2 Description of Alternatives

This summary provides a physical description of the proposed Project and alternatives. A more detailed description is provided in Chapter 2 (Description of Alternatives, including the Proposed Project) of the EIR/EIS. A regional location map depicting the proposed Project (Alternative 2) and other alternatives (Alternatives 3 through 7) is provided in Figure 1 located at the end of this document. For detailed maps of Alternatives 3 through 7, please refer to Figure 2 (Alternative 3), Figures 3 through 6 (Alternative 4A through 4D), Figure 7 (Alternative 5), Figure 8 (Alternative 6), and Figures 9 and 10 (Alternative 7) also located at the end of this document.

This section also summarizes each alternative that was eliminated from further consideration. Alternatives to the proposed Project were suggested by SCE in its Proponent's Environmental Assessment (PEA), which was submitted as part of SCE's application to the CPUC. Additional alternatives were developed by the CPUC and Forest Service in conjunction with the team preparing the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Project/Action. Alternatives were also suggested by public agencies and the public during the scoping period for the EIR/EIS (August-October 2007).

In total, 29 potential alternatives were identified, including alternative route alignments or substation sites, alternate system voltages and system configurations, partial undergrounding of the route, and maximum use of helicopters for construction. The alternatives were primarily evaluated according to: (1) whether they would meet most of the basic project objectives or purpose and need; (2) whether they would be feasible considering legal, regulatory and technical constraints; and (3) whether they have the potential to substantially lessen any of the significant effects of the proposed Project.

2.1 Alternative 1: No Project/Action Alternative

Selection of the No Project/Action Alternative would mean that the Tehachapi Renewable Transmission Project, as proposed, would not be implemented. As such, none of the associated Project activities would occur and the environmental impacts associated specifically with the proposed Project would not occur. For example, SCE's existing Antelope-Vincent 220-kV line and the existing Antelope-Mesa 220-kV line would remain in place, as removal of these lines is specifically linked to construction of the proposed Project. As such, the environmental impacts associated with the Project, as described in Chapter 3 (Environmental Analysis) of the EIR/EIS, would not occur. The objectives for the Project would remain unfulfilled under the No Project/Action Alternative. For example, the electrical facilities necessary to reliably interconnect and integrate new wind generation in the Tehachapi Wind Resource Area (TWRA)

that is currently being planned would not be constructed and therefore SCE and other California utilities may not be able to comply with California's Renewable Portfolio Standard on schedule (i.e., provision of 20 percent renewable energy by year 2010 per California Senate Bill 107).

In the absence of the Project, SCE still would continue to operate and maintain the existing transmission structures, access, and spur roads for operations and maintenance purposes under a variety of agreements (landowners) and permits. For example, within the ANF, approximately 80 miles of roads are currently being used to access the existing structures along Segments 6 and 11, which the use and maintenance of is authorized through existing roads permits issued by the Forest Service. SCE would also be required to interconnect and integrate power generation facilities into its electric system, as required under Sections 210 and 212 of the Federal Power Act (16 U.S.C. § 824 [i] and [k]) and Sections 24 and 25 of the CAISO's Tariff. At the time this analysis was conducted, two wind generation projects had submitted applications to Kern County (the PdV Wind Energy Project and the Alta Wind Development) and others are in the advanced planning stage according to the CAISO Interconnection Queue and are expected to submit applications in the future. Because of their location within SCE's service territory, these upcoming wind generation projects will need to interconnect to the SCE transmission system or find alternative means for transmitting their power to customers. These wind generation projects cannot be interconnected to the SCE transmission system without new transmission infrastructure north of Antelope Substation to the TWRA and an increase in transmission capacity south of Antelope Substation. Transmission of power from the Antelope Valley area is currently constrained by the existing Antelope-Mesa 220-kV transmission line, which would be overloaded by the addition of new wind generation resulting in system-wide power flow and reliability problems due to overloading of the existing system, such as curtailed generation, thermal overload, and blackouts. Therefore, without new transmission infrastructure (north of Antelope Substation) and upgrades to the existing system (south of Antelope Substation), SCE would not be able to interconnect new renewable generation facilities and therefore would not meet Renewables Portfolio Standard requirements and the power needs of southern California.

Under the No Project/Action Alternative, the following events or actions (scenarios) related to the electricity generation and transmission are reasonably expected to occur in the foreseeable future:

- As currently conceived, some wind projects in the Antelope Valley and Tehachapi areas would be postponed or cancelled, as SCE's capacity to transmit energy from the TWRA would be limited to the 700 MW already approved for the Antelope Transmission Project, or these proposed wind projects would have to find alternate means to connect to SCE's transmission system without compromising system reliability.[5]
- The requirement of the Renewables Portfolio Standard (RPS), which requires retail sellers of electricity such as SCE and PG&E to increase their sale of electricity produced by renewable energy sources to 20 percent by 2010 (updated from 2017 to 2010 per the Energy Action Plan), may not be achieved as access to renewable energy from the Antelope Valley-Tehachapi region would either not be provided or would be delayed, and other sources of renewable energy would have to be developed.
- Other renewable energy resources would need to be identified and transmission studies would need to be conducted to connect these newly identified sources to the transmission grid, which would likely further limit achievement of the RPS goal by the 2010 deadline.
- The conceptual plan recommended by the Tehachapi Collaborative Study Group, as discussed in Section 1.2.1 of the EIR/EIS, would not be fully implemented. This plan is intended to collect power from Tehachapi area wind projects, interconnect facilities into the State's backbone grid, and upgrade the network to reliably deliver that power to load centers. The conceptual plan, which would allow for the transmission of over

[5] The Antelope Transmission Project, which provides 700 MW of transmission capacity, is comprised of three segments: Segment 1 or the Antelope-Pardee 500-kV Transmission Project (SCH No. 2005061161) and the Antelope Transmission Project, Segments 2 & 3 (SCH No. 2006041160) were previously analyzed and approved by the CPUC and Forest Service (Segment 1 only).

4,000 MW of wind power, would be not be fully achieved because as SCE's capacity to transmit energy from the TWRA would be limited to the 700 MW already approved for the Antelope Transmission Project.

- Transmission providers such as SCE, PG&E, or LADWP would need to accommodate the new wind generation in the TWRA by upgrading existing transmission infrastructure or building new transmission facilities along a different alignment and/or developers of wind generation facilities would need to build their own transmission facilities to connect to the transmission grid.
- The reliability needs of the CAISO-controlled grid due to projected load growth in the Antelope Valley would not be met and would have to be accommodated by other transmission upgrades to bring power into the area.
- The reliability issues of the existing Lugo-Mira Loma transmission lines within the Cajon Pass related to voltage collapse as a result of uncontrollable loss of load (in the event of wildfires or other natural disasters in the area) would persist.

As indicated above, under the No Project/Action Alternative, some currently unknown plan would need to be developed to provide the transmission upgrades necessary to interconnect renewable generation projects in the Tehachapi area and to also address the existing transmission problems south of Lugo Substation. Similarly, other yet unspecified transmission upgrades would presumably be proposed in the future to provide the needed capacity and reliability to serve growing electrical load in the Antelope Valley. To interconnect wind projects in the Tehachapi area, it is possible that other electrical utilities with transmission facilities in the area, such as LADWP, might purchase some of the power from Tehachapi wind developers and integrate it into their system. Another possibility is for the development of a private transmission line, similar to the existing Sagebrush line, which could connect wind projects to the electrical grid. However, at this time, the Lead Agencies do not know what alternate transmission might be proposed in the future to accomplish the Project objectives if the Project is not implemented.

2.2 Alternative 2: SCE's Proposed Project

SCE's proposed Project would involve new and upgraded transmission infrastructure along approximately 173 miles of new and existing rights-of-way (ROW) from the TWRA in southern Kern County south through Los Angeles County and the Angeles National Forest (ANF) and east to the existing Mira Loma Substation in Ontario, San Bernardino County, California. The major components of SCE's proposed Project have been separated into eight distinct segments (refer to Figure 1). Under separate application to the CPUC, SCE previously requested approval for Segments 1, 2, and 3 of the Antelope Transmission Project, which would also enhance transmission and related infrastructure serving the TWRA. Consequently, the description of major components for the TRTP begins with Segment 4. Segments 4 through 8, as well as Segments 10 and 11 of the TRTP are transmission facilities, while Segment 9 addresses the addition and upgrade of substation facilities. The segments begin numerically (not geographically) with Segment 4 (S4) and continue through Segment 11 (S11); however the discussion throughout this document has been presented geographically beginning with the northernmost point located in the TWRA (Segment 10) and ending at the southern/easternmost point in Ontario (Segment 8). Mileages along each segment are denoted first by the segment number (Sx, where x is between 4 and 11), followed by MP (for milepost) and then the mileage. A summary of the proposed TRTP's components, by segment, are provided in Table 2, below. In addition, Figures 11 through 15 depict the typical lattice steel towers (LSTs) and tubular steel poles (TSPs) that would be used along the route for the Project.

Table 2. Summary of SCE's Proposed Project Components
Overall Project Construction
• Proposed construction duration of 52 months (estimated to begin in July 2009 and end in November 2013) • Transmission facility construction generally scheduled for Monday through Friday, 7:00 a.m. to 5:00 p.m.; however, if extended hours are necessary, such as 24-hour construction, a variance would be acquired • Substation construction generally scheduled for Monday through Friday, 7:00 a.m. to 5:00 p.m.; however, if extended hours are necessary a variance would be acquired • Workforce ranging in size from 10 to 300 persons, with daily average workforce of approximately 75 persons • Disturbance of approximately 1,538 acres with a ±15% range of 1,307-1,769 acres, resulting in permanent land disturbance of approximately 277 acres with a ±15% range of 235-318 acres
Segment 10: New Whirlwind – Windhub 500-kV T/L
• Initiates at the approved Windhub Substation (not part of Project) and ends at the new Whirlwind Substation • Construct new approximately 16.8-mile single-circuit Whirlwind – Windhub 500-kV T/L • All proposed permanent infrastructure to be located within new 330-foot-wide ROW (approx. 16.8 miles) • Erect approximately 96 new single-circuit 500-kV LSTs (94-172 feet tall) • Would require approximately 16 new wire setup sites for pulling/tensioner/splicing of conductor wire
Segment 4: Whirlwind 500/220 kV T/L Elements

• Initiates at the proposed Cottonwind Substation (not part of Project) and ends at the existing Antelope Substation
• Construct two new parallel 4-mile single-circuit 220-kV T/Ls (Cottonwind – Whirlwind 220-kV No. 1 & No. 2)
• Construct new approximately 16-mile single-circuit Antelope – Whirlwind 500-kV T/L
• All proposed permanent infrastructure to be located within new 200-foot-wide ROW (approx. 19.6miles total)
• Erect approximately 165 new transmission structures, including:
  ▪ 88 single-circuit 220-kV LSTs (90-120 feet tall)
  ▪ 77 single-circuit 500-kV LSTs (113-188 feet tall)
• Would require approximately 28 wire setup sites for pulling/tensioner/splicing of conductor wire

Segment 5: Antelope – Vincent No. 2 500-kV T/L
• Initiates at the existing Antelope Substation and ends at the existing Vincent Substation • Remove the existing Antelope – Vincent 220-kV T/L and the existing Antelope – Mesa 220-kV T/L • Construct new approximately 17.8-mile single-circuit Antelope – Vincent No. 2 500-kV T/L • All proposed permanent infrastructure to be located within in existing ROW (17.8 miles) • Erect approximately 67 new single-circuit 500-kV LSTs (113-188 feet tall) • Would require approximately 37 wire setup sites for pulling/tensioner/splicing of conductor wire
Segment 11: New Mesa – Vincent (via Gould) 500/220-kV T/L

• Initiates at the existing Vincent Substation and ends at the existing Mesa Substation
• Remove approximately 4 miles of the existing Pardee – Vincent No. 1 220-kV T/L
• Remove approximately 15 miles of the existing Eagle Rock – Pardee 220-kV T/L
• Construct new approximately 18.7-mile 500-kV single-circuit T/L between Vincent and Gould Substations (initially energized at 220 kV)
• String approximately 17.5 miles (approximately 3.3 miles are located on National Forest System [NFS] lands) of new 220-kV conductor on the vacant side of the existing double-circuit structures of the Eagle Rock-Mesa 220-kV T/L (9 existing structures are located on NFS lands)
• Most of the proposed infrastructure would be located within existing ROW; however, the ROW would need to be expanded by up to approximately 250 feet to the west along the approximately 3 miles north of Gould Substation to maintain safe clearances from the edge of the ROW due to wire swing of the new 500-kV T/L under wind loading conditions
• Erect approximately 76 total new transmission structures (59 LSTs on NFS lands), including:
  ▪ 2 single-circuit 220-kV poles (120 feet tall)
  ▪ 7 single-circuit 220-kV LSTs (120-160 feet tall)
  ▪ 67 single-circuit 500-kV LSTs (100-198 feet tall)
• Construction of 16 structures by helicopter (all on NFS lands), supported by 7 helicopter staging areas (4 on NFS lands)
• Would require approximately 36 wire setup sites for pulling/tensioner/splicing of conductor wire (11 on NFS lands)
• Approximately 40 miles (±15% range of 34 to 46 miles) of roads, of which approximately 33 miles (±15% range of 28 to 38 miles) would be on NFS lands, would be created (new), reconstructed, or require some amount of maintenance
• The majority of along this segment would be located on NFS lands including: S11 MP 1.5-3.5, 3.75-18.5, 19.25-20.3, 20.8-21.3, 21.8-22.6, 23.05-24.15, and 24.35-24.55 (in-holdings or other non-NFS lands are located between the mileposts listed)

Table 2. Summary of SCE's Proposed Project Components

Segment 6: Section of New Replacement Rio Hondo – Vincent No. 2 500-kV T/L (initially energized at 220 kV) and Section of New Mira Loma – Vincent 500-kV T/L

- Initiates at the existing Vincent Substation and ends at the southern boundary of the ANF
- Remove approximately 5 miles of the existing Rio Hondo – Vincent No. 2 220-kV T/L between Vincent Substation and the "crossover" span (S6 MP 5.0)
- Construct new approximately 5-mile single-circuit Mira Loma – Vincent 500-kV T/L from the Vincent Substation to the "crossover" span (S6 MP 5.0)
- Remove approximately 26.9 miles of the existing Antelope – Mesa 220 kV T/L from Vincent Substation to the southern boundary of the ANF
- Construct new approximately 27-mile single-circuit Rio Hondo – Vincent No. 2 500-kV T/L (initially energized at 220 kV)
- Eliminate the existing crossing of the Rio Hondo – Vincent No. 2 220-kV T/L over the Antelope – Mesa 220-kV T/L
- All proposed permanent infrastructure to be located within existing ROW (approx. 32 miles)
- Erect approximately 138 new transmission structures (105 on NFS lands – 99 LSTs and 6 TSPs), including:
  - 2 single-circuit 220-kV LSTs (90-120 feet tall)
  - 26 single-circuit 500-kV tubular steel poles (TSPs) (75-200 feet tall)
  - 106 single-circuit 500-kV LSTs (85-193 feet tall)
  - 4 three-pole dead-end 500-kV structures (75-80 feet tall)
- Construction of 17 structures by helicopter (all on NFS lands), supported by 5 helicopter staging areas (4 on NFS lands)
- Would require approximately 19 wire setup sites for pulling/tensioner/splicing of conductor wire (16 on NFS lands – In addition, 5 alternate sites have been identified on NFS lands)
- Approximately 61 miles (±15% range of 52 to 70 miles) of roads, of which approximately 58 miles (±15% range of 49 to 67 miles) would be on NFS lands, would be created (new), reconstructed, or require some amount of maintenance
- The majority of this segment would be located on NFS lands including: S6 MP 1.45-1.7, 2.75-5.3, 5.65-6.7, 6.7-6.95, 7.05-24.8 (in-holdings or other non-NFS lands are located between the mileposts listed)

Segment 7: Section of New Replacement Rio Hondo – Vincent No. 2 500-kV T/L (initially energized at 220 kV) and Section of New Mira Loma – Vincent 500-kV T/L

- Initiates at the southern boundary of the ANF and ends at the existing Mesa Substation
- Remove approximately 15.8 miles of the existing Antelope – Mesa 220-kV T/L between the southern boundary of the ANF and the Mesa Substation
- Construct new approximately 15.8-mile 500-kV double-circuit T/L to include the Rio Hondo – Vincent No. 2 500-kV T/L (initially energized at 220 kV) and the new Mira Loma – Vincent 500-kV T/L
- Connect the new Rio Hondo – Vincent No. 2 500-kV T/L (initially energized at 220 kV) into the Rio Hondo Substation
- Relocate several existing 66-kV subtransmission lines between the existing Rio Hondo Substation and the existing Mesa Substation
- All proposed permanent infrastructure to be located within existing ROW (approx. 15.8 miles)
- Erect approximately 85 new transmission structures, including:
  - 1 double-circuit 220-kV LST (185 feet tall)
  - 2 double-circuit 500-kV TSPs (195-200 feet tall)
  - 3 single-circuit 500-kV LSTs (113-175 feet tall)
  - 79 double-circuit 500-kV LSTs (147-262 feet tall)
- Erect approximately 150 new double-circuit 66-kV subtransmission Light Weight Steel Poles (LWSPs) and TSPs
- Would require approximately 16 wire setup sites for pulling/tensioner/splicing of conductor wire

Segment 8: Section of New Mira Loma – Vincent 500-kV T/L

- Initiates near the existing Mesa Substation and ends at the existing Mira Loma Substation
- Remove various 220-kV T/L structures between the existing Mesa Substation and the existing Mira Loma Substation
- Construct approximately 33 miles of new double-circuit 500-kV T/L to include approximately 33 miles of the new Mira Loma – Vincent 500-kV T/L (Segments 8A/8C)
- Construct approximately 7 miles of new double-circuit 220-kV T/L from the Chino Substation to the Mira Loma Substation (Segment 8B)
- Relocate several existing 66-kV subtransmission lines in the area of the Mesa and Chino Substations
- Most of the proposed infrastructure would be located within existing ROW, except for the following:
  - Rose Hills Memorial Park ROW relocation (existing: 1.1-mile, 200-foot-wide; future: 1.4-mile, 240-foot-wide)
  - Hacienda Heights ROW expansion (existing: 2.15-mile, 150 to 230-foot-wide; future: 250 to 330-foot-wide)
  - Fullerton Road new ROW (existing: none; future: 0.4-mile, 100-foot-wide)
  - Ontario (near Mira Loma Substation) ROW expansion (existing: 0.45-mile, 175-foot-wide; future: 325-foot-wide)

Table 2. Summary of SCE's Proposed Project Components
• Erect approximately 226 new transmission structures, including: ▪ 2 single-circuit 220-kV LSTs (65-75 feet tall) ▪ 57 double-circuit 220-kV LSTs (113-180 feet tall) ▪ 3 single-circuit 500-kV LSTs (128-149 feet tall) ▪ 92 double-circuit 500-kV LSTs (147-255 feet tall) ▪ 2 single-circuit 220-kV TSPs (85-95 feet tall) ▪ 11 double-circuit 220-kV TSPs (75-115 feet tall) ▪ 5 three-pole dead-end 220-kV structures (75-110 feet tall) ▪ 4 single-circuit 500-kV TSPs (120-170 feet tall) ▪ 50 double-circuit 500-kV TSPs (150-195 feet tall) • Erect approximately 55 new double-circuit 66-kV subtransmission LWSPs • Would require approximately 33 wire setup sites for pulling/tensioner/splicing of conductor wire
Segment 9: Substation Facilities
• Construct new Whirlwind Substation; activity would require acquisition of a new approximately 106-acre substation property • Expand and upgrade existing Antelope and Vincent Substations to accommodate new 500-kV and 220-kV equipment; activity would require acquisition of additional substation property – approximately 18 acres for Antelope upgrade and approximately 0.2 acre for Vincent upgrade; Vincent expansion would disturb approximately 18 acres • Upgrade existing Mesa and Gould Substations to accommodate new 220-kV equipment • Upgrade existing Mira Loma Substation to accommodate new 500-kV equipment

Source: SCE, 2007a. Updated per GIS data submitted by SCE during EIR/EIS development.

Please note that the information provided herein is based on SCE's preliminary design for the TRTP and is subject to change during final engineering. For land disturbance numbers, a deviation factor of ± 15 percent has been incorporated to provide a range allowing for the error associated with a project that has only gone through preliminary engineering. Furthermore, all mileages are approximate due to differences between engineering miles, which take into account topography, and map miles, which assume no variation in topography.

2.3 Alternative 3: West Lancaster Alternative

This alternative was suggested by members of the public prior to the scoping period. It would re-route the new 500-kV T/L in Segment 4 along 115th Street West rather than 110th Street West, as shown in Figure 2. The West Lancaster Alternative would deviate from the proposed route (Alternative 2) at approximately S4 MP 14.9, where the new 500-kV T/L would turn south down 115th Street West for approximately 2.9 miles and turn east for approximately 0.5 mile, rejoining the proposed route at S4 MP 17.9. This re-route would increase the overall distance of Segment 4 by approximately 0.4 mile; however, the number of overall structures would decrease by one due to greater spacing between structures compared to the proposed Project (SCE, 2008a2008a: DR#4 – Q4-02).

Alternative 3 would be identical to the proposed Project (Alternative 2) with respect to Segments 5, 6, 7, 8, 10, and 11 as discussed in Chapter 2, Sections 2.2.5 through 2.2.9, of the EIR/EIS. All substation and information technology facilities would also be identical to the proposed Project as discussed in Sections 2.2.10 and 2.2.11 of the EIR/EIS, respectively. Construction of Alternative 3 would be generally be the same as the proposed Project; however, there would be a decrease in the land disturbance total by a factor of one structure within Segment 4 (SCE, 2008a2008a: DR#4 – Q4-02). As such, the acres disturbed during construction would continue to be approximately 166 acres, and the acres permanently disturbed would continue to be approximately 20 acres. The West Lancaster Alternative would not require additional construction equipment or workforce (SCE, 2008a: DR#4 – Q4-03) compared to Alternative 2 and no additional construction waste is anticipated (SCE, 2008a: DR#4 – Q4-04).

New access and spur roads would need to be created in the area of the re-routed portion of Alternative 3, similar to the proposed Project Segment 4 route. Ideally, down-line access roads would follow the route within the ROW, and would parallel the route with spur roads going to one or more structure locations when down-line access is not possible. SCE would attempt to use existing roads to the extent possible and would only need to build new access or spur roads where the existing roads do not provide the required access (SCE, 2008a: DR#4 – Q4-02).

Operations and maintenance of Alternative 3, including T/L and substation components, would be identical to the proposed Project.

2.4 Alternative 4: Chino Hills Route Alternatives

Route A

This alternative was suggested by the City of Chino Hills during the scoping period. This represents a refinement on the Chino Hills State Park alternatives considered by SCE in its PEA (RA Eliminated 6, Options 1 and 2). As shown in Figure 3, Alternative 4A would deviate from the proposed Project beginning about two miles east of State Route 57 (approximately S8A MP 19.2), where the existing Mira Loma-Walnut/Olinda 220-kV double-circuit T/L and the existing un-energized Chino-Mesa T/L (both in the same corridor as that of Segment 8A) separate from one another. At that point, the new Mira Loma-Vincent 500-kV T/L would turn southeast, remaining parallel and south of the existing Mira Loma-Walnut/Olinda 220-kV double-circuit T/L for approximately 6.2 miles, traversing Los Angeles, Orange, and San Bernardino Counties, including approximately 2.3 miles of Chino Hills State Park (CHSP or park) (SCE, 2008a – DR#4: Q4-14). Along this portion of the alignment, approximately 150 feet of additional ROW would be required to accommodate the new 500-kV double-circuit structures. New permanent spur roads would be required to access the structures constructed as part of this alternative.

At the junction of the existing Walnut/Olinda-Mira Loma 220-kV T/Ls and the existing Serrano-Mira Loma and Serrano-Rancho Vista 500-kV T/Ls, the new Mira Loma-Vincent 500-kV T/L would terminate into a new 500-kV gas-insulated switching station. The existing 500-kV T/Ls would be looped into the new switching station, which would be a minimum of 4 to 5 acres in size, allowing for power to be transferred along the existing 500-kV T/Ls to Mira Loma Substation. For the gas-insulated switching station, the entire system would be enclosed in a sheet metal building, which would require an air conditioning system (SCE, 2008b – DR#5: Q5-07). The building would be approximately 42-feet high and the dead-end structures on either side of the building would be approximately 65-feet high (SCE, 2008b – DR#5: Q5-07).

From the point of deviation (S8A MP 19.2) to the new switching station, approximately 21 new double-circuit 500-kV structures would be required, of which approximately 8 to 10 structures would be within CHSP (SCE, 2008a – DR#4: Q4-11 and Q4-15). In addition, the re-route work at the new switching station would include replacing one existing single-circuit 220-kV dead end lattice structure with one single-circuit 220-kV 3-pole steel dead end structure; the relocation of two existing single-circuit 500-kV dead end lattice structures; and the installation of two new single-circuit 500-kV dead end lattice structures outside of the switching station area (SCE, 2008a – DR#4: Q4-15). At the point of deviation (S8A MP 19.2), an existing 220-kV lattice structure would also be replaced with a 220-kV lattice dead end structure to move the wires out of the way for the new 500-kV wires and structures (SCE, 2008a – DR#4: Q4-15). As a result of this alternative, no upgrades would occur in Segment 8A between S8A MP 19.2 and 35.2 (16 miles) through Chino Hills, Chino, and Ontario. Upgrades to the existing Chino-Mira Loma No. 1, 2, and 3 220-kV T/Ls in Segments 8B (6.8 miles) and 8C (built with Segment 8A) would

also not occur (SCE, 2008a – DR#4: Q4-13). Consequently, approximately 78 double-circuit 500-kV structures (18 LSTs and 60 TSPs) and approximately 40 double-circuit 220-kV structures (associated with the re-build of Chino-Mira Loma No. 3) would no longer be constructed within Segment 8 (SCE, 2008a – DR#4: Q4-12).

Route B

This alternative was suggested by the City of Chino Hills. This represents a refinement to the Chino Hills Route A Alternative. As shown in Figure 4, Alternative 4B would deviate from the proposed Project beginning about two miles east of State Route 57 (approximately S8A MP 19.2), where the existing Mira Loma-Walnut/Olinda 220-kV double-circuit T/L and the existing un-energized Chino-Mesa T/L (both in the same corridor as that of Segment 8A) separate from one another. At that point, the new Mira Loma-Vincent 500-kV T/L would turn southeast, remaining parallel and north of the existing Mira Loma-Walnut/Olinda 220-kV double-circuit T/L for approximately 4.2 miles, traversing Los Angeles, Orange, and San Bernardino Counties. The alternative route would then enter CHSP, continuing to parallel the existing 220-kV double-circuit T/L for approximately 4.9 miles, at which point the new Mira Loma-Vincent 500-kV T/L would exit the east side of CHSP. The new T/L would continue parallel to the existing 220-kV double-circuit T/L for another approximately 0.6 mile outside of CHSP before turning south, crossing the existing T/Ls, to terminate at a new 500-kV gas-insulated switching station located just south of the existing 500-kV T/Ls. Approximately 150 feet of additional ROW would be required to accommodate the new 500-kV double-circuit structures along the 9.7-mile re-route associated with this alternative (SCE, 2008a – DR#4: Q4-24). New permanent spur roads would be required to access the structures constructed as part of this alternative.

The existing 500-kV T/Ls located in this area would be looped into the new switching station, which would be a minimum of 4 to 5 acres in size, allowing for power to be transferred along the existing 500-kV T/Ls to Mira Loma Substation. For the gas-insulated switching station, the entire system would be enclosed in a sheet metal building, which would require an air conditioning system (SCE, 2008b). The building would be approximately 42-feet high and the dead-end structures on either side of the building would be approximately 65-feet high (SCE, 2008b).

From the point of deviation (S8A MP 19.2) to the new switching station, approximately 37 new double-circuit 500-kV structures would be required, of which approximately 18 to 21 structures would be within CHSP (SCE, 2008a – DR#4: Q4-23 and Q4-25). In addition, the re-route work at the new switching station would include replacing four existing double-circuit 220-kV suspension and dead end lattice structure with four single-circuit 220-kV 3-pole steel dead end structures; replacing two existing double-circuit 500-kV suspension lattice structures with dead end structures; and the installation of two new double-circuit 500-kV dead end lattice structures outside of the switching station area (SCE, 2008a – DR#4: Q4-25). At the point of deviation (S8A MP 19.2), an existing 220-kV lattice structure would also be replaced with a 220-kV lattice dead end structure to move the wires out of the way for the new 500-kV wires and structures (SCE, 2008a – DR#4: Q4-25).

As a result of this alternative, no upgrades would occur in Segment 8A between S8A MP 19.2 and 35.2 (16 miles) through Chino Hills, Chino, and Ontario. Upgrades to the existing Chino-Mira Loma No. 1, 2, and 3 220-kV T/Ls in Segments 8B (6.8 miles) and 8C (built with Segment 8A) would also not occur (SCE, 2008a – DR#4: Q4-13). Consequently, approximately 78 double-circuit 500-kV structures (18 LSTs and 60 TSPs) and approximately 40 double-circuit 220-kV structures (associated with the re-build of Chino-Mira Loma No. 3) would no longer be constructed within Segment 8 (SCE, 2008a – DR#4: Q4-12).

Route C

This alternative was suggested by the City of Chino Hills. This represents a refinement to the Chino Hills Route A Alternative based on discussions between Chino Hills, CHSP, SCE, and the CPUC. The route through CHSP has been modified to circumvent Raptor Ridge, which would minimize potential visual impacts and design complications associated with crossing Raptor Ridge, and would avoid crossing the Raptor Ridge Trail (SCE, 2008b – DR#5: Q5-05). As shown in Figure 5, Alternative 4C would deviate from the proposed Project beginning about two miles east of State Route 57 (approximately S8A MP 19.2), where the existing Mira Loma-Walnut/Olinda 220-kV double-circuit T/L and the existing un-energized Chino-Mesa T/L (both in the same corridor as that of Segment 8A) separate from one another. At that point, the new Mira Loma-Vincent 500-kV T/L would turn southeast, and remain parallel and south of the existing Mira Loma-Walnut/Olinda 220-kV double-circuit T/L up to the CHSP boundary (approximately 4.2 miles). Along this portion of the alignment, approximately 150 feet of additional ROW would be required to accommodate the new 500-kV double-circuit structures. At this point, the alternative route would turn east along a new approximately 300-foot-wide ROW for approximately 1.5 miles, which would remain just north of the CHSP boundary, to a new 500-kV gas-insulated switching station (SCE, 2008a – DR#4: Q4-34 and Q4-37). Approximately 19 double-circuit 500-kV LSTs would be required for this approximately 5.7-mile re-route to the new switching station (SCE, 2008a – DR#4: Q4-38). New permanent access and spur roads would be required to access the structures constructed as part of this alternative.

The two existing 500-kV single-circuit T/Ls located within CHSP would be re-routed to allow them to loop into the new switching station, which would be a minimum of 4 to 5 acres in size, allowing for power to be transferred along the existing 500-kV T/Ls to Mira Loma Substation. For the gas-insulated switching station, the entire system would be enclosed in a sheet metal building, which would require an air conditioning system (SCE, 2008b). The building would be approximately 42-feet high and the dead-end structures on either side of the building would be approximately 65-feet high (SCE, 2008b).

Approximately 3.6 miles of new ROW would be required to re-route the existing single-circuit 500-kV T/Ls in and out of the new switching station. The new north-south re-route into the switching station (1.6 miles, of which 1.5 miles is within CHSP) would require an approximately 330-foot wide ROW to accommodate the two 500-kV single-circuit structures. The new east-west re-route beginning at the switching station and proceeding north and east around raptor ridge (2.0 miles, of which 1.6 miles is within CHSP) would require an approximately 480-foot wide ROW to accommodate the two 500-kV single-circuit structures and the re-routed 220-kV double-circuit structures (discussed below) (SCE, 2008a – DR#4: Q4-37). New permanent access and spur roads would be required to access the structures constructed within these new ROWs. To complete the two re-routes of the 500-kV T/Ls (approximately 3.6 miles) would require approximately 30 new single-circuit 500-kV LSTs (approximately 25 within CHSP and 5 outside CHSP) (SCE, 2008a – DR#4: Q4-35). In addition, approximately 17 LSTs (approximately 13 of which are within CHSP) of the existing single-circuit 500-kV T/Ls would be removed (approximately 2.5 miles) (SCE, 2008a – DR#4: Q4-36 and Q4-38).

A portion of the existing 220-kV T/Ls within CHSP would also be re-routed as part of this alternative. Beginning just west of the CHSP boundary (outside of CHSP), the existing 220-kV double-circuit structures would be re-routed to parallel the new 500-kV double-circuit structures along the northern boundary of CHSP to the new switching station (approximately 1.45 miles). As noted above, the new ROW in this area would be approximately 300-feet wide, to accommodate the 500-kV double-circuit and 220-kV double-circuit structures (SCE, 2008a – DR#4: Q4-37). The 220-kV T/Ls would continue past the

switching station, paralleling the re-routed 500-kV T/Ls for approximately 0.36 mile to the boundary of CHSP. At this point, the re-routed 220-kV and 500-kV T/Ls would enter CHSP for approximately 1.62 miles to reconnect with the existing 220-kV and 500-kV structures. As noted above, the new ROW in this area would be approximately 480-feet wide. To complete the approximately 3.43-mile 220-kV re-route, approximately 17 new double-circuit 220-kV LSTs would be required (approximately 5 to 7 within CHSP) (SCE, 2008a – DR#4: Q4-34 and Q4-38). Approximately 12 existing 220-kV double-circuit LSTs within CHSP and 2 outside CHSP (14 total) would be removed (3.4 miles) (SCE, 2008a – DR#4: Q4-33 and Q4-38).

As a result of this alternative, no upgrades would occur in Segment 8A between S8A MP 19.2 and 35.2 (16 miles) through Chino Hills, Chino, and Ontario. Upgrades to the existing Chino-Mira Loma No. 1, 2, and 3 220-kV T/Ls in Segments 8B (6.8 miles) and 8C (built with Segment 8A) would also not occur (SCE, 2008a – DR#4: Q4-13). Consequently, approximately 78 double-circuit 500-kV structures (18 LSTs and 60 TSPs) and approximately 40 double-circuit 220-kV structures (associated with the re-build of Chino-Mira Loma No. 3) would no longer be constructed within Segment 8 (SCE, 2008a – DR#4: Q4-12).

Route D

This alternative was suggested by the City of Chino Hills. This represents a refinement to the Chino Hills Route A Alternative. As shown in Figure 6, Alternative 4D would deviate from the proposed Project beginning about two miles east of State Route 57 (approximately S8A MP 19.2), where the existing Mira Loma – Walnut/Olinda 220-kV double-circuit T/L and the existing un-energized Chino-Mesa T/L (both in the same corridor as that of Segment 8A) separate from one another. At that point, the new Mira Loma-Vincent 500-kV T/L would turn southeast, remaining parallel and north of the existing Mira Loma – Walnut/Olinda 220-kV double-circuit T/L for approximately 4.2 miles, up to the CHSP boundary, traversing Los Angeles, Orange, and San Bernardino Counties. Along this portion of the alignment, approximately 150-feet of additional ROW would be required to accommodate the new 500-kV double-circuit structures (SCE, 2008a – DR#4:Q4-45). At this point, the new Mira Loma-Vincent 500-kV T/L would turn east within a new 200-foot-wide ROW and follow the northern boundary of CHSP for approximately 3.7 miles to just east of Bane Canyon. At this point the alignment would turn southeast, traversing the northeast corner of CHSP for approximately 1.4 miles (new ROW within CHSP), at which point the new 500-kV T/L would turn northeast again parallel and north of the existing T/Ls for approximately 0.5 mile (outside CHSP) before terminating at a new 500-kV gas-insulated switching station located outside of CHSP, just south of the existing 500-kV T/Ls. New permanent access and spur roads would be required to access the structures constructed as part of this alternative. For this approximately 9.8-mile re-route, approximately 47 new double-circuit 500-kV structures would be required, of which approximately 5 to 8 would be within CHSP (SCE, 2008a – DR#4: Q4-44 and Q4-46). In addition, the re-route work at the new switching station would include replacing four existing double-circuit 220-kV suspension and dead end lattice structure with four single-circuit 220-kV 3-pole steel dead end structures; replacing two existing double-circuit 500-kV suspension lattice structures with dead end structures; and the installation of two new double-circuit 500-kV dead end lattice structures outside of the switching station area (SCE, 2008a – DR#4: Q4-46). At the point of deviation (S8A MP 19.2), an existing 220-kV lattice structure would also be replaced with a 220-kV lattice dead end structure to move the wires out of the way for the new 500-kV wires and structures (SCE, 2008a – DR#4: Q4-46).

The new gas-insulated switching station would be a minimum of 4 to 5 acres in size, allowing for power to be transferred along the existing 500-kV transmission lines to Mira Loma Substation. For the gas-

insulated switching station, the entire system would be enclosed in a sheet metal building, which would require an air conditioning system (SCE, 2008b). The building would be approximately 42-feet high and the dead-end structures on either side of the building would be approximately 65-feet high (SCE, 2008b).

As a result of this alternative, no upgrades would occur in Segment 8A between S8A MP 19.2 and 35.2 (16 miles) through Chino Hills, Chino, and Ontario. Upgrades to the existing Chino-Mira Loma No. 1, 2, and 3 220-kV T/Ls in Segments 8B (6.8 miles) and 8C (built with Segment 8A) would also not occur (SCE, 2008a – DR#4: Q4-13). Consequently, approximately 78 double-circuit 500-kV structures (18 LSTs and 60 TSPs) and approximately 40 double-circuit 220-kV structures (associated with the re-build of Chino-Mira Loma No. 3) would no longer be constructed within Segment 8 (SCE, 2008a – DR#4: Q4-12).

2.5 Alternative 5: Partial Underground Alternative

The proposed route for Alternative 5 would follow the same route as the proposed Project; however, an approximately 3.5-mile portion of the Alternative 5 route along Segment 8 would be installed underground (refer to Figure 7). Alternative 5 would be identical to the proposed Project (Alternative 2) with respect to Segments 4, 5, 6, 7, 10, and 11. All substation and information technology facilities would also be identical to the proposed Project. Construction of Alternative 5 would be the same as the proposed Project, with the exception of the underground portion.

Under this alternative, the proposed transmission line would shift from overhead to underground at approximately MP 21.9 of Segment 8A and would continue underground through the City of Chino Hills to approximately MP 25.4 of Segment 8A, where the underground line would shift back to overhead. Gas Insulated Line (GIL) technology would be utilized for the underground portion of Alternative 5. The primary components of the proposed underground segment include GIL system infrastructure, aboveground transition stations, an underground tunnel, and vertical access shafts. The existing aboveground T/L along the proposed underground portion of Alternative 5, which consists of a single-circuit 220-kV T/L on LST structures, would remain in place and would not be removed as part of Alternative 5.

2.6 Alternative 6: Maximum Helicopter Construction in the ANF Alternative

This alternative would utilize helicopter construction within the ANF to the maximum extent feasible, as shown in Figure 8. A total of 143 new 500-kV towers would be constructed by helicopter under this alternative, 87 within Segment 6 and 56 within Segment 11. As a result of helicopter construction, approximately 42 miles (±15% range of 49 to 36 miles) of new and/or upgraded access and spur roads (includes new, reconstruction, and maintenance road types), which would be required as part of SCE's proposed Project (Alternative 2), would not be created and/or upgraded for ground access to the helicopter constructed towers. However, ground-access to wire stringing sites (pulling/tensioner/splicing) would continue to be required for this alternative as equipment for these activities can only be brought in by truck. This alternative would result in not only fewer roads being created and/or upgraded as compared to SCE's proposed Project (Alternative 2) but would also result in less land disturbance associated with ground-based construction. Overall, within Segments 6 and 11, Alternative 6 would reduce temporary land disturbance by approximately 68 acres (±15% range of 58-78 acres) and permanent land disturbance by approximately 47 acres (±15% range of 40-54 acres) compared to Alternative 2.

2.7 Alternative 7: 66-kV Alternative

This alternative is comprised of three 66-kV subtransmission line elements, including the following: (1) Undergrounding the existing 66-kV subtransmission line on Segment 7 through the Woodland Duck Farm/River Commons at the Duck Farm (Duck Farm Project) between Valley Boulevard (S7 MP 8.9) and S7 MP 9.9 as requested by the Board of Supervisors County of Los Angeles to minimize the Project's effects to passive recreation opportunities in the planned Duck Farm Project area; (2) Re-routing and undergrounding the existing 66-kV subtransmission line around the Whittier Narrows Recreation area along Segment 7 (S7 MP 11.4 to 12.025) to provide habitat enhancement for least Bell's vireos, as identified by SCE; and (3) Re-routing the existing 66-kV subtransmission line around the Whittier Narrows Recreation Area along Segment 8A between the San Gabriel Junction (S8A MP 2.2) and S8A MP 3.8 to provide habitat enhancement for least Bell's vireos, as identified by SCE.

Duck Farm 66-kV Underground (Segment 7)

This element of Alternative 7 would consist of undergrounding the Rio Hondo-Amador-Jose-Mesa 66-kV subtransmission line along Segment 7 through the River Commons or Duck Farm Project, as shown in Figure 9. Beginning at the north side of Valley Boulevard (Structure 43) located at approximately S7 MP 8.9, the 66-kV subtransmission line would be placed underground along the west edge of the ROW for a distance of approximately 6,000 feet to just south of Structure 48 (S7 MP 9.9), at which point the 66-kV subtransmission line would transition aboveground and continue overhead to Peck Road, as proposed under Alternative 2 (SCE's Proposed Project). Approximately 14 fewer 66-kV LWSPs would be required as a result of undergrounding the 66-kV subtransmission line through the Duck Farm Project.[6]

Whittier Narrows 66-kV Underground Re-Route (Segment 7)

This element of Alternative 7 would consist of re-routing and undergrounding the Jose-Mesa 66-kV subtransmission line around the Whittier Narrows Recreation area in Segment 7, as shown in Figure 10. Beginning at Peck Road (S7 MP 11.4) the 66-kV subtransmission line, which under SCE's Proposed Project (Alternative 2) would be re-located to the western edge of the ROW, would leave the existing ROW at Peck Road and be placed underground. The new underground 66-kV subtransmission line would proceed approximately 300 feet north along Peck Road, then turn west and continue on Durfee Road for approximately 3,000 feet before rejoining SCE's proposed alignment (Alternative 2) at S7 MP 12.025 (just north of Structure 58). Approximately eight fewer 66-kV LWSPs would be required as a result of undergrounding the 66-kV subtransmission line through the Duck Farm Project.[7]

Whittier Narrows 66-kV Overhead Re-Route (Segment 8A)

This element of Alternative 7 would consist of relocating two 66-kV circuits (Mesa-Narrows 66-kV and Walnut-Hillgen-Industry-Mesa-Reno 66-kV), approximately 1.63 miles of overhead 66-kV lines (x2 lines), and vacating the southern end of the existing Project ROW from San Gabriel Boulevard (just west of the San Gabriel Junction, S8A MP 2.2) to the east side of the San Gabriel River (S8A MP 3.8). The existing 66-kV subtransmission lines currently split at the San Gabriel Junction (S8A MP 2.2) with one line proceeding along the existing 220-kV ROW and the other line proceeding southwest along San Gabriel Boulevard. As such, between the San Gabriel Junction and Lincoln Avenue existing infrastructure

[6] Reduction of 66-kV infrastructure is based on SCE's proposed Project estimate of 150 66-kV structures (LWSPs and TSPs) along Segment 7. The overall length of 15.8 miles was reduced to remove those areas where there do not appear to be 66-kV relocations requested by SCE, including the one-mile segment between approximately S7 MP 10 and 11 and west of the San Gabriel Junction. (150 towers over 12.7 miles or approximately 12 poles per mile).

[7] Ibid.

would be utilized. As shown in Figure 10, these 66-kV circuits would be relocated beginning at the intersection of San Gabriel Boulevard and Lincoln Avenue and proceed southeast approximately 1,880 feet along San Gabriel Boulevard until Rosemead Boulevard, at which point the street name changes to Durfee Avenue. The 66-kV lines would continue for approximately 700 feet southeast across Durfee Avenue and then utilize the existing idle 66-kV structures which currently run southeast along Siphon Road to the San Gabriel River (approximately 2,100 feet). New ROW, approximately 1,200-feet long and 60-feet wide, would be required to cross from the existing 66-kV ROW on the west side of the San Gabriel River to the existing 220-kV ROW located on the east side of the San Gabriel River (near Structure 9), thereby allowing the new 66-kV lines to tie back into the 66-kV lines within the Project ROW (S8A MP 3.8) completing the circuit. Approximately eight new LWSPs and two bolt based TSPs at either side of the channel crossing (10 total) would be installed beginning at the intersection of Lincoln Avenue to Siphon Road (approximately 2,580 feet) and within the new approximately 1,200-foot ROW at the San Gabriel River crossing (SCE, 2008c). Within the existing approximately 2,100-foot 66-kV ROW along Siphon Road, if the existing idle 66-kV structures are found to be inadequate due to deterioration of the structures or due to engineering requirements with respect to wind loads (to be determined during final engineering), then additional LWSPs would be installed to accommodate the new 66-kV subtransmission lines. While this 66-kV re-route would require approximately ten new 66-kV poles (LWSPs and TSPs), approximately 1.63 miles of 66-kV line would be eliminated from the 220-kV ROW or approximately 20 66-kV LWSPs, resulting in a reduction of approximately ten 66-kV LWSPs that would otherwise be required by the proposed Project (Alternative 2).[8]

Other than the minor 66-kV re-routes and underground construction described above for the three elements of Alternative 7, this alternative would be identical to the proposed Project (Alternative 2) as discussed in Sections 2.2.3 through 2.2.9 of the EIR/EIS. All substation and information technology facilities would also be identical to the proposed Project as discussed in Sections 2.2.10 and 2.2.11 of the EIR/EIS, respectively.

2.8 Alternatives Eliminated from Further Evaluation

Alternatives to the proposed Project were suggested by SCE in its Proponent's Environmental Assessment (PEA), which was submitted as part of SCE's application to the CPUC. Additional alternatives were developed by the CPUC and Forest Service in conjunction with the team preparing the EIR/EIS for the Project. In total, 31 potential alternatives were identified. The alternatives considered included: (1) minor routing adjustments to SCE's proposed route; (2) entirely different transmission line routes for some segments of the proposed alignment; and (3) alternate system voltages and system configurations. The alternatives that were not carried forward to the EIR/EIS are discussed below. For a complete discussion and analysis of each alternative that was screened and eliminated from further evaluation, please see Appendix A (Alternatives Screening Report) of the EIR/EIS.

2.8.1 Methodology

The evaluation of the alternatives identified below was completed using a screening process that consisted of three steps: (1) Clarify the description of each alternative to allow comparative evaluation, (2) Evaluate each alternative using CEQA/NEPA criteria, and (3) Based on the results of Step 2, determine the

[8] Reduction of 66-kV infrastructure is based on SCE's proposed Project estimate of 150 66-kV structures (LWSPs and TSPs) along Segment 7. The overall length of 15.8 miles was reduced to remove those areas where there do not appear to be 66-kV relocations requested by SCE, including the one-mile segment between approximately S7 MP 10 and 11 and west of the San Gabriel Junction. (150 towers over 12.7 miles or approximately 12 poles per mile).

suitability of each alternative for full analysis in the EIR/EIS. If the alternative was determined to be unsuitable, it was eliminated from further consideration.

To ensure that the alternatives considered for the EIR/EIS would meet the requirements of both CEQA and NEPA, a reasonable range of alternatives has been considered and evaluated as to whether or not the alternatives (1) meet most of the project objectives/purpose and need, (2) are considered feasible, (3) meet California Independent System Operator (CAISO)/ Western Electricity Coordinating Council (WECC)/ North American Electric Reliability Council (NERC) reliability planning criteria, and (4) would avoid or lessen adverse effects of the proposed Project/Action.

2.8.2 Design Variations

The following potential alternatives are design variations to the proposed Project, which would provide transmission capabilities between the new Windhub Substation and the existing Mira Loma Substation:

- **Whirlwind Substation Site A Alternative:** This alternative substation site was considered by SCE in its PEA (RA Retained 6, Alternative A). This alternative would place the new Whirlwind Substation on 113 acres of previously disturbed land east of Segment 4 and south of the proposed Whirlwind Substation. However, the alternative substation site would require additional land over the proposed Whirlwind Substation site resulting in greater construction impacts and the permanent loss of more land. There is an additional concern regarding soil stability as this is a proposed site for an aquifer recharge facility.
- **Whirlwind Substation Site B Alternative:** This alternative substation site was considered by SCE in its PEA (RA Retained 6, Alternative B). This alternative would place the new Whirlwind Substation on 102 acres of previously undisturbed land west of Segment 4 and the proposed Whirlwind Substation. However, the alternative substation site would be located on previously undisturbed land and would require additional acreage resulting in additional construction impacts (air quality and biology) and the permanent loss of additional land.
- **Upgrade Transmission Through ANF in Segment 6 Only Alternative:** This alternative was considered by SCE in its PEA (RA Eliminated 3, Option 6/11A). It would replace one 220-kV T/L with one 500-kV T/L and construct a new 500-kV T/L in Segment 6, and establish a new east-west corridor between the cities of Duarte and Pasadena. However, system reliability would be compromised and would not meet the required CAISO/NERC/WECC Planning Standards. Additionally, the amount of new corridor and access roads required would increase the potential for air quality, biology, land use, noise, traffic, and visual impacts.
- **Upgrade Transmission Through ANF in Segment 11 Only Alternative:** This alternative was considered by SCE in its PEA (RA Eliminated 3, Option 6/11B). It would replace the existing 220-kV T/L with one 500-kV T/L and construct a new 500-kV T/L in Segment 11, and establish a new east-west corridor between the cities of La Cañada Flintridge (Gould Substation) and Duarte. However, the amount of new corridor and access roads required would increase the potential for air quality, biological, land use, noise, traffic, and visual resource impacts.
- **Reduced Upgrades in Segment 6 Alternative:** This alternative was developed as a hybrid to the alternatives proposed by SCE (RA Eliminated 3, Options 6/11A and 6/11B) where upgrades through the ANF would occur within either Segment 6 or 11. This hybrid alternative would remove the need for a new east-west corridor associated with these other alternatives and would reduce the upgrades necessary within Segment 6 through the ANF required under the proposed Project. This alternative would reduce the number of new 500-kV T/Ls within the ANF along Segment 6 from two to one. However, the Antelope-Mesa 220-kV T/L would not be upgraded as part of this alternative, which would immediately limit the ability of the system to accommodate the additional generation from the TWRA and would not address South of Lugo transmission constraints, two of the main Project objectives.
- **Co-Locate All SCE T/Ls in Either Segment 6 or 11 Across the ANF Alternative:** This alternative was considered by SCE in its PEA (RA Eliminated 3, Option 6/11C). Existing transmission facilities would be moved from one corridor to the other within the ANF. It would result in a total of five T/Ls being located in a single corridor through the ANF, either in Segment 6 or 11, both designated utility corridors. A new east-west corridor would need to be established between the cities of La Cañada Flintridge (Gould Substation) and

Duarte to accommodate up to three T/Ls. System reliability would be compromised and this alternative would not meet the required CAISO/NERC/WECC Planning Standards. In addition, this alternative would require substantially more construction and deconstruction than the proposed Project, resulting in greater air quality, biology, land use, noise, traffic, and visual resource impacts.

- **Reduced Number of 220-kV T/Ls in the ANF Alternative:** This alternative would provide similar upgrades to the proposed Project, but would remove the Rio Hondo-Vincent No. 1 220-kV T/L from Segment 6 and the Mesa-Vincent No. 1 220-kV T/L from Segment 11, thereby reducing the amount of visual "clutter" within the ANF. Additional upgrades would include adding a new 500-kV T/L south of Gould Substation to Mesa Substation and upgrading both the Rio Hondo and Mesa Substations. However, this alternative would not provide for the integration of new wind generation in the TWRA by 2010, and as such would not comply with the California Renewables Portfolio Standard. In addition, a reduction of 220-kV lines through the ANF would decrease capacity and potentially overload the system. As a result, this would interfere with the objective of reliably transmitting 4,500 MW from the TWRA and would not address the South of Lugo transmission constraints.
- **Minimize 500-kV Upgrades Alternative:** Portions of Segments 6, 7, and 11 are currently proposed to be built to 500-kV standards, but would initially be energized to 220 kV for an undetermined length of time. This alternative would rebuild Segment 6 (from Vincent Substation to the southern boundary of the ANF), Segment 7 (from the southern boundary of the ANF to Rio Hondo Substation), and Segment 11 (from Vincent Substation to Gould Substation) to 220-kV standards to allow for the use of new 220-kV conductor, which would provide for additional capacity within SCE's transmission system. While this alternative would provide capacity to allow for the transmission of wind power from the TWRA, it would not accommodate the full 4,500 MW of wind generation currently being planned or expected in the future. Additional upgrades to the system, directly resulting from installation of a system that may meet initial needs for additional capacity, but does not adequately provide for future transmission needs, would eliminate any positive reduction in environmental impacts that this alternative may offer compared to the proposed Project**.**
- **Segments 6 and 11 Double-Circuit Structures Alternative:** This alternative would remove from Segment 6 two existing 220-kV T/Ls north of the crossover span (S6 MP 5.0) and an existing 220-kV T/L and 500-kV T/L south of the crossover span, and replace them with a new double-circuit 500-kV T/L to accommodate the new Rio Hondo-Vincent No. 2 500-kV T/L and the new Mira Loma-Vincent 500-kV T/L. In addition, this alternative would remove from Segment 11 two existing 220-kV T/Ls between the Vincent Substation and La Cañada Flintridge (Gould Substation) and replace them with a new double-circuit 500-kV T/L to accommodate the new Mesa-Vincent No. 1 and No. 2 500-kV T/Ls (initially energized at 220 kV). Implementation of this alternative would result in one existing 220-kV T/L (on single-circuit structures) and two new 500-kV T/Ls (on double-circuit structures) within Segment 6, and two new 500-kV T/Ls (on double-circuit structures) within Segment 11. However, these new towers would be bulkier and taller than the proposed single-circuit 500-kV towers; would require additional towers, and in fact may require the placement of towers outside of the existing ROW; fire safety issues may increase; the structures would not be feasible to construct by helicopter, resulting in the need for additional access roads; and would result in increased impacts associated with the removal of the existing 220-kV structures that would otherwise be untouched under the proposed Project. Furthermore, placement of two 500-kV T/Ls on a double-circuit structure would result in a less reliable design than the proposed Project. Due to both the issues surrounding the reliability of this alternative and the potential for substantially greater environmental impacts (both long-term and short-term), this alternative was eliminated from further consideration.
- **Segments 7/8A Single-Circuit 500-kV Structures Alternative:** This alternative was considered by SCE in its PEA (Technology Alternative 5). It would replace single-circuit 220-kV structures with single-circuit 500-kV structures between Rio Hondo Substation and Chino Substation within Segments 7 and 8A, whereas the proposed Project would use double-circuit 500-kV structures. However, the existing ROW would not be able to accommodate the new single-circuit 500-kV LST structures and could not be expanded due to existing infrastructure (San Gabriel River and the 605 Freeway) which would render this alternative infeasible.
- **Partial Composite Core Conductor Alternative:** This alternative was considered by SCE in its PEA (Technology Alternative 1). It would replace existing 220-kV conductors with lightweight composite core wrapped conductors for the purpose of increasing capacity (up to 50 percent) between the Vincent Substation and the Mesa Substation, and between the Mesa Substation and the Chino Substation. However, this

alternative would limit the overall system capacity, and would require upgrades of the existing transmission structures resulting in environmental impacts that are substantially the same as the proposed Project.

2.8.3 Alternate Corridors

The following potential alternatives provide alternate corridors for some segments of the proposed alignment, which would provide for the delivery of power from the TWRA to the Mira Loma Substation in Ontario.

- **Segment 10A Route Alternative:** This alternative route was considered by SCE in its PEA (RA Retained 7). It would route approximately 18 miles of a single-circuit 500-kV T/L along a new 330-foot-wide corridor that would connect the new Windhub Substation with the proposed Whirlwind Substation. This alternative would mostly parallel the Los Angeles Aqueduct which has existing access roads resulting in a reduction of associated air quality, noise, and visual impacts. However, this minor savings would be offset by the longer route required. As such, this alternative would not offer any substantial or noticeable improvement over the proposed Project.
- **Segment 10B Route Alternative:** This alternative route was considered by SCE in its PEA (RA Retained 7). It would follow the Segment 10A Route Alternative for approximately 2.5 miles, turn west for approximately 4 miles, and then turn south along the undesignated 160th Street for approximately 2 miles. From this point, the route would realign with the Segment 10A Route Alternative. This alternative would provide for some potential reduction in visual impacts by moving the T/L behind existing homesteads. However, this minor savings would be offset by the longer route required, which would result in greater air quality, biology, noise and visual impacts. As such, this alternative would not offer any substantial or noticeable improvement over the proposed Project.
- **Windhub Substation to Cottonwind Substation to Whirlwind Station Alternative:** This alternative was considered by SCE in its PEA (RA Eliminated 7). It would establish a new corridor along the foothills of the Tehachapi Mountain Range from Windhub Substation to Cottonwind Substation. From this point, the route would continue southeast along the Segment 4 corridor to Whirlwind Substation. While this alternative would place a portion of the new 500-kV T/L adjacent to existing ROW, the need for a new approximately 25-mile, 200-foot-wide T/L corridor along the foothills of the Tehachapi Mountains (between the Windhub Substation and the Cottonwind Substation) would result in greater environmental impacts than the proposed Project.
- **Whirlwind Substation to Antelope Substation Alternative:** This alternative was considered by SCE in its PEA (RA Eliminated 1). It would establish a new utility corridor between the proposed Whirlwind Substation and the existing Antelope Substation in Segment 4 at a distance of at least 2,000 feet from either the east or west side of the existing corridor. However, this alternative would require the establishment of a new T/L corridor and would result in a slightly longer alignment. The new corridor and access roads required would increase the potential for air quality, biology, land use, noise, and visual resource impacts. As such, this alternative would not substantially lessen any significant impacts associated with the proposed Project.
- **Antelope Substation to Vincent Substation Alternative:** This alternative was considered by SCE in its PEA (RA Eliminated 2). It would establish a new utility corridor between Antelope Substation and Vincent Substation in Segment 5 at a distance of at least 2,000 feet from either the east or west side of the existing corridor. However, this alternative would require the establishment of a new T/L corridor and would result in a slightly longer alignment. The new corridor and access roads required would increase the potential for air quality, biology, land use, noise, and visual resource impacts. As such, this alternative would not substantially lessen any significant impacts associated with the proposed Project without creating greater impacts of its own.
- **Use LADWP Transmission Corridor through the ANF Alternative:** This alternative was considered by SCE in its PEA (RA Eliminated 3, Option 6/11D). It would establish two new 500-kV T/Ls in one of two existing LADWP utility corridors, which would be expanded to accommodate the new lines. For the northern corridor, the new 500-kV T/Ls would originate at Antelope Substation and continue to Sylmar Substation. For the southern corridor, the new 500-kV T/Ls would originate at Vincent Substation and continue to the Tujunga Valley. Both would require a new east-west corridor to Gould Substation to connect into the southern portion of Segment 11 and on to the City of Duarte to connect into Segment 7. However, this alternative would not fully meet the objectives/purpose and need of the TRTP, would compromise system

reliability, and therefore would not meet CAISO/NERC/WECC requirements. Furthermore, it would result in a longer alignment which may also traverse the ANF (depending on which LADWP corridor is used) and result in greater air quality, biology, land use, noise, and visual impacts.

- **New SCE Corridor Across the ANF Alternative:** This alternative was considered by SCE in its PEA (RA Eliminated 3, Option 6/11E). It would locate two new 500-kV T/Ls in a new corridor that would generally follow State Highway 39 through the ANF. A new east-west corridor would be required from where the T/Ls exit the ANF to the City of Duarte to connect into Segment 7 and to a point south of the Gould Substation to connect into the southern portion of Segment 11. However, this alternative would not fully meet the objectives/purpose and need of the TRTP, would compromise system reliability, and therefore would not meet CAISO/NERC/WECC requirements. Furthermore, it would result in a longer alignment which would also traverse the ANF and result in greater air quality, biology, land use, noise, and visual impacts.
- **New Corridor along Highway 14 Alternative:** This alternative was considered by SCE in its PEA (RA Eliminated 4). It would locate two new 500-kV T/Ls in a new corridor from the Vincent Substation, along State Highway 14, to the Rinaldi Substation area (near the interchange of the I-5 and Highway 210). A new east-west corridor would be required from the Rinaldi Substation area to the City of Duarte. However, this alternative would not fully meet the objectives/purpose and need of the TRTP, would compromise system reliability, and therefore would not meet CAISO/NERC/WECC requirements. Furthermore, it would result in a longer alignment requiring the establishment of substantial new ROW resulting in greater air quality, biology, land use, noise, and visual impacts.
- **New Corridor through Cajon Pass Alternative:** This alternative was considered by SCE in its PEA (RA Eliminated 5). This would route a new 500-kV T/L in a new corridor from Vincent Substation east, towards the Lugo Substation through the San Bernardino National Forest (SBNF), and then south through the Cajon Pass to the Mira Loma Substation. However, this alternative would not fully meet the objectives/purpose and need of the TRTP or comply with CAISO/NERC/WECC requirements. Furthermore, this alternative would result in a longer alignment requiring the establishment of substantial new ROW through the SBNF resulting in greater air quality, biology, noise, and visual impacts.
- **San Gabriel Valley New Corridor Alternative:** This alternative would differ from the proposed Project within Segments 7 and 8A only. The new Rio Hondo-Vincent No. 2 T/L would follow the existing Antelope-Mesa alignment and terminate at the Rio Hondo Substation utilizing single-circuit 500-kV structures rather than double-circuit 500-kV structures. In addition, the new Mira Loma-Vincent 500-kV T/L would head east upon leaving the ANF within a new approximately 200-foot wide ROW for approximately 20 miles, along the foothills of the San Gabriel Mountains, between the cities of Azusa and Rancho Cucamonga. This route would then turn south at Blanchard Street in Rancho Cucamonga to join the existing Lugo-Serrano transmission corridor, which parallels Day Creek, before terminating at Mira Loma Substation. Under this alternative, no construction activities would occur between Rio Hondo Substation and Chino Substation within Segments 7 and 8A. However, the amount of new corridor and access roads required would increase the potential for air quality, biological, land use, noise, traffic, and visual resource impacts. Overall, this alternative would not substantially lessen any significant impacts of the proposed Project without creating greater impacts of its own.

2.8.4 System Alternatives

The following potential alternatives are system-wide variations to the proposed Project. These system alternatives were developed by the Tehachapi Collaborative Study Group.

- **Transmission Lines to Midway Substation Alternative:** This system alternative was suggested by SCE in its PEA (System Alternative 1). In addition to the upgrades proposed for Segments 5 through 11, this alternative would construct a new 500-kV T/L within a new ROW between Whirlwind Substation and Midway Substation near Bakersfield. However, this alternative would require approximately 76 miles of new ROW between the Whirlwind and Midway Substations (versus the 16 miles of new ROW between the Whirlwind and Antelope Substations required under the proposed Project), and would also likely result in the need for extensive additional upgrades (undefined) within the PG&E system. As such, the environmental disadvantages of this alternative far outweigh the environmental advantages.

- **Non-Transmission System Alternative:** This system alternative was suggested by SCE in its PEA (System Alternative 2). It would include the development of in-basin generation instead of interconnecting generation from the TWRA. In addition, demand-side management and energy efficient programs would be implemented. However, this alternative does not meet the basic objectives/purpose and need of the TRTP.

2.8.5 Other Alternatives Considered

Alternatives were also suggested by public agencies and the public during the scoping period for the EIR/EIS (August-October 2007). While some of these requests were detailed enough to generate viable alternatives, others lacked specificity and instead only suggested that some other alternative must be possible. It was also determined that some suggestions were better suited for consideration as mitigation measures within the EIR/EIS. For various reasons, these suggestions did not lead to the development of viable alternatives and, therefore, could not be included in the screening process. Below is a list of concepts for alternatives brought up during the scoping period that did not result in the formulation of potential alternatives. For a complete description of these concepts, please see Appendix A (Alternatives Screening Report) of the EIR/EIS.

- Avoid Impacts to Habitat Authority Properties
- Avoid Parklands, Public Open Space, and Recreation Areas
- Reduce Impacts to the River Commons Project
- Reduce New ROW Width West of Mira Loma Substation
- Use Existing Corridors
- Rowland Heights Water District Detour
- Chino Hills 500-kV Split
- Use Tubular Steel Poles
- Match Existing Structure Heights
- Solar Power