

E.4.13 Geology, Mineral Resources, and Soils

The Modified Route D Alternative route is described in Section E.4.1. It includes three main segments: a southwesterly segment that crosses BLM, CNF and private lands before reaching the Cameron Substation, a westerly segment that follows the southern boundary of the CNF, and a northerly segment that is primarily on CNF land and includes the Modified Route D Substation.

E.4.13.1 Environmental Setting

Geology

The Modified Route D Alternative traverses a mix of mountain, hill, mesa, and valley terrain for its entire length. The Modified Route D Alternative traverses gently to steeply sloping hill and mountains along much of its route, crossing the edges and foothills of Hauser, Echo, Barber, and Middle Mountains, and the intervening hills, which are dissected by many small creeks. The alignment also crosses numerous larger streams and valleys including Miller Valley, La Posta Valley, Cameron Valley, Hauser Creek, Potrero Creek, Cottonwood Creek, Wilson Creek, and Taylor Creek. Geologic units crossed by the Modified Route D Alternative ROW consist of alluvium (Qal), Green Valley Tonalite (gr₃), Bonsall Tonalite (gr₅), Woodson Mountain Granodiorite (gr₆), and Cuyamaca Gabbro (bi₁). These units are described in Table E.1-16. Approximate locations of these units along the Modified Route D Alternative are listed below.

- Alluvium (Qal): MD-MP 8.4–8.6
- Green Valley Tonalite (gr₃): MD-MPs 29.8–29.9, 30.4–32.9 and 34.1–36.3
- Bonsall Tonalite (gr₅): MD-MPs 0–8.4 and 8.6–11.5
- Woodson Mountain Granodiorite (gr₆): MD-MPs 11.5–23.8, 24.5–24.7, 27.5–29.8, 29.9–30.4, and 32.9–34.1
- Cuyamaca Gabbro (bi₁): MD-MPs 23.8–24.5 and 24.7–27.5

Slope Stability. The Modified Route D Alternative route traverses across gently to steeply sloping hill and mountains along much of its route which are underlain by primarily by granitic bedrock. This alignment does not cross any mapped landslides and the granitic terrain underlying the slopes in the area are not typically prone to landslides, although it may be susceptible to rock-fall and shallow landslides in over-steepened areas.

Soils. Four soil associations are mapped underlying the Modified Route D Alternative alignment, s1010, s1012, s1014, and s1018. Basic characteristics of these soils are presented in Table D.13-20. The Sesame–Rock Outcrop–Cienba (s1010), the Rock Outcrop–Las Posas (s1012), and the Tollhouse–Rock Outcrop–La Posta (s1014) associations are formed in material weathered from the underlying granitic rocks. The Oak Glen–Mottsville–Calpine (s1018) soils are generally formed in granitic alluvium. Hazard of erosion for these soils for off-road/off-trail ranges from slight to very severe and for on-road/on-trail ranges from slight to severe. Shrink/swell (expansive) potential of this soil association varies from low to high. Corrosive potential of soils along the Modified Route D Alternative route are moderate to high for uncoated steel and low to moderate for concrete.

Approximate locations of the soil associations along the Modified Route D Alternative are listed below, in order of approximate first order of appearance along the alignment.

- s1014: MD-MPs 0–8.3 and 8.7–14.4
- s1018: MD-MPs 8.3–8.7
- s1010: MD-MPs 14.4–23.7 and 27.6–36.3
- s1012: MD-MPs 23.7–27.6

Mineral Resources. No known active mines, mineral resource sites, or BLM mining claims are located along or near the Modified Route D Alternative route.

Seismicity – Fault Rupture. This alternative does not cross any known active faults and is thus not likely to experience damage due to fault rupture and or offset. No active faults are located in the immediate vicinity of this alternative.

Seismicity – Groundshaking. The Modified Route D Alternative would be primarily susceptible to minor groundshaking from an earthquake on any of the regional or nearby active faults, with some moderate groundshaking in areas underlain by alluvium. Estimated peak horizontal accelerations for this alignment are presented in Table E.4.13-1.

Table E.4.13-1. Approximate Peak Ground Accelerations – Modified Route D Alternative

Approximate Alternative (MD) Transmission Line Milepost	Total Length of Segments (miles)	Peak Ground Acceleration
0-8.4 and 8.6-36.3	36.1	0.1–0.2g
8.4-8.6	0.2	0.3–0.4g

Source: CGS, 2006; USGS, 2006a.

Seismicity – Liquefaction. Most of this alignment has no to low potential for liquefaction as it is primarily underlain by igneous bedrock. However, the portions of the Modified Route D Alternative route where the alignment crosses and is within active washes and flood plains in Cameron Valley and other valleys along the alignment with alluvial deposits that could have local pockets of saturated and loose sandy soils may have moderate potential for liquefaction. These local pockets of loose sandy soils could potentially liquefy in the event of a large earthquake.

Earthquake-Induced Landslides. Most accounts of historical earthquakes in this area describe damaging landslides resulting from earthquake groundshaking (SCEC, 2006). However, the moderately sloping hills of the Cuyamaca Mountains traversed by the Modified Route D Alternative traverses are entirely underlain by igneous and metamorphic bedrock and the minor expected groundshaking would preclude any significant slope failures due to earthquakes in the area.

E.4.13.2 Environmental Impacts and Mitigation Measures

The applicable regulations, plans, and standards and significance criteria for the Modified Route D and options would be the same as for the Proposed Project, in Section D.13.3 and D.13.4.

Table E.4.13-2 summarizes the impacts of the Modified Route D on geology, mineral resources, and soils.

Table E.4.13-2. Impacts Identified – Modified Route D Alternative and Options – Geology, Mineral Resources, and Soils

Impact No.	Description	Impact Significance
Modified Route D Alternative		
G-1	Erosion would be triggered or accelerated due to construction activities.	Class III
G-3	Project would expose people or structures to potential substantial adverse effects as a result of problematic soils.	Class II
G-4	Project would expose people or structures to potential substantial adverse effects as a result of seismically induced groundshaking and/or ground failure.	Class II, III
G-6	Project would expose people or structures to potential substantial adverse effects as a result of slope instability created during excavation and/or grading.	Class II
G-7	Project would expose people or structures to potential substantial adverse effects as a result of landslides, earthflows, debris flows, and/or rockfall.	Class II
Modified Route D Alternative Substation		
G-1	Erosion would be triggered or accelerated due to construction activities.	Class III
G-4	Project would expose people or structures to potential substantial adverse effects as a result of seismically induced groundshaking and/or ground failure.	Class III
Star Valley Option		
G-1	Erosion would be triggered or accelerated due to construction activities.	Class III
G-4	Project would expose people or structures to potential substantial adverse effects as a result of seismically induced groundshaking and/or ground failure.	Class III
G-7	Project would expose people or structures to potential substantial adverse effects as a result of landslides, earthflows, debris flows, and/or rockfall.	Class II

Construction Impacts

No impacts associated with this alternative would occur from construction activities damaging desert pavement (Impact G-2) as none is identified along this alignment nor from interfering with access to known mineral resources (Impact G-9).

Impact G-1: Erosion would be triggered or accelerated due to construction activities. (Class III)

Excavation and grading for tower foundations, work areas, access roads, and spur roads would loosen soil and trigger or accelerate erosion. Soils along the Modified Route D Alternative route have an erosion hazard for off-road/off-trail ranging from slight to very severe and for on-road/on-trail ranges from slight to severe. SDG&E's GEO-APM-1, -2, -5, and -6 (see Table D.13-11) reduce the amount of erosion that would result from construction by: limiting grading of existing roads in areas with sensitive soils, planning construction to minimize new ground disturbance, use of Best Management Practices (BMPs) such as sand bags and road bars, to control water erosion, and limiting construction traffic. In addition, a Storm-water Pollution Prevention Plan (SWPPP) that would limit erosion from the construction site would be required in accordance with the Clean Water Act. This would result in a less than significant impact (Class III).

Impact G-6: Project would expose people or structures to potential substantial adverse effects as a result of slope instability created during excavation and/or grading (Class II)

Destabilization of natural or constructed slopes could occur as a result of construction activities due to excavation and/or grading operations. Construction consisting of grading and excavation within the hills and mountain terrain crossed by the alignment could potentially cause slope instability, triggering rock-falls or landslides. Slope instability including landslides, rock falls, earth flows, and debris flows has the potential to undermine foundations, cause distortion and distress to overlying structures, and displace or destroy project components. SDG&E's GEO-APM-4 and -8 (see Table D.13-11) would partially reduce impacts related to slope instability by avoiding placing structures in unstable areas and removing or stabilizing boulders upslope of structures thus reducing the threat of possible slope failures or rockfalls. However, the Proposed Project would still result in significant impacts if unidentified unstable slopes or areas of potentially unstable slopes were disturbed or undercut by construction activities resulting in slope failures. Slope failures could cause damage to the environment, to project or other nearby structures, and could cause injury or death to workers and/or the public, a significant impact. To ensure that slope instability impacts would be reduced to less than significant (Class II), implementation of Mitigation Measure G-6a is required to delineate potential areas of unstable slopes near and within work areas and to minimize the potential from construction triggered slope failures by avoidance or implementation of slope stabilizing design measures. The full text of the mitigation measures appears in Appendix 12.

Mitigation Measure for Impact G-6: Project would expose people or structures to potential substantial adverse effects as a result of slope instability created during excavation and/or grading

G-6a Conduct geotechnical surveys for landslides and protect against slope instability.

Operational Impacts

There would be no impacts associated with this alternative on project structures due to fault rupture (Impact G-5).

Impact G-3: Project would expose people or structures to potential substantial adverse effects as a result of problematic soils (Class II)

Soils along the Modified Route D Alternative ROW have low to high potential for corrosion to uncoated steel and a low to moderate potential for corrosion to concrete. Expansion potential for the soils varies from low to high. Corrosive and expansive subsurface soils may exist in places along the proposed route which could potentially damage project structures, a significant impact. Application of standard design and construction practices and implementation of GEO-APM-3 (see Table D.13-11) would partially reduce the adverse affects of problematic soils by avoiding placement of structures in areas of high shrink/swell potential, to the extent feasible. However, actual locations of high shrink/swell (expansive) soils and the presence, absence, and location of corrosive soils needs to be determined to fully reduce the potential for adverse affects of problematic soils to less than significant. Unidentified expansive and corrosive soils could damage project structures and facilities potentially resulting in collapse. Collapse of project structures could result in power outages, damage to nearby roads or structures, and injury or death to nearby people, a significant impact. Accordingly, implementation of Mitigation Measure G-3a (Conduct geotechnical studies for soils to assess characteristics and aid in appropriate foundation design) would ensure that impacts associated with problematic soils are reduced to less than significant levels (Class II).

Mitigation Measure for Impact G-3: Project would expose people or structures to potential substantial adverse effects as a result of problematic soils

G-3a Conduct geotechnical studies for soils to assess characteristics and aid in appropriate foundation design.

Impact G-4: Project would expose people or structures to potential substantial adverse effects as a result of seismically induced groundshaking and/or ground failure (Class II and III)

Minor to moderate groundshaking should be expected along portions of this alignment in the event of an earthquake on major faults in the region. Seismically induced groundshaking could potentially damage project structures, a significant impact. SDG&E indicates in the PEA that project structures would be designed to withstand geologically induced stresses and that appropriate tower design accounting for lateral wind loads and conductor loads would likely exceed any creditable seismic loading, minimizing potential damage to tower structures from groundshaking. This would result in a less than significant impact (Class III).

Moderate groundshaking would potentially result in seismically induced liquefaction or slope instability along a small portion of the Modified Route D Alternative, where the alternative alignment crosses and is within active washes and flood plains of Cameron Valley and other active creeks and tributaries. Local pockets of saturated and loose sandy soils within the alluvium would potentially liquefy in the event of a large earthquake. This would potentially result in damage to project structures. Seismically induced slope failures such as landslides and rockfalls could occur along portions of the Modified Route D Alternative where the alignment traverses along and adjacent to hill and mountain terrain with moderate to steep slopes. This would potentially result in damage to project structures. Collapse of project structures could result in power outages, damage to nearby roads or structures, and injury or death to people, a significant impact. To ensure that impacts associated with seismically induced ground failures from strong groundshaking would be reduced to less than significant levels (Class II), implementation of Mitigation Measures G-4b (Conduct geotechnical investigations for liquefaction) and G-6a (Conduct geotechnical surveys for landslides and protect against slope instability) is required prior to final project design to ensure that people or structures are not exposed to hazards associated with strong to severe seismic groundshaking.

Mitigation Measure for Impact G-4: Project would expose people or structures to potential substantial adverse effects as a result of seismically induced groundshaking and/or ground failure

G-4b Conduct geotechnical investigations for liquefaction.

G-6a Conduct geotechnical surveys for landslides and protect against slope instability.

Impact G-7: Project would expose people or structures to potential substantial adverse effects as a result of landslides, earthflows, debris flows, and/or rockfall (Class II)

Slope instability including landslides, earth flows, debris flows, and rock fall during project operation has the potential to undermine foundations, cause distortion and distress to overlying structures, and displace or destroy project components. Landslides and rock-falls would potentially cause damage to project structures in the hills and mountain terrain where the Modified Route D Alternative traverses along moderate to steep slopes. SDG&E's GEO-APM-4 and -8 (see Table D.13-11) would partially reduce impacts related to landslide hazards during operations of the project. However unidentified unstable slopes would potentially fail during the lifetime of Modified Route D. Slope failures would potentially

cause collapse of project structures resulting in power outages, damage to nearby roads or structures, and injury or death to nearby people, a significant impact. To ensure that landslide impacts to project structures would be reduced to less than significant levels (Class II), implementation of Mitigation Measure G-6a (Conduct geotechnical surveys for landslides and protect against slope instability) is required.

Mitigation Measure for Impact G-7: Project would expose people or structures to potential substantial adverse effects as a result of landslides, earthflows, debris flows, and/or rockfall

G-6a Conduct geotechnical surveys for landslides and protect against slope instability.

E.4.13.3 Modified Route D Alternative Substation

If the Modified Route D Alternative were to connect to the Interstate 8 Alternative, a new 40-acre substation, the Modified Route D Alternative Substation, would be required along the alternative route about 2 miles south of its western intersection with I-8 in order to allow for underground construction in Alpine Boulevard.

Environmental Setting

Geology. The Modified Route D Alternative Substation site is entirely underlain by Green Valley Tonalite (gr₃).

Slope Stability. The Modified Route D Alternative Substation site is located on a gently sloping plateau located in the hills north of Japatul Valley and south of the Sweetwater River.

Soils. The Modified Route D Alternative Substation site is underlain by soils of the Sesame–Rock Outcrop–Cienba (s1010) association. Basic characteristics of these soils are presented in Table D.13-2. The Sesame–Rock Outcrop–Cienba (s1010) association is formed in material weathered from the underlying granitic rocks. Hazard of erosion for these soils ranges from not rated to very severe for both off-road/off-trail and on-roads/trails. Shrink/swell (expansive) potential of this soil association varies from low to moderate. Corrosive potential of soils at the Modified Route D Alternative Substation site are moderate for uncoated steel and low to moderate for concrete.

Mineral Resources. No known active mines, mineral resource sites, or BLM mining claims are located along or near the Modified Route D Alternative Substation site.

Seismicity. The Modified Route D Alternative Substation site is not crossed by any known active faults nor are any active faults located in the immediate vicinity of the site, thus it is not likely to experience damage due to fault rupture and or offset. Estimated peak ground accelerations at the Modified Route D Alternative Substation site are low, 0.1 to 0.2g, and only minor groundshaking is expected at this site in the event of a regional earthquake. The substation site is gently sloping to relatively flat and underlain by granitic bedrock and would therefore not experience seismically triggered ground failures.

Construction Impacts

No impacts associated damage to desert pavement (Impact G-2) as none are identified along this alignment. Construction triggered slope instability (Impact G-6) would not occur due to the gently site terrain and the underlying granitic bedrock. Access to known mineral resources would not be impeded by project construction (Impact G-9) as there are no active mineral resource sites or BLM claims at the site.

*Impact G-1: Erosion would be triggered or accelerated due to construction activities.
(Class III)*

Excavation and grading for substation foundations and equipment, work areas, and access roads would loosen soil and trigger or accelerate erosion. Soils at the Modified Route D Alternative Substation site have an erosion hazard ranging from not rated to very severe for both off-road/off-trail and on-roads/trails. SDG&E's GEO-APM-1, -2, -5, and -6 (see Table D.13-11) reduce the amount of erosion that would result from construction by: limiting grading of existing roads in areas with sensitive soils, planning construction to minimize new ground disturbance, use of Best Management Practices (BMPs) such as sand bags and road bars, to control water erosion, and limiting construction traffic. In addition, a Stormwater Pollution Prevention Plan (SWPPP) that would limit erosion from the construction site would be required in accordance with the Clean Water Act. This would result in a less than significant impact (Class III).

Operational Impacts

There would be no impacts associated with this substation on project structures due to fault rupture (Impact G-5) or from slope instability (Impact G-7).

Impact G-4: Project would expose people or structures to potential substantial adverse effects as a result of seismically induced groundshaking and/or ground failure (Class III)

Only minor groundshaking is expected at the Modified Route D Alternative Substation site in the event of an earthquake on the faults in the region, and since SDG&E would follow all applicable building codes and standard practices for substation construction including the Institute of Electrical and Electronics Engineers (IEEE) 693 "Recommended Practices for Seismic Design of Substations" and the 2001 California Building Code, potential impacts from groundshaking would be less than significant for the substation site(Class III).

E.4.13.4 Star Valley Option

The Modified Route D Star Valley Option would exit the Modified Route D Alternative Substation to the west-northwest as an overhead double-circuit 230 kV transmission line. The route would head west and northwest for 2.2 miles, then north for approximately 0.3 miles to meet Star Valley Road, 0.7 miles east of I-8 Exit 33 for Willows Road. On the southwest side of the bend in Star Valley Road, the route would transition underground and continue north to Alpine Boulevard. This option would join the I-8 Alternative at Alpine Boulevard. From the substation, the route would pass through undeveloped land absent built features with industrial character.

Environmental Setting

Geology. The Star Valley Option route is entirely underlain by Green Valley Tonalite (gr₃).

Slope Stability. The Star Valley Option route crosses hill and valley terrain and crosses on a gently sloping plateau located in the hills north of Japatul Valley and south of the Sweetwater River.

Soils. The Star Valley Option route is underlain by soils of the Sesame–Rock Outcrop–Cienba (s1010) association. Basic characteristics of these soils are presented in Table D.13-2. The Sesame–Rock Outcrop–Cienba (s1010) association is formed in material weathered from the underlying granitic rocks. Hazard of erosion for these soils ranges from not rated to very severe for both off-road/off-trail and on-roads/trails. Shrink/swell (expansive) potential of this soil association varies from low to moder-

ate. Corrosive potential of soils along the Star Valley Option route are moderate for uncoated steel and low to moderate for concrete.

Mineral Resources. No known active mines, mineral resource sites, or BLM mining claims are located along or near the Star Valley Option route

Seismicity. The Star Valley Option route is not crossed by any known active faults nor are any active faults located in the immediate vicinity of the route thus it is not likely to experience damage due to fault rupture and or offset. Estimated peak ground accelerations along the Star Valley Option route are low, 0.1 to 0.2g, and only minor groundshaking is expected at along the route in the event of a regional earthquake. The Star Valley Option route crosses moderately sloping hilly terrain underlain by granitic bedrock and would therefore not experience seismically triggered ground failures.

Construction Impacts

No impacts associated damage to desert pavement (Impact G-2) as none are identified along this alignment. Construction triggered slope instability (Impact G-6) would not occur due to the gently site terrain and the underlying granitic bedrock. Access to known mineral resources would not be impeded by project construction (Impact G-9) as there are no active mineral resource sites or BLM claims at the site.

Impact G-1: Erosion would be triggered or accelerated due to construction activities. (Class III)

Excavation and grading for substation foundations and equipment, work areas, and access roads would loosen soil and trigger or accelerate erosion. Soils at the Star Valley Option site have an erosion hazard ranging from not rated to very severe for both off-road/off-trail and on-roads/trails. SDG&E's GEO-APM-1, -2, -5, and -6 (see Table D.13-11) reduce the amount of erosion that would result from construction by: limiting grading of existing roads in areas with sensitive soils, planning construction to minimize new ground disturbance, use of Best Management Practices (BMPs) such as sand bags and road bars, to control water erosion, and limiting construction traffic. In addition, a Stormwater Pollution Prevention Plan (SWPPP) that would limit erosion from the construction site would be required in accordance with the Clean Water Act. This would result in a less than significant impact (Class III).

Operational Impacts

Impact G-4: Project would expose people or structures to potential substantial adverse effects as a result of seismically induced groundshaking and/or ground failure (Class II and III)

Only minor groundshaking is expected along this alignment in the event of an earthquake on major faults in the region, and although unlikely, this seismically induced groundshaking could potentially damage project structures, a significant impact. SDG&E indicates in the PEA that project structures would be designed to withstand geologically induced stresses and that appropriate tower design accounting for lateral wind loads and conductor loads would exceed any creditable seismic loading from minor groundshaking, minimizing potential damage to tower structures from groundshaking. This would result in a less than significant impact (Class III).

Groundshaking would potentially result in seismically induced liquefaction along small portions of the Star Valley Option, where the alternative alignment crosses and is within active washes and flood plains

of upper Sweetwater River and the southern edge of the Viejas Creek Valley and other minor active creeks and tributaries. Local pockets of saturated and loose sandy soils within these drainages would potentially liquefy in the event of a large earthquake. This would potentially result in damage to project structures, a significant impact. Seismically induced slope failures such as landslides and rockfalls would potentially occur along portions of the Star Valley Option route where the alignment traverses along and adjacent to hill and mountain terrain with moderate to steep slopes. This would potentially result in damage to project structures. Collapse of project structures could result in power outages, damage to nearby roads or structures, and injury or death to people, a significant impact. To ensure that impacts associated with seismically induced ground failures from strong groundshaking would be reduced to less than significant levels (Class II), implementation of Mitigation Measures G-4b (Conduct geotechnical investigations for liquefaction) and G-6a (Conduct geotechnical surveys for landslides and protect against slope instability) is required prior to final project design to ensure that people or structures are not exposed to hazards associated with strong to severe seismic groundshaking.

Mitigation Measure for Impact G-4: Project would expose people or structures to potential substantial adverse effects as a result of seismically induced groundshaking and/or ground failure

G-4b Conduct geotechnical investigations for liquefaction.

G-6a Conduct geotechnical surveys for landslides and protect against slope instability.

Impact G-7: Project would expose people or structures to potential substantial adverse effects as a result of landslides, earthflows, debris flows, and/or rockfall (Class II)

Slope instability including landslides, earth flows, debris flows, and rock fall during project operation has the potential to undermine foundations, cause distortion and distress to overlying structures, and displace or destroy project components. Landslides and rock-falls would potentially cause damage to project structures in the hills and mountain terrain where the Star Valley Option route traverses along moderate to steep slopes. SDG&E's GEO-APM-4 and -8 (see Table D.13-11) would partially reduce impacts related to landslide hazards during operations of the project. However unidentified unstable slopes would potentially fail during the lifetime of the Star Valley Option. Slope failures would potentially cause collapse of project structures resulting in power outages, damage to nearby roads or structures, and injury or death to nearby people, a significant impact. To ensure that landslide impacts to project structures would be reduced to less than significant levels (Class II), implementation of Mitigation Measure G-6a (Conduct geotechnical surveys for landslides and protect against slope instability) is required.

Mitigation Measure for Impact G-7: Project would expose people or structures to potential substantial adverse effects as a result of landslides, earthflows, debris flows, and/or rockfall

G-6a Conduct geotechnical surveys for landslides and protect against slope instability.

E.4.13.5 Future Transmission System Expansion

For the Proposed Project and route alternatives along the Proposed Project route, Section B.2.7 identifies Future Transmission System Expansion routes for both 230 kV and 500 kV future transmission lines. These routes are identified, and impacts are analyzed in Section D of this EIR/EIS, because SDG&E has indicated that transmission system expansion is foreseeable, possibly within the next 10 years. For the SWPL alternatives, 500 kV and 230 kV expansions would also be possible. The potential expansion routes for the Route D Alternative are described in the following paragraphs.

230 and 500 kV Future Transmission System Expansion

The Modified Route D Alternative would begin at approximately Interstate 8 MP-47 and would head southwest then northward until it reached the Interstate 8 Alternative at approximately MP I8-71. A substation could be built to convert the 500 kV line to 230 kV at approximately MD-34, the Modified Route D Substation Alternative. The double-circuit 230 kV line would exit the substation overhead, then continue north into the CNF, joining the Interstate 8 Alternative at approximately MP I8-71 where it transitions to underground at the east end of Alpine Boulevard. The Modified Route D Substation would accommodate up to six 230 kV circuits and a 500 kV circuit. Only two 230 kV circuits are proposed at this time, but construction of additional 230 kV circuits and a 500 kV circuit out of the Modified Route D Substation may be required in the future. There are three routes that are most likely for these future lines; each is described below. Figure E.1.1-6 illustrates the potential routes of the future transmission lines.

- Two additional 230 kV circuits could be installed underground within Alpine Boulevard, with appropriate compact duct banks and engineering to avoid, or possibly relocate, existing utilities. This route would follow the Interstate 8 Alternative route from the Interstate 8 Alternative Substation until MP I8-70.8 where it would transition underground until MP I8-79 where it would transition overhead again. The future transmission line route would continue to follow the Interstate 8 Alternative's overhead 230 kV route to the point where it meets the Proposed Project at MP 131. See Section E.1.13.1 and E.1.13.2 for the Geology, Mineral Resources, and Soils setting, impacts, and mitigation measures along the I-8 route. The future transmission route would then join the proposed route corridor to the west, continuing past the Sycamore Canyon Substation to the Chicarita Substation. See Section D.13.2, D.13.8, and D.13.9 for the Geology, Mineral Resources, and Soils setting, impacts, and mitigation measures for the Inland Valley and Coastal Links. It could then follow the Proposed Project's 230 kV Future Transmission Expansion route (see description in Section B.2.7) from Chicarita to the Escondido Substation shown in Figure B-12a. See Section D.13.11 for the Geology, Mineral Resources, and Soils setting, impacts, and mitigation measures for the Future Transmission System Expansion of the Proposed Project.
- Additional 230 and 500 kV circuits could follow the Route D Alternative corridor (see description in Section E.3.1) to the north of Descanso, after following the Interstate 8 Alternative 230 kV route from the Interstate 8 Substation to MP I8 70.3. See Section E.3.X.1 and E.3.X.2 for the Geology, Mineral Resources, and Soils setting, impacts, and mitigation measures along Route D. The Route D corridor would connect with the Proposed Project corridor at Milepost 114.5, and could then follow either: (1) the Proposed Project southwest to the Chicarita Substation and then follow the Proposed Project's 230 kV Future Transmission Expansion route (see description in Section B.2.7) from Chicarita to the Escondido Substation; or (2) the Proposed Project northeastward to the Proposed Central East Substation and then follow the Proposed Project's 500 kV Future Transmission Expansion route shown in Figure B-12b (see description in Section B.2.7). See Section D.13.2, D.13.7, D.13.8, and D.13.9 for the Geology, Mineral Resources, and Soils setting, impacts, and mitigation measures for the Central, Inland Valley, and Coastal Links of the Proposed Project. See Section D.13.11 for the Geology, Mineral Resources, and Soils setting, impacts, and mitigation measures for the Future Transmission System Expansion of the Proposed Project.
- The future 230 and 500 kV lines could follow the Modified Route D Alternative corridor (within the 368 Corridor identified by the Department of Energy's Draft West-wide Corridor Programmatic EIS) south for 8 miles to MP MD-26. See Section E.4.13.1 and E.4.13.2 for the Geology, Mineral Resources, and Soils setting, impacts, and mitigation measures along Modified Route D. At MP MD-26, new 230 or 500 kV circuits would turn west and connect with the northernmost segment of

the West of Forest Alternative route as described in Section E.1.1. See Section E.1.13.5 for the Geology, Mineral Resources, and Soils setting, impacts, and mitigation measures along MP MD-26 to MP I8-79 corridor. This route would meet up with the Interstate 8 Alternative at approximately MP I8-79 and would follow the Interstate 8 Alternative's overhead 230 kV route to the point where it meets the Proposed Project at MP 131 (for a description of the Interstate 8 transmission corridor see Section E.1.1). The future transmission route would then join the proposed route corridor to the west, continuing past the Sycamore Canyon Substation to the Chicarita Substation. It could then follow the Proposed Project's 230 kV Future Transmission Expansion System (see description in Section B.2.7) from Chicarita to the Escondido Substation. See Section D.13.11 for the Geology, Mineral Resources, and Soils setting, impacts, and mitigation measures for the Future Transmission System Expansion of the Proposed Project.