

# **Appendix 4**

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## Alternatives Screening Report

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## 1.0 Introduction

### 1.1 Purpose of Report

On December 15, 2014 Southern California Edison (SCE) filed an application (No. A.14-12-013) with the California Public Utilities Commission (CPUC) for a Permit to Construct (PTC) the Valley South 115-kV Subtransmission Project (VSSP or proposed Project). The proposed Project is described in detail in Section B (Project Description) of the EIR. This document describes the alternatives screening analysis that has been conducted for the proposed Project.

Alternatives to the proposed Project were suggested by SCE in the Proponents Environmental Assessment (PEA) and by the general public during the scoping period (May 5, 2015 to June 8, 2015). The alternatives screening analysis has been carried out in order to determine the range of alternatives that would be carried forward in the EIR. This report describes the screening of alternatives and provides a record of the screening criteria and results that were reached regarding alternatives. This report documents: (1) the range of alternatives that have been considered and evaluated; (2) the approach and methods used by the CPUC Energy Division in screening the feasibility of these alternatives according to guidelines established under the California Environmental Quality Act (CEQA); and (3) the results of the alternatives screening (i.e., which alternatives are analyzed in the EIR).

The Alternatives Screening Report provides the basis and rationale for the selection of each alternative that has been carried forward for full evaluation in the EIR. For each alternative that was eliminated from further consideration, this document explains in detail the rationale for elimination. Since full consideration of the No Project Alternative is required by CEQA, and must automatically be considered fully in the EIR, this report does not address the No Project Alternative. Section D (Alternatives) of the EIR includes a description and analysis of the No Project Alternative.

### 1.2 Summary of the Proposed Project

SCE's PEA states that the VSSP is needed to:

- Serve long-term peak electrical demand requirements in the electrical needs area, which includes portions of unincorporated Riverside County and the cities of Menifee, Wildomar, Murrieta, and Temecula, served by the Valley-Sun City, Valley-Auld, and Valley-Auld-Triton 115-kV subtransmission lines;
- Enhance electrical system reliability and operational flexibility;
- Meet the proposed Project needs while minimizing environmental impacts; and
- Design and construct the proposed Project in conformance with SCE's current engineering, design, and construction standards for substation, transmission, subtransmission, and distribution system projects.

The proposed VSSP includes construction of a new 115-kV subtransmission line extending approximately 15.4 miles from SCE's Valley Substation in the City of Menifee to just west of SCE's Triton Substation in the City of Temecula. The proposed Project includes minor modifications to the existing Valley Substation, construction of a new approximately 12-mile 115-kV subtransmission line between the Valley Substation and a tubular steel pole (TSP) located at the intersection of Leon Road and Benton Road (Segment 1), and replacement of approximately 3.4 miles of existing 115-kV conductor from the Leon/Benton Road TSP to an existing TSP (Terminal TSP) located just outside Triton Substation (Segment 2). Additionally, existing distribution and telecommunication lines would be relocated from old poles to the new poles, and telecommunications facilities would be installed to connect the new subtransmission line to SCE's

telecommunication system. The following bullets provide additional details regarding the components of the proposed Project. The proposed Project is described in detail in Section B (Project Description) of the EIR.

- **115-kV Subtransmission Line: Segment 1** exits the Valley Substation and proceeds approximately 1,600 feet southeasterly on a private SCE access road/farm road between Menifee Road and Briggs Road in a new underground duct bank. The new line would then rise to an overhead configuration and continue east to the intersection of Briggs Road/McLaughlin Road, where existing pole heads would be modified to create double-circuit poles. The new line would continue south on Briggs Road to Case Road, which would also require existing pole heads to be reconfigured to a double-circuit configuration. The line continues southeast for approximately 1 mile to the intersection of Leon Road/Grand Avenue, requiring replacement of existing wood poles, and then south approximately 9 miles along Leon Road to Benton Road in a combination of new, franchise, and existing right-of-way (ROW).
- **115-kV Subtransmission Line: Segment 2** begins at the intersection of Benton Road/Leon Road and continues south on Leon Road to the existing Terminal TSP on the south side of Nicolas Road, near the Triton Substation. Segment 2 involves reconductoring approximately 3.4 miles of existing double-circuit 115-kV subtransmission line; existing 653 thousand circular mil (kcmil) aluminum conductor steel-reinforced would be replaced with non-specular 954 kcmil stranded aluminum conductor.
- **Telecommunications infrastructure** would be added to connect the proposed Project to SCE's telecommunication system, and provide Supervisory Control and Data Acquisition, data transmission, and telephone services. Existing SCE and third-party telecommunication cables would be transferred to the new 115-kV subtransmission poles installed in Segments 1 and 2. These cables would be attached with wood cross-arms and/or metallic suspension side clamps. Channel equipment would also be installed in the existing Mechanical and Electrical Equipment Rooms at the Valley and Triton Substations.
- **Distribution infrastructure (12-kV and 33-kV)** would be adjusted/lowered in elevation outside Valley Substation to allow for double-circuiting of the existing poles, and would be transferred from existing poles to the new poles along Leon Road. Approximately 230 existing distribution wood poles would be removed and replaced by the new subtransmission poles as part of these activities.

**Construction Schedule.** SCE anticipates that construction of the proposed VSSP would take approximately 16 months. In order to meet the June 2020 operating date, construction would need to start in March 2018 and would last through July 2019, followed by cleanup activities through November 2019. The operating date may be accelerated if the regulatory processes can be expedited or SCE can further compress its construction schedule, as necessary.

Construction would include installation of approximately 243 wood poles, 12 light-weight steel poles, 30 TSPs, and 18 wood guy stub poles. To accommodate the underground portion of the 115-kV subtransmission line at the Valley Substation, approximately 1,600 feet of underground duct bank and one approximately 100-foot TSP riser pole would be installed. To support construction, up to six staging yards and approximately 40 pulling, tensioning, and splicing set-up locations would be utilized.

## 2.0 Overview of Alternatives Evaluation Process

This report includes a range of alternatives identified through various sources. The range of alternatives considered in the screening analysis encompasses:

- Alternatives identified by SCE as part of the PEA (December 2014);
- Alternatives identified by the CPUC Energy Division as a result of the agency's independent review of the proposed Project; and

- Alternatives identified by the public during the public scoping period.

Alternatives for this Project were restricted to the general Project area, and other locations further north or south of the proposed route were not considered. The alternatives considered options that would use existing alignments in the general Project area because the use of a new alignment would have more environmental impacts than the proposed Project, which is primarily within an existing subtransmission corridor. In total, the alternatives screening process has culminated in the identification and screening of eight potential alternatives.

## 2.1 Alternatives Evaluated

As noted above, this evaluation considers alternatives presented in SCE's PEA, alternatives suggested during the scoping period, and alternatives developed by the EIR preparers. These alternative categories are presented below. Section 3 presents a summary of alternatives that have been selected for full EIR analysis and those alternatives that have been eliminated from further analysis based on CEQA criteria. Section 4 presents detailed descriptions of each alternative and detailed explanations of why each was selected or eliminated.

### 2.1.1 SCE Alternatives

In its PEA, SCE presents both system and route alternatives to the proposed Project. The following alternatives are discussed in this screening report and Figure Ap.4-1 shows the location of the route alternatives:

- **System Alternative 1.** This alternative considers upgrading the primary 115-kV subtransmission lines, which serves the electrical needs area (i.e., Valley-Sun City, Valley-Auld, and Valley-Auld-Triton) and provides additional line capacity.
- **Subtransmission Line Route Alternative Along Menifee Road.** This alternative would be approximately 19 miles in length and would follow Segment 1 of the proposed Project (SCE's Subtransmission Line Route Alternative 1) for the first approximately 8 miles. This alternative would then turn west at Scott Road for approximately 2 miles to Menifee Road; continue south on Menifee Road for approximately 3 miles, following an existing 115-kV subtransmission line to Clinton Keith Road; and then continue east on Clinton Keith Road to a point near SCE's Auld Substation (14 miles total). Segment 2 would begin at an existing TSP east of Auld Substation, and would connect to the existing Valley-Auld-Triton 115-kV subtransmission line paralleling Los Alamos Road to Briggs Road, then south on Briggs Road, east on Benton Road to the end point of the proposed Segment 1. The remainder of Segment 2 would be the same as the proposed Project.
- **Subtransmission Line Route Alternative Along Briggs Road.** This alternative would be approximately 12 miles in length and would follow Segment 1 of the proposed Project (SCE's Subtransmission Line Route Alternative 1) for the first approximately 8 miles. This alternative would then turn west at Scott Road for approximately 1 mile to Briggs Road; continue south on Briggs Road for approximately 3 miles ending near the Auld Substation.
- **Western Segment – Menifee Road and Briggs Road.** Possible alternative routes for Segment 1 along main streets were considered by SCE west of Leon Road, including Briggs Road and Menifee Road, as opposed to the proposed Project that utilizes Leon Road.
- **Eastern Segment – State Route 79 (SR-79).** Possible alternative routes for Segment 1 on or adjacent to SR-79 that could connect to the proposed Project were considered by SCE.
- **Lower Eastern Segment – Borel Road.** SCE considered an eastern segment to the Pauba Substation which would extend in a southeast direction along the western side of Lake Skinner.

### 2.1.2 Alternatives Developed by the EIR Preparers

The alternatives listed below were developed by the EIR preparers as possible means of avoiding or reducing certain impacts of the proposed Project.

- **Partial Underground Alternative.** This alternative was developed as a partial overhead/underground alternative in response to significant and unavoidable visual resources impacts resulting from the proposed Project along Leon Road, where the route would be located in franchise ROW where no existing 115-kV subtransmission lines currently exist passing within close proximity to residential development. The underground segment would extend approximately 3,300 feet (0.6 miles) from approximately Branding Iron Court south to Bonsai Circle.
- **High-Temperature Low-Sag (HTLS) Conductor Alternative.** This system alternative was developed to eliminate construction of a new subtransmission line in response to significant and unavoidable visual resources impacts resulting from the proposed Project along Leon Road. The alternative would consist of replacing the existing SCE standard conductor with an HTLS conductor on the three existing 115 kV subtransmission lines (e.g. Valley-Sun City, Valley-Auld, and Valley-Auld-Triton) in the Project area.

### 2.1.3 Alternatives Suggested During Scoping

Three scoping comment letters included a suggested alternative to the proposed Project. These suggested alternatives are summarized below:

- **C. Green (Winchester)** – Consider a route down Highway 79 to Temecula.
- **K. Douglas (Winchester)** – Place the line in an underground duct, similar to what is being done near the Valley substation, along a portion of Leon Road; existing lines in the project area were previously placed underground.
- **K. Jass (Spencer’s Crossing development)** – Place the line underground; existing lines in the project area were previously placed underground.

## 2.2 Alternatives Screening Methodology

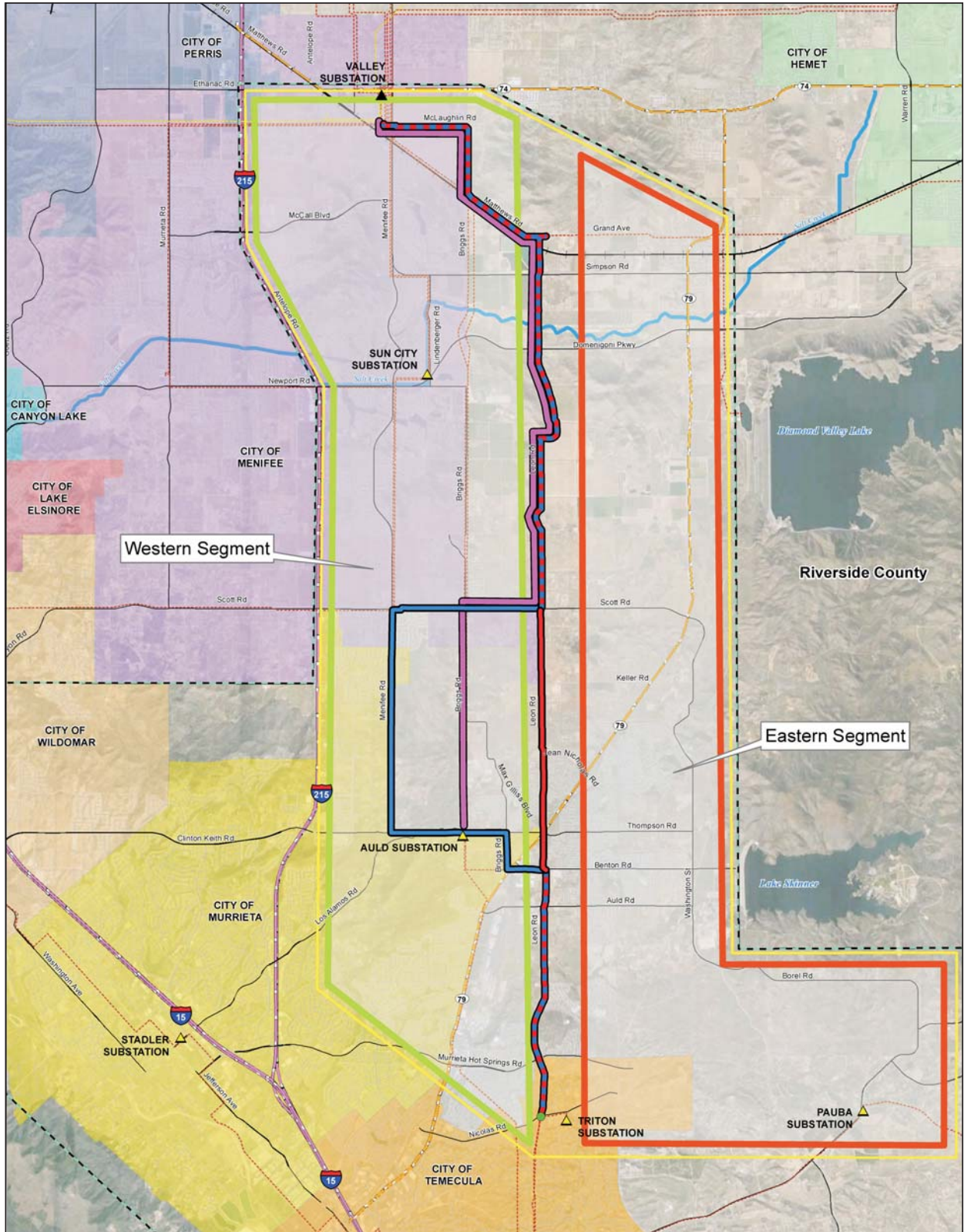
The evaluation of the alternatives identified above was completed using a screening process that consisted of the following three steps:

**Step 1:** Clarify the description of each alternative to allow comparative evaluation.

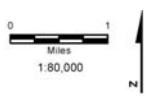
**Step 2:** Evaluate each alternative using CEQA criteria (defined below).

**Step 3:** Based on the results of Step 2, determine the suitability of each alternative for full analysis in the EIR. If the alternative is unsuitable, eliminate it from further consideration.

Infeasible alternatives and alternatives that clearly offer no potential for overall environmental advantage were removed from further analysis. In the final phase of the screening analysis, the advantages and disadvantages of the remaining alternatives were carefully weighed with respect to CEQA’s criteria for consideration of alternatives. These criteria are discussed in the following section.



- |  |   |  |
|--|---|--|
| <p><b>Proposed Project (Alternative 1)</b></p> <ul style="list-style-type: none"> <li><span style="color: red;">—</span> Proposed 115 kV Subtransmission Line</li> <li><span style="color: blue;">—</span> Common to Both</li> </ul> <p><b>Alternative Project (Alternative 2)</b></p> <ul style="list-style-type: none"> <li><span style="color: blue;">—</span> Alternative 115 kV Subtransmission Line</li> </ul> <p><b>Alternative 3</b></p> <ul style="list-style-type: none"> <li><span style="color: purple;">—</span> Alternative 115 kV Subtransmission Line</li> </ul> | <ul style="list-style-type: none"> <li><span style="border: 1px solid yellow; display: inline-block; width: 15px; height: 10px;"></span> Study Area</li> <li><span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px;"></span> Eastern Segment</li> <li><span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px;"></span> Western Segment</li> <li><span style="border: 1px dashed black; display: inline-block; width: 15px; height: 10px;"></span> Electrical Needs Area</li> </ul> | <p><b>Existing Facilities</b></p> <ul style="list-style-type: none"> <li><span style="color: yellow;">▲</span> 115 kV Substation</li> <li><span style="color: black;">▲</span> 500 kV Substation</li> <li><span style="color: green;">●</span> Terminal TSP</li> <li><span style="color: yellow;">---</span> Transmission Line</li> <li><span style="color: red;">---</span> Subtransmission Line</li> </ul> |
|--|---|--|



Source: SCE, 2014.

**Figure Ap.4-1**

**SCE Subtransmission Line Route Alternatives**

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## 2.3 CEQA Requirements for Alternatives

An important aspect of the environmental review process is the identification and assessment of a “reasonable range of alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives” (CEQA Guidelines §15126.6(a)). As such, the selection of alternatives focuses on those alternatives capable of eliminating or reducing any significant environmental effects of the proposed Project, even if these alternatives would impede to some degree the attainment of project objectives, or would be more costly (CEQA Guidelines §15126.6(b)).

The range of alternatives required within an EIR is governed by the “rule of reason”; therefore, the EIR must evaluate only those alternatives necessary to permit a reasoned choice between the alternatives and the proposed Project (CEQA Guidelines §15126.6(f)). An EIR need not consider an alternative whose effects cannot be reasonably ascertained and whose implementation is remote or speculative (CEQA Guidelines §15126.6(f)(3)).

In order to comply with CEQA’s requirements, each alternative that has been suggested or developed for the VSSP has been evaluated in three ways:

- Does the alternative accomplish all or most of the basic project objectives?
- Is the alternative feasible (from economic, environmental, legal, social, technological standpoints)?
- Does the alternative avoid or substantially lessen any significant effects of the proposed Project (including consideration of whether the alternative itself could create significant effects potentially greater than those of the proposed Project).

### 2.3.1 Consistency with Project Objectives

CEQA Guidelines require the consideration of alternatives capable of eliminating or reducing significant environmental effects even though they may “impede to some degree the attainment of project objectives” (§15126.6(b)). Therefore, it is not required that each alternative meet all of SCE’s stated objectives.

#### Project Objectives

The objectives of the proposed Project are defined by SCE in its PEA (Chapter 2), and are described in EIR Section A (Introduction). This EIR does not adopt or endorse the objectives that SCE has defined for its proposed Project. SCE’s stated objectives are as follows:

- Provide safe and reliable electrical service.
- Add capacity to serve long-term forecasted electrical demand requirements in the electrical needs area as soon as possible after receipt of applicable permits;
- Maintain and improve system reliability and provide greater operational flexibility within the electrical needs area;
- Meet the Project needs while minimizing environmental impacts; and
- Design and construct the Project in conformance with SCE’s approved engineering, design, and construction standards for substation, transmission, subtransmission, and distribution system projects.

## Safe and Reliable Electrical Service

Under the Federal Energy Regulatory Commission (FERC); North American Electric Reliability Council (NERC); Western Energy Coordinating Council (WECC); and California Public Utilities Commission (CPUC) rules, guidelines and regulations, electrical transmission, subtransmission, and distribution systems must have sufficient capacity to maintain safe, reliable, and adequate service to customers. The safety and reliability of the systems must be maintained both under normal conditions when all facilities are in service, as well as under abnormal conditions when facilities are out of service due to equipment or line failures, maintenance outages, or outages that cannot be predicted or controlled (such as outages caused by weather, earthquakes, traffic accidents, and other unforeseeable events).

SCE performs annual subtransmission system studies to ensure there is adequate capacity to provide electrical service during peak electrical demand periods under both normal system conditions, when all subtransmission lines are in service, and under specific abnormal system conditions, when any one subtransmission line is out of service. Power flow studies of the subtransmission network evaluate the specific power flows that occur on the lines within the network, and the power flow values that result are dictated by the electrical demand values of the distribution substations served by the subtransmission lines and the characteristics of the power lines themselves (i.e., impedance of the lines). When these studies determine that there is insufficient capacity to provide service and prevent overloads from occurring, a project is identified to address the projected overload and stay within specified operating limits. This process has identified the need for the VSSP.

## Additional Capacity

The Valley South 115-kV subtransmission system is a network of 115-kV lines that provide electrical service to the distribution substations (note: distribution voltages are below 50 kV) located within the electrical needs area, and include Valley Substation (City of Menifee), Sun City Substation (City of Menifee), Auld Substation (City of Murrieta), Triton Substation (City of Temecula), and Pauba Substation (unincorporated Riverside County, south of Lake Skinner). The amount of electrical power that can be delivered to the electrical needs area is limited to the maximum amount of electrical demand that the Valley-Sun City, Valley-Auld, and Valley-Auld-Triton 115-kV subtransmission lines can provide before any individual subtransmission line's maximum operating capacity limit is exceeded. Each of the 115-kV lines providing service to the electrical needs area has an operating limit of 218 mega volt-amperes (MVA) under normal system conditions and 294 MVA under abnormal system conditions. Under abnormal system conditions, the remaining 115-kV source lines are permitted to operate at a higher rating (termed "N-1 capacity limit") for a limited period of time to allow for continuity of electrical service while repairs are performed on the out-of-service line.

Table Ap.4-1 shows the maximum operating limit and criteria projected demand values for the Valley-Auld, Valley-Sun City, and Valley-Auld-Triton 115-kV subtransmission lines with all facilities in service under normal operating conditions (i.e., with all facilities in service). As shown in Table Ap.4-1, under peak electrical demand conditions and normal system configuration, the maximum operating limit of the Valley-Sun City 115-kV subtransmission line is projected to be exceeded beginning in 2018.

**Table Ap.4-1. Electrical Needs Area 115-kV Subtransmission Line Capacity and Peak Demand – Normal Operating Conditions**

115-kV Line	Base Case (MVA)	Year									
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
		Line Capacity (MVA)									
		218	218	218	218	218	218	218	218	218	218
Valley-Auld-Triton (V-A-T)	Line Loading Utilization	186 85%	191 88%	196 90%	198 91%	203 93%	206 94%	211 97%	215 99%	221 <b>101%</b>	225 <b>103%</b>
Valley-Sun City (V-SC)	Line Loading Utilization	202 93%	208 95%	215 99%	217 100%	225 <b>103%</b>	228 <b>105%</b>	234 <b>107%</b>	240 <b>110%</b>	245 <b>112%</b>	249 <b>114%</b>
Valley-Auld (V-A)	Line Loading Utilization	192 88%	198 91%	203 93%	205 94%	210 96%	212 97%	218 100%	221 <b>101%</b>	227 <b>104%</b>	232 <b>106%</b>

Source: SCE, 2014 (PEA Table 2.2).

Table Ap.4-2 shows the maximum operating limit and criteria projected demand values for the Valley-Auld, Valley-Sun City, and Valley-Auld-Triton 115-kV subtransmission lines (only the highest overload condition shown) during specific outages of the Valley-Auld, Valley-Sun City, and Valley-Auld-Triton lines. As shown in Table Ap.4-2, under peak electrical demand conditions and abnormal system conditions (i.e. an outage of one of the other 115-kV subtransmission lines in the system), the Valley-Auld or Valley-Sun City line is projected to exceed its maximum operating limit in 2016.

**Table Ap.4-2. Electrical Needs Area 115-kV Subtransmission Line Capacity and Peak Demand – Abnormal Operating Conditions**

115-kV Line	Line Outage	N-1 (MVA)	Year									
			2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
			Line Capacity (MVA)									
			294	294	294	294	294	294	294	294	294	294
Valley-Auld-Triton (V-A-T)	V-SC	Line Loading Utilization	270 92%	278 95%	287 98%	288 98%	295 100%	307 <b>104%</b>	314 <b>107%</b>	321 <b>109%</b>	329 <b>112%</b>	335 <b>114%</b>
	V-A	Line Loading Utilization	270 92%	278 95%	286 97%	287 98%	296 <b>101%</b>	305 <b>104%</b>	311 <b>106%</b>	319 <b>109%</b>	326 <b>111%</b>	332 <b>113%</b>
Valley-Sun City (V-SC)	V-A	Line Loading Utilization	281 96%	290 99%	299 <b>102%</b>	302 <b>103%</b>	312 <b>106%</b>	318 <b>108%</b>	326 <b>111%</b>	335 <b>114%</b>	342 <b>116%</b>	347 <b>118%</b>
	V-A-T	Line Loading Utilization	271 92%	279 95%	287 98%	292 99%	299 <b>102%</b>	310 <b>105%</b>	319 <b>109%</b>	326 <b>111%</b>	334 <b>114%</b>	340 <b>116%</b>
Valley-Auld (V-A)	V-SC	Line Loading Utilization	282 96%	290 99%	299 <b>102%</b>	301 <b>102%</b>	308 <b>105%</b>	315 <b>107%</b>	324 <b>110%</b>	331 <b>113%</b>	339 <b>115%</b>	345 <b>117%</b>
	V-A-T	Line Loading Utilization	270 92%	278 95%	285 97%	288 98%	293 100%	305 <b>104%</b>	312 <b>106%</b>	318 <b>108%</b>	327 <b>111%</b>	333 <b>113%</b>

Source: SCE, 2014 (PEA Table 2.1).

As noted above, one of the objectives of the proposed Project is to add capacity to serve long-term forecasted electrical demand requirements in the electrical needs area as soon as possible. Due to the assumed regulatory schedule and proposed 16-month construction schedule, the proposed Project is not anticipated to be operational until 2020. A mitigation plan would be required in order to minimize the amount of electrical risk in 2016 to 2020, which is described in more detail below.

During peak electrical demand and abnormal conditions, a mitigation plan has been identified by SCE, which would temporarily implement a system operating procedure that would manually open a circuit

breaker at the terminal of another line within the Valley South 115-kV System. This would be considered a temporary abnormal condition (two 115-kV subtransmission system elements out of service) and would result in a redirection of power flow. This would reduce the amount of power delivered by the 115-kV subtransmission lines that would otherwise be overloaded and all 115-kV subtransmission lines would stay within their operating limits. This mitigation plan would only be utilized as needed as it results in a system that would temporarily have two 115-kV subtransmission lines out of service (one planned and one intentionally). This mitigation plan eliminates the electrical demand risk in 2016; however, it only reduces and does not eliminate the electrical demand risk in 2017, 2018, and 2019, as shown in Table Ap.4-3.

Year	Abnormal N-1 Conditions		Normal Basecase Conditions	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
2016	5 MVA	0 MVA	0 MVA	0 MVA
2017	10 MVA	5 MVA	0 MVA	0 MVA
2018	25 MVA	15 MVA	10 MVA	0 MVA
2019	40 MVA	30 MVA	15 MVA	15 MVA

Source: SCE, 2014 (PEA Table 2.3).

### **Improve Reliability and Greater Operational Flexibility**

Currently the electrical needs of the area are primarily serviced by three 115-kV subtransmission lines: the Valley-Sun City, Valley-Auld, and Valley-Auld-Triton 115-kV subtransmission lines. A new subtransmission line, as proposed, would provide increased system reliability under both planned and unplanned line outages. System operators would have increased operational flexibility allowing additional opportunities to coordinate planned outages and to restore electrical service during unplanned outages. An additional subtransmission line would also provide increased voltage support to the system.

#### **2.3.2 Feasibility**

CEQA Guidelines Section 15364 define feasibility as “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.” The alternatives screening analysis is largely governed by what CEQA terms the “rule of reason,” meaning that the analysis should remain focused, not on every possible eventuality, but rather on the alternatives necessary to permit a reasoned choice. Of the alternatives identified, the EIR is expected to fully analyze those alternatives that are feasible, while still meeting most of the project objectives.

CEQA requires that the Lead Agency (CPUC) consider site suitability, economic viability, availability of infrastructure, general plan consistency, other regulatory limitations, jurisdictional boundaries, and a proponent’s control over alternative sites in determining the range of alternatives to be evaluated in the EIR (CEQA Guidelines §15126.6(f)). For the screening analysis, the feasibility of potential alternatives was assessed taking the following factors into consideration:

- **Legal Feasibility:** Do legal protections on lands preclude or substantially limit the feasibility of permitting the project? Do regulatory restrictions substantially limit the feasibility or success of permitting the project?
- **Regulatory Feasibility:** Is the alternative consistent with regulatory standards for subtransmission line design, operation, and maintenance? Does the alternative have the potential to limit the permitting beyond 2020?

- **Technical Feasibility:** Is the alternative feasible from a technological perspective, considering available technology? Are there any construction, operation, or maintenance constraints that cannot be overcome?
- **Environmental Feasibility:** Would implementation of the alternative cause substantially greater environmental damage than the proposed Project, thereby making the alternative clearly inferior from an environmental standpoint?

This screening analysis does not focus on relative economic factors or costs of the alternatives (as long as they are found to be economically feasible) since the CEQA Guidelines require consideration of alternatives capable of eliminating or reducing significant environmental effects even though they may “impede to some degree the attainment of project objectives or would be more costly” (CEQA Guidelines §15126.6(b)). The CPUC’s proceedings will separately and specifically consider cost issues.

**2.3.3 Potential to Eliminate Significant Environmental Effects**

CEQA Guidelines Section 15126.6(a)) require consideration of alternatives that “would avoid or substantially lessen any of the significant effects of the project”. If an alternative was identified that clearly does not provide potential environmental advantage as compared to the proposed Project, it was eliminated from further consideration. At the screening stage, it is not possible to evaluate all the impacts of the alternatives in comparison to the proposed Project with absolute certainty, nor is it possible to quantify impacts. However, it is possible to identify elements of an alternative that are likely to be the sources of impact and to relate them, to the extent possible, to general conditions in the subject area.

Table Ap.4-4 presents a summary of the potential issues or impacts of the proposed Project. This impact summary was prepared prior to completion of the EIR analysis (i.e., identified at the time of the issuance of the Notice of Preparation for the proposed Project), so it may not be complete in comparison to the detailed analysis presented in Section C (Environmental Analysis) of the EIR. However, the impacts in the table are representative of those resulting from review of SCE’s PEA and were therefore used to determine whether an alternative met this CEQA requirement.

<b>Table Ap.4-4. Summary of Potential Issues or Impacts: Proposed VSSP</b>	
<b>Environmental Issue Area</b>	<b>Potential Issues or Impacts</b>
<b>Aesthetics</b>	<ul style="list-style-type: none"> <li>• Installation of new wood poles where no above ground electrical poles currently exist along Leon Road near Lantana Way would substantially degrade the existing visual character and views from a neighborhood trail and for residences along Leon Road.</li> <li>• Construction-related activities would result in temporary degradation of existing visual character and result in a new source of nighttime lighting.</li> </ul>
<b>Agricultural Resources</b>	<ul style="list-style-type: none"> <li>• Temporary disturbance to Farmland due to site preparation activities associated with construction. Construction traffic along private roads, agricultural roads, and access and spur roads may result in short disruptions to farming and grazing activities.</li> <li>• Permanently converts Farmland to nonagricultural use.</li> <li>• Temporarily impacts three Agricultural Preserve (Williamson Act) parcels.</li> </ul>
<b>Air Quality</b>	<ul style="list-style-type: none"> <li>• Off-road construction equipment, on-road motor vehicles, and earth-moving activities would generate exhaust emissions and fugitive dust containing: carbon monoxide (CO), reactive organic compounds (ROC), nitrogen oxide (NOx), sulfur oxides (SOx), and particulate matter (PM10).</li> <li>• Objectionable odors would be temporarily generated from on- and off-road equipment exhaust.</li> </ul>
<b>Biological Resources</b>	<ul style="list-style-type: none"> <li>• Temporary impacts to special-status species and habitats during construction resulting from the removal of plants and destruction of habitat, as well as indirect impacts in the form of noise, dust, and vibration potentially disrupting breeding activities of birds and amphibians.</li> </ul>

<b>Table Ap.4-4. Summary of Potential Issues or Impacts: Proposed VSSP</b>	
<b>Environmental Issue Area</b>	<b>Potential Issues or Impacts</b>
	<ul style="list-style-type: none"> <li>• Potential to damage wetland/water features either directly through grading or equipment movement, or indirectly through soil discharge and/or altered hydrology during construction.</li> </ul>
<b>Cultural and Paleontological Resources</b>	<ul style="list-style-type: none"> <li>• Potential to impact potentially eligible cultural resources (e.g. the San Jacinto Valley Railroad).</li> <li>• Potential to impact unknown paleontological resources during construction.</li> </ul>
<b>Geology and Soils</b>	<ul style="list-style-type: none"> <li>• Ground surface rupture could occur where the proposed subtransmission line crosses active fault lines, such as the potentially active Murrieta Hot Springs fault that intersects Segment 2.</li> <li>• Potential to result in the disturbance of surface soil, and potential alteration of natural drainages during construction resulting in increased erosion potential, as well as wind and water-driven erosion of soils from grading activities if soil is stockpiled or exposed.</li> </ul>
<b>Greenhouse Gas Emissions</b>	<ul style="list-style-type: none"> <li>• Greenhouse gas emissions may be released from construction and operational equipment.</li> </ul>
<b>Hazards and Hazardous Materials</b>	<ul style="list-style-type: none"> <li>• Improper use or transport of hazardous materials/wastes during construction, operation, or maintenance could present hazards to construction workers or the public.</li> <li>• Leaking or spilling of hydraulic fluids from construction equipment or other vehicles during construction, operation, or maintenance could contaminate soils, surface waters, or groundwater.</li> <li>• The inadvertent uncovering of hazardous materials or contaminated groundwater during excavation activities could cause toxic releases to the environment.</li> </ul>
<b>Hydrology and Water Quality</b>	<ul style="list-style-type: none"> <li>• Construction could result in temporary degradation of water quality resulting from erosion during excavations/drilling for pole removals and pole/foundation installation, trenching and grading for duct bank installation, preparation of material staging yards, work areas, access roads, and other construction-related ground disturbance.</li> <li>• Pollutants from the operation of heavy machinery and equipment, such as gasoline, diesel, and grease could affect surface and groundwater quality.</li> <li>• Dewatering during excavations, if required, could deplete or alter existing groundwater supplies.</li> <li>• Grading and installation of surface improvements could alter the natural flow of stormwater runoff.</li> </ul>
<b>Noise</b>	<ul style="list-style-type: none"> <li>• Construction noise may exceed local noise standards.</li> <li>• Construction noise could create nuisance to nearby residences or other sensitive receptors as noise levels may be substantially higher than ambient noise levels.</li> </ul>
<b>Recreation</b>	<ul style="list-style-type: none"> <li>• Construction may intermittently reduce, disrupt, or temporarily eliminate access to portions of existing trails, Class I Bike Paths, Class II Bike Lanes, and pedestrian sidewalks.</li> </ul>
<b>Transportation and Traffic</b>	<ul style="list-style-type: none"> <li>• Construction could result in temporary impacts to traffic on local highways (SR-74 and SR-79) and Project area roadways.</li> </ul>

## 3.0 Alternative Descriptions and Determinations

### 3.1 Introduction

The alternatives presented in this section include alternate routes to SCE's preferred VSSP route, different system designs, and upgrades to completely different subtransmission lines within the electrical needs area distribution system. After initial screening, if a potential alternative was proven infeasible or if it did not appear to reduce or avoid potentially significant impacts of the proposed Project without creating other significant impacts of its own, then it was eliminated from full evaluation. The alternatives that have been determined to meet all three of CEQA's criteria (see Section 2.3) have been retained for full analysis in the EIR. Each alternative includes a discussion of compliance with each of CEQA's alternatives screening criteria.

## 3.2 SCE Alternatives

This section provides the reasons for elimination or retention for EIR analysis of each of the potential alternatives considered by SCE in its PEA (December 2014). SCE included electrical system alternatives and subtransmission line route alternatives in the PEA. SCE presented two system alternatives. System Alternative 1 (facility upgrades) is discussed below. System Alternative 2 (new subtransmission line) is not addressed below. The PEA stated that a new subtransmission line would be beneficial as proposed to address projected overload conditions and would meet project objectives, but no specific route or system modification was identified for System Alternative 2.

The discussion below also does not include a discussion of the Subtransmission Line Route Alternative 1 discussed in the PEA. This is the proposed Project, which will be evaluated in the EIR and is discussed in detail in Section B (Project Description) of the EIR.

### 3.2.1 System Alternative 1 (facility upgrades)

In its PEA (Section 5.2.2.2.1), SCE presented System Alternative 1. This alternative considers upgrading the primary 115-kV subtransmission lines to provide additional line capacity.

#### Alternative Description

This alternative would provide for upgrading the existing 115-kV subtransmission lines that serve the electrical needs area, including the Valley-Sun City, Valley-Auld, Valley-Auld-Triton 115-kV subtransmission lines, to provide additional line capacity. These three lines are projected to be overloaded under both N-1 and basecase conditions. The lines currently have the maximum approved conductor size (954 kmil SAC) and are operated at full-rated capacity of the conductor (218 MVA Normal and 294 MVA Emergency). SCE upgraded these lines approximately 10 years ago, and thus, has determined that no upgrades were possible as all of these 115-kV subtransmission lines are already constructed to their maximum operating capacity. (SCE, 2015a)

#### Consideration of CEQA Criteria

##### *Project Objectives*

As the existing subtransmission lines have been upgraded and are operating at full-rated capacity, there is no further upgrade that could be made to these lines using standard SCE conductors. This alternative as proposed would not be feasible and would not meet the Project objectives.

##### *Feasibility*

All of the 115-kV subtransmission lines serving the electrical needs area are constructed to their maximum operating capacity, such that further upgrades are not possible. This alternative is, therefore, infeasible. Although further upgrades on these existing lines are not possible with SCE standard conductors, this screening analysis also considers a separate alternative to upgrade the existing subtransmission lines utilizing a High-Temperature Low-Sag conductor.

##### *Environmental Effects*

Upgrading existing subtransmission lines would have the potential to result in fewer visual impacts because of the existing structures along the entire alignment, and the use of existing rights-of-way (ROW)

and access/spur roads could be utilized. However, there is the potential that some impacts could be greater because of the need to upgrade three lines along on more than 25 miles of subtransmission lines as opposed to approximately 15 miles for the proposed Project, and a potentially longer construction period.

### Alternative Conclusion

**ELIMINATED.** This alternative was found to be infeasible and therefore has been eliminated from further consideration in the EIR.

### 3.2.2 Subtransmission Line Route Alternative Along Menifee Road

In its PEA (Section 5.2.2.5.2), SCE presented Subtransmission Line Route Alternative 2. This alternative deviates slightly from the proposed Project route by moving a portion of the route west along Menifee Road.

#### Alternative Description

This alternative would be approximately 19 miles in length and would follow Segment 1 of the proposed Project for the first approximately 8 miles. This alternative would then turn west at Scott Road for approximately 2 miles to Menifee Road; continue south approximately 3 miles following an existing 115-kV subtransmission line along Menifee Road (0.7 mile), existing SCE ROW (1.4 miles through a generally undeveloped area), and a southern portion of Menifee Road south of Baxter Road (1 mile) to Clinton Keith Road; and then continue east on Clinton Keith Road for approximately 1 mile to a point near SCE's Auld Substation (14 miles total). Table Ap.4-5 below provides details on the new poles and pole replacements for the portion of the route that deviates from the proposed Project (goes west from Leon Rd along Scott, Menifee and Clinton Keith Roads, as described above).

SCE has estimated that the alternative would include an average span length of approximately 225 feet for the new poles and pole replacements noted in the table below. Any LWS poles that may be required for this alternative would be within the range of LWS poles identified in the PEA.

<b>Table Ap.4-5. New and Replacement Poles – Route Alternative (Menifee Road)</b>				
<b>Roadway</b>	<b>Structures</b>	<b>Height</b>	<b>New Poles</b>	
Scott Rd. (2 miles)	4 TSPs	95 to 115 feet	New	
	45 wood poles	75 to 85 feet	New	
<b>Roadway</b>	<b>Existing</b>	<b>Existing Height</b>	<b>Replacement Pole</b>	<b>Replacement Pole Height</b>
Menifee Rd. (3 miles)	1 TSP	80 feet	1 TSP	90 to 115 feet
	1 wood pole	85 feet	1 TSP	90 to 115 feet
	49 wood poles	70 to 80 feet	70 wood poles	80 to 90 feet
Clinton Keith Rd. (1 mile)	4 TSPs	70 to 75 feet	4 TSPs	90 to 115 feet
	17 wood poles	70 to 75 feet	24 wood poles	75 to 85 feet

Source: SCE, 2015b.

Segment 2 would begin at an existing TSP east of Auld Substation, and would connect to the existing Valley-Auld-Triton 115-kV subtransmission line paralleling Los Alamos Road for approximately 0.5 mile until it reaches Briggs Road, where it would turn south along Briggs Road for approximately 0.5 mile, span SR-79 in an easterly direction, and then continue east paralleling Benton Road for approximately 0.5 mile to the end point of the proposed Segment 1. The remainder of Segment 2 (approximately 3.5 miles) would be the same as the proposed Project, for a total Segment 2 length of 5 miles.



In Segment 2, the project would require an upgrade from 653.9 ACSR to 954 SAC from the Auld Substation extending east and south on Briggs Road and to Benton Road for approximately 1.6 miles. Pole replacements are not currently anticipated but may be required as part of the final engineering on the project (SCE, 2015b).

### **Consideration of CEQA Criteria**

#### ***Project Objectives***

This alternative would meet the Project objectives.

#### ***Feasibility***

No feasibility issues have been identified.

#### ***Environmental Effects***

This alternative would avoid the area of new subtransmission line along Leon Road near Lantana Way where new wood poles would be placed in an area where no above ground electrical poles currently exist and would result in substantial degradation of existing views, visual character, and views from a neighborhood trail as well as for residences along Leon Road. As such, this alternative would reduce an otherwise significant environmental aesthetic impact. However, this alternative would re-route the 115-kV subtransmission line into an area of culturally important resources, which may result in increased impacts to cultural resources compared to the proposed Project.

### **Alternative Conclusion**

***RETAINED FOR FURTHER ANALYSIS.*** This alternative would meet the Project objectives, is feasible, and would reduce a potentially significant aesthetic impact. Therefore, it has been retained for further consideration in the EIR.

### **3.2.3 Subtransmission Line Route Alternative Along Briggs Road**

In its PEA (Section 5.2.2.6.1), SCE presented Subtransmission Line Route Alternative 3, which extends along Briggs Road.

#### **Alternative Description**

This alternative would be approximately 12 miles in length and would follow Segment 1 of the proposed Project (SCE's Subtransmission Line Route Alternative 1) for the first approximately 8 miles. This alternative would then turn west at Scott Road for approximately 1 mile to Briggs Road; and then continue south on Briggs Road for approximately 3 miles ending near the Auld Substation.

### **Consideration of CEQA Criteria**

#### ***Project Objectives***

This alternative would generally meet the Project objectives; however, it would not improve system reliability. Approximately 3 miles of the existing subtransmission lines that this alternative would follow are currently double-circuited with two existing 115-kV subtransmission lines, where this third 115-kV subtransmission line would need to be added. System reliability would be reduced due to the placement of three 115-kV subtransmission lines on the same structures.

### ***Feasibility***

The addition of a third 115-kV subtransmission line to existing 115-kV wood poles would likely require the existing poles be replaced with TSPs to comply with General Order 95 requirements. This alternative may require additional ROWs to accommodate the larger TSPs and could cause substantial delays in restoring service during emergency restoration or maintenance. As such, the design for this alternative would not conform to SCE's current engineering, design, and construction standards.

### ***Environmental Effects***

As noted above, approximately 3 miles of the existing subtransmission lines that this alternative would follow are currently double-circuited with two existing 115-kV subtransmission lines, where the addition of a third 115-kV subtransmission line would likely require the existing poles be replaced with TSPs to comply with General Order 95 requirements. This alternative may also require additional ROWs to accommodate the larger TSPs. Furthermore, with the addition of a third subtransmission line, shorter span lengths may be required as well as taller structures to maintain electrical clearances. These changes to the existing subtransmission line infrastructure would result in a greater area where environmental impacts could occur, especially if more poles/TSPs are required as a result of shorter span lengths. As such, environmental impacts would be expected to be greater than the proposed Project.

### **Alternative Conclusion**

***ELIMINATED.*** This alternative would not enhance electrical system reliability and operational flexibility, one of the main Project objectives; would not conform to SCE's current engineering, design, and construction standards; and would not avoid or substantially lessen the environmental impacts of the proposed Project. Therefore, this alternative has been eliminated from further consideration in the EIR.

#### **3.2.4 Western Segment – Menifee Road and Briggs Road**

In its PEA (Section 5.2.2.6.2), SCE presented the Western Segment – Menifee Road and Briggs Road alternative.

#### **Alternative Description**

For this alternative, SCE considered possible alternative routes for the northern portion of Segment 1 along main streets, as opposed to the proposed Project that utilizes Leon Road. Briggs Road and Menifee Road were considered based on the rationale that they are identified in the Riverside County General Plan as main streets, are located in close proximity to the Valley Substation, and have existing SCE infrastructure that may be utilized.

The lower portion of the Western Segment (Briggs Road and SR-79) was also considered for the reconductoring portion of the proposed Project (Segment 2), utilizing existing SCE 115-kV subtransmission infrastructure.

#### **Consideration of CEQA Criteria**

##### ***Project Objectives***

This alternative would generally meet the Project objectives; however, it would reduce system reliability. The infrastructure along Menifee Road, including the existing Valley-Sun City and Valley-Newcomb-Skylark 115-kV subtransmission lines, are double-circuited from Valley Substation to Simpson Road. The

infrastructure along Briggs Road, including the Valley-Auld-Triton and Valley-Auld 115-kV subtransmission lines, are double-circuited from Matthews Road to Auld Substation. Placement of a third 115-kV subtransmission line on these existing structures would reduce system reliability.

### ***Feasibility***

As discussed above for the Subtransmission Line Route Alternative Along Briggs Road, the addition of a third 115-kV subtransmission line to existing 115-kV wood poles would likely require the existing poles be replaced with TSPs to comply with General Order 95 requirements. This alternative may also require additional ROWs to accommodate the larger TSPs. There is also the potential for substantial delays in restoring service during emergency restoration or maintenance. As such, the design for this alternative would not conform to SCE's current engineering, design, and construction standards.

### ***Environmental Effects***

As noted above, the addition of a third 115-kV subtransmission line would likely require the existing poles be replaced with TSPs to comply with General Order 95 requirements. This alternative may also require additional ROWs to accommodate the larger TSPs. Furthermore, with the addition of a third subtransmission line, shorter span lengths may be required as well as taller structures to maintain electrical clearances. These changes to the existing subtransmission line infrastructure would result in a greater area where environmental impacts could occur, especially if more poles/TSPs are required as a result of shorter span lengths.

Within the lower portion of the Western Segment (Briggs Road and SR-79), where reconductoring would occur, SCE determined that the majority of the routes in the vicinity would require construction (0.6 mile of new construction) along SR-79 and Nicolas Road, which would require a greater amount of civil work and associated impacts. Additionally, this lower portion of the Western Segment has a greater potential for archaeological impacts and there is greater potential impact to the Western Riverside County Multiple-Species Habitat Conservation Plan (WRCMSHCP) criteria cells. Additionally, visual character and quality is of greater concern in this area because routes would be located in areas where architectural development standards apply.

For these reasons, environmental impacts would be expected to be greater for this alternative than the proposed Project.

### **Alternative Conclusion**

***ELIMINATED.*** This alternative would not enhance electrical system reliability and operational flexibility, one of the main Project objectives; would not conform to SCE's current engineering, design, and construction standards; and would not avoid or substantially lessen the environmental impacts of the proposed Project. Therefore, this alternative has been eliminated from further consideration in the EIR.

### **3.2.5 Eastern Segment – SR-79**

In its PEA (Section 5.2.2.6.2), SCE presented the Eastern Segment – SR-79 alternative.

### **Alternative Description**

For this alternative, SCE considered possible alternative routes for Segment 1 on or adjacent to SR-79 that could connect to the proposed Project. A specific route was not identified.

## Consideration of CEQA Criteria

### *Project Objectives*

Conceptually this alternative would meet the Project objectives.

### *Feasibility*

No feasibility issues have been identified.

### *Environmental Effects*

Due to the topography in the area east of SR-79, a greater amount of civil work and associated environmental impacts are anticipated. The Eastern Segment also has a greater potential for archaeological impacts, and a greater potential to impact WRCMSHCP criteria cells and the coastal California gnatcatcher. Furthermore, there is additional acreage of Prime, Non-prime-Non Renewal, and Prime-Non Renewal Farmland within the Eastern Segment that could be impacted. For these reasons, environmental impacts would be expected to be greater for this alternative than the proposed Project.

## Alternative Conclusion

**ELIMINATED.** Conceptually this alternative would meet the Project objectives; however, it is expected to result in greater environmental impacts than the proposed Project. Therefore, this alternative has been eliminated from further consideration in the EIR.

### **3.2.6 Lower Eastern Segment – Borel Road**

In its PEA (Section 5.2.2.6.2), SCE presented the Lower Eastern Segment – Borel Road alternative.

### **Alternative Description**

For this alternative, SCE considered an eastern segment connecting to the Pauba Substation, which would extend in a southeast direction along the western side of Lake Skinner.

## Consideration of CEQA Criteria

### *Project Objectives*

Conceptually this alternative would meet the Project objectives.

### *Feasibility*

No feasibility issues have been identified.

### *Environmental Effects*

The land designation surrounding Lake Skinner is Open Space – Conservation, which applies to public and private land conserved and managed in accordance with adopted Multiple-Species Habitat Conservation Plans (MSHCPs). As such, a greater potential for biological resources impacts may exist in this area, as well as greater potential to impact coastal California gnatcatcher and Quino Checkerspot butterfly. Additionally, the area around Lake Skinner would also be expected to have greater potential impacts on recreational activities. For these reasons, environmental impacts would be expected to be greater for this alternative than the proposed Project.

## Alternative Conclusion

**ELIMINATED.** Conceptually this alternative would meet the Project objectives; however, it is expected to result in greater environmental impacts than the proposed Project. Therefore, this alternative has been eliminated from further consideration in the EIR.

## 3.3 Alternatives Developed by the EIR Preparers

Below are alternatives developed by the EIR preparers, which were identified to reduce the potentially significant environmental impacts of the proposed Project.

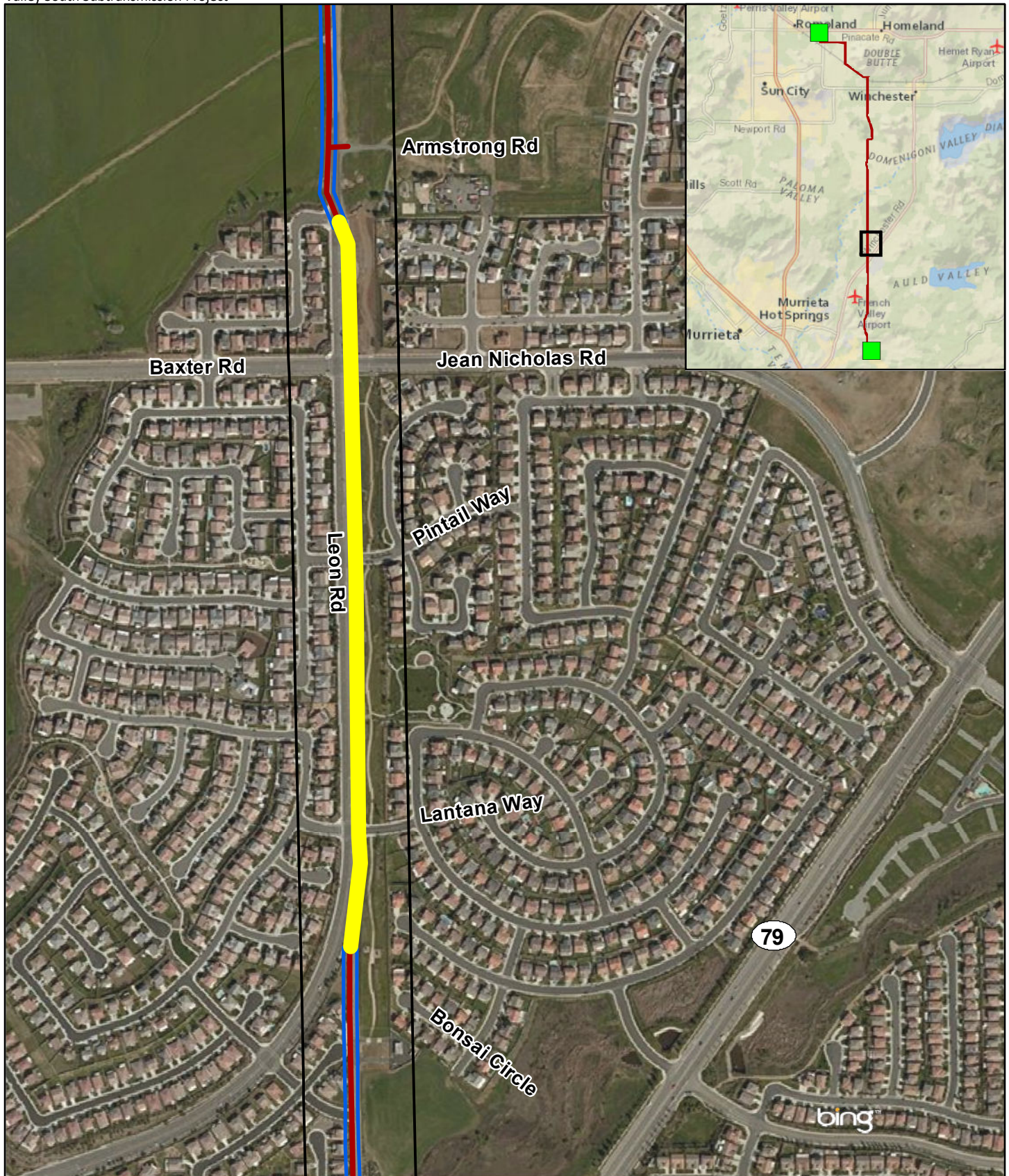
### 3.3.1 Partial Underground Alternative

To reduce potentially significant visual resources impacts, a portion of the proposed 115-kV subtransmission line could be placed underground. See Figure Ap.4-2 for the location of the Partial Underground Alternative along the proposed Project alignment.

#### Alternative Description




Significant and unavoidable visual resources impacts are anticipated along a portion of Leon Road, where the route would be located in franchise ROW where no existing 115-kV subtransmission lines currently exist. The proposed 115-kV subtransmission line would pass in close proximity to residential development and a recreational trail. The underground segment would extend approximately 3,300 feet (0.6 miles) from approximately Branding Iron Court south to Bonsai Circle following the proposed Project route. Road crossings associated with this underground portion (from north to south) include Baxter Road, Pintail Way, and Lantana Way. Once back in SCE's existing ROW, the new 115-kV subtransmission line would transition back to overhead construction as described for the proposed Project. This alternative would require approximately 16 fewer poles, as the subtransmission line would be placed underground rather than on overhead infrastructure.

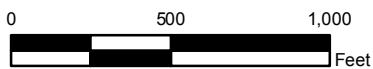
The technology that would be used for the underground portions of this alternative would consist of single-circuit, cross-linked polyethylene, stranded-dielectric cables, with a copper conductor core, installed in a concrete-encased duct bank. The specific components of undergrounding, as well as the construction equipment necessary for underground construction, are described below. This information is based on the proposed underground portion of the proposed Project and from a previously-reviewed CPUC project with an underground component (CPUC, 2007).



**Figure Ap.(-2**

**Partial Underground Alternative**

-  Proposed Underground Portion
-  Proposed 115 kV Subtransmission Line
-  Existing ROW



### Construction of Underground Subtransmission Line

**Riser Pole.** The riser pole is the point at which overhead lines transition to underground lines. For the Partial Underground Alternative, the riser poles would be approximately 100 feet tall. One riser pole (TSP) would be required at each transition point for the single-circuit 115-kV subtransmission line. The underground cables would be routed down from the pole cross arms through rigid conduits. One riser pole would be constructed within the franchise ROW just after the proposed 115-kV subtransmission line crosses from the west side to the east side of Leon Road near Branding Iron Court, and another one would be constructed in SCE’s ROW near Bonsai Circle.

**Trenching/Duct Bank Installation.** To match the current carrying capacity of the proposed Project’s overhead single-circuit 115-kV subtransmission line, the underground system would require the installation of a single cable for each phase of the 115-kV lines. Each underground cable would utilize cross-linked polyethylene, stranded-dielectric insulation, with a 3,000 kcmil copper conductor core. Cables would be installed in a buried concrete-encased duct bank system. Each duct bank would be designed to hold six conduits (two conduits wide by three conduits deep), where three would be filled and three would be spares. The duct banks would be approximately 2 feet wide and 5 feet deep. The total excavation footprint for the duct bank would be approximately 4 feet wide by 5.5 feet deep over the length of the 0.6-mile segment (minus those areas where vaults would be located). Total excavated material for the 0.6-mile segment associated with duct bank construction would amount to approximately 2,700 cubic yards. Conduit installation would proceed at a rate of approximately 200 to 225 feet per day.

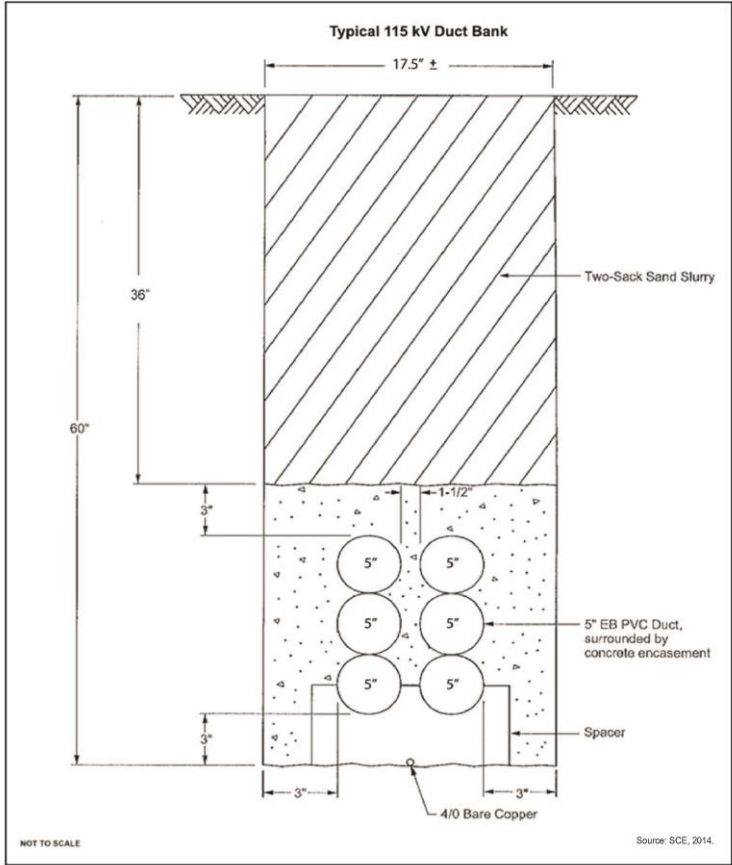


Figure Ap.4-3 Typical Subtransmission Duct Bank

Figure Ap.4-3 provides an illustration of a typical subtransmission duct bank.

During construction, road closures and detours would be required as trenching crosses existing roadways, including Baxter Road, Pintail Way, and Lantana Way. During non-work hours, any open trench would be covered by either heavy-duty plywood (in non-traffic areas) or steel plates (in roadways).

A permanent access road along the underground segment would not be required; however, unencumbered access to the underground structures and the duct bank route must be readily available to SCE crews at all times. Therefore, restrictions would be in place limiting the placement of any structures or permanent or deep-rooted vegetation along the ROW to ensure that future access for regular maintenance and emergency repairs is not impeded. If necessary, SCE would implement methods, such as the installation of turfblock or other

permeable pavers, in certain areas to allow SCE crews to drive along the ROW without causing substantial damage to the grass. Use of the recreational trail and greenbelt area in the vicinity of construction activities may also be restricted to ensure public safety.

**Vault Installation.** Cable splice vaults would be installed at regular intervals below grade (i.e., below the ground surface) along the 0.6-mile underground alignment for this alternative. These vaults would house equipment and splices for the underground circuits. Because there is a practical limit to the length of cable that can be pulled in one section, vaults generally would be located a maximum of every 750 feet to allow splicing of the cable ends. In addition, due to the requirements for cable pulling to the steel riser poles, the first set of splicing vaults must be placed within 150 feet of the riser poles. Figure Ap.2-4 provides an illustration of a typical subtransmission vault.

A total of five vaults are anticipated to be required along the 0.6-mile underground segment. Vaults would pre-fabricated and would be constructed of steel-reinforced concrete, with dimensions of approximately 20 feet long by 10 feet wide by 9.5 feet deep. The vaults would be designed to withstand the maximum credible earthquake in the Project area. During operations, manholes located at finished grade level would provide for access to the vaults so that operations personnel could access the underground cables for maintenance, inspections, and repairs.

The total excavation footprint for a vault would be approximately 26 feet long by 12 feet wide and 12 feet deep. Total excavated material for the five vaults along the 0.6 mile segment would amount to approximately 150 cubic yards. Installation of each vault would take place over an approximately one-week period, and would include the following:

- Excavation and shoring of the vault pit
- Delivery and installation of the vault
- Backfill and compaction followed by restoration of the excavated area.

**Cable Pulling.** After the conduit system and the riser poles have been constructed, the cable would be installed. Starting at one end, cable is pulled from the first vault up through the riser pole. Cable is then pulled through to the next vault, and so on, until the last length of cable has been pulled through the last riser pole. Once installed, the cable is ready to be spliced, terminated, tested, and energized. This would require the installation of one cable per phase, resulting in the use of three of the available conduits in the duct bank leaving three additional spare conduits in the duct bank.

**Cable Splicing and Termination.** After cable installation is completed, the cables would be spliced at all vaults. A splice trailer would be located directly above the vaults' manhole openings for easy access by workers. A mobile power generator would be located directly behind the trailer.

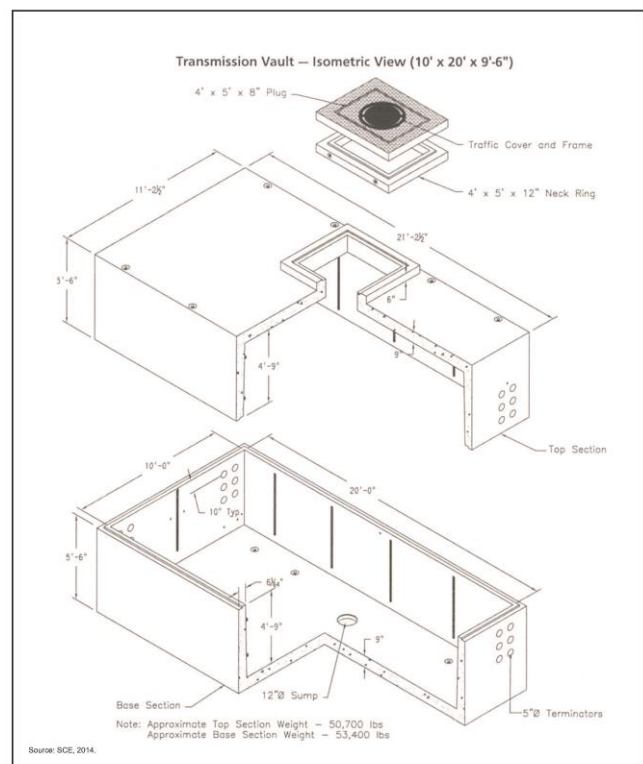


Figure Ap.4-4 Typical Subtransmission Vault



The dryness of the vault must be maintained 24 hours per day to ensure that unfinished splices are not contaminated with water or impurities. Normal splicing hours would be 8 to 10 hours per day with some workers remaining after hours to maintain splicing conditions and guard against vandalism and theft. These conditions are essential to maintaining quality control through completion of splicing. As splicing is completed at a vault, the splicing apparatus setup is moved to the next vault location and the splicing is resumed.

### **Construction Labor and Equipment**

Section B (Project Description) of the EIR includes anticipated construction personnel and equipment for the proposed Project (see Table B-11 Subtransmission Construction Equipment and Workforce Estimates), including the underground component at the Valley Substation. To address this alternative, additional specialized construction equipment for installation of underground facilities would be required beyond the estimates presented in Table B-11 of the EIR. Additional crews for underground construction would be required for activities associated with the underground trench and duct bank, underground vaults, and cable pulling and splicing. Table AP.4-6 presents the estimated workforce and construction equipment that would be needed for the underground portion added under this alternative. These amounts are only for the added underground portion and only address vault and duct installation under this alternative.

<b>Work Activity</b>				<b>Activity Production</b>			
<b>Primary Equipment Description</b>	<b>Estimated Horsepower (HP)</b>	<b>Probable Fuel Type</b>	<b>Primary Equipment Quantity</b>	<b>Estimated Workforce</b>	<b>Estimated Schedule (Days)</b>	<b>Duration of Use (Hrs/Day)</b>	<b>Estimated Production</b>
<b>Vault Installation</b>				<b>6</b>	<b>18</b>		<b>5 Vaults</b>
1-Ton Truck, 4x4	300	Gas	2		9	4	
Backhoe/Front Loader	125	Diesel	1		9	8	
Excavator	250	Diesel	1		9	6	
Dump Truck	350	Diesel	2		9	8	
Water Truck	300	Diesel	1		9	8	
Crane (L)	500	Diesel	1		9	6	
Concrete Mixer Truck	350	Diesel	3		9	2	
Lowboy Truck/Trailer	450	Diesel	1		9	4	
Material Handling Truck	315	Diesel	1		9	8	
Flat Bed Truck/Trailer	400	Diesel	3		9	4	
<b>Duct Bank Installation</b>				<b>6</b>	<b>14</b>		<b>3,300 Feet Trench</b>
1-Ton Truck, 4x4	300	Gas	2		7	4	
Compressor Trailer	60	Diesel	1		7	4	

<b>Table Ap.4-6 Equipment and Workforce Estimates – Underground Construction<sup>1</sup></b>							
<b>Work Activity</b>				<b>Activity Production</b>			
<b>Primary Equipment Description</b>	<b>Estimated Horsepower (HP)</b>	<b>Probable Fuel Type</b>	<b>Primary Equipment Quantity</b>	<b>Estimated Workforce</b>	<b>Estimated Schedule (Days)</b>	<b>Duration of Use (Hrs/Day)</b>	<b>Estimated Production</b>
Backhoe/Front Loader	125	Diesel	1		7	6	
Dump Truck	350	Diesel	2		7	6	
Pipe Truck/Trailer	275	Diesel	1		7	6	
Water Truck	300	Diesel	1		7	8	
Concrete Mixer Truck	350	Diesel	3		7	2	
Lowboy Truck/Trailer	450	Diesel	1		7	4	
<b>Install Underground Cable</b>				<b>8</b>	<b>4</b>		<b>3,500 Feet<sup>2</sup></b>
1-Ton Truck, 4x4	300	Gas	2		2	4	
Manlift/Bucket Truck	250	Diesel	1		2	6	
Boom/Crane Truck	350	Diesel	1		2	6	
Wire Truck/Trailer	350	Diesel	2		2	6	
Pulling Rig	350	Diesel	1		2	6	
Material Handling Truck	315	Diesel	1		2	8	
Static Truck/Tensioner	350	Diesel	1		2	6	
Lowboy Truck/Trailer	450	Diesel	1		20	8	

Source: SCE, 2014 (PEA Table 3.10-A)

Notes:

1. This information is based on data taken from the PEA for the underground portion of the proposed Project. The amounts for duration and size of the trench and cable were doubled to reflect more vaults and a greater length of the undergrounding in this alternative.
2. Similar to the proposed Project, this estimate includes 200 feet of cable to transition from an underground to overhead configuration. (SCE, 2014)

### **Construction Schedule**

The completion of the Partial Underground Alternative between Branding Iron Court to Bonsai Circle, paralleling Leon Road, would add approximately two months to the project schedule, which would result in an approximately 18-month schedule in comparison to the 16-month schedule for the proposed Project.<sup>1</sup> However, some of the work could occur simultaneously reducing the overall length of calendar

<sup>1</sup> Two months was added to the proposed Project schedule. One month was added to account for the vault construction: based on information in the PEA, each vault installation would take one week to complete (one week X 5 vaults = 5 weeks). This alternative would also require trenching for the duct banks; an additional month was added to account for this additional work.

time to complete installation of this alternative, and resulting in a similar construction timeframe as the proposed Project.

### ***Operations and Maintenance***

Regular maintenance would be required for the underground system on an annual basis. This would be accomplished through visual inspections of the cable and splices installed in each vault. Inspections would require approximately two full days of work with a two-person crew in a pick-up truck.

In the event of an underground cable failure, it is likely that the failure would cause collateral damage to other cables and/or splices nearby. Such failures typically result in extensive repair efforts that could include replacing sections of conduit banks. Typically, these repairs require multiple days of construction and complete replacement of cable sections. During restoration work, restrictions similar to those imposed during construction may be necessary including limited use of the recreational trail and greenbelt area in the vicinity of construction/repair activities.

### **Consideration of CEQA Criteria**

#### ***Project Objectives***

This alternative would meet the Project objectives; however, this alternative would be less cost-effective than the proposed Project and would result in greater environmental impacts during construction, as described below.

#### ***Feasibility***

The Partial Underground Alternative would require installing a single-circuit 115-kV subtransmission line underground for approximately 0.6 mile along a residential development. This alternative would be technically feasible. There are no known legal or regulatory feasibility concerns associated with this alternative.

#### ***Environmental Effects***

Under the proposed Project, for the 0.6-mile segment between Branding Iron Court to Bonsai Circle paralleling Leon Road, new wood poles would be installed in an area where no existing subtransmission poles currently exist. The proposed Project would create a substantial visual change from existing conditions. The Partial Underground Alternative would eliminate the aboveground 115-kV subtransmission line through a residential area and would essentially maintain the existing visual character within this portion of the ROW.

Construction of the underground subtransmission line would require substantially more construction activity and ground disturbance due to approximately 0.6 miles of trenching resulting in greater air quality, noise, recreation, and traffic impacts over a longer period of time compared to the proposed Project. The excavation footprint for the duct bank would be 4-feet wide by 5.5-feet deep over the length of the 0.6-mile segment, minus those areas where vaults would be located. The excavation footprint for each vault would be 26-feet long by 12-feet wide by 12-feet deep. Overhead subtransmission line construction would result in construction disturbance primarily at individual structure sites. Due to the greater amount of ground disturbance associated with the construction of duct banks and vaults for underground construction, potentially greater impacts would occur for a number of resource areas. Air quality and traffic impacts during construction would be substantially greater than for the proposed Project due to

both ground disturbance and the need to export excavated materials and trench within streets (to cross Baxter Road, Pintail Way, and Lantana Way). The greater ground disturbance would increase the potential to encounter buried cultural or paleontological resources or contaminated soils along the alignment. Furthermore, these activities would result in greater potential for soil erosion that could degrade water quality and would increase noise impacts to the residences located along the underground portion of the alignment over a longer period of time. As described above, the existing visual character of the area between Branding Iron Court to Bonsai Circle would be maintained with the Partial Underground Alternative; however, the riser poles on either end of the underground segment would be of greater mass than the proposed Project poles, which would reduce the visual quality in these two locations (i.e., west of Branding Iron Court and west of Bonsai Circle) as compared to the proposed Project.

It should also be noted that the maintenance of underground subtransmission lines is more difficult than overhead lines. As discussed above (see “Operations and Maintenance”), maintenance for the underground system would require approximately two full days of work with a two-person crew, whereas maintenance for the overhead system would take the same two-person crew approximately two hours. Additionally, when a problem occurs underground it can be very difficult to identify the exact location of the problem. When the problem is located, the segment (length between two splicing vaults) of cable on which the problem occurred must be removed and replaced. Typically, these repairs require multiple days of construction. This process would cause circuit restoration to take longer than with overhead subtransmission lines. In contrast, if the overhead conductor fails there is a greater possibility that the failed conductor can be simply spliced back together instead of being completely replaced, which substantially reduces the outage time and the construction effort required. Furthermore, underground lines have been found to have a shorter overall lifespan (30-40 years) than overhead lines (60-70 years) due to the degradation of the insulation resulting from the soils surrounding the cables.

### **Alternative Conclusion**

**RETAINED FOR FURTHER ANALYSIS.** This alternative would meet the proposed Project objectives, is feasible, and would reduce a potentially significant aesthetic impact. The new adverse environmental impacts that would be created by this alternative predominately would be short-term construction-related impacts associated with underground trenching and vault installation activities. These impacts are temporary (once construction ends the impacts go away) and may be mitigable. Because this alternative has the overall potential to reduce permanent aesthetic impacts to the residential community, and the adverse environmental impacts associated with this alternative are temporary and generally mitigable, this alternative has been retained for further consideration in the EIR.

### **3.3.2 High-Temperature Low-Sag (HTLS) Conductor Alternative**

To reduce potentially significant visual resources impacts, a higher capacity conductor could be installed on three existing subtransmission lines, thereby eliminating the need for the proposed 115-kV subtransmission line. The HTLS Conductor Alternative is similar to SCE’s System Alternative 1 (facility upgrades), except that this alternative utilizes a conductor that is not an SCE standard conductor type.

### **Alternative Description**

Significant and unavoidable visual resources impacts are anticipated along Leon Road, where the route would be located in franchise ROW where no existing 115-kV subtransmission lines currently exist. The proposed 115-kV subtransmission line would pass in close proximity to residential development and a recreational trail. Construction along a portion of Leon Road would be avoided by installing HTLS

conductor on the three existing 115 kV subtransmission lines that serve the electric load in the area, the Valley-Sun City/Sun City to Auld (12.3 mi), Valley-Auld (10 mi) and Valley-Auld-Triton (15.2 mi) 115 kV subtransmission lines.

This alternative would require conductor installation activities on three existing lines, totaling approximately 37.5 miles to be fitted with the HTLS conductor. The conductor that would be used for this alternative would consist of 795 ACCR “Drake” replacing the existing 954 SAC “Magnolia” conductor on the existing lines, except for the Auld to Triton segment that presently uses 653 ACSR.

According to information provided by SCE, roughly 7% of the wood poles on the existing subtransmission lines are more than 25 years old and would likely need to be replaced. Based on present SCE structure strength criteria it is expected that approximately 35% of the existing poles would not be strong enough to support the HTLS conductor. Replacing approximately 40% of the existing poles would be comparable to building 15 miles of new line under this alternative (SCE, 2015c).

### ***Selected Pole Replacements and Installation of HTLS Conductor***

The majority of the existing subtransmission lines are along roadways. Existing access roads along the three subtransmission lines would be used during construction and traffic control would be required. Some guard structures may need to be installed prior to wire stringing at road crossings and occasional brief road closures may be required. Following wire stringing, any guard structures would be removed.

**Pole Replacements.** Prior to replacing the existing conductor with HTLS conductor, existing wood pole structures that are more than 25 years old and poles without sufficient strength to support the HTLS conductor would be replaced. In most instances it is expected that the new replacement poles would be set adjacent to the existing poles, the existing conductor would be transferred to the new poles and the old poles would be removed. In order to set the new poles and transfer conductor, the existing subtransmission line would need to be de-energized. The majority of the existing lines are in a double circuit configuration meaning that both circuits would need to be taken out of service to accomplish the pole replacements. Double line outages would potentially compromise the ability of the subtransmission system to continue to reliably serve the electric load in the area, therefore, additional temporary construction would be necessary in order to put in place a section of line that would bridge the length of line that needs to be out of service. Although approximately 40% of the existing poles would be replaced, it is expected that the total amount of temporary line necessary to accomplish the pole replacements could be in excess of 50% of the line length.

**Wire Stringing.** Installation of the new conductor would also require taking the subtransmission line out of service and de-energizing the existing conductor on the existing subtransmission lines. Once the line is de-energized construction crews would access each structure to place the existing conductor in stringing travelers. The existing conductor would be removed by using it to pull in the new conductor. Following sagging of the new conductor, construction crews would again access each structure to clip in the new conductor. When this step is completed, the conductor would be re-energized and the subtransmission line would be placed back in service. This construction process would be completed for one subtransmission line, then the same construction process would be used sequentially on each of the other subtransmission lines.

### ***Construction Labor and Equipment***

This alternative requires constructing the equivalent of 15 miles of new subtransmission line and temporary line construction for at least 50% of the lines that are being reconducted. The construction personnel and equipment for installation of the HTLS conductor on 37.5 miles of lines is estimated to be in the range of 150% to 185% of the construction effort for the proposed Project.

### ***Operations and Maintenance***

Operation and maintenance for this alternative would be the same as presently performed by SCE on the existing subtransmission lines.

### **Consideration of CEQA Criteria**

#### ***Project Objectives***

This alternative partially meets Project objectives. This alternative could provide long-term peak electrical demand, but may not provide operational flexibility and would not conform to SCE's current construction standards. SCE has not considered HTLS technology for use on projects at the subtransmission voltage levels (66 kV and 115 kV) (SCE, 2015a).

#### ***Feasibility***

The HTLS Conductor Alternative would require replacing the 115 kV subtransmission conductor on approximately 37.5 miles of existing subtransmission lines. SCE has indicated that the present conductor on the existing subtransmission lines is 954 SAC "Magnolia," with the exception of the segment from Auld to Triton, which is 653 ACSR "Edison Bird." From a power transfer perspective, the use of 795 ACCR "Drake" HTLS conductor would increase the ampacity of the subtransmission lines from 1,090 Amps to 1,902 Amps, an increase of 74%.

Without detailed engineering studies, it is unknown precisely how much of an increase in ampacity would be obtained, but the PEA notes (Tables 1.1 and 1.2) that overloads are expected to be significant and can reach as high as 118% under abnormal conditions and 114% under normal conditions in 2023. In SCE's responses to data requests, they also note that the existing system could go as high as 125 to 130% under abnormal conditions in 5 to 7 years. It would appear that the higher ampacity of the HTLS conductor would resolve the present forecasted overload on the existing conductor, of up to 30% within 5 to 7 years, and provide ample capacity for future load growth.

Prior to replacing the existing conductor with HTLS conductor, existing wood pole structures that are more than 25 years old and poles without sufficient strength to support the HTLS conductor would need to be replaced. In order to accomplish these pole change outs and to install the new HTLS conductor, a significant number of subtransmission line outages would need to be taken and temporary line segments would need to be put in place to maintain electrical service. Although the construction activities are feasible, it is anticipated that this alternative would cause greater construction impacts than the proposed Project.

#### ***Environmental Effects***

Under the proposed Project, for the 0.6-mile segment between Branding Iron Court to Bonsai Circle paralleling Leon Road, new wood poles would be installed in an area where no existing subtransmission poles currently exist. The proposed Project would create a substantial visual change from existing

conditions. The HTLS Conductor Alternative would eliminate the construction of the 115-kV subtransmission line through this residential area, which would essentially maintain the existing visual character along this portion of Leon Road.

The existing subtransmission lines are generally supported on double circuit structures. Replacing the existing conductor with HTLS conductor would result in the same visual appearance as the lines have today. Based on a number of the existing poles requiring replacement because of their age and also to address SCE's new structure strength criteria, this alternative would be roughly equivalent to constructing 15 miles of new subtransmission line. Installation of HTLS conductor on three existing subtransmission lines would require substantially more construction activity, ground disturbance, air quality, and noise impacts in comparison to the proposed Project. Although the installation of HTLS conductor would reduce the potential visual impact associated with the proposed Project, this alternative may not eliminate the need for future improvements in the future or the need for added capacity in the future.

### **Alternative Conclusion**

*ELIMINATED.* This alternative would reduce a potentially significant aesthetic impact, however, it would have environmental impacts and other consequences that would be greater than those associated with the proposed Project. This alternative includes pole replacements that would be roughly equivalent to the amount under the proposed Project. However, the combination of pole replacements and installation of a new conductor on three subtransmission lines would more than double the overall construction effort in comparison to the proposed Project. In addition, the temporary line construction necessary to maintain electric service in the area during line outages would be substantially greater than the line outages associated with the proposed Project. Furthermore, this alternative would address the immediate electrical needs of the area but would not increase operational flexibility over what exists today (SCE, 2015a). In view of the greater construction-related environmental impacts and the lack of operational flexibility, this alternative has not been retained for further consideration in the EIR.

## **3.4 Alternatives Suggested During Scoping**

Two alternatives were suggested during the scoping period (May 5, 2015 to June 8, 2015) by the general public. These two alternatives included consideration of an underground alternative and a route on State Route 79. An underground alternative was identified by the EIR Preparers to address the potential significant visual impact associated with the proposed Project. The discussion of this alternative is in Section 3.3.1 (Partial Underground Alternative). A route along Highway 79 was considered in Section 3.2.5 (Eastern Segment – SR-79) above. There were no other feasible underground alternatives that could be proposed or that would address a potentially significant unavoidable impact of the proposed Project. In addition, there were no other potential SR 79 alternatives that were feasible for this Project. Therefore, the alternatives identified by SCE and the EIR Preparers address the two suggested alternative routes submitted by the public; the comment letters provided no specific information on the route alignments.

## **4.0 Summary of Alternative Screening Results**

Table Ap.4-7 lists the alternatives evaluated in this report and summarizes the results of the alternatives screening analysis. The table presents a summary of the screening analysis as presented in Section 3 of this report and identifies those alternatives that will be carried forward for full analysis in the EIR and the alternatives that were eliminated from further consideration.

<b>Table Ap.4-7. Summary of Alternative Screening Results</b>		
<b>Alternative</b>	<b>Retained or Eliminated</b>	<b>Comments / Fatal Flaws</b>
System Alternative 1	Eliminated	Alternative is infeasible, lines constructed to maximum operating capacity such that upgrades with standard conductors would not be possible.
<b>Subtransmission Line Route Alternative Along Menifee Road</b>	<b>Retained</b>	Meets the Project objectives, is feasible, and would reduce potentially significant aesthetic impact by rerouting the subtransmission line.
Subtransmission Line Route Alternative Along Briggs Road	Eliminated	Alternative would not enhance electrical system reliability and operational flexibility, one of the main Project objectives; would not conform to SCE's current engineering, design, and construction standards; and would not avoid or substantially lessen the environmental impacts of the proposed Project.
Western Segment – Menifee Road and Briggs Roads	Eliminated	Alternative would not enhance electrical system reliability and operational flexibility, one of the main Project objectives; would not conform to SCE's current engineering, design, and construction standards; and would not avoid or substantially lessen the environmental impacts of the proposed Project.
Eastern Segment – SR-79	Eliminated	Conceptually would meet the Project objectives; however, it is expected to result in greater environmental impacts than the proposed Project due to the greater amount of civil work required in hilly terrain, greater potential for agricultural and archaeological impacts, and a greater potential to impact WRCMSHCP criteria cells and the coastal California gnatcatcher.
Lower Eastern Segment – Borel Road	Eliminated	Conceptually would meet the Project objectives; however, it is expected to result in greater biological resources impacts than the proposed Project due to being located near/on lands managed in accordance with an adopted MSHCP, as well as greater potential to impact coastal California gnatcatcher and Quino Checkerspot butterfly.
<b>Partial Underground Alternative</b>	<b>Retained</b>	Meets the Project objectives, is feasible, and would reduce a potentially significant aesthetic impact by placing the new subtransmission line underground along a 0.6-mile segment. The new adverse environmental impacts created by this alternative would be predominately short-term construction-related impacts and may be mitigable.
HTLS Conductor Alternative	Eliminated	Alternative would not enhance electrical system reliability and operational flexibility, one of the main Project objectives, and would have substantially more construction related impacts because of the length of the needed improvements (37.5 miles versus 15.4 miles).

## 5.0 References

CPUC (California Public Utilities Commission). 2007. Draft Environmental Impact Report for Southern California Edison's Application for a Permit to Construct the El Casco System Project. Application No. A.07-02-022. Appendix 1, Alternatives Screening Report. December.

SCE (Southern California Edison). 2014. Proponent's Environmental Assessment: Valley South 115 kV Subtransmission Project (Volumes 1-4) (A.14-12-013). December 15.

\_\_\_\_\_, 2015a. SCE's Data Request Response. Responses to Data Request 5 (Response 5.1 and 5.8). June 10.

\_\_\_\_\_, 2015b. SCE's Data Request Response. Responses to Data Request 4. A.14-12-013, Questions 01 a-d. May 12.

\_\_\_\_\_, 2015c. SCE's Data Request Response. Responses to Data Request 7. A.14-12-013; Questions 1, 2, and 3. August 28.