2.0 PROJECT ALTERNATIVES

The following sections describe the development of alternatives for the selection of the Alberhill Substation site, 500 kV transmission line segments to serve the Alberhill Substation, the required 115 kV subtransmission line modifications, and alternatives for a new 115 kV subtransmission line.

2.1 500/115 kV Substation Site Alternatives

Site selection for the Alberhill Substation began with the development of a Substation Target Area that delineated an area within which the Alberhill Substation would have the maximum electrical benefit for the Electrical Needs Area, and meet both the Purpose and Need for the project and be consistent with the Basic Objectives of the project. The Substation Target Area was developed using the following basic requirements:

- The substation site should be in proximity to the Serrano-Valley 500 kV transmission line to facilitate connection of the new substation to SCE's existing 500 kV transmission system

- The substation site should be in proximity to existing 115 kV subtransmission lines to facilitate the transfer of existing 115/12 kV substations from the Valley South 115 kV System to the new Alberhill System

- The substation site should be in proximity to planned development along the I-15 corridor to facilitate service of additional 115 kV substations, should they become required in the future

Substation sites would require a minimum parcel size of 40 acres. After a review of available land of 40 acres or more, three potential substation sites were identified. These sites are shown on Figure 2.1, Substation Sites Alternatives, and are described below. In addition, SCE also evaluated the Nevada Hydro Company's LEAPS Lake Switchyard site, as described in Section 2.1.1, LEAPS Lake Switchyard Site, below.

2.1.1 LEAPS Lake Switchyard Site

Previous applications from the Nevada Hydro Company to the CPUC for a Certificate of Public Convenience and Necessity (CPCN) to construct the Lake Elsinore Advanced Pump Storage (LEAPS) project have included a proposed switchyard on property between the I-15 freeway and Temescal Canyon Road adjacent to Lee Lake. SCE evaluated the LEAPS Lake Switchyard Site, and determined the site would be unsuitable for a 500/115 kV substation. The site is susceptible to liquefaction, and there is evidence of past faulting on and adjacent to the site. The site is less than 40 acres and is in a shape that can not accommodate the substation equipment. In addition, the 500 kV lines would have to be constructed over Lee Lake, presenting engineering and maintenance issues and potential environmental impacts. As a result, SCE did not pursue this site as a viable substation site alternative.

2.1.2 Alternative Site A

Alternative Site A is approximately 124 acres, on the north side of the intersection of Temescal Canyon Road and Concordia Ranch Road. It has been previously disturbed and is presently used as a horse farm. Although much of the northern part of the property has steep topography, a sufficient portion of the southern portion of the property is flat. This parcel has been designated light industrial in the Riverside County General Plan. This site is a viable site for the Alberhill Substation.

2.1.3 Alternative Site B

Alternative Site B is located on a west-facing slope of the Gavilan Hills. This site consists of two 80 acre parcels, totaling 160 acres. These parcels are not located adjacent to an existing paved road and would require cutting into the slope midway up the mountain along with extensive grading to accommodate the substation. This grading would be more than required for Alternative Site A. As a result, SCE did not pursue this site as a viable substation site alternative.

2.1.4 Alternative Site C

Alternative Site C consists of 45 acres located adjacent to and east of Alternative Site A. Although the size of the site is above the 40 acres needed for the substation, the site would require that the substation incorporate gas-insulated switchgear on both the high side and low side of the transformer banks in order to conserve space, increasing the cost of constructing and operating the substation. Extensive blasting/fracturing would be required for site preparation. Extensive waste material would be required to be removed from the site. As a result, SCE did not pursue this site as a practical substation site alternative.

2.1.5 Alberhill Substation Site Selection

The only viable and practical substation site identified during the siting process was Alternative Site A. As a result, SCE selected this site to construct the Alberhill Substation, and is in the process of purchasing the site. The entire substation property would total 124 acres. Due to the mountainous nature of the property, approximately 34 acres would be devoted to the substation and its surrounding improvements such as landscaping and access roads. With the exception of a portion of the site dedicated to the 500 kV transmission lines leading to the substation, the remaining property would not be disturbed.

Figure 2.1 Substation Sites Alternatives

Figure 2.1 Substation Sites Alternatives

2.2 500 kV Transmission Lines Segments

After the site selection for the Alberhill Substation concluded, SCE commenced development of 500 kV transmission line segment options to access the existing Serrano-Valley 500 kV transmission line to source the new substation. During this process, seven alternative routes were developed. These segments are shown on Figure 2.2~~,~~(a), 500 kV Transmission Line Segment Alternatives. Two additional segments were added in March 2011. All of these segments are described below.

~~Figure 2.1 Substation Sites Alternatives~~

~~Figure 2.1 Substation Sites Alternatives~~

~~Figure 2.2 500 kV Transmission Line Segment Alternatives~~

~~Figure 2.2 500 kV Transmission Line Segment Alternatives~~

All the segments are viable segments, and originate at the Alberhill Substation and extend into a mountainous area through Critical Habitat andfor the California gnatcatcher (federally threatened), as well as conservation land (or land designated for conservation) to the existing Serrano-Valley 500 kV transmission line. Only theThese features are also shown on Figure 2.2a, 500 kV Transmission Line Alternative Segments. There are two types of conservation land in the area that is crossed by one or more of the segments:

- Stephens' Kangaroo Rat (SKR) Habitat Conservation Plan (HCP) Core Reserve: This land has been established as part of the SKR HCP for the conservation, preservation, restoration and enhancement of the SKR and its habitat.
- Designated conservation land for the Western Riverside County Multiple Species Habitat Conservation Plan (WRMSHCP): This land is presently owned by Riverside County and is designated to have ownership transferred to the Regional Conservation Authority for conservation under the WRMSHCP.

Each segments' distinctive features are listeddescribed below.

- Segment N1: This segment crosses an area with the steepest topographic features, and some tower sites may not be accessible by road and would require helicopter construction. This segment crosses land designated as SKR HCP Core Reserve.
- Segment N2: This segment would have a greater number of dead-end structures, adding to the cost, and some tower sites may not be accessible by road and would require helicopter construction. This segment crosses land designated as SKR HCP Core Reserve.
- Segment N3: One of the straightest segments, minimizing the need for extensive engineering and minimizing use of large-sized towers. This segment crosses land designated as SKR HCP Core Reserve.
- Segment C1: One of the straightest segments, minimizing the need for extensive engineering and minimizing use of large-sized towers. This segment crosses land designated as SKR HCP Core Reserve.
- Segment C2: There is a residence in very close proximity to the segment, and the construction effort would require entry onto land managed by the Bureau of Land Management. This segment crosses land designated as SKR HCP Core Reserve.
- Segment C3: The construction effort would require entry onto land managed by the Bureau of Land Management. This segment crosses land designated as SKR HCP Core Reserve.
- Segment C4: The longest segment of the N and C segments, and would have a comparatively greater number of large-sized towers and access roads. This segment crosses land designated as SKR HCP Core Reserve.

- Segment SA: Approximately one-half mile longer than the N and C segments, this segment would avoid the SKR HCP Core Reserve.
- Segment VA: Approximately one-half mile longer than the N and C segments, this segment would avoid the SKR HCP Core Reserve and span the designated conservation land for the WRMSHCP.

2.2.1 500 kV Transmission Line Segment Selection

SCE selected Segments N3 and C1 as the 500 kV transmission line segments to connect the Alberhill Substation to the existing Serrano-Valley 500 kV transmission line. These two segments are anticipated to have the fewest construction issues, and would require the fewest number of large-sized towers.

Segment SA and Segment VA are now being proposed as potential 500 kV segments. Both SA and VA would avoid the SKR HCP Core Reserve.

2.3 115 kV Subtransmission Lines

SCE evaluated the ability of the existing subtransmission lines to support the transfer of the Ivyglen, Fogarty, Elsinore, Skylark, and Newcomb Substations to the new Alberhill 115 kV system. As a result of this evaluation, portions of four existing 115 kV subtransmission lines were identified as requiring additions or extensions in order to reliably serve existing substations from the new Alberhill Substation. This change in configuration is shown on Figure 2.3, Alberhill System Configuration. The existing lines that require additional circuits are described in detail in Chapter 3, Project Description.

As shown on Figure 2.~~3~~3a, Alberhill System Configuration, there is no existing connection between Newcomb Substation and Skylark Substation. Both Newcomb Substation and Skylark Substation are presently connected to Valley Substation from two separate subtransmission lines, each originating at Valley Substation. Because both Newcomb Substation and Skylark Substation would be served from the new Alberhill System, a connection is necessary between Newcomb and Skylark Substations to maintain the minimum number of source lines for each substation. Two potential new 115 kV subtransmission routes were identified to accomplish this connection and are described below.

Figure 2.2a 500 kV Transmission Line Segment Alternatives

Figure 2.2a 500 kV Transmission Line Segment Alternatives

Figure 2.3a Alberhill System Configuration

Figure 2.3a Alberhill System Configuration

2.3.1 New 115 kV Subtransmission Line Segment Alternatives Considered

2.3.1.1 New 115 kV Subtransmission Line Segment Alternative 1

New 115 kV Subtransmission Line Segment Alternative 1 originates at the intersection of Newport Road and Murrieta Road in the City of Menifee. The route travels south along an existing SCE distribution line route on the west side of Murrieta Road to the intersection of Murrieta Road and Bundy Canyon Road where it would connect to the Valley-Skylark 115 kV subtransmission line ROW. The entire segment alternative would follow SCE's existing distribution lines.

In total, New 115 kV Subtransmission Line Segment Alternative 1 is approximately 3 miles long, and crosses land that is presently undeveloped, rural residential, or is used as an exterior buffer for new housing developments.

2.3.1.2 New 115 kV Subtransmission Segment Alternative 2

New 115 kV Subtransmission Line Segment Alternative 2 originates at the intersection of Newport and Murrieta Roads in the City of Menifee. The route travels south along an existing distribution line on the west side of Murrieta Road for approximately 1 mile to the intersection of Murrieta Road and Holland Road, and then turns west on Holland Road for approximately 0.5 miles to the intersection of Holland Road and Byers Road. The route would travel south and west on Byers Road for approximately 2 miles and then follow Waldon Road for approximately 0.5 miles to the intersection of Waldon Road and Bundy Canyon Drive and the Valley-Skylark 115 kV subtransmission line ROW. The entire segment alternative would follow SCE's existing distribution lines.

In total, New 115 kV Subtransmission Line Segment Alternative 2 is approximately 4 miles long, and crosses land that is presently undeveloped or is used for rural residential purposes.

~~2.3.2 Figure 2.3 Alberhill System Configuration~~

~~2.3.3 Figure 2.3 Alberhill System Configuration~~

2.3.2 New 115 kV Subtransmission Line Segment Alternative Recommendation

Both New 115 kV Subtransmission Segment Alternatives 1 and 2 have the ability to serve the Alberhill Substation Project. However, New 115 kV Subtransmission Line Segment Alternative 1 would be built along paved roads, facilitating access for construction and maintenance. New 115 kV Subtransmission Line Segment Alternative 1 is also shorter in length, slightly reducing the amount of new construction required for the project.

New 115 kV Subtransmission Segment Alternative 2 would require construction on unpaved roads in hilly terrain along a route that is slightly longer in length. This would require more earthwork and dust control during construction.

For these reasons, New 115 kV Subtransmission Line Segment Alternative 1 was selected as the preferred route.

2.4 Proposed Project

SCE proposes to construct the Alberhill System Project utilizing the Substation Site Alternative A, 500 kV transmission line segments ~~N3~~SA and ~~C1~~VA, and New 115 kV Subtransmission Line Segment Alternative 1 (Proposed Project). The Proposed Project meets the basic objectives of the Alberhill System Project, and is described in detail in Chapter 3, Project Description.

New 115 kV Subtransmission Line Segment Alternative 2 is evaluated in this PEA as an Alternative 115 kV Segment to the Proposed Project.

These components are shown on Figure 2.~~4~~4a, Proposed Project and Alternative.

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Figure 2.44a Proposed Project and Alternative

Figure 2.~~4~~4a Proposed Project and Alternative

3.0 PROJECT DESCRIPTION

The proposed Alberhill System Project includes the following components:

- Construction of a new 1,120 MVA 500/115 kV substation to increase electrical service capacity to the area presently served by the Valley South 115 kV System
- Construction of two new 500 kV transmission line segments to connect the new substation to SCE's existing Serrano-Valley 500 kV transmission line
- Construction of a new 115 kV subtransmission line and modifications to existing 115 kV subtransmission lines to transfer five existing 115/12 kV substations (Ivyglen, Fogarty, Elsinore, Skylark, and Newcomb Substations) presently served by the Valley South 115 kV System to the new 500/115 kV substation
- Installation of telecommunications improvements to connect the new facilities to SCE's telecommunications network

The Proposed Project is described in more detail below. The Alberhill Substation would be constructed in unincorporated Riverside County. Construction of the 500 kV transmission line segments between the Alberhill Substation and the existing Serrano-Valley 500 kV transmission line would occur in unincorporated Riverside County and within the northwestern boundary of the City of Lake Elsinore. The new and modified 115 kV subtransmission lines would be constructed in unincorporated Riverside County and the cities of Lake Elsinore, Wildomar, and Menifee.

3.1 Proposed Project Components

3.1.1 Alberhill Substation Description

The Proposed Alberhill Substation would be an unstaffed, automated, 1,120 MVA 500/115 kV substation capable of an ultimate buildout of 1,680 MVA. Because the substation would be located in an area susceptible to earthquake forces, the substation structures would be designed consistent with the Institute of Electrical and Electronic Engineers (IEEE) 693, Recommended Practices for Seismic Design of Substations. Its components are described in more detail below.

3.1.1.1 500 kV Switchrack

The proposed 500 kV switchrack would be comprised of gas-insulated switchgear contained within a steel enclosure measuring approximately 350 feet long, 60 feet wide, and 49 feet in height. Four dead end structures would be erected outside the gas-insulated switchgear enclosure to facilitate connections between the two 500 kV transmission line segments and the switchrack, and each would be approximately 90 feet long and 108 feet high.

The 500 kV switchrack would consist of six positions with two operating buses and arranged in a breaker-and-a-half configuration. Initially, four positions would be installed. Four positions would be equipped for two 500 kV line positions and two transformer bank positions.

3.1.1.2 115 kV Switchrack

The 115 kV switchrack would consist of eleven bays with two operating buses in a breaker-and-a-half configuration. Initially, seven positions would be installed. One position would be equipped for bus sectionalization, and five positions would be equipped for five 115 kV lines and two 115 kV transformer bank positions. One position would remain empty but is necessary to maintain the alignment of the 115 kV lines as they exit the substation. The 115 kV switchrack would use a high and low dead-end structure with heights of 60 feet and 43 feet, respectively.

3.1.1.3 Transformers

Transformation would initially occur using two 560 MVA 500/115 kV transformers, with an ultimate capability for three transformers in service, plus the spare transformer as required by SCE’s Transmission Planning Criteria and Guidelines. Each 560 MVA transformer would be approximately 37 feet high.

3.1.1.4 Capacitor Banks

One 115 kV capacitor bank rated at 46.8 megavolts ampere reactive (MVAR) would be installed with a circuit breaker and a disconnect switch. The capacitor bank would be approximately 14 feet high. In addition, should they be required at a future date, space is reserved at the substation site for three additional 115 kV capacitor banks and two 500 kV capacitor banks.

3.1.1.5 Control Building

The monitoring equipment for the substation would be located in a permanent control building structure that would typically be constructed of concrete block, and would include a full basement. This building would require a building permit, and would be designed consistent with the applicable California Building Code standards for the area. The control building would be equipped with air conditioning, control and relay panels, a battery and battery charger, AC and DC distribution, a human-machine interface rack, communication equipment, and local alarms. The control building dimensions would be approximately 64 feet wide, 110 feet long, and 20 feet high.

3.1.1.6 Substation Electrical Power

The new substation would have three independent sources of electrical power for the control building and other ancillary facilities. The primary source of power to the control building would be an output of one of the substation’s main transformers. A second source would be a nearby distribution line that would be connected to the substation site.

For use in case of emergency, one 500 kVA 120/240 volt 3-phase stationary backup generator would be installed at the substation site for emergency backup power. It would have a diesel tank capable of storing approximately 960 gallons of fuel. The stationary generator would be permitted by the South Coast Air Quality Management District.

3.1.1.7 Restroom Facility

A stand-alone prefabricated permanent restroom would be installed within the substation perimeter near the control building. Domestic water is currently available at the site and would serve the restroom as well as irrigation required for landscaping. The site is not served by a public sewer system, so a new septic system would be installed and permitted by Riverside County. The restroom enclosure would be approximately 10 feet high, 10 feet long and 10 feet wide.

3.1.1.8 Substation Access

Presently, access to the proposed substation site and to privately owned properties to the north of the substation site is attained from Temescal Canyon Road along an unpaved private road leading to Love Lane at the north of the substation site. The present location of this road is within the footprint of Alberhill Substation, and would have to be relocated prior to substation construction.

The private road would be relocated to the western boundary of the substation property and serve as the primary access to the substation's main gate. The relocated private road would become a 36-foot wide paved road extending approximately 250 feet north of Temescal Canyon Road. At that point a 30-foot wide paved substation access driveway would connect to the main substation gate. The remainder of the relocated private road would be unpaved and would extend to the north joining with the existing unpaved Love Lane, approximately 400 feet north of the substation entrance.

The substation entrance would have an electrically operated gate for two-way traffic access into the substation (shown on Figure 3.~~1~~1a, Alberhill Substation Layout). A similar secondary access gate would be located on Temescal Canyon Road. A third manually operated gate located at the eastern end of the substation would provide access to the 500 kV transmission line corridors. All access gates would be a minimum of 8 feet in height. The primary and secondary gates would be approximately 40 feet wide while the transmission line access gate would be 24 feet wide. In addition, SCE would install a walk-in gate within the substation wall for additional access into the substation.

Within the substation enclosure, one 45-foot wide driveway and a series of 30-foot wide driveways would facilitate vehicular movement around the substation equipment. In addition, a 7,600 square foot parking area would be constructed within the substation enclosure for vehicular parking.

3.1.1.9 Substation Site Preparation

Water Line Relocation

An existing 30 inch gravity agricultural water line owned and operated by the Elsinore Valley Municipal Water District (EVMWD) currently crosses through the proposed substation site. Relocation of this water line would be required prior to any substation grading or construction. The relocation of this line is not expected to have any impact on local water service.

The new water line alignment would begin with a connection to the existing pipe at the southeast corner of the substation site near Temescal Canyon Road, and continue in a northwest direction to follow the relocated private road, and connect to the existing water line at the northwest corner of the substation site. On average, the trench excavated to install the new water line would be approximately 4 feet wide and 6 feet deep, and be approximately 1,700 feet long. SCE would consult with EVMWD prior to construction, and would build the new water line to EVMWD specifications. The existing pipe would be removed and disposed of off-site.

~~Demolition~~

~~The site is an existing horse ranch with improvements consisting of frame buildings, stables, corrals, and fences. Removal of all improvements would be required prior to the commencement of site grading. The location of the existing site septic system would be identified and the proper measures would be taken to remove and fill the facility.~~

3.1.1.10 Substation Drainage

The substation site would be graded to a slope between one and two percent and compacted to 90 percent of the maximum dry density. Construction of the substation would interrupt the existing drainage patterns throughout the site and would require diversion around the substation to areas where percolation would continue or through channels and pipes to be installed to the existing discharge point at the Temescal Wash along the southwest corner of the substation property. The drainage would be designed to maintain a discharge of stormwater runoff from the site consistent with that currently experienced at the site. SCE would consult with Riverside County prior to finalizing the substation drainage design.

3.1.1.11 Substation Site Ground Surface Improvements

The ground surface of the substation site would be finished with materials imported to the site and materials excavated and used on the site. These materials, and their approximate square footage and volumes are listed in Table 3.1, Substation Ground Surface Improvement Materials and Volumes.

Figure 3.~~1~~1a Alberhill Substation Layout

Figure 3.~~1~~1a Alberhill Substation Layout

Table 3.1 Substation Ground Surface Improvement Materials and Volumes

Element	Material	Approximate Surface Area (sq ft)	Approximate volume (cu yd)
Site grading, cut	Soil	740,000	70,000
Site grading, fill[1]	Soil	740,000	63,000
Drainage structures	Concrete	12,500	650
Substation equipment foundations	Concrete	49,000	10,000
Cable trenches[2]	Concrete	80	6
Water line relocation	Soil	68,000	1,500
Internal driveways	Asphalt Concrete/ Class II aggregate	140,000	3,400
External roads	Asphalt Concrete/ Class II aggregate	16,000	500
Rock surfacing	Crushed rock	870,000	10,800
Wall foundation	Concrete	4,300	320

Notes:
[1]Includes allowances for shrinkage and settlement.
[2]The concrete cable trenches are factory fabricated and delivered to the site.

Based on preliminary design, approximately 8,000 cubic yards of soil, vegetation, and rock would be removed from the site. Any waste material would be handled as described in Section 3.7, Waste Management.

Approximately 10,000 cubic yards of soil would be excavated as a result of excavation for foundation and building footings. This soil would be stock piled during excavation and ultimately would be graded and compacted on site.

The substation grading design would incorporate Spill Prevention Control and Countermeasure (SPCC) Plan requirements due to the planned operation of oil-filled transformers at the substation (in accordance with 40 CFR Part 112.1 through Part 112.7). Typical SPCC features include secondary containment, curbs, berms, and basins designed and installed to contain spills, should they occur. These features would be part of SCE's final engineering design for the Proposed Project.

3.1.1.12 Substation Lighting

The proposed substation would have access and maintenance lighting. The access lighting would be low-intensity and controlled by a photo sensor. Maintenance lights would be controlled by a manual switch and would normally be in the "off" position. Maintenance lights would be used only when required for maintenance outages or emergency repairs occurring at night. The lights would be located in the switchracks, around the transformer banks, and in areas of the substation where maintenance activity may take place, and would be directed downward and shielded to reduce glare outside the facility.

Each gate at the substation would have a beacon light installed for safety and security purposes. It would be illuminated only while the gate is open or in motion. Typically, SCE utilizes double flash strobe lights as beacon lights on substation gates.

3.1.1.13 Substation Perimeter

An 8-foot high perimeter wall would surround the substation. The wall would be made of concrete panels or decorative block, consistent with safety standards for major electrical facilities, and consistent with surrounding community standards (subject to the requirements of SCE). At a minimum, a band of at least three strands of barbed wire would be affixed near the top of the perimeter wall inside of the substation and would not be visible from the outside.

Landscaping and irrigation would be installed after the substation wall is constructed. Prior to the start of the substation construction, SCE would develop a landscaping and irrigation plan that is consistent with surrounding community standards.

3.1.2 500 kV Transmission Line Connection

Two new 500 kV transmission line segments would connect the Alberhill Substation to the existing Serrano-Valley 500 kV transmission line. To reliably operate the Proposed Project, two 500 kV transmission line segments on separate structures are required to interconnect the substation to the Serrano-Valley 500 kV transmission line as shown on Figure 2.~~1~~4, Proposed Project and Alternative. The northern segment is approximately 1.~~1~~6 miles long, and the southern segment is approximately 1.~~2~~7 miles long.

Construction of the two 500 kV transmission line segments would require approximately ~~twelve~~two double circuit and ten single circuit lattice towers. ~~Approximately five towers would be utilized for the southern~~Each segment ~~and~~ would utilize approximately one double circuit tower and five single circuit towers~~ would be utilized for~~. At the ~~northern segment. Approximately four existing towers~~connection points on the Serrano-Valley 500 kV transmission line, two of the existing structures would be ~~removed and~~ replaced ~~with~~utilizing two of the new ~~towers to facilitate the connection~~structures mentioned above.

Based on preliminary designs, the towers would have a dull galvanized steel finish and would range in height from approximately 95 to ~~172~~190 feet, with span lengths between towers ranging between approximately 400 to 2,100 feet. Lattice steel structures ~~typically~~ require ~~an~~four excavated ~~hole of~~holes typically 3 to 6 feet in diameter and 20 to 45 feet deep. On average each foundation would extend above the ground between approximately 1 to 4 feet. See Figure 3.~~2~~2a, Typical 500 kV Transmission ~~Structure~~Structures, for a depiction of tower designs for the 500 kV line segment structures. The information presented in this section is based on preliminary engineering and design, and refinement during final engineering design may result in components that are modified from the descriptions provided in this PEA.

Figure 3.~~2~~2a Typical 500 kV Transmission ~~Structure~~Structures

Figure 3.~~2~~2a Typical 500 kV Transmission ~~Structure~~Structures

The towers used for the 500 kV transmission line segments would support 2,156 kcmil non-specular aluminum conductor steel reinforced (ACSR) conductors, polymer insulators, ~~one optical ground wire (OPGW),~~ and ~~one~~two overhead ~~groundwire~~groundwires (OHGW) for ~~telecommunications and~~ shielding.

Each structure site would require 24-hour vehicular access during operation of the Proposed Project for emergency and maintenance activities. Approximately 2 miles of 14-wide access roads and spur roads would be installed with the 500 kV transmission line segments ROW. The road may be wider in areas that require slope stabilization. Existing and new access roads and spur roads for the Proposed Project are shown in Appendix D, Proposed Project Road Story.

3.1.3 115 kV Subtransmission Line Description

The Alberhill System Project would require modification of existing 115 kV subtransmission facilities and construction of new 115 kV subtransmission facilities. The modification of existing 115 kV facilities include:

- Double-circuit an existing single-circuit 115 kV subtransmission line without structure replacement (approximately 6.5 miles)
- Double-circuit an existing single-circuit 115 kV subtransmission line with structure replacement (approximately 8 miles)
- ~~Replace an existing pole with a new switch pole~~
- Replace two existing poles with new poles at an existing I-15 freeway crossing

In addition, the Alberhill System Project would require the following new facilities:

- Construct a new 115 kV subtransmission line (approximately 3 miles)
- Install new 115 kV subtransmission structures at the Alberhill Substation site
- Install new 115 kV subtransmission structures within SCE's existing Serrano-Valley 500 kV corridor

These components are shown on Figure 3.~~3~~3a, 115 kV Subtransmission Line Description, and are described in detail in the sections below.

Construction of the new and modified 115 kV subtransmission lines would utilize light weight steel (LWS) poles, tubular steel poles (TSPs), and H-frames~~, and switch poles.~~. Each structure would support polymer insulators~~ and~~ , 954 stranded aluminum conductor~~.~~ and a single 4/0 aluminum conductor steel reinforced conductor for grounding. If needed, 954 aluminum conductor steel reinforced ground conductor would be used at locations requiring higher tension. The dimensions of these structures are shown on Figure 3.~~4~~4a, Typical 115 kV Subtransmission Structures, and summarized in Table 3.2, Typical 115 kV Subtransmission Structure Dimensions. Because the Proposed Project is located in a raptor concentration area, all 115 kV subtransmission structures would be designed to be consistent with the Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 2006[1].

Table 3.2 Typical Subtransmission Structure Dimensions

Pole Type	Approximate Diameter	Approximate Height Above Ground	Approximate Auger hole Depth	Approximate Auger Diameter
Light Weight Steel (LWS)[†]	Between 1.5 and 2.5 feet	Between 65 and 91 feet	Between 7 and 10 feet	Between 2 and 3 feet
Tubular Steel Pole (TSP)	Between 2 and 4 feet	Between 70 and 100 feet	Not applicable	Not applicable
TSP Concrete Foundation	Between 5 to 8 feet	2 feet	Between 20 and 40 feet	Between 5 and 8 feet

Note: Specific pole height and spacing would be determined upon final engineering and would be constructed in compliance with CPUC General Order 95.
[†]The H-frames would utilize two LWS poles approximately 12 feet apart

Light weight steel poles would be direct buried and extend approximately 65 to 91 feet above ground. The diameter of LWS poles are typically 1.5 to 2 feet at the base, and taper to approximately 1 foot at the top of the pole. Approximately 304 LWS poles would be utilized for the Proposed Project.

The TSPs are used in areas where the length and strength of LWS poles are inadequate, such as freeway crossings, turning points, and other locations where extra structure strength is required. The TSPs utilized for the Proposed Project would extend between 70 feet and 100 feet above ground, and the tallest poles would be used at crossings of the I-15 freeway. The TSPs would be attached to a concrete foundation approximately 5 to 8 feet in diameter that extends between approximately 20 to 40 feet below ground and may extend up to 2 feet above ground. Approximately 40 TSPs would be utilized for the Proposed Project.

H-frame structures would also be used for the Proposed Project. H-frames are used in areas where extra structure strength is required. These structures are shown on Figure 3.~~4~~4a, Typical 115 kV Subtransmission Structures, and would range in height from approximately 65 feet to 75 feet above ground. Approximately 10 H-frames would be utilized for the Proposed Project.

[1] Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 2006 is published by the Edison Electric Institute and the Avian Power Line Interaction Committee in collaboration with the Raptor Research Foundation.

Figure 3.~~3~~3a 115 kV Subtransmission Line Description

Figure 3.~~3~~3a 115 kV Subtransmission Line Description

Figure 3.44a Typical 115 kV Subtransmission Structures

(To be provided separately)

Figure 3.44a Typical 115 kV Subtransmission Structures

~~Switch poles are used in specific locations to create system ties that can be opened or closed. The switch pole for the Proposed Project would be approximately 85 feet high and would be made of LWS.~~

3.1.3.1 Double-circuit an existing single-circuit 115 kV subtransmission line without structure replacement

Pending approval from the CPUC, SCE will be constructing a new 115 kV subtransmission line between Valley Substation and Ivyglen Substation as part of the Valley-Ivyglen/Fogarty Project (CPUC Application Nos. A.07-01-031 and A.07-04-028).

The Alberhill System Project would require that an approximate 6.5 mile portion of the Valley-Ivyglen 115 kV subtransmission line be double-circuited between the Alberhill Substation site and the intersection of Third Street and Collier Avenue. Because the new Valley- Ivyglen 115 kV subtransmission line has been designed to support two circuits, it is not anticipated that additional structures or structure replacement would be required. This portion of the Alberhill 115 kV subtransmission line modifications would require the addition of crossarms, anchors, insulators, and 954 SAC to existing structures.

The double-circuiting of an existing single-circuit subtransmission line without structure replacement would begin at the Alberhill Substation and follow Concordia Ranch Road to its terminus, cross the I-15 freeway to Temescal Canyon Road, to Lake Street. From that point, the line would be located within a proposed Castle & Cooke utility corridor that follows the present alignment of Lake Street to Coal Avenue. The line would then follow Coal Avenue to Nichols Road, then turn southeast on Baker Street Avenue to Riverside Avenue (State Route 74). The route crosses a drainage channel and continues southeast on Pasadena Avenue, then turns northeast on Third Street to the intersection of Third Street and Collier Avenue. However, the final route of this portion of the subtransmission modifications would be dependent on CPUC final approval of the Valley-Ivyglen line, expected in late 2009/early 2010.

3.1.3.2 Double-circuit an existing single-circuit 115 kV subtransmission line with structure replacement

Portions of four existing single-circuit 115 kV subtransmission lines would need to be removed and new structures capable of supporting a double-circuit subtransmission line would need to be installed.

<u>Valley-Elsinore-Ivyglen 115 kV Subtransmission Line</u>

An approximate 0.3 mile section of the existing Valley-Elsinore-Ivyglen 115 kV subtransmission line in the City of Lake Elsinore between the intersection of Third Street and Collier Avenue and the intersection of Second Street and Camino del Norte, would require new structures to support a second circuit. This section would rebuild an existing crossing of the I-15 freeway, and require the removal of approximately 12 existing structures and the installation of approximately 11 new LWS poles and three TSPs.

Ivyglen-Newcomb-Skylark and Elsinore-Skylark 115 kV Subtransmission Lines

Approximately 4.5 miles of existing 115 kV subtransmission lines in the cities of Lake Elsinore and Wildomar between the intersection of East Hill Street and Flint Street and Skylark Substation would require new structures to support a second circuit. Three poles paralleling East Hill Street on the Ivyglen-Newcomb-Skylark 115 kV subtransmission line would be replaced, and approximately 104 poles of the existing Elsinore-Skylark 115 kV subtransmission line along Franklin Street, Auto Center Drive, Casino Drive, Malaga Road, and Mission Trail to Skylark Substation would be replaced. This section would require removal of approximately 106 existing structures and the installation of approximately 91 new LWS poles and approximately 15 new TSPs .

Valley-Newcomb-Skylark 115 kV Subtransmission Line

An approximate 5.5 mile section of the existing Valley-Newcomb-Skylark 115 kV subtransmission line between Skylark Substation and the intersection of Scott Road and Murrieta Road in the cities of Wildomar and Menifee would require new structures to support a second circuit. From Skylark Substation, this section of line follows Waite Street, turns north on Almond Street, turns east on Lemon Street, and crosses the I-15 freeway. The line then follows Lost Road, and generally follows Crab Hollow Circle to Beverly Street, where it then follows Bundy Canyon Road and Scott Road to the intersection of Scott Road and Murrieta Road. This section would require the removal of approximately 127 existing structures and installation of approximately 116 new LWS poles, four new TSPs, and 10 new H-frame structures.

There is a second section of the Valley-Newcomb-Skylark 115 kV subtransmission line in the City of Menifee that would be modified as part of the project. An approximate 0.2 mile section of the existing Valley-Newcomb-Skylark 115 kV subtransmission line between Newcomb Substation and the intersection of Newport Road and Murrieta Road would need to be replaced with structures capable of supporting a double circuit. This section would require the removal of approximately five existing structures and installation of approximately five new LWS poles and approximately two new TSPs.

~~New Switch Pole and~~ New Poles at Existing I-15 Freeway Crossing

~~A new switch pole would be installed immediately east of the intersection of Murrieta Road and the Serrano-Valley~~ and Line Separation at 500 kV ~~corridor in the City of Menifee in order to facilitate transfers between the Valley South 115 kV System and the Alberhill System. In addition, one span of wire on the Valley-Newcomb 115 kV subtransmission line would be removed.~~Crossing

Two existing 115 kV subtransmission poles would be replaced at the existing I-15 freeway crossing immediately south of the Alberhill Substation site. This area is shown on Figure 3.~~3~~3a, 115 kV Subtransmission Line Description.

The existing Valley-Newcomb 115 kV subtransmission line would be physically and electrically separated by disconnecting existing jumper loop wires at the 500 kV crossing. This is also shown on Figure 3.3a, 115 kV Subtransmission Line Description.

3.1.3.3 New 115 kV Subtransmission Lines

A distribution line approximately 3 miles long between the intersection of Newport Road and Murrieta Road and Murrieta Road and Bundy Canyon Road would be rebuilt as a single-circuit 115 kV subtransmission line and the existing distribution line would be transferred to the new 115 kV structures below the 115 kV circuit. This section would require the removal of approximately 66 existing poles and installation of approximately 78 new LWS poles.

Approximately 11 new TSPs would be installed at the Alberhill Substation site and Concordia Ranch Road to facilitate the 115 kV subtransmission connection from the Alberhill Substation to existing 115 kV subtransmission lines along Concordia Ranch Road.

In addition, a connection between the Valley-Ivyglen 115 kV subtransmission line on the north side of the Serrano-Valley 500 kV corridor and the Valley-Newcomb 115 kV subtransmission line located on the south side of the corridor, would be made. This section is approximately 300 feet long and would require removal of approximately one existing structure, and installation of approximately three LWS poles and three TSPs. An access road would also be installed. This area is shown on Figure 3.~~3~~3a, 115 kV Subtransmission Line Description.

3.1.4 Telecommunications Improvements

The proposed Alberhill Substation requires the installation of new telecommunication infrastructure to protect the transmission and subtransmission lines and provide protective relaying, data transmission, and telephone services to the substations served by the Alberhill 115 kV System. These new facilities include modifications to the existing SCE microwave system and the addition of new fiber optic cable.

3.1.4.1 Microwave System

To connect the Alberhill Substation to SCE's microwave communications system, a 120-foot tall antenna tower would be built at Alberhill Substation to provide a line of sight with an antenna tower at Santiago Peak Communications Site, approximately 7 miles to the southwest.

In total, three new microwave dish antennas would be installed on existing tower structures: two at Santiago Peak Communications Site (one directed at the Alberhill Substation, and one directed at Serrano Substation), and one microwave dish antenna would be installed at Serrano Substation and directed at the Santiago Peak Communications Site. Typical microwave dish antennas are approximately 10 feet in diameter.

New microwave radios and new channel equipment would also be installed inside the existing telecommunications control room at Santiago Peak, Serrano Substation, and the new telecommunications control room to be installed at Alberhill Substation.

3.1.4.2 Fiber Optic Cable

Alberhill Substation would be connected to an existing fiber optic system serving Valley, Mira Loma, and Serrano Substations. In addition, the five 115/12 kV substations that would be transferred to the new Alberhill System would be connected by new and existing fiber optic cable, and new telecommunications equipment would be installed within the telecommunications rooms at Serrano, Barre, Walnut, Mira Loma, Valley, Ivyglen, Fogarty, Newcomb, Tenaja, and Skylark Substations to facilitate the new connections. In addition to each segment of the 500 kV transmission line segments carrying OPGW, approximately 8.5 miles of overhead cable would be installed on 115 kV structures installed as part of the Proposed Project. This distance and location are subject to change as the surrounding area develops and space on or within existing facilities is put to use by other utilities, and new facilities become available for SCE's use. The preliminary areas of fiber optic installation are shown in Appendix E, Telecommunications Improvements.

3.2 Proposed Project Construction Plan

The Proposed Project would include construction of the Alberhill Substation, two 500 kV transmission line segments, new and modified 115 kV subtransmission lines, and telecommunications improvements. Construction would also include construction support activities, such as establishing material staging yards, and the development of access roads and spur roads. The following sections provide more detailed information on the tasks that would be associated with construction of the Proposed Project.

3.2.1.1 Storm Water Pollution Prevention Plan

Because construction of the Proposed Project would disturb a surface area greater than one acre, SCE would be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit. The State Water Resources Control Board may require either the Santa Ana Regional Water Quality Control Board (SARWQCB) or the San Diego Regional Water Quality Control Board (SDRWQCB) to monitor adherence to permit conditions. To acquire the permit, SCE would prepare a Storm Water Pollution Prevention Plan (SWPPP) that includes project information; monitoring and reporting procedures; and Best Management Practices (BMPs), such as dewatering procedures, storm water runoff quality control measures, and concrete waste management, as necessary. The SWPPP would be based on final engineering design and would include all project components.

3.2.1.2 Dust Control

The construction activities would occur in the South Coast Air Quality Management District (SCAQMD) and would be subject to SCAQMD Rule 403. This rule minimizes emissions of fugitive dust by requiring persons to take action to prevent, reduce or mitigate fugitive dust emissions by utilizing one or more applicable best available control measures. These measures include actions such as the application of water or chemical stabilizers to disturbed soil.

3.2.1.3 Marshalling Yards and Material Staging Yards

Temporary marshalling yards would be used to stage equipment and materials during construction. Materials and equipment typically staged at these marshalling yards would include, but would not be limited to, construction trailers, construction equipment, steel, conductor, wire reels, cable, hardware, insulators, signage, fuel, joint compound, and other consumable materials. The Proposed Project would utilize the Alberhill Substation site as a primary marshalling yard, but may use additional yards as needed. Preparation of the marshalling yard may include the application of gravel and the installation of perimeter fencing.

The marshalling yard would be used as a reporting location for workers, and for vehicle and equipment parking and material storage. The yard would have offices for supervisory and clerical personnel. Normal maintenance of construction equipment would be conducted at the marshalling yard. The maximum number of workers reporting to the marshalling yard is not expected to exceed approximately 100 workers at any one time.

In addition to the primary marshalling yard, temporary secondary material staging yards would be established for short-term utilization near construction sites. Where possible, the secondary staging yards would be sited in areas of previous disturbance near the construction areas. Final siting of these yards would depend upon availability of appropriately zoned property that is suitable for this purpose. The number and size of the secondary yards would be dependent upon a detailed field inspection and would take into account, where practical, suggestions by the successful bidder for the construction work. Typically, an area approximately 1 to 3 acres would be required. Once sites for secondary yards are proposed, an environmental review would be conducted before final site selection. Preparation of the secondary staging yards would include installation of perimeter fencing. The application of road base may also occur, depending on existing ground conditions at the yard site. Land disturbed at the temporary material staging areas, if any, would be restored to preconstruction conditions or to a condition agreed upon between SCE and the landowner following the completion of construction of the Proposed Project.

All materials associated with construction efforts would be delivered by truck to an established marshalling or material staging yard. Delivery activities requiring major street use would be scheduled to occur during off-peak traffic hours to the extent feasible in accordance with applicable local ordinances.

If necessary, SCE would hire a local security company to provide 24-hour attendance at the marshalling yard or material staging yards during construction.

3.2.1.4 Concrete Use

During construction, existing concrete supply facilities would be used where feasible. If concrete supply facilities are not available, a temporary concrete batch plant would be set up. If necessary, approximately 2 acres of property would be partitioned from an established marshalling yard or material staging yard for a temporary concrete batch plant. Equipment would include a central mixer unit (drum type); three silos for injecting concrete additives, fly ash, and cement; a water tank; portable pumps; a pneumatic injector; and a loader for handling concrete additives not in the silos. Dust emissions would be controlled by watering the area and by sealing the silos and transferring the fine particulates pneumatically between the silos and the mixers.

3.2.1.5 Traffic Control

Construction activities completed within public street rights-of-way would require the use of a traffic control service and all lane closures would be conducted in accordance with local ordinances and city permit conditions. These traffic control measures are typically consistent with those published in the ~~WATCH Manual (Work Area Protection and~~California Joint Utility Traffic Control Manual~~, American Public Works Association,~~ (April ~~2006~~, 2010).

3.2.1.6 Identification of Underground Utilities During Construction

Prior to drilling boreholes for foundations or for direct bury of LWS poles, SCE or its contractor would contact Underground Service Alert to identify any underground utilities in the construction area. If other utilities are located in the construction area, SCE would contact the owner of such utility to discuss protection or relocation of such utility.

3.2.1.7 Nighttime Construction

Under normal circumstances, construction of the Proposed Project would occur during daylight hours. However, there is a possibility that construction would occur at night, and temporary artificial illumination would be required. SCE would use lighting to protect the safety of the construction workers, but orient the lights to minimize their effect on any nearby receptors.

~~3.2.1.8 Blasting/Fracturing~~

~~During the access road construction, spur road construction, grading, and foundation work activities, blasting or fracturing may be a desired method to use for rock removal. If these methods are used, a person licensed by the Federal Bureau of Alcohol, Tobacco, and Firearms would assess the area, make any required site measurements (e.g., distance to utilities or houses), and engineer the charge for a safe and effective explosion. Pre-blast notifications would be made to the local fire department, residents, utilities, and others potentially affected by blasting operations. Once the notifications are complete, the holes would be drilled and the explosive charges loaded into the holes. If the blast is near sensitive receptors (houses, power lines, roads), special protective measures (e.g., gravel or blast mats) would be installed to control flying rock from the blast site. In addition, the area would be secured to avoid inadvertent entry by the public or other personnel. After the area is secured, the appropriate pre-blast warning signals would be given and the charge detonated. After detonation, a post-blast safety inspection would be conducted to ensure that the blast completely discharged and personnel may enter safely to excavate the blasted material.~~

3.2.2 Alberhill Substation Construction

The following sections describe the construction activities associated with installing the components of the proposed Alberhill Substation.

The substation site would be prepared by clearing existing vegetation and installing a temporary chain link fence to surround the construction site. The site would be graded in accordance with a grading plan developed in consultation with Riverside County. The area to be enclosed by the perimeter wall would be graded to a slope that varies between one and two percent and compacted to 90 percent of the maximum dry density. The areas outside the substation wall that would be used as a buffer would be graded in a manner consistent with the overall site drainage design as described in Section 3.1.1.10, Substation Drainage.

After the substation site is graded, below grade facilities would be installed. Below grade facilities include a ground grid, trenches, building foundations, equipment foundations, utilities, and the base of the substation wall. The design of the ground grid would be based on soil resistivity measurements collected during a geotechnical investigation that would be conducted prior to construction (as described in Section 3.5, Geotechnical Studies). Above grade installation of substation facilities (i.e. buses, capacitors, circuit breakers, transformers, steel support structures, and the control building) would commence after the below grade structures are in place.

The transformers would be delivered by heavy-transport vehicles and off-loaded on site by large cranes with support trucks. A traffic control service may be used for transformer delivery, if necessary.

3.2.3 500 kV Transmission Line Segment Construction

The following sections describe the construction activities associated with the construction of the 500 kV transmission line segments.

3.2.3.1 Access Roads and Spur Roads

Transmission line roads are classified into two groups: access roads and spur roads. Access roads are through roads that run between tower sites along a ROW and serve as the main transportation route along transmission line ROWs. Spur roads are roads that lead from line access roads and terminate at one or more of the structure sites. It is anticipated that most of the roads constructed to accommodate construction of the Proposed Project would be left in place to facilitate future access for operations and maintenance purposes. Gates would be installed where required at fenced property lines to restrict general and recreational vehicular access to ROW roads.

All access roads and spur roads (new and existing) would first be cleared and grubbed of vegetation. Roads would be blade-graded to remove potholes, ruts, and other surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet (preferably with 2 feet of shoulder on each side), but may be wider depending on final field conditions.

In addition, drainage structures (e.g., wet crossings, water bars, overside drains, pipe culverts, and energy dissipaters) may be installed along roads to protect the road from the effects of uncontrolled water flow. Slides, washouts, and other slope failures would be repaired and stabilized along the roads 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 and final engineering of the Proposed Project.

Existing and new access roads and spur roads for the Proposed Project are shown in Appendix D, Proposed Project Road Story.

3.2.3.2 500 kV Tower Site Preparation

The new tower pad locations would first be graded and/or cleared to provide a reasonably level and vegetation-free surface for footing construction. Sites would be graded 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. The graded area would be compacted to at least 90 percent relative density, and would be capable of supporting heavy vehicular traffic.

Each tower site would typically require a laydown area of approximately 200 feet by 200 feet. In locations where the terrain in the laydown area is already reasonably level, only vegetation removal would occur 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 also require establishment of a temporary crane pad to allow an erection crane to set up 60 feet from the centerline of each structure. The crane pad would be located transversely from each applicable structure location. In most cases, this crane pad would be located within the laydown area used for structure assembly. If a separate pad is required, it would occupy an area of approximately 50 feet by 50 feet. The decision to use a separate crane pad would be determined by the final engineering for the Proposed Project and the selection of the appropriate construction methods to be used by SCE or its contractor.

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 extremely steep and rugged terrain. Benching would be used on an as-needed basis in areas to help ensure the safety of personnel during construction activities, and to control costs in situations where potentially hazardous, manual excavations would be required.

Where there would be a structure located in terrain inaccessible by a crane, it is anticipated that a helicopter may be used for the installation of the structure. The final decision on helicopter use would be made by SCE and the construction contractor. The use of helicopters for the erection of structures would be in accordance with SCE specifications and would be similar to methods detailed in IEEE 951-1996, Guide to the Assembly and Erection of Metal Transmission Structures, Section 9, Helicopter Methods of Construction. Helicopter use for the Proposed Project is explained in more detail in Section 3.2.3.5, Wire Stringing Operations.

3.2.3.3 Tower Foundations

Structure foundations for the towers would typically be drilled concrete piers. Each tower would be constructed on four drilled concrete foundations. The foundation process would start with the auguring of the holes for each tower. The holes would be bored using truck or track-mounted excavators with various diameter augers to match diameter requirements of the foundation sizes.

Foundations in soft or loose soil that extend below the groundwater level may require the borehole be stabilized with mud slurry during drilling. If this is the case, a mud slurry would be mixed and pumped into the borehole after drilling to prevent the sidewalls from sloughing. The concrete for the foundation is then 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 off-site disposal facility in accordance with all applicable laws.

Following excavation for the foundation, reinforcing steel, and stub angles would be installed and the concrete would then be placed. Steel reinforced cages and stub angles would be assembled at laydown yards and delivered to each structure location by flatbed truck. A typical tower would require 25 to 100 cubic yards of concrete delivered to each structure location. Concrete samples would be drawn at time of pour and tested to ensure engineered strengths were achieved. A normally specified SCE concrete mix typically takes approximately 20 working days to cure to an engineered strength. This strength is verified by controlled testing of sampled concrete. Once this strength has been achieved, crews would be permitted to commence erection of steel.

Conventional construction techniques would generally be used as described above for new footing installation. In certain cases, equipment and material may be deposited at structure sites using helicopters or by workers on foot, and crews may prepare the footings using hand labor assisted by hydraulic or pneumatic equipment, or other methods.

3.2.3.4 Tower Assembly

Each tower would be assembled at laydown areas at its location, and then erected and bolted to the foundations. Tower assembly would begin with hauling and stacking bundles of steel at tower location per engineering drawing requirements. This activity requires use of several tractors with 40-foot trailers and a rough terrain forklift. After steel is delivered and stacked, crews would proceed with the assembly of leg extensions, body panels, boxed sections and the bridges. The assembled tower sections would be lifted into place with a minimum 80-ton all-terrain or rough terrain crane. The steel work would be completed by a combined erection and torquing crew with a lattice boom crane. The construction crew may opt to install insulators and wire rollers (travelers) for the conductor installation at this time.

3.2.3.5 Wire Stringing Operations

Wire-stringing includes all activities associated with the installation of conductors onto the structure. This activity includes the installation of primary conductor and OPGW or ground wire, vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Wire-stringing activities would be conducted in accordance with SCE specifications, which is similar to process methods detailed in IEEE Standard 524-2003, Guide to the Installation of Overhead Transmission Line Conductors. A standard wire-stringing plan includes a sequenced program of events starting with determination of wire pulls and wire pull equipment set-up positions. Advanced planning determines circuit outages, pulling times, and safety protocols needed for ensuring that safe and quick installation of wire is accomplished.

Wire pulls are the length of any given continuous wire installation process between two selected points along the line. Typically, wire pulls occur every 15,000 to 18,000 feet on flat terrain or less in rugged terrain. Wire splices typically occur every 7,500 to 9,000 feet on flat terrain or less in rugged terrain. Wire pulls are selected, where possible, based on availability of dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment setups. To ensure the safety of workers and the public, safety devices such as traveling grounds, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

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

- Sock Line Threading: A helicopter would fly a lightweight sock line from tower to tower, which would be threaded through the wire rollers in order to engage a cam-lock device that would secure the pulling sock in the roller. This threading process would continue between all towers through the rollers of a particular set of spans selected for a conductor pull.

- Pulling: The sock line would be used to pull in the conductor pulling cable. The conductor 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 from twisting as the conductor unwinds off the reel. A piece of hardware known as a running board would be installed to properly feed the conductor into the roller; this device keeps the conductor from wrapping during installation.

- Splicing, Sagging, and Dead-ending: After the conductor is pulled in, all mid-span splicing would be performed. Once the splicing has been completed, the conductor would be sagged to proper tension and dead-ended to structures.

- Clipping-in: After conductor is dead-ended, the conductors would be attached to all structures; a process called clipping in.

The dimensions of the area needed for the stringing setups associated with wire installation are variable and depend upon terrain. The preferred minimum size needed for tensioning equipment set-up sites requires an area of 500 feet by 150 feet, the preferred minimum size needed for pulling equipment set-up sites requires an area of 300 feet by 150 feet, the preferred minimum size needed for splicing equipment set-up sites requires an area 150 feet by 100 feet; however, crews can work from within slightly smaller areas when space is limited. Each stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end. Splicing sites would be strategically located to support the stringing operations; splicing sites include specialized support equipment such as skidders and wire crimping equipment.

The puller, tensioner, and splicing set-up locations are used to remove temporary pulling splices and install permanent splices once the conductor is strung through the rollers located on each tower, and are necessary as the permanent splices that join the conductor together cannot travel through the rollers. For stringing equipment that cannot be positioned at either side of a dead-end transmission tower, field snubs (i.e., anchoring and dead-end hardware) would be temporarily installed to sag conductor wire to the correct tension.

The puller, tensioner, and splicing set-up locations 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. These temporary wire stringing areas would be restored to previous conditions following completion of pulling and splicing activities. The number and locations of the puller, tensioner, and splicing sites will be determined by the final engineering for the Proposed Project and the construction methods chosen by SCE or its contractor.

An OPGW and An OHGW would be installed on the transmission towers for shielding and communication. Both. The OHGW and the OPGW would be installed in the same manner as the conductor; it is typically installed in continuous segments of 11,000 feet or less, depending upon various factors including line direction, inclination, and accessibility. Following installation of the OPGW, the strands in each segment are spliced together to form a continuous length from one end of a transmission line to the other. At a splice tower, the fiber cables are routed down the structure where the splicing occurs. The splices are housed in a splice box (an approximate 3 foot by 3 foot by 1 foot metal enclosure) that is mounted to one of the structure legs some distance above the ground.

3.2.3.6 Helicopter Use

The operations area of the small helicopter utilized during the sock line threading would be limited to helicopter staging areas, such as Skylark Field, and positions that are considered safe locations for landing. Final siting of staging areas for helicopter use would be conducted with the input of the helicopter contractor and local agencies. Helicopter fueling would occur at staging areas or at a local airport (e.g., Skylark Field) using either the helicopter contractor’s fuel truck or the fuel service available at the airport. The helicopter and fuel truck may stay overnight at a local airport or at a staging area if adequate security is in place.

3.2.4 115 kV Subtransmission Line Construction

The following sections describe the construction activities associated with the 115 kV subtransmission line.

3.2.4.1 Airstrip

Construction of the modified 115 kV subtransmission lines for the Proposed Project would occur within 1,200 feet of a private airstrip (Skylark Field) near the south side of Lake Elsinore that is primarily used for skydiving. SCE would provide a construction schedule to the operator of Skylark Field prior to construction of the 115 kV subtransmission modifications near Skylark Substation, including the construction that would occur on Mission Trail, Waite Street, Lemon Street, Lost Road, and Beverly Street.

3.2.4.2 Site Preparation and Grading

The new LWS pole and TSP locations would first be graded and/or cleared to provide a reasonably level and vegetation-free surface for footing construction. An approximate 150 by 75 foot area around each 115 kV LWS pole and an approximate 200 by 100 foot area around each 115 kV TSP would be cleared of vegetation to provide a safe working area during construction. Any steel poles that are replacing existing wood poles would be installed as close as possible to the original structure and would require new excavations to set the poles. Depending on their location, the assembly and erection of some of the new 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 each TSP. The crane pad would be located transversely from each applicable TSP location.

Assembly of LWS and TSP poles typically would require a laydown area of approximately 200 feet by 100 feet. In locations where the terrain in the laydown area is already reasonably level, only vegetation removal would occur 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.

3.2.4.3 Light Weight Steel Pole Installation

LWS poles would be installed in the native soil in holes bored approximately 2 to 3 feet in diameter and 7 to 10 feet deep. LWS poles are normally shipped in sections with slip joints to the lay-down yard and then jacked together at the new pole location. LWS poles are normally installed using a line truck. Once the LWS poles are set in place, bore spoils (material from holes drilled) would be used to backfill the hole. If the bore spoils are not suitable for backfill, imported clean fill material, such as clean dirt and/or base material, would be used. Excess bore spoils would be distributed at each pole site and used as backfill for the holes left after removal of existing structures, or disposed of off-site in accordance with all applicable laws.

3.2.4.4 Tubular Steel Pole Installation

Structure foundations for the TSPs would typically be drilled concrete piers. The TSPs would be installed on top of cylindrical concrete foundations approximately 5 to 8 feet in diameter and approximately 20 to 40 feet deep (approximately 35 cubic yards would be removed) and is similar in method to that described above for the installation of 500 kV transmission tower foundations. 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 two sections would be bolted together and may be spot welded together for additional stability.

3.2.4.5 Subtransmission Wire Stringing Activities and Guard Structures

Conductor would be installed on the LWS poles and TSPs as similarly described above for the 500 kV transmission wire stringing activities, except that a line truck would drive from location to location to string the sock line, rather than use a helicopter.

Guard structures may be installed at transportation, flood control, and utility crossings. Guard structures are temporary facilities designed to stop the movement of a conductor should it momentarily drop below a conventional stringing height. Temporary netting could be installed to protect some types of under-built infrastructure. Typical guard structures are standard wood poles, 60 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. The guard structures are removed after the conductor is secured into place. In some cases, the wood poles could be substituted with the use of specifically equipped boom-type trucks with heavy outriggers staged to prevent the conductor from dropping. Approximately 104 guard structures would be used for installing the 115 kV subtransmission lines.

Public agencies differ on their policies for preferred methods to protect public safety during conductor stringing operations. For highway and open channel aqueduct crossings, SCE would work with the applicable agency to secure the necessary permits to string conductor across the applicable infrastructure. For major roadway crossings, typically one of the following four methods is employed to protect the public:

- Erection of a highway net 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; or
- Strategic placement of special line trucks with extension booms on the highway deck.

Some agencies may require the use of a secondary safety take out sling at highway crossings.

3.2.4.6 Removal of Existing Subtransmission Structures

After the existing subtransmission, distribution lines, and telecommunication lines are transferred (where applicable) to the new subtransmission poles, the existing structures would be completely removed (including the below-ground portion) and the hole would be backfilled using imported fill in combination with fill that may be available as a result of excavation for the installation of the new steel poles. Depending on their condition and original chemical treatment, any wood poles removed may be reused by SCE, returned to the manufacturer, disposed of in a Class I hazardous waste landfill, or disposed of in the lined portion of a Regional Water Quality Control Board (RWQCB)-certified municipal landfill.

3.2.5 Energizing the Constructed 500 kV Transmission and 115 kV Subtransmission Lines

The final step in completing construction of the 500 kV transmission line segments and 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 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 energized.

3.2.6 Telecommunications Construction

The following sections provide detail on the construction activities associated with the telecommunications improvements.

3.2.6.1 Microwave System Construction

A 120-foot microwave tower would be installed at Alberhill Substation. All tower material would be delivered by truck and would be staged within a lay down area at the substation site. After the tower foundation is installed, each tower section would be assembled on site and erected using a 120-foot crane and a 120-foot lifting (bucket) truck.

The microwave dish antennas at Alberhill Substation, Santiago Peak, and Serrano Substation would be installed on the towers using a bucket truck.

3.2.6.2 Fiber Optic System Construction

The fiber optic system construction would include the installation of overhead facilities, underground facilities, and new telecommunications equipment at Serrano, Barre, Walnut, Mira Loma, Valley, Ivyglen, Fogarty, Newcomb, Tenaja, and Skylark Substations. The overhead telecommunications cable would be installed by attaching cable to structures in a manner similar to that described above for subtransmission wire stringing.

3.2.7 Post Construction Cleanup

SCE would restore all areas that were temporarily disturbed by construction of the Proposed Project (including temporary material staging yards, and conductor pull/tension/splicing sites) to as close to preconstruction conditions as possible, or to the conditions agreed upon between the landowner and SCE following the completion of construction of the Proposed Project. Any damage to existing roads as a result of construction would be repaired once construction is complete in accordance with local requirements.

In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of off-site. SCE would conduct a final inspection to ensure that cleanup activities were successfully completed.

3.3 Land Acquisition

SCE is in the process of acquiring approximately 124 acres of land for use as the Alberhill Substation site, approximately 24 acres of which would be within the substation wall. Approximately 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, buffers, and landscaping. Approximately six acres located to the outside of the north substation wall, plus the north-east and north-east corners would be primarily dedicated to the control of stormwater run-off. The remaining approximately 90 acres of the property is either excess land that is not needed, or is comprised of steep hills that is not suitable for development.

Each 500 kV transmission line segment, originating at the Alberhill Substation and extending to the Serrano-Valley 500 kV transmission line, would require a 200 foot wide ROW. Approximately 12 acres of these ROWs would be on the substation parcel acquired for Alberhill Substation, and approximately ~~10~~99 acres of ROWs would be acquired from four private property owners and a parcel owned by ~~the~~ Riverside County ~~Habitat Conservancy Agency~~ (for which SCE would acquire a permit to cross).

3.4 Land Disturbance

Land disturbance would include the ground surface modifications at the substation site, the installation of the 500 kV transmission line segments and access roads, and the installation of the 115 kV subtransmission line structures. The portions of the Proposed Project construction that occurs along existing roads in the franchise position is summarized in Table 3.3, Summary of Land Disturbance Within Public ROW. Land disturbance associated with portions of the Proposed Project that would be constructed in areas away from public streets are summarized in Table 3.4, Summary of Land Disturbance Outside of Public ROW. Rights-of-way acquisition requirements are discussed above in Section 3.3, Land Acquisition.

3.5 Geotechnical Studies

Prior to the start of construction, SCE would conduct a geotechnical study of the substation site and the 500 kV transmission line segments and the new and modified 115 kV subtransmission line routes that would include an evaluation of the depth to the water table, liquefaction potential, physical properties of subsurface soils, soil resistivity, slope stability, and the presence of hazardous materials. This information would be used to develop final engineering of the Proposed Project facilities.

3.6 Hazards and Hazardous Materials

Construction and operation of the Proposed Project would require the limited use of hazardous materials, such as fuels, lubricants, and cleaning solvents. All hazardous materials would be stored, handled, and used in accordance with the applicable regulations. For all hazardous materials in use at the construction site, Material Safety Data Sheets would be made available to all site workers in case of emergency.

The SWPPP prepared for the Proposed Project would provide detail of locations where hazardous materials may be stored during construction, and the protective measures, notifications, and cleanup requirements for any accidental spills or other releases of hazardous materials that could occur.

Table 3.3 Summary of Land Disturbance Within Public ROW

Project Activity	Site Quantity	Disturbed Area	Acres Disturbed During Construction	Acres to be Restored	Acres Required Within Public ROW
Guard Structures	100	50’ x 75’	8.7	8.7	--
Remove Existing 115 kV TSP	7	200’ x 100’	3.2	3.2	--
Remove Existing 115 kV LWS	2	50’ x 50’	0.1	0.1	--
Remove Existing 115 kV Wood Pole	292	50’ x 50’	16.8	16.8	--
Construct New 115 kV TSP	40	200’ x 100’	18.4	16.0	2.4
Construct New 115 kV LWS	284	150’ x 75’	73.3	59.1	14.2
115 kV Wire Stringing - Puller	16	200’ x 100’	7.3	7.3	--
115 kV Wire Stringing - Tensioner	16	500’ x 100’	18.4	18.4	--
115 kV Wire Stringing - Splicing	3	150’ x 100’	1.0	1.0	--
New Roads (Access & Spur)	0.06	Linear miles x 14’ wide	0.8	--	0.8
Subtotal: 115 kV Subtransmission Within Public ROW			**148**	**130**	**18**

Note: The disturbed acreage calculations are estimates based upon SCE’s preferred area of use and the width of the proposed right-of-way for the described project feature; they are subject to revision based upon final engineering.

Table 3.4 Summary of Land Disturbance Outside of Public ROW

Project Activity	Site Quantity	Disturbed Area	Acres Disturbed During Construction	Acres to be Restored	Acres Required
Alberhill Substation	**1**	**--**	**34**	**--**	**34**
Remove Existing 500 kV Towers	~~4~~2	150’ x ~~75’~~150’	1.0	1.0	--
Construct New 500 kV Towers	12	200’ x 200’	11.0	8.6	2.4
500 kV Wire Stringing - Puller	~~1~~2	~~300’~~100’ x ~~150’~~50’	~~1.~~0.2	~~1.~~0.2	--
500 kV ~~Wire Stringing - Tensioner~~Field Snub Area	~~1~~2	~~500’~~50’ x ~~150’~~50’	0.1~~.7~~	0.1~~.7~~	--
~~500 kV Wire Stringing - Splicing~~	~~1~~	~~150’ x 100’~~	~~0.3~~	~~0.3~~	~~--~~
New Roads (Access & Spur)	~~2.0~~--	~~linear miles x 14’ wide~~See Note (1) below	~~3.4~~11.1	--	~~3.4~~11.1
Subtotal: 500 kV Transmission			**~~19~~23**	**~~13~~11**	**~~6~~14**
Guard Structures	4	50’ x 75’	0.3	0.3	--
Remove Existing 115 kV Wood H-Frame	15	75’ x 50’	1.3	1.3	--
Remove Existing 115 kV Wood Pole	20	50’ x 50’	1.1	1.1	--
Construct New 115 kV LWS	20	150’ x 75’	5.2	4.2	1.0
Construct New 115 kV Wood H-Frame	10	100’ x 50’	1.1	0.4	0.7
115 kV Wire Stringing - Puller	1	200’ x 100’	0.5	0.5	--
115 kV Wire Stringing - Tensioner	1	500’ x 100’	1.1	1.1	--
115 kV Wire Stringing - Splicing	1	150’ x 100’	0.3	0.3	--

Project Activity	Site Quantity	Disturbed Area	Acres Disturbed During Construction	Acres to be Restored	Acres Required
Subtotal: 115 kV Subtransmission			**11**	**9**	**2**
Total Outside Public ROW			**63**	**21**	**42**

Note: The disturbed acreage calculations are estimates based upon SCE's preferred area of use and the width of the proposed right-of-way for the described project feature; they are subject to revision based upon final engineering.
(1) Disturbance acreages for the access roads was estimated using Civil 2008 in conjunction with AutoCAD software.

3.7 Waste Management

Construction of the Proposed Project would result in the generation of various waste materials that can be recycled and salvaged. 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 the material staging yards, sorted, and baled, and then sold through available markets. Items that may be recycled include the steel from towers (i.e., towers, nuts, bolts, and washers), the conductor wire and the hardware (i.e., shackles, clevises, yoke plates, links, or other connectors used to support conductor).

Construction of the Proposed Project would also generate waste materials that cannot be reused or recycled (i.e., wood, soil, vegetation, and sanitation waste); local waste management facilities would be used for the disposal of these types of construction waste. The disposal of any hazardous waste would be done at an appropriately licensed facility.

3.8 Environmental Surveys

Prior to the start of construction, detailed environmental surveys would be conducted to identify sensitive biological and cultural resources in the vicinity of the Proposed Project. Where feasible, the information gathered from these surveys may be used to modify the project design in order to avoid sensitive resources, or to implement Applicant Proposed Measures (APMs) to minimize the impact to sensitive resources from project-related activities. The results of these surveys would also determine the extent to which environmental specialist construction monitors would be required.

The following focused biological resource surveys would be conducted during Spring 2010, and some surveys would occur annually until construction.2011. More information on these sensitive species can be found in Section 4.4, Biological Resources.

- Focused plant surveys. Focused plant surveys would be conducted in the spring following a winter season of adequate rainfall throughout the region for the special statusnarrow endemic plant and WRMSHCP criteria area plant species with the potential to occur within the vicinity of the Proposed Project, and are necessary to determine the impacts the Proposed Project would have on any sensitive plant species.. The special status plant surveys would follow guidelines developed by California Natural Plant Society (CNPS) to identify sensitive species that have the potential to be present in the area. If sensitive species are present, and avoidance is not feasible, consultation with the US Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG) would be necessary to determine if a permit would be required to impact any one of these species, and SCE would propose APMs to minimize impacts.

- Focused wildlife surveys. Focused wildlife surveys would be conducted for the special status wildlife species with potential to occur within the vicinity of the Proposed Project. These surveys would be performed at the appropriate time of year to detect the species, and are necessary to establish the impacts of the Proposed Project on any listed species. If sensitive wildlife species are present, and avoidance is not feasible, consultation with the USFWS and the CDFG would be necessary to determine if a permit would be required to impact any one of these species, and SCE would propose APMs to minimize impacts.

- Stephen's Kangaroo Rat. SCE would conduct focused surveys, including trapping, throughout the permitting period for the Alberhill System Project within the areas managed by the Riverside County Habitat Conservation Agency.

In addition, SCE would conduct the following surveys as the Proposed Project approaches final design:

- Jurisdictional Drainages. and Riparian and Riverine Surveys. A wetland delineation would be conducted during Spring 2010 to describe and map the extent of resources under the jurisdiction of the US Army Corps of Engineers (USACE), the RWQCB, the CDFG, and/or the CDFGWRMSHCP following the guidelines presented in the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. and other agency guidance documents. As appropriate, SCE would secure appropriate permits such as a Streambed Alteration Agreement from the CDFG, and Clean Water Act Section 404 and 401 permits from the USACE and State Water Resources Control Board, respectively, and/or a certificate of inclusion from the WRMSHCP.

- Burrowing owl. Focused burrowing owl surveys would be conducted in the areas affected by the Proposed Project following California Department of Fish and Game Guidelines. If burrowing owls are observed within the construction areas of the Proposed Project, CDFG Protocols would be implemented, and SCE would propose APMs to minimize impacts.

- Stephens' Kangaroo Rat and other small mammals. Focused surveys for Stephens' kangaroo rat and other small mammals with the potential to occur in the vicinity of the Proposed Project would be conducted during the appropriate time of year to detect the species. If Stephens' kangaroo rat or other small mammals listed by USFWS and/or CDFG are present and avoidance is not feasible, consultation with the USFWS and the CDFG would be necessary to determine if a permit would be required to impact any one of these species.

In addition, SCE would conduct the following surveys as the Proposed Project approaches final design:

- Paleontological Resource Survey. SCE would conduct a paleontological resource survey to identify sensitive paleontological resources in the areas potentially affected by the project. This information would be used to modify the design of the project, or develop a Paleontological Resources Recovery Plan, should it be necessary.

The following environmental surveys would occur prior to construction.

- Burrowing owl. The preconstruction surveys for burrowing owl would be conducted no more than 30 days prior to ground-disturbing activities. Potential burrows that are identified and determined to be unoccupied outside of the nesting season would be collapsed to avoid construction impacts to the species during nesting season. If burrowing owls are observed within the construction areas of the Proposed Project, CDFG Protocols would be implemented, and SCE would propose APMs to minimize impacts.

- Biological Resource Clearance Surveys. These surveys would identify all sensitive resources within a given work area within 10 days of any ground disturbing work. Should any special-status plants and/or wildlife species be located during this survey, appropriate measures would be implemented to avoid any impacts to special-status species (i.e., flag and avoid, utilization of construction fencing, biological monitor present during work, etc.). If avoidance cannot be maintained, consultation with appropriate agencies would occur

- Active nests. The nesting season is generally February 15 to August 31. Work near nests would be scheduled to take place outside the nesting season when feasible. If a nest must be moved during the nesting season, SCE would coordinate with the CDFG and USFWS and obtain approval prior to moving the nest.

- Protected Trees. Prior to construction of the Proposed Project, SCE would determine if removal or alteration of trees protected by local ordinances would be required. If protected trees cannot be avoided, SCE would obtain the appropriate permits from the local agency prior to removing the tree.

- Biological Resource Clearance Surveys. These surveys would identify all sensitive resources within a given work area within 10 days of any ground disturbing work. Should any special-status plants and/or wildlife species be located during this survey, appropriate measures would be implemented to avoid any impacts to special-status species (i.e., flag and avoid, utilization of construction fencing, biological monitor present during work, etc.). If avoidance cannot be maintained, consultation with appropriate agencies would occur

3.9 Worker Environmental Awareness Training

Prior to construction, a Worker Environmental Awareness Plan would be developed based on the final engineering design, the results of preconstruction surveys, and a list of mitigation measures, if any, developed by the CPUC to mitigate significant environmental effects of the Proposed Project. A presentation would be prepared by SCE 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 SCE personnel associated with the Proposed Project (archeologist, biologist, environmental compliance 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 compliance coordinator
- Instruction on washing the wheels, tracks, and underbodies of construction vehicles to minimize the spread of invasive species
- Instruction on individual responsibilities under the Clean Water Act, the project SWPPP, site-specific BMPs, and the location of Material Safety Data Sheets for the project
- 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

- 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 Proposed Project

3.10 Construction Equipment and Personnel

The estimated elements, equipment, and number of personnel required for construction of the Proposed Project are summarized in Appendix F, Construction Equipment and Personnel Requirements.

Construction would be performed by either SCE construction crews or contractors, depending on the availability of SCE construction personnel at the time of construction. If SCE transmission and telecommunications construction crews are used they would likely be based at one of SCE's local facilities such as the Valley Substation or the Wildomar Service Center. Contractor construction personnel would be managed by SCE construction management personnel.

In general, construction efforts would occur in accordance with accepted construction industry standards. Construction activities generally would be scheduled during daylight hours (e.g., 7:00 am to 7:00 pm), Monday through Saturday. When different hours or days are necessary, SCE would obtain variances, as necessary, from the jurisdiction in which the work would take place. All materials associated with construction efforts would be delivered by truck or helicopter to established marshalling yards. Delivery activities requiring major street use would be scheduled to occur during off-peak traffic hours.

3.11 Construction Schedule

SCE anticipates that construction of the Proposed Project would take approximately 23 months. Construction would commence following CPUC approval, final engineering, and procurement activities. A preliminary construction schedule can be found in Table 3.5, Preliminary Proposed Project Construction Schedule. The Proposed Project is scheduled to be in operation June 2014.

Table 3.5 Preliminary Proposed Project Construction Schedule

Activity	Duration
Substation Construction	23 months
Subtransmission Construction	12 months
Transmission Construction	12 months
Telecommunications	12 months
Testing	1 month

3.12 Project Operation

Components of the Alberhill Substation Project would require routine maintenance, and may require emergency repair for service continuity. Alberhill Substation would be unstaffed, and electrical equipment within the substation would be remotely monitored and controlled by an automated system from SCE's Valley Substation Regional Control Center. SCE personnel would visit for electrical switching and routine maintenance purposes. Routine maintenance would include equipment testing, equipment monitoring, and repair. SCE personnel would generally visit the substation three to four times per month.

The new 500 kV transmission line segments and new and modified 115 kV subtransmission lines would be maintained in a manner consistent with CPUC General Order 165. SCE inspects transmission and subtransmission lines at least once per year by driving and/or flying the line routes, and the lines may otherwise occasionally require emergency repairs.

The telecommunications system would require routine maintenance, which would include equipment testing, monitoring, and repair. No additional SCE personnel, beyond normal staffing levels, would be required to operate or maintain the telecommunications system at the substations. Once per year, one individual would perform routine maintenance of the telecommunications components located at the substations.

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APPENDIX F

APPENDIX F Construction Equipment and Personnel Requirements

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Schedule (Days)	Duration of Use (Hours/Day)
Substation					
Survey					
Crew Vehicle	200	Gasoline	2	15	2
Grading					
Dozer	305	Diesel	1	60	7
Loader	147	Diesel	2	60	4
Scraper	267	Diesel	1	60	7
Grader	110	Diesel	1	60	7
Water Truck	350	Diesel	1	60	7
4x4 Backhoe	79	Diesel	2	60	7
4x4 Tamper	174	Diesel	1	60	7
Crew Vehicle	200	Gasoline	5	60	7
Fencing					
Bobcat	75	Diesel	1	15	8
Flatbed Truck	350	Diesel	1	15	3
Crewcab Truck	300	Diesel	3	15	2
Civil					
Excavator	152	Diesel	2	90	4
Foundation Auger	79	Diesel	2	90	7
Backhoe	79	Diesel	3	90	6
Dump Truck	350	Diesel	2	90	2
Skip Loader	75	Diesel	2	90	3
Water Truck	350	Diesel	1	90	5
Bobcat Skid Steer	75	Diesel	2	90	4
Forklift	83	Diesel	1	90	4
17-ton Crane	125	Diesel	1	90	2
Control Building					
Carry-all Truck	350	Diesel	2	20	2
Stake Truck	350	Diesel	1	20	2

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Schedule (Days)	Duration of Use (Hours/Day)
Electrical					
Scissor Lift	87	Diesel	2	300	5
Manlift	43	Diesel	2	300	7
Reach Manlift	87	Diesel	2	300	6
15-ton Crane	125	Diesel	1	300	5
Crew Truck	200	Gasoline	6	300	2
Wiring					
Manlift	43	Diesel	1	250	4
Crew Truck	200	Gasoline	4	250	2
Transformers					
Crane	125	Diesel	1	90	6
Forklift	83	Diesel	1	90	6
Crew Truck	200	Gasoline	4	90	2
Low Bed Truck	350	Diesel	1	90	4
Maintenance Crew Equipment Check					
Maintenance Truck	300	Diesel	2	60	4
Testing					
Crew Truck	200	Gasoline	2	200	3
Asphalting					
Paving Roller	46	Diesel	2	30	4
Asphalt Paver	152	Diesel	1	30	4
Stake Truck	350	Diesel	1	30	4
Tractor	45	Diesel	1	30	3
Dump Truck	350	Diesel	1	30	3
Crew Trucks	200	Gasoline	2	30	2
Asphalt Curb Machine	35	Diesel	1	30	3
Landscaping					
Tractor	45	Diesel	1	45	7
Dump Truck	350	Diesel	1	45	3
Forklift	83	Diesel	1	45	4
Crew Truck	200	Gasoline	4	45	2

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Schedule (Days)	Duration of Use (Hours/Day)
500 kV Transmission					
Survey					
1/2-Ton Pick-up Truck, 4x4	~~200~~300	Gas	2	~~3~~4	8
Marshalling Yard					
1-Ton Crew Cab, 4x4	300	Diesel	1	All	~~2~~4
~~30-Ton Crane Truck~~10,000 lb Rough Terrain Fork Lift	~~300~~125	Diesel	1	All	~~2~~6
~~10,000 lb Rough Terrain Fork Lift~~Boom/Crane Truck	~~200~~215	Diesel	1	All	~~5~~2
Truck, Semi, Tractor	~~350~~400	Diesel	1	All	~~1~~2
Roads and Landing Work					
1-Ton Crew Cab, 4x4	300	Diesel	2	9	2
Road Grader	~~350~~50	Diesel	1	9	~~4~~6
Water Truck	~~350~~300	Diesel	2	9	8
Backhoe/Front Loader	~~350~~125	Diesel	1	9	~~6~~8
Drum Type Compactor	~~250~~100	Diesel	1	9	~~4~~6
Track Type Dozer	~~350~~150	Diesel	1	9	~~6~~8
Excavator	~~300~~250	Diesel	1	~~9~~6	6
Lowboy Truck/Trailer	~~500~~450	Diesel	1	9	2
Tower Removal					
~~3/4~~1-Ton ~~Pick-up Truck~~Crew Cab, 4x4	300	~~Diesel~~Gas	2	4	~~5~~4
1-Ton ~~Crew Cab~~ Flat Bed, 4x4	300	~~Diesel~~Gas	2	4	~~5~~6
Compressor Trailer	~~120~~60	Diesel	1	4	~~6~~8
Flat Bed Truck/Trailer	400	Diesel	1	4	4

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Schedule (Days)	Duration of Use (Hours/Day)
~~80-Ton~~ Rough Terrain Crane	~~350~~275	Diesel	1	4	6
Tower Foundation Removal					
1-Ton Crew Cab, 4x4	300	Gas	1	4	4
Compressor Trailer	60	Diesel	1	2	8
Backhoe/Front Loader	125	Diesel	1	2	6
Dump Truck	350	Diesel	1	2	6
Install Tower Foundations					
1-Ton ~~Crew Cab~~ Flat Bed, 4x4	300	~~Diesel~~Gas	2	~~26~~20	2
~~30-Ton~~ Boom/Crane Truck	~~300~~350	Diesel	1	~~26~~20	5
Backhoe/Front Loader	~~200~~125	Diesel	1	~~26~~20	8
Auger Truck	~~500~~210	Diesel	1	~~26~~12	8
~~4000 gallon~~ Water Truck	~~350~~300	Diesel	1	~~26~~20	8
~~10 cu. yd.~~ Dump Truck	350	Diesel	~~2~~1	~~26~~20	8
~~10 cu. yd.~~ Concrete Mixer Truck	~~425~~350	Diesel	3	~~26~~12	5
Tower Steel Haul					
1-Ton Crew Cab Flat Bed, 4x4	300	~~Diesel~~Gas	2	~~13~~10	~~2~~4
~~10,000 lb~~ Rough Terrain Fork Lift	~~200~~125	Diesel	1	~~13~~10	6
~~40'~~ Flat Bed Truck/ Trailer	~~350~~400	Diesel	1	~~13~~10	8
Tower Steel Assembly					
3/4-Ton Pick-up Truck, 4x4	~~300~~275	~~Diesel~~Gas	~~3~~2	~~26~~40	4
1-Ton Crew Cab Flat Bed, 4x4	300	~~Diesel~~Gas	2	~~26~~40	4
~~10,000 lb~~ Rough Terrain Fork Lift	~~200~~125	Diesel	1	~~26~~40	6

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Schedule (Days)	Duration of Use (Hours/Day)
~~30-Ton Crane Truck~~Compressor Trailer	~~300~~60	Diesel	~~2~~1	~~26~~40	8
~~Compressor Trailer~~Rough Terrain Crane	~~350~~215	Diesel	~~2~~1	~~26~~40	6
Tower Erection					
3/4-Ton Pick-up Truck, 4x4	~~300~~275	~~Diesel~~Gas	~~2~~3	~~13~~33	~~5~~4
1-Ton Crew Cab Flat Bed, 4x4	300	~~Diesel~~Gas	2	~~13~~33	~~5~~4
Compressor Trailer	~~120~~60	Diesel	1	~~13~~33	~~6~~8
~~80-Ton~~ Rough Terrain Crane (M)	~~350~~215	Diesel	1	~~13~~22	6
Rough Terrain Crane (L)	275	Diesel	1	11	6
Wire Stringing					
3/4-Ton Pick-up Truck, 4x4	~~300~~275	~~Diesel~~Gas	~~6~~4	~~5~~9	~~8~~4
1-Ton Crew Cab Flat Bed, 4x4	300	~~Diesel~~Gas	~~5~~6	~~5~~9	~~8~~4
Wire Truck/Trailer	350	Diesel	~~6~~4	~~5~~6	~~2~~6
~~Pole~~Dump Truck~~/Trailer~~ (Trash)	~~500~~350	Diesel	1	~~5~~9	~~6~~4
~~Dump~~Bucket Truck ~~(Trash)~~	~~350~~250	Diesel	~~1~~2	~~5~~9	~~2~~8
~~20,000 lb. Rough Terrain Fork Lift~~Boom/Crane Truck	350	Diesel	~~1~~2	~~5~~9	~~2~~6
~~22-Ton Manitex~~Rough Terrain Crane (M)	~~350~~215	Diesel	~~1~~2	~~5~~9	~~8~~6
~~30-Ton Manitex~~Spacing Cart	~~350~~10	Diesel	~~4~~2	~~5~~3	~~6~~8
~~Splicing Rig~~Static Truck/ Tensioner	350	Diesel	~~2~~1	~~5~~9	~~2~~6

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Schedule (Days)	Duration of Use (Hours/Day)
~~Splicing Lab~~3 Drum Sock line Puller	300	Diesel	~~2~~1	~~5~~4	~~2~~6
~~Spacing Cart~~Bull Wheel Puller	~~10~~525	Diesel	~~3~~1	5	~~8~~6
~~Static Truck/ Tensioner~~Sag Cat w/ 2 winches	350	Diesel	~~1~~2	~~5~~9	~~2~~4
~~3 Drum Straw line Puller~~Backhoe/Front Loader	~~300~~125	Diesel	~~2~~1	~~5~~9	4
~~60lk Puller~~D8 Cat	~~525~~350	Diesel	~~1~~2	~~5~~9	~~3~~4
~~Sag Cat w/ 2 winches~~Lowboy Truck/Trailer	~~350~~450	Diesel	~~2~~3	~~5~~9	2
~~580 Case Backhoe~~Hughes 500 E Helicopter	~~120~~	~~Diesel~~Jet A	1	~~5~~2	~~2~~6
~~D8 Cat~~Fuel, Helicopter Support Truck	300	Diesel	~~4~~1	~~5~~2	~~1~~4
~~Lowboy Truck/Trailer~~	~~500~~	~~Diesel~~	~~1~~	~~5~~	~~2~~
~~Hughes 500 E Helicopter~~		~~Jet A~~	~~1~~	~~1~~	~~4~~
~~Fuel, Helicopter Support Truck~~	~~300~~	~~Diesel~~	~~1~~	~~1~~	~~2~~
Restoration					
1-Ton Crew Cab, 4x4	300	~~Diesel~~Gas	2	4	~~2~~4
Road Grader	~~350~~250	Diesel	1	4	6
Water Truck	~~350~~300	Diesel	1	4	8
Backhoe/Front Loader	~~350~~125	Diesel	1	4	~~6~~4
Drum Type Compactor	~~250~~100	Diesel	1	4	6
~~Track Type Dozer~~	~~350~~	~~Diesel~~	~~1~~	~~4~~	~~6~~
Lowboy Truck/Trailer	~~300~~450	Diesel	1	4	~~3~~2
115 kV Subtransmission					
Survey					

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Schedule (Days)	Duration of Use (Hours/Day)
1~~/2-~~Ton ~~Pick-up~~ Truck, 4x4	~~200~~300	Gas	2	18	8
Marshalling Yard					
1-Ton Crew Cab, 4x4	300	~~Diesel~~Gas	1	~~All~~Duration of Project	~~2~~4
~~30-Ton~~ Boom/Crane Truck	~~300~~215	Diesel	1	~~All~~Duration of Project	2
~~10,000 lb~~ Rough Terrain ~~Fork Lift~~Forklift	~~200~~125	Diesel	1	~~All~~Duration of Project	~~5~~6
Truck, Semi, Tractor	~~350~~400	Diesel	1	~~All~~Duration of Project	~~1~~2
~~Roads and Landing Work~~R/W Clearing					
1-Ton Crew Cab, 4x4	300	~~Diesel~~Gas	~~2~~1	~~86~~0	~~2~~8
Road Grader	~~350~~250	Diesel	1	~~86~~0	~~4~~6
Water Truck	~~350~~300	Diesel	~~2~~1	~~86~~0	8
Backhoe/Front Loader	~~350~~125	Diesel	1	~~86~~0	6
Track Type Dozer	150	Diesel	1	0	6
Lowboy Truck/Trailer	450	Diesel	1	0	4
Roads & Landing Work					
1-Ton Crew Cab, 4x4	300	Gas	1	88	2
Road Grader	250	Diesel	1	88	4
Water Truck	300	Diesel	1	88	8
Backhoe/Front Loader	125	Diesel	1	88	6
Drum Type Compactor	~~250~~100	Diesel	1	~~86~~88	4
Track Type Dozer	~~350~~150	Diesel	1	~~86~~88	6
Excavator	~~300~~250	Diesel	1	~~43~~44	6
Lowboy Truck/Trailer	~~500~~450	Diesel	1	~~43~~44	2

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Schedule (Days)	Duration of Use (Hours/Day)
Guard Structure Installation					
3/4-Ton ~~Pick-up~~ Truck, 4x4	~~300~~275	~~Diesel~~Gas	~~2~~1	26	6
1-Ton Crew Cab Flat Bed, 4x4	300	~~Diesel~~Gas	1	26	6
Compressor Trailer	~~120~~60	Diesel	1	26	6
Auger Truck	~~500~~210	Diesel	1	26	6
Extendable Flat Bed Pole Truck	~~350~~400	Diesel	1	26	6
~~30-Ton~~ Boom/Crane Truck	~~500~~350	Diesel	1	26	8
~~80ft. Hydraulic Man-lift/~~Bucket Truck	~~350~~250	Diesel	1	26	4
Remove Existing Wood H-Frames & Poles					
1-Ton Crew Cab, 4x4	300	~~Diesel~~Gas	2	23	5
~~10,000 lb.~~ Rough Terrain Forklift	~~200~~125	Diesel	1	23	4
~~30-Ton~~ Boom/Crane Truck	~~300~~350	Diesel	~~2~~1	23	6
Compressor Trailer	~~120~~60	Diesel	~~2~~1	23	6
Flat Bed Pole Truck~~/ Trailer~~	~~350~~400	Diesel	1	23	8
Remove Existing Tubular Steel / Light Weight Steel Poles					
3/4-Ton ~~Pick-up~~ Truck, 4x4	~~300~~275	~~Diesel~~Gas	2	~~3~~5	5
1-Ton Crew Cab Flat Bed, 4x4	300	~~Diesel~~Gas	2	~~3~~5	5
Compressor Trailer	~~120~~60	Diesel	1	~~3~~5	5
~~80-Ton Rough Terrain~~ Boom/Crane Truck	350	Diesel	1	~~3~~5	6
Install ~~TSP~~Tubular Steel Pole Foundations					
1-Ton Crew Cab Flat Bed, 4x4	300	~~Diesel~~Gas	~~3~~1	~~74~~96	2

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Schedule (Days)	Duration of Use (Hours/Day)
~~30-Ton~~ Boom/Crane Truck	~~300~~350	Diesel	1	~~74~~96	5
Backhoe/Front Loader	~~200~~125	Diesel	1	~~74~~96	8
Auger Truck	~~500~~210	Diesel	1	~~50~~65	8
~~4000 gallon~~ Water Truck	~~350~~300	Diesel	1	~~74~~96	8
~~10 cu. yd.~~ Dump Truck	350	Diesel	~~2~~1	~~74~~96	8
~~10 cu. yd.~~ Concrete Mixer Truck	~~425~~350	Diesel	3	~~50~~65	5
Steel Pole Haul					
3/4-Ton ~~Pick-up~~ Truck, 4x4	~~300~~275	~~Diesel~~Gas	2	~~125~~128	5
~~80-Ton Rough Terrain~~ Boom/Crane Truck	350	Diesel	1	~~125~~128	6
40' Flat Bed Pole Truck~~/ Trailer~~	~~350~~400	Diesel	~~2~~1	~~125~~128	8
Steel Pole Assembly					
3/4-Ton Pick-Up Truck, 4x4	~~300~~275	~~Diesel~~Gas	2	~~249~~255	5
1-Ton Crew Cab Flat Bed, 4x4	300	~~Diesel~~Gas	2	~~249~~255	5
Compressor Trailer	~~120~~60	Diesel	1	~~249~~255	5
~~80-Ton Rough Terrain~~ Boom/Crane Truck	350	Diesel	1	~~249~~255	6
Steel Pole Erection					
3/4-Ton Pick-up Truck, 4x4	~~300~~275	~~Diesel~~Gas	2	~~249~~255	5
1-Ton Crew Cab Flat Bed, 4x4	300	~~Diesel~~Gas	2	~~249~~255	5
Compressor Trailer	~~120~~60	Diesel	1	~~249~~255	5

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Schedule (Days)	Duration of Use (Hours/Day)
~~80-Ton Rough Terrain~~ Boom/Crane Truck	350	Diesel	1	~~249~~255	6
~~Wire Stringing~~Install Conductor & OHGW/GW					
3/4-Ton ~~Pick-up~~ Truck, 4x4	~~300~~275	~~Diesel~~Gas	2	89	~~8~~4
1-Ton Crew Cab Flat Bed, 4x4	300	~~Diesel~~Gas	~~4~~3	89	~~8~~4
Wire Truck/Trailer	350	Diesel	2	60	2
Dump Truck ~~(Trash)~~	350	Diesel	1	89	~~2~~4
Bucket Truck	~~350~~250	Diesel	~~2~~4	89	8
~~22-Ton Manitex~~Boom/Crane Truck	350	Diesel	2	89	8
Splicing Rig	350	Diesel	1	~~23~~20	~~2~~6
~~Splicing Lab~~	~~300~~	~~Diesel~~	~~1~~	~~23~~	~~2~~
3 Drum ~~Straw~~Sock Line Puller	300	Diesel	1	45	6
Static Truck/ Tensioner	350	Diesel	1	45	6
Guard Structure Removal					
3/4-Ton ~~Pick-up~~ Truck, 4x4	~~300~~275	~~Diesel~~Gas	~~2~~1	18	6
1-Ton Crew Cab Flat Bed, 4x4	300	~~Diesel~~Gas	~~2~~1	18	6
Compressor Trailer	~~120~~60	Diesel	~~2~~1	18	6
Extendable Flat Bed Pole Truck	~~350~~400	Diesel	~~2~~1	18	6
~~30-Ton~~ Boom/Crane Truck	~~500~~350	Diesel	1	18	8
~~80ft. Hydraulic Man-lift /~~ Bucket Truck	~~350~~250	Diesel	1	18	4
Restoration					

Primary Equipment Description	Estimated Horsepower	Probable Fuel Type	Primary Equipment Quantity	Estimated Schedule (Days)	Duration of Use (Hours/Day)
1-Ton Crew Cab, 4x4	300	~~Diesel~~Gas	2	18	2
Road Grader	~~350~~250	Diesel	1	18	6
Water Truck	~~350~~300	Diesel	1	18	8
Backhoe/Front Loader	~~350~~125	Diesel	1	18	6
Drum Type Compactor	~~250~~100	Diesel	1	18	6
~~Track Type Dozer~~	~~350~~	~~Diesel~~	~~1~~	~~18~~	~~6~~
Lowboy Truck/Trailer	~~300~~450	Diesel	1	18	3
Telecommunications					
Tower Foundation					
Crew Truck	300	Diesel	2	5	8
Backhoe	79	Diesel	1	5	8
Stake bed truck	350	Diesel	1	5	8
Concrete Mixer	120	Diesel	1	5	8
Tower Construction					
Crew Trucks	300	Diesel	2	30	2
150-foot crane	300	Diesel	1	30	8
150-foot lift truck	100	Diesel	1	30	8
Dish Installation					
Crew Truck	300	Diesel	1	10	2
150-foot lift truck	300	Diesel	1	10	8
Control Building					
Crew Truck	300	Diesel	1	25	2
Bucket Truck	350	Diesel	1	25	8
Overhead Communications Installation					
Bucket truck	350	Diesel	1	31	8
Reel truck	300	Diesel	1	31	8
Substation Telecommunications Equipment Installation					
Van	200	Gasoline	2	10	2

Activity and Crew Size Assumptions

Activity	**Crew Size Assumption**
Substation	
Survey	One 4-person crew
Grading	One 10-person crew
Fencing	One 10-person crew
Civil	One 15-person crew
Control Building	One 6-person crew
Electrical	One 15-person crew
Wiring	One 8-person crew
Transformers	One 10-person crew
Maintenance Crew Equipment Check	One 4-person crew
Testing	One 4-person crew
Asphalting	One 10-person crew
Landscaping	One 10-person crews
500 kV Transmission	
Survey	One 4-person crew
Marshalling Yards	One 4-person crew
Roads & Landing Work	One 5-person crew
LST Removal	One 8-person crew
LST Foundation Removal	One 4-person crew
Install Foundations for LSTs	One 9-person crew
LST Steel Haul	One 4-person crew
LST Steel Assembly	~~Two 7~~One 10-person ~~crews~~crew
LST Erection	One ~~8~~12-person crew
Wire Stringing	~~Four 8~~One 55-person ~~crews~~crew
Restoration	One 7-person crew
115 kV Subtransmission	
Survey	One 4-person crew
Marshalling Yards	One 4-person crew
Roads & Landing Work	One 5-person crew
Guard Structure Installation	One 6-person crew
Remove Existing Wood Poles	One 6-person crew
Remove Existing TSP / LWS Poles	One 8-person crew

Activity	Crew Size Assumption
Install Foundations for Tubular Steel Poles	One 7-person crew
Steel Pole Haul	One 4-person crew
Steel Pole Assembly	One 8-person crew
Steel Pole Erection	One 8-person crew
Conductor & OHGW/OPGW Installation	Two ~~8~~10-person crews
Guard Structure Removal	One 6-person crew
Restoration	One 7-person crew
Telecommunications	
Tower Foundation	One 4-person crew
Tower Construction	One 4-person crew
Dish Installation	One 4-person crew
Control Building	One 2-person crew
Overhead Telecommunications Installation	One 4-person crew
Substation Telecommunications Equipment Installation	One 2-person crew

Figure 2.1
Substation Site Alternatives

Substation Site Alternatives

Subtransmission Lines

Existing 115-161 kV (SCE, 2009)

Major Transmission Lines

Existing 500 kV (SCE, 2009)

N W E S

0 0.14 Miles

Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.

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Contact Corporate Security (27910) for handling/storage requirements, if any questions.

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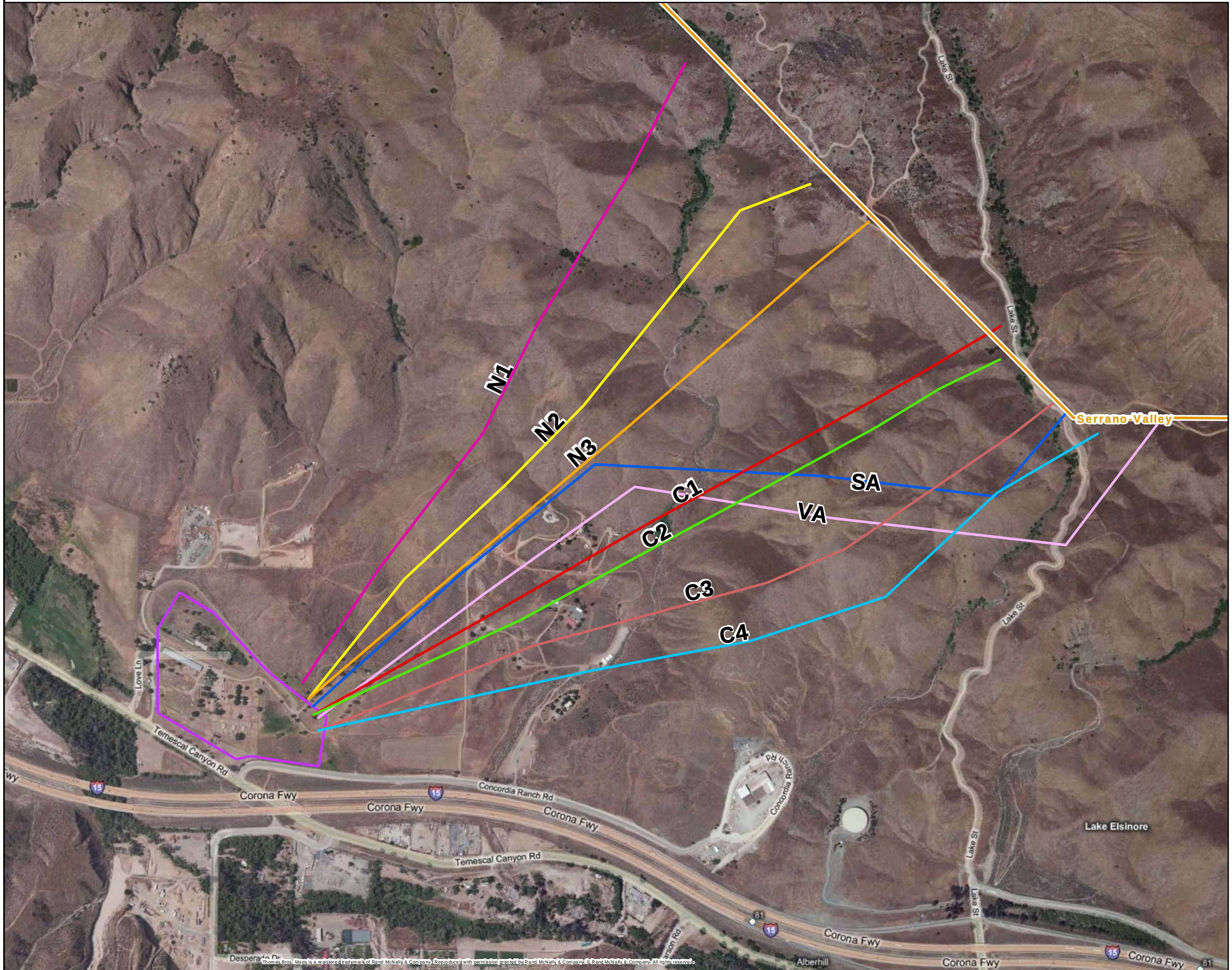

Figure 2.2a
500 kV Transmission Line Segment Alternatives

500kV Transmission Alternatives

- Segment C1
- Segment C2
- Segment C3
- Segment C4
- Segment N1
- Segment N2
- Segment N3
- Segment SA
- Segment VA
- Existing 500 kV (SCE, 2006)
- Proposed Alberhill Substation

N W E S

0 0.2 Miles

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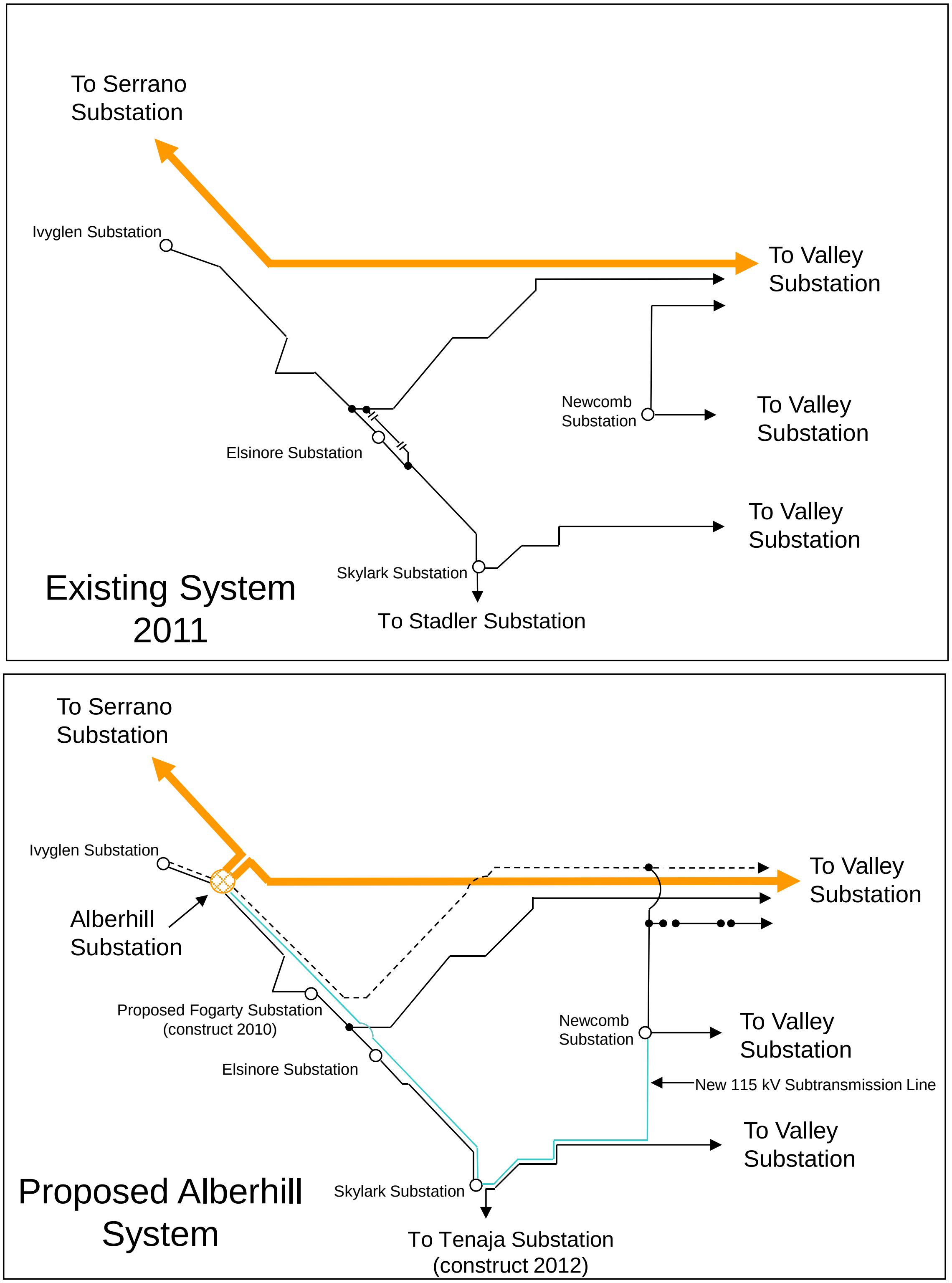

LEGEND

- 500 kV Transmission Line
- Existing 115 kV Subtransmission Line
- Valley-Ivyglen 115 kV Subtransmission Line (construct 2010)
- 115 kV Subtransmission Circuit Installed for Alberhill System Project
- 115 kV Subtransmission Line Separation

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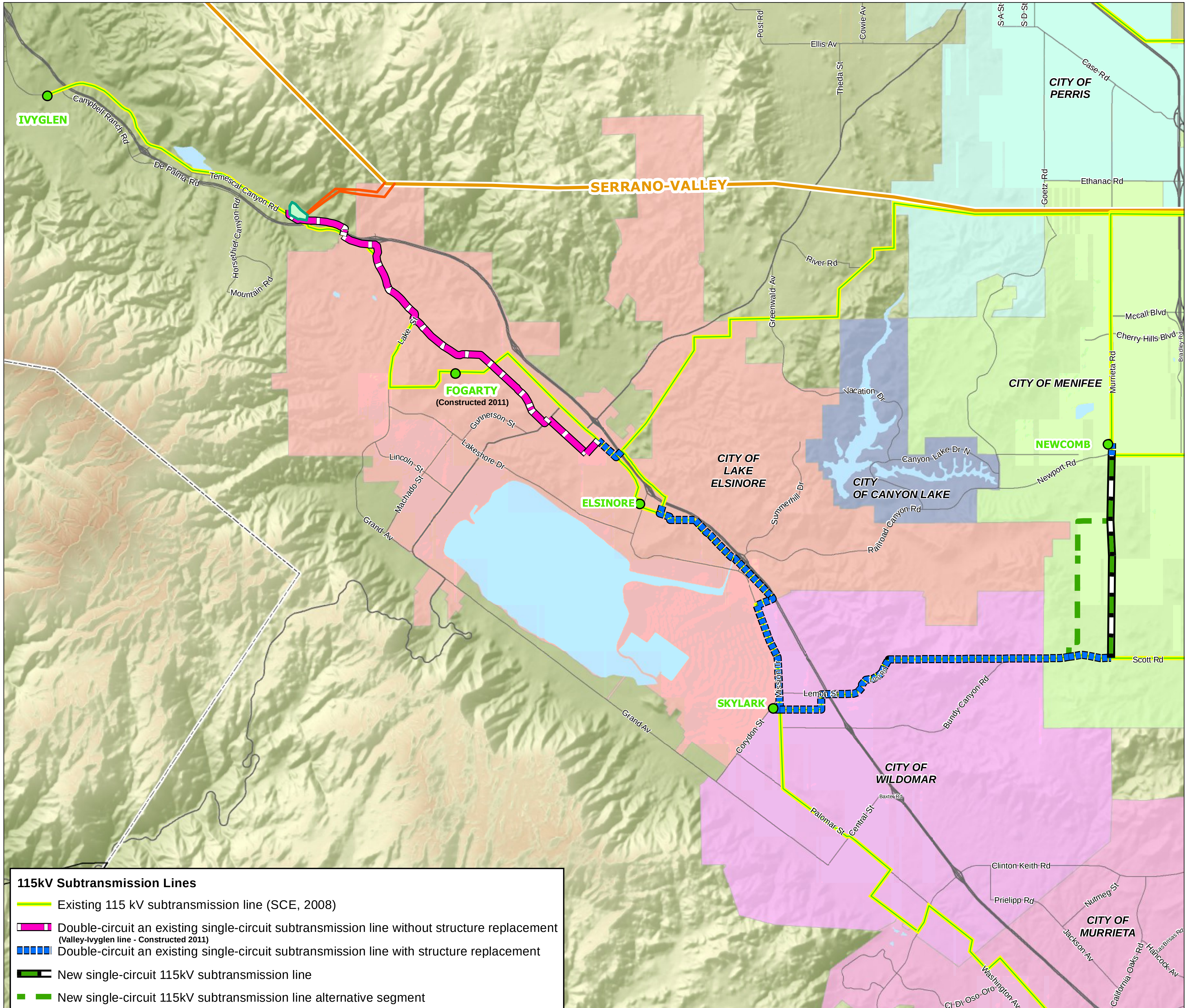
Figure 2.3a
Alberhill System Configuration

Figure 2.4a
Proposed Project and Alternative



Substations

Proposed Alberhill Substation

Substations (SCE, 2008)

500kV Transmission Lines (SCE, 2007)

Existing 500 kV Transmission Lines (SCE, 2007)

Proposed 500kV Alternative Routes

Basemap Data

Transportation Lines (TBM, 2008)

SCE Service Territory Boundary (SCE, 2006)

County Boundaries (TBM, 2008)

Water Features (TBM, 2008)

N W E S

0 0.5 1 2 Miles

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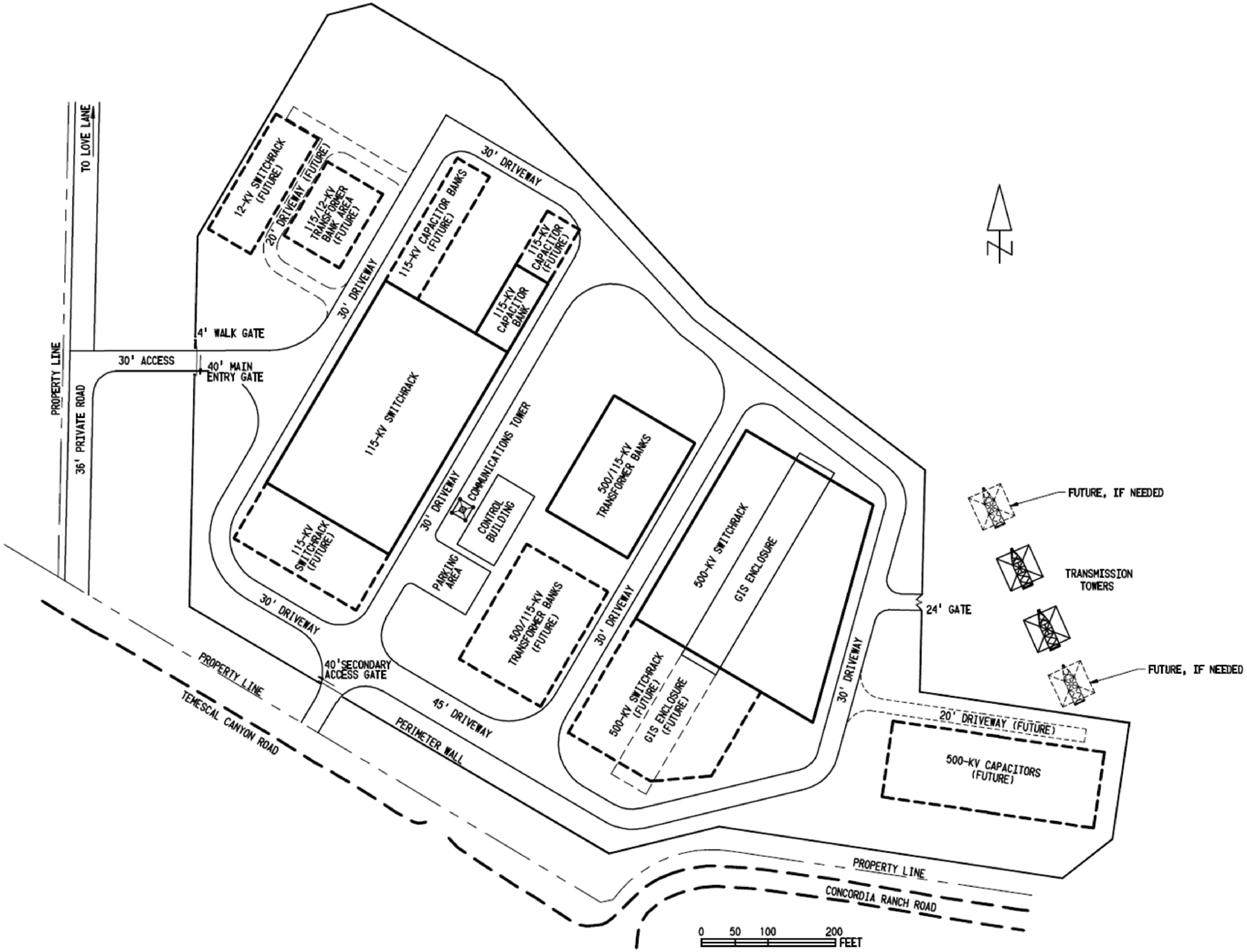
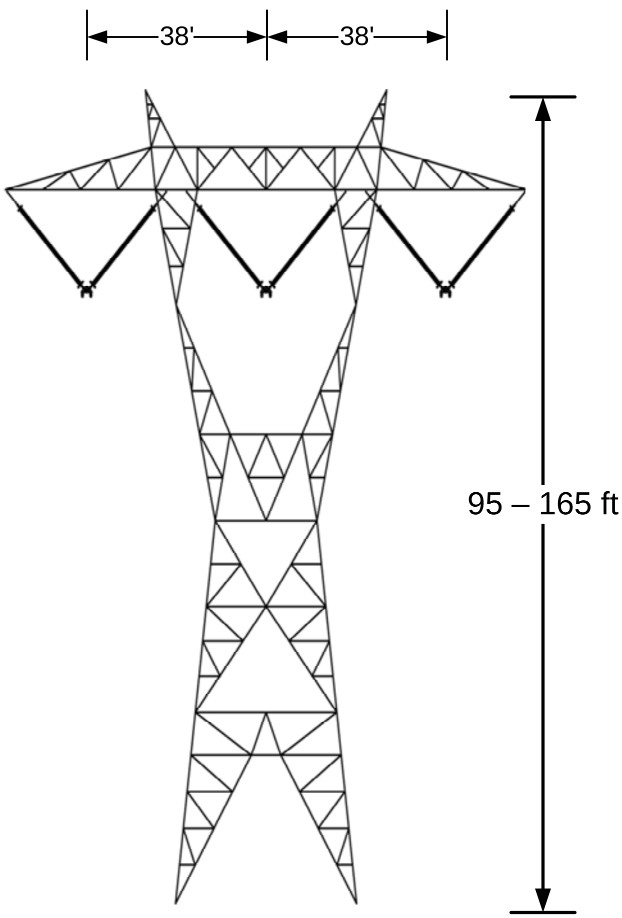
Major Transmission Projects - Alberhill Sub Project

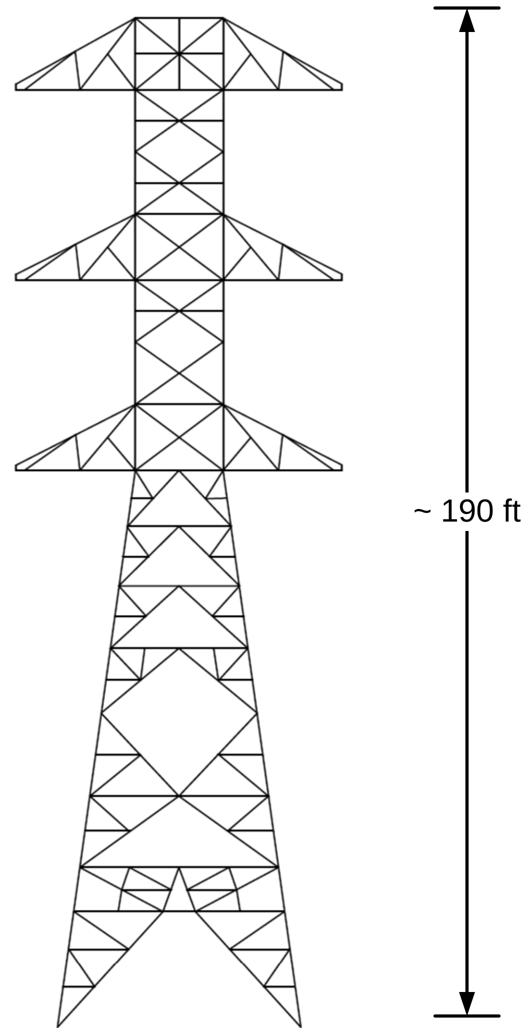
Figure 3.1a
Alberhill Substation Layout



N
W E
S



Typical
Single-circuit 500 kV Tower



Typical
Double-circuit 500 kV Tower

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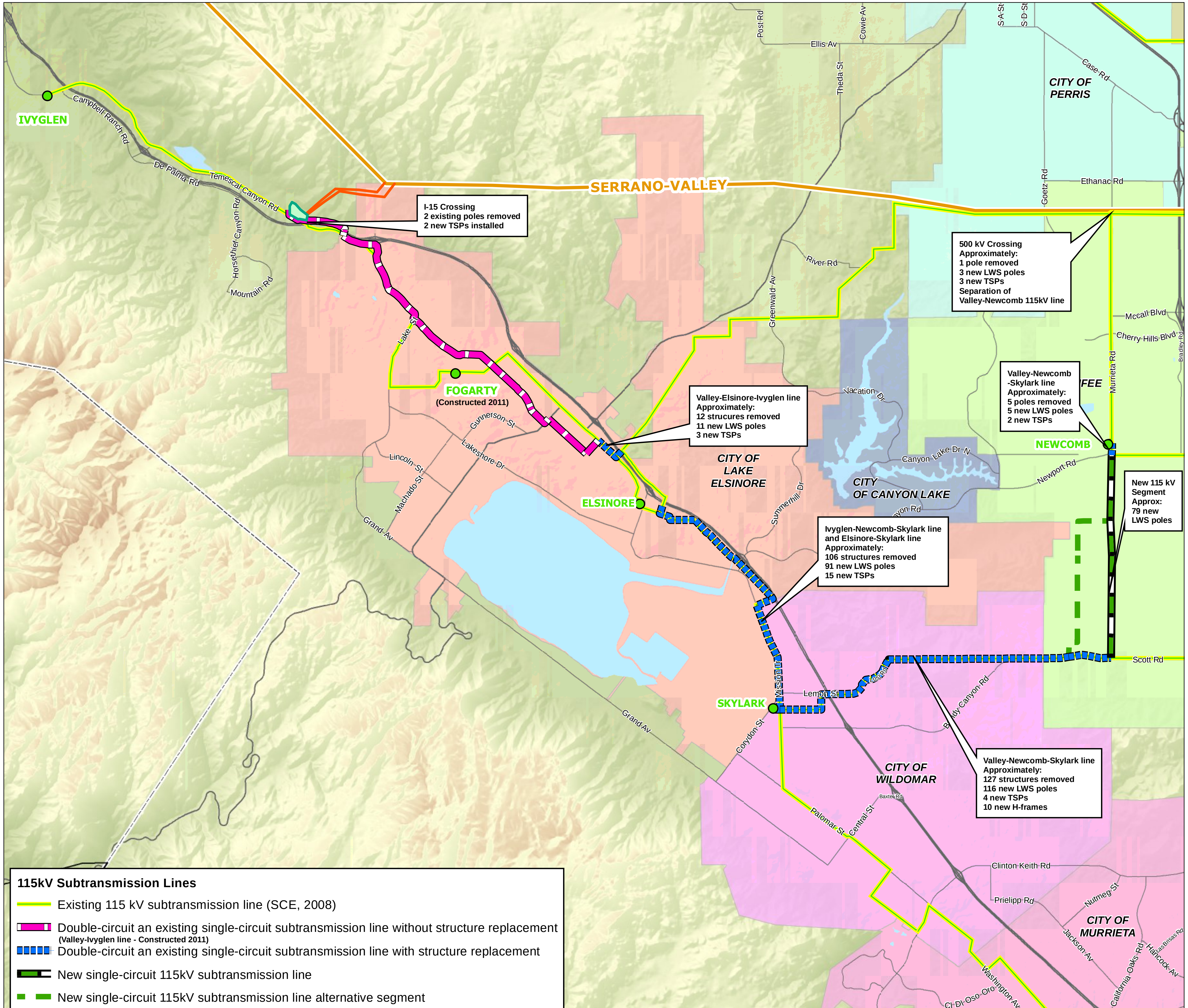
Figure 3.2a

Typical 500 kV Structures

Figure 3.3a
115 kV Subtransmission Line Description



Substations

- Proposed Alberhill Substation
- Substations (SCE, 2008)

500kV Transmission Lines (SCE, 2007)

- Existing 500 kV Transmission Lines (SCE, 2007)
- Proposed 500kV Alternative Routes

Basemap Data

- Transportation Lines (TBM, 2008)
- SCE Service Territory Boundary (SCE, 2006)
- County Boundaries (TBM, 2008)
- Water Features (TBM, 2008)

N W E S

0 0.5 1 2 Miles

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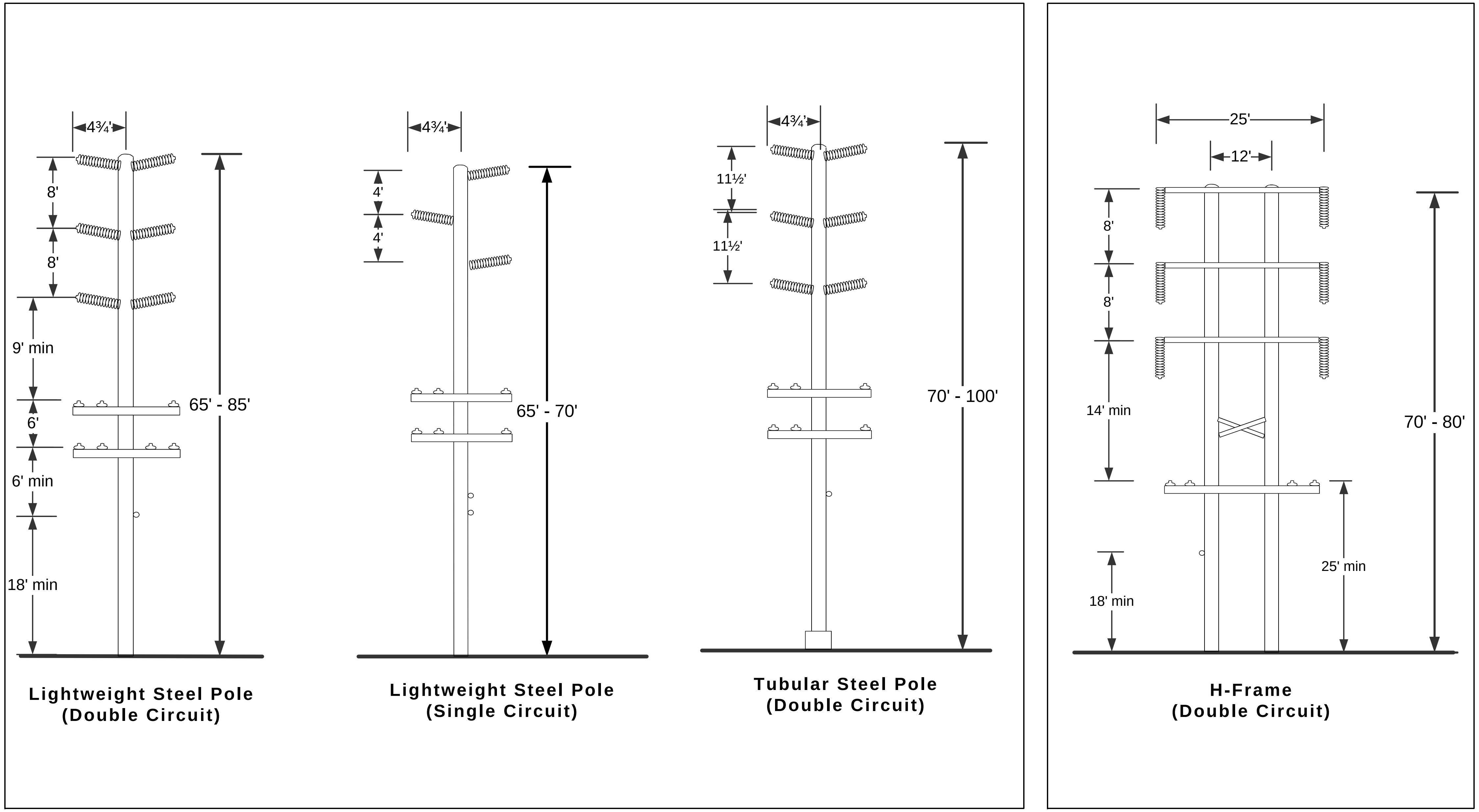
Figure 3.4a

Typical 115 kV Subtransmission Structures



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