4. Comparison of Alternatives

This section provides a comparison of the proposed Project and alternatives described in Chapter 2 and analyzed in Sections 3.2 through 3.17. The comparative analysis presented in this section focuses on the differences in impacts among the various alternatives, with particular emphasis given to the differences in significant effects. This section is intended to provide decision-makers with information about the merits and disadvantages of the alternatives that will assist them in their consideration of SCE's pending application for the proposed Project, and to assist the public in understanding the differences between the alternatives. Consistent with State CEQA Guidelines (Section 15126.6(e)(2)), the environmentally superior alternative identified by the CEQA Lead Agency, the CPUC, is presented this section. Among the alternatives analyzed in this EIR/EIS, the NEPA Lead Agency, the USDA Forest Service, has not identified a preferred alternative, but such an alternative will be identified in the Final EIR/EIS (40 CFR 1502.14). Furthermore, pursuant to NEPA Regulations (40 CFR 1505.2(b)), the environmentally preferred alternative or alternatives must be identified in the Record of Decision (ROD) for the Project.

Section 4.1 provides a summary of the proposed Project and the alternatives analyzed in this EIR/EIS. Section 4.2 provides a discussion highlighting the differences and similarities among the alternatives by environmental issue/resource area, and presents a comparison matrix of environmental impacts and issues for all the alternatives. Section 4.3 describes the methodology used for comparing alternatives and provides a discussion and conclusion regarding the environmentally superior alternative as required by CEQA.

4.1 Summary of Alternatives

To facilitate a clear understanding of the various alternatives, this section provides a summary of the detailed descriptions for each alternative presented in Chapter 2. The primary features of the proposed Project and each alternative are presented in a series of tables for each alternative, and a summary matrix of the components of the proposed Project and all alternatives is provided in Table 4.1-10 at the end of this section to allow for ease of comparison. An overall map of the proposed Project and alternatives is presented in Figure 2.1-1 located at the end of Chapter 2. More detailed route maps are also presented in Figures 2.2-1a through 2.2-1y (located in the Map & Figure Series Volume) for SCE's proposed Project (Alternative 2), and in Figure 2.3-1 (Alternative 3), Figure 2.4-1 through 2.4-4 (Alternatives 4A to 4D), Figure 2.5-1 (Alternative 5), Figure 2.6-1 (Alternative 6), and Figures 2.7-1 and 2.7-2 (Alternative 7) located at the end of Chapter 2.

4.1.1 No Project/Action Alternative

The No Project/Action Alternative is described in Section 2.1. The No Project/Action Alternative would result in the TRTP, as proposed, not being implemented. 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 (Forest Service and USACE). 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 3.2 and 5.7 of the

CAISO's Tariff. Future generation projects, specifically within the TWRA, 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 T/L, 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, 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 T/L, 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.

4.1.1 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 ROW from the TWRA in southern Kern County south through Los Angeles County and the 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. 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 major features of SCE's proposed Project (Alternative 2), by segment, are provided in Table 4.1-1 (see Table 2.2-1 in Chapter 2 for a more complete summary).

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.

Table 4.1-1. Features of Alternative 2 (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) • Disturbance during construction 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
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 4.0-mile single-circuit 220-kV T/Ls (Cottonwind – Whirlwind 220-kV No. 1 & No. 2) • Construct new approximately 15.6-mile single-circuit Antelope – Whirlwind 500-kV T/L • All proposed permanent infrastructure to be located within new 200-foot-wide ROW (approx. 19.6 miles total) • Erect approximately 165 new transmission structures
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 in existing ROW (approx. 17.8 miles) • Erect approximately 67 new single-circuit 500-kV LSTs
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 (on private lands) 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 on NFS lands along approx. 20.4 miles) • Construction of 16 structures by helicopter (all on NFS lands), supported by 7 helicopter staging areas (4 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
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 26.9-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 total new transmission structures (105 on NFS lands along approx. 21.85 miles) • Construction of 17 structures by helicopter (all on NFS lands), supported by 5 helicopter staging areas (4 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

Table 4.1-1. Features of Alternative 2 (SCE's Proposed Project) Components
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 Rio Hondo Substation and the Mesa Substation • All proposed permanent infrastructure to be located within existing ROW (approx. 15.8 miles) • Erect approximately 85 new transmission structures • Erect approximately 150 new double-circuit 66-kV subtransmission LWSPs and TSPs
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 (Segment 8A/8C) • Construct approximately 6.8 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) • Erect approximately 226 new transmission structures • Erect approximately 55 new double-circuit 66-kV subtransmission LWSPs
Segment 9: Substation Facilities
• Construct new Whirlwind Substation • Expand and upgrade existing Antelope and Vincent Substations to accommodate new 500-kV and 220-kV equipment • 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.

4.1.2 Alternative 3: West Lancaster Alternative

This alternative would re-route the new 500-kV T/L in Segment 4 along 115th Street West rather than 110th Street West. The West Lancaster Alternative would deviate from the proposed route 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 3.4-mile 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. Details of those segments of Alternative 3 that differ from SCE's proposed Project (Alternative 2) are provided in Table 4.1-2.

Table 4.1-2. Features of Alternative 3 (West Lancaster) Components
Overall Project Construction
• Proposed construction duration of 52 months (estimated to begin in July 2009 and end in November 2013) • There would be a decrease in the land disturbance total by a factor of one structure within Segment 4. As such, the acres disturbed during construction would continue to be basically the same as Alt 2.
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 4.0-mile single-circuit 220-kV T/Ls (Cottonwind – Whirlwind 220-kV No. 1 & No. 2) • Construct new approximately 16.0-mile single-circuit Antelope – Whirlwind 500-kV T/L (0.4 mile greater than Alt 2) • All proposed permanent infrastructure to be located within new 200-foot-wide ROW (approx. 20.0 miles total) • Erect approximately 164 new transmission structures (one less structure compared to Alt 2)

4.1.3 Alternative 4: Chino Hills Route Alternatives

4.1.3.1 Chino Hills Route A Alternative

Alternative 4A would deviate from the proposed Project (Alternative 2) beginning about two miles east of State Route 57 (approximately S8A MP 19.2). At that point, the new Vincent-Mira Loma 500-kV T/L would turn southeast, remaining parallel and south of the existing Walnut/Olinda-Mira Loma 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 CHSP. 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 access and spur roads would be required to access the transmission structures and switching station (described below) 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 Vincent-Mira Loma 500-kV T/L would terminate into a new 500-kV gas-insulated switching station. The existing 500-kV lines would be looped into the new switching station allowing for power to be transferred along the existing 500-kV lines to Mira Loma Substation.

From the point of deviation (S8A MP 19.2) to the new switching station (6.2 miles), approximately 21 new double-circuit 500-kV structures would be required, of which approximately 8 to 10 structures would be within CHSP. 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. 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. 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. 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.

Details of those segments of Alternative 4A that differ from SCE's proposed Project (Alternative 2) are provided in Table 4.1-3.

Table 4.1-3. Features of Alternative 4A (Chino Hills Route A) Components
Overall Project Construction
• Proposed construction duration of 52 months (estimated to begin in July 2009 and end in November 2013) • Construction of the new switching station would take approximately one year to complete; however, depending on the civil improvements required, approximately two years would be required for engineering, procurement, and construction. It is assumed that this schedule would be accommodated within the 36 months currently allotted for Segment 8 • Disturbance during construction of approximately 1,512 acres with a ±15% range of 1,269-1,755 acres, resulting in permanent land disturbance of approximately 291 acres with a ±15% range of 246-336 acres
Segment 8: Section of New Mira Loma – Vincent 500-kV T/L
• Initiates near the existing Mesa Substation and ends at a new switching station within CHSP • Remove various 220-kV T/L structures between the existing Mesa Substation and S8A MP 19.2 (point of deviation) • Construct approximately 23.2 miles of new double-circuit 500-kV T/L (9.8 miles less than Alt 2) plus approximately 0.85 mile of modifications to existing T/Ls in CHSP to tie into the new switching station • No construction between the Chino Substation and Mira Loma Substation • No relocation of 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) ▪ Alt 4A re-route ROW expansion (existing: none; future: 6.2 miles [2.3 miles within CHSP], 150-foot-wide) • Erect approximately 135 new transmission structures, of which 8 to 10 would be within CHSP (Reduces total structures by 91 compared to Alt 2) • New 4-5 acre gas-insulated switching station in CHSP
Segment 9: Substation Facilities
• Construct new Whirlwind Substation • Expand and upgrade existing Antelope and Vincent Substations to accommodate new 500-kV and 220-kV equipment • Upgrade existing Mesa and Gould Substations to accommodate new 220-kV equipment • No upgrades to the existing Mira Loma Substation are required as no new T/Ls would connect

4.1.3.2 Chino Hills Route B Alternative

Alternative 4B would deviate from the proposed Project (Alternative 2) beginning about two miles east of State Route 57 (approximately S8A MP 19.2). At that point, the new Mira Loma-Vincent 500-kV T/L would turn southeast, remaining parallel and north of the existing Walnut/Olinda-Mira Loma 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. New permanent access and spur roads would be required to access the transmission structures and switching station (described below) constructed as part of this alternative. The existing 500-kV T/Ls located in this area would be looped into the new switching station, allowing for power to be transferred along the existing 500-kV T/Ls to Mira Loma Substation.

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. 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. 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. 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. 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.

Details of those segments of Alternative 4B that differ from SCE's proposed Project (Alternative 2) are provided in Table 4.1-4.

Table 4.1-4. Features of Alternative 4B (Chino Hills Route B) Components

Overall Project Construction
• Proposed construction duration of 52 months (estimated to begin in July 2009 and end in November 2013) • Construction of the new switching station would take approximately one year to complete; however, depending on the civil improvements required, approximately two years would be required for engineering, procurement, and construction. It is assumed that this schedule would be accommodated within the 36 months currently allotted for Segment 8 • Disturbance during construction of approximately 1,539 acres with a ±15% range of 1,291-1,788 acres, resulting in permanent land disturbance of approximately 281 acres with a ±15% range of 238-324 acres
Segment 8: Section of New Mira Loma – Vincent 500-kV T/L
• Initiates near the existing Mesa Substation and ends at a new switching station just east of CHSP • Remove various 220-kV T/L structures between the existing Mesa Substation and S8A MP 19.2 (point of deviation) • Construct approximately 26.7 miles of new double-circuit 500-kV T/L (6.3 miles less than Alt 2) plus approximately 0.95 mile of modifications to existing T/Ls to tie into the new switching station • No construction between the Chino Substation and Mira Loma Substation • No relocation of 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) ▪ Alt 4B re-route ROW expansion (existing: none; future: 9.7 miles [4.9 miles within CHSP], 150-foot-wide) • Erect approximately 154 new transmission structures, of which 18 to 21 would be within CHSP (reduction of 72 structures compared to Alt 2) • New 4-5 acre gas-insulated switching station east of CHSP
Segment 9: Substation Facilities
• Construct new Whirlwind Substation • Expand and upgrade existing Antelope and Vincent Substations to accommodate new 500-kV and 220-kV equipment • Upgrade existing Mesa and Gould Substations to accommodate new 220-kV equipment • No upgrades to the existing Mira Loma Substation are required as no new T/Ls would connect

4.1.3.3 Chino Hills Route C Alternative

Alternative 4C would deviate from the proposed Project (Alternative 2) beginning about two miles east of State Route 57 (approximately S8A MP 19.2). At that point, the new Mira Loma-Vincent 500-kV T/L would turn southeast, and remain parallel and south of the existing Walnut/Olinda-Mira Loma 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. Approximately 19 double-circuit 500-kV LSTs would be required for this approximately 5.7-mile re-route to the new switching station. In addition, at the point of

deviation (S8A MP 19.2), an existing 220-kV lattice structure would 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.

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, allowing for power to be transferred along the existing 500-kV T/Ls to Mira Loma Substation. Approximately 3.6 miles of new ROW would be required to re-route the existing 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). 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). 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).

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. 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 mile 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). In addition, approximately 12 existing 220-kV double-circuit LSTs within CHSP and 2 outside CHSP (14 total) would be removed (2.4 miles).

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. 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.

Details of those segments of Alternative 4C that differ from SCE's proposed Project (Alternative 2) are provided in Table 4.1-5.

Table 4.1-5. Features of Alternative 4C (Chino Hills Route C) Components

Overall Project Construction
• Proposed construction duration of 52 months (estimated to begin in July 2009 and end in November 2013) • Construction of the new switching station would take approximately one year to complete; however, depending on the civil improvements required, approximately two years would be required for engineering, procurement, and construction. It is assumed that this schedule would be accommodated within the 36 months currently allotted for Segment 8 • Disturbance during construction of approximately 1,567 acres with a ±15% range of 1,313-1,822 acres, resulting in permanent land disturbance of approximately 287 acres with a ±15% range of 243-332 acres

Table 4.1-5. Features of Alternative 4C (Chino Hills Route C) Components
Segment 8: Section of New Mira Loma – Vincent 500-kV T/L
• Initiates near the existing Mesa Substation and ends at a new switching station located outside of CHSP (northwest) • Remove various 220-kV T/L structures between the existing Mesa Substation and S8A MP 19.2 (point of deviation) • Construct approximately 22.7 miles of new double-circuit 500-kV T/L (10.3 miles less than Alt 2) • Construct approximately 3.6 miles of 2 new parallel single-circuit 500-kV T/Ls, one approximately 1.6 miles (north-south) and one approximately 2.0 miles (east-west) to re-route the existing single-circuit 500-kV T/Ls into/out of the new switching station • Construct approximately 3.43 miles of new double-circuit 220-kV T/L to re-route existing double-circuit 220-kV T/Ls. Route would parallel the new double-circuit 500-kV T/Ls from CHSP boundary to switching station (1.45 miles) and then follow the re-routed single-circuit 500-kV T/Ls around the new switching station and into CHSP (1.98 miles). • No construction between the Chino Substation and Mira Loma Substation • No relocation of 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) ▪ Alt 4C re-route ROW expansion S8A MP 19.2 to CHSP boundary (existing: none; future: 4.2-mile, 150-foot-wide) ▪ Alt 4C 500/220 re-route new ROW CHSP boundary to switching station (existing: none; future: 1.5-mile, 300-foot-wide) ▪ Alt 4C north-south 500-kV re-route new ROW (existing: none; future 1.6-mile [1.5 miles in CHSP], 330-foot-wide) ▪ Alt 4C east-west 500/220 re-reroute new ROW (existing: none; future 2.0-mile [1.6 miles within CHSP], 480-foot wide) • Erect approximately 175 new transmission structures of which 30 to 32 would be within CHSP (Reduces total structures by 51 compared to Alt 2) • Remove approximately 17 existing single-circuit 500-kV structures (13 in CHSP) • Remove approximately 14 existing double-circuit 220-kV structures (12 in CHSP) • New 4-5 acre gas-insulated switching station northwest of CHSP
Segment 9: Substation Facilities
• Construct new Whirlwind Substation • Expand and upgrade existing Antelope and Vincent Substations to accommodate new 500-kV and 220-kV equipment • Upgrade existing Mesa and Gould Substations to accommodate new 220-kV equipment • No upgrades to the existing Mira Loma Substation are required as no new T/Ls would connect

4.1.3.4 Chino Hills Route D Alternative

Alternative 4D would deviate from the proposed Project (Alternative 2) beginning about two miles east of State Route 57 (approximately S8A MP 19.2). At that point, the new Mira Loma-Vincent 500-kV T/L would turn southeast, remaining parallel and north of the existing Walnut/Olinda-Mira Loma 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. 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, 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. 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. 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. 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.

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. 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.

Details of those segments of Alternative 4D that differ from SCE's proposed Project (Alternative 2) are provided in Table 4.1-6.

Table 4.1-6. Features of Alternative 4D (Chino Hills Route D) Components

Overall Project Construction
• Proposed construction duration of 52 months (estimated to begin in July 2009 and end in November 2013) • Construction of the new switching station would take approximately one year to complete; however, depending on the civil improvements required, approximately two years would be required for engineering, procurement, and construction. It is assumed that this schedule would be accommodated within the 36 months currently allotted for Segment 8 • Disturbance during construction of approximately 1,549 acres with a ±15% range of 1,298-1,800 acres, resulting in permanent land disturbance of approximately 290 acres with a ±15% range of 245-335 acres
Segment 8: Section of New Mira Loma – Vincent 500-kV T/L
• Initiates near the existing Mesa Substation and ends at a new switching station just east of CHSP • Remove various 220-kV T/L structures between the existing Mesa Substation and S8A MP 19.2 (point of deviation) • Construct approximately 26.8 miles of new double-circuit 500-kV T/L (6.2 miles less than Alt 2) plus approximately 0.95 mile of modifications to existing T/Ls to tie into the new switching station • No construction between the Chino Substation and Mira Loma Substation • No relocation of 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) ▪ Alt 4D re-route ROW expansion (existing: unknown; future: 4.2 miles, 150-foot-wide expansion) ▪ Alt 4D re-route new ROW (existing: none; future: 5.6 miles [1.4 miles within CHSP], 200-foot-wide) • Erect approximately 164 new transmission structures of which 5 to 8 would be within CHSP (reduction of 62 structures compared to Alt 2) • New 4-5 acre gas-insulated switching station east of CHSP
Segment 9: Substation Facilities
• Construct new Whirlwind Substation • Expand and upgrade existing Antelope and Vincent Substations to accommodate new 500-kV and 220-kV equipment • Upgrade existing Mesa and Gould Substations to accommodate new 220-kV equipment • No upgrades to the existing Mira Loma Substation are required as no new T/Ls would connect

4.1.4 Alternative 5: Partial Underground Alternative

Alternative 5 would utilize underground construction through Chino Hills between approximately S8A MP 21.9 and 25.4 in place of the proposed overhead line construction, following generally the same route as the proposed Project (Alternative 2). Beginning just west of the dead-end of Eucalyptus Avenue (~S8A MP 21.9) the proposed double-circuit 500-kV T/L would transition from overhead to underground via a new transition station. The underground segment would continue underground generally following the existing ROW for approximately 3.5 miles through the developed area of Chino Hills to an area just west of Pipeline Avenue and State Highway 71 (~S8A MP 25.4), where a transition station would be placed to convert the double-circuit 500-kV T/L back from underground to overhead.

The existing 220-kV T/L along Segment 8A would be left in place from approximately S8A MP 21.9 to 25.4.

Details of those segments of Alternative 5 that differ from SCE's proposed Project (Alternative 2) are provided in Table 4.1-7.

Table 4.1-7. Features of Alternative 5 (Partial Underground) Components

Overall Project Construction
• Proposed construction duration of 52 months (estimated to begin in July 2009 and end in November 2013) • It is assumed that the underground portion of Alternative 5, including tunnel excavation, liner installation, line installation, transition stations, and the ventilation system would be constructed concurrently over a 24 month period • Disturbance during construction of approximately 1,563 acres with a ±15% range of 1,309-1,816 acres, resulting in permanent land disturbance of approximately 280 acres with a ±15% range of 237-323 acres
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 (Segment 8A/8C), of which 3.5 miles would be constructed in a new 18-foot external diameter underground tunnel • Construct approximately 6.8 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 construction in 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) • Erect approximately 211 new transmission structures (reduction of 15 structures compared to Alt 2) • Erect approximately 55 new double-circuit 66-kV subtransmission LWSPs • Construct two new transition stations (each approximately 220-feet wide by 320-feet long or 1.6 acres)

4.1.5 Alternative 6: Maximum Helicopter Construction in the ANF Alternative

Alternative 6 includes candidate helicopter staging/support areas that have been identified within the vicinity of Segments 6 and 11 to facilitate helicopter construction within the ANF. 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, access and spur roads, 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. As a result of helicopter construction, approximately 42 miles (±15% range of 49 to 36 miles) of new and upgraded roads (reconstruction/maintenance), which would be required as part of SCE's proposed Project (Alternative 2), would not be created or upgraded for ground access to the helicopter constructed towers.

Details of those segments of Alternative 6 that differ from SCE's proposed Project (Alternative 2) are provided in Table 4.1-8.

Table 4.1-8. Features of Alternative 6 (Maximum Helicopter Construction in the ANF) Components

Overall Project Construction
• Construction of Alternative 6 would be identical to the proposed Project (52 months), with the exception of Segments 6 and 11, where the need for substantial helicopter construction may result in a longer construction schedule due to the limited availability of specialized helicopters and personnel. The schedule for helicopter construction would be finalized as part of final engineering.

Table 4.1-8. Features of Alternative 6 (Maximum Helicopter Construction in the ANF) Components
• Disturbance during construction of approximately 1,456 acres with a ±15% range of 1,237-1,674 acres, resulting in permanent land disturbance of approximately 230 acres with a ±15% range of 196-265 acres
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 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 approximately the 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 on NFS lands along approx. 20.4 miles) • Construction of 56 structures by helicopter (all on NFS lands), supported by 4 helicopter staging areas (3 on NFS lands) • Approximately 23 miles (±15% range of 20 to 27 miles) of roads, of which approximately 16 miles (±15% range of 14 to 18 miles) would be on NFS lands, would be created (new), reconstructed, or require some amount of maintenance
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 26.9-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 total new transmission structures (105 on NFS lands along approx. 21.85 miles) • Construction of up to 87 structures by helicopter (all on NFS lands), supported by 7 helicopter staging areas (7 on NFS lands) • Approximately 35 miles (±15% range of 30 to 41 miles) of roads, of which approximately 33 miles (±15% range of 28 to 37 miles) would be on NFS lands, would be created (new), reconstructed, or require some amount of maintenance

4.1.6 Alternative 7: 66-kV Subtransmission Alternative

This alternative is comprised of three 66-kV subtransmission line elements, including the following: (1) Duck Farm 66-kV Underground, which includes undergrounding the existing 66-kV subtransmission line on Segment 7 through the River Commons at the Duck Farm (Duck Farm Project) between Valley Boulevard (S7 MP 8.9) and S7 MP 9.9) to minimize the Project's effects to passive recreation opportunities in the planned Duck Farm Project area; (2) Whittier Narrows 66-kV Underground Re-Route, which includes 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; and (3) Whittier Narrows 66-kV Overhead Re-Route, which includes 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.

Details of those segments of Alternative 7 that differ from SCE's proposed Project (Alternative 2) are provided in Table 4.1-9.

Table 4.1-9. Features of Alternative 7 (66-kV Subtransmission) Components

Overall Project Construction

- Identical to Alternative 2 (SCE's Proposed Project). Proposed construction duration of 52 months (estimated to begin in July 2009 and end in November 2013)
- Disturbance during construction 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. Some additional temporary disturbance associated with underground construction of 66-kV subtransmission lines through the Duck Farm and along Segment 7 to re-route the 66-kV line around the Whittier Narrows Recreation area. New access and spur roads may also be required for the new approximately 1,200 foot ROW for the San Gabriel River crossing within Segment 8A associated with the Whittier Narrows 66-kV Overhead Re-Route.

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 Rio Hondo Substation and the Mesa Substation. Unlike Alternative 2 (SCE's Proposed Project), this alternative would include two short segments of 66-kV underground, as follows:
  - (1) an approximately 6,000-foot underground segment of 66-kV subtransmission line from S7 MP 8.9 to 9.9 through the Duck Farm Project; and
  - (2) an approximately 3,300-foot re-route of 66-kV subtransmission line, which would be placed underground, beginning at approx. S7 MP 11.4 and proceed north along Peck Road, then west along Durfee Road, rejoining the 220-kV ROW (proposed Project ROW) at approx. S7 MP 12.025.
- All proposed permanent infrastructure to be located within existing ROW (approx. 15.8 miles)
- Erect approximately 85 new transmission structures
- Erect approximately 128 new double-circuit 66-kV subtransmission LWSPs and TSPs (22 fewer than Alt 2)

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 (Segment 8A/8C)
- Construct approximately 6.8 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. Unlike Alternative 2 (SCE's Proposed Project), this alternative would re-route a short segment of 66-kV overhead out of Whittier Narrows Recreation Area beginning near the San Gabriel Junction (S8A MP 2.2) and southeast along San Gabriel Boulevard and Siphon Road to rejoin the 220-kV ROW (proposed Project ROW) at approx. S8A MP 3.8.
- Most of the proposed infrastructure would be located within existing ROW, except for the following:
  - San Gabriel River Crossing (66-kV) new ROW (existing: none; future: 0.2-mile or 1,200-foot, 60-foot-wide)
  - 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)
- Erect approximately 226 new transmission structures
- Erect approximately 45 new double-circuit 66-kV subtransmission LWSPs (10 fewer than Alt 2)

Table 4.1-10. Summary Comparison of Components of the Proposed Project and Alternatives

	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max Helicopter in ANF)	Alternative 7 (66-kV Subtransmission)
Overall Project Construction						
Total length of 500-kV and 220-kV T/L (miles)	172.9	173.3	Route A: 156.3 plus 0.85 for existing T/L modifications (approx. 157 miles total) Route B: 159.8 plus 0.95 for existing T/L modifications (approx. 161 miles total) Route C: 155.8 plus 7.0 for re-routing existing 220/500kV T/Ls (approx. 163 miles total) Route D: 159.9 plus 0.95 for existing T/L modifications (approx. 161 miles total)	172.9	172.9	172.9
Total number of new transmission structures (not including 66-kV sub-T/Ls)	853	852	Route A: 762 Route B: 781 Route C: 802 Route D: 791	838	853	853
Total disturbance during construction (acres)	1,538 (±15%: 1,307 to 1,769)	1,538* (±15%: 1,307 to 1,769)	Route A: 1,512 (±15%: 1,269 to 1,755) Route B: 1,539 (±15%: 1,291 to 1,788) Route C: 1,567 (±15%: 1,313 to 1,822) Route D: 1,549 (±15%: 1,298 to 1,800)	1,563 (±15/20%: 1,309 to 1,816)	1,456 (±15%: 1,237 to 1,674)	1,538** (±15%: 1,307 to 1,769)
NFS lands (acres)	272 (±15%: 231 to 312)	272 (±15%: 231 to 312)	272 (±15%: 231 to 312)	272 (±15%: 231 to 312)	203 (±15%: 172 to 233)	272 (±15%: 231 to 312)
Total permanent disturbance (acres)	277 (±15%: 235 to 318)	277* (±15%: 235 to 318)	Route A: 291 (±15%: 246 to 336) Route B: 281 (±15%: 238 to 324) Route C: 287 (±15%: 243 to 332) Route D: 290 (±15%: 245 to 335)	280 (±15/20%: 237 to 323)	230 (±15%: 196 to 265)	277** (±15%: 235 to 318)

Table 4.1-10. Summary Comparison of Components of the Proposed Project and Alternatives

	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max Helicopter in ANF)	Alternative 7 (66-kV Subtransmission)
Total permanent disturbance (acres) NFS lands (acres)	109 (±15%: 93 to 125)	109 (±15%: 93 to 125)	109 (±15%: 93 to 125)	109 (±15%: 93 to 125)	62 (±15%: 53 to 72)	109 (±15%: 93 to 125)
Duration of Construction	52 months	52 months	52 months	52 months	52 months***	52 months
Segment 10: New Whirlwind – Windhub 500-kV T/L						
Distance of new ROW [1 s-c 500-kV T/L]	16.8 miles	16.8 miles	16.8 miles	16.8 miles	16.8 miles	16.8 miles
No. new transmission structures	96 (s-c 500-kV LSTs)	96 (s-c 500-kV LSTs)	96 (s-c 500-kV LSTs)	96 (s-c 500-kV LSTs)	96 (s-c 500-kV LSTs)	96 (s-c 500-kV LSTs)
Segment 4: Whirlwind 500/220 kV T/L Elements						
Distance of new ROW	19.6 miles	20.0 miles	19.6 miles	19.6 miles	19.6 miles	19.6 miles
2 s-c 220-kV T/Ls	4.0 miles (each)	4.0 miles (each)	4.0 miles (each)	4.0 miles (each)	4.0 miles (each)	4.0 miles (each)
1 s-c 500-kV T/L	15.6 miles	16.0 miles	15.6 miles	15.6 miles	15.6 miles	15.6 miles
No. new transmission structures	165	164	165	165	165	165
Segment 5: Antelope – Vincent No. 2 500-kV T/L						
Distance of existing ROW [1 s-c 500-kV T/L]	17.8 miles	17.8 miles	17.8 miles	17.8 miles	17.8 miles	17.8 miles
Existing T/Ls to be removed	Antelope-Vincent 220-kV; Antelope-Mesa 220-kV	Antelope-Vincent 220-kV; Antelope-Mesa 220-kV	Antelope-Vincent 220-kV; Antelope-Mesa 220-kV	Antelope-Vincent 220-kV; Antelope-Mesa 220-kV	Antelope-Vincent 220-kV; Antelope-Mesa 220-kV	Antelope-Vincent 220-kV; Antelope-Mesa 220-kV
No. new transmission structures	67 (s-c 500-kV LSTs)	67 (s-c 500-kV LSTs)	67 (s-c 500-kV LSTs)	67 (s-c 500-kV LSTs)	67 (s-c 500-kV LSTs)	67 (s-c 500-kV LSTs)
Segment 11: New Mesa – Vincent (via Gould) 500/220-kV T/L						
Distance of ROW [existing and expanded]	36.2 miles	36.2 miles	36.2 miles	36.2 miles	36.2 miles	36.2 miles
New 220-kV conductor on existing towers	17.5 miles	17.5 miles	17.5 miles	17.5 miles	17.5 miles	17.5 miles
1 s-c 500-kV T/L	18.7 miles	18.7 miles	18.7 miles	18.7 miles	18.7 miles	18.7 miles
Distance of expanded ROW	3.0 miles	3.0 miles	3.0 miles	3.0 miles	3.0 miles	3.0 miles
Distance of ROW on NFS lands	20.4 miles	20.4 miles	20.4 miles	20.4 miles	20.4 miles	20.4 miles
Existing T/Ls to be removed	Pardee-Vincent No.1 220-kV Eagle Rock-Pardee 220-kV	Pardee-Vincent No.1 220-kV Eagle Rock-Pardee 220-kV	Pardee-Vincent No.1 220-kV Eagle Rock-Pardee 220-kV	Pardee-Vincent No.1 220-kV Eagle Rock-Pardee 220-kV	Pardee-Vincent No.1 220-kV Eagle Rock-Pardee 220-kV	Pardee-Vincent No.1 220-kV Eagle Rock-Pardee 220-kV

Table 4.1-10. Summary Comparison of Components of the Proposed Project and Alternatives

	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max Helicopter in ANF)	Alternative 7 (66-kV Subtransmission)
No. new transmission structures (total)***	76 (s-c 500 & 220-kV LSTs s-c 220-kV TSPs)	76 (s-c 500 & 220-kV LSTs s-c 220-kV TSPs)	76(s-c 500 & 220-kV LSTs s-c 220-kV TSPs)	76 (s-c 500 & 220-kV LSTs s-c 220-kV TSPs)	76 (s-c 500 & 220-kV LSTs s-c 220-kV TSPs)	76 (s-c 500 & 220-kV LSTs s-c 220-kV TSPs)
No. on NFS lands[1]	59 (s-c 500-kV LSTs)	59 (s-c 500-kV LSTs)	59 (s-c 500-kV LSTs)	59 (s-c 500-kV LSTs)	59 (s-c 500-kV LSTs)	59 (s-c 500-kV LSTs)
No. new transmission structures constructed by helicopter (all NFS lands)	16	16	16	16	56	16
No. of helicopter staging areas (total)	7	7	7	7	4	7
No. on NFS lands	4	4	4	4	3	4
New Roads on NFS lands	1.35 miles	1.35 miles	1.35 miles	1.35 miles	0.36 miles	1.35 miles
Reconstructed Roads on NFS lands	13.3 miles	13.3 miles	13.3 miles	13.3 miles	8.56 miles	13.3 miles
Maintenance Roads on NFS lands	18.2 miles	18.2 miles	18.2 miles	18.2 miles	7.10 miles	18.2 miles
Private/Non-NFS Roads requiring upgrade	7.23 miles	7.23 miles	7.23 miles	7.23 miles	7.12 miles	7.23 miles
Total new/upgraded roads	40.05 miles (±15%: 34 to 46)	40.05 miles (±15%: 34 to 46)	40.05 miles (±15%: 34 to 46)	40.05 miles (±15%: 34 to 46)	23.13 miles (±15%: 20 to 27)	40.05 miles (±15%: 34 to 46)
Total new/upgraded roads on NFS lands	32.83 miles (±15%: 28 to 38)	32.83 miles (±15%: 28 to 38)	32.83 miles (±15%: 28 to 38)	32.83 miles (±15%: 28 to 38)	16.01 miles (±15%: 14 to 18)	32.83 miles (±15%: 28 to 38)
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						
Distance of existing ROW [s-c 500-kV T/L]	26.9 miles	26.9 miles	26.9 miles	26.9 miles	26.9 miles	26.9 miles
Distance of NFS lands	21.85 miles	21.85 miles	21.85 miles	21.85 miles	21.85 miles	21.85 miles
Existing T/Ls to be removed	Rio Hondo-Vincent No. 2 220-kV; Antelope-Mesa 220-kV	Rio Hondo-Vincent No. 2 220-kV; Antelope-Mesa 220-kV	Rio Hondo-Vincent No. 2 220-kV; Antelope-Mesa 220-kV	Rio Hondo-Vincent No. 2 220-kV; Antelope-Mesa 220-kV	Rio Hondo-Vincent No. 2 220-kV; Antelope-Mesa 220-kV	Rio Hondo-Vincent No. 2 220-kV; Antelope-Mesa 220-kV
No. new transmission structures (total)	138 (s-c 500 & 220-kV LSTs s-c 500-kV TSPs)	138 (s-c 500 & 220-kV LSTs s-c 500-kV TSPs)	138 (s-c 500 & 220-kV LSTs s-c 500-kV TSPs)	138 (s-c 500 & 220-kV LSTs s-c 500-kV TSPs)	138 (s-c 500 & 220-kV LSTs s-c 500-kV TSPs)	138 (s-c 500 & 220-kV LSTs s-c 500-kV TSPs)
No. on NFS lands	105 (99 s-c 500-kV LSTs 6 s-c 500-kV TSPs)	105 (99 s-c 500-kV LSTs 6 s-c 500-kV TSPs)	105 (99 s-c 500-kV LSTs 6 s-c 500-kV TSPs)	105 (99 s-c 500-kV LSTs 6 s-c 500-kV TSPs)	105 (99 s-c 500-kV LSTs 6 s-c 500-kV TSPs)	105 (99 s-c 500-kV LSTs 6 s-c 500-kV TSPs)

[1] There are a total of 68 structures on NFS lands in Segment 11; where 59 structures are new and nine (9) are existing double-circuit structures of the Eagle Rock-Mesa 220-kV T/L where new 220-kV conductor would be strung on the vacant side of these structures.

Table 4.1-10. Summary Comparison of Components of the Proposed Project and Alternatives

	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max Helicopter in ANF)	Alternative 7 (66-kV Subtransmission)
No. new transmission structures constructed by helicopter (all NFS lands)	17	17	17	17	87	17
No. of helicopter staging areas (total)	5	5	5	5	7	5
No. on NFS lands	4	4	4	4	7	4
New Roads on NFS lands	2.85 miles	2.85 miles	2.85 miles	2.85 miles	0.30 mile	2.85 miles
Reconstructed Roads on NFS lands	9.67 miles	9.67 miles	9.67 miles	9.67 miles	4.27 miles	9.67 miles
Maintenance Roads on NFS lands	45.6 miles	45.6 miles	45.6 miles	45.6 miles	28.0 miles	45.6 miles
Private/Non-NFS Roads requiring upgrade	2.66 miles	2.66 miles	2.66 miles	2.66 miles	2.66 miles	2.66 miles
Total new/upgraded roads	60.79 miles (±15%: 52 to 70)	60.79 miles (±15%: 52 to 70)	60.79 miles (±15%: 52 to 70)	60.79 miles (±15%: 52 to 70)	35.22 miles (±15%: 30 to 41)	60.79 miles (±15%: 52 to 70)
Total new/upgraded roads on NFS lands	58.13 miles (±15%: 49 to 67)	58.13 miles (±15%: 49 to 67)	58.13 miles (±15%: 49 to 67)	58.13 miles (±15%: 49 to 67)	32.55 miles (±15%: 28 to37)	58.13 miles (±15%: 49 to 67)
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						
Distance of existing ROW [d-c 500-kV T/L]	15.8 miles	15.8 miles	15.8 miles	15.8 miles	15.8 miles	15.8 miles
Existing T/L to be removed	Antelope-Mesa 220-kV	Antelope-Mesa 220-kV	Antelope-Mesa 220-kV	Antelope-Mesa 220-kV	Antelope-Mesa 220-kV	Antelope-Mesa 220-kV
No. new transmission structures	85 (d-c 500-kV LSTs/TSPs s-c 500-kV LSTs d-c 220-kV LST)	85 (d-c 500-kV LSTs/TSPs s-c 500-kV LSTs d-c 220-kV LST)	85 (d-c 500-kV LSTs/TSPs s-c 500-kV LSTs d-c 220-kV LST)	85 (d-c 500-kV LSTs/TSPs s-c 500-kV LSTs d-c 220-kV LST)	85 (d-c 500-kV LSTs/TSPs s-c 500-kV LSTs d-c 220-kV LST)	85 (d-c 500-kV LSTs/TSPs s-c 500-kV LSTs d-c 220-kV LST)
No. new subtransmission structures	150 (d-c 66-kV LWSPs and TSPs)	150 (d-c 66-kV LWSPs and TSPs)	150 (d-c 66-kV LWSPs and TSPs)	150 (d-c 66-kV LWSPs and TSPs)	150 (d-c 66-kV LWSPs and TSPs)	128 (d-c 66-kV LWSPs and TSPs)
Segment 8: Section of New Mira Loma – Vincent 500-kV T/L						
Distance of ROW [existing and expanded/new]						
Segment 8A/8C [d-c 500-kV T/L]	33.0 miles	33.0 miles	Route A: 23.2 miles Route B: 26.7 miles Route C: 22.7 miles Route D: 26.8 miles	33.0 miles	33.0 miles	33.0 miles
Segment 8B [d-c 220-kV T/L]	6.8 miles	6.8 miles	None	6.8 miles	6.8 miles	6.8 miles

Table 4.1-10. Summary Comparison of Components of the Proposed Project and Alternatives

	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max Helicopter in ANF)	Alternative 7 (66-kV Subtransmission)
Distance of expanded/new ROW	4.4 miles	4.4 miles	Route A: 10.15 miles Route B: 13.65 miles Route C: 13.25 miles Route D: 13.75 miles	4.4 miles	4.4 miles	4.6 miles
Distance of underground 500-kV T/L	None	None	None	3.5 miles	None	None
Existing T/Ls to be removed	Various 220-kV T/L structures	Various 220-kV T/L structures	Various 220-kV T/L structures	Various 220-kV T/L structures	Various 220-kV T/L structures	Various 220-kV T/L structures
No. new transmission structures	226 (d-c 500-kV LSTs/TSPs d-c 220-kV LST/TSPs s-c 500-kV LSTs/TSPs s-c 220-kV LST/TSPs 220-kV 3-pole dead-end)	226 (d-c 500-kV LSTs/TSPs d-c 220-kV LST/TSPs s-c 500-kV LSTs/TSPs s-c 220-kV LST/TSPs 220-kV 3-pole dead-end)	Route A: 135 Route B: 154 Route C: 175 Route D: 164 (d-c 500-kV LSTs/TSPs d-c 220-kV LST/TSPs s-c 500-kV LSTs/TSPs s-c 220-kV LST/TSPs 220-kV 3-pole dead-end) All require a new switching station	211 (d-c 500-kV LSTs/TSPs d-c 220-kV LST/TSPs s-c 500-kV LSTs/TSPs s-c 220-kV LST/TSPs 220-kV 3-pole dead-end) 2 transition stations	226 (d-c 500-kV LSTs/TSPs d-c 220-kV LST/TSPs s-c 500-kV LSTs/TSPs s-c 220-kV LST/TSPs 220-kV 3-pole dead-end)	226 (d-c 500-kV LSTs/TSPs d-c 220-kV LST/TSPs s-c 500-kV LSTs/TSPs s-c 220-kV LST/TSPs 220-kV 3-pole dead-end)
No. new subtransmission structures	55 (d-c 66-kV LWSPs)	55 (d-c 66-kV LWSPs)	None	55 (d-c 66-kV LWSPs)	55 (d-c 66-kV LWSPs)	45 (d-c 66-kV LWSPs)
Components within CHSP	None	None	Route A: 2.3-mile T/L; 4- to 5-acre switching station; 8 to 10 500-kV double-circuit structures Route B: 4.9-mile T/L; 18 to 21 500-kV double-circuit structures Route C: 3.1-mile T/L; 25 single-circuit 500-kV structures and 5 to 7 double-circuit 220-kV structures; Remove 25 existing 220/500-kV structures Route D: 1.4-mile T/L; 5 to 8 500-kV structures	None	None	None

Table 4.1-10. Summary Comparison of Components of the Proposed Project and Alternatives

	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max Helicopter in ANF)	Alternative 7 (66-kV Subtransmission)
Segment 9: Substation Facilities						
New Whirlwind Substation						
Total temporary disturbance	65 acres	65 acres	65 acres	65 acres	65 acres	65 acres
Total acres to be restored	None	None	None	None	None	None
Total permanent disturbance	65 acres	65 acres	65 acres	65 acres	65 acres	65 acres
Substation Modifications						
Antelope Substation	Expand/upgrade for new 500-kV & 220-kV equipment	Expand/upgrade for new 500-kV & 220-kV equipment	Expand/upgrade for new 500-kV & 220-kV equipment	Expand/upgrade for new 500-kV & 220-kV equipment	Expand/upgrade for new 500-kV & 220-kV equipment	Expand/upgrade for new 500-kV & 220-kV equipment
Vincent Substation	Expand/upgrade for new 500-kV & 220-kV equipment	Expand/upgrade for new 500-kV & 220-kV equipment	Expand/upgrade for new 500-kV & 220-kV equipment	Expand/upgrade for new 500-kV & 220-kV equipment	Expand/upgrade for new 500-kV & 220-kV equipment	Expand/upgrade for new 500-kV & 220-kV equipment
Mesa Substation	Upgrade to accommodate new 220-kV equipment	Upgrade to accommodate new 220-kV equipment	Upgrade to accommodate new 220-kV equipment	Upgrade to accommodate new 220-kV equipment	Upgrade to accommodate new 220-kV equipment	Upgrade to accommodate new 220-kV equipment
Gould Substation	Upgrade to accommodate new 220-kV equipment	Upgrade to accommodate new 220-kV equipment	Upgrade to accommodate new 220-kV equipment	Upgrade to accommodate new 220-kV equipment	Upgrade to accommodate new 220-kV equipment	Upgrade to accommodate new 220-kV equipment
Mira Loma Substation	Upgrade to accommodate new 500-kV equipment	Upgrade to accommodate new 500-kV equipment	No upgrades	Upgrade to accommodate new 500-kV equipment	Upgrade to accommodate new 500-kV equipment	Upgrade to accommodate new 500-kV equipment

Note: s-c: single-circuit; d-c: double-circuit

Information provided here 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

* Land disturbance under Alternative 3 would decrease by a factor of one structure within Segment 4. As such, the acres disturbed would continue to be almost identical to Alternative 2.

** Alternative 7 would have some additional temporary disturbance associated with underground construction of the 66-kV subtransmission lines in Segment 7 through the Duck Farm Project area and due to the overhead re-routing the 66-kV line in the Whittier Narrows Recreation area in Segments 7 and 8A. New access and spur roads may also be required for the new approximately 1,200 foot ROW for the San Gabriel River crossing within Segment 8A associated with the Whittier Narrows Overhead Re-Route.

*** Construction of Alternative 6 would be identical to Alternative 2, with the exception of Segments 6 and 11, where substantially more helicopter construction may result in a longer construction schedule due to the limited availability of specialized helicopters and personnel. The schedule for helicopter construction would be finalized as part of final design and pre-construction planning.

4.2 Comparison of Alternatives

For comparison purposes, Table 4.2-1 presents a summary matrix by environmental issue/resource area of the environmental issues and impacts associated with the alternatives, as described in Chapter 3 (Affected Environmental and Environmental Consequences).

To further compare the environmental impacts of the Project amongst the alternatives, a discussion of the noteworthy differences between the alternatives for each environmental issue/resource area is provided in Sections 4.2.1 through 4.2.16 below. Following this discussion (immediately after Section 4.2.16) is Table 4.2-2, which provides a summary of the alternative comparisons.

This analysis is provided, in part, to support the determination of the CEQA environmentally superior alternative (see Section 4.3.1) and the NEPA preferred alternative (see Section 4.3.2). The No Project/ Action Alternative has not been included in the discussion below because the intent of the comparative analysis is to highlight differences among "action" alternatives, and because CEQA does not allow the selection of the No Project Alternative as the environmentally superior alternative (State CEQA Guidelines §15126.6(e)(2)). Please note that the Forest Service has not yet identified a preferred alternative.

4.2.1 Agricultural Resources

Based on the analyses of the Agricultural Resources impacts of the proposed Project and alternatives, as presented in Section 3.2 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Agricultural Resources, the differentiators used to compare the alternatives included primarily the amount of Prime Farmland, Unique Farmland, and Farmland of Statewide importance that would be converted to nonagricultural uses, and secondarily on the linear distance (miles) of agricultural lands that would be traversed by the Project.

As shown in Table 4.2-1, implementation of Alternative 2 (SCE's Proposed Project) would result in the permanent conversion of approximately 5.83 acres of Farmland to non-agricultural use. The other Project alternatives, except Alternative 4 (Chino Hills Routes), would result in the conversion of the same amount of Farmland as Alternative 2. Alternative 4 would result in the conversion of less Farmland because new transmission infrastructure would not be constructed through the agricultural areas of Chino and Ontario. For the same reason, substantially fewer miles of agricultural land would be traversed by Alternative 4 than the other Project alternatives.

4.2.2 Air Quality

Based on the analyses of the Air Quality impacts of the proposed Project and alternatives, as presented in Section 3.3 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Air Quality, the differentiators used to compare the alternatives included such considerations as total emissions, health impacts of the emissions, location of the emissions (urban areas vs. rural areas), and ability to mitigate the emissions due to the differences in construction methods for the alternatives.

Section 3.3 describes the anticipated construction and operational emissions associated with each Project alternative, including GHG emissions. As discussed in Section 3.3 and shown in Table 4.2-1, all of the Project alternatives would exceed regional emission thresholds for the South Coast Air Quality

Table 4.2-1. Summary Comparison of Environmental Issues

Environmental Issue	Alternative 1 (No Project/Action)	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max. Helicopter Construction in ANF)	Alternative 7 (66-kV Subtransmission)
AGRICULTURAL RESOURCES							
Acres of Farmland temporarily converted to non-agricultural use.	Potential projects would likely traverse the same geographic regions as Alts 2 through 7, and subsequently introduce similar types of impacts.	54.75 acres	Same as Alternative 2.	33.07 acres	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Acres of Farmland permanently converted to non-agricultural use.	Potential projects would likely traverse the same geographic regions as Alts 2 through 7, and subsequently introduce similar types of impacts.	5.83 acres	Same as Alternative 2.	4.35 acres	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Miles of agricultural land traversed by Project.	Potential projects would likely traverse the same geographic regions as Alts 2 through 7, and subsequently introduce similar types of impacts.	75.55 miles	75.95 miles	Alternative 4A: 57.67 miles. Alternative 4B: 58.22 miles. Alternative 4C: 64.63 miles. Alternative 4D: 61.23 miles.	74.85 miles	Same as Alternative 2.	Same as Alternative 2.
AIR QUALITY							
Construction emissions would exceed the SCAQMD, AVAQMD, and/or KCAPCD regional emission thresholds.	The impacts of new power plants and new T/Ls could add air pollutants contributing to existing nonattainment conditions or violations of ambient air quality standards, if they occur in areas of substantial existing pollution.	SCAQMD – NOx, VOC, CO. PM10, and PM2.5 thresholds exceeded. AVAQMD – NOx, VOC, CO, and PM10 thresholds exceeded. KCAPCD – PM10 threshold exceeded.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2 with magnitudes of exceedances higher in SCAQMD.	Same as Alternative 2 with magnitudes of NOx exceedances higher and PM exceedances lower.	Same as Alternative 2.
Operating emissions would exceed the SCAQMD, AVAQMD, and/or KCAPCD regional emission thresholds.	Same as Alternative 2; however, the difference in net emissions of criteria pollutants is unknown.	No exceedances of emission thresholds. Indirect impacts of enabling renewable energy use would be beneficial.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
The Project would not conform to Federal General Conformity Rules.	New transmission lines on federal lands are anticipated to exceed thresholds and require a General Conformity analysis.	Project would exceed SoCAB NOx thresholds. General Conformity analysis required.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	General Conformity analysis required. Magnitude of SoCAB NOx threshold exceedance substantially higher than Alternative 2.	Same as Alternative 2.
The Project would not conform to Angeles National Forest air quality strategies.	A project similar to the TRTP which crosses the ANF with appropriate mitigation would conform with ANF air quality strategies.	With appropriate mitigation the Project would conform with ANF air quality strategies.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Emissions would contribute to climate change.	Same as Alternative 2; however, the difference in net greenhouse gas (GHG) emissions is unknown.	Indirect impacts of enabling renewable energy use are beneficial and greater than the direct emissions from construction and operation of the Project.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2 with direct GHG emissions from construction higher than Alternative 2.	Same as Alternative 2 with direct GHG emissions from construction higher than Alternative 2.	Same as Alternative 2.
BIOLOGICAL RESOURCES							
Loss or degradation of vegetation communities	Potential projects would likely traverse the same geographic regions as either the proposed Project or Alts 3 through 7, and subsequently introduce similar types of impacts	1,538 acres of vegetation communities will be degraded, of which 277 acres will be permanent.	1,538 acres of vegetation communities will be degraded, of which 277 acres will be permanent. (Note: Land disturbance under Alternative 3 would decrease by a factor of one structure within Segment 4. As such, the acres disturbed would continue to be almost identical to Alt. 2.)	Route A: 1,512 acres of vegetation communities will be degraded, of which 291 acres will be permanent. Route B: 1,539 acres of vegetation communities will be degraded, of which 281 acres will be permanent. Route C: 1,567 acres of vegetation communities will be degraded, of which 287 acres will be permanent. Route D: 1,549 acres of vegetation communities will be degraded, of which 290 acres will be permanent.	1,563 acres of vegetation communities will be degraded, of which 280 acres will be permanent.	1,456 acres of vegetation communities will be degraded, of which 230 acres will be permanent.	1,538 acres of vegetation communities will be degraded, of which 277 acres will be permanent. (Note: Alt. 7 would have additional temporary disturbance associated with underground construction of 66-kV lines in Segment 7, re-routing the 66-kV line around the Whittier Narrows Recreation area in Segments 7 and 8A. New access and spur roads may be required for the new ROW for the San Gabriel River crossing within Segment 8A.)
Loss or degradation of riparian communities	Same as above.	13.4 acres of riparian communities will be degraded or impacted.	Unknown acreage of riparian communities will be degraded or impacted as final engineering has not been conducted. Similar to Alt. 2.	Unknown acreage of riparian communities would be degraded or impacted as final engineering has not been conducted. Greater than Alt. 2.	Same as Alternative 2.	12.8 acres of riparian communities will be degraded or impacted.	Unknown acreage of riparian communities will be degraded or impacted as final engineering has not been conducted. Greater than Alt. 2.

Table 4.2-1. Summary Comparison of Environmental Issues

Environmental Issue	Alternative 1 (No Project/Action)	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max. Helicopter Construction in ANF)	Alternative 7 (66-kV Subtransmission)
Number of Riparian Conservation Areas (RCAs) subject to Project disturbance	Same as above.	Vehicle access, road grading, and culvert placement would affect 171 RCAs, of which 95 would be negatively impacted.	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Vehicle access, road grading, and culvert placement would affect 86 RCAs, of which 57 would be negatively impacted.	Same as Alternative 2
Potential to spread noxious weeds	Same as above.	Construction would result in potential spread of noxious weeds. 225.7 miles of access and spur roads would be constructed and improved and approx. 1,538 acres of ground-disturbing activities would result as part of construction.	Same as Alternative 2	Greater land disturbance would occur in open space and riparian habitat; increased likelihood for spread of noxious weeds. Route A: 231.9 miles of constructed and improved roads and 1,512 acres of ground-disturbing activities. Route B: 228.5 miles of constructed and improved roads and 1,539 acres of ground-disturbing activities. Route C: 231.8 miles of constructed and improved roads and 1,567 acres of ground-disturbing activities. Route D: 233.2 miles of constructed and improved roads and 1,549 acres of ground-disturbing activities.	Greater land disturbance would occur in open space, increasing the likelihood for spread of noxious weeds. 225.7 miles of access and spur roads would be constructed and improved and approx. 1,563 acres of ground-disturbing activities would result as part of construction.	Reduced number of spur roads and potential decrease in road traffic may reduce the likelihood for spread of noxious weeds. 183.2 miles of access and spur roads would be constructed and improved and approx. 1,456 acres of ground-disturbing activities would result as part of construction.	Greater land disturbance would occur in open space and riparian habitat, increasing the likelihood for spread of noxious weeds. 225.7 miles of access and spur roads would be constructed and improved and approx. 1,538 acres of ground-disturbing activities would result as part of construction.
Disturbance to common wildlife, nesting birds and raptors	Same as above.	Construction would result in disturbance to wildlife and nesting birds. For noise, 361,703 onroad vehicle trips are estimated to occur as part of construction of this Project. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 225.7 miles of new and upgraded road and 1,538 acres of ground-disturbing activities would result. 172.9 miles of new transmission line.	For noise, 361,586 onroad vehicle trips are estimated to occur as part of construction. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 225.7 miles of new and upgraded road and 1,538 acres of ground-disturbing activities would result. 173.3 miles of new transmission line.	Greater loss of habitat; increased disturbance to wildlife and nesting birds. For noise, 340,332 (Route A), 348,691 (Route B), 357,930 (Route C), or 353,091 (Route D) estimated onroad construction vehicle trips would occur. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. Route A: 231.9 miles of new and upgraded roads and 1,512 acres of ground-disturbing activities. 157.2 miles of new transmission line. Route B: 228.5 miles of new and upgraded roads and 1,539 acres of ground-disturbing activities. 160.8 miles of new transmission line. Route C: 231.8 miles of new and upgraded roads and 1,567 acres of ground-disturbing activities. 162.8 miles of new transmission line. Route D: 233.2 miles of new and upgraded roads and 1,549 acres of ground-disturbing activities. 160.9 miles of new transmission line.	Greater land disturbance would increase disturbance to wildlife and nesting birds. For noise, 418,912 onroad vehicle trips are estimated to occur as part of construction of this Project. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 225.7 miles of new and upgraded road and 1,538 acres of ground-disturbing activities would result. 172.9 miles of new transmission line.	A reduction in land disturbance would occur; however, helicopter use would increase disturbance to wildlife and nesting birds due to noise, rotor wash, etc. For noise, 361,697 onroad vehicle trips are estimated to occur as part of construction of this Project. Up to approx. 42,014 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 183.2 miles of new and upgraded road and 1,456 acres of ground-disturbing activities would result. 172.9 miles of new transmission line.	Greater land disturbance in natural areas would increase disturbance to wildlife and nesting birds. For noise, 362,861 onroad vehicle trips are estimated to occur as part of construction of this Project. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 225.7 miles of new and upgraded road and 1,538 acres of ground-disturbing activities would result. 172.9 miles of new transmission line.
Disturbance to threatened/ endangered and special-status plants	Same as above.	Although not observed, construction may affect listed plant species if present. Potential impacts to special-status plant species observed and potentially occurring in the Project area. 1,538 acres of land disturbance (277acres permanent)	Same as Alternative 2	Greater land disturbance; increased potential impacts to listed plants. Route A: 1,512 acres of land disturbance (291 acres permanent). Route B: 1,539 acres of land disturbance (281 acres permanent). Route C: 1,567 acres of land disturbance (287 acres permanent). Route D: 1,549 acres of land disturbance (290 acres permanent).	Greater land disturbance would increase potential impacts to listed plants 1,563 acres of land disturbance (280 acres permanent).	Reduced potential to affect listed plant species due to decreased land disturbance. 1,456 acres of land disturbance (228 acres permanent).	Greater land disturbance in natural areas would increase potential impacts to listed plants. 1,538 acres of land disturbance (277acres permanent).

Table 4.2-1. Summary Comparison of Environmental Issues

Environmental Issue	Alternative 1 (No Project/Action)	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max. Helicopter Construction in ANF)	Alternative 7 (66-kV Subtransmission)
Disturbance to threatened/ endangered and special-status wildlife	Same as above.	Potential effects on listed species including arroyo toad, California condor, California Gnatcatcher, least Bell's vireo, and Santa Ana Sucker. For noise, 361,703 onroad vehicle trips are estimated to occur as part of construction of this Project. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 225.7 miles of new and upgraded road and 1,538 acres of ground-disturbing activities would result. 172.9 miles of new transmission line.	Same as Alternative 2 For noise, 361,586 onroad vehicle trips are estimated to occur as part of construction. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 225.7 miles of new and upgraded road and 1,538 acres of ground-disturbing activities would result. 173.3 miles of new transmission line.	Greater land disturbance, including effects to riparian habitat and coastal sage scrub in the Chino Hills; Increased potential impacts to listed species such as least Bell's vireo and California gnatcatcher. For noise, 340,332 (Route A), 348,691 (Route B), 357,930 (Route C), or 353,091 (Route D) onroad estimated construction vehicle trips would occur. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. Route A: 231.9 miles of new and upgraded roads and 1,512 acres of ground-disturbing activities. 157.2 miles of new transmission line. Route B: 228.5 miles of new and upgraded roads and 1,539 acres of ground-disturbing activities. 160.8 miles of new transmission line. Route C: 231.8 miles of new and upgraded roads and 1,567 acres of ground-disturbing activities. 162.8 miles of new transmission line. Route D: 233.2 miles of new and upgraded roads and 1,549 acres of ground-disturbing activities. 160.9 miles of new transmission line.	Same as Alternative 2 For noise, 418,912 onroad vehicle trips are estimated to occur as part of construction of this Project. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 225.7 miles of new and upgraded road and 1,563 acres of ground-disturbing activities would result. 172.9 miles of new transmission line.	Decreased land disturbance may decrease effects to listed wildlife; however, use of access roads and helicopter staging areas may still affect listed species. Use of helicopters may affect California condor, if present. For noise, 361,697 onroad vehicle trips are estimated to occur as part of construction of this Project. Up to approx. 42,014 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 183.2 miles of new and upgraded road and 1,456 acres of ground-disturbing activities would result. 172.9 miles of new transmission line.	Greater land disturbance, including effects to riparian habitat and coastal sage scrub in the vicinity of the Whittier Narrows, would increase impacts to listed species such as least Bell's vireo and California gnatcatcher. For noise, 362,861 onroad vehicle trips are estimated to occur as part of construction of this Project. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 225.7 miles of new and upgraded road and 1,538 acres of ground-disturbing activities would result. 172.9 miles of new transmission line.
Transmission line strikes and electrocutions	Potential for transmission line strikes and electrocutions of birds and bats.	Potential for transmission line strikes and electrocutions of birds and bats. 172.9 miles of new transmission line.	Slightly longer transmission line route would result in slightly higher potential for line strikes and electrocutions. 173.3 miles of new transmission line.	Greater length of transmission line in open space; Slightly higher potential for line strikes and electrocutions. 157.2 (Route A), 160.8 (Route B), 162.8 (Route C), 160.9 (Route D) miles of new transmission line.	Underground portion of transmission line in Chino Hills would result in lower potential for line strikes and electrocutions. 172.9 miles of new transmission line.	Same as Alternative 2	Greater length of 66-kV line in open space would result in slightly higher potential for line strikes and electrocution; however, underground portions would reduce potential for line strikes and electrocution. 172.9 miles of new transmission line.
Interference with wildlife movement	Potential projects would likely traverse the same geographic regions as either the proposed Project or Alternatives 3 through 7, and subsequently introduce similar types of impacts	For noise, 361,703 onroad vehicle trips are estimated to occur as part of construction of this Project. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 225.7 miles of new and upgraded road and 1,538 acres of ground-disturbing activities would result, Activities would occur during any hours of the day or potentially the night, thus impacts with vehicles or deterrents to wildlife movement would occur.	For noise, 361,586 onroad vehicle trips are estimated to occur as part of construction. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 225.7 miles of new and upgraded road and 1,538 acres of ground-disturbing activities would result. Activities would occur during any hours of the day or potentially the night, thus impacts with vehicles or deterrents to wildlife movement would occur.	For noise, 340,332 (Route A), 348,691 (Route B), 357,930 (Route C), or 353,091 (Route D) estimated onroad construction vehicle trips would occur. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. Route A: 231.9 miles of new and upgraded roads and 1,512 acres of ground-disturbing activities. 157.2 miles of new transmission line. Route B: 228.5 miles of new and upgraded roads and 1,539 acres of ground-disturbing activities. 160.8 miles of new transmission line. Route C: 231.8 miles of new and upgraded roads and 1,567 acres of ground-disturbing activities. 162.8 miles of new transmission line. Route D: 233.2 miles of new and upgraded roads and 1,549 acres of	For noise, 418,912 onroad vehicle trips are estimated to occur as part of construction of this Project. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 225.7 miles of new and upgraded road and 1,538 acres of ground-disturbing activities would result. Activities would occur during any hours of the day or potentially the night, thus impacts with vehicles or deterrents to wildlife movement would occur. .	For noise, 361,697 onroad vehicle trips are estimated to occur as part of construction of this Project. Up to approx. 42,014 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx.183.2 miles of new and upgraded road and 1,456 acres of ground-disturbing activities would result. Activities would occur during any hours of the day or potentially the night, thus impacts with vehicles or deterrents to wildlife movement would occur.	For noise, 362,861 onroad vehicle trips are estimated to occur as part of construction of this Project. Up to approx. 9,339 helicopter trips would occur as part of construction on the ANF. For habitat disturbances, approx. 225.7 miles of new and upgraded road and 1,538 acres of ground-disturbing activities would result. Activities would occur during any hours of the day or potentially the night, thus impacts with vehicles or deterrents to wildlife movement would occur.

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				ground-disturbing activities. 160.9 miles of new transmission line. Activities would occur during any the day or potentially the night, thus impacts with vehicles or deterrents to wildlife movement would occur.			
CULTURAL RESOURCES							
Number of identified resources in the APE.	The number and nature of cultural resources cannot be determined without specific information about actions that might occur in lieu of the Project.	135 (57 prehistoric/73 historical/5 both)	Same as Alternative 2.	139 (58 prehistoric/75 historical/6 both)	Same as Alternative 2.	142 (63 prehistoric/74 historical/5 both)	151 (57 prehistoric/88 historical/6 both)
Number of resources added.	Not known.	Not known without additional information.	None.	9	Not known without additional information.	7	10
Potential for unanticipated discoveries during construction.	Impacts would occur as a result of various actions in lieu of the Project, but the extent of such impacts is not known.	Yes	Yes, but greater than Alternative 2.	Yes, but greater than Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Yes, but greater than Alternative 2.
ENVIRONMENTAL CONTAMINATION AND HAZARDS							
Mobilization of contaminants currently existing in the soil.	Construction of new T/Ls in urban areas with historic and recent commercial/industrial land uses in lieu of the Project would have the same impacts.	228 known contaminated sites within 0.25-mile of ROW.	Same as Alternative 2.	Alts 4A & 4B: 169 known contaminated sites within 0.25-mile of ROW. Alts 4C & 4D: 170 known contaminated sites within 0.25-mile of ROW. One known munitions testing/disposal site within 150 feet of alignment.	Underground construction at shafts has increased potential to encounter pre-existing contaminated soil. Deep tunnel section likely below known soil and groundwater contamination.	Same as Alternative 2.	Underground construction of 0.6 mile of 66kV subtransmission line in commercial land use areas has incrementally increased potential to encounter preexisting contaminated soil.
Exposure of workers and the public to landfill/natural gas	New T/Ls may or may not avoid landfills and oil fields.	19 landfills, 2 oil fields within 0.25-mile of ROW.	Same as Alternative 2.	Alts 4A, 4B, & 4C: 19 landfills, 2 oil fields within 0.25-mile of ROW; Alt. 4D: 19 landfills, 4 oil fields within 0.25-mile of ROW.	Same as Alternative 2. .	Same as Alternative 2.	Same as Alternative 2.
Unanticipated preexisting soil and/or groundwater contamination could be encountered during excavation or grading	Construction of new T/Ls in urban areas with historic and recent commercial/industrial land uses in lieu of the Project would have the same impacts.	New T/Ls traverse 48.5 miles of urban area with commercial/industrial land use.	Same as Alternative 2.	New T/Ls traverse 32.5 miles of urban area with commercial/ industrial land use.	Generally the same as Alternative 2. Only east transition station located in urban area; remainder of deep tunnel and shafts are in non-urban areas.	Same as Alternative 2.	Same as Alternative 2.
Contamination of soils or groundwater within the Project area during operation.	Operation and maintenance (O&M) of comparably-sized substations and length of T/L would have the same impacts as the Project.	O&M of one new substation and 3 expanded substations and 172.9 miles of new T/L infrastructure (181.7 circuit miles).	Same as Alternative 2.	The total distance of any of the Alt. 4 routes would be shorter than Alt. 2, but all of these routes would result in O&M of a new substation, switching station, and 2 expanded substations. Transmission line distances: Alternative 4A – approx. 157.2 miles; Alternative 4B – approx. 160.8 miles; Alternative 4C – approx. 162.8 miles; Alternative 4D – approx. 160.8 miles.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Mobilization of contaminants or encountering ordnance currently existing in the soil	Construction of new T/Ls in areas with historic and recent munitions testing and disposal in lieu of the Project would have the same impacts.	No known munitions testing and disposal sites within 0.25-mile of ROW.	Same as Alternative 2.	Known area of munitions testing and disposal within 0.25 mile of ROW: Alts 4A & 4B avoid the munitions areas; Alts 4C & 4D: construction areas and access routes may encounter munitions testing and disposal sites.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.

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GEOLOGY, SOILS, AND PALEONTOLOGY							
Erosion could be triggered or accelerated due to construction activities.	Construction of new T/Ls in areas with comparable soils in lieu of the Project would have the same impacts.	Soil erosion could occur due to grading and excavation at new and modified access and spur roads, storage yards, 853 tower locations, 12 helicopter staging areas, one new substation, and expansion at five existing substations.	Construct approx. 2 additional miles of new access road; two additional towers and spur roads.	Despite shorter length and reduction in towers compared to other alternatives, erosion potential is increased due to the need for new or modified access/spur roads in the Chino Hills State Park (CHSP). Approx. miles of additional roads: Alternatives 4A & 4B – 6.5 miles; Alternatives 4C & 4D – 9.5 miles.	Construction of large transition stations would disturb more soil resulting in increased potential to trigger or accelerate erosion.	Helicopter construction for most towers in the ANF results in less road grading and one less helicopter staging area that would potentially need to be graded compared to Alt. 2. The overall ground disturbance during construction would be reduced by approx. 82 acres compared to Alt. 2, resulting in a decreased potential to trigger or accelerate erosion.	Construction of underground re-routes would require additional excavation and trenching, resulting in slightly more soil disturbance and incrementally increased potential to trigger or accelerate erosion.
Excavation and grading during construction activities could cause slope instability or trigger landslides.	New T/Ls in hillside areas may or may not encounter areas of landslides and unstable slopes.	Slope failures could be triggered by construction related excavation and grading of access and spur roads, helicopter staging areas, and new towers through approx. 77 miles of hillside and mountain areas with known landslides and unstable slopes.	Same as Alternative 2.	Greater risk of slope instability due to increased length of alignment which would result in increased ground disturbance in the landslide-prone Puente Formation. Approx. mileage of new roads and towers in hillside area with known landslide potential: Alternatives 4A & 4B - 2.7 miles; Alternatives 4C & 4D - 9.5 miles.	Incrementally less than Alt. 2 because construction bypasses some towers along hillsides in the landslide prone Puente Formation.	Reduced construction and grading of access and spur roads in steep mountainous terrain (approx. 60 less acres of ground disturbance during construction than Alt. 2) resulting in decreased potential to trigger landslides or slope instability during construction.	Same as Alternative 2.
Project structures could be damaged by surface fault rupture at crossings of active faults exposing people or structures to hazards.	Construction of new T/Ls may or may not cross active faults with surface rupture potential.	New T/Ls cross or parallel active faults in nine locations.	Same as Alternative 2.	Minor decrease for Alts 4A & 4C due to one less fault crossing (Chino-Central Ave fault, which is not a large significantly active fault). Otherwise the same as Alt. 2. Slightly increased potential for fault rupture for Alts 4B & 4D due to the to the location of the switching station adjacent to or on the mapped trace of the Alquist-Priolo zoned Chino Fault.	Incrementally increased due to underground construction proposed across the projected trend of the active of Chino fault at eastern end of tunnel and at eastern transition station.	Same as Alternative 2.	Same as Alternative 2.
Project structures could be damaged by problematic soils exposing people or structures to hazards.	Construction of new T/Ls and substations may or may not be in areas of unsuitable soil.	New T/Ls, new substation, and expanded substations are located locally in areas of unsuitable soils.	Same as Alternative 2.	Slightly less potential for damage to Project structures due to unsuitable soils because the shorter length would require fewer towers. Approx. reduction in towers: Alternative 4A – 91; Alternative 4B – 72; Alternative 4C – 51; Alternative 4D – 62.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Transmission line structures could be damaged by landslides, earth flows, or debris slides, during operation.	Construction of new T/Ls and substations may or may not be in hillside areas with landslides or other types of slope failures.	Approx. 360 new towers would be constructed through 77 miles of hillside and mountain areas with known landslides and unstable slopes.	Same as Alternative 2.	Greater risk of slope instability due to increased length of alignment in landslide-prone Puente Formation. Approx. increase in towers within landslide-prone areas (Puente and Chino Hills): Alternative 4A – 15; Alternative 4B – 23; Alternatives 4C & 4D – 28.	Incrementally less than Alternative 2 because construction bypasses some towers along hillsides in the landslide-prone Puente Formation.	Same as Alternative 2.	Same as Alternative 2.
Grading and excavation could destroy paleontologic resources.	Construction of comparably-sized substations and length of T/L would have the same impacts as the Project.	Ground disturbance due to construction of new transmission structures and access and spur roads across approx. 66.4 miles of geologic units with moderate to high paleontologic sensitivity.	Same as Alternative 2.	Increased grading and excavation in geologic unit having high paleontologic sensitivity. Approx. miles of additional roads: Alternatives 4A & 4B - 6.5 miles; Alternatives 4C & 4D – 9.5 miles. Approx. reduction in towers:	Incrementally increased due to the greater ground disturbance required for tunneling and construction of the transition stations in units with moderate to high paleontologic sensitivity.	Same as Alternative 2.	Slightly increased due to the greater ground disturbance required for trenching and excavation for re-routes in units with moderate paleontologic sensitivity.

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				Alternative 4A – 91; Alternative 4B – 72; Alternative 4C – 51; Alternative 4D – 62.			
Existing structures could be damaged by ground settlement along the tunnel exposing people or structures to hazards.	Construction of new T/Ls may or may not include underground construction and tunneling.	Would not occur because no tunnels would be constructed.	Same as Alternative 2.	Same as Alternative 2.	Short-term (days) and long-term (years) settlement of the ground surface could occur during construction and operation of the tunnel and shafts (underground portion only).	Same as Alternative 2.	Same as Alternative 2.
HYDROLOGY AND WATER QUALITY							
Number of named streams crossed by ROW.	Many named streams would be crossed by various actions in lieu of the Project, but the exact number is unknown.	41	Same as Alternative 2.	Alternative 4A and 4C: 32 Alternative 4B and 4D: 33	36	Same as Alternative 2.	Same as Alternative 2.
Number of unnamed streams crossed by ROW.	Many unnamed streams would be crossed by various actions in lieu of the Project, but the exact number is unknown.	160	162	Alternative 4A: 152 Alternative 4B: 154 Alternative 4C: 157 Alternative 4D: 150	157	Same as Alternative 2.	Same as Alternative 2.
Miles of T/L within a Flood Hazard Area.	T/Ls that would be built in lieu of the Project could be placed in Flood Hazard Areas, but the number of miles is unknown.	19.94	19.86	Alternative 4 (A-D): 14.12	19.76. Also places the proposed eastern transition station in a Flood Hazard Area.	Same as Alternative 2.	Same as Alternative 2.
Number of named streams crossed by new and/or improved access and/or spur roads in the ANF	It is anticipated that many named streams would be crossed by various actions in lieu of the Project, but the exact number is unknown.	14	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	6	Same as Alternative 2.
Number of unnamed streams crossed by new and/or improved access and/or spur roads in the ANF	It is anticipated that many named streams would be crossed by various actions in lieu of the Project, but the exact number is unknown.	123	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	62	Same as Alternative 2.
LAND USE							
Residential land uses would be temporarily or permanently disrupted, displaced or precluded.	Potential projects would likely traverse the same geographic regions as either the proposed Project or Alternatives 3 through 7, and subsequently introduce similar types of impacts.	No residential land uses would be temporarily or permanently displaced. In comparison to Alternative 3, a slightly greater number of residential land uses would be temporarily disturbed or disrupted by construction.	The number of residential land uses disturbed or disrupted by construction and O&M would be slightly reduced in the North Region compared to Alternative 2.	The number of residential land uses disturbed or disrupted by construction and O&M would be reduced by an estimated 29.2 miles of ROW in the South Region compared to Alternative 2. This represents the greatest reduction of temporary disturbance to residential land uses.	The number of residential land uses temporarily disturbed by construction would be slightly reduced along the underground portion of the alignment, except at the transition stations where construction-related disturbances would increase. Permanent disruptions and disturbances would be the same as Alternative 2.	Temporary disruptions and disturbances to residential land uses in the affected area of the ANF (private in-holdings) would be prolonged; however, short- and long-term total land disturbances within the ANF would be reduced. Outside of the ANF, temporary impacts to residential land uses would be the same as Alternative 2.	Same as Alternative 2.
Non-residential land uses would be temporarily or permanently disrupted, displaced or precluded.	Potential projects would likely traverse the same geographic regions as either the proposed Project or Alternatives 3 through 7, and subsequently introduce similar types of impacts.	Non-residential land uses would be temporarily disrupted, displaced or precluded by construction, particularly in the South Region (Segments 7, 11, and 8). No non-residential land uses would be permanently displaced or precluded by O&M.	Same as Alternative 2.	Same as Alternative 2 except along Segment 8, where no temporary or permanent impacts to existing non-residential land uses along a portion of Segment 8A/8C (16 miles) and all of Segment 8C (6.4 miles) would occur. Temporary and permanent disruptions, displacements and preclusions of non-residential land uses within CHSP would occur.	Same as Alternative 2 except along Segment 8A between MP 21.9 and MP 25.8. At S8A MP 25.8 construction would result in the permanent displacement (removal) of commercial land uses.	Increase in the duration of temporary disruptions to non-residential land uses within the ANF. Additional coordination required with the FAA and L.A. County Sheriff's Dept. related to the use of helicopters in the ANF. Permanent disruptions within the ANF would be the same as Alt 2. Outside of the ANF, temporary and permanent impacts to non-residential land uses would be the same as Alt 2.	Same as Alternative 2 except along Peck Road and Durfee Avenue and through the Duck Farm Project area, where construction-related activities would be intensified.

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Construction or O&M activities would conflict with applicable federal, State or local land use plans, goals, or policies.	Potential projects would likely traverse the same geographic regions as either the proposed Project or Alts 3 through 7, and subsequently introduce similar types of impacts.	No conflicts with any applicable federal, State or local land use plans, goals, or policies.	Same as Alternative 2.	Same as Alternative 2 except within CHSP. Construction and O&M would conflict with the CHSP General Plan.	Same as Alternative 2.	Same as Alternative 2; however, additional agency coordination would be necessary related to the increased level of helicopter construction within the ANF.	Same as Alternative 2.
NOISE							
Construction noise would substantially disturb sensitive receptors.	Because unspecified transmission upgrades would be required, it is assumed these activities would generate construction noise similar to the proposed Project.	Sensitive noise receptors within close proximity (200 feet) to construction activities would be disturbed by substantial construction noise (i.e. result in an ambient noise increase of at least 5 dBA).	Slightly fewer sensitive receptors in the City of Lancaster would be subjected to construction noise than Alternative 2.	Fewer sensitive residential receptors within the City of Chino Hills would be subject to construction noise than Alternative 2.	Because of underground tunnel construction within the City of Chino Hills, construction noise would affect fewer sensitive receptors within the City of Chino Hills than Alternative 2.	Construction of additional helicopter staging areas and the increased use of helicopters would substantially increase construction noise. Small increase in the number of sensitive receptors that would be subjected to construction noise in and around the ANF.	Slightly increased construction noise would occur in the areas where subtransmission lines would be re-routed or installed underground.
Construction noise levels would violate local standards.	Because unspecified transmission upgrades would be required, it is assumed these activities would generate construction noise similar to the proposed Project.	Construction would not comply with noise ordinances adopted by the Cities of Baldwin Park, Duarte, La Habra Heights, Pasadena, and South El Monte.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Permanent noise levels along the ROW would increase due to corona noise from operation of the transmission lines and substations.	Substantial noise effects would occur for any noise sensitive uses near possible new substations and new transmission facilities, which could result in operational noise, including corona noise.	Corona noise modeled for the proposed Project indicates that corona noise would substantially increase (i.e. more than 5 dBA above existing ambient noise) along Segments 5, 6, 7, 8, 10, and 11, with fewer sensitive noise receptors present along Segments 10, 6 and 11 (in the ANF).	Same as Alternative 2; however, due to the rerouting of the T/L in the City of Lancaster, slightly fewer sensitive receptors would be subjected to corona noise in the City of Lancaster.	Same as Alternative 2; however, by rerouting the proposed T/L through more rural areas of the City of Chino Hills, fewer sensitive residential receptors would be subjected to corona noise.	Same as Alternative 2; however, because a transmission segment would be placed underground within the City of Chino Hills, operational corona noise would affect fewer sensitive receptors.	Same as Alternative 2.	Same as Alternative 2; however, would avoid some amount of operational corona from 66-kV subtransmission lines along the two underground segments.
PUBLIC SERVICES AND UTILITIES							
Utility systems would be temporarily disrupted during the construction period	The construction of new generating sources would create additional impacts to existing utilities and service systems that may be similar to the Project.	Project construction may require existing utility systems to be temporarily removed from service.	May avoid potential disruption to utility systems associated with planned development in Lancaster.	CHSP routing options would avoid potential utility system disruptions in the cities of Chino and Ontario, but may introduce disruptions to existing utility systems in the vicinity of the Alt. 4 routes in Chino Hills.	Potential for rolling blackouts in the case a Gas Insulated Line (GIL) system failure occurs.	Same as Alternative 2.	Same as Alternative 2.
SOCIOECONOMICS							
Operations and maintenance activities would affect (decrease) property values along the Project alignment.	Potentially would occur in the future due to construction of other T/Ls to meet the purpose and need of the Project.	Would be expected to occur in the North and South Regions.	Same as Alternative 2.	Slightly less than Alternative 2; Alts 4A to 4D would avoid homes along 16 miles of Segment 8A through Chino Hills, Chino, and Ontario.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Potential decrease in revenues for agricultural landowners during construction.	Potentially would occur in the future due to construction of other T/Ls to meet the purpose and need of the Project.	Would be expected to occur in agricultural areas of the North Region.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Project activities would affect public agency revenue.	Public revenue would not benefit from Project implementation.	Long-term public revenue affect would be positive due to property taxes and fees paid for Project operation; temporary decrease in Forest Service revenue from Adventure Pass sales during construction.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
TRAFFIC AND TRANSPORTATION							
Closure of roads to through traffic or reduction of travel lanes that would result in substantial congestion.	Impacts of potential future projects would most likely be similar to those of the proposed Project or alternatives.	Potentially affects 420 roadways.	Same as Alternative 2.	Alts 4B & 4D: Potentially affect 361 roadways Alts 4A & 4C: Potentially affect 360 roadways (would not cross Bane Canyon Road).	Potentially affects 409 roadways (11 fewer roadways than Alternative 2).	Would potentially affect 420 roadways and require temporary closure of two roadways that would not be required during construction of any other alternative.	Requires longer duration of temporary closures along 4 more roadway segments than Alternative 2.

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Construction traffic would result in congestion on area roadways.	Impacts of potential future projects would most likely be similar to those of the proposed Project or alternatives.	Potentially affects 420 roadways.	Same as Alternative 2.	Alts 4B & 4D: Potentially affect 361 roadways Alts 4A & 4C: Potentially affect 360 roadways (would not cross Bane Canyon Road).	Would result in substantially more congestion on roadways within the Southern Region.	Same as Alternative 2.	Affects 4 more roadway segments than Alternative 2.
Construction activities could temporarily interfere with emergency response.	Impacts of potential future projects would most likely be similar to those of the proposed Project or alternatives.	Potentially affects 420 roadways.	Same as Alternative 2.	Approx. 60 fewer roadways than Alternative 2.	Potentially affects 409 roadways (11 fewer roadways than Alternative 2).	Incrementally increased due to potential closures of Upper Big Tujunga Canyon Road and Angeles Forest Highway.	Affects 4 more roadway segments than Alternative 2.
Construction activities could temporarily interfere with the use of pedestrian/bicycle paths.	Impacts of potential future projects would most likely be similar to those of the proposed Project or alternatives.	Would potentially affect several pedestrian and bicycle paths along the Project route.	Same as Alternative 2.	The following numbers of paths would be affected compared to Alt. 2: Alternatives 4A & 4B: 9 more paths; Alternative 4C: 3 more paths; Alternative 4D: 2 more paths.	Would affect approx. 11 fewer residential roadways than Alternative 2; thus it incrementally affects fewer sidewalks and pedestrian paths.	Same as Alternative 2.	Would affect sidewalks along 5 more roadway segments than Alternative 2.
VISUAL RESOURCES							
Temporary visual contrast resulting from construction activities and equipment	In the short term, existing visual conditions and landscapes would not be impacted. However there will continue to be a need for T/L project(s) to be implemented somewhere. The visual impacts of future T/L project(s) are not known.	Project construction activities including road improvements, heavy equipment use, and helicopter staging areas would be visible from sensitive receptor locations as strong visual contrasts.	*Slightly less than Alt. 2 due to minor re-route.* Construction activities along Segment 4 would not be visible in the foreground of 110th Street West for two miles.	*Greater than Alt. 2 due to effects in the CHSP.* Construction activities would be visible within the Chino Hills State Park (CHSP), including from Carbon Canyon Rd and other roads and trails near and within the CHSP. Impact V-1 would not occur on S8 from MP 19.2 to 35.2.	*Greater than Alt. 2 due to underground const.* The underground portion of S8 would introduce the following visual contrasts: large earth-moving and boring equipment; truck trips to remove excavated materials; and large areas of land for disposal of excavated materials.	*Greater than Alt. 2 due to helicopter visibility.* Within the ANF, less spur road improvement would occur and associated visual contrast would be less; however, helicopter use would be more intense (construction of 143 towers via helicopter vs. 33 for Alt. 2) and temporary visual contrast would be substantial.	*Slightly greater than Alt. 2 due to 66-kV re-route in South Area.* Temporary visual contrast of equipment for underground construction would be greater in and near Whittier Narrows and the Duck Farm (South Area).
Visual contrast due to introducing T/L structure(s) where none currently exist	In the short term, existing visual conditions and landscapes would not be impacted. However there will continue to be a need for T/L project(s) to be implemented somewhere. The visual impact for future project(s) is not known.	Construction in new ROW (S10, S4, S8A) would modify existing landscape character from "natural" (S4, S10) and "urban park" (S8A) to "industrial"; in these areas, new T/L towers would be the tallest structures in the landscape, creating skyline interference to landscape views.	*Slightly less than Alt. 2 due to minor re-route.* Direct alternation of landscape views would be less along 110th Street West in Lancaster (S4).	*Greater than Alt. 2 due to effects in the CHSP.* Adverse effects would not occur along S8A, MP 19.2 to 35.2. Routes 4C and 4D be in new ROWs near and within CHSP, introducing the tallest structures in the landscape and creating skyline interference to landscape views	*Slightly less than Alt. 2 due to underground.* In the long-term the underground portion of Alt. 5 would result in fewer overhead structures being installed.	*Same as Alternative 2.*	*Slightly greater than Alt. 2 due to re-routed subtransmission lines.* A new 66-kV subtransmission line would be introduced along San Gabriel Boulevard and Durfee Road, which are currently characterized as urban landscape character.
Visual contrast due to increasing T/L structure size and/or type where T/L structures currently exist	In the short term, existing visual conditions and landscapes would not be impacted. However there will continue to be a need for T/L project(s) to be implemented somewhere. The visual impacts of future T/L project(s) are not known.	Double-circuit 500-kV T/L structures would be larger than existing structures and would result in the following visual contrasts: increased prominence and industrial character; structure skylining; increased background landscape obstruction; lower scenic integrity conditions in the ANF; Forest Plan amendment for Standard ANF S1 (PCT).	*Same as Alternative 2.*	*Greater than Alt. 2 due to effects in the CHSP.* Each routing option would introduce new and/or larger structures in and/or near the CHSP.	*Slightly less than Alt. 2 due to underground.* A transition station would be installed at each end of the underground portion, but new overhead T/L structures (LSTs) would not be introduced along the underground segment.	*Less than Alt. 2 due to better compliance with Forest Standard ANF S1.* In the ANF, proposed use of a TSP at the Mill Creek Summit PCT Trailhead would allow the current trail location to remain and better comply with Standard ANF S1; a Forest Plan amendment would not be required in this location.	*Less than Alt. 2 due to undergrounding 66-kV.* The underground installation of subtransmission lines through Whittier Narrows and the Duck Farm would decrease adverse visual effects.
Visual contrast due to clearing and grading activities	In the short term, existing visual conditions and landscapes would not be impacted. However there will continue to be a need for T/L project(s) to be implemented somewhere. The visual impacts of future project(s) are not known.	Roads (access / spur) in the ANF would be improved, resulting in substantial adverse visual effects including strong soil color contrasts. Visual effects from spur road improvement would not occur for 33 structures that would be constructed via helicopter. Twelve helicopter staging areas would be cleared / graded in the ANF and would result in visual scarring and contrast similar to roads.	*Same as Alternative 2.*	*Slightly greater than Alt. 2 due to effects in the CHSP.* Adverse visual effects would be introduced to the CHSP as a result of clearing and grading activities for Routes A through D; these effects would not occur along S8A from MP 19.2 to MP 35.2.	*Temporary contrast would be greater than Alt. 2 due to u/g const.* Substantial earthwork would be required for installation of underground infrastructure and would introduce temporary adverse visual effects.	*Less than Alt. 2 due to fewer spur road improvements.* Fewer spur roads would be constructed due to more structures being constructed via helicopter (143 vs. 33 for Alt.2); adverse visual effects of spur roads would not occur for the 143 helicopter-constructed towers. Other roads such as West Fork Bikeway would not be widened or result in visual contrast. One fewer helicopter staging area (11 vs. 12 for Alt. 2) would be cleared and graded.	*Same as Alternative 2.* Vegetative clearing and earthwork associated with the underground portions of Alternative 7 and pulling/splicing locations for the new overhead line would temporarily affect existing landscape character and visual quality in the vicinity of Whittier Narrows and the Duck Farm.

Table 4.2-1. Summary Comparison of Environmental Issues

Environmental Issue	Alternative 1 (No Project/Action)	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max. Helicopter Construction in ANF)	Alternative 7 (66-kV Subtransmission)
Sunlight reflection and glare from new metal surfaces	In the short term, existing visual conditions and landscapes would not be impacted. However there will continue to be a need for T/L project(s) to be implemented somewhere. The visual impacts of future project(s) are not known.	When viewed from higher vantage points, such as a mountain road, or crest trail, sunlight reflecting off new conductors and towers would cause color and texture contrasts.	*Same as Alternative 2.*	*Slightly less than Alt. 2 due to non-build along Segment 8A.* Routes 4A through 4D would have new conductors that could be viewed from ridgetop trails in CHSP; however, no new towers would be installed along S8A from MP 19.2 to MP 35.2, thereby lessening the amount of new metal surfaces.	*Same as Alternative 2.*	*Same as Alternative 2.*	*Same as Alternative 2.*
Long-term loss or degradation of scenic viewshed(s)	In the short term, existing visual conditions and landscapes would not be impacted. However there will continue to be a need for T/L project(s) to be implemented somewhere. The visual impacts of future project(s) are not known.	The Project would traverse and/or be visible from multiple designated or eligible scenic highways and trails, thereby directly degrading and causing the long-term loss of scenic quality of the viewsheds.	*Same as Alternative 2.*	*Slightly greater than Alt. 2 due to effects to Carbon Canyon Rd.* Routes 4A through 4D would traverse Carbon Canyon Road (SR 142), which is an Eligible State Scenic Highway.	*Same as Alternative 2.*	*Less than Alt. 2 due to decreased road const. in the ANF.* Fewer spur roads would be built or improved in the ANF. Helicopter staging area #5 would be visible at background distances from the PCT along Santa Clara Divide; however, no helicopter staging areas would be visible from the Angeles Crest Scenic Highway, I-210, West Fork National Scenic Bikeway Trail, or State Routes 39 and 57.	*Same as Alternative 2.*
Non-compliance with established visual resource management plans or landscape conservation plans [1]	In the short term, existing visual conditions and landscapes would not be impacted. However there will continue to be a need for T/L project(s) to be implemented somewhere. The visual impacts of future project(s) are not known.	The Project would be inconsistent with Forest Standard ANF S1 of the Forest Plan, LMP Part 3 Aesthetic Standards ANF S9 and S10, with the High Scenic Integrity Objective of NFS lands, and with Goal Visual-1 and Objective Visual-1.2 of the Puente Hills Landfill Native Habitat Preservation Authority Resource Management Plan.	*Same as Alternative 2.*	*Greater than Alt. 2 due to conflict with the CHSP General Plan.* Routes 4A through 4D would be in conflict with the CHSP General Plan's goals for visual resource management.	*Same as Alternative 2.*	*Less than Alt. 2 due to compliance with Forest Standard S1.* Use of a TSP at the PCT Trailhead at Mill Creek Summit would provide consistency with Forest Standard S1 and would not require an amendment to the Forest Plan.	*Same as Alternative 2.*
WILDERNESS AND RECREATION							
Total number of Developed Recreation resources located within one-half mile of Project components [2] (North Region / Central Region / South Region)	Another, similar T/L project would likely introduce similar impacts to recreational and wilderness resources that would be introduced through the Project or an alternative.	126 (13 / 53 / 60)	Same as Alternative 2	Alternative 4A: 126 (13 / 53 / 60) Alternative 4B: 125 (13 / 53 / 59) Alternative 4C: 114 (13 / 53 / 48) Alternative 4D: 125 (13 / 53 / 59)	Same as Alternative 2	122 (13 / 50 / 59)	Same as Alternative 2
Comparison of Developed Recreation resources within one-half mile of Project components on NFS and non-NFS lands[3]	Another, similar T/L project would likely introduce similar impacts to recreational and wilderness resources that would be introduced through the Project or an alternative.	47 (NFS) / 79 (non-NFS)	Same as Alternative 2	Alternative 4A: 47 / 79 Alternative 4B: 47 / 78 Alternative 4C: 47 / 71 Alternative 4D: 47 / 78	Same as Alternative 2	44 (NFS) / 78 (non-NFS)	Same as Alternative 2

[1] Following are the Forest Plan Standards that apply to visual resource management on the ANF:
- ANF S1 - Pacific Crest Trail - Protect scenic integrity of foreground views as well as from designated viewpoints. Where practicable, avoid establishing nonconforming land uses within the viewshed of the trail (Liebre-Sawmill, Santa Clara Canyons, Soledad Front Country and Angeles High Country). (p. 76)
- ANF S9: Design management activities to meet the Scenic Integrity Objectives (SIOs) shown on the Scenic Integrity Objectives Map.
- ANF S10: Scenic Integrity Objectives will be met with the following exceptions: Minor adjustments not-to-exceed a drop of one SIO level is allowable with the Forest Supervisor's approval.
- Temporary drops of more than one SIO level may be made during and immediately following project implementation providing they do not exceed three years in duration.

The Forest Supervisor may approve a project in the ANF that would lower the Scenic Integrity Objectives level without a Forest Plan amendment, as long as the decrease would not be greater than one SIO level (for instance if a project would achieve a Moderate SIO in an area designated for a High SIO). See the detailed discussion of SIOs achieved by mileposts (MP) for Segments 6 and 11 under Alternatives 2 and 6. A drop of more than one level of SIO would require a Forest Plan amendment.

[2] Project components are inclusive of T/L facilities as well as substations and helicopter staging areas. Recreational resources on NFS lands in the ANF are managed by the Forest Service as either Developed Recreation or Dispersed Recreation. Unless defined otherwise on a case-by-case basis in this analysis, "Developed Recreation" includes resources that are regularly maintained by the Forest Service such as OHV routes, trails (for hiking, biking, and equestrian use), campgrounds, picnic areas, information centers, and other, similar facilities. Also unless defined otherwise on a case-by-case basis in this analysis, "Dispersed Recreation" includes undeveloped areas such as open space and natural scenic vistas which are used for recreational purposes but are not regularly maintained by the Forest Service.

[3] The Central Region of the Project Area extends slightly beyond the southern border of the ANF and therefore, not all recreational resources in the Central Region are located on NFS lands.

Table 4.2-1. Summary Comparison of Environmental Issues

Environmental Issue	Alternative 1 (No Project/Action)	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max. Helicopter Construction in ANF)	Alternative 7 (66-kV Subtransmission)
Number of recreation resources (not incl. Dispersed Recreation) that would be temporarily disrupted during construction	Another, similar T/L project would likely introduce similar impacts to recreational and wilderness resources that would be introduced through the Project or an alternative.	80 (41 on NFS)	Same as Alternative 2	Alternative 4A: 86 (+6) Alternative 4B: 89 (+9) Alternative 4C: 85 (+5) Alternative 4D: 81 (+1)	Same as Alternative 2	78 (39 on NFS)	Same as Alternative 2
Number of recreation resources (not incl. Dispersed Recreation) that would be regularly disrupted due to operation and maintenance activities [4]	Another, similar T/L project would likely introduce similar impacts to recreational and wilderness resources that would be introduced through the Project or an alternative.	35 (16 on NFS)	Same as Alternative 2	Alternative 4A: 40 (+5) Alternative 4B: 42 (+7) Alternative 4C: 33 (-2) Alternative 4D: 36 (+1)	Same as Alternative 2	35 (16 on NFS)	Same as Alternative 2
Level of disturbance to Dispersed Recreation that would occur as a result of construction-related access restrictions/disturbances such as increased noise [3]	Another, similar T/L project would likely introduce similar impacts to recreational and wilderness resources that would be introduced through the Project or an alternative.	Medium	Same as Alternative 2	High	Same as Alternative 2	High	Same as Alternative 2
Number of recreation resources within one-half mile of the T/L route that are located on State Park lands	Another, similar T/L project would likely introduce similar impacts to recreational and wilderness resources that would be introduced through the Project or an alternative.	0	Same as Alternative 2	Alternative 4A: 12 Alternative 4B: 11 Alternative 4C: 7 Alternative 4D: 11	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Level of unmanaged recreation that would occur as a result of Project construction. [4]	Another, similar T/L project would likely introduce similar impacts to recreational and wilderness resources that would be introduced through the Project or an alternative.	Medium	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Low	Same as Alternative 2
Level of temporary degradation of the "Solitude and Unconfined Recreation" characteristic of the San Gabriel WA[7]	Another, similar T/L project would likely introduce similar impacts to recreational and wilderness resources that would be introduced through the Project or an alternative.	Low	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Medium	Same as Alternative 2
Level of temporary degradation of the "backcountry experience" on the PCT (temporary / permanent)[5]	Another, similar T/L project would likely introduce similar impacts to recreational and wilderness resources that would be introduced through the Project or an alternative.	Medium / Low	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	High / Low	Same as Alternative 2

[4] Operation and maintenance activities would only have the potential to result in wilderness and recreation impact(s) for those resources which experience a "direct crossing" by the Project.

[3] "Level of disturbance" is indicated as being "Low", "Medium", or "High", which represent generalized rankings for the purposes of comparison only and do not reflect impact significance determinations, which are discussed in the impact analysis for wilderness and recreation. Dispersed Recreation includes undeveloped areas such as open space and natural scenic vistas which are used for recreational purposes but are not regularly maintained by the Forest Service or other responsible agency. With regards to Dispersed Recreation, Alternative 2 is ranked as MED due to effects within the ANF, while Alternative 4 is ranked as HIGH due to effects within the CHSP as well as the ANF, and Alternative 6 is also ranked as HIGH because although this alternative would not affect the CHSP, its effects within the ANF would be more substantial. Please see the impact analysis for further discussion.

[4] Unmanaged recreation refers to recreational activities that occur but are not authorized, such as OHV use in areas that are managed to be non-motorized. In the ANF, unmanaged recreation would be expected to occur in areas where roads are improved or installed, thus providing access to areas that otherwise were not easily accessible by the public. With regards to unmanaged recreation, Alternative 2 is ranked as MED because this alternative would include road improvements throughout the ANF, which would introduce the potential for unmanaged recreation in some areas. Alternative 6 is ranked as LOW because more transmission towers would be constructed via helicopter for Alternative 6 and therefore, fewer spur roads would need to be installed and/or improved, which is expected to result in less unmanaged recreation in the Forest, particularly in the form of unauthorized OHV use.

[7] Wilderness Areas (WA) are officially designated by the U.S. Congress only if they have the following primary characteristics: natural and undisturbed landscape; solitude and unconfined recreation; 5,000 contiguous acres; features of natural value. Due to the Project's proximity to the San Gabriel WA, construction noise would have the potential to affect the "Solitude and Unconfined Recreation" characteristic of the San Gabriel WA. With regards to this WA characteristic, Alternative 2 is ranked as LOW with Alternative 6 ranked as MED because the greater extent of helicopter construction included under Alternative 6 increases noise-related disturbances in the Forest, particularly in sensitive or unique areas such as the San Gabriel WA. The use of helicopters may require flight paths to enter airspace over the San Gabriel WA, depending on wind and weather conditions. This construction-related degradation of the "Solitude and Unconfined Recreation" characteristic of the San Gabriel WA would be temporary.

[5] The proposed Project and each of the identified alternatives would traverse the Pacific Crest National Scenic Trail (PCT) in three locations: once in the North Region and twice in the Central Region. Transmission lines that would be replaced by the Project currently exist at each of the proposed crossings of the PCT. As such, under current conditions, hikers on the PCT pass under transmission lines at each location, and hikers may be exposed to operation and maintenance activities at each of these locations. Therefore, the presence of transmission lines would not dramatically change existing conditions; however, the size of infrastructure included under the proposed Project and alternatives is larger than existing infrastructure, and would be visible from a greater distance away on the PCT. During the construction period, the implementation of "maximum helicopter construction" under Alternative 6 would cause greater disturbance to the "backcountry experience" on the PCT due to the noise, aesthetics, and air quality affects associated with helicopter use. In addition, Alternative 6 includes a helicopter staging area (Alt. 6 #4) located within 0.1 mile of the PCT in an area where the trail would not be traversed by the transmission line or otherwise disturbed by construction activities, whereas Alternative 2 includes a helicopter staging area (SCE #1) that is located within 0.3 mile of the PCT in an area where the trail is traversed by existing transmission lines as well as Project transmission lines and would therefore already be disturbed by construction activities.

Table 4.2-1. Summary Comparison of Environmental Issues

Environmental Issue	Alternative 1 (No Project/Action)	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max. Helicopter Construction in ANF)	Alternative 7 (66-kV Subtransmission)
Level of temporary disturbance and/or preclusion that would affect hunting and fishing opportunities in the ANF[6]	Another, similar T/L project would likely introduce similar impacts to recreational and wilderness resources that would be introduced through the Project or an alternative.	Medium	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	High	Same as Alternative 2
WILDFIRE PREVENTION AND SUPPRESSION							
Construction and/or maintenance activities would reduce the effectiveness of firefighting.	Construction of a T/L in place of TRTP could interfere with emergency response vehicles during the construction phase through wildland areas with high-risk fuels.	Interference with emergency response vehicles during the construction phase through the ANF and Puente Hills Landfill Natural Habitat Authority (PHLNHA) lands.	Same as Alternative 2.	Increased number of narrow, unpaved wildland access roads that would be potentially obstructed by emergency service vehicles in the event of a wildfire in CHSP.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Presence of new or higher overhead transmission line would reduce the effectiveness of firefighting.	Presence of a T/L in place of TRTP in a new corridor could substantially increase the obstruction to firefighting operations.	Increased height of transmission structures in existing corridors along several segments, creating a marginal increased burden on aerial firefighting operations.	Same as Alternative 2.	Increased height of transmission structures in existing corridors along several segments, and increased length of new linear firefighting obstacles on the landscape, creating an increased burden on aerial firefighting operations.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Construction and/or maintenance activities would increase the risk of wildfire.	Construction of a T/L in place of TRTP in a new corridor could substantially increase the risk of ignitions.	Wildfire ignition risks during the construction phase through wildland areas with high-risk fuels.	Same as Alternative 2.	Increased T/Ls through the high-risk Tehachapi Fireshed would increase potential for construction and O&M ignitions. Mileage of T/L increase: Alternative 4A – 2.3 miles; Alternative 4B – 4.5-miles; Alternative 4C – 5.6-miles; Alternative 4D – 5.2 miles. Alternative 4D would also add new linear element to a high-risk fuel-laden landscape that, in combination with other T/Ls, would create an indefensible space of approx. 2,000 acres. Increased potential for interference with fire suppression.	Same as Alternative 2.	Reduced construction-related ignitions compared with Alternative 2.	Same as Alternative 2.
Construction and/or maintenance activities would increase the risk of personnel injury or death in the event of fire.	Construction and maintenance of a T/L in place of TRTP would have a similar risk of personnel injury or death if constructed through wildland areas with high-risk fuels and limited ingress/egress.	Increased risk of personnel injury or death due to presence of personnel in access-limited wildlands that are highly susceptible to wildfire.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2 after implementation of additional mitigation measures.	Same as Alternative 2.
Presence of the overhead transmission line would increase the risk of wildfire.	Presence of a T/L in place of TRTP would have a similar risk of long-term ignitions if constructed through high-risk fuels for a similar length.	Same risk of igniting fire in fire-prone areas of route as the existing T/L the Project would replace.	Same as Alternative 2.	Would incrementally increase risk of igniting wildfire in Chino Hills and CHSP.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Project activities would introduce non-native plants, which would contribute to an increased ignition potential and rate of fire spread.	Construction of a T/L in place of TRTP through wildland areas could have similar effects on fire behavior resulting from the introduction of non-native plants.	Introduces non-native plants, which would contribute to a change in fuel characteristics and fire behavior that could worsen the effects of fire.	Same as Alternative 2.	Introduces incrementally more non-native plants than Alternative 2, which would contribute to a change in fuel characteristics and fire behavior that could worsen the effects of fire.	Same as Alternative 2.	Introduces incrementally fewer non-native plants than Alternative 2 as a result of fewer roads (approx. 42 miles less) being constructed.	Same as Alternative 2.

[6] Construction activities that occur during designated hunting season(s) in Hunting Zone D-11 would affect recreational hunting activities through road closures that restrict hunters' movement through the Forest, and/or through the introduction of construction noise and aesthetics that may affect wildlife presence and/or movement. The use of helicopters during construction would have a greater affect on hunting activities, primarily as a result of noise and. therefore, Alternative 6 would have a greater affect on hunting than Alternative 2. Impacts to fishing opportunities along the West Fork San Gabriel would not occur under Alternative 6 because construction traffic would not use Forest Road 2N25.1; other impacts to fishing opportunities would be the same for all alternatives.

Table 4.2-1. Summary Comparison of Environmental Issues

Environmental Issue	Alternative 1 (No Project/Action)	Alternative 2 (SCE's Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4 (Chino Hills Routes)	Alternative 5 (Partial Underground)	Alternative 6 (Max. Helicopter Construction in ANF)	Alternative 7 (66-kV Subtransmission)
ELECTRICAL INTERFERENCE AND HAZARDS [7]							
Interferes with radio/television/communications/ electronic equipment.	Interference would be generated by building or upgrading other transmission infrastructure in lieu of the Project.	No substantial interference with implementation of mitigation.	Interference would occur over a slightly longer line route than Alternative 2.	Interference would occur over the shortest routes.	Same as Alternative 2, except underground portion in Segment 8 would not generate interference.	Same as Alternative 2.	Same as Alternative 2, except underground portion in Segment 7 (66-kV) would not generate interference.
Causes induced currents or shock hazards.	Induced currents or shock hazards would be generated by building or upgrading other transmission infrastructure in lieu of the Project.	No substantial induced currents or shock hazards would occur with implementation of mitigation.	Induced currents or shock hazards would occur over a slightly longer line route than Alternative 2.	Induced currents or shock hazards would occur over the shortest routes.	Same as Alternative 2, except underground portion in Segment 8 would not result in induced currents or shock hazards.	Same as Alternative 2.	Same Alternative 2, except underground portion in Segment 7 (66-kV) would not result in induced currents or shock hazards.
Introduces hazards related to wind or earthquake.	Hazards would be introduced by building or upgrading other transmission infrastructure in lieu of the Project.	No substantial hazards related to wind or earthquake would occur, as structures would be designed such that failure related to wind conditions would be highly unlikely and with dynamic loading under variable wind conditions that generally exceed earthquake loads.	Same as Alternative 2.	Same as Alternative 2, except that hazards would occur over the shortest line routes.	Same as Alternative 2, except underground portion in Segment 8 would not result in wind or earthquake hazards.	Same as Alternative 2.	Same as Alternative 2, except underground portion in Segment 7 (66-kV) would not result in wind or earthquake hazards.

[7] In Decision D.06-01-042, dated January 26, 2006, the CPUC was "unable to determine whether there is a significant verifiable relationship between EMF exposure and negative health consequences." In the absence of any defined standards for determining health risks from EMF, a comparison of health impacts between the alternatives cannot be made and is not presented in this table.

Management District (SCAQMD), Antelope Valley Air Quality Management District (AVAQMD), and the Kern County Air Pollution Control District (KCAPCD). The magnitude of exceedances would vary for each alternative.

Of all the Project alternatives, construction and operation of Alternative 4 (Chino Hills Routes) would have the lowest emissions due to the construction of fewer towers, reduced tower removal (wreck-out), reduced substation improvement work, and reduced 66-kV pole removal and new construction in Segments 8 and 9 (Substations). Additionally, Alternative 4 would reduce emissions in an area with poor air quality and much higher population density than the other Project alternative routes.

Alternative 2 (SCE's Proposed Project), Alternative 3 (West Lancaster), and Alternative 7 (66-kV Subtransmission) would have similar air quality impacts, although the emissions from Alternative 3 would be marginally less than Alternative 2, while the emissions from Alternative 7 would be marginally greater than Alternative 2. Compared to the other Project alternatives, Alternative 6 (Maximum Helicopter Construction in the ANF) would contribute to a greater increase in construction emissions for VOC and CO due to the substantial increase in helicopter use.

The construction and operating criteria pollutants (specifically NOx and PM10) and GHG emissions would be higher for Alternative 5 (Partial Underground) than any other alternative due to increased inspection and maintenance requirements for the underground lines and due to the substantial increase in SF_6 gas use, which is required to insulate the underground transmission lines.

4.2.3 Biological Resources

Based on the analyses of the Biological Resources impacts of the proposed Project and alternatives, as presented in Section 3.4 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Biological Resources, the differentiators used to compare the alternatives included such considerations as total land disturbance, sensitive vegetation communities affected, designated critical habitat lost or disturbed, and numbers of listed and special-status species affected.

As shown in Table 4.2-1 and detailed in Section 3.4, although Alternative 2 (SCE's Proposed Project) and Alternative 6 (Maximum Helicopter Construction in the ANF) would result in direct and indirect impacts to biological resources, impacts associated with these alternatives would be lower in size and magnitude than the remaining alternatives. Alternative 2 would result in more land disturbance than Alternative 6 due to the extent of road improvements and construction. Alternative 6 follows the same route as the other alternatives through the ANF, impacting identical habitats and species, but it would comprise a net decrease in the size and magnitude of direct and indirect long-term impacts as a result of the construction of the majority of the transmission line on the ANF by helicopter. However, short-term impacts associated with helicopter construction, such as noise, rotor wash, and general disturbance to wildlife, would be greater under this alternative as compared to Alternative 2.

Alternative 3 (West Lancaster), Alternative 5 (Partial Underground), and Alternative 7 (66-kV Subtransmission) would result in incrementally greater impacts to biological resources as compared to Alternative 2. The re-routed portion of Alternative 3 would incrementally increase impacts to California annual grassland, native wildflower field, and desert wash habitats as compared to Alternative 2, while the implementation of Alternative 5 would result in additional incremental impacts to disturbed/developed areas and California annual grassland. The rerouted 66-kV lines associated with Alternative 7 would

incrementally increase impacts to sensitive riparian vegetation, as well as coastal sage scrub, ruderal grassland, nonnative woodland, and barren/developed areas.

Although Alternative 4 (Chino Hills Routes) would construct less miles of new transmission line than the other alternatives, it would result in a net increase to disturbance of unique vegetation communities as the re-routes (A through D) traverse primarily natural habitats including CHSP, as opposed to the remaining Project alternatives which traverse primarily barren/developed and agricultural habitats in this area of the Project (Segment 8). While there are slight differences in the routing options of Alternative 4, no individual route would result in a substantial increase or decrease of impacts to biological resources.

4.2.4 Cultural Resources

Based on the analyses of the Cultural Resources impacts of the proposed Project and alternatives, as presented in Section 3.5 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Cultural Resources, the differentiators used to compare the alternatives included total land surface and subsurface disturbance; nature and extent of physical impacts; amount of new ROW required; extent to which cultural resource inventories have been completed; the location, distribution, and nature of known cultural resources affected; and the potential for unanticipated discoveries of cultural resources during construction.

As described in Table 4.2-1, there are 107 identified cultural resources within the Area of Potential Effects (APE) for Alternative 2 (SCE's Proposed Project), Alternative 3 (West Lancaster), and Alternative 5 (Partial Underground); 139 identified cultural resources within the APE for Alternative 4 (Chino Hills Routes); 142 for Alternative 6 (Maximum Helicopter Construction in the ANF); and 151 for Alternative 7 (66-kV Subtransmission). Alternative 7 (66-kV Subtransmission) has the greatest potential among the Project alternatives for direct and indirect impacts on cultural resources because of the greater number of known resources, higher archaeological sensitivity, and enhanced potential for buried archaeological remains, including human remains.

4.2.5 Environmental Contamination and Hazards

Based on the analyses of the Environmental Contamination and Hazards impacts of the proposed Project and alternatives, as presented in Section 3.6 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Environmental Contamination and Hazards, the differentiators used to compare the alternatives included proximity to known and suspected areas of soil and groundwater contamination, proximity to oil fields and landfills where methane and toxic gases may be present, potential for previously unanticipated contamination in Project areas due to past land use activities, and the potential for construction-related contamination based on the relative amount of construction work (length of each alternative, number of new structures to be constructed, number of existing structures to be removed).

All four routes under Alternative 4 (Chino Hills Routes) are between approximately 10 miles (Route C) to 16 miles (Route A) shorter than the other Project alternatives and avoid 10 miles of commercial/industrial areas with many known environmental contamination sites. The shorter Project length incrementally reduces the potential for impacts related to environmental contamination to occur during construction and during operation and maintenance of the proposed transmission line.

Alternative 2 (SCE's Proposed Project) includes approximately 16 miles of transmission line within commercial and industrial areas along Segment 8A with numerous known environmental contamination

sites. Alternative 3 (West Lancaster) and Alternative 5 (Partial Underground) would have potential environmental contamination impacts that would be the same as or similar to Alternative 2.

Alternative 7 (66-kV Subtransmission) and Alternative 6 (Maximum Helicopter Construction in the ANF) would increase the potential for spills and leaks of fuel, lubricants and other chemicals to occur during construction compared to the other Project alternatives. Potential spills and leaks from Alternative 7 may result from the increase in construction effort required for underground construction of 66-kV subtransmission lines, while spills and leaks from Alternative 6 may result from the extensive use of helicopters to support construction along Segments 6 and 11 in the ANF.

4.2.6 Geology, Soils, and Paleontology

Based on the analyses of the Geology, Soils, and Paleontology impacts of the proposed Project and alternatives, as presented in Section 3.7 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Geology, Soils, and Paleontology, the differentiators used to compare the alternatives included such considerations as erosion potential (based on soil characteristics and total land disturbance), potential for damage from slope instability or other ground failures both during construction and operation, potential for damage from seismic events (i.e., fault rupture, liquefaction, or seismically induced landslides), and potential to disturb and or destroy unique paleontologic resources.

As described in Table 4.2-1, Alternative 2 (SCE's Proposed Project) would involve the construction of access roads, helicopter and other associated construction staging areas, and a total of 853 new towers. Land disturbance consisting of grading and excavation would be required through approximately 77 miles of hillside and mountain areas with known landslides and unstable slopes, resulting in the potential for impacts from construction triggered slope failures, seismically induced slope failures, and slope failures during Project operation. Slope stability impacts associated with Alternative 3 (West Lancaster), Alternative 5 (Partial Underground), and Alternative 7 (66-kV Subtransmission) would be similar to Alternative 2, as these alternatives would have similar construction through the same hillside and mountain areas for the same distance. Compared to Alternative 2, impacts related to construction triggered landslides under Alternative 6 (Maximum Helicopter Construction in the ANF) are expected to decrease due to the reduction in land disturbance from grading of fewer access and spur roads (approximately 45 acres versus 105 acres) required in the hillside and mountain areas with maximum helicopter construction. Of all the Project alternatives, Alternative 4 (Chino Hills Routes) would have the greatest increase in the amount of construction-related land disturbance in hillside areas with known landslides and slope stability issues and earthquake induced slope failure hazards.

Compared to Alternative 2, construction-related erosion is expected to increase under Alternative 5 (Partial Underground) and Alternative 7 (66-kV Subtransmission) due to increased ground disturbance from underground construction activities, as well as under Alternative 4 (Chino Hills Routes) due to the increased amount of grading required for access roads and new spur roads. Of all the Project alternatives, erosion related impacts would have the greatest decrease under Alternative 6 (Maximum Helicopter Construction in the ANF) due to the reduction in the number of new and upgraded access and spur roads (approximately 42 miles with a $\pm 15\%$ range of 49 to 36 miles), resulting in less ground disturbance in areas with potential erosion issues.

In comparison with the other Project alternatives, Alternative 4 (Routes B and D) and Alternative 5 would result in slightly increased potential for damage from surface fault rupture. Under Routes 4B and 4D, a

switching station would be located adjacent to or on the mapped trace of the Alquist-Priolo zoned Chino Fault, while the underground portion of the Alternative 5 alignment would cross the projected trend of the Chino fault.

Compared to the other Project alternatives, the potential to damage or destroy paleontologic resources during construction is expected to increase for Alternative 4 (Chino Hills Routes) and Alternative 7 (66-kV Subtransmission). Alternative 4 would increase ground disturbance in the paleontologically sensitive Puente Formation, while Alternative 7 would cause a slight increase in ground disturbance from underground construction and new 66-kV poles in young alluvium with moderate paleontologic sensitivity.

Of all the Project alternatives, only Alternative 5 (Partial Underground) would create a potential impact from ground subsidence/settlement during and after construction of the tunnel that could result in damage to overlying structures.

4.2.7 Hydrology and Water Quality

Based on the analyses of the Hydrology and Water Quality impacts of the proposed Project and alternatives, as presented in Section 3.8 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Hydrology and Water Quality, the differentiators used to compare the alternatives included such considerations as the number of streams that would be crossed, the water quality and level of surrounding development of the streams that would be crossed, the number of miles of Project structures within a Flood Hazard Area, and the potential for underlying groundwater to be contaminated by Project construction activities. A quantitative comparison of the alternatives was conducted for criteria where adequate data are available.

As a result of constructing 143 transmission towers in the ANF by helicopters, Alternative 6 (Maximum Helicopter Construction in the ANF) would include the least amount of new or upgraded access and spur roads, in comparison with the proposed Project and other alternatives. Therefore, the amount of erosion and sedimentation that would occur under Alternative 6 would be lower and the subsequent impacts to surface and groundwater quality would also be diminished. Alternative 3 (West Lancaster) would follow the same route as the proposed Project except for a short distance in the North Region where the transmission line would traverse two additional unnamed streams (in comparison with the proposed Project). Alternative 4 (Chino Hills Routes), Route D, would cross fewer streams and overlies one fewer groundwater basin than the proposed Project, Alternative 3, or Alternative 6, but would affect high quality, natural streams within CHSP that would not be affected by the aforementioned alternatives. Alternative 4, Route A, would cross one more stream than Alternative 4, Route D; Alternative 4, Route B, would cross four additional streams; and Alternative 4, Route C, would cross six additional streams (in comparison with Alternative 4, Route D). Alternative 5 (Partial Underground) would avoid several stream crossings that would occur under the proposed Project; however, this alternative would have greater potential to come in direct contact with groundwater resources as a result of the 3.5-mile underground segment included in the South Region (Segment 8). Alternative 7 (66-kV Subtransmission) would also introduce the potential to come into contact with groundwater resources as a result of the undergrounded portions of 66-kV subtransmission line in the South Region (Segments 7 and 8).

4.2.8 Land Use

Based on the analyses of the Land Use impacts of the proposed Project and its alternatives, as presented in Section 3.9 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in

order to evaluate the overall effect of each alternative. For Land Use, the differentiators used to compare the alternatives included such considerations as total land disturbance, the duration of potential short- and long-term impacts, and the ability to avoid or minimize the types of land uses affected.

As shown in Table 4.2-1, construction-related disruptions, displacements and preclusions to residential and non-residential land uses would be temporary in nature for all Project alternatives and can be mitigated to a level of less than significant. Alternative 5 (Partial Underground) would result in the permanent loss of non-residential (commercial) land uses along Segment 8A near MP 25.3. In comparison to Alternative 5, implementation of the remaining Project alternatives would not result in any permanent disruptions, displacements or preclusions of any residential or non-residential land uses.

Under Alternative 4 (Chino Hills Routes), there would be a very substantial reduction in the short- and long-term disruptions of both residential and non-residential land uses east of Segment 8A MP 19.2 and along Segments 8B and 8C in comparison to all other alternatives. However, Alternative 4 would result in both short- and long-term conflicts with existing land uses and maintenance and operational activities within Chino Hills State Park (CHSP), as well as with the park's General Plan. No other Project alternative would conflict with an applicable federal, State, or local land use plan, goal, or policy.

4.2.9 Noise

Based on the analysis conducted for Noise impacts of the proposed Project and alternatives, as presented in Section 3.10 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Noise, the differentiators used to compare the alternatives included such considerations as duration and intensity of construction noise, operational corona noise levels, and numbers of sensitive receptors affected by construction and operational noise.

Alternative 2 (SCE's Proposed Project) would have significant unavoidable construction and operational noise impacts to sensitive receptors. Impacts would be similar for the other Project alternatives, although the number of affected sensitive receptors would be lower under Alternatives 3 (West Lancaster) and 4 (Chino Hills Routes). Alternative 5 (Partial Underground) would also subject fewer sensitive receptors to both construction and operational corona noise, as it would avoid both construction and permanent corona noise impacts to a number of residences along the 3.5-mile underground segment of transmission line within the City of Chino Hills.

Although Alternative 6 (Maximum Helicopter Construction in the ANF) and Alternative 7 (66-kV Subtransmission) would have nearly identical operational noise impacts to sensitive receptors as Alternative 2, construction noise impacts would be greater than Alternative 2. Alternative 6 would expose the highest number of sensitive receptors to high volume helicopter noise, while Alternative 7 would result in an increase in the amount of construction equipment and the intensity of construction for the underground placement of the 66 kV subtransmission line.

4.2.10 Public Services and Utilities

Based on the analysis of the Public Services and Utilities impacts for the proposed Project and alternatives, as presented in Section 3.11 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Public Services and Utilities, the differentiators used to compare the alternatives included the potential interference with or an increased need for public services and utility systems.

For each of the Project alternatives, construction activities would potentially interfere with emergency services as well as Los Angeles County Public Works maintenance yards and waste management services. In addition, construction of each alternative would potentially increase the need for utility systems, such as water resources, and could temporarily disrupt the flow of utility systems. However, these impacts would be less-than-significant with implementation of the mitigation measures discussed in Section 3.11.

Compared to the other Project alternatives, Alternative 4 (Chino Hills Routes) includes four routing options (A through D) that would terminate the Project before it would reach the cities of Chino or Ontario, which would avoid interference with public service and utilities systems in both of these cities while potentially introducing new impacts in the City of Chino Hills and CHSP. Alternative 5 (Partial Underground) also differs from the other Project alternatives, in that it would include potential rolling black-outs if system failure were to occur with the Gas Insulated Line. Reliability considerations are primarily related to the lack of precedence in installing GIL systems of the length and voltage proposed under Alternative 5, and the likelihood of system failure for the system is unknown at this time. As a result, construction of Alternative 5 could interfere with the flow of utility systems in the vicinity of the proposed 3.5-mile underground portion of Segment 8.

4.2.11 Socioeconomics

Based on the analysis of the Socioeconomic impacts for the proposed Project and alternatives, as presented in Section 3.12 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Socioeconomics, the six identified Issues of Concern were used as differentiators to compare the alternatives. These Issues of Concern included the following: Population and Housing, Quality of Life, Employment, Private Property Value, Local Business Revenue, and Public Revenue.

As shown in Table 4.2-1, each of the Project alternatives would have the potential to result in decreased agricultural business revenue in the North Region, particularly during the construction period. Each of the alternatives would also have the potential to affect private property value as a result of Project infrastructure, particularly in the South Region. Compared to the other Project alternatives, Alternative 4 (Chino Hills Routes) would avoid potential property value impacts along approximately 16 miles of the transmission line route that is proposed under the remaining alternatives. Alternative 5 (Partial Underground) would differ from the other Project alternatives in that it could possibly have a temporary effect on local business revenue in proximity to the transition stations, specifically the eastern transition station, as a result of the extended construction schedule affecting access of customers to business establishments. In comparison with the other Project alternatives, Alternative 6 (Maximum Helicopter Construction in the ANF) could have a greater effect on the "quality of life" Issue of Concern during the construction period, particularly for visitors on lands in the ANF, because certain factors that are considered to contribute to an individual's perception of quality of life (such as noise, aesthetics, and air quality) would be temporarily degraded due to this alternative's increased use of helicopter construction.

4.2.12 Traffic and Transportation

Based on the analyses of the Traffic and Transportation impacts of the proposed Project and alternatives, as presented in Section 3.13 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Traffic and Transportation, the differentiators used to compare the alternatives primarily included the total number of roadways crossed, roadway congestion, number of transit and pedestrian routes crossed, and overall construction duration.

As shown in Table 4.2-1, implementation of Alternative 2 (SCE's Proposed Project), Alternative 3 (West Lancaster), Alternative 6 (Maximum Helicopter Construction in the ANF), and Alternative 7 (66-kV Subtransmission) would result in overhead crossings of approximately 420 roadways, while Alternative 5 (Partial Underground) and Alternative 4 (Chino Hills Routes) would result in overhead crossings of approximately 409 and 350 roadways, respectively. Trenching required for construction of Alternative 7 would result in temporary closure of roadways that would not be required for any other alternative. Underground construction activities required for Alternative 5 would result in a substantially longer duration of construction activities with considerable truck trips associated with removal of dirt and import of concrete to form the proposed tunnel, and consequently a longer duration and more extensive Traffic and Transportation impacts than the other alternatives.

4.2.13 Visual Resources

Based on the analyses of the Visual Resources impacts of the proposed Project and alternatives, as presented in Section 3.14 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Visual Resources, the differentiators used to compare the alternatives included such considerations as differences in: visual sensitivity; changes from existing visual conditions to future conditions; total land area and visual environment disturbance; Project visibility from sensitive receptor locations; amount of skyline interruption; and, numbers of communities, residential areas, and/or parklands affected.

Alternative 2 (SCE's Proposed Project) would have the greatest visual impacts of all Project alternatives from placing new T/Ls along a second priority scenic highway (110th Street West) in Segment 4 and in a highly visible location to many viewers (urban area) through the Cities of Chino Hills, Chino, and Ontario in Segment 8. Compared to Alternative 2, Alternative 3 (West Lancaster) would avoid visual impacts along the second priority scenic highway (110th Street West); Alternative 5 (Partial Underground) would reduce visual impacts in Chino Hills along a 3.5-mile portion; Alternative 6 (Maximum Helicopter Construction in the ANF) would utilize helicopter construction to reduce the construction of new and upgraded access and spur roads within the ANF in order to minimize visual impacts; and Alternative 7 (66-kV Subtransmission) would improve the visual environment of the Duck Farm Project area and the Whittier Narrows Recreation Area.

In comparison with the other Project alternatives, Alternative 4 (Chino Hills Routes) would eliminate construction and operation of new transmission lines through portions of Chino Hills, Chino, and Ontario, thereby reducing visual impacts in these communities; however, this alternative would create new significant and unavoidable visual impacts within CHSP.

4.2.14 Wilderness and Recreation

Based on the analysis of the Wilderness and Recreation impacts of the proposed Project and alternatives, as presented in Section 3.15 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Wilderness and Recreation, the differentiators used to compare the alternatives included such considerations as the level of temporary and permanent disturbance that would affect recreational resources and opportunities in the Project Area. Particular consideration was given to potential disturbance of unique or sensitive recreational resources, such as the Pacific Crest National Scenic Trail (PCT), designated Wilderness Areas (WA) in the ANF, the Duck Farm Project, CHSP, and others.

All of the Project alternatives are routed through the ANF, and would introduce temporary impacts to recreational resources and opportunities on NFS lands as a result of construction activities. Under Alternative 6 (Maximum Helicopter Construction in the ANF), 143 transmission towers in the Forest would be constructed using helicopters, as opposed to 33 helicopter-constructed towers associated with each of the remaining Project alternatives. Therefore, temporary construction impacts to recreational resources and opportunities that would occur as a result of helicopter use, particularly as a result of noise disturbance, would be greater under Alternative 6. Unique recreational resources in the Forest, including the PCT and the San Gabriel WA, are especially susceptible to helicopter disturbance along the transmission line route and helicopter flight paths, as well as in proximity to helicopter staging areas. During operation and maintenance of the transmission line, effects to recreational resources and opportunities would be extremely similar among all Project alternatives, which would also be similar to existing conditions. However, compared to the other Project alternatives, it is expected that unmanaged recreation related to new or improved access and spur roads in the ANF would be less under Alternative 6 because access and spur roads to helicopter-constructed towers would not be improved or installed and would therefore not provide access to unauthorized areas for unmanaged recreation.

In comparison to the other Project alternatives, Alternative 7 (66-kV Subtransmission) would minimize recreation impacts at the Duck Farm Project site by undergrounding the 66-kV subtransmission line in this area, thereby avoiding permanent disruption to the approved site plan. In contrast, Alternative 4 (Chino Hills Routes) would introduce permanent wilderness and recreation impacts to areas of CHSP that would be avoided under the other Project alternatives.

4.2.15 Wildfire Prevention and Suppression

Based on the analyses of the Wildfire Prevention and Suppression impacts of the proposed Project and alternatives, as presented in Section 3.16 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Wildfire Prevention and Suppression, the differentiators used to compare the alternatives included such considerations as the number of significant, unavoidable (Class I) impacts, the number of miles of new transmission lines that would be constructed through wildland areas with high-risk fuels, and whether indefensible spaces would be created by siting transmission lines in new corridors resulting in conflicts with firefighting operations.

All of the Project alternatives would pose wildfire ignition risks during the construction phase. Compared to the other Project alternatives, Alternative 6 (Maximum Helicopter Construction in the ANF) would require the construction of fewer roads within the ANF, which would slightly reduce the number of potential ignitions during construction and slightly reduce the potential introduction of non-native weeds that provide fuel for wildfires.

Alternative 4 (Routes A through D) would reduce the total mileage of new transmission line and upgrades, in comparison with the other Project alternatives, by between 10 miles (Route C) and 16 miles (Route A). However, the mileage of new transmission line through the high-risk Tehachapi Fireshed would increase with the implementation of Alternative 4, thereby increasing the potential for construction and operational ignitions in high-risk fuels. In addition, Route D would introduce a new linear element to a high-risk fuel laden landscape in a new 5.3-mile length of ROW and create an indefensible space of approximately 2,000 acres in combination with existing transmission lines, thereby increasing the potential for interference with fire suppression efforts.

4.2.16 Electrical Interference and Hazards

Based on the analyses of the Electrical Interference and Hazards impacts of the proposed Project and alternatives, as presented in Section 3.17 of this EIR/EIS, distinguishing characteristics of the alternatives have been highlighted in order to evaluate the overall effect of each alternative. For Electrical Interference and Hazards, the differentiators used to compare the alternatives included such considerations as the transmission line length, as Electrical Interference and Hazards impacts are directly related to the length of the line, and whether the transmission line would be located overhead or placed underground. Please note that potential health risks associated with EMF are not considered in this evaluation because there is no consensus in the scientific community regarding health risks associated with EMF exposure and, therefore, conclusions regarding this concern cannot be reached in this report.

As shown in Table 4.2-1, Alternative 4 (Chino Hills Routes) would result in the shortest overall line length compared to the other alternatives, and therefore would have the fewest miles where Electrical Interference and Hazards impacts could occur. Similarly, placement of the proposed transmission line (double-circuit 500-kV) underground as part of Alternative 5 (Partial Underground) and the 66-kV subtransmission lines as part of Alternative 7 (66-kV Subtransmission) would reduce potential impacts, as underground portions would not have any Electrical Interference and Hazards impacts. Alternative 2 (SCE's Proposed Project), Alternative 6 (Maximum Helicopter Construction in the ANF), and Alternative 3 (West Lancaster) would result in similar Electrical Interference and Hazards impacts as these alternatives are of relatively the same length and have the same or extremely similar (in the instance of Alternative 3) proposed overhead and underground transmission and subtransmission infrastructure.

4.3 Conclusion

4.3.1 CEQA Environmentally Superior Alternative

In accordance with CEQA requirements, an "environmentally superior alternative" must be identified among the alternatives analyzed in an EIR or EIR/EIS. The environmentally superior alternative is the alternative found to have an overall environmental advantage compared to the other alternatives based on the impact analysis in the EIR. If the environmentally superior alternative is the No Project alternative, State CEQA Guidelines Section 15126.6(e)(2) requires the EIR to identify an environmentally superior alternative from among the other alternatives.

Determining which of the alternatives is environmentally superior involves judgment and depends on many factors. As discussed in Section 4.2 and shown in Tables 4.2-1 and 4.2-2, different alternatives are clearly superior for certain environmental resource/issue areas. For other resource/issue areas, there are only slight differences among the alternatives, making the superiority of one alternative over another difficult to ascertain. Determination of the environmentally superior alternative also requires a weighing of one type of impact against another type, such as weighing short-term effects against long-term effects or weighing effects on the natural environment against effects on the human environment. Consequently, establishment of the environmentally superior alternative is sometimes difficult and there can be a lack of consensus even when the most objective measures are used to evaluate alternatives.

In order to meet CEQA's requirement to identify an environmentally superior alternative, the EIR/EIS preparers primarily considered those resource/issue areas that have the greatest potential for resulting in long-term, significant impacts, which include visual resources, biological resources, land use, public recreation, noise, and wildlife prevention/suppression. Consideration was also given to community

concerns, such as air quality, electrical interference/hazards, and socioeconomics. Impacts associated with construction (i.e., temporary or short-term) or those that are easily mitigated to less-than-significant levels were given consideration, but were considered less important than permanent impacts.

Segments 5 and 10

Among the alternatives analyzed within this EIR/EIS, Project elements that are identical to all of the alternatives include Segment 10 (Windhub Substation to Cottonwind Substation) and Segment 5 (Antelope Substation to Vincent Substation). Therefore, for these segments of the TRTP, the environmentally superior alternative would reflect SCE's proposed Project (Alternative 2).

Segment 4

Within Segment 4 (Cottonwind Substation to Antelope Substation), the alternatives that differ from each other are:

- Alternative 2 (SCE's Proposed Project); and
- Alternative 3 (West Lancaster).

Alternative 3 represents a refinement of the proposed alignment by SCE after submittal of their Proponent's Environmental Assessment (PEA); therefore, this re-route was treated as an alternative. As described in Section 4.2, Alternative 3 would result in very similar impacts compared to Alternative 2; however, placing the new T/L along 115th Street West would eliminate temporary and permanent impacts to existing residential uses between S4 MP 14.9 and 17.9. Additionally, under this alternative tower structures would be placed equidistant from the existing road; consequently, the T/L would not be placed in the immediate foreground of 110th Street West, which is a designated second priority scenic highway. Therefore, along Segment 4 of the TRTP, Alternative 3 (West Lancaster) is considered to be environmentally superior compared to Alternative 2.

Segments 6 and 11

Within Segment 6 (Vincent Substation to the southern boundary of the ANF) and Segment 11 (Vincent Substation to Mesa Substation), the alternatives that differ from each other are:

- Alternative 2 (SCE's Proposed Project); and
- Alternative 6 (Maximum Helicopter Construction in the ANF).

Under Alternative 6 a substantially greater number of towers would be constructed by helicopter in comparison to Alternative 2 (134 versus 33 towers). Increased helicopter construction activity would result in considerably greater air pollutant emissions; additionally, it would generate greater construction-related noise. In comparison to Alternative 2, these impacts would have a greater effect on sensitive receptors (residences and recreationists) located in the vicinity of Segments 6 and 11, and would also disturb wildlife to a greater degree. In addition, increased helicopter construction would: (1) disrupt more Dispersed Recreation (i.e., undeveloped areas such as open space and natural scenic vistas that are used for recreational purposes but are not regularly maintained by the Forest Service or other responsible agency); and, (2) increase the potential for fuel leaks, which could result in soil contamination. Although these impacts would be short-term in nature, they would still be sustained for a period of more than three years in and surrounding the ANF; additionally, the severity of these impacts, although mitigable to a certain degree, would still be more severe than under Alternative 2.

The short-term impacts associated with maximizing the amount of helicopter construction in the ANF represent a trade-off to the notable reduction in long-term impacts associated with Alternative 6 when compared to Alternative 2 (SCE's Proposed Project). Alternative 6 would reduce the amount of new and upgraded access and spur roads (includes new, reconstruction, and maintenance road types) required within the ANF to facilitate ground-based construction activities by approximately 42 miles (±15% range of 49 to 36 miles. The reduction in access roads would also result in 61 fewer RCAs adversely affected in comparison to Alternative 2. Furthermore, all spur roads within the ANF created for ground-based construction of towers as part of Alternative 6 would be temporary and would be revegetated upon completion of construction activities, whereas the spur roads created under Alternative 2 would be permanent. Therefore, Alternative 6 would be a preferred alternative from a biological resources perspective (as noted in Table 4.2-2). Overall, within Segments 6 and 11, Alternative 6 would reduce land disturbance during construction by approximately 82 acres (±15% range of 70-95 acres) and permanent land disturbance by approximately 47 acres (±15% range of 40-54 acres) compared to SCE's proposed Project (Alternative 2). Specifically on NFS lands, Alternative 6 would reduce land disturbance during construction by approximately 69 acres (±15% range of 59-79 acres) and permanent land disturbance by approximately 47 acres (±15% range of 40-54 acres) compared to SCE's proposed Project (Alternative 2).

The reduction in access and spur roads would also decrease the amount of grading required resulting in less ground disturbance and a reduction in the potential for erosion, landslides, and slope instability in mountainous terrain. It would also affect the fewest high quality surface resources, and minimize visual impacts in the ANF by avoiding soil disturbances, cut slopes in bedrock, and soil color contrasts that would result from new and upgraded roads.

Many construction impacts, such as visual scars, could persist for years following construction. Ultimately, the preferred method for construction in the ANF would be site-specific and would involve a balancing of the effects on helicopter construction against ground-based construction on sensitive resources. For instance, in areas where road construction would result in unacceptable impacts to sensitive species, such as in the Lynx Gulch area, helicopter construction would be preferred to the degree that it would avoid or minimize such impacts. In other locations, road construction to accommodate construction vehicle access would be preferred to avoid the impacts associated with the establishment of helicopter staging areas. Therefore, the environmentally superior alternative for Segments 6 and 11 is a combination of the helicopter construction and ground-based construction methods, with the total number of helicopter constructed towers falling within the range characterized by Alternative 2 and Alternative 6 (33 to 134 towers).

Segment 7

Within Segment 7 (Southern Boundary of the ANF to Mesa Substation), the alternative that differs from Alternative 2 (SCE's Proposed Project) is Alternative 7 (66-kV Subtransmission). The long-term benefits of undergrounding the 66-kV subtransmission line through the River Commons at the Duck Farm Project area (between Valley Boulevard – S7 MP 8.9 and S7 MP 9.9) and around the Whittier Narrows Recreation Area (S7 MP 11.4 to 12.025) would include:

- land use benefits to residential and non-residential land uses;
- improvement of the visual environment by eliminating visual contrast, skylining, and viewshed blockage associated with the aboveground placement of the 66-kV subtransmission lines;
- avoidance of impacts to planned recreation, specifically the Duck Farm Project; and

- elimination of potential electrical interference and hazards impacts a associated with the underground of the 66-kV line as underground lines do not create such impacts.

In comparison to Alternative 2, the net reduction in long-term impacts associated with Alternative 7 outweighs the greater short-term impacts associated with its underground construction element. This is particularly evident when considering that most of Alternative 7's short-term impacts would only be slightly greater than Alternative 2's short-term impacts, and that these impacts could be reduced to less-than-significant levels with implementation of the same mitigation measures as Alternative 2. Therefore, along Segment 7 of the TRTP, Alternative 7 (66-kV Subtransmission – Duck Farm 66-kV Underground and Whittier Narrows 66-kV Underground Re-Route) would be environmentally superior.

Segment 8

Within Segment 8 (Mesa Substation to Mira Loma Substation), the alternatives that differ from one another are:

- Alternative 2 (SCE's Proposed Project);
- Alternative 4 (Chino Hills Routes 4A through 4D);
- Alternative 5 (Partial Underground); and
- Alternative 7 (66-kV Subtransmission – Whittier Narrows 66-kV Overhead Re-Route).

Of these alternatives, Alternative 5 (Partial Underground) would have greater impacts than the other alternatives with respect to Air Quality, Hydrology and Water Quality, Land Use, Public Services/Utilities, and Traffic/Transportation as discussed in Section 4.2 above. While many of the impacts associated with Alternative 5 are short-term in duration (construction only), this alternative would also result in long-term impacts, including:

- increased greenhouse gas emissions associated with operations due to the use of sulfur hexafluoride (SF6) gas in the Gas Insulated Line (GIL) system;
- potential to destroy paleontological resources;
- potential ground subsidence/settlement effects that could potentially result in damage to overlying structures and utilities;
- permanent displacement of existing commercial land uses; permanent land disturbances resulting from the need to construct transition stations; and
- increased potential for rolling black-outs due to system failures associated with the GIL system's reliability, which is unknown at this time.

Alternative 5 (Partial Underground) would also reduce certain long-term impacts associated with the other Segment 8 alternatives, which are:

- a reduction in corona noise impacts for residents along the 3.5-mile underground segment;
- a reduction in electrical hazards associated with overhead transmission lines; and
- a reduction in visual impacts associated with aboveground transmission infrastructure (structures and conductor) along the 3.5-mile underground segment.

Overall, Alternative 5 (Partial Underground) is not superior to the other alternatives and is not considered the environmentally superior alternative within Segment 8.

Within Segment 8, between the San Gabriel Junction (S8A MP 2.2) and S8A MP 3.8, the alternatives that differ include Alternative 2 (SCE's Proposed Project) and Alternative 7 (66-kV Subtransmission – Whittier Narrows 66-kV Overhead Re-Route). The 66-kV re-route around the Whittier Narrows

Recreation Area was intended to reduce habitat impacts to least Bell's vireos; however, Alternative 7 would likely result in an incremental increase in impacts to sensitive biological resources when compared to Alternative 2. Therefore, the intended purpose of the Whittier Narrows 66-kV Overhead Re-Route would not be fully achieved. Consequently, Alternative 2 (SCE's Proposed Project) would be environmentally superior compared to the other alternatives along this portion of Segment 8 (S8A MP 2.2 to 3.8).

Among the remaining alternatives within Segment 8, Alternative 2 (SCE's Proposed Project) and Alternative 4 (Chino Hills Routes) differ substantially. Alternative 4 (Routes 4A through 4D) would eliminate the need for construction along the proposed Project (Alternative 2) route between S8A MP 19.2 and 35.2 (16 miles), thereby eliminating impacts associated with construction and operation of that portion of the proposed Project. However, Alternative 4 would require placement of transmission infrastructure within the CHSP. Alternative 4 (Routes 4A through 4D) would eliminate all Land Use and Socioeconomic impacts east of Segment 8A MP 19.2 along the Alternative 2 route, which would:

- benefit several communities (Chino Hills, Chino, and Ontario) and their existing and planned land uses;
- convert fewer acres of Farmland and traverse shorter distances of agricultural lands compared to Alternative 2;
- avoid construction and operational (corona) noise impacts along 16 miles of the proposed alignment (Alternative 2);
- avoid interference with public service and utilities systems during construction (within the re-routed portion);
- avoid potential adverse impacts to private property values within the re-routed portion of Segment 8 (Socioeconomics);
- cross the fewer roadways, municipal transit routes, bicycle routes, and pedestrian routes; and
- place the new double-circuit 500-kV T/L and switching station in a less visible location to many viewers in the cities of Chino Hills, Chino, and Ontario.

Most of these positive attributes are short-term (construction-related) and most of the construction impacts that would be avoided by Alternative 4 can be mitigated to less-than-significant levels. Therefore, these short-term effects are not considered to be as important in distinguishing between the alternatives as long-term effects related to corona noise and visual resources. Any potential adverse effects on private property values are not considered significant under CEQA, although it is an issue that can be considered by the CPUC in its decision-making process. Compared to Alternative 2, corona noise and visual impacts for Alternative 4 (Routes 4A through 4D), which are considered significant and unavoidable, would shift from affecting residences located along Segment 8 through Chino Hills, Chino, and Ontario to affecting users of CHSP.

While Alternative 4 (Routes 4A through 4D) would result in the reduction of some significant impacts associated with SCE's proposed Project (Alternative 2), these re-routes around and through CHSP would result in other new significant impacts that would not be associated with Alternative 2, as discussed below.

Alternative 4A would require 6.2 miles of new ROW east of S8A MP 19.2 (only 0.45 miles new expanded ROW is required for Alternative 2 east of S8A MP 19.2), of which 2.3 miles would be within the CHSP, and would place the new switching station within CHSP. The visual conditions of the CHSP area would be degraded by Alternative 4A as a result of placing a new double-circuit 500-kV T/L (alongside an existing single-circuit 500-kV T/L) near the north boundary of the CHSP. Furthermore, the

placement of the switching station within CHSP would be very visible in the foreground from existing hiking and equestrian trails and in the middleground from the Horse Camp, and would not be favorable from a Visual Resources perspective. Alternative 4A would also result in increased construction in hillside areas with known landslides and slope stability issues, as well as earthquake-induced slope failures. It would also have greater impacts to recreational resources compared to Alternative 2 as a result of locating Project elements within CHSP. Alternative 4A would result in a net increase in the disturbance of sensitive vegetation communities as the re-routed ROW would traverse primarily natural habitats including those within CHSP. In comparison, Alternative 2 would traverse primarily disturbed and developed lands and agricultural lands. Consequently, Alternative 4 would locate elements of the Project in closer proximity to wildlife and sensitive resources, such as riparian areas.

Alternative 4B would reduce the overall distance of new double-circuit 500-kV transmission lines by 6.3 miles compared to Alternative 2, but would require 9.7 miles of new ROW, of which 4.9 miles would be within CHSP. Alternative 4B would also require a new switching station east of CHSP adjacent to an area planned for residential development. The visual conditions in the CHSP area would be degraded by Alternative 4B as a result of placing a new double-circuit 500-kV T/L through the center of CHSP. In addition, the switching station location would be very visible in the foreground from Butterfield Ranch Road. Alternative 4B would also result in increased construction in hillside areas with known landslides and slope stability issues, including earthquake-induced slope failures, and would result in increased potential for damage from surface fault rupture due to the location of the switching station in very close proximity to the mapped trace of the Alquist-Priolo zoned Chino Fault. Additionally, Alternative 4B would have greater effects on recreational resources compared to Alternative 2 as a result of locating Project elements within CHSP. Compared to Alternative 2, Alternative 4B would result in a net increase to disturbance of sensitive vegetation communities as the re-routed ROW would traverse primarily natural habitats including those within CHSP, whereas Alternative 2 would traverse primarily disturbed and developed lands and agricultural lands. Therefore, similar to Alternative 4A, Alternative 4B would locate elements of the Project in closer proximity to wildlife and sensitive resources such as riparian areas.

Alternative 4D would reduce the overall distance of new double-circuit 500-kV transmission lines by 6.2 miles compared to Alternative 2, but would require 9.8 miles of new and expanded ROW, of which 1.4 miles would be within CHSP. This alternative would also require a new switching station east of CHSP near an area planned for residential development (same location as Alternative 4B). The visual character of the CHSP area would be degraded with Alternative 4D as a result of placing a new double-circuit 500-kV T/L along the north boundary of CHSP and crossing over Bane Canyon near the CHSP entry kiosk. Furthermore, the switching station location would be very visible in the foreground from Butterfield Ranch Road (same as Alternative 4B). Alternative 4D would also result in increased construction in hillside areas with known landslides and slope stability issues, including earthquake-induced slope failures, and would result in increased potential for damage from surface fault rupture due to the location of the switching station in very close proximity to the mapped trace of the Alquist-Priolo zoned Chino Fault. Alternative 4D would be the least preferred of the Alternative 4 routes from an Environmental Contamination and Hazards perspective, as some of its elements (namely transmission structures) would be placed within 100 to 400 feet of a former burn area at the Aerojet Chino Hills ammunition test facility. The proximity to this area increases the potential to encounter environmental contamination and hazards, although prudent selection of structure locations and new access roads could avoid the waste area. Additionally, this route would approach either plugged or abandoned oil wells or dry holes or active oil wells, thereby increasing the potential for encountering natural gas during construction. Alternative 4D

would also have greater impacts in comparison to Alternative 2 as related to placing Project elements within CHSP (Wilderness and Recreation) and increasing disturbances to sensitive vegetation communities, wildlife, and habitat.

Of all of the Chino Hills routes (Routes 4A through 4D), Alternative 4C would be the most preferable from an environmental perspective as it would:

- reduce the overall distance of new double-circuit 500-kV transmission lines by 10.3 miles (more than any of the other Alternative 4 routes);
- re-route the existing 220-kV T/L outside of CHSP (along the northern boundary);
- re-route the existing single-circuit 500-kV T/Ls to a less visible location; and
- place the new switching station outside CHSP in an area screened by topography.

However, the new double-circuit 500-kV T/L and the additional re-routes of existing infrastructure would result in the need for approximately 9.3 miles of new and expanded ROW, of which 3.1 miles would be within CHSP. Alternative 4C would result in increased construction in hillside areas with known landslides and slope stability issues, including earthquake-induced slope failure. It would have greater impacts to recreational resources compared to Alternative 2 as a result of locating Project elements within CHSP. It would also be less preferred than Alternatives 4A and 4B from an Environmental Contamination and Hazards perspective because this alternative would be placed within 100 to 400 feet of a former burn area at the Aerojet Chino Hills ammunitions test facility. Although prudent selection of structure locations and new access roads could avoid the waste area, it would still increase the potential to encounter environmental contamination and hazards. Similar to the other Alternative 4 routes, in comparison to Alternative 2, Alternative 4C would not be preferable from a Biological Resources perspective as it would result in a net increase in disturbances to sensitive vegetation communities, wildlife, and habitat, including riparian areas.

All of the Alternative 4 routes would be inconsistent with the CHSP General Plan due to conflicts with CHSP's management objective to improve habitat quality within the Park and its maintenance and operational activities. This is a significant and unavoidable impact that would not occur under Alternative 2 (SCE's Proposed Project), but would be remedied with approval of an amendment to the CHSP General Plan by the State Park and Recreation Commission to allow the development of transmission system infrastructure. However, the Lead Agencies do not know if the State Parks and Recreation Commission would approve such an amendment, thereby making the viability of Alternative 4 uncertain.

Based on the above discussion of increased adverse impacts associated with Alternative 4 (Routes 4A through 4D), and specifically those associated with the increase in transmission infrastructure within CHSP where there is a greater biological, cultural, geological, hydrological, recreational, and wildfire

sensitivity, the environmentally superior alternative within Segment 8 (east of S8A MP 19.2) would be Alternative 2 (SCE's Proposed Project).[9]

Summary

Overall for the TRTP, the environmentally superior alternative is a combination of Alternative 2 (SCE's Proposed Project), Alternative 3 (West Lancaster), Alternative 6 (Maximum Helicopter Construction in the ANF), and Alternative 7 (66-kV Subtransmission) within Segment 7. Within the ANF, the Forest Service will need to determine the specific combination of Alternative 2 and Alternative 6 features that provides the least overall impact to Forest resources. This is basically a decision as to which transmission structures would best be demolished and constructed by helicopter versus by conventional ground-based construction methods. As indicated in Section 4.3.2 below, the Forest Service has not yet made such a determination.

4.3.2 NEPA Lead Agency Preferred Alternative

The "preferred alternative" is a preliminary indication of the federal responsible official's preference of action, which is chosen from among the proposed Project and alternatives. The preferred alternative may be selected for a variety of reasons (such as the priorities of the particular lead agency) in addition to the environmental considerations discussed in the EIS. For the proposed Project, the federal responsible official is the Forest Supervisor of the ANF. If the Forest Supervisor is prepared to identify a preferred alternative at the time the Draft EIR/EIS is prepared, that alternative/s should be discussed in the draft document. If a preferred alternative has not be identified at the time the Draft EIS is prepared, it is assumed one or more will have been identified by the time the Final EIS is prepared. At this time In accordance with NEPA (40 CFR 1502.14(e)), the Forest Supervisor has not identified a preferred alternative. As such, the preferred alternative will be identified in the Final EIS per NEPA (40 CFR 1502.14(e)), "unless another law prohibits the expression of such a preference."

In addition to the preferred alternative, the federal responsible official, or federal lead agency, is also required to identify an "environmentally preferable alternative" in the ROD for the EIS (40 CFR 1505.2(b)). In contrast with the preferred alternative, the environmentally preferable alternative is the alternative that will promote the National Environmental Policy Act as expressed in NEPA's Section 101. Typically, this is the alternative that would cause the least environmental damage as well as preserve natural resources related to cultural and historical values. Therefore, the preferred alternative identified in the Final EIR/EIS may not be the same as the environmentally preferable alternative identified in the ROD. As with the CEQA environmentally superior alternative, the NEPA environmentally preferable alternative is subject to all mitigation measures applicable to NFS lands identified in Section 3 (Affected Environment and Environmental Consequences).

[9] This conclusion is not altered by the proposal of the 21st Century Green Partnership described in Section 5.3.4. The 21st Century proposal is not part of any of the alternatives analyzed in this EIR/EIS nor is it considered mitigation for impacts identified in the EIR/EIS. While the 21st Century proposal attempts to compensate the Department of Parks and Recreation for routing Segment 8A across Chino Hills State Park as part of Alternative 4, it does not directly address the significant adverse effects on the physical environmental associated with Segment 8A that are identified in this EIR/EIS. One of the components of the 21st Century proposal (removal of existing transmission lines in CHSP) attempts to offset visual impacts associated with Alternative 4, but does so by proposing to improve existing conditions in CHSP. Existing conditions are taken as a given in CEQA and NEPA analysis and impacts are assessed by comparing future conditions with the Project to existing conditions. Therefore, the presence of transmission lines in the existing environment is not considered an impact in the context of the EIR/EIS analysis and the removal of these lines is not considered mitigation for Project impacts. However, decision makers are free to give consideration to the 21st Century proposal as part of the decision-making process.

Table 4.2-2. Summary of Alternative Comparisons

Issue/Resource Area	Alternative 2 (Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4A (Chino Hills Route A)	Alternative 4B (Chino Hills Route B)	Alternative 4C (Chino Hills Route C)	Alternative 4D (Chino Hills Route D)	Alternative 5 (Partial Underground)	Alternative 6 (Max. Heli in ANF)	Alternative 7 (66-kV Subtransmission)
Agricultural Resources	Converts same amount of Farmland as Alts 3 and 5. Traverses 75.6 miles of agricultural land.	Converts same amount of Farmland as Alts 2, 5, and 6. Traverses the most agricultural land (75.95 miles) and causes greatest interference with agricultural operations.	Converts fewest acres of Farmland compared to other Project alternatives. Traverses least distance of agricultural land (~57.7 miles) compared to Alts 4B-4D.	Same acreage of Farmland converted as Alt 4A, but traverses 58.2 miles of agricultural land.	Same acreage of Farmland converted as Alt 4A, but traverses 64.6 miles of agricultural land.	Same acreage of Farmland converted as Alt 4A, but traverses 61.2 miles of agricultural land.	Converts same amount of Farmland as Alts 2 and 3. Traverses less agricultural land (74.85 miles)	Same impacts as Alt 2 and 7. Alts 2, 6 and 7 would convert more Farmland than Alts 4 and 5 but less than Alt 3.	Same impacts as Alt 2 and 6. Alts 2, 6 and 7 would convert more Farmland than Alts 4 and 5 but less than Alt 3.
Air Quality	Slightly higher air quality emissions during construction than Alt 4 due to comparably higher construction requirements in Segments 8 and at Mira Loma Substation. Slightly higher operational emissions as well due to increase in sulfur hexafluoride (SF_6) containing equipment at Mira Loma Substation	Slightly lower emissions than Alt 2 due to one fewer tower	Lower emissions than Alt 2 due to fewer towers (wreck-out and new).	Higher emissions than Alt 4A, but lower than Alt 2 due to fewer towers (wreck-out and new).	Highest emissions of the Alt 4 routes, but lower than Alt 2 due to fewer towers (wreck-out and new).	Higher emissions than Alts 4A and 4B, but lower than Alt 4C and Alt 2 due to fewer towers (wreck-out and new).	Substantially increases construction requirements, including use of large equipment and more truck trips to transport materials on and off site. GHG would be higher due to greater maintenance requirements and use of SF_6.	Substantially increases construction emissions due to helicopter use. While total particulate emissions would decrease due to less unpaved road travel; those particulate emissions have a lower toxic profile than the emissions from helicopters. Emissions are in an area of limited nearby receptors so less impacting than Alt 5.	Will result in slightly higher emissions than Alt 2 due to additional construction activities from underground construction and longer 66-kV overhead routes in Segments 7 and 8A compared to Alts 2 and 3
Biological Resources	Generally located in existing ROW thereby minimizing the amount of necessary habitat disturbance. Alt 2 would result in additional land disturbance compared to Alt 6.	Only incremental increase in impacts over Alt 2 for California annual grassland, native wildflower field, and desert wash habitats.	Net increase to disturbance of sensitive vegetation communities as route would traverse primarily natural habitats such as CHSP vs. barren/developed and agricultural lands.	Generally the same as Alt 4A	Generally the same as Alt 4A	Generally the same as Alt 4A	Only incremental increase in impacts over Alt 2 for barren/developed areas and California annual grassland.	Alt 6 will result in less land disturbance than Alt 2, impacts will be lessened due to the use of helicopters for construction; however, helicopter noise may disturb wildlife.	Only incremental increase in biological resource impacts over Alt 2. Re-routed portions of the 66 k-V distribution lines would incrementally increase impacts to sensitive biological resources.
Cultural Resources	135 (57 prehistoric/73 historical/5 both) identified resources in the APE, with 43.8 miles of new/expanded ROW.	Same number of identified resources in the APE as Alt 2, but 0.4 mile more new/expanded ROW increasing the potential for unanticipated discoveries of cultural resources.	139 (58 prehistoric/75 historical/6 both) identified resources in the APE, with 49.6 miles of new/expanded ROW.	139 (58 prehistoric/75 historical/6 both) identified resources in the APE, with 53.1 miles of new/expanded ROW.	139 (58 prehistoric/75 historical/6 both) identified resources in the APE, with 52.7 miles of new/expanded ROW.	139 (58 prehistoric/75 historical/6 both) identified resources in the APE, with 53.2 miles of new/expanded ROW.	Same number of resources identified in the APE as Alternative 2; however, there is a greater potential to affect cultural resources than Alts 2, 3, and 6 because the unique construction methods may affect more area than above-ground construction resulting in greater physical impacts.	142 (63 prehistoric/74 historical/5 both) identified resources in the APE, with 43.8 miles of new/expanded ROW.	151 (57 prehistoric/88 historical/6 both) identified resources in the APE, with 44.0 miles of new/expanded ROW. A greater number of known cultural resources and higher archaeological sensitivity is located in the area of the re-routed 66-kV lines.
Environmental Contamination and Hazards	Longer than the Alt 4 routes, including 16 miles of T/L within commercial/industrial areas with numerous known environmental contamination sites. Same potential impacts as Alts 3 and 5.	Alt 3 is identical to Alt 2 except for minor incremental increase in Project length increasing the potential to encounter unknown contaminants.	The shorter route compared to other alts incrementally reduces potential for impacts and avoids approx. 10 miles of commercial/industrial areas with many known environmental contamination sites.	The shorter route compared to other alts incrementally reduces potential for impacts and avoids approx. 10 miles of commercial/industrial areas with many known environmental contamination sites.	Identical to Alts 4A and B, except located within 100 to 150 feet of a former burn area at the Aerojet Chino Hills munitions testing/disposal facility, thereby increasing potential impacts. Prudent selection of tower locations and roads could avoid the waste area.	Identical to Alt 4C, except route approaches either plugged or abandoned oil wells or dry holes, or active oil wells increasing the potential for encountering natural gas during construction.	Underground portion is located in residential areas with limited potential for environmental contamination impacts; therefore, same potential impacts as Alts 2 and 3.	Would increase (approximately 4 times) the amount of helicopter fueling and maintenance in areas not fully suited for these activities compared to Alts 2 and 3. Could increase fuel leaks, etc from helicopter activity which may result in soil contamination.	Better than Alt 6 due to less helicopter fueling and maintenance in undeveloped forest area. Would incrementally increase potential for leaks of fuel, etc during construction due to increased disturbance as opposed to overhead construction of Alts 2 through 5. Also increased potential to encounter impacted soils due to increased ground disturbance.

Table 4.2-2. Summary of Alternative Comparisons

Issue/Resource Area	Alternative 2 (Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4A (Chino Hills Route A)	Alternative 4B (Chino Hills Route B)	Alternative 4C (Chino Hills Route C)	Alternative 4D (Chino Hills Route D)	Alternative 5 (Partial Underground)	Alternative 6 (Max. Heli in ANF)	Alternative 7 (66-kV Subtransmission)
Geology, Soils, and Paleontology	Alt 2 results in more ground disturbance than Alt 6 contributing to increased potential for erosion and construction related slope stability impacts; however, Alt 2 crosses less landslide prone hillside areas of eastern Puente Hills than Alt 4 resulting in comparably less impacts related to slope stability issues.	Same as Alt 2, except for an incremental increase in length in an area of no geologic hazards or erosion concerns, and low paleontologic sensitivity.	Results in increased construction and ground disturbance in hillside areas with known landslides and slope stability issues, as well as earthquake induced slope failures. The increased ground disturbance resulting from the greater amount of grading required for access and spur roads also results in an increase in potential to accelerate or trigger erosion and destroy paleontologic resources. Alt 4A is the shortest and results in less ground disturbance and therefore less potential to accelerate erosion, trigger landslides, and destroy paleontologic resources than other Alt 4 routes.	Similar to Alt 4A. Results in more miles of construction in hillside areas with known landslides and slope stability issues, as well as earthquake induced slope failure hazards compared to all other Project alternatives. Alt 4B has increased potential for damage from surface fault rupture due to the location of the switching station adjacent to or on the mapped trace of the Alquist-Priolo zoned Chino Fault.	Similar to Alt 4A. Results in increased construction and ground disturbance in hillside areas with known landslides and slope stability issues, as well as earthquake induced slope failures. The increased ground disturbance resulting from the greater amount of grading required for access and spur roads also results in an increase in potential to accelerate or trigger erosion and destroy paleontologic resources..	Similar to Alt 4B. Results in more miles of construction in hillside areas with known landslides and slope stability issues, as well as earthquake induced slope failure hazards compared to all other Project alternatives. Alt 4D has increased potential for damage from surface fault rupture due to the location of the switching station adjacent to or on the mapped trace of the Alquist-Priolo zoned Chino Fault.	Underground construction activities and construction of large transition stations results in an increase in ground disturbance compared to Alts 2. 3, 6, and 7, which increases the potential for construction triggered erosion and construction related damage or destruction of paleontological resources. The eastern transition station and east end of tunnel would be located along the projected trend of the active Chino Fault, increasing the potential for fault rupture as compared to Alts 2, 3, 6, and 7. The tunnel portion of the alignment could also result in ground subsidence/ settlement that would potentially damage overlying structures, which would not occur with any of the other alternatives.	Decreases the amount of grading required for access and spurs roads resulting in approximately 60 less acres of ground disturbance along access and spur roads, which correspondingly decreases the potential for construction triggered erosion and landslides in landslide prone mountainous terrain as compared to Alt 2.	Underground construction of 66-kV lines slightly increases the potential for construction-related erosion compared to Alt 2. Excavations for underground construction and new poles for the 66-kV re-routes in the San Gabriel Valley and Whittier Narrows areas also slightly increases the potential to damage or destroy paleontologic resources in comparison to Alt 2.
Hydrology and Water Quality	Similar to Alt 6 as it affects less high quality surface water and groundwater resources than Alt 3. However, a greater number of streams within the ANF would be impacted by construction of access and spur roads.	Affects nearly the same resources as Alt 2; however, it crosses two additional unnamed streams.	Affects same high quality streams as Alt 4D, as well as crossing one additional stream.	Affects same high quality streams as Alt 4D, as well as crossing four additional streams.	Affects same high quality streams as Alt 4D, as well as crossing six additional streams.	Would affect high quality, natural streams within CHSP that would not be affected by Alts 2, 3, and 7.	Potential to come into direct contact with groundwater resources in the Chino Hills area.	Would affect the fewest high quality surface and groundwater resources.	Has potential to directly affect groundwater resources due to underground construction disturbance.
Land Use	Would result in temporary and permanent impacts to existing residences between S4 MP 14.9 and 17.9.	Eliminates temporary and permament impacts to existing residential uses between S4 MP 14.9 and 17.9.	Disturbs second smallest acreage within CHSP and still achieves elimination of all land use-related impacts east of S8A MP 19.2.	Disturbs second smallest acreage within CHSP and still achieves elimination of all land use-related impacts east of S8A MP 19.2.	Disturbs second smallest acreage within CHSP and still achieves elimination of all land use-related impacts east of S8A MP 19.2.	Eliminates construction, operation, and maintenance along 16 miles of Alt 2 and results in the smallest acreage of disturbance within CHSP.	Results in permanent loss of non-residential land uses along Segment 8A to accommodate Eastern Transition Station. No other alt results in permanent loss of any existing or planned land use.	Results in the smallest acreage of permanent land disturbance reducing potential long-term disruptions to existing and planned land uses compared to Alts 2, 3, 5, and 7; however, specialized helicopters and construction personnel would be expected to result in the longest duration of temporary, construction-related impacts to land uses within the ANF.	Undergrounding portions of the 66-kV lines would likely be considered a net benefit to the residential and non-residential land uses that are adjacent to their respective ROWs; otherwise, identical to Alt 2.
Noise	Impacts slightly more sensitive receptors than Alt 3, and substantially more than Alts 4 and 5.	Would impact slightly fewer sensitive receptors than Alt 2, but more than Alts 4 and 5.	Would impact more sensitive receptors than Alt 5, including recreational users, but fewer than Alts 2, 3, 6 and 7.	Same as Alt 4A	Same as Alt 4A	Same as Alt 4A	Underground segment would avoid construction and permanent corona noise impacts to sensitive receptors along the 3.5-mile underground segment in Chino Hills.	Alt 6 would have maximum construction noise impacts from helicopter noise to sensitive receptors and same amount of corona noise as Alt 2.	Nearly identical impacts as Alt 2; however Alt 7 would result in slightly increased construction noise in the areas where subtransmission lines would be re-routed or installed.

Table 4.2-2. Summary of Alternative Comparisons

Issue/Resource Area	Alternative 2 (Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4A (Chino Hills Route A)	Alternative 4B (Chino Hills Route B)	Alternative 4C (Chino Hills Route C)	Alternative 4D (Chino Hills Route D)	Alternative 5 (Partial Underground)	Alternative 6 (Max. Heli in ANF)	Alternative 7 (66-kV Subtransmission)
Public Services and Utilities	Double-circuit structures along Segments 7 and 8A could interfere with emergency aircraft services. Could potentially interfere with public services and interrupt the flow of utility systems. Less than significant with mitigation.	Same at Alts 2, 6 and 7.	Would avoid interference with public service and utilities systems in Chino and Ontario.	Same as Alt 4A.	Same as Alt 4A.	Same as Alt 4A.	Same potential utility service interruptions associated with construction as Alt 2; however, reliability of the system is unknown due to the lack of precedence in installing GIL systems of the length and voltage proposed.	Same as Alts 2, 3 and 7.	Same as Alts 2, 3 and 6.
Socioeconomics	Would introduce potential socioeconomic Issues of Concern to an urbanized area that would be avoided under Alt 4.	Same as Alts 2 and 7.	Avoids potential adverse impacts to private properties along Segment 8 (16 miles).	Same as Alt 4A.	Same as Alt 4A.	Same as Alt 4A.	Potential effects on local business revenue resulting from extended construction schedule.	Potential to temporarily affect factors (e.g. noise, aesthetics, air quality) that contribute to perceived Quality of Life.	Same as Alts 2 and 3.
Traffic and Transportation	Increased potential to affect roadways compared to Alts 4 and 6. Crosses the highest number of municipal transit routes, bicycle routes, and pedestrian routes.	Same as Alt 2.	Crosses the fewest number of roadways, municipal transit routes, bicycle routes, and pedestrian routes.	Same as Alt 4A.	Same as Alt 4A.	Same as Alt 4A.	Extended construction schedule would increase the duration of traffic impacts.	Potential to affect Upper Big Tujunga Canyon Rd and ANF Highway.	Trenching required for this alternative would require temporary closure of roads and highways as opposed to overhead construction options.
Visual Resources	Greatest visual impacts of all the alternatives as the new T/Ls would be placed along a second priority scenic highway (110th Street West) in Segment 4 and in a highly visible location to many viewers (urban area) through Chino Hills, Chino, and Ontario. Re-opening and widening existing access roads along Segments 6 and 11, plus re-constructing spur roads to all but 33 LSTs would create strong visual contrasts. Construction of LST at the PCT Trailhead at Mill Creek Summit would require trail relocation and Forest Plan amendment. Use of the West Fork National Scenic Bikeway for construction equipment and deliveries would degrade the visual environment of this scenic viewshed.	Not as many visual impacts compared to Alts 2 and 7 by relocating the T/L to 115th Street West and placing the structures equidistant from the road so they are no longer in the immediate foreground of 110th Street West, which is a County designated second priority scenic highway.	Eliminates construction and operation in existing residential neighborhood and parklands from S8A MP 19.2 to 35.2, but visual integrity would be compromised by a new double-circuit 500-kV T/L alongside an existing 500-kV single-circuit T/L near the north boundary of CHSP. Switching station would be in CHSP and on a wooded knoll that would be very visible in the foreground from existing hiking and equestrian trails, and in the middleground from the Horse Camp.	Eliminates construction and operation in existing residential neighborhood and parklands from S8A MP 19.2 to 35.2,, but visual integrity would be compromised by a new double-circuit 500-kV T/L through the center of CHSP further cluttering the visual environment of the Park. Switching station would be very visible in the foreground from Butterfield Ranch Road (same as Alt 4D).	Eliminates construction and operation in existing residential neighborhoods and parklands from S8A MP 19.2 to 35.2. Existing 220 and 500-kV TL would be relocated within CHSP to less visible locations. A new double-circuit 500-kV T/L and switching station would be located outside of CHSP in an area screened by topography.	Eliminates construction and operation in existing residential neighborhood and parklands, but visual integrity would be compromised by a new double-circuit 500-kV T/L aligned along the north boundary of CHSP and crossing over Bane Canyon near the entry kiosk. Switching station would be very visible in the foreground from Butterfield Ranch Road.	Retains the elements that Alt 4 eliminates in Segment 8 and has two large transition stations, similar in appearance to a typical substation, all of which have adverse and significant visual impacts.	Visual impacts in the ANF would be minimized by avoidance of soil disturbance, cut slopes in bedrock, and soil color contrasts associated with new and/or upgraded access and spur roads as a result of helicopter construction. Construction of a TSP at the PCT Trailhead at Mill Creek Summit would not require trail relocation or Forest Plan amendment. The West Fork National Scenic Bikeway would not be used for construction access to Segment 6 and the immediate environment of the West Fork would not be degraded.	Undergrounding the 66-kV lines would eliminate existing aboveground visual contrasts, skylining, and viewshed blockage in Whittier Narrows and Duck Farm viewsheds. Relocating the 66-kV line adjacent to a collector street, rather than through the Whittier Narrows Recreation Area, would improve the visual environment of parklands.
Wilderness and Recreation	This alternative would not enter the CHSP and therefore would avoid Wilderness and Recreation impacts on State Park lands.	Same as Alt 2.	Would have the potential to affect more resources in CHSP than Alts 4C and 4D.	This route alternative would have the most impacts to recreation resources and opportunities in the CHSP.	Would have the potential to affect more resources in CHSP than Alt 4D.	Potentially affects four more recreational resources than Alt 4C; however would affect a substantially smaller portion of CHSP.	Same as Alt 2.	During construction, the use of helicopters would result in greater wilderness and recreation impacts than other Project alternatives. During operation and maintenance, less unmanaged recreation would be expected due to fewer spur roads being constructed or improved.	Underground portions of the subtransmission line would avoid recreation impacts to the River Commons at the Duck Farm Project. This alternative would have no wilderness and recreation impacts in the CHSP.

Table 4.2-2. Summary of Alternative Comparisons

Issue/Resource Area	Alternative 2 (Proposed Project)	Alternative 3 (West Lancaster)	Alternative 4A (Chino Hills Route A)	Alternative 4B (Chino Hills Route B)	Alternative 4C (Chino Hills Route C)	Alternative 4D (Chino Hills Route D)	Alternative 5 (Partial Underground)	Alternative 6 (Max. Heli in ANF)	Alternative 7 (66-kV Subtransmission)
Wildfire Prevention and Suppression	Poses wildfire ignition risks during the construction phase and introduce long-term ignitions from overhead structures through high-risk fuels areas. Increase heights of transmission structures, creating marginally increased burden on aerial firefighting.	Same as Alt 2.	Increases the miles of new T/L through high-risk Tehachapi Fireshed by 2.3 miles.	Increases the miles of new T/L through high-risk Tehachapi Fireshed by 4.5 miles.	Increases the miles of new T/L through high-risk Tehachapi Fireshed by 5.6 miles.	Increases the miles of new T/L through high-risk Tehachapi Fireshed by 5.2 miles. Would also introduce a new 5.3-mile linear element to a high-risk fuel laden landscape and create an indefensible space of approximately 2,000 acres in combination with existing T/Ls, thereby increasing potential interference with fire suppression efforts.	Same as Alt 2.	Would have reduced construction-related ignitions compared with Alt 2 and would introduce incrementally fewer non-native plants than Alt 2 as a result of marginally fewer roads being constructed.	Same as Alt 2.
Electrical Interference and Hazards	Longer overhead route than Alts 4 and 5 (172.9 miles), thereby increasing potential for Electrical Interference and Hazards impacts.	Longest overhead route (173.3 miles) resulting in greatest amount of Electrical Interference and Hazards impacts.	Shortest overall route (156.3 miles plus 0.85 mile for existing T/L modifications).	Similar to Alt 4A (159.8 miles plus 0.95 mile for existing T/L modifications).	Similar to Alt 4A (155.8 miles plus 7.0 miles for re-routing existing 220/500kV T/Ls).	Similar to Alt 4A (159.9 miles plus 0.95 mile for existing T/L modifications).	Underground portion would not have Electrical Interference and Hazard impacts (169.4 miles overhead and 3.5 miles underground). Therefore, fewest Electrical Interference and Hazards impacts due to shorter overhead route.	Same as Alt 2 (172.9 miles).	Underground 66-kV subtransmission lines would not have Electrical Interference and Hazards impacts. Therefore, fewer Electrical Interference and Hazards impacts than Alts 2, 3, and 6.