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4.6 GEOLOGY, SOILS AND MINERAL RESOURCES

Would the project:		Potentially Significant Impact	Potentially Significant Unless APMs Incorporated	Less than Significant Impact	No Impact
a.	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i.	Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☑
ii.	Strong seismic ground shaking?	☐	☐	☑	☐
iii.	Seismic-related ground failure, including liquefaction?	☐	☐	☑	☐
iv.	Landslides?	☐	☐	☑	☐
b.	Result in substantial soil erosion or the loss of topsoil?	☐	☐	☑	☐
c.	Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☑	☐
d.	Be located on expansive soil, as defined by article 1803.5 of the California Building Code, creating substantial risks to life or property?	☐	☐	☑	☐
e.	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☑
f.	Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state?	☐	☐	☐	☑
g.	Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☑

4.6.1 Introduction

This section of the PEA describes existing geologic, soil, and mineral resources within the Proposed Project area and potential impacts related to these resources that could result from construction, operation, and maintenance of the Proposed Project.

Proposed Project construction activities would comply with all relevant federal, state, and local regulatory requirements. With implementation of project design features, construction, operation, and maintenance of the Proposed Project facilities are expected to have less than significant impacts related to geologic, soil, and mineral resources.

4.6.2 Methodology

Preparation of this section was primarily based on review of published and unpublished geologic maps and reports, evaluation of the Proposed Project route on USGS topographic maps, and analysis of 1:2,400 scale aerial photographs covering the Proposed Project area. Much of the Proposed Project alignment has been investigated by previous geotechnical studies, and reports of those studies were reviewed (Benton Engineering, Inc., 1972a and b; Geocon, Inc., 2012a and b). The Proposed Project description was reviewed and potential for impacts related to geologic resources and hazards was evaluated based on the existing geologic and soil conditions as determined by the data review.

4.6.3 Existing Conditions

4.6.3.1 Regulatory Setting

The key regulatory requirements relevant to the assessment of Proposed Project impacts related to geologic, soil, and mineral resources include the following:

a) The Alquist-Priolo Special Studies Act of 1972 (Alquist-Priolo Act) which, in part, required the California Division of Mines and Geology (now the California Geological Survey) to compile maps of the surface traces of all known active faults in the State of California (State); and

b) CPUC General Order 95, which designates rules and regulations for overhead electric line construction.

The Surface Mining and Reclamation Act of 1975 (SMARA), in part, encourages the production, conservation, and protection of the State's mineral resources.

While the Alquist-Priolo Act and SMARA do not impose any requirement on the Proposed Project, the active faults and mineral resources mapped by the State provide information for evaluating potential impacts on a project from surface fault displacement and loss of mineral resources in accordance with the CEQA Initial Study Checklist items 6(a)(i) and 6(f).

An additional relevant regulatory requirement is the RWQCB's General Construction Permit. The General Construction Permit requires that a SWPPP be prepared and implemented for projects disturbing over 1 acre of land. While the General Permit is a regulatory requirement for water quality protection (see further discussion in Section 4.8, Hydrology and Water Quality), its requirements for stormwater management BMPs include measures that limit impacts to soils.

The *City of San Diego General Plan* does not include goals or policies directly relevant to the Proposed Project related to geology, soils and mineral resources, but Goal VIII in the Poway Comprehensive Plan: General Plan, Public Safety Element is relevant to the portion of the Proposed Project located in the Poway City boundaries. Goal VIII states that it is the goal of the City of Poway to minimize injuries, loss of life, and property damage resulting from natural and

man-made hazards. Policy B and Policy C for achieving Goal VIII are relevant to the Proposed Project:

- Policy B – Geologic Hazards:
    - Compare all development applications with the Geographic Information Management Systems (GIMS) mapping system to determine if significant geologic hazards exist.
    - Investigations performed by a qualified engineering geologist or soil engineer shall be required for all new development review applications.
    - Include, as a condition of approval, the recommendations of the engineering geologist for geologic hazard mitigation and the soils engineer for soils related issues.
- Policy C – Seismic Safety:
    - Take all appropriate actions to identify and mitigate seismic hazards such as groundshaking, ground rupture, landslides, liquefaction and structural hazards.
    - The GIMS Mapping System and the Seismic Matrix shall be used to determine if the probability of a seismic hazard exists.
    - Where it has been determined that there is the probability of a seismic hazard, an investigation by a qualified engineering geologist shall be required.

The Proposed Project traverses the south-westernmost corner of the City of Poway. The City's GIMS map does not indicate any surface fault traces, landslides, liquefaction potential, or other geologic hazard conditions at the Proposed Project location that would be a hazard to the Proposed Project or could be exacerbated by the Proposed Project.

4.6.3.2 Topographic Setting

The Proposed Project traverses variable terrain. The western portion of the Proposed Project is dominated by gently sloped marine terraces incised by canyons and valleys. These terraces transition to irregular foothills and valleys in the eastern portion of the Proposed Project area. In the western portion of the Proposed Project, elevations generally range from approximately 250 to 450 feet above mean sea level at structure locations to approximately 100 feet above mean sea level in the bottoms of the lowest canyons that would be spanned. In the eastern portion of the Proposed Project area, elevations generally range from 400 to 900 feet amsl.

4.6.3.3 Geologic Setting

Regional Setting

The Proposed Project area is located within the southern Peninsular Ranges Physiographic Province, which is characterized by northwest-trending fault-bounded mountain ranges, broad intervening valleys, and low-lying coastal plains. The western portion of the Proposed Project area occurs in the coastal plain where near surface geologic materials are comprised of Tertiary Period and younger marine and non-marine sediments. The coastal plains begin to transition into more irregular foothills topography in the eastern portion of the Proposed Project area where much older Jurassic Period and Cretaceous Period crystalline and metamorphic bedrock are

exposed in places, as well as overlying Tertiary Period and younger marine and non-marine sediments.

The Proposed Project occurs on a block of basement rock bounded by the Elsinore Fault Zone to the northeast and by the Newport-Inglewood-Rose Canyon fault zone to the west. Neither of these fault zones crosses the Proposed Project alignment.

Proposed Project Geologic Setting

Geologic units that occur along the Proposed Project alignment are summarized in Table 4.6-1, Geologic Units Along the Proposed Project Alignment. A geologic map is provided in Figure 4.6-1, Proposed Route Geologic Map.

The majority of the Proposed Project alignment occurs in the Quaternary Very Old Paralic Deposits (Qvop) and Eocene Epoch sedimentary units (i.e., Tmv, Tst, Tf and Tsc) listed in Table 4.6-1. The Young Alluvial Deposits (Qya) and the Ardath Shale (Ta) occur along the Proposed Project alignment and would be spanned by Proposed Project facilities but would not be impacted by Proposed Project construction since none of the Proposed Project ground features occur in these units.

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Proposed Route

Sycamore to Peñasquitos 230 kV Transmission Line Project

Proposed Route Geologic Map

Figure 4.6-1a

N W E S

0 0.5 1 1.5 2 Miles

3/13/2014

TRC

SDGE A Sempra Energy utility

Sources: Kennedy, Michael P. and Siang, S. Tan. 2005. Geologic Map of the San Diego 30' X 60" Quadrangle, California. California Geological Survey Regional Geologic Map Series (SDSU http://www.geology.sdsu.edu/kmlgeology/kmz/sandiego_30_60/san_diego_30_60.kmz); SDG&E, 2013; Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

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BACK OF FIGURE 4.6-1A

Geologic Units

- Kd
- Kgd
- Kl
- Kt
- Mzu
- Qaf
- Qls
- Qmb
- Qoa
- Qop Unit 6
- Qpe
- Qvoa
- Qvop Unit 1
- Qvop Unit 2
- Qvop Unit 3
- Qvop Unit 4
- Qvop Unit 5
- Qvop Unit 6
- Qvop Unit 7
- Qvop Unit 8
- Qvop Unit 9
- Qvop Unit 9a
- Qvop Unit 10
- Qw
- Qya
- Ta
- Td
- Td-Tf
- Tf
- Tmv
- Tp
- Tpm
- Tsc
- Tscu
- Tst
- Tt
- Water

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Sycamore to Peñasquitos 230 kV Transmission Line Project

Proposed Route Geologic Map

Figure 4.6-1b

3/13/2014

Sources: Kennedy, Michael P. and Siang, S. Tan. 2005. Geologic Map of the San Diego 30' X 60" Quadrangle, California. California Geological Survey Regional Geologic Map Series (SDSU http://www.geology.sdsu.edu/kmlgeology/kmz/sandiego_30_60/san_diego_30_60.kmz); SDG&E, 2013

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BACK OF FIGURE 4.6-1B

Table 4.6-1: Geologic Units Along the Proposed Project Alignment

Symbol	Unit Name	Period	Description
Sedimentary Units			
Af	Artificial Fill	Historic	Varies.
Qya	Young Alluvial Deposits	Quaternary (Holocene Epoch)	Unconsolidated to slightly consolidated sand and gravel deposited in active washes and flood plains.
Qvop	Very Old Paralic Deposits	Quaternary	Mostly poorly sorted reddish-brown interfingered strandline, beach, estuarine and colluvial deposits composed of siltstone, sandstone and conglomerate.
Tmv	Mission Valley Formation	Tertiary (Middle Eocene Epoch)	Predominantly light olive-grey soft and friable fine- to medium-grained marine and nonmarine sandstone with cobble conglomerate tongues.
Tst	Stadium Conglomerate	Tertiary (Middle Eocene Epoch)	Massive cobble conglomerate with a dark yellowish-brown course-grained sandstone matrix.
Tf	Friars Formation	Tertiary (Middle Eocene Epoch)	Mostly yellowish-grey medium-grained, massive, poorly indurated nonmarine and lagoonal sandstone and claystone with tongues of cobble conglomerate.
Tsc	Scripps Formation	Tertiary (Middle Eocene Epoch)	Mostly pale yellowish-brown, medium-grained sandstone containing occasional cobble-conglomerate interbeds.
Ta	Ardath Shale	Tertiary (Middle Eocene Epoch)	Mostly uniform olive-grey sandstone and concretionary beds.
Igneous and Metamorphic Units			
Kd	Diorite (undivided)	Mid-Cretaceous	Mostly massive, medium- to course-grained, dark gray hornblend diorite and quartz-bearing diorite.
Mzu	Metasementary and Metavolcanic Rocks (Undivided)	Jurassic and Cretaceous	Low grade (greenschist facies) metasedimentry rocks (conglomerate, sandstone and siltstone) interlayered and mixed with metavolcanic rocks.

Source: *Kennedy and Siang, 2005; Kennedy, 1975.*

Faulting and Seismicity

The Alquist-Priolo Act required the California Division of Mines and Geology (now the California Geological Survey) to compile maps of the surface traces of all known active faults in the State. By definition, an active fault is one that is "sufficiently active and well-defined," with evidence of surface displacement within the Holocene epoch time (within approximately about the last 11,000 years). Active fault zones are the locations in the State with the most potential for surface fault rupture. A potentially active fault is one that has evidence of displacement within the Quaternary Period (last 1.6 million years). Potentially active faults are considered to also represent possible surface rupture hazards, although to a lesser degree than active faults. In contrast to active or potentially active faults, faults considered inactive have not moved in the last 1.6 million years.

The Proposed Project occurs within the area of two USGS 7.5 minute quadrangle maps: (1) Del Mar Quadrangle; and (2) Poway Quadrangle. There are no known active or potentially active faults or Alquist-Priolo Act earthquake fault zones in these quadrangles. The closest known active and potentially active faults are those associated with the Rose Canyon Fault Zone. Both active and potentially active surface traces of the Rose Canyon Fault Zone are mapped to occur approximately four miles west of the Proposed Project. The Rose Canyon Fault is a southward extension of the Newport Inglewood Fault Zone and with an estimated slip rate of 1.5 to 2 millimeters per year (Southern California Edison, 2012). The closest active or potentially active faults to the north and east of the Proposed Project are those associated with the Elsinore Fault Zone. Active and potentially active surface traces of the Elsinore Fault Zone occur more than 25 miles to the northeast of the Proposed Project. The Elsinore Fault Zone is a major dextral strike-slip fault zone that is part of the overall San Andreas Fault System that accommodates up to 5 millimeters per year of Pacific-North American plate boundary slip. Other regional faults with the potential to cause strong ground shaking in the Proposed Project area include the offshore Coronado Bank Fault Zone and the Earthquake Valley Fault and the San Jacinto Fault Zone. Distance from the Proposed Project area and maximum earthquake magnitude (Mw) for each of these faults are provided in Table 4.6-2, Major Faults in the Region.

Table 4.6-2: Major Faults in the Region

Fault Name	Distance and Direction	Maximum Earthquake Magnitude (Mw)
Rose Canyon Fault Zone	4 miles W	7.2
Coronado Bank Fault Zone	16 Miles W	7.6
Elsinore (Julian Section)	>25 Miles NW	7.1
Earthquake Valley	>30 Miles E	6.5
San Jacinto (Coyote Creek Section)	>46 Miles E	6.8
San Jacinto (Anza Section)	>48 Miles NE	7.2
Sources: *Distance and direction approximated from Jennings and Bryant, 2010; Maximum Earthquake magnitudes from Geocon, Inc., 2012.*		

Fault Rupture

There are no known active or potentially active faults or Alquist-Priolo Act earthquake fault zones within the Proposed Project footprint. Therefore, there are no locations within the Proposed Project footprint area that are prone to surface fault rupture.

Strong Seismic Shaking

Intensity of seismic shaking during an earthquake is dependent on the distance from the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions underlying and surrounding the area. All of southern California is considered to be a seismically active region. The San Diego County area is subject to strong seismic shaking from regional earthquakes that may occur on active faults that occur in the region including, but not limited to, those listed in Table 4.6-2.

4.6.3.4 Geologic Hazards

Subsidence

The primary causes of most subsidence involve human activities, including groundwater or petroleum withdrawal from large alluvial basins with thick accumulations of unconsolidated sediments or drainage of organic soils. Regional lowering of land elevation occurs gradually over time. Subsidence is not a significant risk for the Proposed Project because the Proposed Project does not involve the withdrawal of fluid from geologic materials that could cause subsidence, and because Proposed Project facilities are not generally vulnerable to adverse effects from subsidence.

Landslides

Landslide potential can be high in steeply sloped areas. Human factors such as over-steepening/overloading of slopes or introduction of excessive water in soil pores or joints and fractures in rock can also lead to landslides. The principal natural factors contributing to landslides are topography, geology and precipitation. The Proposed Project alignment does not cross any landslide areas identified on published geologic maps reviewed (Kennedy and Siang, 2005; Kennedy, 1975). Additionally, much of the Proposed Project alignment has been investigated by three geotechnical reports prepared for previous SDG&E projects (Benton Engineering, Inc., 1972a and 1972b; Geocon, Inc., 2012). No landslides have been identified within the project area. Review of the terrain via aerial photographs in conjunction with this PEA evaluation also did not identify any landslides in proximity to Proposed Project structures. Nevertheless, in areas of locally steep terrain, there is potential for landslides and other mass wasting to occur. The Ardath Shale geologic unit and the Friars Formation geologic unit that occur in the project region, are identified in the San Diego County GIS geologic hazards database as being prone to landslides. As described in Section 4.6.3.3, the Ardath Shale would not be disturbed by the Proposed Project; it occurs in a few canyon bottoms near the west end of the Proposed Project and would only be spanned by conductors. Only one Proposed Project structure is expected to be located on Friars Formation (E5), in an area of gently sloping terrain with limited landslide potential. A geotechnical investigation would be completed for the Proposed Project that would consider geotechnical conditions at each proposed structure

location. The Proposed Project facilities final designs will account for any substantive risks identified by the geotechnical study.

Liquefaction and Lateral Spreading

Liquefaction is a seismic phenomenon in which loose, saturated, cohesionless soils behave similar to a fluid when subjected to high-intensity ground shaking. An increase in pore pressure occurs as the soil attempts to compact in response to the shaking, resulting in less grain-to-grain soil contact and, therefore, loss of strength. Liquefaction occurs when three general conditions exist: shallow groundwater (40 feet below ground surface or less); low-density, fine-grained sandy soils; and high-intensity ground motion. Effects of liquefaction on level ground can include sand boils, settlement, and bearing capacity failures below structural foundations.

Lateral spreads involve lateral displacement of large, intact soil blocks down gentle slopes or in the direction of a steep free face such as a stream bank. Lateral spreading can occur in fine-grained, sensitive soils such as quick clays, particularly if remolded or disturbed by construction and grading. Loose, granular soils present on gentle slopes and underlain by a shallow water table commonly produce lateral spreads through liquefaction. Conditions susceptible to lateral spreading can be found along stream banks, canals, or cut slopes in recent alluvial or deltaic deposits.

Much of the Proposed Project alignment has been investigated by geotechnical reports prepared for previous SDG&E projects (Benton Engineering, Inc., 1972a and b; Geocon, Inc., 2012a and b) and no locations susceptible to liquefaction or lateral spreading were identified. Review of the Proposed Project area terrain via aerial photographs in conjunction with this PEA evaluation also did not identify any structure locations in low-lying alluvial areas or other settings commonly susceptible to liquefaction. Some Proposed Project structures are in the vicinity of free-face terrain that might have a potential for lateral spreading; for example, where structure locations occur near the edge of a marine terrace. A geotechnical investigation would be completed for the Proposed Project that would consider geotechnical conditions at each proposed structure location. The Proposed Project facilities' final designs would account for any substantive risks identified by the geotechnical study.

Soil Collapse

Soil collapse occurs when added moisture causes bonds between soil particles to weaken, which allows the soil structure to collapse and the ground surface to subside. Collapsible soils are generally low-density, fine-grained combinations of clay and sand left by mudflows that have dried, resulting in the formation of small air pockets in the subsurface. The addition of moisture reduces the strength of the soil, resulting in collapse or subsidence. Geotechnical studies to be completed for the Proposed Project would evaluate Proposed Project facility locations for conditions susceptible to soil collapse. The Proposed Project facilities' final designs would account for any substantive risks identified by the geotechnical study.

4.6.3.5 Soils

Table 4.6-3, Soils in the Proposed Project Footprint, identifies soils that could potentially be affected by the Proposed Project. Soils range from rocky sandy loam to clay. Soil symbols and names in Table 4.6-3 correspond to the USDA Soil Conservation Service mapping program.

Table 4.6-3: Soils in the Proposed Project Footprint

Symbol	Name	Drainage Class	Typical Slope (%)
AtF	Altamont Clay	Well Drained	30-50
AtC	Altamont Clay	Well Drained	5-9
AwD	Auld Clay	Well Drained	9-15
DaC	Diablo Clay	Well Drained	2-9
DaE	Diablo Clay	Well Drained	15-30
DaD	Diablo Clay	Well Drained	9-15
DoE	Diablo-Olivenhain Complex	Well Drained	9-30
FxG	Friant Rocky Fine Sandy Loam	Well Drained	30-70
GaF	Gaviota Fine Sandy Loam	Well Drained	30 -50
LEC2	Las Flores Loamy Fine Sand	Moderately Well Drained	5-9
LeD2	Las Flores Loamy Fine Sand	Moderately Well Drained	9-15
LeE	Las Flores Loamy Fine Sand	Moderately Well Drained	15-30
LsE	Linne Clay Loam	Well Drained	9-30
OhE	Olivenhain Cobbly Loam	Well Drained	9-30
OhF	Olivenhain Cobbly Loam	Well Drained	30-50
RdC	Redding Gravelly Loam	Well Drained	2- 9
ReE	Redding Cobbly Loam	Well Drained	9-30
RfF	Redding Cobbly Loam	Well Drained	15-50
SbC	Salinas Clay Loam	Well Drained	2-9
SmE	San Miguel Rocky Silt	Well Drained	9-30
SnG	San Miguel-Exchequer Rocky Silty Loams	Well Drained	9-70
TeF	Terrace Escarpment	Not Specified	Not Specified

Source: *UC Davis, 2013.*

4.6.3.6 Mineral Resources

Portions of the Proposed Project, including much of the route from near I-15 eastward, is classified by the State as Mineral Resource Zone 2 (MRZ-2) (Department of Conservation, 1982; City of San Diego, 2008). The MRZ-2 designation encompasses areas where the State has determined adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence. All new transmission and power line facilities would be located within existing SDG&E ROWs or within public roadways. No mineral rights would be affected.

4.6.4 Potential Impacts

4.6.4.1 Significance Criteria

Thresholds of impact significance were derived from Appendix G of the *CEQA Guidelines*. Under these guidelines, the Proposed Project could have a potentially significant impact to geology and soils if it would:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
   i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publication 42);
   ii. Strong seismic ground shaking;
   iii. Seismic-related ground failure, including liquefaction; or
   iv. Landslides;
b) Result in substantial soil erosion or the loss of topsoil;
c) Be located on a geologic unit that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landsliding, lateral spreading, subsidence, liquefaction, or collapse;
d) Be located on expansive soil, as defined by article 1803.5 of the California Building Code (CBC), creating substantial risk to life or property; or
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

Impacts to mineral resources may be considered significant if they:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state; or
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

4.6.4.2 Question 6a(i) – Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?

Construction– No Impact

No portion of the Proposed Project is located in an Alquist-Priolo Act earthquake fault zone. There are no active or potentially active faults crossing the Proposed Project route. The closest known active fault is the Rose Canyon Fault Zone located approximately 4 miles to the west of the Proposed Project. No recognized active faults underlie the Proposed Project area; therefore, no impacts from fault rupture are expected.

Operation & Maintenance – No Impact

As noted above, no portion of the Proposed Project is located in an Alquist-Priolo Act earthquake fault zone, there are no active or potentially active faults crossing the Proposed Project route, and the closest known active fault is the Rose Canyon Fault Zone located approximately 4 miles to the west of the Proposed Project. No recognized active faults underlie the Proposed Project area; therefore, no impacts from fault rupture are expected.

In addition, SDG&E currently maintains and operates electric transmission, power, distribution and substation facilities throughout the Proposed Project area. SDG&E's existing facilities and operations and maintenance activities constitute the baseline against which the impacts of the Proposed Project are evaluated. Operations and maintenance activities for the Proposed Project would be similar to baseline conditions. Therefore, the operations and maintenance of the Proposed Project would not result in any potential impacts relating to fault rupture.

4.6.4.3 Question 6a(ii) – Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?

Construction – Less than Significant Impact

As noted above, no portion of the Proposed Project is located in an Alquist-Priolo Act earthquake fault zone, there are no active or potentially active faults crossing the Proposed Project route, the closest known active fault is the Rose Canyon Fault Zone located approximately 4 miles to the west of the Proposed Project. Nonetheless, all of southern California is considered to be a seismically active region, and the San Diego County area is subject to strong seismic shaking from regional earthquakes that may occur on active faults that occur outside of the Proposed Project area. However, because of the short (approximately one year construction period) and the low likelihood of a moderate to large earthquake to occur during this time, the potential for construction personnel to experience strong seismic ground shaking is less than significant.

Operation & Maintenance – Less than Significant Impact

Underground electric transmission facilities are generally not subject to direct effects of shaking because they are confined by surrounding soil. Design and construction of overhead facilities would conform to CPUC General Order 95, industry practice, and SDG&E internal structural design requirements. These transmission design requirements for wind loading combined with broken phase loading exceed those for seismic accelerations. With the application of engineering principles and compliance with design standards outlined in General Order 95 applied to minimize damage from seismic shaking, the risk of damage to the Proposed Project facilities is less than significant.

Additionally, SDG&E currently maintains and operates electric transmission, power, distribution and substation facilities throughout the Proposed Project area. SDG&E's existing facilities and operations and maintenance activities constitute the baseline against which the impacts of the Proposed Project are evaluated. Operations and maintenance activities for the Proposed Project would be similar to baseline conditions. Therefore, the operations and maintenance related seismic risk to people would not be materially different from existing conditions.

4.6.4.4 Question 6a(iii) – Expose people or structures to potential substantial adverse effects, including seismic-related ground failure, including Liquefaction?

Construction – Less Than Significant Impact

Much of the Proposed Project alignment has been investigated by geotechnical reports prepared for previous SDG&E projects (Benton Engineering, Inc., 1972a and b; Geocon, Inc., 2012a and b) and no locations susceptible to liquefaction were identified. Review of the Proposed Project area terrain via aerial photographs in conjunction with this PEA evaluation also did not identify any structure locations in low-lying alluvial areas or other settings commonly susceptible to liquefaction. As described in Section 4.6.3.4, Geologic Hazards, a geotechnical investigation would be completed for the Proposed Project that would consider geotechnical conditions at each proposed structure location. The Proposed Project facilities' final designs would account for any substantive risks identified by the geotechnical study. Because the Proposed Project is not in terrain with a high susceptibility to liquefaction, and the low likelihood of a large earthquake occurring during the short construction period, the risk of construction personnel being exposed to earthquake-induced liquefaction is less than significant.

Operation & Maintenance – Less Than Significant Impact

As previously described, much of the Proposed Project alignment has been investigated by geotechnical reports prepared for previous SDG&E projects (Benton Engineering, Inc., 1972a and b; Geocon, Inc., 2012a and b) and no locations susceptible to liquefaction were identified. Review of the Proposed Project area terrain in conjunction with this PEA evaluation also did not identify any structure locations in low-lying alluvial areas or other settings commonly susceptible to liquefaction. A geotechnical investigation would be completed for the Proposed Project that would consider geotechnical conditions at each proposed structure location. The Proposed Project's final design in accordance with CPUC General Order 95, industry practice, and SDG&E internal requirements will account for any substantive risks identified by the geotechnical study so that the potential for damage to Proposed Project facilities from earthquake-induced liquefaction would be less than significant.

Additionally, SDG&E currently maintains and operates electric transmission, power, distribution and substation facilities throughout the Proposed Project area. SDG&E's existing facilities and operations and maintenance activities constitute the baseline against which the impacts of the Proposed Project are evaluated. Operations and maintenance activities for the Proposed Project would be similar to baseline conditions. Therefore, the operations and maintenance-related risk to people would not be materially different from existing conditions.

4.6.4.5 Question 6a(iv) – Expose people or structures to potential substantial adverse effects, including landslides?

Construction – Less than Significant Impact

The Proposed Project alignment does not cross any landslide areas identified on published geologic maps reviewed (Kennedy and Siang, 2005; Kennedy, 1975). Additionally, much of the Proposed Project alignment has been investigated by three geotechnical reports prepared for previous SDG&E projects (Benton Engineering, Inc., 1972a and 1972b; Geocon, Inc., 2012a and 2012b) and no slope stability issues were identified. Review of the terrain via aerial photographs in conjunction with this PEA evaluation also did not identify any landslides in proximity to Proposed Project structures. Nevertheless, in areas of locally steep terrain, there is potential for landslides and other mass wasting to occur. Slope stability issues can be exacerbated by changes to grading, drainage or infiltration characteristics if proper precautions are not taken.

The Proposed Project would result in minimal change to surface grades, drainage or infiltration characteristics. The proposed transmission and power line facilities follow City streets and the existing SDG&E ROWs with associated access roads so nearly all access would be accomplished on existing access routes with smoothing and re-establishment of roads as needed. Minor grading for spur road construction could be required at a few structures. Stringing sites and laydown areas would be selected to utilize areas that would require little or no grading. Section B of the transmission line would be within a City street with the surface restored upon completion of construction. The primary graded features of the Proposed Project would be the permanent work pads at the locations where structure replacements are proposed on Sections A and D. Grading would be designed to retain existing drainage patterns. The volume of grading at most new structure sites would be less than 300 cubic yards of cut or fill per location, and the maximum cut or fill volume would be approximately 2,300 cubic yards. Construction disturbances would be stabilized when work is complete. The minimum grading needed for structure locations and prompt stabilization of construction disturbances would minimize the potential for the Proposed Project to adversely affect natural slope stability. A geotechnical investigation would be completed for the Proposed Project that would consider geotechnical conditions at each proposed structure location. The Proposed Project facilities final design in accordance with CPUC General Order 95, industry practice, and SDG&E internal requirements would account for any substantive risks identified by the geotechnical study so that the potential for landslide-related impacts to people and structures from Proposed Project construction would be less than significant.

Operation & Maintenance – Less Than Significant Impact

As previously described, the Proposed Project would result in minimal change to surface grades, drainage or infiltration characteristics and construction disturbances would be stabilized when

work is complete. The minimum grading and prompt stabilization of construction disturbances would minimize the potential for the Proposed Project to adversely affect natural slope stability. A geotechnical investigation would be completed for the Proposed Project that will consider geotechnical conditions at each proposed structure location. The Proposed Project facilities final design in accordance with CPUC General Order 95, industry practice, and SDG&E internal requirements will account for any substantive risks identified by the geotechnical study so that the potential for landslide-related impacts to people and structures from Proposed Project facilities would be less than significant.

Additionally, SDG&E currently maintains and operates electric transmission, power, distribution and substation facilities throughout the Proposed Project area. SDG&E's existing facilities and operations and maintenance activities constitute the baseline against which the impacts of the Proposed Project are evaluated. Operations and maintenance activities for the Proposed Project would be similar to baseline conditions.

4.6.4.6 Question 6b – Result in substantial soil erosion or the loss of topsoil?

Construction – Less Than Significant Impact

Where construction would occur within public roads, parks or other developed areas there would be no loss of native soil. Where construction is outside of developed areas it would be along the existing ROW and transmission and power line corridor with associated access roads so that nearly all access would be accomplished on existing access routes. Minor grading for spur road construction could be required at a few structures. Stringing sites and laydown areas would be selected to utilize areas that would require little or no grading, thereby limiting impacts to soils. The primary soil disturbances would be the work pads at the locations where structure replacements are proposed on Sections A and D. Temporary soil disturbance during construction at these structure locations would typically be approximately one-half acre per site, with typically less than 0.2 acre of long-term disturbance per site. Soil erosion or loss of topsoil could result from excavation or grading activities during construction.

Soil erosion and topsoil loss would be controlled by implementing SDG&E's *BMP Manual* during design and construction of the Proposed Project. In addition, the Proposed Project would comply with the Construction General Permit which would include the preparation of a SWPPP (refer to Section 4.8 for additional information on the Construction General Permit). Surface disturbance would be minimized to the extent consistent with safe and efficient completion of the Proposed Project. Topsoil would be salvaged from areas where grading would otherwise result in a loss of topsoil, and the salvaged soil would be used to reclaim areas of temporary construction disturbance. Once temporary surface disturbances are complete, temporary construction impact areas would be stabilized. Considering these measures, impacts to soil erosion and loss of topsoil would be less than significant.

Operation & Maintenance – No Impact

SDG&E currently maintains and operates electric transmission, distribution and substation facilities throughout the Proposed Project site. SDG&E's existing facilities and operations and maintenance activities constitute the baseline against which the impacts of the Proposed Project are evaluated. Operations and maintenance activities for the Proposed Project would be similar to baseline conditions. Soil erosion and topsoil loss would be controlled by implementing

SDG&E's *BMP Manual* for maintenance of Proposed Project facilities. Considering that operation and maintenance will be similar to existing conditions and that BMPs will be implemented, there will be no material effect on soil erosion or loss of topsoil.

4.6.4.7 Question 6c – Be located on a geologic unit that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landsliding, lateral spreading, subsidence, liquefaction, or collapse?

Construction – Less than Significant Impact

The potential for liquefaction and landslide related impacts are addressed in Sections 4.6.4.4 and 4.6.4.5, respectively.

Construction would have no subsidence impact because the Proposed Project does not involve the withdrawal of subsurface fluids that can cause subsidence.

As described in Section 4.6.3.4, Geologic Hazards, a geotechnical investigation would be completed for the Proposed Project that would consider geotechnical conditions at each proposed structure location. The finals design of the Proposed Project facilities would account for any substantive risks identified by the geotechnical study, including lateral spreading or collapsible soils. Considering this and the low likelihood of a large regional earthquake during the short period of construction, the risk of lateral spreading or issues related to collapsible soils during construction is less than significant.

Operation & Maintenance – Less than Significant Impact

The potential for liquefaction and landslide related impacts are addressed in Sections 4.6.4.4 and 4.6.4.5, respectively. Operation and maintenance of the Proposed Project would have no subsidence impact because the Proposed Project does not involve the withdrawal of subsurface fluids that can cause subsidence. SDG&E currently maintains and operates existing electric power, distribution and substation facilities throughout the Proposed Project site. SDG&E's existing facilities and operations and maintenance activities constitute the baseline against which the impacts of the Proposed Project are evaluated. There is nothing about the Proposed Project operations and maintenance that differs from the existing conditions in terms of collapsible soils or lateral spreading, and thus there are no potential impacts.

4.6.4.8 Question 6d – Be located on expansive soil, as defined by article 1803.5 of the California Building Code, creating substantial risk to life or property?

Construction – Less Than Significant Impact

Expansive soils are clayey soils that have a high plasticity index. Typical shallow reinforced concrete spread footing foundations, such as those for buildings and other foundations covering a considerable area of ground, can be affected by expansive soils if such soils are present close to the ground surface. The Proposed Project does not include any spread footing foundations that could be adversely affected by expansive soils. The geotechnical study for the Proposed Project would include evaluation of soil conditions, and if expansive soils are identified at any proposed structure locations, the footings at these locations would be designed to accommodate the soil conditions identified. Considering that the Proposed Project does not include any foundations

susceptible to damage from expansive soils, the potential for expansive soils to occur in the Proposed Project area does not create a substantial risk to life or property and impacts would be less than significant.

Operation & Maintenance – No Impact

SDG&E currently maintains and operates existing electric power, distribution and substation facilities throughout the Proposed Project site. SDG&E's existing facilities and operations and maintenance activities constitute the baseline against which the impacts of the Proposed Project are evaluated. There is nothing about the Proposed Project operations and maintenance that differs from the existing conditions in terms of high plasticity soils, and thus there are no potential operation and maintenance impacts. Any future potential maintenance-related construction projects would be evaluated under General Order 131-D and CEQA for purposes of assessing whether further CPUC approval is required.

4.6.4.9 Question 6e – Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Construction and Operation & Maintenance – No Impact

The Proposed Project would not involve the installation of a septic tank or alternative wastewater disposal system; therefore, no impact would occur.

4.6.4.10 Question 6f – Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state?

Construction and Operation & Maintenance – No Impact

Portions of the Proposed Project, including much of the route from near Interstate 15 eastward, is classified by the State as MRZ-2. The MRZ-2 designation encompasses areas where the State has determined adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence. The MRZ-2 lands in the Proposed Project area are classified as MRZ-2 for their potential to contain valuable aggregate resources (e.g., sand and gravel). All Proposed Project facilities would be located within existing public roadways or SDG&E ROWs. No mineral rights would be affected.

4.6.4.11 Question 6g – Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

Construction and Operation & Maintenance – No Impact

The *City of San Diego General Plan* does not identify any locally important mineral resources in the Proposed Project area.

The *Poway Comprehensive Plan* does not identify any valuable mineral resource other than the aggregate resources recognized by the State as described in Section 4.6.4.10.

All Proposed Project facilities would be located within existing public roadways and parks or SDG&E ROWs. No mineral rights would be affected.

4.6.5 Project Design Features and Ordinary Construction/Operating Restrictions

The Proposed Project has been designed and would be constructed consistent with SDG&E's policy to implement the SDG&E's *BMP Manual*. This manual includes design and construction BMPs to control soil erosion.

Proposed Project facilities would be designed and constructed to comply with the following standards and regulations:

- CPUC General Order 95, which designates rules and regulations for overhead electric line engineering;
- A geotechnical study would be conducted for the Proposed Project under the direction of a California-licensed Geotechnical Engineer or Certified Engineering Geologist, and recommendations identified in the geotechnical report will be carried out; and
- Construction General Permit, which will require the preparation and implementation of a SWPPP including BMP measures to control soil erosion (refer to Section 4.8, Hydrology and Water Quality for additional information on the Construction General Permit).

The Proposed Project is designed to minimize ground and soil disturbance through use of existing access routes.

Implementation of the engineering and regulatory standards, practices and guidelines, previously described in this section would ensure that impacts related to geologic hazards and resources would remain less than significant.

4.6.6 Applicant Proposed Measures

The Proposed Project would have no potentially significant impacts relating to geology, soils, and mineral resources; therefore, no APMs are proposed.

4.6.7 Detailed Discussion of Significant Impacts

Based upon the preceding analysis, no significant impacts relating to geology, soils, or mineral resources are anticipated from the Proposed Project.

4.6.8 References

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