill Substation would be connected to an existing fiber optic system serving Valley, Mira Loma, and Serrano substations (Figure 1-1) overhead along the Serrano–Valley 500-kV Transmission Line (Figure 2-2a). To connect the five 115/12-kV substations that would be transferred to the proposed Alberhill 115-kV System, new fiber optic cable would be installed overhead along the 115-kV segments specified in Table 2-2 and shown in Figure 2-5a through c.

Trenching outside the footprint of the Alberhill (proposed), Skylark, and Newcomb substations to the nearest suitable utility pole would be required within the general disturbance area shown in Figures 2-6b and 2-6c. Trenching to install fiber optic line underground would also be required at several locations within the general disturbance area along Mission Trail Road, Lemon Street, and Murrieta Road (Figure 2-6c). New telecommunications equipment would be installed within the telecommunications rooms at the~~ Serrano~~, Barre, Walnut, Mira Loma, Serrano, Ivyglen, Fogarty, Skylark, Tenaja, Newcomb, and Valley substations to facilitate the new telecommunications connections. Telecommunications systems would also be upgraded at the Box Springs Communications Site, which is located northwest of the City of Moreno Valley, California, and the applicant's Irvine Operations Center in southeastern Irvine, California.

2.3.2.5 Access Roads

Each of the proposed 500-kV transmission line tower sites could~~would~~ require 24-hour vehicular access during operation of the proposed Alberhill Project for emergency and maintenance activities. The applicant would install gates to restrict general and recreational vehicular access roads. The applicant would construct approximately 3~~approximately 6.1~~ miles of new or modified access roads to access the proposed 500-kV transmission line structures (Table 2-6; Figure 2-2i) if the conventional method of construction is used for the 500-kV transmission line (refer to Section 2.4.5.5).

The proposed Alberhill 115-kV segments would not require new or modified access roads,.~~, except for a short access road segment for 115-kV Segment ASP5.~~

Access road widths would vary as described in Section 2.3.1.3 for the proposed Valley–Ivyglen Project. For the purposes of this document and to ensure that the applicant has the required flexibility needed during construction, it is assumed that any of the proposed access roads could be up to 26 feet wide. In addition, it is anticipated that additional permanent and temporary disturbance areas for vehicle turnaround and positioning would be required during access road construction due to hilly terrain along the proposed 500-kV transmission line routes. In some locations, the permanent, graded disturbance areas may be as wide as 200 feet, and the temporary disturbance areas may be as wide as 500 feet. Excess soils and vegetation from access road construction would be distributed within the permanent, graded disturbance areas adjacent to the proposed access roads or disposed of as described in Section 2.4.4.8. Refer to the disturbance calculations in Section 2.4.2.2.

2.4 Construction of the Proposed Projects

2.4.1 Schedule, Equipment, and Personnel

The anticipated construction schedule for the proposed projects is provided in Table 2-3. The estimated construction schedule in miles or quantity per day for the proposed 500-kV transmission lines, 115-kV subtransmission lines, and fiber optic lines is provided in Table 2-4.

Table 2-3 Estimated Construction Schedule

Project Components	Estimated Start	Duration
ASP: 115-kV Lines (ASP1 to ASP8)	Q1 2018~~Spring 2017~~	28 months
ASP: Telecommunications	Q3 2018~~Winter 2017~~	12 months [a]
VIG: 115-kV Lines (VIG1 to VIG8)	Q1 2017~~Fall 2016~~	28~~27~~ months
VIG: Telecommunications	Q4~~Summer~~ 2017	7 months
ASP: Proposed Alberhill Substation	Q1 2018~~Summer 2016~~	21 months
ASP: 500-kV Lines	Q1 2019~~Summer 2017~~	17 months
ASP and VIG: Testing	Timing to be determined during final engineering	3 months
Estimated Operational Date (VIG)	Q4 2019 (28~~Fall/Winter 2018 (27~~ months to construct)	
Estimated Operational Date (ASP)	Q4 2020~~Summer 2019~~ (28 months to construct)	

Sources: SCE 2011, 2013, 2014
Key: ASP = Alberhill System Project, kV = kilovolt, VIG = Valley–Ivyglen 115-kV Subtransmission Line Project,
Note: [a] The applicant does not anticipate that the proposed telecommunications installations would require more than 12 months to complete, but the telecommunications installations may occur at any time throughout the 12-month period beginning in Q3 2018~~Winter 2017~~.

Table 2-4 Daily Transmission, Subtransmission, and Fiber Optic Line Construction Schedule Estimates

Construction Activity	Estimate
500-kV Transmission Lines (Alberhill Project)	
Survey	1 mile per day
Road and landing work	0.5 miles per day (2 structure pads per day)
LST removal	0.75 towers per day
Install LST foundation	0.5 towers per day
LST haul/delivery	1 tower per day
LST assembly	0.5 towers per day
LST erection	1 tower per day
Wire stringing	0.35 miles per day
Restoration	0.5 miles per day
115-kV Subtransmission Lines (Valley–Ivyglen and Alberhill Projects)	
Surveys	1 mile per day
Staging yards	Duration of construction
Right-of-way clearing	0.25 miles per day (4 structure pads per day)
Guard structure installation	5 structures per day
Remove existing wood poles	5 poles per day
Remove existing LWS poles	2 poles per day
TSP foundation	0.5 foundations per day
TSP assembly	1 pole per day
TSP erection	1 pole per day
Hybrid pole assembly	1 pole per day
Hybrid pole erection	1 pole per day
LWS pole haul/delivery	5 poles per day
LWS pole assembly	4 poles per day

Table 2-4 Daily Transmission, Subtransmission, and Fiber Optic Line Construction Schedule Estimates

Construction Activity	Estimate
LWS pole erection	4 poles per day
Wood pole installation	4 poles per day
Shoofly LWS pole haul/delivery	5 poles per day
Shoofly LWS pole assembly	4 poles per day
Shoofly LWS pole installation	4 poles per day
Underground vault installation	0.33 vaults per day
Duck bank installation	200 feet per day
Install underground cable	350 feet per day
Conductor and overhead ground wire installation	0.33 mile per day
Guard structure removal	6 structures per day
Restoration	1 mile per day
Fiber Optic Lines (Valley–Ivyglen and Alberhill Projects)	
Trenching	350 feet per day
Duct bank installation	350 feet per day
Manhole installation	2 manholes per day
Wire stringing	5,000 feet per day

Sources: SCE 2011, 2013, 2014
Key: kV = kilovolt, LST = Lattice Steel Tower, LWS = Lightweight Steel, TSP = Tubular Steel Pole, Hybrid pole = TSP with prefabricated concrete base section

Construction activities would be scheduled during ~~daylight~~ hours within the local noise ordinance, Monday through Saturday. In the event that construction activities are required to take place outside of the days and hours specified by local ordinance, the applicant would take actions consistent with Project Commitment H, as listed in Section 2.6, "Project Commitments." Construction would be performed by either the applicant's construction crews or contractors, depending on the availability of the applicant's construction personnel at the time of construction. If the applicant's transmission and telecommunications construction crews are used, crews would likely be based at one of the applicant's local facilities, such as Valley Substation (Menifee Service Center) or Wildomar Service Center. Contractor construction personnel would be managed by the applicant's construction management personnel.

For the proposed Alberhill Project, it is conservatively estimated that a maximum of 200 workers per day (100 at the Alberhill Substation site, 50 on the 115-kV subtransmission line, and 50 on the 500-kV transmission lines) would be working during construction. For the proposed Valley–Ivyglen Project, the applicant estimates that up to 125 workers per day would be required during construction. Equipment used for project activities is contained in the air quality calculations in Appendix B.

2.4.1.1 Alberhill Project Schedule for Water Pipeline Relocation and Roadway Crossings

The applicant estimates that it would take three months to relocate the 27-inch agricultural water pipeline described in Section 2.3.2.1. During the relocation period, one lane of Concordia Ranch Road and Temescal Canyon Road would be closed during the daytime. At night, both lanes would be open. Ingress and egress along Love Lane would not be obstructed, although Love Lane would be relocated west, away from the proposed Alberhill Substation site, as described in Section 2.3.2.1.

Relocation of the pipeline would be conducted in accordance with Elsinore Valley Municipal Water District requirements and encroachment permits obtained from the County of Riverside for crossing public ROWs. Traffic control would be implemented as described in Section 2.4.4.4 and in accordance with local ordinances and city permit conditions. See also, Section 2.4.4.6.

2.4.2 Land Disturbance for the Proposed Projects

2.4.2.1 Land Disturbance for the Valley–Ivyglen Project

Construction of the proposed Valley–Ivyglen Project would result in the disturbance of approximately 633.7 acres of land along the 115-kV subtransmission line route. The applicant estimates that approximately 141.5 acres would be disturbed permanently. Land disturbance estimates from implementation of the proposed Valley–Ivyglen Project are summarized in Table 2-5.

Table 2-5 Land Disturbance Estimates: Valley–Ivyglen 115-kV Subtransmission Line

Component (Quantity)	Disturbed Area Dimensions (length x width in feet)	Acres Disturbed During Construction	Acres Temporarily Disturbed	Acres Permanently Disturbed (a)
Install lightweight-steel poles (514)	150 x 75	132.7	107.0	25.7
Install tubular steel poles (121)	200 x 150	83.3	76.0	7.3
Install hybrid poles (4)	150 x 75	1.0	0.8	0.2
Install guy poles (26)	50 x 50	1.5	1.5	<0.1
Install wood poles (16)	100 x 100	3.7	2.9	0.8
Remove wood poles (90 subtransmission line, 280 distribution line) (b).	150 x 75	95.6	95.6	0.0
Install and remove shoofly line wood poles (10) (c).	150 x 75	2.6	2.6	0.0
Install and remove guard structure wood poles (98) (d)	50 x 75	8.4	8.4	0.0
Trenching for 115-kV line in new underground conduit (115-kV Segment VIG1)	300 x 300	2.1	2.1	0.0
Trenching for 115-kV line in new underground conduit (115-kV Segment VIG8)	10,094 x 50	11.6	11.6	0.0
Install underground vaults (9)	150 x 150	4.6	4.6	<0.1
Trenching for fiber optic line in new underground conduit	9,995 x 50	11.5	11.5	0.0
Staging Areas VIG2 through VIG6 and VIG8 through VIG14	n/a	75.0	75.0	0.0
Access road construction	14 miles x 22-feet(e.)	95.0	0.0	95.0
Additional disturbance area for access road construction along 115-kV Segments VIG1 and VIG6	1 mile x 200-feet (f.)	24.0	12.0	12.0
Retaining walls, 8 feet high for access roads	2,200 feet x 20	1.0	0.5	0.5
Sites for conductor stringing, pulling, tensioning, or splicing (90)	up to 500 x 100 (g.)	77.5	77.5	0.0

Table 2-5 Land Disturbance Estimates: Valley–Ivyglen 115-kV Subtransmission Line

Component (Quantity)	Disturbed Area Dimensions (length x width in feet)	Acres Disturbed During Construction	Acres Temporarily Disturbed	Acres Permanently Disturbed [(a)]
Sites for fiber optic line stringing, pulling, tensioning, or splicing (90)	60 x 20 [(g.)]	2.5	2.5	0.0
Trenching for relocation of up to 2,500 feet of distribution underground	2,500 x 2	0.1	0.1	0.0
	Total disturbance	633.7acres	492.2 acres	141.5 acres

Sources: SCE 2013, 2014
Key: kV = kilovolt, VIG = Valley–Ivyglen
Notes:

[a] The estimated permanent disturbance areas that would be maintained around each of the proposed structures are as follows: lightweight-steel and wood poles = 2,178 square feet each (less than 75-feet long by 30-feet wide); tubular steel and hybrid poles = 2,614 square feet each (less than 75-feet long by 35-feet wide); guy poles = 9 square feet each (approximately 3-feet long by 3-feet wide). Vaults are conservatively assumed to result in a disturbed area of 400 square feet (20 feet by 20 feet) for maintenance access.

[b] Includes trenching for the replacement of 35 distribution-line riser poles as described in Section 2.4.5.3.

[c] A shoofly is a temporary electrical line used during construction activities to maintain electrical service to an area while allowing sections of a permanent line that requires modification to be taken out of service.

[d] Guard structures are temporary structures designed to catch the conductor should it drop below the required stringing height.

[e] Approximately 14 miles of new or modified access roads would be constructed. Access road widths would vary from approximately 24 feet wide to 28 feet wide (including shoulders) depending on terrain, curves, drainage, and turnaround requirements. In some locations, the permanent graded area would be as wide as 100 feet, and temporary disturbance areas may be as wide as 200 feet. The applicant estimates that approximately 70 percent of the access roads would be 18 feet wide (or less). For the land disturbance estimates provided in this table, it is estimated that each access road would be approximately 22 feet wide.

[f] Additional permanent and temporary disturbance areas are anticipated to be required for vehicle turnaround and positioning during access road construction due to hilly terrain along sections of 115-kV Segments VIG1 and VIG6. Permanent, graded disturbance areas may be as wide as 100 feet, and temporary disturbance areas may be as wide as 200 feet. For the land disturbance estimates provided in this table, it is estimated that up to a total of 1 mile along 115-kV Segments VIG1 and VIG6 would require these additional land disturbance dimensions.

[g] The applicant estimates that the wire-stringing sites would range in length from 200 feet to 500 feet and range in width from 34 feet to 100 feet. For the land disturbance estimates provided in this table, it is estimated that each wire-stringing site would be approximately 375 feet long by 100 feet wide. The applicant estimated that each conductor reel would hold approximately 6,500 feet of conductor for the disturbance estimate provided and noted that topography and route design would also affect the number of sites needed. The same estimate (90 sites) was applied for the number of fiber optic line wire-stringing sites that may be needed.

Land disturbance for 115-kV Segments VIG1 through VIG8 would occur primarily within public ROW but also on private property in some locations. There is no standard construction ROW width for the installation of subtransmission lines. The applicant would be required to obtain all necessary permits, easements, and approvals from local agencies and private parties prior to construction.

2.4.2.2 Land Disturbance for the Alberhill Project

Construction of the Alberhill Project would result in the permanent disturbance of approximately 109.5 acres of land if the Conventional Method of construction is used and approximately 68.8 acres of land if maximum Helicopter Construction is used.

115-kV Segments ASP1 through ASP8, Alberhill Substation

Construction of 115-kV Segments ASP1 through ASP 8 and the Alberhill Substation would result in the permanent disturbance of approximately 66.3 acres of land. Land disturbance estimates for these project components are summarized in Table 2-6.

Table 2-6 Land Disturbance Estimates: Alberhill Substation and 115-kV Segments ASP1 through ASP8

Component (Quantity)	Disturbed Area Dimensions (length x width in feet)	Acres Disturbed During Construction	Acres Restored	Acres Permanently Disturbed [a]
Proposed Alberhill Substation, 115-kV Segment ASP1, and Import Soil Source Area[f]	N/A	42.9	0	42.9
Install lightweight steel poles (346)	150 x 75 [e]	89.3	72.0	17.3
Install tubular steel poles (51)	200 x 150 [e]	35.1	32.0	3.1
Install wood poles (3)	100 x 100	0.7	0.5	0.2
Install H-frame structures (10)	150 x 50 [e]	1.7	1.2	0.5
Install lightweight steel pole guy stubs (36)	150 x 75 [e]	9.3	7.5	1.8
Existing TSPs to be modified (4)	200 x 150 [e]	2.7	2.5	0.2
Install TSPs (modified) (2)	200 x 150 [e]	1.4	1.3	0.1
Remove lightweight steel poles (7)	150 x 75	1.8	1.8	0.0
Remove tubular steel poles (3)	150 x 75	0.8	0.8	0.0
Remove wood poles (260)	150 x 75	67.1	67.1	0.0
Remove H-frame structures (8)	100 x 50	0.9	0.9	0.0
Remove wood H-frames (2)	100 x 50	0.2	0.2	0.0
Install and remove guard structure wood poles (3) [b]	75 x 50	0.3	0.3	0.0
115-kV wire stringing (9 sites)	200 x 50	2.1	2.1	0.0
Staging areas [d]	N/A	31.8	31.8	0.0
Trenching for fiber optic line installation	5,808 x 1.5	0.2	0.2	0.0
~~Access Road on 115-kV Segment ASP5~~	~~325 x 26~~	~~0.2~~	~~0.0~~	~~0.2~~
115-kV Segments ASP1.5 through ASP8 total		245.4~~6~~ acres	222.2 acres	23.24 acres
Total (115-kV Subtransmission Lines and Substation)		288.3~~5~~ acres	222.2 acres	66.1~~3~~ acres

Sources: SCE 2011, 2013

Key: ASP = Alberhill System Project, kV = kilovolt, LWS = Lightweight Steel, ROW = right-of-way, TSP = Tubular Steel Pole

Notes:

a The estimated permanent disturbance areas that would be maintained around each of the proposed structures are as follows: lightweight steel, lightweight steel pole guy stub, and wood poles = 2,178 square feet each (less than 75 feet long by 30 feet wide); tubular steel poles and modified tubular steel poles = 2,614 square feet each (less than 75 feet long by 35 feet wide); guy poles = 9 square feet each (approximately 3 feet long by 3 feet wide).

b Guard structures are temporary structures designed to stop the movement of a conductor should it drop below the required stringing height.

c The proposed H-frame structures would be constructed of two LWS poles.

d For the purposes of this document, it is assumed that the applicant may use any of the staging areas identified by the applicant for construction of the proposed 115-kV subtransmission lines (i.e., all staging areas except Staging Area ASP2). The Primary Staging Area (the footprint of the Alberhill Substation site) is not included in this total because it would already be disturbed as part of substation construction. Staging Areas ASP1 and ASP2 are accounted for in Tables 2-7 and 2-8. This total therefore represents the area of Staging Areas ASP3 through ASP8 as well as the area of Staging Area ASP7 that is already used for storing materials. Fewer staging areas would likely be required during construction. See Section 2.4.3.2.

e The dimensions of the estimated disturbed area for TSP and LWS pole construction include the laydown area for assembly of the structure.

f As described in Section 2.4.6.2, the applicant would either truck in 80,000 cubic yards of soil or excavate the soil from a 5.2-acre area located adjacent to the northeast side of the proposed Alberhill Substation site (Figure 2-2x). The Import Soil Source Area is located under the proposed 500-kV transmission line routes near 500-kV Towers SA1 and VA1. For the purposes of this document, it is assumed that regardless of the import soil option selected by the applicant, the 5.2-acre area would be permanently disturbed.

The applicant has acquired approximately 124 acres of land and would use about 34 acres for construction of the proposed Alberhill Substation and 115-kV Segment ASP1 as follows:

- 24 acres of land would be within the substation wall (Figure 2-7).
- 4 acres of land immediately outside the substation perimeter wall to the west, east, and south would be used for subtransmission and transmission line access, vehicular access, landscaping, water pipeline relocation, and buffer.[10]
- 6 acres located outside of the north substation wall, plus the northeast and northwest corners would be primarily dedicated to the control of storm water runoff.

If the applicant elects to excavate 5.2 acres of land adjacent to the northeast corner of the proposed Alberhill Substation site to obtain fill required for grading, then the land required for construction of the proposed substation would increase from 34 acres to approximately 40 acres (Section 2.4.6.2). In addition, pending approval of the proposed Alberhill Project, the applicant would acquire 99 acres in easement and/or in fee outside the proposed Alberhill substation from four private property owners and Riverside County for construction of the 500-kV transmission lines. Land disturbance for the proposed Alberhill Substation and 500-kV transmission lines would be away from public streets, but each 500-kV transmission line would require a 200-foot-wide ROW.

Land disturbance for 115-kV Segments ASP1.5 through ASP8 would occur primarily within public ROW but also on private property in some locations. There is no standard construction ROW width for the installation of subtransmission lines. The applicant would be required to obtain all necessary permits, easements, and approvals from local agencies and private parties prior to construction.

500-kV Transmission Lines

Conventional Method

Construction of the proposed Alberhill Project using the Conventional Method would result in the permanent disturbance of approximately 21.6 acres of land along the 500-kV transmission line. Land disturbance estimates from implementation of the proposed Alberhill Project using the Conventional Method to construct the 500-kV transmission line are summarized in Table 2-7.

Helicopter Construction

Construction of the proposed Alberhill Project using Helicopter Construction would result in the disturbance of approximately 2.5 acres of land along the 500-kV transmission line routes. Land disturbance estimates from implementation of the proposed Alberhill Project are summarized in Table 2-8.

[10] The buffer would be a 10-foot-wide belt maintained around the substation's proposed perimeter wall that excludes structures and vegetation that could be used to access the inside of the proposed substation.

Table 2-7 Conventional Method Land Disturbance Estimates: 500-kV Transmission Lines

Component (Quantity)	Disturbed Area Dimensions (length x width in feet)	Acres Disturbed During Construction [a.]	Acres Restored	Acres Permanently Disturbed
Remove 500-kV tower (1)	150 x 150	0.5	0.5	0.0
Install 500-kV towers (12)	200 x 200 [c.]	11.0	8.6	2.4
500-kV wire-stringing (5 sites) [d.]	150 x 50	0.9	0.9	0.0
500-kV stringing/tensioning (3 sites)	500 x 150	5.2	5.2	0.0
New or modified access roads (3 ~~6.1~~ miles)	6.1 miles x 26 feet [e.]	60.6	51.1~~41.4~~	9.5~~19.2~~
Staging areas [f.]	N/A	10.6	10.6	0.0
Total 500-kV transmission lines disturbance		88.8 acres	67.2 acres	21.6 acres

Sources: SCE 2011, 2013

Key: ASP = Alberhill System Project, kV = kilovolt, ROW = right-of-way

Notes:

[a] The disturbed acreage calculations are estimates based on the applicant's work area requirements and width of the proposed ROW.

[b] As described in Section 2.4.6.2, the applicant would either truck in 80,000 cubic yards of soil or excavate the soil from a 5.2-acre area located adjacent to the northeast side of the proposed Alberhill Substation site. The Import Soil Source Area is located under the proposed 500-kV transmission line routes near 500-kV Towers SA1 and VA1. For the purposes of this document, it is assumed that regardless of the import soil option selected by the applicant, the 5.2-acre area would be permanently disturbed.

[c] The dimensions of the disturbed area for this component include the laydown area for assembly of the tower. Tower installation may require the construction of permanent crane pads. If pads are required, they would each occupy an area of approximately 50 feet by 50 feet and may extend outside of the 200-foot-wide ROW in proximity to some 500-kV tower locations. The total area of disturbance, however, would not exceed 200 square feet for each 500-kV tower.

[d] To minimize the disturbance area, a technique called *slack spanning* would be used (Section 2.4.5.6).

[e] Access road widths would vary from approximately 24 feet wide to 28 feet wide (including shoulders) depending on terrain, curves, drainage, and turnaround requirements. In some locations, the permanent graded area would be as wide as 100 feet and temporary disturbance areas may be as wide as 200 feet. The applicant estimates that approximately 70 percent of the access roads would be 18 feet wide (or less). For the land disturbance estimates provided in this table, it is estimated that each access road would be approximately 26 feet wide at buildout. Temporary disturbance accounts for the potential for BMP installation, clearing, grubbing, and cut and fill slopes that would be revegetated after construction is complete. This very conservatively accounts for a disturbance area that is up to 200 feet wide for 2.5 miles.

[f] For the purposes of this document, it is assumed that the applicant would use Staging Area ASP1 and ASP2 as well as the Primary Staging Area (the footprint of the Alberhill Substation site). Acreage in this row is only ASP1 and ASP2; the Substation Site is included in a separate row. See Table 2-6.

[g] Additional permanent and temporary disturbance areas are anticipated to be required for vehicle turnaround and positioning during access road construction due to hilly terrain along the proposed 500-kV transmission line routes. Permanent, graded disturbance areas may be as wide as 200 feet, and temporary disturbance areas may be as wide as 500 feet. For the land disturbance estimates provided in this table, it is estimated that up to a total of 3 miles of access roads to the proposed 500-kV would require these additional land disturbance dimensions.

Table 2-8 Helicopter Construction: 500-kV Transmission Lines

Component (Quantity)	Disturbed Area Dimensions (length x width in feet)	Acres Disturbed During Construction [a.]	Acres Restored	Acres Permanently Disturbed
Remove 500-kV tower (1)	150 x 150	0.5	0.5	0.0
Install 500-kV towers conventionally (4)	200 x 200 [c.]	3.7	2.9	0.8
Install 500-kV towers with helicopter (8)	150' x 150'	4.1	2.5	1.6

Table 2-8 Helicopter Construction: 500-kV Transmission Lines

Component (Quantity)	Disturbed Area Dimensions (length x width in feet)	Acres Disturbed During Construction [a.]	Acres Restored	Acres Permanently Disturbed
Construct helicopter landing platform (5)	50' x 50'	0.3	0.2	0.1
500-kV wire-stringing (5 sites) [d.]	150 x 50	0.9	0.9	0.0
500-kV stringing/tensioning (3 sites)	500 x 150	5.2	5.2	0.0
Staging areas [f.]	N/A	10.6	10.6	0.0
Total 500-kV transmission lines disturbance		25.3 acres	22.8 acres	2.5 acres

Sources: SCE 2011, 2013
Key: ASP = Alberhill System Project, kV = kilovolt, ROW = right-of-way
Notes:
[a] The disturbed acreage calculations are estimates based on the applicant's work area requirements and width of the proposed ROW.
[b] As described in Section 2.4.6.2, the applicant would either truck in 80,000 cubic yards of soil or excavate the soil from a 5.2-acre area located adjacent to the northeast side of the proposed Alberhill Substation site (Figure 2-2x). The Import Soil Source Area is located under the proposed 500-kV transmission line routes near 500-kV Towers SA1 and VA1. For the purposes of this document, it is assumed that regardless of the import soil option selected by the applicant, the 5.2-acre area would be permanently disturbed.
[c] The dimensions of the disturbed area for this component include the laydown area for assembly of the tower. Tower installation may require the construction of permanent crane pads. If pads are required, they would each occupy an area of approximately 50 feet by 50 feet and may extend outside of the 200-foot-wide ROW in proximity to some 500-kV tower locations. The total area of disturbance, however, would not exceed 200 square feet for each 500-kV tower.
[d] To minimize the disturbance area, a technique called *slack spanning* would be used (Section 2.4.5.6).
[e] Access road widths would vary from approximately 24 feet wide to 28 feet wide (including shoulders) depending on terrain, curves, drainage, and turnaround requirements. In some locations, the permanent graded area would be as wide as 100 feet and temporary disturbance areas may be as wide as 200 feet. The applicant estimates that approximately 70 percent of the access roads would be 18 feet wide (or less). For the land disturbance estimates provided in this table, it is estimated that each access road would be approximately 26 feet wide.
[f] For the purposes of this document, it is assumed that the applicant would use Staging Area ASP1 and ASP2 as well as the Primary Staging Area (the footprint of the Alberhill Substation site). Acreage in this row is only ASP1 and ASP2; the Substation Site is included in a separate row. See Table 2-6.

2.4.2.3 115-kV General Disturbance Areas

Final engineering for the proposed projects has not been completed. For this reason, the applicant provided large, general disturbance areas for the proposed projects to ensure that the required flexibility would be available during construction and for final siting of the proposed 115-kV facilities. The Alberhill 115-kV General Disturbance Area is approximately 505 acres, and the Valley–Ivyglen 115-kV General Disturbance Area is approximately 1,335 acres (Figures 2-6a to 2-6d). A general disturbance area was not identified for the other components of the proposed Alberhill Project (i.e., the proposed Alberhill Substation and 500-kV transmission lines) because more detailed final engineering was ~~not~~ provided by the applicant prior to completion of this document.

Disturbance areas for the proposed projects would typically vary between 50 feet wide and 150 feet wide along the proposed 115-kV routes (50 feet to 75 feet on each side of centerline) depending on the type of structure to be installed or construction activity to be completed (Tables 2-5 and 2-6~~7~~). In some locations, however, the potential disturbance area evaluated within this document is substantially wider (e.g., 1,000 or more feet wide) because of anticipated access constraints and because final engineering has not been completed. The actual amount of disturbance in these locations is anticipated to be substantially less than the area evaluated.

The size of the 115-kV disturbance area evaluated in this document is specific to the resource area that may be impacted. For impacts on biological resources, for example, it is assumed that the entire 115-kV general disturbance area would be disturbed. This approach ensures that the evaluation accounts for the full extent of impacts that could occur to various species. For impacts on air quality, however, it is not assumed that the entire 115-kV general disturbance area would be disturbed.

Activities that may occur within the 115-kV general disturbance area could include, but would not be limited to, equipment and materials staging, equipment and materials laydown adjacent to the proposed 115-kV structures, access road construction, removal, foundations, assembly, erection and wire stringing. In addition, helicopter landing and materials delivery by helicopter could occur within the Valley–Ivyglen 115-kV General Disturbance Area along 115-kV Segments VIG1 and VIG4 to VIG7. Each of the staging areas described in Section 2.4.3.1 that may be used for construction of the proposed 115-kV facilities are included within the 115-kV general disturbance area respective to the associated project. It is assumed that footprint of each staging area would be fully disturbed. The locations where other construction activities would occur within the general disturbance areas have not yet been identified by the applicant.

2.4.3 Staging Areas for the Proposed Projects

Temporary staging areas would be used to stage equipment and materials during construction. The areas would be used as a reporting location for workers, and for vehicle and equipment parking, worker parking, and material storage. The areas may have offices for supervisory and clerical personnel. Routine construction equipment maintenance would be conducted at staging areas. Materials and equipment typically managed at staging areas would include, but not be limited to, construction trailers, construction equipment, steel, conductor, wire reels, cable, hardware, insulators, signage, fuel, joint compound, and other consumable materials.

Staging areas may also be established at the following substation sites: Ivyglen, Fogarty, Skylark, Alberhill, Newcomb, and Valley. The applicant has committed to the following with regard to staging areas:

- Delivery activities requiring extensive street use would be scheduled to occur during off-peak traffic hours to the extent feasible in accordance with applicable local ordinances.
- All materials associated with construction of the proposed projects would be delivered by truck or helicopter to each work site from an established staging area. Helicopters may land at the proposed Alberhill Substation site, Staging Areas ASP1 to ASP3, and any of the Valley–Ivyglen Project staging areas except Staging Areas VIG5 and VIG12.
- Preparation of temporary staging areas would include the application of gravel or crushed rock and the installation of temporary perimeter fencing.
- If necessary, the applicant would hire a local security company to provide 24-hour attendance at staging areas during construction.
- The maximum number of workers reporting to staging areas is not expected to exceed 100 at any one time.
- Final siting of staging areas would depend on the availability of appropriately zoned property that is suitable for this purpose.

If, after certification of this document, it is determined that staging areas other than those discussed in this section would be needed, additional environmental analysis pursuant to CEQA may be required. Wire-stringing sites for the 500-kV and 115-kV lines are discussed in Section 2.4.5.6.

2.4.3.1 Valley–Ivyglen Project Staging Areas

The applicant stated that the nine staging areas, including the applicant's Menifee Service Center detailed in Table 2-9 would be used for staging activities during construction of the proposed Valley–Ivyglen Project. The location of each staging area is shown on Figures 2-2a through 2-2d and 2-2f.

Table 2-9 Valley–Ivyglen Project Staging Areas

Staging Site [a]	Size/Land Type	Location
Staging Area VIG2[b]	5.4 acres/disturbed and already used for staging materials	South of Valley Substation adjacent to Menifee Road within the City of Menifee.
Staging Area VIG3	3.5 acres/disturbed	Approximately 0.10 miles east of the intersection of SR-74 and Ethanac Road in unincorporated Riverside County.
Staging Area VIG4	2.8 acres/disturbed	Approximately 0.06 miles east of the intersection of SR-74 and Ethanac Road in unincorporated Riverside County.
Staging Area VIG5	1.6 acres/disturbed	Southwest of the intersection of Central Avenue and El Toro Cut Off Road in the City of Lake Elsinore.
Staging Area VIG6	5 acres/disturbed	Southwest of the intersection of Collier Avenue and Chaney Street in the City of Lake Elsinore.
Staging Area VIG8	3.8 acres/disturbed	Southwest of the intersection of Collier Avenue and Riverside Drive (SR-74) in the City of Lake Elsinore.
Staging Area VIG9[b]	11 acres/disturbed	Adjacent to Horse Thief Canyon Road, approximately 0.13 miles southwest of I-15, in unincorporated Riverside County.
Staging Area VIG10	12.1 acres/disturbed	West of Menifee Road and south of Case Road, on north side of Rouse Road in the City of Menifee.
Staging Area VIG12	13.0 acres/disturbed	On the corner of Highway 74 and Rosetta Canyon Drive in the City of Lake Elsinore.
Staging Area VIG13	5.0 acres/disturbed	On the southeast corner of Chaney Street and West Minthron Street in the City of Lake Elsinore.
Staging Area VIG14	17.2 acres/disturbed	0.17 miles south of W Minthorn Street on the northwest side of Chaney Street in the City of Lake Elsinore.

Note:
[a] Staging Areas VIG1 and VIG11 are no longer proposed to be used for the Valley–Ivyglen Project.
[b] Staging sites would also be used for the proposed Alberhill Project, see Staging Areas ASP3 and ASP7 in Table 2-9.

2.4.3.2 Alberhill Project Staging Areas

The applicant stated that the Alberhill Substation site and the following seven staging areas detailed in Table 2-10 would be used for staging activities during construction of the proposed Alberhill Project. The location of each staging area is shown on Figures 2-2a, 2-2e, and 2-2i.

Table 2-10 Alberhill Project Staging Areas

Staging Site	Size/ Land Type	Location
Primary Alberhill Staging Area	42.9 acres/disturbed	Within the footprint of the Alberhill Substation.
Staging Area ASP1	10.3 acres/disturbed	At the end of Concordia Ranch Road, 0.5 miles east of the proposed Alberhill Substation site in unincorporated Riverside County.
Staging Area ASP2	0.3 acres/disturbed	Between 500-kV Towers SA6 and VA6 within the existing Serrano–Valley 500-kV Transmission Line ROW in the City of Lake Elsinore.
Staging Area ASP3[a]	7.4 acres/disturbed	Approximately 1 mile west of the proposed Alberhill Substation site, along Horse Thief Canyon Road in unincorporated Riverside County.
Staging Area ASP4	6.2 acres/vacant	West of the intersection of Lewis Street and Mission Trail Road within the City of Lake Elsinore.
Staging Area ASP5	6.2 acres/vacant	Adjacent to the southern side of Skylark Substation within the City of Wildomar.
Staging Area ASP6	3.7 acres/vacant	Approximately 0.25 miles south of Skylark Substation, adjacent to Mission Trail Road within the City of Wildomar.

Table 2-10 Alberhill Project Staging Areas

Staging Site	Size/ Land Type	Location
Staging Area ASP7[a]	10.5 acres/4.9 disturbed and used as staging and 5.6 vacant	South of Valley Substation adjacent to Menifee Road within the City of Menifee.
Staging Area ASP8	8.8 acres/disturbed	.11 miles southwest of Lakeshore Drive and .04 miles west of Diamond Drive in the City of Lake Elsinore.

Note:
[a] Staging sites would also be used for the proposed Valley–Ivyglen Project. See Staging Areas VIG2 and VIG9 in Table 2-8.

2.4.4 General Construction Plans, Methods, and Materials

2.4.4.1 Water Use during Construction

Various construction activities for the proposed projects would require the use of water, including dust suppression for ground disturbing activities, drilling, and concrete mixing.

During construction of the proposed Valley–Ivyglen Project, approximately 56 million gallons of water would be required. Water trucks would be required for up to 10 hours per day for the duration of the proposed Valley–Ivyglen Project. The local water agency would supply all of the water used for construction of the proposed projects.

During construction of the proposed Alberhill Substation, approximately 250,000 gallons of water per day would be required for earth moving activities (dust control) and moisture conditioning of soils for compaction purposes. Combined, it is estimated that approximately 37.5 million gallons of water would be required for these activities (250,000 gallons of water per day for 150 days). In addition, approximately 17.5 million gallons of water would be required to control fugitive dust during construction of the 500-kV transmission lines and 115-kV subtransmission lines.

2.4.4.2 Concrete Use

Each 500-kV tower would be constructed on four drilled concrete foundations. Steel-reinforced cages and stub angles would be installed into the auger holes and then concrete would be poured. A similar method would be used for 115-kV TSP construction using single drill concrete foundation, but less concrete is required for a TSP foundation.

Concrete foundations in soft or loose soil that extend below the groundwater level may require that the borehole be stabilized with mud slurry during drilling. If this is the case, the applicant would mix and pump a mud slurry into the borehole after drilling to prevent the sidewalls from sloughing. The concrete for the foundation would then be pumped to the bottom of the hole, displacing the mud slurry. The mud slurry that is brought to the surface is typically collected in a pit adjacent to the foundation and then pumped out of the pit to be reused or discarded at an offsite disposal facility.

A typical 500-kV tower requires 25 to 100 cubic yards of concrete. Concrete samples would be drawn at the time of pour and tested to ensure engineered strengths were achieved. According to the applicant's specification, the concrete mix used typically takes 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 with erection of the steel tower. The applicant would obtain the concrete from an existing local concrete supply facility.

2.4.4.3 Storm Water Pollution Prevention Plans

The applicant would be required to obtain National Pollutant Discharge Elimination System permits because construction of the proposed projects would disturb surface areas greater than 1 acre. To acquire the permit, the applicant would prepare SWPPPs for each of the proposed projects that include project information, monitoring and reporting procedures, and Best Management Practices (BMPs). The BMPs would cover activities including dewatering procedures, storm water runoff quality control measures, and concrete waste management. The SWPPPs would be based on final engineering design and applicable to all components of the proposed projects.

2.4.4.4 Traffic Control and Lane Closure

Construction activities completed within or along public streets would require the use of a traffic control service and may require lane closures. Lane closures would be temporary and short term, and likely limited to a day at a time during stringing activities. In addition, the applicant may use flaggers to control traffic during conductor and telecommunications wire installation activities in locations where guard structures are not used. These delays would last approximately 15 minutes per conductor for a total of up to one hour in some locations.~~Very short closures of roads may occasionally be required for equipment and personnel repositioning for safety.~~ Traffic control would be conducted in accordance with local ordinances and permit conditions. Such traffic control measures are typically consistent with those published in the *California Joint Utility Traffic Control Manual* (California Inter-Utility Coordinating Committee 2010).

Valley–Ivyglen Project Road Closures

Construction of the proposed Valley–Ivyglen Project would result in roadway closures/lane closures at locations where the construction activities would be located within or immediately adjacent to the ROW of public streets and highways:

- 115-kV Segment VIG2 would be installed adjacent to SR-74
- 115-kV Segment VIG3 would be installed adjacent to Third Street and Conard Avenue.
- 115-kV Segment VIG4 would be installed adjacent to Third Street, Pasadena Avenue, SR-74 (Riverside Drive), and Baker Street in the City of Lake Elsinore.
- 115-kV Segment VIG5 would be installed adjacent to Lake Street between Nichols Road and Temescal Canyon Road in the City of Lake Elsinore and unincorporated western Riverside County. Segment 5 would then continue along Temescal Canyon Road until reaching Hostettler Road.
- 115-kV Segment VIG7 would be installed adjacent to De Palma Road.
- Construction of approximately 0.4 miles of 115-kV Segment VIG7 would occur along Temescal Canyon Road.
- 115-kV Segment VIG8 would be installed adjacent to the northbound lane of Temescal Canyon Road.

Temporary closures along these alignments may be necessary to facilitate construction activities occurring into or close to the public roadway. Installation of these segments would require temporary lane closures between two and four days during pole installation and/or installation and removal of guard structures. These lane closures would be limited to the areas of active construction.

The modified stringing setup areas located adjacent to or within roadways would also require lane closures. Lane closures would be temporary and short term, and likely limited to a day at a time during stringing activities. In addition, the applicant may use flaggers to control traffic during conductor and telecommunications wire installation activities in locations where guard structures are not used. These delays would last approximately 15 minutes per conductor for a total of up to one hour in some locations. Additionally, stringing activities would require temporary traffic stops along local roads as well as I-215, I-15, and SR-74.

Approximately 1.9 miles of new underground conduit would be installed as part of the Proposed Modifications to accommodate the telecommunications and 115-kV lines. Similar to the underground portions of the subtransmission line, the installation of these facilities would require temporary lane closures. These closures would last approximately two months, would be dispersed across the entire underground telecommunications system alignment, and would require agency coordination through the encroachment permit process.

Alberhill Project Road Closures

Construction of the proposed Alberhill Project would result in roadway closures/lane closures at several locations where the construction activities would be located within or immediately adjacent to the ROW of public streets and highways:

- 115-kV Segments ASP1 and ASP1.5 would be constructed adjacent to Temescal Canyon Road.
- 115-kV Segment ASP2 would be constructed adjacent to Temescal Canyon Road, Lake Street, Nichols Road, Baker Street, SR-74 (Riverside Drive), Pasadena Street, and Third Street
- 115-kV Segment ASP3 would be constructed adjacent to Collier Avenue.
- 115-kV Segment ASP4 would be constructed adjacent to East Hill Street, Pottery Street, Avenue 6, Auto Center Drive, Casino Drive, Malaga Road, and Mission Trail.
- 115-kV Segment ASP5 would be constructed adjacent to Waite Street, Almond Street, Lemon Street, Lost Road, Beverly Street, and Bundy Canyon Road.
- 115-kV Segment ASP6 would be constructed adjacent to Murrieta Road.
- 115-kV Segment ASP7 would be constructed adjacent to Murrieta Road.

Temporary closures along these alignments may be necessary to facilitate construction activities occurring into or close to the public roadway. Installation of these segments would require temporary lane closures between two and four days during pole installation and/or installation and removal of guard structures. These lane closures would be limited to the areas of active construction.

Lane closures would be temporary and short term, likely limited to a day at a time during stringing activities. In addition, the applicant may use flaggers to control traffic during conductor and telecommunications wire installation activities in locations where guard structures are not used. These delays would last approximately 15 minutes per conductor for a total of up to one hour in some locations. Additionally, stringing activities would require temporary traffic stops along local roads as well I-15 and SR-74.

Approximately 1.1 miles of new underground conduit would be installed as part of the proposed project to accommodate the telecommunications and 115-kV lines. Similar to the underground portions of the subtransmission line, the installation of these facilities would require temporary lane closures. These closures would last approximately two months, would be dispersed across the entire underground telecommunications system alignment, and would require agency coordination through the encroachment permit process.

Relocation of the EVMWD pipeline would require closure on one road. The reroute of the pipeline would cross Concordia Ranch Road near its intersection with Temescal Canyon Road. One lane of Concordia Ranch Road would be kept open at all times during the day, with both lanes being open at night. One lane of traffic would be closed while work in that area is completed. Once work in that area is completed, then that lane would be open and the opposite lane would be closed while work is completed on the other side of the road. The rerouted pipeline would run parallel to Temescal Canyon Road. Love Lane would be relocated to the west in the area where the relocated pipeline is planned to cross the current Love Lane alignment. Love Lane would therefore remain open for the entirety of construction.

2.4.4.5 Nighttime Construction

Under normal circumstances, construction of the proposed projects would occur during daylight hours. However, there is a possibility that construction would occur at night and temporary lighting would be required. The California Independent System Operator or California Department of Transportation, for example, may require that conductor stringing over highways occur at night. In the event of nighttime construction, the applicant would use lighting to protect the safety of the construction workers but would orient the lights to minimize effects on sensitive receptors.

2.4.4.6 Identification of Underground Utilities

By California law, prior to conducting any excavation, including drilling boreholes for foundations or LWS poles, the applicant or its contractor would be required to contact Underground Service Alert to identify underground utilities in the construction area. If other utilities are located in the construction area, the applicant would contact the owner of the utility to discuss protection and avoidance measures. Exploratory excavations (potholing) may be required to verify the location of existing utilities.

2.4.4.7 Hazardous Materials Use and Hazardous Waste Disposal

The SWPPPs prepared for the proposed projects would provide information about the locations where hazardous materials would be stored during construction and the protective measure, notification, and cleanup requirements for accidental spills or releases of hazardous materials. They would also contain cleanup requirements for accidental spills or releases of hazardous materials. The applicant would make Safety Data Sheets for all hazardous materials in use at the construction site available to all site workers in case of emergency.

Construction and operation of the proposed Valley–Ivyglen Project would require limited use of hazardous materials (e.g., fuels, lubricants, and cleaning solvents). The applicant would store, handle, and use hazardous materials in accordance with applicable regulations. The applicant would dispose of hazardous waste at an appropriately licensed facility.

Similarly, construction and operation of the proposed Alberhill Project would require the same types and amounts of hazardous materials as the proposed Valley–Ivyglen Project, with the exception of fuel for the proposed emergency backup generator, mineral oil (transformer oil) for insulating media in the 500/115-kV transformers, and battery fluid contained in batteries located in the control room at the Alberhill Substation site (Table 2-2).

The applicant would not store any other bulk fuels onsite during construction or operation of the proposed projects. Existing fuel supply facilities would be used by the applicant and its contractors. An offsite fuel supply truck may temporarily be brought onsite to support construction vehicles. Small quantities of fuel—10 to 40 gallons—would be stored onsite for gasoline powered hand tools and small portable generators.

Wood poles that are removed may be reused by the applicant, ~~returned to the manufacturer~~, disposed of in a Class I hazardous waste landfill, or disposed of in the lined portion of a municipal landfill certified by the associated Regional Water Quality Control Board depending on their condition and original chemical treatment. Thirty cubic yards (estimated at 6 tons) of treated wood utility poles was recovered by the applicant during horse ranch demolition activities conducted in 2011 for the proposed Alberhill Project (Section 2.4.6.1).

2.4.4.8 Waste Disposal and Recycling

Valley–Ivyglen Project

Construction would result in the generation of approximately 40 tons of various waste materials that would be recycled and salvaged as described for the proposed Alberhill Project. Construction of the proposed Valley-Ivyglen Project would generate approximately 31,873 tons of waste material that cannot be reused or recycled (e.g., wood, soil, vegetation, and sanitary waste). Waste would be generated from the removal of existing structures, shoofly (temporary 115-kV line) construction, and civil work for the proposed 115-kV structures including new access roads. The applicant would use approved disposal facilities for the disposal of construction waste that cannot be salvaged or recycled.

Alberhill Project

Construction of the proposed Alberhill Project would result in the generation of approximately 40 tons of various waste materials that can be recycled and salvaged. Items that may be recycled include steel (e.g., electrical towers, support beams, nuts, bolts, and washers), conductor wire, and other hardware (e.g., shackles, clevises, yoke plates, links, or other connectors used to support conductor wire). These items would be gathered by construction crews and separated into roll-off boxes. Salvageable items (i.e., conductor, steel, and hardware) would be transported to staging areas, sorted, and baled for sale through available markets.

Construction of the proposed Alberhill Project would also generate approximately 142,070 tons of waste material that cannot be reused or recycled (e.g., wood, soil, vegetation, and sanitary waste). Waste would be generated from relocation of the water line on the proposed Alberhill Substation site, removal of existing 500-kV and 115-kV structures, and civil work for the proposed 500-kV structures including the proposed access roads. Soil excavated for building and equipment foundations at the proposed Alberhill Substation site would be stockpiled during excavation and ultimately would be graded and compacted onsite. The applicant would use applicant-approved disposal facilities for the disposal of construction waste that cannot be salvaged or recycled.

In addition, materials that were removed from the horse ranch site in 2011 (Section 2.4.6.1) included wood, metal, rock, concrete, soil, green waste, and fiberglass. Waste (176 tons) was disposed of at El Sobrante Landfill in Corona, California, and four dump-truck loads of concrete and rock (45 tons) was processed at Wyroc Regional Materials Recovery, Inc. in Vista, California.

2.4.4.9 Cleanup, Restoration, and Roadway Repair

The applicant would restore all areas temporarily disturbed during construction of the proposed projects, including temporary staging areas and wire-stringing sites, to as close to preconstruction conditions as possible or to the conditions agreed upon between the applicant and landowner after completion of construction. The applicant would repair damage to roads that results from construction in accordance with local requirements after construction is complete. The applicant would conduct a final inspection to ensure that cleanup activities were successfully completed.

2.4.5 Subtransmission and Transmission Line Construction

The applicant would be required to ensure that the proposed transmission, subtransmission, and telecommunication lines would maintain, at minimum, the clearance requirements specified in California Public Utilities Commission (CPUC) General Order 95, *Rules for Overhead Electric Line Construction*. The clearance requirements apply to distances to the ground and between conductors at highways, bridges, buildings, water areas, and other crossings.

2.4.5.1 Access Road Construction

The applicant would first clear and grub access roadways (new and existing) of vegetation. Then the roadways would be graded to remove potholes, ruts, and other surface irregularities and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. To minimize impacts from road construction on drainage and wetland areas, the applicant would access construction sites using *overland access* where possible. Road preparation work would not be required for overland access areas that may be used through relatively flat, grassy areas that do not include aquatic features (e.g., drainages or wetlands). Overland access areas would not be maintained after construction of the proposed projects.

Valley–Ivyglen Project

The drivable area of the proposed access roads would generally be 24 feet wide with an additional 2 feet on each side if drainage berms or swales are required. In addition, hilly terrain along sections of 115-kV Segments VIG1 and VIG6 may require additional permanent and temporary disturbance areas for vehicle turnaround and positioning during access road construction. In some locations, the permanent, graded disturbance areas may be as wide as 100 feet, and the temporary disturbance areas may be as wide as 200 feet. The access roads constructed to accommodate construction would be permanent.

Slope stability improvements may also be required during the new access road construction, widening of existing access roads, repairing earthen slopes damaged by erosion, grading with significant cut and fill depths, and benched grading activities. It is typically preferable to use cut-and-fill slopes that are configured at slope ratios that are stable without using reinforcement. However, due to ROW limitations, sensitive resource avoidance, and existing topography, the proposed Valley–Ivyglen Project may require reinforced earthen slopes, permanent erosion control, or an earth retaining system. ~~The applicant estimates that the total combined length of retaining walls may be approximately 2,200 feet with an average height of 8 feet.~~ Other slope stability systems considered include mechanically stabilized systems, along with drainage improvements (i.e., v-ditches, downdrains, energy dissipaters, etc.). The extent of slope stability improvements and earth retaining walls are determined during final engineering after site-specific geotechnical investigations and a topographic survey are performed.

Substantial cut-and-fill grading activities to repair slopes damaged by erosion may be required along 115-kV Segments VIG1 and VIG6 to construct access roads. Benched (terraced) grading activities may be required. Benching is a technique in which a tracked earth-moving vehicle excavates terraced sites in steep and rugged terrain. Blasting or fracturing may also be required. Blasting and fracturing are described in Section 2.4.5.4. Permanent erosion control facilities (e.g., retaining walls) may also be required based on the topography and resources present. Other slope stability systems may include drainage improvements (e.g., v-ditches, downdrains, or energy dissipaters). The extent of slope stability improvements required would be determined during final engineering and based on the results of site-specific geotechnical investigations.

Blasting or fracturing may also be required. Blasting and fracturing are described in Section 2.4.5.4.

Alberhill Project

Under the conventional method of construction for the 500-kV transmission line, about 3~~6.1~~ miles of access road would be constructed (includes new and modified).~~.~~ Under the helicopter construction method, no access road would be constructed for the 500-kV transmission line.~~ About 325 feet of access road would be constructed for 115-kV Segment ASP5.~~ The drivable area of the proposed access roads would generally be 24 feet wide with an additional 2 feet on each side if drainage berms or swales are required. In addition, hilly terrain along the proposed 500-kV transmission line routes is anticipated to require additional permanent and temporary disturbance areas for vehicle turnaround and positioning during access road construction. In some locations, the permanent, graded disturbance areas may be as wide as 200 feet, and the temporary disturbance areas may be as wide as 500 feet. Temporary disturbance would result from grading and vegetation removal outside the permanent roadway. This could include reinforced earthen slopes, permanent erosion control, or an earth retaining system to support the permanently disturbed drivable portion of the road. The temporarily disturbed areas would also be where BMPs are installed. These temporarily disturbed areas would be revegetated after construction is complete. The access roads constructed to accommodate construction would be permanent. Modifications in the permanent disturbance area would include the drivable portion of the road as well as appurtenant infrastructure, such as drainage improvements.

The proposed Alberhill Project would repair and stabilize slides, washouts, and other slope failures along the roads due to inclement weather by installing retaining walls or other means necessary to prevent future failures. The type of drainage structure or earth-retaining structure to be used would be based on site-specific conditions. The crossing of an aquatic feature (Figure 4.9-2) to access 500-kV Tower SA5, is discussed in Section 4.9.

2.4.5.2 Helicopter and Airstrip Use

Valley–Ivyglen Project

Light-duty helicopters may be used along 115-kV Segments VIG1 and ~~VIG4~~ to VIG6~~VIG7~~ for materials delivery, hardware installation, and wire stringing. In general, helicopter operations (including takeoff and landing) would be limited to areas in proximity to wire stringing sites or access roads and previously disturbed areas near construction sites within the 115-kV Valley–Ivyglen General Disturbance Area (Section 2.4.2.1) or the fueling, takeoff, and landing areas described below. Heavy-duty helicopters would not be used for construction of the proposed Valley–Ivyglen Project.

Alberhill Project

The applicant may use a heavy-duty helicopter to facilitate construction in lieu of constructing new access roads or where the proposed 500-kV transmission line towers would be located on terrain on which a crane could not be used or some of the required equipment and materials could not be delivered by truck (refer to Section 2.4.5.5). For all sections of the 500-kV transmission lines, a light-duty helicopter would be used for *sock-line threading*—the stringing of a lightweight pilot line (a sock line) between power line structures. After securing the sock line to the conductor-pulling cable, the sock line and the conductor-pulling cable are threaded through the structures.

The applicant does not anticipate that helicopters would be used for 115-kV subtransmission line construction with the exception of wire stringing along a section of 115-kV Segment ASP5 between Lost Road and Bundy Canyon Road that is undeveloped and has hilly terrain (Figure 2-2g). For wire stringing along these 115-kV segments, a light-duty helicopter would be used. For all other 115-kV segments, the applicant would install conductor on the proposed 115-kV subtransmission lines using a line truck instead of a helicopter to string the sock line.

Helicopter Fueling, Takeoff, and Landing Areas

Helicopter fueling, takeoff, and landing may occur at Skylark Field Airport, Perris Valley Airport, or the applicant's Chino Air Operations Facility at Chino Airport for either of the proposed projects. In addition:

- For the Proposed Valley–Ivyglen Project, helicopter fueling, takeoff, and landing may also occur within the Valley–Ivyglen 115-kV General Disturbance Area (Section 2.4.2.1) along 115-kV Segments VIG1 and VIG4 to VIG7 and at all Valley–Ivyglen Project staging areas except Staging Areas VIG5 and VIG VIG12.
- For the proposed Alberhill Project, helicopter fueling may also occur at the proposed Alberhill Substation site or at Staging Areas ASP1 or ASP3.
- For the proposed Alberhill Project, helicopter takeoff and landing may also occur adjacent to wire stringing sites along the 500-kV transmission line routes during wire-stringing activities or for materials delivery, adjacent to tower sites for micropile foundation construction activities and tower erection, and at Staging Areas ASP1, ASP2, and ASP3.

Temporary landing areas within staging areas, at wire-stringing sites, or along the 500-kV transmission line routes would be approximately 100 feet wide by 100 feet long. The helicopter contractors selected by the applicant for construction of the proposed projects may select helicopter operations facilities or airports other than those listed in this document, which could result in the need for additional evaluation pursuant to CEQA. Helicopters would remain at local airports, or the applicant's or helicopter contractor's air operations facilities at night or when not in use.

Skylark Field Airport

Construction activities for the proposed Alberhill Project 115-kV segments would occur within 1,000 feet of a private airstrip (Skylark Field Airport) in southern Lake Elsinore. The airport is private and primarily used for skydiving. It has turf runways, the longest of which is approximately 2,800 feet (AirNav, LLC 2013a). The applicant would provide written notice of the construction schedule to the Skylark Field Airport operator prior to construction of components of the proposed Alberhill Project that would require use of the airport or construction activities that would occur near the airport (e.g., construction on Mission Trail, Waite Street, Lemon Street, Lost Road, and Beverly Street). The applicant may stage helicopters and helicopter support equipment at local airports, including Skylark Field Airport, for the proposed Alberhill Project.

Perris Valley Airport

The applicant may stage helicopters and helicopter support equipment at local airports, including Perris Valley Airport, for the proposed Valley–Ivyglen Project. Perris Valley Airport is a public-use airport with an asphalt runway that is approximately 5,100-feet long (AirNav, LLC 2013b). The airport is located approximately 1.5 miles north of 115-kV Segment VIG1 and 115-kV Segment ASP8.

Chino Airport

The applicant's Chino Air Operations Facility is located at 7000 Merrill Avenue in Chino, California, at the Chino Airport (approximately 18 miles northwest Ivyglen Substation). Chino Airport is a public use airport located within Los Angeles County with asphalt runways, the longest of which is approximately 7,000 feet (AirNav, LLC 2013c). The Chino Air Operations Facility may be used for helicopter staging activities.

Helicopter Specifications and Best Management Practices

Helicopters would be used in accordance with the applicant's specifications, which are similar to the methods detailed in the Institute of Electrical and Electronic Engineers 951-1996 Standard, *Guide to the Assembly and Erection of Metal Transmission Structures* (Section 9, Helicopter Methods of Construction). The applicant may need to submit a Congested Area Plan to the Federal Aviation Administration 30 to 60 days prior to start of construction for helicopter external-load operations over populated areas or areas congested with structures or objects. Determination of whether a Congested Air Plan is necessary will be made through consultation with the Federal Aviation Administration.

The type of helicopter used for transmission and subtransmission line construction would be determined during final engineering design for the proposed projects and would depend on the helicopters and contract helicopter services available at the time of construction. For the purpose of the analyses in this document, the applicant indicated that a light-duty Hughes 500E (369E) helicopter with a Rolls Royce 250-C20B engine (refer to Appendices B1 and B2 for estimated hours of operation) or similar would be used for wire stinging activities and materials delivery.

Heavy-duty helicopters would not be required for the proposed Valley–Ivyglen Project but may be used as part of the proposed Alberhill Project. If a heavy-duty or medium-duty helicopter is required for construction of the proposed 500-kV transmission lines as part of the Alberhill Project because of rough terrain, the following or similar models would be used for up to five days (up to 12 hours per day or in accordance with all applicable noise ordinances):

- Sikorsky S64 Skycrane twin-engine heavy-lift helicopter with Pratt and Whitney T73-P-1 engines (heavy-duty); or
- Kaman K-MAX helicopter with a Lycoming T53 engine (medium-duty helicopter); or
- Hughes 500-530 helicopter.

If the Helicopter Construction option is used, the models listed above would be used for up to 22 weeks (up to six days per week, 12 hours per day, or in accordance with all applicable noise ordinances). Actual flight time for each helicopter would not exceed 5 hours per day.

Consistent with Project Commitment H, the~~The~~ applicant would employ BMPs to minimize noise impacts caused by the use of helicopters. BMPs would include:

- Maximizing the efficient use of~~Using helicopters with low-emitting engines to the extent practical~~
- ~~Efficiently maximizing~~ flight times
- Designating flight paths away from residential areas
- Identifying sensitive receptors that might be disturbed by construction noise
- Providing advance notice of helicopter work

- ~~Obtaining variances from local noise ordinances as required~~

The applicant would not use helicopters for construction at night. Helicopters would only be used during daylight hours consistent with applicable laws and regulations.

2.4.5.3 Removal of Existing Structures

115-kV and Distribution Structure Removal

After the existing 115-kV subtransmission, distribution, and telecommunication lines are transferred to the proposed structures, the existing 115-kV structures would be completely removed, including their below-ground components. The remaining holes would be backfilled using native and/or clean fill remaining from excavation activities in combination with imported clean fill as needed. Conductor and hardware on the structures would also be removed and recycled or disposed of as described in Section 2.4.4.8.

Existing access roads would be used where feasible to reach the structures to be removed. Road work may be required and could include any of the activities described under Section 2.4.5.1 for access road construction. Wire-pulling sites for conductor removal would be located at intervals of approximately 6,500 feet. In some cases, the tops of existing poles would be removed after removal of the subtransmission line. The distribution line would be left in place on the lower section of the poles until the distribution line is relocated. The *topping* of poles would be completed with a bucket truck and saw. The numbers of subtransmission and distribution structures to be removed are presented in Tables 2-1 and 2-2.

For the proposed Valley–Ivyglen Project, approximately 35 distribution-line riser poles would be replaced with 115-kV structures designed to support the required distribution-line riser pole components on their lower sections. Each replacement would require approximately 30 feet of trenching (20 to 24 inches wide and 42 inches deep) to facilitate the replacement. In addition, approximately three distribution-line riser poles would require installation of approximately 3 to 4 additional vaults and approximately 600 to 2,500 feet of trenching each. Trenching would be completed on Temescal Canyon Road near Indian Truck trail and on Temescal Canyon Road between Hostettler Road and I-15. Distribution-line riser poles are located at each terminus of an underground segment of distribution line where conductor transitions up the riser pole to an overhead position. Trenching and vault installation would be conducted as described in Section 2.4.5.4, under the heading, “Trenching and Duct Banks” and “Vault Installation.”

Where new 115-kV structures would replace distribution line structures, the new 115-kV structures would be installed along the same alignment of the existing distribution structures, but the span lengths between structures would differ. Spans lengths between 115-kV structures are, on average, greater than span lengths between distribution structures.

For the proposed Alberhill Project, where new 115-kV structures would replace existing 115-kV structures, the new structures would be installed as close as possible to the original structures, where existing structures are present.[11]

[11] Exceptions (i.e., where existing pole locations would not be reused) may include, but would not be limited to, requirements for even span lengths, avoiding utility infrastructure, spanning driveways, and pole *loading*—the amount of force that may be applied to an installed pole.

500-kV Tower Removal

To remove Serrano–Valley 500-kV Transmission Line tower M13-T4, the applicant would do the following:

1. The transmission line would be de-energized.
2. Grounding and wire snubbing would be completed as described in Section 2.4.5.3.
3. Conductor spans would be removed from the existing tower and transferred to the proposed 500-kV towers.
4. The tower would be dismantled down to the tower footings.
5. The footings would be removed to 2 feet below grade.
6. The footing holes would be backfilled using clean fill material excavated in proximity to the tower site during construction. If excavated material is not suitable for backfill, clean fill material, such as clean dirt and/or base material, would be imported.

The applicant anticipates that removal of the 500-kV tower would occur within the same period as installation of the proposed 500-kV towers and conductor to minimize the amount of time that the Serrano–Valley 500-kV Transmission Line would be out of service.

2.4.5.4 115-kV Structure Construction

The following construction activities are proposed for the 115-kV segments. The number of structures to be removed and installed and length of each segment are provided in Tables 2-1 and 2-2.

Grading and Laydown Areas

The new guy pole, wood pole, hybrid pole, LWS pole, H-frame structure, and TSP locations would first be graded and/or cleared to provide an adequately level and vegetation-free surface for footing construction. An approximately 50-foot by 50-foot area around each guy pole, 100-foot by 100-foot area around each wood pole, 150-foot by 75-foot area around each hybrid pole, 150-foot by 75-foot area around each LWS pole and H-frame structure, and 200-foot by 150-foot area around each TSP would be cleared of vegetation to provide a safe working area and laydown area needed for pole assembly (Tables 2-5 and 2-7).

Depending on the location, the assembly and erection of some TSPs may require that a new crane pad, approximately 50 feet by 50 feet, be prepared to allow an erection crane to set up 60 feet from the centerline of the TSP. Crane pads would be located transversely (crosswise) from the TSP. The locations that would require a crane pad cannot be determined until final engineering and, therefore, for the purposes of this document, it is assumed that crane pads could be required anywhere along 115-kV segments that would include the installation of a TSP (Tables 2-1 and 2-2).

Blasting and Fracturing (Valley–Ivyglen Project)[12]

Blasting or fracturing would only occur in areas that require excavation and where subsurface obstructions reasonably preclude excavation using conventional construction equipment as part of the proposed Valley–Ivyglen Project. Blasting or fracturing may be required during access road construction, site preparation, excavation work, or foundation work.

[12] Blasting and fracturing are not anticipated to be needed as part of the Alberhill Project.

Blasting or fracturing may be required where rock is present to install the proposed structures along 115-kV Segments VIG1, VIG2, VIG5, VIG6, and VIG8. Structure and access road sites that may require blasting are shown in Table 2-11. If, after certification of this document, it is determined that blasting locations other than those discussed in this section would be needed, additional environmental analysis pursuant to CEQA may be required.

Table 2-11 Blasting Details and Locations (Valley–Ivyglen Project)

Segment	Material Removed (Estimated)	Nearest Sensitive Receptor	Blasting Location by Proposed 115-kV Structure Site [(a)]
115-kV Segment VIG1	2,240 cubic yards	80 feet	Access road between Structures 144 and 147[(b)]
115-kV Segment VIG1	400 cubic yards	80 feet	Structures 131 and 144–157 (15 structures)
115-kV Segment VIG2	267 cubic yards	65 feet	Structures 212–214, 219, 221, 224, 230, and 251–253 (10 structures)
115-kV Segment VIG5	107 cubic yards	90 feet	Structures 32 to35 (4 structures)
115-kV Segment VIG6	107 cubic yards	None in proximity	Structures 527–530 (4 structures)
115-kV Segment VIG8	Not provided	None in proximity	Each underground vault location (8 vaults)

Sources: SCE 2013, 2014

Notes:

(a) Proposed Valley–Ivyglen 115-kV structure sites are shown on Figures 2-2a through 2-2d, 2-2f, and 2-2i.

(b) Boulders in this location may be associated with a known cultural site (P-33-000714/CA-RIV-714). The State Historic Preservation Officer has concurred that the proposed project impact area would not overlap with contributing elements of the site. In this area, the applicant has agreed to spot check all boulders to be blasted prior to their removal (Roland-Nawi 2014). Refer to Section 4.5, "Cultural Resources."

Explosive agents that may be used include dynamite, ammonium nitrate/fuel oil, slurry (water-gel explosive), and packaged emulsion explosives. Open blasting areas, such as areas to be leveled for road construction, typically require up to 1.5 pounds of explosive agent per cubic yard of rock. Close-quarters sites (e.g., sites to be excavated for the installation of concrete footings for utility structures) can require up to 4 pounds of explosive agent per cubic yard of rock. The maximum blast depth would be no more than 5 feet per blast. Blasting may be required for up to the full depth of the required excavation depending on the amount of rock present and results of the geotechnical analyses.

Prior to blasting, distances to sensitive receptors in the area would be assessed to ensure that the blast would be engineered to be safe and effective. The area would be secured to avoid inadvertent entry by the public or other personnel. Holes would be drilled and the explosive charges loaded into the holes. Protective measures (e.g., gravel or blast mats) would be installed to control rock and debris that may be expelled from the blast site. The appropriate pre-blast warning signals would be given prior to detonating the blast. After detonation, a post-blast safety inspection would be conducted to ensure that the blast completely discharged and that personnel may safely return to excavate blasted material.

Fracturing involves boring into rock at various points in a pattern configuration and filling pre-drilled holes with an expansive agent. Expansive agents are fine-grain powders that, when mixed with water, form a slurry that can be poured. At the appropriate temperature, the slurry expands substantially in size. The expansive agent hardens as it dries and expands. Expansive agents that may be used for fracturing include limestone, dolomite, calcium hydroxide, calcium oxide, silicon dioxide, aluminum oxide, and ferric oxide. Fracturing is a much slower process than blasting. It requires up to one work day for preparation and 24 hours for the expansion agent to cure and expand. Geotechnical survey results and contractor input are considered when determining the safest and most effective method to break up material. Fracturing is not a viable alternative to blasting in all situations. All blasting and fracturing would be conducted in accordance with applicable laws and regulatory requirements.

Guy Pole, Wood Pole, and Lightweight Steel Pole Installation

The proposed guy poles, wood poles, and LWS poles would be installed in holes bored into soil that are approximately 1.5 feet to 3 feet in diameter and 6 feet to 14 feet deep. They would be *direct buried*—installed into the ground without a foundation or footings. While on the ground at the laydown area, the poles would be configured, if not preconfigured, with the necessary crossarms, insulators, and wire-stringing hardware. LWS poles are typically shipped to the laydown area in sections with slip joints and then jacked together. The poles would be installed using a line truck. Once the poles are set in place, excavated material from the holes would be used to backfill the hole. If the excavated material is not suitable for backfill, clean fill material, such as clean dirt and/or base material, would be imported. The applicant would use excess excavated material to backfill the holes or dispose of it offsite in accordance with all applicable laws.

H-frame structures, which are composed of two LWS poles spaced approximately 12 feet apart, would be used for applications that require extra structure strength. The installation process for H-frames would be similar to that for a single LWS pole.

Tubular Steel Pole Installation

TSPs would be used in areas where the length and strength of LWS poles would be inadequate (e.g., freeway crossings and turning points). The tallest TSPs for the proposed Alberhill Project would be used at I-15 crossings. For the proposed Valley–Ivyglen Project, the tallest TSPs would be used at I-15 crossings and to span a cultural resources site located along 115-kV Segment VIG1. The TSPs would be attached to a concrete foundation approximately 5 feet to 8 feet in diameter that extends 20 to 50 feet below ground and up to 2 feet above ground. A crane would be used to position each pole base section onto the foundation. When the base section is secured, the top section would be placed above the base section. The sections would be slipped together and may be spot welded together for additional stability.

Hybrid Pole Installation (Valley–Ivyglen Project)

Hybrid poles consist of a separate base and top sections. The base section would be made of concrete and the top section made of steel. Each hybrid pole would consist of a prefabricated concrete base section that would be installed into an approximately 6-foot-diameter hole that is 20 to 25 feet deep. The proposed hybrid poles along 115-kV Segment VIG4 would be direct buried without poured-in-place foundations. No hybrid poles are anticipated for the proposed Alberhill Project. The hole would be excavated using either an auger or a backhoe. The prefabricated concrete base would be set inside the hole, and the hole would be backfilled with engineered backfill material. Final engineering design would determine appropriate backfill material to fill the annular space around the foundation. Typically, a granular backfill or slurry backfill material is used. In the event natural water levels exist at a level above the excavation depth, polymer or bentonite stabilizing agents (absorbent clay material) may be required to prevent caving during the drilling process or setting of the base section. Fluids displaced by the backfill material and pole setting process would be vacuumed into tanker trucks and disposed of at an off-site facility.

When the base section is secured, the steel upper pole sections would be installed by slipping them onto the concrete base. Typically, a crane and a line truck are used for the installation of hybrid poles. Once the pole sections are assembled, the sections would be jacked together.

Shoofly Construction (Valley–Ivyglen Project)[13]

A shoofly line is a temporary electrical line used during construction activities to maintain electrical service to an area while allowing sections of a permanent line that requires modification to be taken out of service. The applicant proposes to install a temporary shoofly line along Temescal Canyon Road along the westernmost 0.5 miles of 115-kV Segment VIG7 to the start of 115-kV Segment VIG8 (Figure 2-2a). The proposed shoofly line would consist of approximately 10 wood poles. 115-kV subtransmission line conductor would be installed on the poles as described in Section 2.4.5.6.

The temporary shoofly line would be energized after its construction, which would allow a section of the Fogarty–Ivyglen 115-kV line to be de-energized with the minimal loss of 115-kV electrical service to Ivyglen Substation. The Fogarty–Ivyglen 115-kV line provides the single source of 115-kV electrical service to Ivyglen Substation. Electrical outages would be required to facilitate work at the intercept points of the existing line and shoofly line. To construct the proposed shoofly line along 115-kV Segment VIG7, the applicant estimates that four to eight interruptions in electrical service to Ivyglen Substation would occur. Once the proposed 115-kV Valley–Ivyglen line is operational, all conductor cables and wood poles for the shoofly line would be removed after 115-kV Segment VIG7 is operational, as described in Section 2.4.5.3.

115-kV Underground Installations (Valley–Ivyglen Project)[14]

115-kV Segments VIG1 and VIG8 would be at least partially located in new or existing underground conduits.

Trenching and Duct Banks

A duct bank contains conduit, spacers, ground wire, and concrete encasement. Duct banks for 115-kV subtransmission lines typically contain six polyvinyl chloride conduits (each approximately 6 inches wide) that are fully encased with a minimum of 3 inches of concrete. They can accommodate up to six cables and may include distribution or telecommunications lines. The proposed underground duct banks for the Valley–Ivyglen 115-kV line would use three of the six conduits and leave three spare conduits for future use pursuant to the applicant's standards for 115-kV underground construction. Each duct bank would be approximately 21 inches high by 20 inches wide.

Approximately 20-inch to 24-inch-wide by 5-foot-deep trenches would be required to install the proposed Valley–Ivyglen 115-kV line underground. Where vaults are installed, the trench would be approximately 12 feet wide and approximately 14 feet deep. A minimum of 36 inches of cover above the duct bank is required (Figure 2-4). The location of underground utilities in proximity of the underground work (if any) would be marked. The trench line would be drawn on the ground, and a saw would be used to cut asphalt or concrete pavement as necessary. A backhoe or similar excavation equipment would be used to excavate the trench. Trenches would be widened and shored where appropriate to meet California Occupation and Safety Health Administration requirements. Trenching would be staged so that the period during which trenches remain open would be minimized. Where trenches must remain open, steel plates would be placed over the trenches to allow for vehicle and pedestrian traffic. Provisions for emergency vehicle access would be ensured and arranged with local jurisdictions in advance of all trenching activities.

[13] No shoofly construction is anticipated to be needed for construction of the proposed Alberhill Project.
[14] No subtransmission line segments would be placed underground as part of the proposed Alberhill Project.

Trench width and depth may vary where a duct bank would cross or run parallel to other substructures. For substructures that operate at normal soil temperatures (e.g., gas lines, telephone lines, water mains, storm drains, or sewer lines), a minimal clearance of 6 inches for crossing and 12 inches for paralleling the substructures would be required. For substructures that operate at temperatures that substantially exceed normal soil temperature (e.g., other underground transmission circuits, primary distribution cables, steam lines, or heated oil lines), additional clearance may be required. Clearances and depths would meet the requirements established by Rule 41.4 of CPUC General Order 128. In areas where underground utilities are highly congested or in areas where it is necessary to arrange underground conduit horizontally instead of vertically within the duct banks, flat configuration duct banks may be required. Trenches in this case would be shallower and wider. Flat configurations are unusual, however, and the applicant does not anticipate that they would be required.

After installing the duct banks, the trenches would be backfilled with a sand and slurry backfill material. Excavated materials would be disposed of at an offsite disposal facility in accordance with all applicable laws and regulations. Should groundwater be encountered, it would be pumped into a holding tank and disposed of at an offsite disposal facility in accordance with all applicable laws and regulations.

Vault Installation

Vaults are below-grade concrete enclosures where underground electrical or telecommunications lines terminate, are spliced together, or transition to or from overhead positions. They are constructed of prefabricated steel-reinforced concrete and designed to withstand heavy truck traffic loading. They would be placed no more than 1,500 feet apart along the underground sections of the proposed subtransmission line. Initially, the vaults would be used as pulling locations to pull 115-kV conductor through the conduit. After the cable is installed, the vaults would be used to splice cables together. During operations, the vaults would provide maintenance access to the underground conductor.

Underground vaults would be installed along 115-kV Segments VIG1 and VIG8 (Table 2-1). The installation of each vault would take place over an approximately one-week period, depending on soil conditions. First, each vault pit would be excavated and shored; a minimum of 6 inches of mechanically compacted aggregate base would cover the bottom of each excavated pit. Vault delivery and installation would follow excavation. After each vault is set into the excavated pit, grade rings (for manhole cover placement) and the vault casting would be installed. After vault installation, each excavated pit would be backfilled with a sand and slurry material 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, and excess spoils would be disposed of at an offsite disposal facility in accordance with all applicable laws and regulations.

Underground Conductor Pulling, Splicing, and Termination

To pull the 115-kV conductor cable through the underground duct banks installed along 115-kV Segments VIG1 and VIG8, a cable reel would be placed at a vault at one end, and a pulling rig would be placed at a vault at the opposite end. The cable from the cable reel would be attached to a rope in the duct bank, and the rope would be linked to the pulling rig, which would pull the rope and the attached conductor through the duct banks. The process would be repeated moving from one vault to the next. A lubricant would be applied as the cable enters the ducts to decrease friction and facilitate travel through the conduit. The 115-kV conductor cables would be pulled through the conduit at a rate of two to three sections of conductor cable between vaults per day. After pulling is completed, the conduit sections would be spliced together within the vaults. A splice crew would conduct splicing operations at each vault location.

Riser Poles

At each terminus of the proposed underground Valley–Ivyglen Project 115-kV sections, the conductor would transition to an overhead position up a riser pole (Figure 2-4). There would be two riser poles installed along 115-kV Segment VIG8, for example. One would be installed at the start of the segment and one at the end. The proposed riser poles would be TSPs that would support conductor termination hardware, lightning arresters, and dead-end hardware. Construction methods for riser pole installation would be similar to those described for TSP installation.

2.4.5.5 500-kV Tower Construction (Alberhill Project)

The applicant would construct the 500-kV transmission line using one of two options:

- **Conventional Method:** All towers would be constructed using ground construction methods.
- **Helicopter Construction:** Eight towers would be constructed using helicopters; the remaining four towers would be constructed using the conventional method.

The methods are described in detail below. Where activities would differ between methods, the methods are described separately.

Grading and Laydown Areas

Conventional Method

The new tower pad locations for the 500-kV transmission lines would first be graded and cleared to provide an adequately level and vegetation-free surface for footing construction. The graded area would be compacted to be capable of supporting heavy vehicular traffic. The applicant would grade the areas such that water would run toward the direction of the natural drainage and prevent ponding and erosive water flows that could cause damage to the tower footings.

Each tower site would require a laydown area of approximately 200 feet by 200 feet for tower assembly (Table 2-6). In locations where the terrain in the laydown area is already reasonably level, only vegetation removal would be needed to prepare the site for construction. In locations where a level surface is not present, both vegetation clearing and grading would be necessary to prepare the laydown area for construction.

Tower installation may require construction of permanent crane pads to allow an erection crane to set up at an angle approximately 60 feet from the centerline of each structure. Crane pads would be located transversely (crosswise) from each applicable structure location. If pads are required, they would each occupy an area of approximately 50 feet by 50 feet and may extend outside of the 200-foot-wide ROW in proximity to some 500-kV tower locations. The precise locations that would require grading or crane pad construction cannot be determined until final engineering and, therefore, for the purposes of this document, it is assumed that crane pads could be required anywhere along the 500-kV transmission line routes.

Benching

In mountainous areas, benching may be required to provide access for footing construction, assembly, erection, and wire-stringing activities during line construction. Benching is a technique in which a tracked earth-moving vehicle excavates a terraced access to excavation areas in steep and rugged terrain. Benching would be used, if needed, to help ensure the safety of personnel during construction activities and to control costs in situations where potentially hazardous, manual excavations would be required. The locations that would require benching cannot be determined until final engineering and, therefore, for the purpose of this document, it is assumed that benching could occur anywhere along the 500-kV transmission line routes.

Helicopter Construction

All material, equipment, and crew members would be flown via helicopter to each location where towers would be constructed using helicopters. Tower foundation sites for eight 500-kV towers would be graded and/or cleared to provide a sufficiently level and vegetation-clear surface for footing construction. Each tower site would require a laydown area of approximately 150 feet by 150 feet for equipment staging. Crane pads would not be required for towers constructed using helicopters.

Helicopter construction would require construction of five permanent helicopter pads that would be used for construction and operation. Helicopter pads would be approximately 24 feet by 24 feet and would be located within the 200-foot ROW. Each helicopter pad would be built using six LWS poles of varying height as a foundation, depending on the slope of the terrain.

The remaining four towers would be graded as described for the conventional method.

Tower Foundation, Assembly, and Erection

Conventional Method: Drilled Concrete Foundations

Each 500-kV transmission line tower would be constructed on four, drilled concrete foundations (footing). First, the four holes for the concrete footings would be bored using truck or track-mounted excavators with various diameter augers to match the diameter requirements for the footing. Next, steel-reinforced cages and stub angles would be installed. Concrete would then be poured. Steel-reinforced cages and stub angles would be assembled at the tower laydown area or at staging areas and delivered to each tower location by truck, where possible, and by heavy-duty helicopter, if necessary.

Depending on the terrain, equipment and material may need to be delivered at structure sites using a heavy-duty helicopter or by workers on foot, and crews may prepare the footings by hand using hydraulic or pneumatic equipment or other methods.

At tower laydown or project staging areas, tower assembly would begin with hauling and stacking bundles of steel. This activity requires the use of several tractors with trailers and a forklift or crane designed for use on rough terrain. After steel is delivered and stacked, crews would proceed with the assembly of tower leg extensions, body panels, boxed sections, and bridges. The assembled tower sections would be lifted into place with all-terrain or rough-terrain crane. Heavy-duty helicopters may also be used for 500-kV tower erection. The steel work would be completed by a combined erection and torquing crew with a boom crane. Insulators and wire rollers (travelers) for the conductor may also be installed at this time.

Helicopter Construction: Micropile Foundations

Micropile foundations (footing) would be used for eight towers. First, steel platforms would be flown to the site via helicopter and installed over the tower footing locations. Once the platform is installed, a lightweight drill rig would be flown to the site via helicopter and bolted to the steel platform. The drill rig would drill several holes, which would measure approximately 4 inches in diameter. Steel rebar would be placed and grouted into each hole once the required depth is achieved. A stub angle pole would be installed, followed by pouring a concrete cap to encase all exposed portions of the micropiles.

At the helicopter staging yard, tower assembly would begin with hauling and stacking bundles of steel. This activity requires the use of several tractors with 40-foot trailers and a forklift designed for use on rough terrain. After steel is delivered and stacked, crews would proceed with the assembly of tower leg extensions, body panels, boxed sections, and bridges. The assembled tower sections would be flown from the staging yard to each tower site using a heavy-duty helicopter.

Foundations and towers for the remaining four towers would be constructed as described for the conventional method.

Grounding and Snubbing: Core Reserve Access

The proposed 500-kV transmission line alignments (500-kV Line SA and 500-kV Line VA) and new 500-kV towers that would connect the proposed Alberhill Substation to the Serrano–Valley 500-kV Transmission Line would not be located within the boundary of the Core Reserve (Section 2.3.2.2, under the heading “Lake Mathews/Estelle Mountain Reserve”). Grounding and snubbing, however, would be required during construction of the proposed Alberhill Project at towers M14-T2 and M14-T1, which are located within the Core Reserve boundary (Figure 2-2i). Equipment would not be positioned within land managed by the BLM.

Grounding

To ensure worker safety during construction within the applicant’s Serrano–Valley 500-kV Transmission Line ROW, the applicant would ground the Serrano–Valley 500-kV Transmission Line at two~~four~~ existing 500-kV tower sites: M14~~-T2, M14~~-T1, ~~M13-T3,~~ and M13-T3.~~T2.~~ No equipment other than pickup trucks, capstan hoists, clamps, and grounding cables would be required for grounding the two towers located within the Core Reserve (M14~~-T2 and M14~~-T1). At the other tower sites, additional equipment (e.g., bucket trucks for lifting workers) may be used. No grounding cables or rods would be installed into the ground. No ground disturbance would be required for grounding at any of the existing or proposed 500-kV tower sites.

To access the tower sites located within the Core Reserve, the applicant estimates that construction crews would drive to towers M14~~-T2 and M14~~-T1 (about 2.5 miles roundtrip) using pickup trucks on existing access and maintenance roads. Access to towers M13-T3~~ and M13-T2~~ would also require the applicant to drive on an existing access road that briefly passes through the Core Reserve boundary. Access to these tower sites would occur twice per day during 500-kV Tower SA6 and VA6 foundation installation and for wire snubbing: once to install grounds and once to remove them. The existing access and maintenance roads that would be used are shown on Figure 2-2i.

To install the grounds, first the Serrano–Valley 500-kV Transmission Line would be de-energized. Then workers would climb each of the four 500-kV lattice steel towers to install grounding clamps. Two clamps would be installed to the bridge of each tower for each of the three conductor *phases*[15] (two conductors per phase, six clamps per tower; Figure 2-10). The clamps would be connected by grounding cables to both the 500-kV conductors and the overhead ground wire. Once connected to the towers, the lattice steel towers would *ground* the transmission line conductors—provide a path from the transmission line conductors to the earth. If lightning strikes a transmission line conductor or tower or electricity otherwise energizes the 500-kV transmission line after it has been grounded, the electricity would travel

[15] Three-phase, alternating-current electrical transmission systems use at least three conductors to transmit electricity. For the Serrano–Valley 500-kV Transmission Line, each of the three phases use two conductors. Each of the two side-by-side conductor cables are referred to as *conductor bundles*. Six conductor cables (i.e., three conductor bundles) are used to transmit electricity along the Serrano–Valley 500-kV Transmission Line.

down the lattice steel towers and into the earth. Workers would be able to safely work at existing tower site M13-T4 and proposed tower sites SA6 and VA6 (Figure 2-2i), which would be located between four grounded towers (M14-T2, M14-T1, M13-T3, and M13-T2). This grounding technique, which creates a safe area between grounds along a transmission line, is called *bracket grounding*.

Conductor and Overhead Ground Wire Snubbing

Conductor snubbing would be required for each of the three 500-kV transmission line conductor phases, which would be separated from existing 500-kV lattice steel tower M13-T4 and extended to the two proposed towers (500-kV Towers SA6 and VA6) within the existing 500-kV ROW. The term *conductor snubbing* refers to removing conductors from the insulators and securing them to utility structures. ~~(Figure 2-10).~~ In this case, insulators are located between each of the conductors and the bridges of the 500-kV lattice steel towers. Snubbing ensures that the conductors are secured such that when they are separated (cut) they do not fall to the ground. Snubbing would also be required for the overhead ground wire.

Conductor snubbing would occur at the proposed 500-kV towers VA6 and SA6.~~500-kV towers M14-T2, M14-T1, M13-T3, and M13-T2 and the proposed 500-kV towers VA6 and SA6. Between one and two conductor phases (two conductors each) would be snubbed to towers M14-T2, M14-T1 and M13-T3 or M13-T2. Multiple towers would be used for snubbing to ensure that the weight of the conductors does not damage any of the towers along the 500-kV transmission line. Conductor would also be snubbed as needed to the other proposed 500-kV towers (SA1 to SA5 and VA1 to VA5)~~ during conductor and overhead ground wire installation from the proposed substation, upslope to the Serrano–Valley 500-kV Transmission Line.

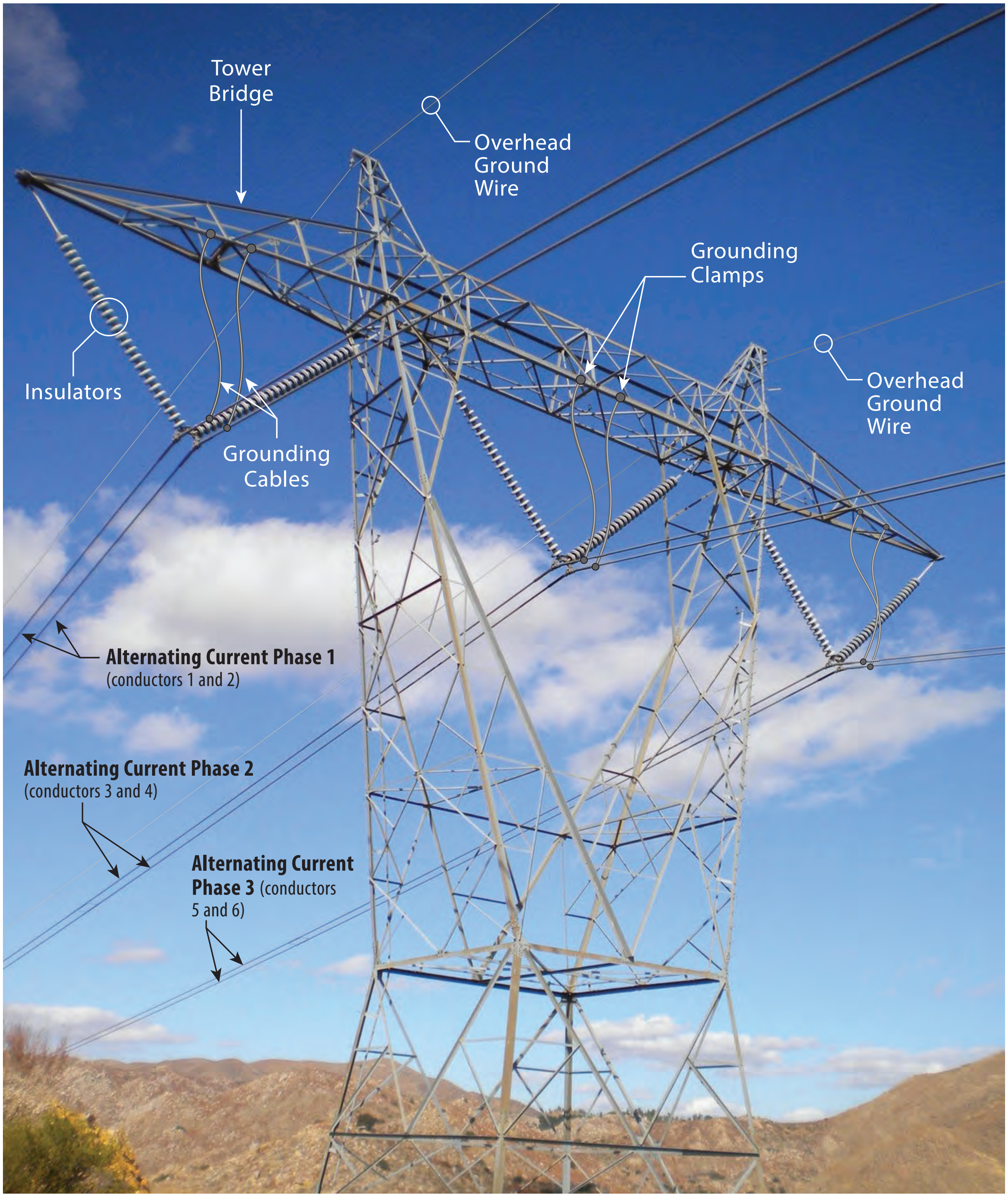

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Figure 2-10

500-kV Transmission Line Grounding (Alberhill Project)

Alberhill and Valley-Ivyglen Projects

Riverside County, California

~~Rough-terrain cranes, a man lift (e.g., bucket or boom truck), and crew truck would be used for conductor snubbing at the 500-kV tower sites, including towers M14-T2 and M14-T1 within the Core Reserve.~~ Grips would be installed on each conductor by workers raised by a man lift to the bridge level of the towers. The grips would be connected to a hoist device that attaches to the tower. The conductors would be removed from the insulators and a crane would be used to raise the conductors to the tower bridge where they would be *snubbed*—affixed.

Access to the Core Reserve for snubbing would be required twice: first to ground and snub the conductors and overhead ground wire and then to remove the grounds and snubs. Snubbing would take approximately one workday. Snub removal would also take approximately one workday. The 500-kV transmission line would be grounded for the duration of the snubbing period. Once snubbed, the conductor and overhead ground wire snubs would not be removed until conductor and overhead ground wire installation for proposed 500-kV Line SA and 500-kV Line VA is completed. The process of stringing, pulling, tensioning, and splicing to install conductor on the 500-kV towers is described in Section 2.4.5.6, under the heading "500-kV Transmission Line Wire Stringing."

2.4.5.6 Wire Stringing

Wire stringing includes all activities associated with the installation of conductors onto a supporting structure. This activity includes the installation of sockline, hardline travelers, primary conductor, overhead ground wire, vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Wire-stringing activities would be conducted in accordance with the applicant's specifications, which are similar to those of the Institute of Electrical and Electronic Engineers 524-2003 standard, *Guide to the Installation of Overhead Transmission Line Conductors.*

The applicant would prepare and implement a standard wire-stringing plan, which would outline the sequenced program of events to be conducted, starting with the siting of wire pulls and wire pull equipment set-up positions. Advanced planning determines circuit outages and safety protocols needed for ensuring the safe and quick installation of wire. To ensure the safety of workers and the public, safety devices such as traveling grounds (to maintain a continuous ground connection), guard structures, and radio-equipped roving, public safety vehicles, and linemen would be in place prior to the initiation of wire-stringing activities.

For major roadway crossings, typically one of the following methods is employed to protect the public:

- Erection of a highway net and guard structure system
- Detour of all traffic off a highway at the crossing position
- Implementation of a controlled continuous traffic break while stringing operations are performed
- Strategic placement of special line trucks with extension booms on the highway deck

Depending on the permitting agency, the use of a secondary, safety take-out sling at highway crossings may be required.

Wire-Stringing Sites

The term *wire-stringing site* refers to areas where wire stringing, pulling, tensioning, and splicing activities occur to install conductor on an overhead electrical line. Wire-stringing sites are selected, where possible, based on the geometry of the line, terrain, and availability of dead-end structures. For stringing equipment that cannot be positioned at either side of a dead-end structure, anchoring and dead-end hardware would be temporarily installed to sag conductor wire to the correct tension.

Wire-stringing sites require level areas to allow for equipment maneuvering. When possible, these locations would be located on existing, level areas and existing roads to minimize the need for grading and cleanup. If necessary, however, wire-stringing sites would be graded. Wire pulls typically occur every 15,000 to 18,000 feet on flat terrain or less frequently in rugged terrain. Wire splices (the connection of two lengths of conductor) typically occur every 7,000 to 9,000 feet on flat terrain or less frequently in rugged terrain. The estimated number of wire-stringing sites and amount of disturbed area for these activities are specified in Tables 2-5 through 2-7.

The wire-stringing sites would, in general, be located within the linear orientation of the proposed transmission and subtransmission line routes at a distance of approximately three times the height of the proposed transmission and subtransmission structures. The approximate locations of wire-stringing sites for the proposed 500-kV transmission lines are shown in Figure 2-2i. The approximate locations of wire-stringing activities along the proposed 115-kV routes have not yet been specifically identified, but are expected to occur at locations where the width of the proposed 115-kV general disturbance areas increase as shown in Figures 2-6a through 2-6d. The precise location of each wire-stringing site would not be known until the applicant completes final engineering. For the purposes of this document, it is assumed that wire-stringing sites could occur anywhere along the proposed 500-kV transmission line or 115-kV subtransmission line routes.

500-kV Transmission Line Wire Stringing (Alberhill Project)

Wire stringing for each of the proposed 500-kV transmission line routes would require a puller positioned at one end and a tensioner and wire-reel stand truck positioned at the other end. The puller would be positioned at the Serrano–Valley 500-kV Transmission Line end of the proposed SA and VA 500-kV transmission lines. It would be located within the applicant's existing ROW for the Serrano–Valley 500-kV Transmission Line. The tensioner and wire-reel stand truck would be positioned at the proposed Alberhill Substation site. Splicing sites between lengths of transmission cable would be located as needed within the 200-foot ROW for the proposed 500-kV transmission line routes.

The following four steps describe the wire-stringing process:

1. **Sock-Line Threading:** A light-duty helicopter would fly a lightweight sock line from structure to structure, which would be threaded through wire rollers installed on the transmission line structures. A cam-lock device would be engaged during threading that secures the sock line to the rollers.
2. **Pulling/Tensioning:** The sock line would be used to pull hardline-pulling cable onto the transmission line structures. The hardline-pulling 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 caused by twisting as the conductor unwinds off the reel. A piece of hardware known as a *running board* would be installed to feed the conductor into the wire roller. This device keeps the conductor from wrapping during installation. The new conductor would be installed by utilizing conductor tensioning equipment at the conductor end of the pull.
3. **Splicing, Sagging, and Dead-Ending:** Depending on conductor cable lengths and the lengths of spans between structures, temporary mid-span splices may be installed during the conductor pulling process. Temporary pulling socks are removed and permanent splices installed once the conductor is threaded through the wire rollers located on each structure. The temporary socks are

necessary because the permanent splices used to join conductor together cannot travel through the rollers.

After permanent splicing is completed, the conductor would be sagged to proper tension and attached to the dead-end structures.

4. **Clipping In:** After conductor is dead-ended, the conductors would be attached to the transmission line structures—a process called clipping in.

Overhead Ground Wire

Overhead ground wire would be installed along the tops of the 500-kV transmission line structures. It would be installed in the same manner as the conductor and is typically installed in continuous sections of 11,000 feet or less, depending upon factors such as line direction, slope, and accessibility.

Core Reserve Access

If wire-stringing equipment is required to be placed outside the existing Serrano–Valley 500-kV Transmission Line ROW, it would be placed on an existing access road. If wire-stringing equipment must be positioned within or partially within the Core Reserve (Section 2.3.2.2, under the heading "Lake Mathews/Estelle Mountain Reserve"), the equipment would be backed up onto the existing access road or other areas within the Core Reserve while being monitored by a qualified biologist (Section 4.4, "Biological Resources"). The applicant anticipates that wire-stringing equipment and associated vehicles would be required to back up onto existing access roads or other areas within the Core Reserve adjacent to the proposed sites for 500-kV Towers SA6 and VA6 and adjacent to existing tower sites M13-T4, M13-T3, and M13-T2 (Figure 2-2i).

To avoid or minimize locating equipment within the Core Reserve or on land managed by the BLM, the applicant would employ a technique called *slack spanning*. Typically, wire-pulling locations are set up behind transmission line structures (in-line with/parallel to transmission line alignments), but in this case wire-pulling locations would be placed to the side (offset) of the transmission line alignments as shown by the wire stringing sites identified on Figure 2-2i within the Serrano–Valley 500-kV Transmission Line ROW. Standard wire-stringing processes and equipment are used when slack spanning, but shorter conductor leads and lesser tensions are applied to ensure that tower loading specifications are not exceeded.

115-kV Subtransmission Line Wire Stringing

Conductor would be installed on the proposed 115-kV wood poles, hybrid poles, LWS poles, H-frame structures, and TSPs as previously described for 500-kV transmission line stringing, except for the proposed Alberhill Project and proposed Valley–Ivyglen Project 115-kV lines for which a boom truck would be used to string the sock line instead of a light-duty helicopter. Light-duty helicopters would be used for wire stringing along the 115-kV segments specified in Section 2.4.5.2.

Guard Structures

Guard structures are temporary facilities designed to stop conductor from falling should it drop below stringing height. For both of the proposed projects, guard structures would be used for 115-kV subtransmission line wire stringing that occurs on either side of highways, streets, railroads, trails, and flood control facilities or where other overhead utilities are present to prevent conductor from falling onto these areas. Guard structures are typically wood poles, 60 feet to 80 feet tall, and depending on the width of the conductor being constructed, the number of guard poles installed on either side of a crossing would be between two and four.

Guard structures are installed using similar methods to those required for the installation of permanent wood poles. Each guard structure would be installed within an approximately 2-foot-diameter hole. Guard structures are removed after the conductor is secured into place. In some cases, the wood poles could be substituted with the use of boom-type trucks with heavy outriggers staged to prevent the conductor from dropping. Additionally, temporary netting may be installed, if required.

2.4.5.7 De-energizing and Energizing the Transmission and Subtransmission Lines

The applicant estimates that the Serrano–Valley 500-kV Transmission Line would be de-energized for a minimum of 30 days to install the proposed 500-kV conductor and overhead ground wires. The maximum length of the electrical outage would be determined by the California Independent System Operator.

De-energizing the Serrano–Valley 500-kV Transmission Line to install and connect the proposed lines would occur at a time of year when electrical demands are lower (off-peak) to reduce effects of the outage. Once the proposed transmission lines are connected to the existing line, the existing line would be returned to service and the new lines would be energized.

The final step in completing construction of the 500 kV transmission line segments and the new and modified 115 kV subtransmission lines involves energizing the new conductor. To accomplish this, the existing lines in service would be de-energized, and the connections between the new and modified lines would be made. De-energizing and connecting the new lines to the existing system would typically occur when electrical demand is low in order to reduce the need for electric service outages. Once the connection is complete, the existing lines would be returned to service and the new facilities would be tested and then energized.

2.4.6 Alberhill Substation Construction (Alberhill Project)

2.4.6.1 Demolition of Horse Ranch Facilities and Weed Abatement

The applicant owns the site proposed for the Alberhill Substation. The site had previously been used as a horse ranch. At the time that the applicant filed an application for the proposed Alberhill Project in September 2009, the applicant did not own the horse ranch property. During preparation of this document, the applicant purchased the property and, at that time, residents were living at the site. Subsequent to the sale of the property to the applicant, the residents moved out.[16]

2011 Demolition and Weed Abatement

In compliance with a Notice of Defects issued by the County of Riverside Department of Building and Safety on May 26, 2011 and a Notice of Violation issued by the County of Riverside Transportation and Land Management Agency on June 9, 2011, the applicant removed the aboveground components of one single-family residence, one mobile home, two garages, one barn, one shed, and a concrete animal shelter from the proposed Alberhill Substation site during demolition and weed abatement activities conducted from September 8 through September 20, 2011 (County of Riverside Demolition Permits #BDE110047, #BDE110048, #BDE110049, #BDE110050, and #BDE110068). The applicant removed the aboveground components of a potentially historic resource identified at the proposed Alberhill Substation site (a second

[16] The demolition of horse ranch facilities was described as part of the proposed Alberhill Project in the Proponent's Environmental Assessment (PEA) submitted by the applicant in 2009. The applicant proposed to remove horse ranch demolition from their updated PEA in 2011, but the CPUC elected to retain horse ranch demolition and weed abatement activities in the EIRs' description of the proposed Alberhill Project.

single-family residence) during demolition activities conducted from December 12 through December 15, 2011 (County of Riverside Demolition Permits #BDE110068). The removal took place after receiving a letter from the California State Historic Preservation Office that concurred with the applicant's findings that the structure was not significant pursuant to California Register of Historical Resources criteria (Stratton 2011).

Nine acres of weeds/grass land were mowed with a tractor (weed abatement) and a water truck was onsite to keep mowed areas wet for dust control and fire safety during weed abatement activities. No foundations were removed and no grading occurred during the demolition activities conducted in 2011. No wells or septic tank pits were abated at the horse ranch in 2011, but four septic tanks and associated leach areas would be abandoned and abated prior to construction of the proposed Alberhill Project pursuant to methods approved by the County Building Official. No contaminated soil or groundwater were encountered during demolition activities conducted in 2011.

At the time of publication of this document, no homes or residences are located on the proposed Alberhill Substation site. Nonetheless, demolition of the horse ranch facilities, including those demolished during the preparation of this document to comply with County of Riverside code enforcement, is considered part of the proposed Alberhill Project. The remaining horse ranch facilities, including the belowground components (foundations) of the facilities demolished in 2011, stables, corrals, and fences would be removed prior to commencement of site grading. Additional materials that would be removed would include soil, wood, metal, rock, cement, green waste, and fiberglass. All materials would be delivered to approved disposal, recycling, or landfill facilities. Hazardous and non-hazardous waste disposal for horse ranch demolition activities conducted in 2011 are discussed in Sections 2.4.4.7 and 2.4.4.8.

Best Management Practices for Demolition and Weed Abatement (2011)

The applicant conducted a nesting bird assessment and bat survey prior to demolition and weed abatement activities and environmental monitoring during demolition and weed abatement activities (Section 4.4, "Biological Resources"). An archaeological monitor provided training prior to weed abatement and demolition activities, but was not present during weed abatement or demolition because there was no ground disturbance. In addition, lead and asbestos air monitoring and abatement was performed for demolition activities conducted in 2011 (McKenna Environmental 2010).

The BMPs implemented by the applicant during demolition and weed abatement activities that occurred in 2011 included:

- Applying water to prevent the generation of visible dust plumes and stabilize wind-erodible surfaces, surfaces where equipment and vehicles operate, loose soils, and demolition debris;
- Compliance with SCAQMD Rule 403 (Fugitive Dust) and Rule 1403 (Asbestos Emissions from Demolition Activities);
- Conducting demolition after nesting season (in general, after August 31) and during daytime hours (to reduce the potential for impacts on bats and other nocturnal species);
- Conducting bat clearance surveys three days prior to demolition;
- Conducting biological monitoring for birds, bats, and other wildlife during weed abatement and demolition activities;
- Preventing the disposal of rinse or wash waters, oil, grease, fuel, waste, or other materials onto impervious or pervious site surfaces or into storm drains; and

- Implementing the following California Stormwater Quality Association BMPs, among others: scheduling (the sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking weather into consideration), water conservation practices, vehicle and equipment maintenance, spill prevention and control, and waste management.

A complete list of BMPs for weed abatement and demolition activities at the proposed Alberhill Substation site is provided in Appendix C.

2012 Weed Abatement

On March 31, 2012, the applicant received a Notice of Violation and Order to Abate from the Riverside County Fire Department. To comply with the Order to Abate, from April 25 to April 28, 2012, the applicant mowed approximately 2 acres of land along Concordia Ranch Road, east of the road's intersection with Temescal Canyon Road. One of the two parcels mowed was partially located within the footprint of the disturbance area for the proposed Alberhill Substation. The vegetation mowed was up to 4 feet tall, and the mower cut vegetation to 4 inches above the ground. The Riverside County Habitat Conservation Agency does not require that property owners obtain permission to abate weeds within areas located within the Stephens' Kangaroo Rat Habitat Conservation Plan coverage area (Section 4.4, "Biological Resources") when ordered by the Riverside County Fire Department as long as weed abatement only occurs within the abatement area specified in the Order to Abate (Barton 2012).

Water Well Destruction and Septic System Abandonment and Abatement

As further discussed in Section 4.8, "Hazards and Hazardous Materials," a Phase I Environmental Site Assessment was conducted for the proposed Alberhill Substation site. The Phase I Environmental Site Assessment identified four septic tanks and associated leach areas, two water wells, and an aboveground water tank (Rubicon Engineering Corporation 2009a). The applicant would abandon and abate the septic system in accordance with the requirements of an Underground Storage Tank Closure Permit and may destroy the water well in accordance with a Well Permit, both of which are issued by the Riverside County Department of Environmental Health. In addition, the applicant would disposed of the water in an aboveground tank located at the proposed Alberhill Substation site (Rubicon Engineering Corporation 2009b) at a facility licensed to accept water contaminated with oil and grease, and the water tank would be removed and disposed of in accordance with all applicable laws and regulations.

If the water wells are destroyed, once the Well Permit (to destruct) is approved, water wells are sealed by a well contractor registered with Riverside County. The contractor typically would remove the well pump, the inner pipe to the pump, and any material or obstructions in the well. A sealant pipe would be installed within the bottom of the well's borehole. A County-approved sealant would be pumped to fill the well from the bottom up. Once the well is capped, a driller's report would be submitted to the County.

For septic system abandonment and abatement, the applicant would submit a work plan as part of the permitting process. The applicant would test and abate for flammable vapor in the tanks prior to removal or abandonment in place. If the septic tanks are to be abandoned in place, soil surveys would be performed below and around the tank. If the septic tanks are to be removed, soil surveys would be performed after the tank is removed. All associated piping would typically be removed. Requirements specific to the septic systems at the proposed Alberhill Substation site would be identified as part of the Underground Storage Tank Closure permitting process.

2.4.6.2 Fill, Grading, Drainage, and Surface Materials

The area to be enclosed by the perimeter wall of the proposed Alberhill Substation would be graded and compacted, and fill would be imported to create an even slope that varies between 1 and 2 percent. The site would slope downward from east to west, parallel with Temescal Canyon Road and perpendicular to Love Lane. The ground surface of the proposed substation site would be improved with imported materials as well as materials excavated from the site (Table 2-12). Approximately 80,000 cubic yards of soil would be imported as fill during grading.[17] The applicant would clear vegetation at the proposed Alberhill Substation site prior to grading and then retain at the site any excess soil resulting from grading, excavation, and other earth-moving activities.

Table 2-12 Alberhill Substation Ground Surface Materials (Quantities Estimated)

Alberhill Substation Site	Material	Surface Area (acres)	Volume (cubic yards)
Site grading, cut	Soil	21.880	91,000
Site grading, fill [(a)]	Soil	21.880	168,700
Drainage structures	Concrete	0.503	900
Substation equipment foundations	Concrete	1.449	15,000
Excavation for foundation and building footings [(b)]	Soil	1.449	15,000
Cable trenches [(c)]	Concrete	0.04~~002~~	55~~6~~
Water line relocation	Soil	0.23	3,500
Internal driveways and parking	Asphalt, concrete, Class II aggregate base	4.820	2,500 (asphalt, concrete) 3,000 (aggregate)
External roads	Asphalt, concrete, Class II aggregate base	0.739	300 (asphalt, concrete) 500 (aggregate)
Rock surfacing	Crushed rock	25.724	10,800
Wall foundation	Concrete	0.038	500
Import Soil Source Area [(d)]	Soil	6.712	80,000 [(e)]

Source: SCE 2009

Notes:

(a) Includes allowances for shrinkage and settlement.

(b) Soil excavated for foundation and building footings would be stockpiled during excavation and later would be graded and compacted onsite.

(c) Concrete cable trenches are factory fabricated and would be delivered rather than poured on site.

(d) The Import Soil Source Area, which is located adjacent to the northeast side of the proposed substation site, would only be excavated if Import Soil Option 1 is selected for construction of the proposed Alberhill Substation.

(e) The applicant estimates that the Import Soil Source Area could provide up to 120,000 cubic yards of soil, but only 80,000 cubic yards would be required for the proposed Alberhill Project.

Import Soil Options

The applicant would obtain the fill required for the proposed substation site using one of the following two options:

[17] The applicant estimates that grading would require 91,000 cubic yards of soil be cut and 157,700 cubic yards be filled at the proposed substation site. An additional 11,000 cubic yards of fill would be required due to subsidence. In total, the applicant estimates that 77,700 cubic yards of fill would be required, which has been rounded for the sake of this analysis to approximately 80,000 cubic yards.

- **Import Soil Option 1 (5.2-Acre Source Area):** Excavate a 5.2-acre area (227,000 square feet), the *Import Soil Source Area*, which would be located adjacent to the northeast side of the proposed substation site; or
- **Import Soil Option 2 (Local Quarry):** Truck in soil from a quarry, such as Corona Rock and Asphalt (also known as Vulcan Materials Company–Western Division or Corona Quarry) or other import source,~~),~~ which is located approximately 32 miles from the proposed substation site at 1709 Sherborn Street, Corona, California. The entire 80,000 cubic yards of soil would be hauled to the proposed Alberhill Substation site during a 60-day period by dump trucks with an estimated capacity of 14 cubic yards each. Approximately 96 roundtrips to the site would be required per day (192 one-way truck trips) for approximately 11,500 one-way truck trips.

Initial estimates indicate that the 5.2-acre Import Soil Source Area could provide up to 120,000 cubic yards of soil. A geotechnical study would be completed during final engineering for the proposed Alberhill Project to determine if the Import Soil Source Area would be capable of providing the required 80,000 cubic yards of soil. If geotechnical study recommendations require that a retaining wall or another type of earth-retaining structure would be required for the Import Soil Source Area, new visual simulations and additional environmental analysis pursuant to CEQA may be required.

It is possible that some combination of Import Soil Options 1 and 2 would be used to provide the 80,000 cubic yards of soil for construction of the proposed substation. If, for example, the geotechnical study completed during final engineering of the proposed Alberhill Project indicates that the Import Soil Source Area cannot provide the entire 80,000 cubic yards of soil, the additional soil required may be trucked to the site. If both import soil options are implemented for the import of soil, all project commitments and mitigation measures included in this document that would reduce impacts specific to one import soil option or the other would be applicable to construction of the proposed Alberhill Project.

Preliminary Drainage Design

An external detention basin (volume of 13.5 acre-feet) located at the northern corner of the site between the proposed substation wall and Love Lane would capture and detain surface flow from within the enclosed substation and from the hills to the north and northeast outside the substation walls. Surface flow would be gathered by gravity into concrete swales and directed from east to west into the basin. A surface flow energy dissipation field would be constructed to reduce the velocity of water captured by the swales. Percolation would dissipate water captured by the detention basin to reduce excess discharge from the proposed substation site. Excess discharge from the basin would be conveyed through drainage pipes south to existing discharge points that flow into Temescal Wash.

Surface runoff from the south side of the proposed substation site near Concordia Ranch Road would be collected in drainage pipes and discharged from the property at an existing discharge point that flows into Temescal Wash. Additional detention basins would be incorporated into the drainage design if the 5.2-acre Import Soil Source Area is excavated as part of Import Soil Option 1 (see previous discussion) or if deemed necessary during final engineering for the proposed Alberhill Project (JLC Engineering and Consulting, Inc. 2011; SCE 2011). The final drainage design, which would be based on final geotechnical and soil evaluation results, would be reviewed and approved by Riverside County.

Spill Prevention, Control, and Countermeasure Plan

The grading design for the proposed substation site would incorporate requirements from the Spill Prevention, Control, and Countermeasure (SPCC) Plan because of the planned operation of oil-filled transformers at the substation. Typical SPCC Plan features include secondary containment, curbs, berms, and basins designed and installed to contain spills should they occur. During construction, BMPs for erosion and drainage control would be implemented as specified in the SWPPP (Section 2.4.4.3).

2.4.6.3 Below-Grade and Above-Grade Facility Installation

After the proposed substation site is graded, below-grade facilities would be installed. Below-grade facilities would include a ground grid, trenches, building foundations, equipment foundations, utilities, and the base of the proposed substation wall. Above-grade installation of proposed substation facilities (e.g., capacitor banks, switchracks, transformers, and control building) would commence after the below-grade structures are in place. The design of the ground grid would be based on soil resistivity measurements collected during the geotechnical study that would be conducted prior to construction.

2.4.6.4 Transformer Delivery and Installation

The transformers would be delivered to the proposed Alberhill Substation by heavy-transport vehicles and off-loaded onsite by large cranes with support trucks. The applicant may use a traffic control service to facilitate transformer delivery, if necessary.

2.4.7 Telecommunications Installations

2.4.7.1 Fiber Optic Line Installation

The fiber optic line would be installed overhead and underground on various segments of the proposed projects as described in Sections 2.3.1.2; Tables 2-1 and 2-2; and Figures 2-5a through 2-5d. The overhead fiber optic line would be *underbuilt*—installed on the proposed 115-kV structures below the 115-kV circuits—on crossarms that are 5 to 10 feet wide. The fiber optic lines would be installed in a manner similar to that described above for subtransmission wire stringing. The applicant would not install new poles or replace poles specifically to support the fiber optic lines.

The underground fiber optic line sections would be installed within trenches that would be approximately 18 inches wide and 36 inches deep. A minimum of 3 inches of slurry, dirt, and gravel would be placed on top of the conduit and then the trench would be backfilled. Excess excavated soils would be disposed of offsite in accordance with all laws and regulations. Underground sections may be as long as 2,000 feet. Vaults or pull boxes (which are, essentially, small vaults) would be installed at the ends of each underground section for splicing fiber optic line sections and for pulling line through the conduit. Vaults and pull boxes are used during operations to access the fiber optic line for maintenance.

2.4.7.2 Microwave System Construction (Alberhill Project)

A 120-foot microwave tower would be installed at the proposed Alberhill Substation. Tower material would be delivered by truck and staged at the proposed substation site. After the tower foundation is installed, each tower section would be assembled onsite and erected using a crane and a bucket truck. The microwave dish antenna would be installed on the tower using the bucket truck.

As part of the proposed Alberhill Project, three microwave dish antennas would be installed on existing communication towers at the Santiago Peak Communications Site (two antennas) and the applicant's Serrano Substation (one antenna). The existing communications tower at the Santiago Peak Communications Site would be strengthened because of the additional load from the two new microwave dish antennas proposed to be installed at about 45 feet above ground level. Nine cross members on the existing communications tower would be replaced. In addition, two of the applicant's microwave dish antennas located on the communications tower at an elevation of about 100 feet would be lowered to an elevation of about 35 feet. After installation, there would be a total of seven dish antennas on the communications tower. The applicant stated that up to eight dish antennas could be installed without overloading the communications tower. Modifications to the existing tower and microwave antenna installation would be accomplished using a *gin pole*—a rigid pole with a pulley on the end that is attached to a communications tower and used for raising objects (e.g., new antennas or additional tower sections to increase the height of a tower).

Work on the Santiago Peak communications tower is expected to be completed on 12 days during the course of six weeks and would be scheduled depending on weather. Lowering of the two existing dish antennas and installation of the two new antennas would not result in interruption to electrical service. Work would only be performed during daylight hours.

All work involving the applicant's telecommunication system is coordinated with the applicant's Grid Control Center. Some of the communication system circuits are used for powerline protection, and the Grid Control Center would decide, based on electrical power flow and other conditions, if reduced powerline protection capability is acceptable for a given time period. The communication outage would likely be timed to occur during non-summer months to avoid peak electrical use conditions. The communication outage would not interrupt electrical service.

2.5 Operation and Maintenance of the Proposed Projects

The applicant inspects transmission and subtransmission lines or segments of the lines at least once per year by driving and/or flying by helicopter along the routes.~~. The applicant inspects the entire Serrano–Valley 500-kV Transmission Line by helicopter every other year.~~ The additional time needed to inspect the proposed 500-kV and 115-kV lines would be minimal. The new 500-kV lines and new and modified 115-kV lines would be maintained in a manner consistent with CPUC General Order 165, *Inspection Cycles for Electric Distribution Facilities*. In the event of an emergency and for certain maintenance conditions, helicopters may be used to locate and access affected areas along the proposed 500-kV or 115-kV lines to minimize response and repair times.

The telecommunications system for both of the proposed projects would require routine maintenance, which would include equipment testing, monitoring, and repair. No additional personnel, beyond the applicant's normal staffing levels, would be required for routine telecommunications maintenance along the proposed transmission and subtransmission lines or to operate or maintain the telecommunications system at the proposed Alberhill Substation and other substations that would receive telecommunications components as part of the proposed Alberhill Project. The new telecommunications equipment to be installed at the applicant's Valley, Newcomb, Skylark, Elsinore, Fogarty, Ivyglen, Mira Loma, Serrano, Vista, Tenaja, Barre, and Walnut substations; Irvine Operations Center; and the Santiago Peak and Box Springs communications sites as part of the proposed Alberhill Project would be maintained in conjunction with the telecommunications equipment that already exist at these facilities. Approximately once per year, one individual would perform routine maintenance of the telecommunications components located at the substations.

The proposed Alberhill Substation would be unstaffed, and electrical equipment within the proposed substation would be remotely monitored and controlled by an automated system from the applicant's Valley Substation Regional Control Center. Components of the proposed projects would require routine maintenance and may require emergency repair for electrical service continuity. The applicant's personnel would visit the proposed Alberhill Substation for electrical switching and routine maintenance purposes. Routine maintenance would include equipment testing, equipment monitoring, and repair.

The applicant's personnel would inspect the proposed Alberhill Substation at least once per week from the applicant's Valley Switching Center located at Valley Substation. No additional vehicle trips other than routine trips already conducted for the operation and maintenance of applicant facilities are expected due to operation of the proposed projects. No vehicles would be permanently stationed at the proposed Alberhill Substation.

2.5.1 Water Use during Operations

Water would be used for equipment cleaning, the restroom, and landscaping irrigation during operation and maintenance of the proposed Alberhill Substation. Approximately 3,000 gallons per year of de-ionized water would be used for cleaning electrical equipment at the proposed substation during operations. The water, which is provided by the local water agency and then de-ionized at the applicant's Valley Substation, would be transported to the proposed Alberhill Substation once per year. All other water used for operation and maintenance of the proposed projects, including landscaping for the proposed Alberhill Substation, would be supplied by the local water agency. The proposed Alberhill Substation would be unattended. A minimal amount of water would be used for the proposed restroom.

There would be no water used for dust suppression for routine operation and maintenance of the proposed transmission and subtransmission lines. There would be no water used to perform line cleaning (insulator washing). The applicant would use polymer insulators that do not require cleaning or washing.

2.5.2 Chemical Storage and Use (Alberhill Project)

The applicant would keep the following chemicals at the proposed Alberhill Substation during operation of the proposed Alberhill Project (see Table 2-2 for quantities):

- Transformer (mineral) oil used as insulating media in the two 500/115-kV transformers;
- Diesel (Low-Sulfur Diesel No. 2) used as fuel for the backup generator;
- SF_6 gas used as insulating media in the 500-kV switchracks and 115-kV circuit breakers; and
- Lead-calcium batteries stored in the control room (no quantity specified by the applicant).

2.5.3 Gas-Insulated Equipment (Alberhill Project)

The insulating media in the proposed 500-kV switchracks and 115-kV circuit breakers at the proposed Alberhill Substation would be SF_6 gas, which is one of the four primary greenhouse gases as defined by the Kyoto Protocol (Section 4.7, "Greenhouse Gases"). All gas-insulated equipment purchased and installed by the applicant, including the equipment that would be installed as part of the proposed Alberhill Project, has a manufacturer's certified leak rate of 0.5 percent per year or less. As older equipment is replaced, newer manufacturer-certified equipment is installed to meet this SF_6 specification.

Pursuant to Title 17 of the California Code of Regulations (CRR), Sections 95350 – 95359, SF_6 emissions, including emissions from the proposed gas-insulated equipment, once operational, will be reported to the California Air Resources Board. The applicant will comply with the Maximum Annual SF_6 Emission Rates established in CCR Title 17, section 95352, which, by 2020, would be 1 percent per year for all gas-insulated equipment.

2.5.4 Electric and Magnetic Fields

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

After several decades of study regarding potential public health and safety risks associated with EMF from power lines, research results remain inconclusive. In 1993, the California Public Utilities Commission (CPUC) implemented decision D.93 11-013, which requires utilities to use "low-cost or no cost" EMF reduction measures for EMFs associated with electrical facilities requiring certification under CPUC GO 131-D. The decision directed utilities to use a 4 percent benchmark for low-cost measures. The applicant included a Field Management Plan as part of its applications for the proposed projects that describes the EMF reduction measures that would be part of the proposed projects. This decision also implemented a number of EMF measurement, research, and education programs. The CPUC did not adopt any specific numerical limits on or regulation of EMF levels related to electric power facilities.

The CPUC's January 27, 2006, decision (D.06-01-042) affirmed the 1993 decision on the low-cost/no cost policy to mitigate EMF exposure for new utility transmission and substation projects. Additionally, the 2006 decision directs the CPUC's Energy Division to pursue and review all available studies regarding EMF and to review scientific information and report on new findings. The CPUC has been unable to determine whether there is a significant scientifically verifiable relationship between EMF exposure and negative health consequences, and no change to the CPUC EMF policy has been made to date. The CPUC will reconsider its EMF policies and open a new rulemaking, as necessary, if new findings indicate negative EMF health impacts.

At present, the CPUC does not consider EMFs, in the context of the California Environmental Quality Act (CEQA), to be an environmental impact because there is no agreement among scientists that EMFs create a potential health risk and because CEQA does not define or adopt standards for defining any potential risk from EMFs. Therefore, EMFs are not addressed in the Environmental Impacts and Mitigation Measures section of this document. For further information about EMFs and CPUC guidelines, refer to the CPUC's web page:
http://www.cpuc.ca.gov/PUC/energy/Environment/ElectroMagnetic+Field.

2.6 Project Commitments

The applicant has committed to the items listed in Table 2-12 as part of the design of the proposed projects. Unless otherwise specified, the following Project Commitments apply to both of the proposed projects.

Table 2-13~~12~~ Project Commitments

Project Commitment A	**Landscaping and Irrigation Plan.** For the Alberhill Project, prior to the start of construction, the applicant would develop a Landscaping and Irrigation Plan for Alberhill Substation road frontage only along Temescal Canyon Road, Concordia Ranch Road and Love Lane that is consistent with surrounding community standards, substation security and safety requirements. The applicant would consult with Riverside County about the Plan and incorporate applicable County recommendations to the extent possible. Landscaping would be designed to filter views from the surrounding community and other potential sensitive receptors near the proposed substation and be consistent with the surrounding community. The landscape plan would include a plant species list and installation and construction requirements. The applicant would contract a landscape architect to complete the landscaping plan during final engineering for the Alberhill Project. Irrigation and landscaping installation would occur after construction of the substation perimeter wall, subtransmission and transmission poles/towers erected, underground utility lines/cable ducts installed and water service has been established. During operations, the applicant would maintain the substation site pursuant to the Landscaping and Irrigation Plan and be responsible for upkeep as long as the applicant owns

Table 2-13~~12~~ Project Commitments

	the property.
Project Commitment B	Worker Environmental Awareness Plan. Prior to construction of the proposed projects, a Worker Environmental Awareness Plan would be developed based on final engineering designs, the results of preconstruction surveys, project commitments, and mitigation measures imposed by the California Public Utilities Commission. A presentation would be prepared by the applicant and shown to all site workers prior to their start of work. A record of all trained personnel would be kept with the construction foreman. In addition to the instruction for compliance with any site-specific biological or cultural resource protective measures and project mitigation measures, all construction personnel would also receive the following: • A list of phone numbers of the applicant's personnel with the (archeologist, biologist, environmental coordinator, and regional spill response coordinator); • Instruction on the South Coast Air Quality Management District Rule 403 for control of dust; • Instruction on what typical cultural resources look like, and if discovered during construction, to suspend work in the vicinity of any find and contact the site foreman and archeologist or environmental coordinator; • Instruction on individual responsibilities under the Clean Water Act, the Storm Water Pollution Prevention Plan for the projects, site-specific Best Management Practices, and the location of Material Safety Data Sheets for the projects; • Instructions to notify the foreman and regional spill response coordinator in case of hazardous materials spills and leaks from equipment or upon the discovery of soil or groundwater contamination; • A copy of the truck routes to be used for material delivery; and • Instruction that noncompliance with any laws, rules, regulations, or mitigation measures could result in being barred from participating in any remaining construction activities associated with the projects.
Project Commitment C	Raptor Protection on Power Lines. The applicant would design all 115-kV subtransmission structures consistent with the *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006).
Project Commitment D	Habitat Restoration and Revegetation Plan. With input from the appropriate resource agencies, the applicant would develop and implement a Habitat Restoration and Revegetation Plan to restore temporarily impacted areas where construction of the projects would be unable to avoid impacts on native vegetation and sensitive resources, such as wetlands, wetland buffer areas, riparian habitat, and other sensitive natural communities. The applicant would restore all temporarily impacted areas disturbed during construction of the projects, including staging areas and pull, tension, and splicing sites, to as close to pre-construction conditions as possible, or to the conditions agreed upon between the applicant and landowner. Replanting and reseeding would be conducted under the direction the applicant or contract biologists. If revegetation would occur on private property, revegetation conditions would be part of the agreement between the applicant and the landowner.
Project Commitment E	Grading Plan. SCE shall consult with Riverside County regarding the grading plans for construction and operation of the proposed projects. Storm water improvements shall be designed to maintain a discharge of storm water runoff consistent with the characteristics of storm water runoff presently discharged from project areas including the Alberhill Substation site. Measures included in the plans shall minimize adverse effects on existing or planned storm water drainage systems. Ground surface improvements installed at the site pursuant to the plans shall be designed to minimize discharge of materials that would contribute to a violation of water quality standards or waste discharge requirements. The final grading design shall include features that would minimize erosion and siltation both onsite and offsite. In addition, the final grading (and drainage) design shall be based on the results of the geotechnical study and soil evaluation for the substation site (Project Commitment F).
Project Commitment F	Geotechnical Study, Soil Testing, and Seismic Design Standards. Prior to the start of construction, the applicant shall conduct geotechnical and hydrologic studies and field investigations of the Alberhill Substation site, 500-kV transmission line routes, all 115-kV subtransmission line routes, and all telecommunications line routes. The studies shall include an evaluation of the depth to the water table, liquefaction potential, physical properties of subsurface soils, soil resistivity, and slope stability (landslide susceptibility). The studies shall include soil boring and laboratory testing to determine the engineering properties of soils, characterize soils and underlying bedrock units, characterize groundwater conditions, and evaluate faulting and seismicity risk. Soil samples shall be collected and analyzed for common contaminants and the presence of hazardous materials. If chemicals are detected in the soil samples at concentrations above acceptable threshold levels,

Table 2-13~~12~~ Project Commitments

	the applicant shall avoid the above threshold soil or work with the property owner to remove the above threshold soil. The results of this study shall be applied to final engineering designs for the projects. The information collected shall be used to determine final tubular steel pole foundation designs. In addition, the applicant shall design Alberhill Substation consistent with the applicable federal, state, and local codes, including the Institute of Electrical and Electronic Engineers 693 Standard, *Recommended Practices for Seismic Design of Substations*.
Project Commitment G	Aircraft Flight Path Safety Provisions and Consultations. Prior to construction, the applicant shall consult with the Federal Aviation Administration and ensure the filing of forms and associated specifications per the requirements of Federal Aviation Regulations Part 77 (Objects Affecting Navigable Airspace). The applicant shall review all recommendations and/or determinations from the FAA and mark and/or light the FAA recommended components where the applicant finds they are reasonable and feasible.
Project Commitment H	Noise Control and Notification. The applicant shall implement the following noise control measures for the proposed projects: • All construction and general maintenance activities, except in an emergency or within enclosed structures which reduce the noise to less than significant, shall be limited to the hours of 7 a.m. to 7 p.m. and prohibited on Sundays and ~~all legally proclaimed~~ holidays recognized by the~~. SCE will obtain all relevant ministerial or non-discretionary noise permits from~~ local jurisdictions. In the event that construction activities are necessary on days or hours outside of what is specified by the local ordinance, SCE would provide advance~~five-day advanced~~ notification, including a general description of the work to be performed, location and hours of construction anticipated, to the CPUC, the local jurisdiction, and residents within 300 feet of the anticipated work, as well route all construction traffic away from residences, schools and recreational facilities to the extent feasible. • Construction equipment shall use noise reduction features (e.g., mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer. • Construction traffic shall be routed away from residences and schools, where feasible. • Unnecessary construction vehicle use and idling time shall be minimized to the extent feasible. The ability to limit construction vehicle idling time is dependent upon the sequence of construction activities and when and where vehicles are needed or staged. A "common sense" approach to vehicle use shall be applied: if a vehicle is not required for use immediately or continuously for construction activities, its engine should be shut off. Note: certain equipment, such as large diesel-powered vehicles require extended idling for warm-up and repetitive construction tasks. • The applicant will notify all receptors within 300~~500~~ feet of construction of the potential to experience significant noise levels during construction. • During construction, the applicant will use a temporary noise barrier ~~that blocks the line of sight~~ between the construction area and the residence in areas where sensitive receptors would be subjected to significant noise impacts. • The applicant would shield small stationary equipment with portable barriers within 100 feet of residences, where feasible. • The applicant would minimize engine idling and turn off engines when not in use. • Where blasting is required~~ for the Alberhill system Project~~, the applicant would conduct additional pre-blast notification and coordination with residents, utilities, and others that may be affected by blasting operations.
Project Commitment I	Agricultural Uses. Existing agricultural and grazing uses within the existing and proposed ROW areas shall be allowed to continue during operation of the proposed projects. In addition, the applicant shall coordinate construction and maintenance activities with agricultural landowners to avoid interference with grazing and agricultural activities unless such coordination is not possible due to emergency circumstances.
Project Commitment J	Air Emissions Controls. The applicant would implement the following fugitive dust control measures for the Valley–Ivyglen Subtransmission Project: • Water three times per day or as needed during excavation, bulldozing, scraping, and grading activities, in order to ensure compliance with SCAQMD Rule 403, Fugitive Dust. • Water storage piles twice a day, resulting in a 50% fugitive dust control efficiency. • Limit vehicle speeds on unpaved roads to 15 miles per hour, per SCAQMD's Table XI-A, Mitigation

Table 2-13~~12~~ Project Commitments

	Measure Examples: Fugitive Dust from Construction and Demolition (Rev. 4/2007). The applicant would implement the following fugitive dust control measures for the Alberhill System Project: • Water three times per day or as needed during excavation, bulldozing, scraping, and grading activities, in order to ensure compliance with SCAQMD Rule 403, Fugitive Dust. • Water storage piles twice a day, resulting in a 50% fugitive dust control efficiency. • Limit vehicle speeds on unpaved roads to 15 miles per hour, per SCAQMD's Table XI-A, Mitigation Measure Examples; Fugitive Dust from Construction and Demolition (Rev. 4/2007).

Sources: SCE 2011, 2014

2.7 Permitting and Consultation Requirements

Table 2-13 lists the federal, state, and local permits and consultations that may be required for construction and operation of the proposed projects.

Table 2-14~~13~~ Consultation and Permitting Requirements

Agency / Group	Jurisdiction	Consultation or Permit
Federal		
United States Army Corps of Engineers	Work within Waters of the United States including wetlands	Consultation with the USACE for a Clean Water Act Section 404 Nationwide Permit Authorization
United States Fish and Wildlife Service	Federally listed threatened or endangered species impacts	Take authorization (if required) and consultation with the USFWS. Consultation for Section 7 or 10 of the Federal Endangered Species Act.
United States Forest Service	United States National Forest System land	Permission to install communications equipment (i.e., two new microwave dish antennas) on an existing communications tower at the Santiago Peak Communications Site. Thirty-day Technical Data Form notice to be sent to all leaseholders at the Santiago Peak Communications Site. A United States Forest Service representative for the Cleveland National Forest confirmed that no environmental review pursuant to the National Environmental Policy Act would be required for the installation of two microwave dish antennas on an existing communications tower at the communication site (Taylor 2012).
Federal Aviation Administration	Aircraft operation and safety in United States air space	Consultation to determine whether Congested Area Plan approval for helicopter external-load operations is required. Consultation to ensure compliance with Federal Aviation Regulations Part 77 (Objects Affecting Navigable Airspace).
State		
California Department of Fish and Wildlife	State listed threatened or endangered species impacts. Work in Waters of the State.	Take authorization (if required) and consultation with the CDFW Consultation for Section 2081 of the California Endangered Species Act. Consultation is anticipated to be completed as part of the Participating Special Entity (PSE) application process to obtain "take" coverage under the WRCMSHCP. Consultation for Section 1600 of the Fish and Game Code (streambed alteration agreement).
California Department of Transportation	Acts on behalf of the U.S. Department of Transportation pursuant to California Streets and Highways Code 660 to 711.21 and California Code of Regulations 1411.1 to 1411.6.	Caltrans requires that all work done within or spanning a state or interstate highway ROW receives an encroachment permit. Permit required for oversize and/or overweight truck loads that exceed the limits of a legal load as defined by the California Vehicle Code.
State~~Santa Ana Regional~~ Water	National Pollutant Discharge Elimination System coverage	All required Permit Registration Documents (PRDs for Construction General Permit (CGP) for Storm Water Discharge.

Table 2-1413 Consultation and Permitting Requirements

Agency / Group	Jurisdiction	Consultation or Permit
Resources Control Board	and Clean Water Act Section 401 oversight	Section 401 Water Quality Certification.
State Historic Preservation Office, Native American Heritage Commission	Historic, cultural, and archaeological resources	Consultation for Section 106 of the National Historic Preservation Act may be required. Consultation regarding known cultural resources. Consultation regarding the listing of cultural or historic resources in the National Register of Historic Places or California Register of Historical Resources. Cultural Resources Use Permit, Field Use Authorization, or Archeological Resources Protection Act Permit (as required) for land disturbance in culturally sensitive areas.
Regional and Local		
Elsinore Valley Municipal Water District	Public water pipelines	Permit and consultation to relocate water pipeline at proposed substation site. The pipeline is owned and operated by EVMWD.
South Coast Air Quality Management District	Air pollution and greenhouse gas emissions including fugitive dust	The stationary diesel generator at the proposed substation may require a SCAQMD permit. Rule 403 Permit for fugitive dust. Notification of demolition and asbestos removal (Rule 1403) for demolition of structures at horse ranch.
Riverside County Habitat Conservation Agency	Threatened or endangered species (including the Stephen's kangaroo rat), and conservation plans	Consultation with RCHCA to determine "take" permit (Federal and State Endangered Species Acts) and mitigation requirements for proposed project areas in Riverside County that would cross core habitat reserves and other areas covered by a Habitat Conservation Plan.
Western Riverside County Regional Conservation Authority	Western Riverside County Multiple Species Habitat Conservation Plan	Consultation with the Western Riverside County RCA to determine permit and mitigation requirements for proposed project areas
Riverside County	Protected trees, aqueduct crossings, and grading in unincorporated Riverside County	Permits required for tree removal (e.g., mature trees and oak woodlands). The grading permit would incorporate requirements from the Spill Prevention, Control, and Countermeasure Plan because of the oil-filled transformers at the substation (Codified Federal Regulations Part 112.1–112.7).
Riverside County Department of Building and Safety	All buildings constructed or demolished in unincorporated Riverside County	~~Permit required for construction of the proposed substation and to erect steel.~~ Demolition permit required for removal of the existing horse ranch facilities on the proposed substation site including an asbestos clearance permit. Permit required for design of the perimeter wall to ensure consistency with the surrounding community.
Riverside County Department of Environmental Health	Installation of wastewater treatment systems, abandonment and abatement of septic systems, and destruction of water wells	Septic system installation permit required for the new septic system at proposed substation site. Closure permit required for the abandonment and abatement of existing septic systems. Permit required for the destruction of onsite water well.
Riverside County Transportation Department	Encroachment on railroad, road crossings, and other public ROWs (including excavation along ROWs)	Encroachment permit
Riverside County Flood Control and Water Conservation District	Flood control and water conservation in the district; Sedco and Wildomar Master Drainage Plan boundaries	Encroachment permit
Cities of Lake Elsinore, Menifee, Perris, and	Construction activities in public ROW or easements, tree	Encroachment permits, tree removal permits, and grading permits

Table 2-14~~13~~ Consultation and Permitting Requirements

Agency / Group	Jurisdiction	Consultation or Permit
Wildomar (ministerial)	protection, and grading within the city limits	
Santa Ana Regional Water Control Board	National Pollutant Discharge Elimination System coverage, Construction Dewatering oversight	Oversight for the Construction General (CGP) for Storm Water Discharge. Dewatering permitting consultation.
Riverside County Municipal Separate Storm Sewer System (MS4)	Post-Construction Requirements for Storm Water	Consultation for Post-Construction Requirements.

Source: SCE 2011

Key: Caltrans = California Department of Transportation, CDFW = California Department of Fish and Wildlife, CEQA = California Environmental Quality Act, EVMWD = Elsinore Valley Municipal Water District, kV = kilovolt, RCA = Regional Conservation Authority, RCHCA = Riverside County Habitat Conservation Agency, ROW = right-of-way, RWQCB = Regional Water Quality Control Board, SCAQMD = South Coast Air Quality Management District, SWPPP = Storm Water Pollution Prevention Plan, USACE = U.S. Army Corps of Engineers, USFWS = U.S. Fish and Wildlife Service

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