# 4.7 Geology, Soils, Seismicity, and Paleontological Resources

## 4.7.1 Introduction

This section evaluates impacts related to geology, soils, seismicity, and paleontological resources from the Proposed Project, reasonably foreseeable distribution components, and alternatives. Paleontological resources are the fossil remains of prehistoric flora and fauna, or traces of evidence of the existence of prehistoric flora and fauna.

## 4.7.2 Regulatory Setting

### Federal Laws, Regulations, and Policies

#### *National Earthquake Hazards Reduction Act*

The National Earthquake Hazards Reduction Act of 1977 (Public Law 95-124) created the National Earthquake Hazards Reduction Program (NEHRP), establishing a long-term earthquake risk reduction program to better understand, predict, and mitigate risks associated with seismic events. Four federal agencies are responsible for coordinating activities under NEHRP: USGS; National Science Foundation (NSF); Federal Emergency Management Agency (FEMA); and National Institute of Standards and Technology (NIST). Since its inception, NEHRP has shifted its focus from earthquake prediction to hazard reduction. The current program objectives are as follows:

1. Developing effective measures to reduce earthquake hazards;
2. Promoting the adoption of earthquake hazard reduction activities by federal, state, and local governments, national building standards and model building code organizations, engineers, architects, building owners, and others who play a role in planning and constructing buildings, bridges, structures, and critical infrastructure or "lifelines";
3. Improving the basic understanding of earthquakes and their effects on people and infrastructure through interdisciplinary research involving engineering, natural sciences, and social, economic, and decision sciences; and
4. Developing and maintaining the USGS seismic monitoring system (Advanced National Seismic System); the NSF-funded project aimed at improving materials, designs, and construction techniques (George E. Brown Jr. Network for Earthquake Engineering Simulation); and the global earthquake monitoring network (Global Seismic Network).

Implementation of NEHRP objectives is accomplished primarily through original research, publications, and recommendations and guidelines for state, regional, and local agencies in the development of plans and policies to promote safety and emergency planning.

## State Laws, Regulations, and Policies

### *Alquist-Priolo Earthquake Fault Zoning Act*

The Alquist-Priolo Earthquake Fault Zoning Act (PRC Section 2621 et seq.) was passed to reduce the risk to life and property from surface faulting in California. The Alquist-Priolo Act prohibits construction of most types of structures intended for human occupancy on the surface traces of active faults and strictly regulates construction in the corridors along active faults (earthquake fault zones). The Alquist-Priolo Act defines criteria for identifying active faults, giving legal weight to terms, such as "active," and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones. Under the Alquist-Priolo Act, faults are zoned and construction along or across them is strictly regulated if they are "sufficiently active" and "well defined." Before a project can be permitted, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.

Because the Alquist-Priolo Act does not prohibit construction of utility infrastructure, such as substations or powerlines, and the Proposed Project does not involve the development of structures intended for human occupancy; regulatory policies are not applicable to the Proposed Project.

### *Seismic Hazards Mapping Act*

The Seismic Hazards Mapping Act of 1990 (PRC Sections 2690-2699.6) establishes statewide minimum public safety standards for mitigation of earthquake hazards. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act. Under the Seismic Hazards Mapping Act, the State is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other seismic hazards, and cities and counties are required to regulate development within mapped seismic hazard zones. In addition, the act addresses not only seismically induced hazards but also expansive soils, settlement, and slope stability. Under the Seismic Hazards Mapping Act, cities and counties may withhold the development permits for a site within seismic hazard zones until appropriate site-specific geologic and/or geotechnical investigations have been carried out and measures to reduce potential damage have been incorporated into the development plans.

### *California Building Code and International Building Code*

Title 24 of the CCR is also known as the California Building Standards Code (CBC). The CBC specifies standards for geologic and seismic hazards other than surface faulting. These codes are administered and updated by the California Building Standards Commission. The CBC specifies criteria for open excavation, seismic design, and load-bearing capacity directly related to construction in California.

The 2012 International Building Code (IBC) (known as the Uniform Building Code prior to 2000) was developed by the International Conference of Building Officials (ICBO) and is used by most states, including California, as well as local jurisdictions to set basic standards for acceptable design of structures and facilities. The IBC provides information on criteria for seismic design, construction, and load-bearing capacity associated with various buildings and other structures and features. Additionally, the IBC identifies design and construction requirements for addressing and mitigating potential geologic hazards. New construction generally must meet the requirements of the most recent version of the IBC.

#### *California Public Utilities Commission General Order 95*

CPUC G.O. 95 provides general standards for design and construction of overhead electric transmission and distribution lines (CPUC 2015). Standards include but are not limited to rules addressing general arrangement and use of lines, grounding, clearances between electrified portions of lines and the ground or other physical structures, and vegetation management. The intent of these rules is to provide for adequate service and secure safety to persons engaged in the construction, maintenance, operation, or use of overhead lines and to the public in general. The rules are not intended to provide complete construction specifications, but to embody the requirements determined to be most important from the standpoint of safety and service.

#### *California Public Utilities Commission General Order 174*

CPUC G.O. 174, adopted in 2012, provides rules for electric utility substations, including minimum requirements for substation design and construction and for an inspection program for substations. Specifically, G.O. 174 states that:

> “Substations shall be designed, constructed and maintained for their intended use, regard being given to the conditions under which they are to be operated, to promote the safety of workers and the public and enable adequacy of service. Design, construction and maintenance should be performed in accordance with accepted good practices for the given local conditions known at the time by those responsible.”

G.O. 174 also specifies that operators of substations must inspect their facilities as frequently as necessary to ensure the safe operation of equipment and components and maintain records of these inspections.

#### *Public Resources Code Section 5097.5*

PRC Section 5097.5 defines as a misdemeanor any unauthorized disturbance or removal of a historic or prehistoric ruin, burial ground, or archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions or other archaeological, paleontological or historical feature on public land and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources.

## 4.7.3 Environmental Setting

### Geology, Soils, and Seismicity

#### *Regional Setting*

California is divided into several physiographic or geomorphic provinces, including the Sierra Nevada range, the Central (Great) Valley, the Transverse Ranges, the Coast Ranges, and others. San Luis Obispo County lies within the Coast Range geomorphic province of California. The Coast

Ranges are northwest-trending mountain ranges and valleys, parallel to the San Andreas Fault. The Coast Ranges are composed of thick Mesozoic and Cenozoic sedimentary strata. To the east, strata dip beneath alluvium of the Great Valley and, to the west, is the Pacific Ocean where the coastline is uplifted, terraced, and wave-cut. The northern and southern ranges are separated by a depression containing the San Francisco Bay. The portion of the Coast Range province that comprises the coast of central California was formed at the intersection of two tectonic plates: the Pacific plate to the west and the North American plate to the east. The compressive and shearing motions between the tectonic plates resulted in a complex system of active strike-slip faults, reverse faults, thrust faults, and related folds (bends in rock layers) (McLaren and Sauvage 2001).

San Luis Obispo County is divided into four structurally and physiographically distinct areas, called seismotectonic domains, which include: the Santa Maria-San Luis Range domain, the Coastal Franciscan domain, the Salinian domain, and the Western San Joaquin Valley domain. The Proposed Project lies within the Salinian domain, located in the northern and eastern portion of San Luis Obispo County, including the communities of Paso Robles, Templeton, Shandon, and Atascadero. The domain extends south to southeast to also include the Carrizo Plains area. Granitic and crystalline metamorphic basement rocks underlie the sedimentary formations in this domain (McLaren and Sauvage 2001). The Salinian domain has a moderate- to high-relief western region characterized by abundant northwest-striking faults with historical earthquake activity, and an eastern region characterized by generally low relief and few recognized surface faults.

Historical seismicity in the Salinian domain is concentrated mainly along its right-lateral strike-slip boundary faults (Nacimiento and San Andreas) and is relatively sparse within the central portion of the domain. Seismically, the Salinian domain, apart from the San Andreas Fault, is relatively quiet (McLaren and Sauvage 2001). The pronounced difference in seismic character between the Salinian domain and the adjacent Coastal Franciscan domain (with moderate to high seismicity) is attributed to the differences in the strength of the rocks that comprise their respective zones. The Salinian domain has a generally lower occurrence of geologic hazards in comparison to the Santa Maria Basin-San Luis Range Domain and Coastal Franciscan domains. The main geologic hazards associated with this domain are groundshaking, liquefaction or seismic-related settlement of alluvium in the low-lying areas, and landslide potential in hillsides of moderate to steep slopes.

### *Stratigraphic Units*

Stratigraphy is the branch of geology which describes the formation, composition, sequence, and properties of stratified (sedimentary) rocks. Major stratigraphic or geologic units in and around the Proposed Project, reasonably foreseeable distribution components, and alternatives are shown on Figure 4.7-1. As shown on Figure 4.7-1, areas surrounding the Proposed Project, reasonably foreseeable distribution components, and most of the alternative substation sites and alignments are entirely underlain by quaternary deposits, including:

- the Paso Robles Formation (Qtp);
- modern alluvial gravel and sand deposits of stream channel (Qg) underlying the Salinas River, Huer Huero Creek, and Dry Creek;

- undifferentiated early to late Pleistocene alluvial deposits (Qoa); and
- undifferentiated latest Pleistocene to Holocene alluvial gravel and sand of valley areas (Qa).

Bedrock beneath the alluvial sediments is mapped as the Paso Robles Formation (Qtp). The Paso Robles Formation is a Plio-Pleistocene, predominantly non-marine geologic unit comprised of relatively thin, often discontinuous sand and gravel layers interbedded with thicker layers of silt and clay. The formation was deposited in alluvial fan, flood plain, and lake depositional environments. Seashells are reported in some well logs near the base of the formation, suggesting a near-shore marine depositional environment. The formation is unconsolidated, generally poorly sorted, and not usually intensely deformed. The sand and gravel beds within the unit have a high percentage of Monterey shale gravel (California Department of Water Resources [DWR] 2016a,b). The Paso Robles Formation is less coarse and less permeable than other alluvium.

Alluvial deposits occur beneath the flood plains of the rivers and streams in the area. These deposits reach a depth of about 100 feet below ground surface (bgs) or less and are typically comprised of coarse sand and gravel. The alluvium is generally much coarser than the Paso Robles Formation sediments, resulting in higher permeability (DWR 2016a,b).

### *Soils*

Soils are comprised of particles known as sand, silt, and clay, where a loamy soil is considered an equal balance of all components. Soil types provide background for engineering constraints, such as erosion and runoff potential, corrosion risks, and various behaviors that effect structures, such as expansion and settlement. Soils that are primarily sandy are porous with less fine particulate matter embedded between sand grains. These sandy soils are less stable and more susceptible to seismic hazards, such as liquefaction and erosion. Soils that are dominated by clay are close-textured but can be expansive, or susceptible to shrinking and swelling, which can lift or settle during rain events and cause damage to structures. Lastly, soils overlaying steep slopes or soft alluvial geologic structures are more susceptible to instability, such as landslides (NEET West and PG&E 2017).

Geotechnical investigations were conducted for the Estrella Substation and the proposed 70 kV power line alignments (refer to Appendix L and M of the PEA)[1], which identified and evaluated the types of soils underlying the Proposed Project components. The geotechnical investigation involved soil drill boring to depths between 30 to 45 feet, and bedrock was not encountered at any of the boring sites drilled. Soil borings at the Estrella Substation site encountered native soils approximately 8 to 12 inches beneath the topsoil. Native soils consisted of soft to hard lean clays and very loose to very dense sand soils. Soils encountered during the investigations along the 70 kV power line route and reconductoring segment generally consisted of medium dense to dense clayey sand, silty sand, and poorly graded sand with variable quantities of fine gravel. Sandy soils close to the Huer Huero Creek channel on the 70 kV power line route tended to be

[1] Appendices of the PEA can be accessed at https://www.cpuc.ca.gov/environment/info/horizonh2o/estrella/docs/Revised_PEAAppendicesOnly_May2017.pdf

less dense than other alluvial soils. Soils along the reconductoring segment were underlain by stiff to hard lean clay and sandy lean clay (NEET West and PG&E 2017).

Overall, approximately 50 percent of proposed Estrella Substation site and approximately 53 percent of the proposed 70 kV power line route are comprised of Arbuckle or Arbuckle complex soils (Arbuckle-Positas or Arbuckle-San Ysidro). The next most prevalent soil assemblage is Nacimiento complex soils, which make up approximately 50 percent of the Estrella Substation site (Nacimiento-Los Osos) and approximately 19 percent of the 70 kV power line route (Nacimiento-Ayar and Nacimiento-Los Osos). Handford and Greenfield soils make up approximately 9 percent of the 70 kV power line route, with the remaining 19 percent of the power line route comprised of several other soils (NEET West and PG&E 2017). The most common soil complexes in the area of the Proposed Project and alternatives as a whole are Arbuckle-San Ysidro, Nacimiento-Los Osos, Arbuckle-Positas, and Linne-Calodo (U.S. Department of Agriculture, Natural Resources Conservation Service [NRCS] 2020). Table 4.7-1 provides the primary characteristics of soil types found in the Proposed Project, reasonably foreseeable distribution components, and alternatives vicinity.

### Table 4.7-1. Soil Types and Characteristics

| Soil Type | Characteristics |
|---|---|
| Arbuckle | Very deep, well-drained, sandy loam formed in alluvial materials from mainly conglomerate and metasedimentary rocks occurring on low terraces. |
| Positas | Deep and very deep, moderately well-drained, gravelly loam formed in alluvial material from mixed rock sources typically occurring on stream terraces. |
| San Ysidro | Deep, moderately well-drained, fine sandy loam that are formed in alluvium from sedimentary rocks occurring on old, low terraces. |
| Nacimiento | Moderately deep, well-drained, silty clay loam formed in material weathered from calcareous shale and sandstone occurring on rolling uplands. |
| Los Osos | Moderately deep, well-drained loam that formed in material weathered from sandstone and shale occurring on uplands. |
| Diablo | Typically, well-drained, silty clay formed from weathered shale, sandstone, and consolidated sediments with minor areas of material containing volcanic ash typically occurring on rolling to steep uplands. |
| Ayar | Deep or very deep, well-drained, silty clay formed from weathered, decomposed alkaline shale and sandstone material often associated with rolling hills. |

| Soil Type | Characteristics |
|---|---|
| Balcom | Moderately deep and well-drained loam formed from soft, calcareous shale and sandstone substrates typically occurring on hills. |
| Calleguas | Typically, shallow, well-drained, clay loam occurring on exposed and eroded upland slopes and hills and primarily formed from weathered sedimentary rock. |
| Hanford | Typically, very deep, well-drained, fine sandy loam formed from moderately coarse alluvium dominated by weathered granitic material, and are found on stream bottoms, floodplains and in alluvial fans. |
| Greenfield | Deep, well-drained, coarse sandy loam formed from alluvium materials derived from granitic and mixed rock sources occurring in alluvial fans and terraces. |
| Linne | Moderately deep, well-drained, clay loam that consist largely of weathered soft shale and sandstone materials and typically on mountainous uplands and foothills. |
| Calodo | Shallow, well-drained, clay loam that consist of calcareous shale and sandstone material occurring in uplands. |
| Metz | Very deep, excessively drained, fine sandy loam that consist of alluvial material derived primarily from sedimentary rock and some other mixed rock material occurring in floodplains and alluvial fans. |
| Sesame | Moderately deep, well-drained, sandy loam formed from weathered granitic, quartz diorite, gabbrodiorite and metamorphic rocks often found in foothills and mountainous uplands. |
| Xerofluvents | Somewhat excessively drained soils that occur in floodplains and are often comprised of sand, stratified gravel, sandy loam, and gravelly loam materials. |
| Riverwash | Occur in river channels and are comprised entirely of sandy material. |

*Source: NEET West and PG&E 2017*

### *Seismicity*

Seismicity refers to the occurrence and frequency of earthquakes in a region. An earthquake is a sudden and violent shaking of the ground as a result of movements within the earth's crust or volcanic action. One of the primary causes of earthquakes is the collision of tectonic plates, which occurs at the location of faults. Earthquake damage generally occurs in two ways: ground shaking and surface rupture. Seismically-induced ground shaking covers a wide area and is greatly influenced by the distance of the site to the seismic source, soil conditions, and depth to groundwater. Surface rupture is limited to the area very near the fault. Other seismic hazards include earthquake-triggered landslides and tsunamis (NEET West and PG&E 2017).

## Faults

As described in Section 4.7.2, the Alquist-Priolo Act requires the establishment of "Earthquake Fault Zones" along known active faults in California. A fault is considered active if it has generated earthquakes accompanied by surface rupture during historic time (approximately the last 200 years) or has shown evidence of fault displacement during the Holocene period (approximately the last 11,000 years) (Bryant and Hart 2007). A fault is considered potentially active if there is evidence of fault displacement during the Quaternary period (approximately the last 1.6 million years). A fault is considered inactive if the most recent documented fault displacement pre-dates the Quaternary period.

The major fault zones in the region include the San Andreas Fault, Rinconada Fault, Huerhuero Fault, and Oceanic Fault, each of which is described further below. The structural trend in the region is northwest to southeast, controlled mainly by the San Andreas Fault. Most of the faults within San Luis Obispo County have not been active in recent geologic times. Figure 4.7-2 shows a regional map of fault zones within the vicinity of the Proposed Project, reasonably foreseeable distribution components, and alternatives. As shown on Figure 4.7-2, only the Rinconada Fault and the Huer Huero Fault occur in relative proximity to the Proposed Project, reasonably foreseeable distribution components, or alternatives.

### *San Andreas Fault*

The San Andreas Fault zone is located approximately 18 miles east of the Proposed Project near Cholame and is the primary surface boundary between the Pacific and North American plates. There have been numerous historic earthquakes along the San Andreas Fault, and it is generally considered to pose the greatest earthquake risk to California. In the Paso Robles area, most earthquakes detected have originated from movement along the San Andreas Fault and it is the primary source of potential ground shaking in the area (City of Paso Robles 2003). The highest recorded magnitude earthquake on the San Andreas Fault in San Luis Obispo County was a magnitude 6.0 earthquake recorded near Shandon, CA, located approximately 17 miles east of Paso Robles, in 2004 (USGS 2020). The 2002 Probabilistic Seismic Hazard Assessment deemed this fault capable of a magnitude 7.4 earthquake, while the recent third Uniform California Earthquake Rupture Forecast ("UCERF3") report estimates an earthquake with a magnitude greater than 8.0 has a 7 percent likelihood to occur between 2014 and 2044 (Cao et al 2003, Field and WGCEP 2014).

### *Rinconada Fault*

The Rinconada Fault is located approximately 0.4 mile southwest of the Proposed Project's 70 kV power line reconductoring segment. The Rinconada Fault also parallels the majority of the Alternative SE-PLR-2 route and crosses the Alternative SE-PLR-2 alignment near the intersection of El Pomar Road and South River Road. Although definitive geologic evidence of Holocene surface rupture has not been found on the Rinconada Fault, it was regarded as an earthquake source for the California Geological Survey (CGS) Probabilistic Seismic Hazards Assessment (PSHA) because of the postulated slip rate of 1±1 mm per year, and the calculated maximum magnitude of 7.3 (Rosenberg et al. 2009). Based on the quaternary age of the Rinconada Fault, it is considered potentially active.

### *Huer Huero Fault*

The Huer Huero Fault is located approximately 1.2 miles south of the Proposed Project 70 kV power line in the area of Union Road. The fault trends in a northwest direction along Huer Huero Creek south of SR 46. The fault is a possible extension of the potentially active La Panza Fault, located about 12 miles southeast of Paso Robles, near Creston. The Huer Huero Fault is inactive and is classified as an "undivided Quaternary fault"—a fault that has evidence of displacement in the last 1.6 million years (NEET West and PG&E 2017).

### *Oceanic Fault*

The Oceanic Fault zone lies offshore and in the Santa Lucia Mountains in coastal Central California, north of Cambria near Hearst Castle. The Oceanic Fault is part of a fault system that stretches from Vandenberg Air Force Base in the south to the Golden Gate Bridge in the north. This fault zone was the source of the San Simeon earthquake, which occurred on December 22, 2003.

## Ground Shaking

Seismic ground shaking is controlled by the earthquake magnitude, duration, and distance from the source. Ground conditions also influence impacts from strong ground motions. Seismic waves attenuate with distance from their sources, so estimated bedrock accelerations are highest in areas closest to the source. Local soil conditions may amplify or dampen seismic waves as they travel from the underlying bedrock to the ground surface. Ground shaking can be described in terms of acceleration, velocity, and displacement of the ground (NEET West and PG&E 2017).

As described in the PEA, the Applicants calculated potential ground shaking at the proposed Estrella Substation site and at Paso Robles Substation. Table 4.7-2 shows the peak ground acceleration values in the area of the Proposed Project. For reference, USGS's instrumental intensity scale is also provided.

**Table 4.7-2. Peak Ground Acceleration and Instrumental Intensity Scale**

| Peak Ground Acceleration | Firm Rock | Soft Rock | Alluvium |
|---|---|---|---|
| Paso Robles Substation | 0.301 g | 0.324 g | 0.345 g |
| Estrella Substation | 0.325 g | 0.324 g | 0.369 g |

| Instrumental Intensity | Peak Velocity (cm/s) | Peak Ground Acceleration (g) | Perceived Shaking | Potential Damage |
|---|---|---|---|---|
| I | <0.02 | <0.0005 | Not Felt | None |
| II-III | 0.1 | 0.003 | Weak | None |
| IV | 1.4 | 0.028 | Light | None |
| V | 4.7 | 0.062 | Moderate | Very Light |
| VI | 9.6 | 0.12 | Strong | Light |

| Instrumental Intensity | Peak Velocity (cm/s) | Peak Ground Acceleration (g) | Perceived Shaking | Potential Damage |
|---|---|---|---|---|
| VII | 20 | 0.22 | Very Strong | Moderate |
| VIII | 41 | 0.40 | Severe | Moderate/Heavy |
| IX | 86 | 0.75 | Violent | Heavy |
| X+ | >178 | 1.39 | Extreme | Very Heavy |

Notes: cm/s = centimeters per second; g = force of gravity

*Source: NEET WEST and PG&E 2017; USGS 2020*

### *Landslide and Slope Failure*

A landslide is a mass of rock, soil, or debris that has been displaced downslope by sliding, flowing, or falling. Landslides and slope instability can occur as a result of wet weather, weak soils, improper grading, improper drainage, steep slopes, adverse geologic structure, earthquakes, or a combination of these factors. Landslides can result in damage to property and cause buildings to become unsafe either due to distress or collapse during sudden or gradual slope movement. Structures constructed in steep terrain, possibly on stable ground, may also experience landslide hazards if they are sited in the path of potential mud flows or rockfall hazards (NEET West and PG&E 2017).

The Salinian domain, underlying the Proposed Project, reasonably foreseeable distribution components, and alternatives, has landslide potential in hillsides of moderate to steep slopes that have experienced large to moderate size landslides. The Proposed Project topography ranges from relatively flat (0 to 1 percent slope) to relatively steep (greater than 50 percent slopes), with steepest grades generally occurring along the east bank of the Salinas River, along North and South River Road (i.e., along the reconductoring segments for the Proposed Project and Alternatives PLR-1A and PLR-1C, and along Alternative SE-PLR-2). Although City of Paso Robles General Plan maps indicate that the Proposed Project is located in areas of low and moderate landslide risk (City of Paso Robles 2003), the County of San Luis Obispo General Plan identifies areas of high-risk potential (County of San Luis Obispo 2006).

Figure 4.7-3 shows landslide potential in the vicinity of the Proposed Project, reasonably foreseeable distribution components, and alternatives based on the County of San Luis Obispo’s data. As shown in Figure 4.7-3, the proposed Estrella Substation is located in an area of low landslide potential, while the proposed new 70 kV power line segment generally crosses areas of high landslide potential west of Huer Huero Creek. Much of the length of the reconductoring segment is identified as not having high landslide potential.

Of the alternatives under consideration, Alternative SS-1 is located on an area of low landslide potential, while Alternative SE-1A is located on an area with high landslide potential. Alternatives PLR-1A, PLR-1C, and SE-PLR-2 all traverse areas of low, moderate, and high potential for landslides. Example FTM Sites 5 and 6 are located in high landslide potential areas, while the remainder of the example FTM sites are located in areas of low or moderate landslide potential.

### *Subsidence, Erosion, & Liquefaction*

Subsidence is defined as the downward displacement (or lowering) of a large portion of land. Subsidence may occur through compaction of loose, compressive soils, primarily as a result of excessive groundwater withdrawal or also due to seismic ground-shaking. Alluvial deposits along the Salinas River and their tributaries have a history of water well use and heavy groundwater extraction, and the region surrounding the Proposed Project, reasonably foreseeable distribution components, and alternatives sites primarily relies upon groundwater wells for both urban and agricultural uses. In general, soils susceptible to hydrocompaction are geologically immature soils that have high void ratios and low densities (NEET West and PG&E 2017).

Erosion is the process by which rocks, soil, and other land materials are abraded or worn away from the Earth's surface over time. The rate of erosion depends on many factors, including soil type and geologic parent materials, slope and placement of soils, and human activity. The potential for erosion is highest in loose, unconsolidated soils. Other factors, such as the steepness of slopes and absence of vegetation, may increase the natural rates of erosion. In general, erosion potential is highest in steep, unvegetated areas, especially those disturbed by grading or other construction activities (NEET West and PG&E 2017).

The Salinian domain, which underlies the Proposed Project, reasonably foreseeable distribution components, and alternative sites, is subject to liquefaction or seismic-related settlement of alluvium in low-lying areas. Liquefaction is a phenomenon in which saturated, cohesionless soils, such as sand and silt, temporarily lose their strength and liquefy when subjected to dynamic forces, such as intense and prolonged ground shaking. The vast majority of liquefaction hazards are associated with sandy and silty soils of low plasticity (CGS 2008). As shown in Figure 4.7-4, the Proposed Project, reasonably foreseeable distribution components, and alternatives are primarily located in mapped areas of low potential for liquefaction. Areas of high risk for liquefaction in the region are primarily along rivers and streams, such as Estrella River, Huer Huero Creek, and Salinas River.

*This page intentionally left blank.*

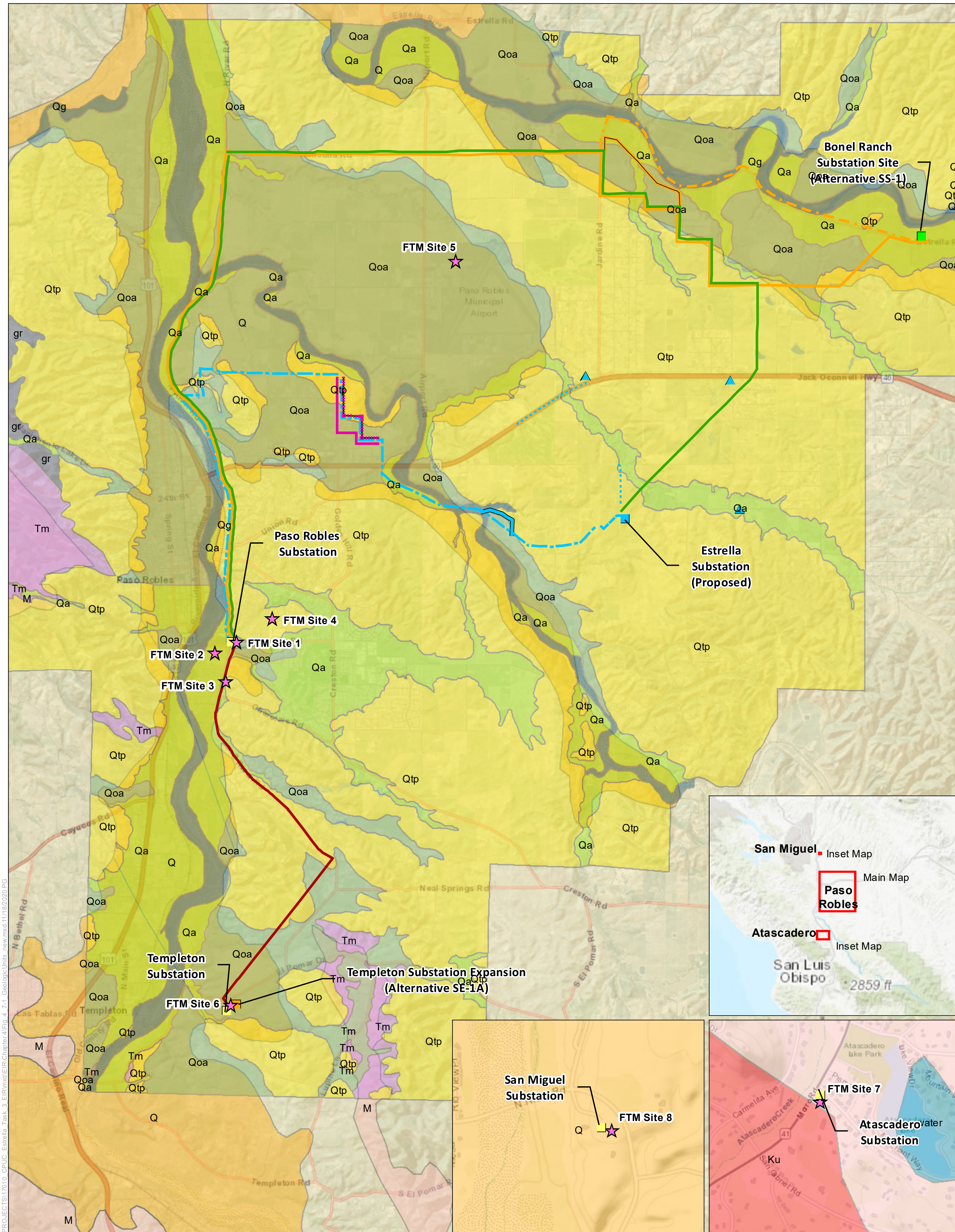



**Figure 4.7-1**
Geologic Units

**Proposed Project**
- Estrella Substation
- 70kV Route
- 70 kV Minor Route Variation 1

**Reasonably Forseeable Distribution Components**
- New Distribution Line Segments
- Additional 21/12 kV Pad-Mounted Transformer

**Existing Infrastructure**
- Existing Substations

**Project Alternatives**
- Front-of-the-Meter (FTM) Battery Storage Sites (Alternative BS-2)
- Alternative SS-1: Bonel Ranch Substation Site
- Alternative SE-1A: Templeton Substation Expansion - 230/70 kV Substation
- Alternative PLR-1A: Estrella Route to Estrella Substation
- Alternative PLR-1C: Estrella Route to Bonel Ranch, Option 1
- Alternative PLR-1C: Minor Route Variation 1
- Alternative PLR-1C: Minor Route Variation 2
- Alternative PLR-3A: Strategic Undergrounding, Option 1
- Alternative PLR-3B: Strategic Undergrounding, Option 2
- Alternative SE-PLR-2: Templeton-Paso South River Road Route

**Geologic Units**
- Qa - Surficial sediments (valley areas)
- Qg - Surficial sediments (stream channels)
- Qoa - Older surficial sediments
- Qtp - Paso Robles Formation
- Tm - Tertiary marine
- gr - Mesozoic granitic rocks
- Q - Pliocene to Holocene alluvium
- Ku - Late Cretaceous sandstone
- M - Oligocene to Pilocene sandstone
- water

N

0 1
Miles

Horizon
WATER and ENVIRONMENT

Source: ESRI 2018, PG&E 2019, SCWA 2017, CDOC 2019

Note: The route variations shown are offset and simplified in order to display the alignments of the alternative routes that may overlap in places

Estrella Substation and
Paso Robles Area Reinforcement Project

*This page intentionally left blank.*

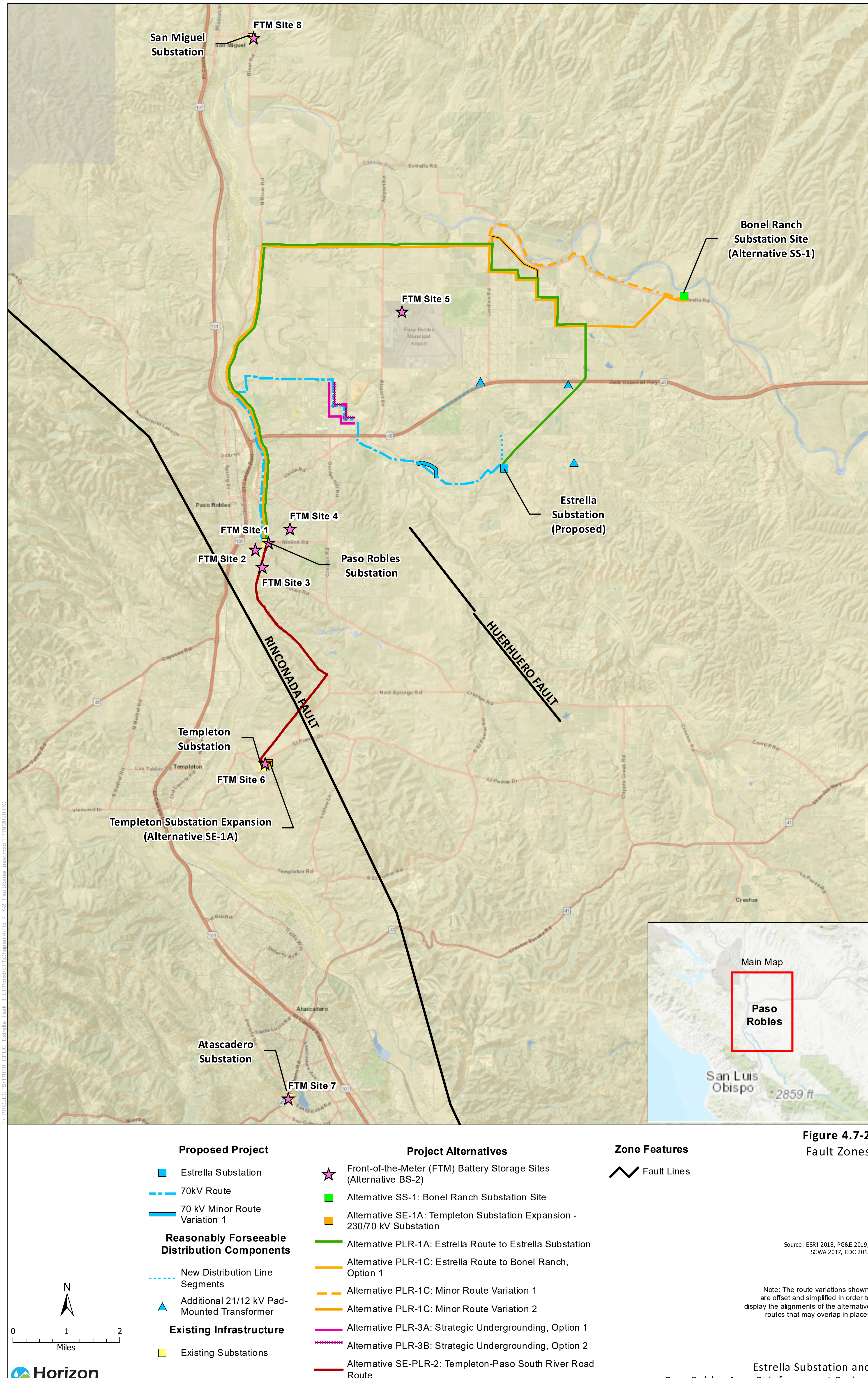
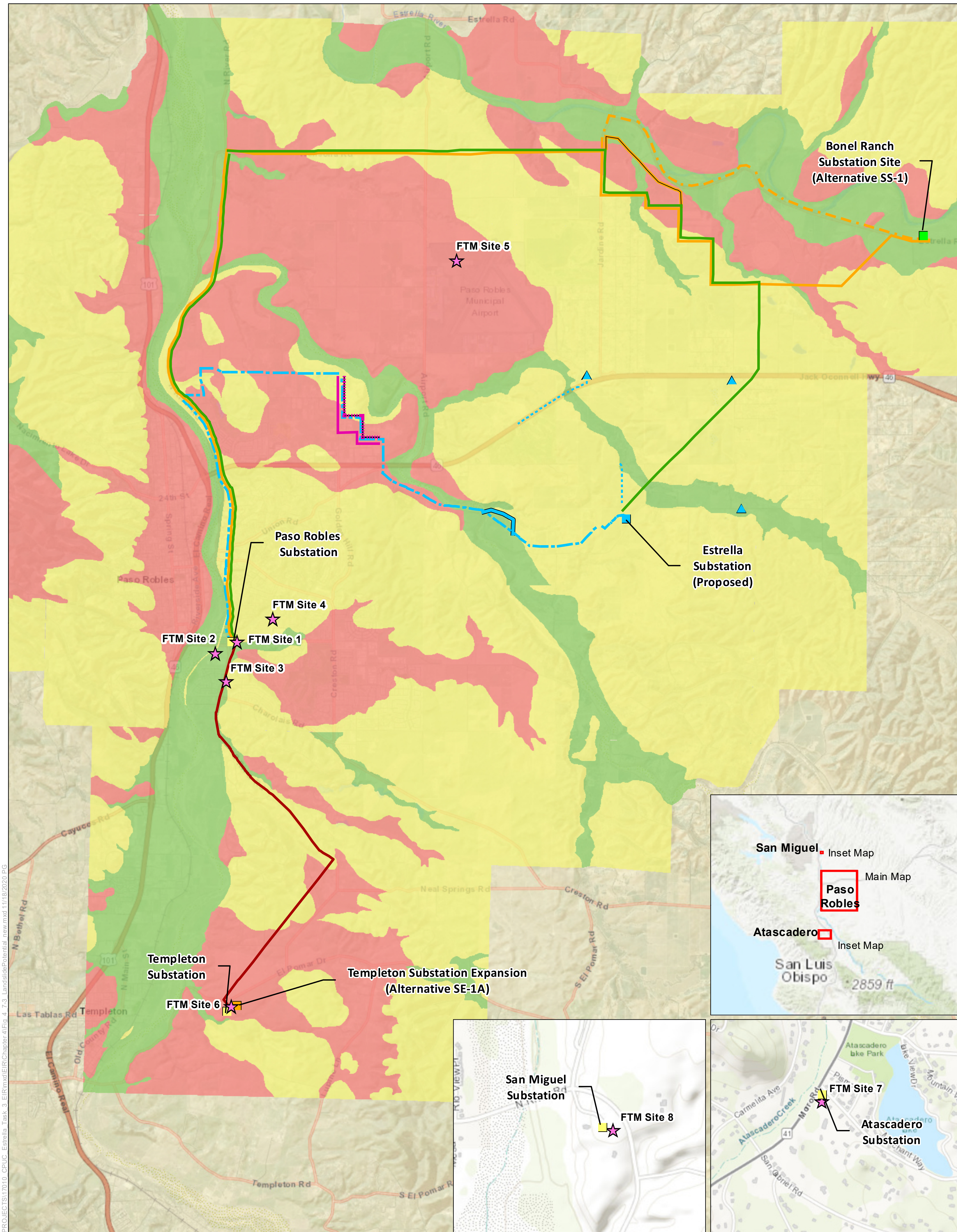



Figure 4.7-2
Fault Zones

*This page intentionally left blank.*




**Proposed Project**

- Estrella Substation
- 70kV Route
- 70 kV Minor Route Variation 1

**Reasonably Forseeable Distribution Components**

- New Distribution Line Segments
- Additional 21/12 kV Pad-Mounted Transformer

**Existing Infrastructure**

- Existing Substations

**Project Alternatives**

- Front-of-the-Meter (FTM) Battery Storage Sites (Alternative BS-2)
- Alternative SS-1: Bonel Ranch Substation Site
- Alternative SE-1A: Templeton Substation Expansion - 230/70 kV Substation
- Alternative PLR-1A: Estrella Route to Estrella Substation
- Alternative PLR-1C: Estrella Route to Bonel Ranch, Option 1
- Alternative PLR-1C: Minor Route Variation 1
- Alternative PLR-1C: Minor Route Variation 2
- Alternative PLR-3A: Strategic Undergrounding, Option 1
- Alternative PLR-3B: Strategic Undergrounding, Option 2
- Alternative SE-PLR-2: Templeton-Paso South River Road Route

**Landslide Potential***

- High Potential
- Moderate Potential
- Low Potential

*A portion of this layer was digitized from SLO County Planning Department Figures and is only approximate.

N

0 1
Miles

Horizon
WATER and ENVIRONMENT

**Figure 4.7-3**
Landslide Potential

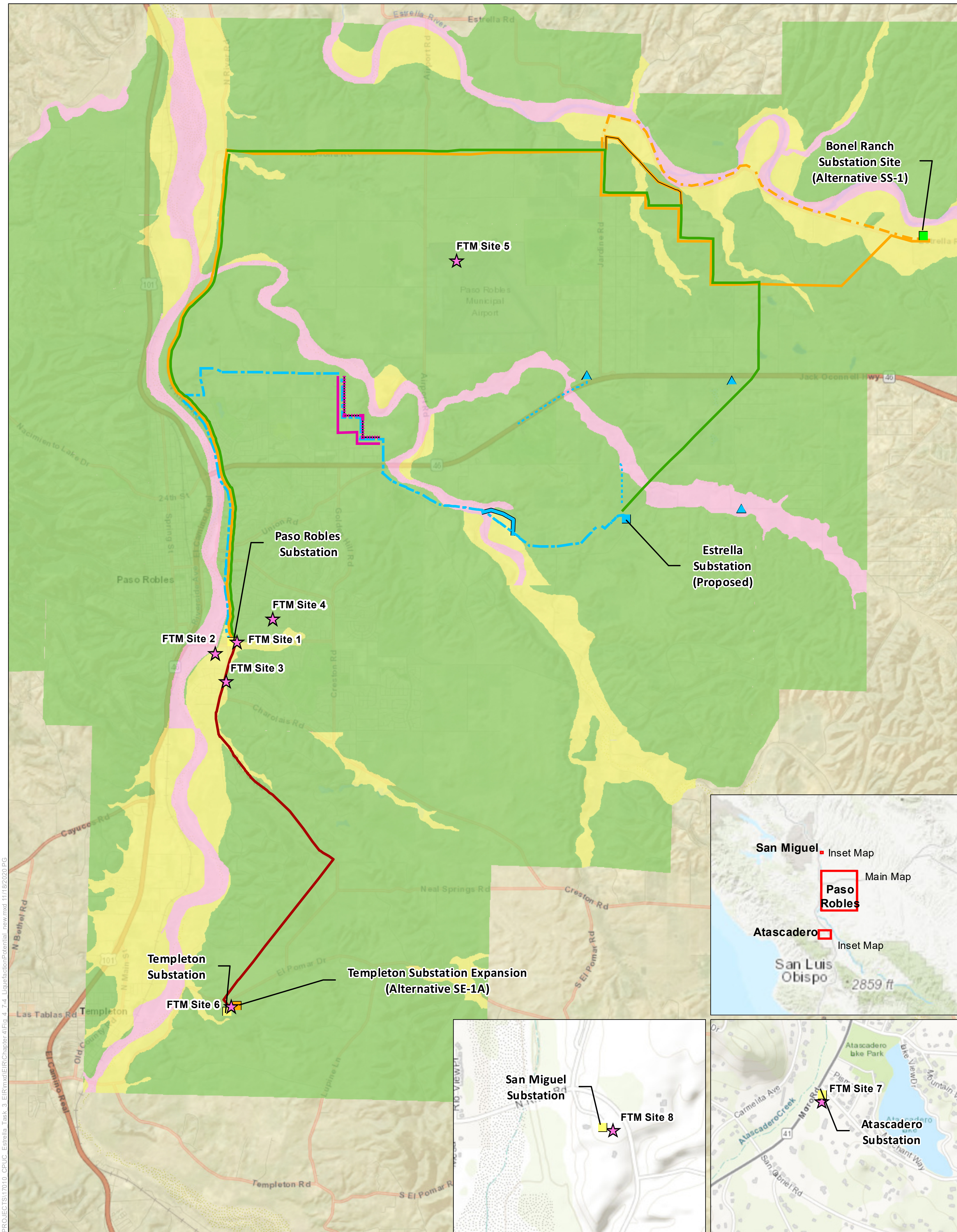
Source: ESRI 2018, SCWA 2017, and CDOC 2019, SLO County Planning and Building Department 2013

Note: The route variations shown are offset and simplified in order to display the alignments of the alternative routes that may overlap in places

Estrella Substation and
Paso Robles Area Reinforcement Project

T:_PROJECTS\17010_CPUC_Estrella_Task_3_EIR\mxd\EIR\Chapter4\Fig_4_7-3_LandslidePotential_new.mxd 11/18/2020 PG

*This page intentionally left blank.*




## Proposed Project

Estrella Substation

## Existing Infrastructure

Existing Substations

70kV Route

## Reasonably Forseeable Distribution Components

New Distribution Line Segments

70 kV Minor Route Variation 1

Additional 21/12 kV Pad-Mounted Transformer

## Project Alternatives

Front-of-the-Meter (FTM) Battery Storage Sites (Alternative BS-2)

Alternative SS-1: Bonel Ranch Substation Site

Alternative SE-1A: Templeton Substation Expansion - 230/70 kV Substation

Alternative PLR-1A: Estrella Route to Estrella Substation

Alternative PLR-1C: Estrella Route to Bonel Ranch, Option 1

Alternative PLR-1C: Minor Route Variation 1

Alternative PLR-1C: Minor Route Variation 2

Alternative PLR-3A: Strategic Undergrounding, Option 1

Alternative PLR-3B: Strategic Undergrounding, Option 2

Alternative SE-PLR-2: Templeton-Paso South River Road Route

## Public Facilities

High Potential

Moderate Potential

Low Potential

*A portion of this layer was digitized from SLO County Planning Department Figures and is only approximate.

N

0 1

Miles

Horizon WATER and ENVIRONMENT

**Figure 4.7-4**

Liquefaction Potential

Source: ESRI 2018, SCWA 2017, and CDOC 2019, SLO County Planning and Building Department 2013

Note: The route variations shown are offset and simplified in order to display the alignments of the alternative routes that may overlap in places

Estrella Substation and Paso Robles Area Reinforcement Project

*This page intentionally left blank.*

## Paleontological Resources

Paleontological resources include fossil remains, as well as fossil localities and rock or soil formations that have produced fossil material. Fossils, which are the remains or traces of prehistoric animals and plants, are important scientific and educational resources because of their use in:

(1) documenting the presence and evolutionary history of particular groups of now-extinct organisms;

(2) reconstructing the environments in which these organisms lived; and

(3) determining the relative ages of the strata in which they occur, as well as the relative ages of the geologic events that resulted in the deposition of the sediments that formed these strata and in their subsequent deformation.

The potential for paleontological resources to be present on or beneath a given site depends on the type of rock formation/substrate, as well as whether any documented fossil localities are on or near the site. Paleontological resource surveys were conducted by the Applicants for the Proposed Project and Alternatives PLR-1A/PLR-1C, SE-1A, and SE-PLR-2 and the results of these surveys are described below. Surveys were not conducted for the reasonably foreseeable distribution components, Alternative SS-1, or the example FTM sites under Alternative BS-2.

### *Paleontological Resources in the Proposed Project Area*

As described above, and depicted on Figure 4.7-1, the proposed Estrella Substation is underlain by the Paso Robles Formation (Qtp), while the proposed 70 kV power line route is underlain by four geologic units: Holocene alluvial gravel, sand, and clay (Qa); Holocene stream alluvial sand and gravel (Qg); Pleistocene older alluvial sediments (Qoa); and Pleistocene to latest Pliocene Paso Robles Formation (Qtp) (NEET West and PG&E 2017). The Holocene-aged alluvium would be considered too young to preserve fossils.

Field inspections at the substation site did not discover any paleontological resources or any paleontologically sensitive geologic formations on the ground surface within the substation footprint. This area, as well as much of the proposed 70 kV power line route, is nearly completely covered by agricultural and residential development and geologic features were generally not observable at the surface during walking surveys of the Proposed Project area. Surveyors were able to gather basic information about the subsurface geology along roadcuts and streambeds in the study area. In general, at these locations, non-sensitive geologic units, such as the Holocene alluvium (Qa) and surface soils ranging in thickness up to 6 feet was observed. These observations were generally consistent with the geotechnical data from the borings taken during the Proposed Project geotechnical investigations (refer to Appendices L and M of the PEA).

Literature and museum records searches were also conducted as part of the paleontological resources survey and, together with the results of the ground survey, allowed for the geologic units in the Proposed Project area to be assigned Potential Fossil Yield Classifications (PFYCs), which are shown in Table 4.7-3.

**Table 4.7-3. Paleontological Sensitivity of Geologic Units in the Proposed Project Area**

| Geologic Unit | Age | Potential Fossil Yield Classification | Location in the Proposed Project Area |
|---|---|---|---|
| Alluvial gravel, sand, and clay (Qa) | Holocene (0.01 Ma – present) | Low – Class 2 | Exposures along the central portion of the 70 kV power line route, from SR 46 south paralleling Union Road and Huer Huero Creek. |
| Stream alluvial gravel and sand (Qg) | Holocene (0.01 Ma – present) | Low – Class 2 | Exposure in the streambed paralleling Union Road and Huer Huero Creek from Kit Fox Lane to the sharp southern turn in Union Road. |
| Quaternary older alluvium (Qoa) | Pleistocene (2.6 – 0.01 Ma) | High – Class 4b | Sediments occur primarily in the northern portion of the 70 kV power line route, with a small occurrence in the southeastern portion along Huer Huero Creek. |
| Paso Robles formation (Qtp) | Pleistocene (3.6 – 2.6 Ma) | High – Class 4b | Outcrops in the northern portion of the 70 kV power line route near its start at River Road and near the termination of Buena Vista Drive; the majority of the southwestern end of the 70 kV power line route. |

Notes: kV = kilovolt; Ma = million years ago

*Source: NEET WEST and PG&E 2017*

## *Paleontological Resources Within or Adjacent to Alternative Sites*

### Alternatives PLR-1A/PLR-1C: Estrella Route Variations

A paleontological resources study (PG&E 2017) was undertaken for the Estrella Route, originally conceived of in the PEA, which is identical to the Alternative PLR-1A route considered in this DEIR. Much of the Alternative PLR-1C route also is covered by the previously completed paleontological resources study, although a portion of the Alternative PLR-1C route is not covered by the study (i.e., where the Alternative PLR-1C route diverges from the Alternative PLR-1A route towards the Bonel Ranch Substation Site).

As described in the Estrella Route Paleontological Resources Technical Report (PRTR) (PG&E 2017), geological mapping indicates that the area surrounding the Estrella Route is underlain by three geologic units: Quaternary valley alluvial sands (Holocene [0.01 Ma]), Quaternary older alluvial sediments (Pleistocene [0.01 – 2.6 Ma]), and the Pleistocene to latest Pliocene Paso Robles formation (2.6 – 3.6 Ma). Museum collections records indicate no previously recorded fossil localities exist within the footprint of the Estrella Route; however, one locality is within a 1-mile radius of the alignment and seven fossil localities have been recorded within a 15-mile radius (PG&E 2017). No paleontological resources were identified during a field inspection of the Estrella Route. Based on the literature and museum record searches and the field survey, paleontological sensitivity for the alternative alignment was identified, as shown in Table 4.7-4.

**Table 4.7-4. Paleontological Sensitivity of Geologic Units in the Vicinity of the Estrella Route**

| Geologic Unit | Age | Potential Fossil Yield Classification | Location in the Alternative Route Vicinity |
|---|---|---|---|
| Alluvial gravel, sand, and clay (Qa) | Holocene (0.01 Ma – present) | Low – Class 2 | Sediments occur at the northwest terminus at North River Road, in the northwest portion near where the route crosses Jardine Road, and in the southern portion, near the route terminus where the route crosses the dry streambed. |
| Quaternary older alluvium (Qoa) | Pleistocene (2.6 – 0.01 Ma) | High – Class 4b | Sediments occur along the northwestern portion of the route for roughly 1 mile before the end of the route and in the northeastern portion of the route where the route stair-steps south. |
| Paso Robles formation (Qtp) | Pleistocene (3.6 – 2.6 Ma) | High – Class 4b | Sediments occur in the majority of the northern portion of the route and the majority of the eastern and southern portions. |

Notes: Ma = million years ago

*Source: PG&E 2017*

### Alternative SE-1A: Templeton Substation Expansion – 230/70 kV Substation

As described in the PRTR for Alternative SE-1A (NEET West 2019), geologic mapping indicates that the Alternative SE-1A site is underlain by Pleistocene-aged older alluvium. Paso Robles Formation may occur in the subsurface underlying this older alluvium. Museum collections searches indicate no records of fossil localities within the alternative site, although six fossil localities have been recorded within a 15-mile radius of the alternative substation site, the nearest being in a wash off Dry Canyon between State Route 46 and Union Road (less than 1 mile away). All six fossil localities occur in either older alluvium or the Monterey Formation, which does not occur at the surface in the Alternative SE-1A area (NEET West 2019). No fossils were discovered during the field investigation of the Alternative SE-1A site. Based on the literature and museum records searches, paleontological sensitivity for geologic units underlying the site were identified, as shown in Table 4.7-5.

**Table 4.7-5. Paleontological Sensitivity of Geologic Units in the Vicinity of the Templeton Substation Expansion Site**

| Geologic Unit | Age | Potential Fossil Yield Classification | Presence in Alternative Site |
|---|---|---|---|
| Quaternary older alluvium (Qoa) | Pleistocene (2.6 – 0.01 Ma) | High – Class 4 | Surface. |
| Paso Robles formation (Qtp) | Pleistocene-late Pliocene (3.6 – 2.6 Ma) | High – Class 4 | Subsurface. |

Notes: Ma = Million years ago

*Source: NEET West 2019*

### Alternative SE-PLR-2 Templeton-Paso South River Road Route

As described in the PRTR (PG&E 2019) for the Templeton Route Alternatives (one of which is Alternative SE-PLR-2), geologic mapping indicates that the Templeton Route Alternatives traverse Holocene-aged younger alluvium (Qa), Pleistocene-aged older alluvium (Qoa), and the Pliocene/Pleistocene-aged Paso Robles Formation (Qtp). Additionally, Miocene-aged Monterey Formation (Tm) may be present in the subsurface of the alternative power line alignments. Literature searches identified 10 fossil localities that have been recorded within a 15-mile radius of the Templeton Route Alternatives, although none are located within the Alternative SE-PLR-2 alignment. All 10 fossil localities occur in either older alluvium (Qoa) or the Monterey Formation, which does not occur at the surface of the Alternative SE-PLR-2 route (PG&E 2019). No fossils were identified during field surveys of the Templeton Route Alternatives. Based on the literature and museum records searches, paleontological sensitivity for geologic units underlying the Templeton Route Alternatives were identified, as shown in Table 4.7-6.

**Table 4.7-6. Paleontological Sensitivity of Geologic Units in the Vicinity of the Templeton Route Alternatives**

| Geologic Unit | Age | Potential Fossil Yield Classification | Occurrence along Alternative Routes |
|---|---|---|---|
| Alluvial gravel, sand, and clay (Qa) | Recent – early Holocene (0.01 Ma) | Low – Class 2 | Surface. |
| Quaternary older alluvium (Qoa) | Pleistocene (2.6 – 0.01 Ma) | High – Class 4 | Surface and subsurface. |
| Paso Robles formation (Qtp) | Pleistocene-late Pliocene | High – Class 4 | Surface and subsurface. |

| Geologic Unit | Age | Potential Fossil Yield Classification | Occurrence along Alternative Routes |
|---|---|---|---|
| | (3.6 Ma – 2.6 Ma) | | |
| Monterey Formation (Tm) | Late Miocene (15 – 3 Ma) | High – Class 4 | Subsurface. |

Notes: Ma = Million years ago

*Source: PG&E 2019*

## 4.7.4 Impact Analysis

### Methodology

The evaluation of impacts was qualitative in nature and considered whether and how construction and operation of the Proposed Project, reasonably foreseeable distribution components, and alternatives could directly or indirectly affect geology, soils, seismicity, and paleontological resources, as determined by the CEQA Guidelines Appendix G significance criteria. As described further below, the impact analysis also took into account the California Supreme Court decision, *California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369 ("*CBIA v. BAAQMD*") that has bearing on the analysis of geology, soils, seismicity, and paleontological resources impacts.

### Criteria for Determining Significance

Based on Appendix G of the CEQA Guidelines, the Proposed Project, reasonably foreseeable distribution components, or alternatives would have a significant effect related to geology, soils, seismicity, and paleontological resources if they would meet any of the following conditions:

A. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

    i. rupture of a known earthquake fault;
    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 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 in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect 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 disposal of wastewater; or

F. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

The analysis takes into account the 2015 California Supreme Court's holding in *CBIA v. BAAQMD* that CEQA does not generally operate "in reverse." That is, CEQA generally does not require analysis of the impact of the existing environmental conditions on future users or residents of a proposed project. The Court determined, "it is the *project*'s impact on the environment – and not the *environment's* impact on the project – that compels an evaluation of how future residents or users could be affected by exacerbated conditions." (*Id*. at p. 377.) Evaluating "the environment's effects *on* a project… would impermissibly expand the scope of CEQA." (Id. at p. 387.) Thus, the court determined, "when a proposed project risks exacerbating those environmental hazards or conditions that already exist, an agency must analyze the potential impact of such hazards on future residents or users." (*Id.* at p. 377.)

In applying *CBIA's* holding with respect to geology, soils, seismicity, and paleontological resources, a proposed project that places structures or people in areas subject to geological hazards would only result in significant impacts if it were to exacerbate these existing geological hazards or conditions. Therefore, the impacts analyses below focus on the extent to which the Proposed Project, reasonably foreseeable distribution components, or alternatives could exacerbate any existing geologic hazards or conditions that may already be present within the impact area.

## Environmental Impacts

### *Proposed Project*

**Impact GEO-1: Potential to directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death associated with rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, or landslides** – *No Impact*

#### i. Rupture of a known earthquake fault – *No Impact*

No faults zoned under the Alquist-Priolo Earthquake Fault Zoning Act, or any other active faults (having surface ruptured in the last 200 years or shown displacement in the 11,000 years) are located on or near the proposed Estrella Substation site or the proposed 70 kV power line alignment (refer to Figure 4.7-2). The nearest potentially active fault is the Rinconada Fault, which is located approximately 0.4 mile southwest of the southern terminus of the 70 kV power line reconductoring segment. Because construction and operation of the Proposed Project would not occur on an active fault line delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, it would not directly or indirectly cause potential substantial adverse effects associated with rupture of a known earthquake fault.

Additionally, there is no substantial evidence indicating that the Proposed Project components, would directly or indirectly exacerbate the effects of a potential rupture. Neither the construction or operation of the substation or power line would reasonably increase the likelihood of an earthquake nor increase the force or magnitude of a fault rupture. Therefore, **no impact** would occur.

### ii. Strong seismic ground shaking – *No Impact*

Although no active faults are located in immediate proximity to the Proposed Project components, there is potential for a high-magnitude earthquake to occur along one of the existing regional fault lines. As described in Section 4.7.3, the proposed Estrella Substation and 70 kV power line are located on alluvial geologic formations, which tend to experience stronger ground-shaking than hard rock formations. The proposed substation site could experience Peak Ground Acceleration (PGA) levels that translate to very strong to severe perceived intensity with the potential for moderate to heavy damage. Given the relative proximity of active faults such as the San Andreas and Oceanic faults, the entire Paso Robles area could potentially be subject to strong ground shaking in the event of an earthquake along one of these faults.

While the Proposed Project would be located in an area susceptible to earthquakes, the Proposed Project would not exacerbate the effects of ground shaking that may occur in the Proposed Project area. The proposed substation and power line would not be used for human occupancy and would be designed in accordance with existing laws and regulations related to geological and seismic stability. Specifically, the Proposed Project components would be designed in accordance with CPUC G.O. 174, which outlines minimum construction material requirements, calculations for foundations, and utility safety measures designed to withstand damage from ground rupture and seismic shaking. The proposed 70 kV power line structures also would be engineered to meet loads generated by forces such as seismic activity, as required by CPUC G.O. 95. Finally, implementation of APM GEO-1 would employ other appropriate measures to avoid, accommodate, replace, or improve soft or loose soils if they are encountered during construction, which would help to increase stability of structures in the event of strong seismic ground shaking.

Because construction and operation of the Proposed Project would neither directly nor indirectly cause nor exacerbate seismic ground shaking that may occur in the Proposed Project area, **no impact** would occur.

### iii. Seismic-related ground failure, including liquefaction – *No Impact*

As shown in Figure 4.7-4, the proposed Estrella Substation and the vast majority of the length of the proposed 70 kV power line is located in an area mapped as having low potential for liquefaction. The only portion of the proposed 70 kV power line that crosses an area identified as having moderate or high potential for liquefaction is the portion that crosses over Huer Huero Creek. The majority of the Proposed Project area is located on sandy Arbuckle soils, loose clay Nacimiento soils, and other sandy loam soils with no evidence of shallow groundwater levels or saturated soils. The geotechnical investigation reports conducted for both the proposed Estrella Substation (RRC 2016) and 70 kV power line (Kleinfelder 2017) found the potential for liquefaction to be negligible. Regardless, construction or operation of the Proposed Project would not directly or indirectly exacerbate any existing liquefaction hazards in the Project vicinity. This is because the Proposed Project would not include uses that would substantially change the existing soil composition in the area nor would the project increase the groundwater table or otherwise increase soil saturation. Therefore, **no impact** would occur.

### iv. Landslides – *No Impact*

The proposed Estrella Substation would be constructed on agricultural lands with mild slopes, designated as having moderate potential for landslides (see Figure 4.7-3). The proposed 70 kV power line would traverse areas of low, moderate, and high landslide risk, although the majority of the new power line segment is located on level ground with slopes of less than 30 percent. Areas with the greatest slopes occur along the 70 kV power line reconductoring segment and installation of new conductors and replacement poles would not change the line's susceptibility to damage from landslide beyond existing conditions. In general, grading required for the Proposed Project would not create new steep slopes and the Proposed Project would be designed in accordance with applicable laws and regulations related to geologic and seismic stability (see discussion under Impact GEO-1, subsection ii). As such, construction and operation of the Proposed Project would not directly or indirectly cause potential substantial adverse effects associated with landslides nor exacerbate existing landslide hazards in the Proposed Project vicinity. Therefore, **no impact** would occur.

### Impact GEO-2: Result in substantial soil erosion or the loss of topsoil – *Less than Significant*

Excavation and ground disturbing activities associated with construction of the Proposed Project could increase exposure of soil to erosive forces. Proposed Project activities that would expose soil to erosive forces include the construction of Estrella Substation (e.g., vegetation removal, site grading, trenching, and cut and fill), preparing new pole and tower sites, augering holes for new and replacement pole and tower foundations, removal of existing poles, establishing new access roads and staging areas, establishing pull and tension sites and other work areas (e.g., landing zones), and, to a limited extent, use of existing access roads that are not paved. Intense rain or wind events in areas where these activities are occurring could result in soil erosion into adjacent waterways.

Soils underlying the proposed Estrella Substation site are moderately susceptible to erosion, while soils underlying the 70 kV power line alignment range in characteristics but include some areas with moderate to high erosion potential. The proposed substation site and the majority of the length of the proposed 70 kV power line occur on low to moderate slopes. As described in detail in Section 4.10, "Hydrology and Water Quality", the Applicants would be required to obtain coverage under the SWRCB's General Permit for Storm Water Discharges Associated with Construction Activity Order Number 2009-0009-DWQ (Construction General Permit), which would require development and implementation of a SWPPP. Among other measures, the SWPPP would include measures to control erosion and sedimentation from Proposed Project construction and operation activities. Erosion-control measures or BMPs may include scheduling or limiting activities to certain times of the year (i.e., during the dry season); installing sediment barriers, such as silt fence and fiber rolls along the perimeter of the construction area, and implementing sediment-tracking controls, such as stabilizing entrances to the construction site.

Implementation of the SWPPP would reduce the potential for substantial soil erosion resulting from the Proposed Project construction. Topsoil reuse is not practicable within the fenced substation area; however, topsoil would be conserved at exterior temporary work areas where applicable (see Chapter 2, *Proposed Project*). SWPPP BMPs would ensure that soil stockpiles are protected from storm events and located away from and/or downgradient from waterways, as well as provide for avoidance of excessive disturbance of steep slopes, control of vehicle traffic, and implementation of a dust-control program. Implementation of APM AIR-3, which would require a variety of measures to reduce fugitive dust during construction, would also serve to minimize loss of topsoil and reduce erosion.

After construction of the Proposed Project is complete, disturbed areas would be restored to pre-project conditions through implementation of measures outlined within the SWPPP. During operation, no elements of the Proposed Project would cause substantial soil erosion or loss of topsoil. As noted previously, the Proposed Project components would operate remotely and no staff would be permanently located on-site. Infrequent routine inspection and maintenance activities for the Estrella Substation and 70 kV power line would have limited potential to cause substantial soil erosion or loss of topsoil, although accessing the power line structures via dirt access roads or by helicopter could potentially cause some soil disturbance and subsequent erosion. Due to the limited scale of operation and maintenance activities and their infrequent nature, this potential impact would be less than significant.

Implementation of the SWPPP and APM AIR-3 would substantially reduce potential for significant soil erosion and loss of topsoil during construction of the Proposed Project. For the reasons above, potential erosion and loss of topsoil during Proposed Project operation would be less than significant. Overall, Impact GEO-2 would be **less than significant**.

**Impact GEO-3: 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** – *Less than Significant with Mitigation*

As discussed above, the Estrella Substation would be located on relatively minor slopes with soft to hard lean clays and very loose to very dense sand soils. The power line route would be located on mild to moderate slopes with a variety of soils, including medium dense to dense clayey sand, silty sand, and poorly graded sand with variable quantities of fine gravel (NEET West and PG&E 2017). As discussed under Section 4.7.3, soils that are primarily sandy are porous with less fine particulate matter embedded between sand grains. These sandy soils are less stable and more susceptible to seismic hazards (e.g., landslides, lateral spreading, and subsidence), which would be considered a significant impact. Alternatively, soils that are dominated by clay are close-textured, but can be expansive, or susceptible to shrinking and swelling, that can result in damage to structures (e.g., collapse), which would be considered a significant impact. As described above, the Estrella Substation and the majority of the length of the proposed 70 kV power line route would be located on areas identified as having low potential for liquefaction (see Figure 4.7-4).

Geotechnical investigation reports for the Estrella Substation (RRC 2016) and the 70 kV power line (Kleinfelder 2017) concluded that underlying geologic units and soils within the Proposed Project area are sufficiently stable to support construction and operation of the Proposed Project components. Nevertheless, geotechnical investigation reports have site-specific recommendations included to reduce potential direct and indirect impacts to geologic unit and soils. **Mitigation Measure GEO-1** requires that the Proposed Project Applicants implement recommendations provided in the Project Geotechnical Investigations, for assurance that subsequent potential impacts related to instability (e.g., landslide, lateral spreading, subsidence, liquefaction, or collapse) would be reduced to levels that are less than significant.

Further, as described under Impact GEO-1, the proposed substation and power line would be designed in accordance with existing laws and regulations related to geologic and soil stability (e.g., G.O. 174 and 95). Additionally, the Applicants would implement APM GEO-1, requiring replacement or improvement of any loose soils encountered during construction. All of these measures would improve the stability of Proposed Project structures and components. Overall, the Proposed Project components would not exacerbate any instability in underlying geologic units or soil, nor result in adverse geologic effects.

No evidence has been discovered of shallow groundwater and/or saturated soils in the locations where Proposed Project components would be constructed. While water required for occasional maintenance tasks may or may not be obtained from groundwater; Proposed Project operation and maintenance tasks would not consume significant amounts of groundwater, such that soils would shrink or retract, resulting in instability of the underlying geologic unit and soils, and/or cause excessive drawdown of the aquifer and land subsidence (refer to Appendices L and M of the PEA).

Overall, with implementation of APM GEO-1, Mitigation Measure GEO-1, and with adherence to existing laws and regulations related to geologic and soil stability (e.g., G.O. 174 and 95), the Proposed Project impacts related to its location on unstable geologic units or soils resulting in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse would be **less than significant with mitigation**.

> **Mitigation Measure GEO-1: Implement Recommendations in the Project Geotechnical Investigation Report.**
>
> HWT, PG&E, and/or their contractors shall implement the recommendations contained in the geotechnical investigation report prepared for the proposed Estrella Substation (RRC 2016) and proposed 70 kV power line (Kleinfelder 2017). These include recommendations for a professional geotechnical engineer or his/her representative to be present during construction to evaluate the suitability of excavated soils for use as engineered fill, to observe and test site preparation and fill placement, and to assess the need for densification of subgrade materials.

### Impact GEO-4: Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property – *Less than Significant with Mitigation*

The proposed Estrella Substation and the 70 kV power line are located on soils which vary in shrink-swell potential from low to high. Areas that are rated as having a high potential for shrinking and swelling can lift or settle during rain events and cause damage to structures, which would be considered a significant impact. The Estrella Substation geotechnical investigation (Kleinfelder 2017) revealed the substation site includes both soft clays and loose sandy soils, and included recommendations to excavate soils to a depth of 4 feet or until a stable soil is reached, then backfill with more suitable material (RRC 2016). The geotechnical report completed for the power line also includes recommendations to design the power line to reduce potential impacts resulting from expansive soil (Kleinfelder 2017). With implementation of **Mitigation Measure GEO-1**, geotechnical report recommendations would be adhered to and the Proposed Project would not be subject to excessive risks from expansive soils. For these reasons, the Proposed Project components would not exacerbate any existing hazards from expansive soils. Therefore, this impact would be **less than significant with mitigation**.

### Impact GEO-5: Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for disposal of waste water – *No Impact*

The Proposed Project would not include the use of septic tanks or alternative wastewater disposal systems. Therefore, **no impact** would occur.

### Impact GEO-6: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature – *Less than Significant*

As described in Section 4.7.3, the subsurface of the Estrella Substation and 70 kV power line alignment includes Paso Robles formation (Qtp) and Quaternary older alluvium (Qoa), which has a high paleontological sensitivity (PFYC Class 4b); however, no records of fossils were identified within 1 mile of the Proposed Project location. No geological units that underlie the Proposed Project area are known to contain unique geologic features (NEET West and PG&E 2017). Based on the size and depth of grading and ground disturbing activities required for Proposed Project construction, it is possible that paleontological resources within the underlying Paso Robles formation and Quaternary older alluvium could be encountered. If the Project were to directly or indirectly destroy such paleontological resources, or site or geologic feature, the Project would result in a significant impact.

The Applicants have proposed a number of project design measures related to paleontological resources protection, as described in Table 2-12 of Chapter 2, *Project Description* that would help avoid potential paleontological impacts. Specifically, APM GEN-1 would require that the Applicants prepare and implement a WEAP, including training all on-site construction personnel in avoidance and minimization measures for paleontological resources. This training would include information on how to identify paleontological resources, including the types of fossils that could be found in the Proposed Project area and types of lithologies in which the fossils could be preserved; avoidance requirements and procedures to be followed if a fossil is discovered during construction, and penalties for disturbing paleontological resources. Additionally, APM PALEO-1 would require retention of a Paleontological Resources Principal Investigator meeting the standards set forth by the Society of Vertebrate Paleontology to ensure that APMs related to paleontological resources are properly implemented.

APM PALEO-2 would outline a set of procedures for construction personnel to follow if paleontological resources are discovered during construction activities. This would include: stopping work immediately within 50 feet of the find; protecting the site from further impacts; allowing the Paleontological Resources Principal Investigator to evaluate the discovery and make recommendations regarding its significance; and implementation of resource-specific measures to protect and document the resource, if warranted. (Refer to Chapter 2 for the full APM text.) Implementation of APM PALEO-3 would require monitoring of ground-disturbing construction activities by paleontological monitors in accordance with the sensitivity of subsurface materials. Finally, APM PALEO-4 would outline procedures for fossil recovery in the event that fossils or unique paleontological resources are encountered during construction. The fossil recovery effort would be led by the Paleontological Resources Principal Investigator in coordination with the CPUC.

Implementation of the above-described APMs would ensure potential impacts on paleontological resources or unique geologic features are less than significant. Workers would be trained in identifying resources that could be contained within the subsurface materials encountered during construction and the presence of paleontological monitors and the Paleontological Resources Principal Investigator will further reduce potential for inadvertently destroying any significant resources. The procedures outlined in the APMs also would provide for protection, evaluation, and preservation/documentation of any discovered resources. Following construction, the Proposed Project would not involve any excavation or ground-disturbance during operation that could potentially impact paleontological resources.

Overall, with implementation of the applicable APMs, the Proposed Project would not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. Therefore, this impact would be **less than significant**.

### *Reasonably Foreseeable Distribution Components and Ultimate Substation Buildout*

Construction and operation of the reasonably foreseeable distribution components would have minimal potential to result in adverse effects related to geology, soils, and seismicity, including paleontological resources. The new distribution line segments and additional 21/12 kV pad-mounted transformers would not be located on any active faults delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map and would have similar proximity to the potentially active Rinconada Fault and the active regional faults as the Proposed Project components (see Impact Geo-1). Likewise, the equipment and facilities associated with ultimate substation buildout would primarily be placed within the fence line of the already-constructed Estrella Substation, except for the additional 230 kV interconnection, which would be constructed adjacent to the substation. Note that the routes for any additional future distribution feeders and/or 70 kV power lines that could be established through ultimate substation buildout are not known, and thus the impacts of these facilities are speculative and not evaluated in this DEIR. While construction and operation of the reasonably foreseeable distribution components and ultimate substation buildout facilities could be subject to strong seismic groundshaking; these facilities would not directly or indirectly cause or exacerbate rupture of a known earthquake fault (criterion A subsection i), strong seismic ground shaking (criterion A subsection ii), or seismic-related ground failure (criterion A subsection iii). Reasonably foreseeable distribution components would be located on areas identified as having low potential for liquefaction (see Figure 4.7-4; criterion A subsection ii). The reasonably foreseeable distribution components would be located in areas with low to moderate landslide risk and the construction and operation of the distribution components would not cause landslides or exacerbate the existing landslide hazards (see Figure 4.7-3; criterion A subsection iv). Therefore, **no impact** would occur under significance criterion A (subsections i-iv).

As described in Chapter 2, *Project Description*, new distribution line poles would be directly embedded following standard construction practices for PG&E. Distribution poles would be installed along existing roads and would require minimal work areas at each structure site. Because these areas collectively are less than 1 acre in size, they do not trigger coverage under the Construction General Permit, which requires development and implementation of a SWPPP, and typically adherence to erosion control and sedimentation measures. Without implementation of these measures, while minimal in size, reasonably foreseeable distribution components have the potential to result in substantial adverse impacts related to erosion or the loss of topsoil. During construction, PG&E would implement APM GEO-1, which requires replacement or improvement of loose soils encountered during installation of distribution line poles. Further, **Mitigation Measure HYD/WQ-1** would require that PG&E implement erosion-control BMPs during construction, which would minimize potential for erosion and loss of topsoil. As mentioned above, the equipment and facilities associated with ultimate substation buildout would primarily be placed within the fence line of the already-constructed Estrella Substation, where ground disturbance would be limited to that required for equipment foundations and substation wiring. Construction of the additional 230 kV interconnection for ultimate substation buildout would have greater potential for causing erosion, but this could be minimized through implementation of standard measures. Overall, with implementation of APM GEO-1 and Mitigation Measure HYD/WQ-1, impacts under significance criterion B would be **less than significant with mitigation.**

The reasonably foreseeable distribution components would not be located on steep slopes or in areas susceptible to landslides or liquefaction (see Figure 4.7-3 and Figure 4.7-4). It is unknown whether the geologic unit and soils within the areas which the new distribution line poles would be embedded would be unstable or expansive, such that seismic hazards (e.g., landslide, lateral spreading, subsidence, liquefaction, or collapse) or shrinking or retracting, respectively, would result in instability of the underlying geologic unit and soils (see Impacts GEO-3 and GEO-4). However, the Proposed Project's incorporation of APM GEO-1 would minimize the risk of significant adverse effects from unstable and expansive soils, such that impacts would not be considered significant. Additionally, there is no evidence that construction and/or operation of the reasonably foreseeable distribution components would exacerbate existing geologic hazards related to instability or expansive soils. The equipment and facilities associated with ultimate substation buildout would be placed within the fence line of Estrella Substation or immediately adjacent, and therefore potential for impacts related to unstable or expansive soils, seismic hazards (e.g., landslide, lateral spreading, subsidence, liquefaction, or collapse), and/or shrinking or retracting are the same as those described for the Proposed Project. Reasonably foreseeable distribution components and infrastructure anticipated as part of the ultimate substation buildout do not include habitable structures that would put people at risk from existing hazards. For these reasons, impacts under significance criteria C and D would be **less than significant.**

Neither the reasonably foreseeable distribution components nor the proposed infrastructure affiliated with ultimate substation buildout would include or require use of septic tanks or alternative wastewater disposal systems. Therefore, **no impact** would occur under significance criterion E.

The reasonably foreseeable distribution components would have less potential to impact paleontological resources than the Proposed Project because construction would involve far less excavation and ground-disturbance. Nevertheless, the distribution components would be installed primarily in areas overlying the paleontologically-sensitive Paso Robles formation (Qtp) and construction activities could potentially encounter paleontological resources. During construction, the Applicants would implement APM GEN-1 and APMs PALEO-1 through 4. As described in Impact GEO-6 above, these measures would avoid or substantially reduce potential impacts on paleontological resources. The equipment and facilities associated with ultimate substation buildout would be located primarily within the fence line of the previously constructed Estrella Substation. Therefore, presence of unique paleontological resources or geologic features in these areas and related direct and indirect impacts are unlikely. Potential impacts associated with the additional 230 kV interconnection for ultimate substation buildout should be avoided through implementation of standard measures. As such, impacts under significance criterion F would be **less than significant.**

### *Alternatives*

#### No Project Alternative

Under the No Project Alternative, no new substation or power line would be constructed; therefore, there would be no potential for new impacts related to geology, soils, and seismicity, and there would be no potential for ground-disturbing activities to encounter paleontological resources. Therefore, **no impact** would occur.

#### Alternative SS-1: Bonel Ranch Substation Site

Siting the substation at Bonel Ranch under Alternative SS-1 would include roughly the same features/components and footprint as the proposed Estrella Substation. As such, it would involve roughly the same amount of excavation work and same construction processes as proposed for the Estrella Substation. As shown in Figure 4.7-2, no faults traverse the Bonel Ranch site, active or otherwise. The Bonel Ranch Substation Site would be further from the potentially active Rinconada Fault compared to the Estrella Substation site but would be closer to the active San Andreas Fault System. Because construction and operation of the Proposed Project is not located on an active fault line delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, the project would not directly or indirectly result in potential substantial adverse effects associated with rupture of a known earthquake fault (criterion A subsection i).

Further, there is no substantial evidence indicating that construction and/or operation of the substation at the Bonel Ranch Substation Site would directly or indirectly exacerbate seismic-related hazards in the area. While construction and operation of Alternative SS-1 could be subject to strong seismic groundshaking, there is no evidence to suggest these facilities would directly or indirectly cause or exacerbate strong seismic ground shaking (criterion A subsection ii), or seismic-related ground failure (criterion A subsection iii). Bonel Ranch Substation Site is located in an area identified as having low potential for liquefaction (see Figure 4.7-4; criterion A subsection ii). The Bonel Ranch Substation Site is located in an area with moderate landslide risk, however there is no evidence to suggest that construction and operation of the substation would cause landslides or exacerbate the existing landslide hazards (see Figure 4.7-3; criterion A subsection iv). Additionally, the substation would be operated remotely and would not place any people in a potentially hazardous area. For these reasons, **no impact** would occur under significance criterion A (subsections i-iv).

Because Alternative SS-1 would disturb more than 1 acre of land, it would require coverage under the Construction General Permit, including preparation and implementation of a SWPPP. As described under Impact GEO-2 above, BMPs likely to be included in the SWPPP would reduce potential for substantial erosion from construction activities as well as migration of sediments off-site and loss of topsoil. Implementation of APM AIR-3, requiring fugitive dust mitigation measures during construction, would also serve to minimize loss of topsoil and reduce erosion. Topsoil reuse is not feasible within the fenced substation area; as with the Proposed Project, topsoil would be conserved at exterior temporary work areas. Overall, impacts under significance criterion B would be **less than significant.**

At this time, there is no indication that the Bonel Ranch Substation Site is located on an unstable geologic unit, or unstable and/or expansive soils such that construction and/or operation of the substation could result in subsequent seismic hazards (e.g., landslide, lateral spreading, subsidence, liquefaction, or collapse) or shrinking or retracting, respectively. As part of the alternatives selection and development process conducted for the PEA, the Applicants evaluated this alternative substation site for feasibility and constructability, including site preparation and grading requirements, and did not identify fatal faults with respect to geologic site conditions (NEET West and PG&E 2017). The Alternative SS-1 site is relatively flat and identified as having moderate liquefaction potential (see Figure 4.7-4), and its location near the Estrella River could increase the likelihood of encountering soft soils during construction. Should construction of the substation encounter soft soils and exacerbate existing stability issues, direct and indirect adverse impacts would be considered a significant impact. However, incorporation of APM GEO-1 would employ other appropriate measures to avoid, accommodate, replace, or improve soft or loose soils if they are encountered during construction, which would help to increase stability of structures in the event of strong seismic ground shaking. Further, design and construction requirements in G.O. 95 and 174, as well as the CBC, would minimize hazards associated with unstable geologic units/soils or expansive soils, ensuring the potential for such impacts would be less than significant. Additionally, there is no evidence that construction and/or operation of the Alternative SS-1 components would exacerbate existing hazards from unstable geologic units/soils or expansive soils. For these reasons, impacts under significance criteria C and D would be **less than significant.**

Alternative SS-1 would not require the use of septic tanks or alternative wastewater disposal systems. Therefore, **no impact** would occur under significance criterion E.

As shown in Figure 4.7-1, the Alternative SS-1 site is underlain by Holocene alluvial gravel, sand, and clay (Qa), which would generally be considered too young to bear fossils. However, a PRTR has not been prepared for the Bonel Ranch Substation Site, so the potential sensitivity of the underlying soils and geology for paleontological resources are not fully known. Under Alternative SS-1, the Applicants would implement APM GEN-1 and APMs PALEO-1 through 4, which would reduce potential for impacts to paleontological resources; however, if these efforts were not informed by a pre-construction survey describing the areas of relative sensitivity within the disturbance area, they may be less effective, resulting in a significant impact. Therefore, **Mitigation Measure GEO-2** would require performance of a paleontological resources survey and preparation of a technical report and monitoring plan to inform paleontological resources avoidance and monitoring during construction of Alternative SS-1. Mitigation Measure GEO-2, further, requires that the Applicants implement any recommendations contained in the PRTR prepared for Alternative SS-1, thereby reducing potential impacts. Given implementation of this mitigation measure and the APMs described above, impacts under significance criterion F would be **less than significant with mitigation.**

**Mitigation Measure GEO-2: Paleontological Resources Survey, Technical Report, and Construction Monitoring.**

HWT, PG&E, and/or their contractors shall conduct a paleontological resources survey for any alternative substation sites or 70 kV power line alignments that have not yet been investigated and shall prepare a PRTR documenting the results of the survey. The PRTR shall evaluate the sensitivity of the subject sites or alignments, including identification and review of subsurface geology, literature review and museum records search, and field evaluation of the sites or alignments. The PRTR shall be prepared in accordance with standards provided by the Society for Vertebrate Paleontology and shall assign site sensitivity based on the potential fossil yield classification system utilized by the Bureau of Land Management.

The paleontological resources survey, as documented in the PRTR, shall inform the monitoring, resource protection, and treatment requirements outlined in APM PALEO-1, PALEO-2, PALEO-3, and PALEO-4. HWT, PG&E, and/or their contractors shall implement the recommendations contained in the alternative project's PRTR. Portions of alternative substation sites or 70 kV power line routes identified as having high surface sensitivity for paleontological resources shall receive at least the same level of monitoring as identified for the Proposed Project in APM PALEO-3.

### Alternative PLR-1A: Estrella Route to Estrella Substation

Alternative PLR-1A would be similar to the Proposed Project's 70 kV power line but would follow a more northerly route and would be approximately 6.5 miles longer than the proposed 70 kV power line. As shown in Figure 4.7-2, the Alternative PLR-1A route does not traverse any faults, active or otherwise. Because construction and operation of Alternative PLR-1A would not occur on any active fault lines, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, the alternative would not directly or indirectly result in potential substantial adverse effects associated with rupture of a known earthquake fault (criterion A subsection i). Further, there is no substantial evidence indicating that construction and/or operation of Alternative PLR-1A would directly or indirectly exacerbate seismic-related hazards in the area. While construction and operation of Alternative PLR-1A could be subject to strong seismic groundshaking, there is no evidence to suggest these facilities would directly or indirectly cause or exacerbate strong seismic ground shaking (criterion A subsection ii), or seismic-related ground failure (criterion A subsection iii). Alternative PLR-1A is located primarily in areas identified as having low potential for liquefaction (see Figure 4.7-4; criterion A subsection ii). Alternative PLR-1A is located in areas that range between low, moderate, and high landslide risk; however there is no evidence to suggest that construction and operation of the power line would cause landslides or exacerbate the existing landslide hazards (see Figure 4.7-3; criterion A subsection iv). Additionally, the 70 kV power line under Alternative PLR-1A would be operated remotely and would not place any people in a potentially hazardous area. For these reasons, impacts occurring under significance criterion A (subsections i-iv) would be considered **less than significant**.

Because Alternative PLR-1A would disturb more than 1 acre of land, it would require coverage under the Construction General Permit, including preparation and implementation of a SWPPP. As described under Impact GEO-2 above, the BMPs likely to be included in the SWPPP would reduce potential for substantial erosion from construction activities as well as migration of sediments off-site and loss of topsoil. Implementation of APM AIR-3, requiring fugitive dust mitigation measures during construction, would also serve to minimize loss of topsoil and reduce erosion. Overall, impacts under significance criterion B would be **less than significant.**

At this time, there is no indication that the Alternative PLR-1A 70 kV route would be located on an unstable geologic unit or expansive soils, such that construction and/or operation of the Estrella Route would directly or indirectly exacerbate or cause the instability of soils. As part of the alternatives selection and development process conducted for the PEA, the Applicants evaluated this alternative alignment for feasibility and constructability, including site preparation and grading requirements, and did not identify fatal faults with respect to geologic site conditions (NEET West and PG&E 2017). The Alternative PLR-1A route traverses areas of varying topography, including areas with largely low to moderate liquefaction potential (see Figure 4.7-4). Adhering to design and construction requirements in G.O. 95 and 174, as well as the CBC, would ensure hazards associated with unstable geologic units/soils or expansive soils would be minimized. Given that there is no evidence to suggest Alternative PLR-1A would be located on unstable soils, no evidence that construction or operation would result in the instability of soils, and existing design and construction requirements that would be mandated; Alternative PLR-1A components would not exacerbate any existing hazards from unstable geologic units/soils or expansive soils. Therefore, impacts under significance criteria C and D would be **less than significant.**

Alternative PLR-1A would not require the use of septic tanks or alternative wastewater disposal systems. Therefore, **no impact** would occur under significance criterion E.

As described in Table 4.7-4, the Alternative PLR-1A alignment is underlain by Quaternary older alluvium (Qoa) and Paso Robles formation (Qtp), both of which are considered sensitive for paleontological resources. Due to its longer length compared to the proposed 70 kV power line route, Alternative PLR-1A may have increased potential for construction activities to encounter paleontological resources as a result of the increased excavation/ground-disturbance activities. Implementation of APM GEN-1 and APMs PALEO-1 through PALEO-4 would avoid or minimize potential impacts to paleontological resources during construction. Given implementation of the APMs described above, impacts under significance criterion F would be **less than significant.**

### Alternative PLR-1C: Estrella Route to Bonel Ranch, Option 1

Alternative PLR-1C would be similar to Alternative PLR-1A, following an identical route for much of its length, but would start at the Bonel Ranch Substation Site. Alternative PLR-1C would be 6 miles longer than the Proposed Project's 70 kV power line. As shown in Figure 4.7-2, the Alternative PLR-1C route does not traverse any faults, active or otherwise; therefore, the alternative would not directly or indirectly result in potential substantial adverse effects associated with rupture of a known earthquake fault (criterion A subsection i). Further, there is no substantial evidence indicating that construction and/or operation of Alternative PLR-1C would directly or indirectly exacerbate seismic-related hazards in the area. While construction and operation of Alternative PLR-1C could be subject to strong seismic groundshaking, there is no evidence to suggest these facilities would directly or indirectly cause or exacerbate strong seismic ground shaking (criterion A subsection ii), or seismic-related ground failure (criterion A subsection iii). Alternative PLR-1C is located primarily in areas identified as having low potential for liquefaction (see Figure 4.7-4; criterion A subsection ii). Alternative PLR-1C is located in areas that range between low, moderate, and high landslide risk; however there is no evidence to suggest that construction and operation of the substation would cause landslides or exacerbate the existing landslide hazards (see Figure 4.7-3; criterion A subsection iv). Additionally, the 70 kV power line under Alternative PLR-1C would be operated remotely and would not place any people in a potentially hazardous area. For these reasons, impacts occurring under significance criterion A (subsections i-iv) would be considered **less than significant**.

Because Alternative PLR-1C would disturb more than 1 acre of land, it would require coverage under the Construction General Permit, including preparation and implementation of a SWPPP. As described under Impact GEO-2 above, the BMPs likely to be included in the SWPPP would reduce potential for substantial erosion from construction activities as well as migration of sediments off-site and loss of topsoil. Implementation of APM AIR-3, requiring fugitive dust mitigation measures during construction, would also serve to minimize loss of topsoil and reduce erosion. Overall, impacts under significance criterion B would be **less than significant.**

At this time, there is no indication that the Alternative PLR-1C 70 kV route would be located on an unstable geologic unit or expansive soils, or that construction and/or operation of the alternative would directly or indirectly exacerbate or result-in unstable soils. As part of the alternatives selection and development process conducted for the PEA, the Applicants evaluated much of the length of this alternative alignment for feasibility and constructability, including site preparation and grading requirements, and did not identify fatal faults with respect to geologic site conditions (NEET West and PG&E 2017). The Alternative PLR-1C route passes through areas of varying topography and through areas of primarily low to moderate liquefaction potential (see Figure 4.7-4). The Alternative PLR-1C Minor Route Variation 1 segment, in particular, would pass through areas of moderate and high liquefaction potential adjacent to the Estrella River. Adhering to design and construction requirements in G.O. 95 and 174, as well as the CBC, would ensure hazards associated with unstable geologic units/soils or expansive soils are minimized. Given that there is no evidence to suggest Alternative PLR-1C would be located on unstable soils, no evidence that construction or operation would result in the instability of soils, and existing design and construction requirements that would be mandated; Alternative PLR-1C components would not exacerbate any existing hazards from unstable geologic units/soils or expansive soils. Therefore, impacts under significance criteria C and D would be **less than significant.**

Alternative PLR-1C would not require the use of septic tanks or alternative wastewater disposal systems. Therefore, **no impact** would occur under significance criterion E.

As described in Table 4.7-4, the portion of the Alternative PLR-1C alignment evaluated as part of the Estrella Route is underlain by Quaternary older alluvium (Qoa) and Paso Robles formation (Qtp), both of which are considered sensitive for paleontological resources. Due to its longer length compared to the proposed 70 kV power line route, Alternative PLR-1C may have increased potential for construction activities to encounter paleontological resources due to the additional excavation/ground-disturbance activities. Implementation of APM GEN-1 and APMs PALEO-1 through 4 would avoid or minimize potential impacts to paleontological resources during construction, however, if these efforts were not informed by a pre-construction survey describing the areas of relative sensitivity within the disturbance area, they may be less effective, resulting in a significant impact. Therefore, **Mitigation Measure GEO-2** would require performance of a paleontological resources survey and preparation of a technical report and monitoring plan to inform paleontological resources avoidance and monitoring during construction of Alternative PLR-1C. Mitigation Measure GEO-2, further, requires that the Applicants implement any recommendations contained in the PRTR to be prepared for Alternative PLR-1C, thereby reducing potential impacts. Given implementation of this mitigation measure and the APMs described above, impacts under significance criterion F would be **less than significant with mitigation.**

### Alternative PLR-3: Strategic Undergrounding (Both Options)

Alternative PLR-3 would underground an approximately 1.1-mile segment of the proposed 70 kV power line in the area of Golden Hill Road. As shown in Figure 4.7-2, the Alternative PLR-3 alignments (both options) would not cross any active or inactive faults; therefore, the alternative would not directly or indirectly result in potential substantial adverse effects associated with rupture of a known earthquake fault (criterion A subsection i). Further, there is no substantial evidence indicating that construction and/or operation of Alternative PLR-3 would directly or indirectly exacerbate seismic-related hazards in the area. Similar to the Proposed Project, construction and operation of Alternative PLR-3 could be subject to strong seismic groundshaking, however there is no evidence to suggest these facilities would directly or indirectly cause or exacerbate strong seismic ground shaking (criterion A subsection ii), or seismic-related ground failure (criterion A subsection iii). As Alternative PLR-3 follows the same general alignment as the Proposed Project (only undergrounds a segment of the proposed alignment), potential for liquefaction and landslides are the same as the Proposed Project (criterion A subsection ii and iv; see Impact GEO-1 above). Additionally, the underground 70 kV power line under Alternative PLR-3 would be operated remotely and would not place any people in a potentially hazardous area. Therefore, **no impact** would occur under significance criterion A (subsections i-iv).

Construction of Alternative PLR-3, which would be conducted in conjunction with the remainder of the Proposed Project, would disturb more than 1 acre of land. Therefore, it would require coverage under the Construction General Permit, including preparation and implementation of a SWPPP. As described under Impact GEO-2, the BMPs likely to be included in the SWPPP would reduce potential for substantial erosion from construction activities as well as migration of sediments off-site and loss of topsoil. Implementation of APM AIR-3, requiring fugitive dust mitigation measures during construction, would also serve to minimize loss of topsoil and reduce erosion. Overall, impacts under significance criterion B would be **less than significant.**

As noted above, the majority of both Alternative PLR-3 route options would follow, and be installed within, existing roads; therefore, it is unlikely this undergrounding route would encounter unstable geologic/soil conditions or expansive soils such that construction or operation of Alternative PLR-3 could cause the soils beneath to be unstable. The Alternative PLR-3 alignment (both options) is relatively flat and in an area mapped as having low potential for liquefaction. Following the design and construction requirements in G.O. 95 and 174, as well as the CBC, would minimize hazards associated with unstable geologic units/soils or expansive soils. For these reasons, Alternative PLR-3 components would not exacerbate any existing hazards from unstable geologic units/soils or expansive soils. Therefore, impacts under significance criteria C and D would be **less than significant.**

Alternative PLR-3 would not require the use of septic tanks or alternative wastewater disposal systems. Therefore, **no impact** would occur under significance criterion E.

As shown in Figure 4.7-1, both Alternative PLR-3 options are underlain by Paso Robles formation (Qtp) and Quaternary older alluvium (Qoa), both of which are considered sensitive for paleontological resources. As Alternative PLR-3 would involve substantially more excavation and ground disturbance than the same segment of the overhead proposed 70 kV power line, it would have increased potential to encounter paleontological resources during construction compared to the Proposed Project. Nevertheless, implementation of APM GEN-1 and APMs PALEO-1 through PALEO-4 would avoid or minimize potential impacts to paleontological resources during construction, as described in Impact GEO-6. Therefore, impacts under significance criterion F would be **less than significant.**

### Alternative SE-1A: Templeton Substation Expansion – New 230/70 kV Substation

The substation sited at the Templeton Substation Expansion Site under Alternative SE-1A would include roughly the same features/components and footprint as the proposed Estrella Substation. As such, it would involve roughly the same amount of excavation work and same construction processes as proposed for the Estrella Substation. As shown in Figure 4.7-2, no faults traverse the immediate Templeton Substation Expansion site; however, the potentially active Rinconada Fault occurs in fairly close proximity (approximately 1 mile) to the site. While construction and operation of Alternative SE-1A could be subject to strong seismic groundshaking, there is no evidence to suggest these facilities would directly or indirectly cause or exacerbate seismic-related hazards (criterion A subsection i), strong seismic ground shaking (criterion A subsections ii), or seismic-related ground failure (criterion A subsection iii). The Templeton Substation Expansion Site is located in an area identified as having low potential for liquefaction (see Figure 4.7-4; criterion A subsection ii). The Templeton Substation Expansion Site is located in an area designated as having high potential for landslide risk, however there is no evidence to suggest that construction and operation of the substation would cause landslides or exacerbate the existing landslide hazards (see Figure 4.7-3; criterion A subsection iv). Although a rupture of the Rinconada Fault could subject the substation under Alternative SE-1A to strong seismic ground shaking, or subsequent seismic-related hazards such as landslides, construction and operation of the substation would not reasonably cause an earthquake or exacerbate any seismic-related hazards in the area. Additionally, the substation would be operated remotely and would not place any people in a potentially hazardous area. Therefore, **no impact** would occur under significance criterion A (subsections i-iv).

Because Alternative SE-1A would disturb more than 1 acre of land, it would require coverage under the Construction General Permit, including preparation and implementation of a SWPPP. As described under Impact GEO-2, typical BMPs included in a SWPPP would reduce potential for substantial erosion from construction activities as well as migration of sediments off-site and loss of topsoil. Implementation of APM AIR-3, requiring fugitive dust mitigation measures during construction, would also serve to minimize loss of topsoil and reduce erosion. Topsoil reuse is not feasible within the fenced substation area; however, topsoil would be conserved at exterior temporary work areas where applicable. Overall, impacts under significance criterion B would be **less than significant.**

At this time, there is no indication that the Templeton Substation Expansion Site is located on an unstable geologic unit or expansive soils or that construction and operation of the substation under Alternative SE-1A would cause instability to existing soils. The Alternative SE-1A site is relatively flat and identified as having moderate liquefaction potential (see Figure 4.7-4). Following the design and construction requirements in G.O. 95 and 174, as well as the CBC, would minimize hazards associated with unstable geologic units/soils or expansive soils. Regardless, the Alternative SE-1A components would not exacerbate any existing hazards from unstable geologic units/soils or expansive soils. Therefore, impacts under significance criteria C and D would be **less than significant.**

Alternative SE-1A would not require the use of septic tanks or alternative wastewater disposal systems. Therefore, **no impact** would occur under significance criterion E.

As described in Section 4.7.3, geologic mapping indicates that the Alternative SE-1A site is underlain by Pleistocene-aged older alluvium, and Paso Robles Formation may occur in the subsurface underlying this older alluvium. Based on museum record searches and other information, these geologic units were both assigned PFYC Class 4, indicating they are sensitive for paleontological resources (refer to Table 4.7-5). While this indicates that excavation/ground-disturbing activities for construction of Alternative SE-1A could potentially encounter paleontological resources, implementation of APM GEN-1 and APMs PALEO-1 through PALEO-4 would avoid or substantially reduce potential impacts to such resources. Therefore, impacts under significance criterion F would be **less than significant.**

### Alternative SE-PLR-2: Templeton-Paso South River Road Route

Alternative SE-PLR-2 would be approximately 4.8 miles shorter than the Proposed Project's 70 kV power line and would connect the expanded substation under Alternative SE-1A to Paso Robles Substation. As shown in Figure 4.7-2, the Alternative SE-PLR-2 route would occur in close proximity to the Rinconada Fault for much of its length and would cross the fault line near the intersection of El Pomar Road and South River Road. The Rinconada Fault is not considered active under the Alquist-Priolo Earthquake Zoning Act but is thought to be capable of producing a 7.3 magnitude earthquake. As discussed previously, while the new 70 kV power line under Alternative SE-PLR-2 could be subjected to strong seismic ground shaking from a rupture along the Rinconada Fault, these new facilities would not cause an earthquake or exacerbate the existing seismic-related hazards. There is no substantial evidence indicating that construction and/or operation of Alternative SE-PLR-2 would directly or indirectly exacerbate seismic-related hazards in the area (criterion A subsection i). While construction and operation of Alternative SE-PLR-2 could be subject to strong seismic groundshaking, there is no evidence to suggest these facilities would directly or indirectly cause or exacerbate strong seismic ground shaking (criterion A subsection ii) or seismic-related ground failure (criterion A subsection iii). Alternative SE-PLR-2 is located primarily in areas identified as having low potential for liquefaction (see Figure 4.7-4; criterion A subsection ii). Alternative SE-PLR-2 is located in areas that range between low, moderate, and high landslide risk; however, there is no evidence to suggest that construction and operation of the power line would cause landslides or exacerbate the existing landslide hazards (see Figure 4.7-3; criterion A subsection iv). Additionally, the 70 kV power line under Alternative SE-PLR-2 would be operated remotely and would not place any people in a potentially hazardous area. Therefore, **no impact** would occur under significance criterion A (subsections i-iv).

Because Alternative SE-PLR-2 would disturb more than 1 acre of land, it would require coverage under the Construction General Permit, including preparation and implementation of a SWPPP.

As described under Impact GEO-2 above, the BMPs likely to be included in the SWPPP would reduce potential for substantial erosion from construction activities as well as migration of sediments off-site and loss of topsoil. Implementation of APM AIR-3, requiring fugitive dust mitigation measures during construction, would also serve to minimize loss of topsoil and reduce erosion. Overall, impacts under significance criterion B would be **less than significant.**

At this time, there is no indication that the Alternative SE-PLR-2 route would be located on an unstable geologic unit or expansive soils, such that construction or operation of the alternative alignment would cause direct or indirect adverse impacts to stability. The Alternative SE-PLR-2 route passes through areas of varying topography, including some hilly areas, and through areas of primarily moderate to high landslide potential (see Figure 4.7-3) and low liquefaction potential (see Figure 4.7-4). Following the design and construction requirements in G.O. 95 and 174, as well as the CBC, would minimize hazards associated with unstable geologic units/soils or expansive soils. Given that there is no evidence to suggest Alternative SE-PLR-2 would be located on unstable soils, no evidence that construction or operation would result in the instability of soils, and the adherence required for design and construction requirements; Alternative SE-PLR-2 components would not exacerbate any existing hazards from unstable geologic units/soils or expansive soils. Therefore, impacts under significance criteria C and D would be **less than significant.**

Alternative SE-PLR-2 would not require the use of septic tanks or alternative wastewater disposal systems. Therefore, **no impact** would occur under significance criterion E.

As described in Table 4.7-6, several of the geologic units underlying or in the vicinity of the Templeton Route Alternatives (including Alternative SE-PLR-2) are sensitive for paleontological resources (PFYC Class 4), including Pleistocene-aged older alluvium (Qoa), Pliocene/Pleistocene-aged Paso Robles Formation (Qtp), and Miocene-aged Monterey Formation (Tm). Due to the shorter length of Alternative SE-PLR-2, it could have reduced potential to encounter paleontological resources compared to the Proposed Project (due to the lesser amount of excavation/ground-disturbing work); however, due to the sensitivity of underlying units, paleontological resources could be uncovered and adverse effects could occur if proper protocols are not followed. As described in Impact GEO-6, APM GEN-1 and APMs PALEO-1 through PALEO-4 would be implemented and would avoid or minimize potential impacts to paleontological resources during construction. Therefore, impacts under significance criterion F would be **less than significant.**

### Alternative BS-2: Battery Storage to Address the Distribution Objective

The ultimate size of FTM BESS facilities under Alternative BS-2 is not yet determined and would depend on future load growth in the Paso Robles area. In most cases, the FTM BESSs are likely to be substantially smaller than the proposed Estrella Substation. Each of the example FTM sites under consideration is located on vacant parcels or portions of parcels that are relatively flat. Example FTM Sites 1-4 are located within existing development near downtown Paso Robles, while FTM Site 5 is adjacent to the CAL FIRE Air Attack Base and FTM Sites 6-8 are all located adjacent to existing area substations.

Those FTM sites examined as part of the DEIR would have similar proximity to regional faults as the Proposed Project and other alternatives. FTM Site 6 is located at the existing Templeton Substation and would be the same distance to the Rinconada Fault as Alternative SE-1A. As such, any of the FTM BESSs could experience strong ground shaking due to an earthquake along the Rinconada Fault or one of the other regional faults (e.g., San Andreas, Oceanic). However, there is no indication that construction or operation of FTM BESSs under Alternative BS-2 would cause an earthquake or exacerbate any existing seismic-related hazards in the region, strong seismic ground shaking, seismic-related ground failure, or impacts related to liquefaction and landslide risk. Additionally, the FTM BESSs would be operated remotely and would not place any people in a potentially hazardous area.

Given that the individual FTM BESSs, and cumulative development of FTM BESSs under Alternative BS-2, may not exceed 1 acre of ground disturbance, construction of Alternative BS-2 may not require coverage under the Construction General Permit, which requires development and implementation of a SWPPP, and typically adherence to erosion control and sedimentation measures. It is assumed, however, that all applicable federal, state, and local laws would be followed during BESS construction, including local best management practices related to fugitive dust management. FTM BESS facilities are minimal in size and, therefore, are likely to have less potential to result in adverse impacts related to erosion or the loss of topsoil.

Two of the illustrative FTM sites (5 and 6) are located in areas designated as having high potential for landslides (see Figure 4.7-3), although the sites themselves are relatively flat. The FTM sites also are mapped as having low to moderate potential for liquefaction. In general, following the design and construction requirements in G.O. 95 and 174, as well as the CBC, would minimize hazards associated with unstable geologic units/soils or expansive soils. Further, as explained above, there is no evidence to suggest Alternative BS-2 components would exacerbate existing hazards from unstable geologic units/soils or expansive soils. Alternative BS-2 would not require the use of septic tanks or alternative wastewater disposal systems.

As shown in Figure 4.7-1, several of the illustrative FTM sites are underlain by geologic units that are sensitive for paleontological resources, such Pleistocene-aged older alluvium (Qoa) and Paso Robles Formation (Qtp). Because excavation, grading, and other ground-disturbing activities are required for construction of individual FTM BESS facilities, construction of the FTM facilities could result in direct or indirect impacts to paleontological resources. Once constructed, the BESS facilities under Alternative BS-2 would not require substantial excavation, grading, or other ground-disturbing activities; thus, impacts to paleontological resources during operation or maintenance would not be expected.

Overall, FTM BESS sites were selected for illustrative purposes only, BESS installations have not been designed and technologies have not been selected, and the specifics of Alternative BS-2 are unknown. Thus, project-level determinations cannot be made as impacts are speculative. Therefore, consistent with CEQA Guidelines Section 15145, no significance conclusion is provided for any of the significance criteria.

### Alternative BS-3: Third Party, Behind-the-Meter Solar and Battery Storage

The specific locations of individual BTM solar or BESS facilities are unknown and would depend on which customers choose to participate in a BESS program. Thus, the geologic conditions of individual BTM sites; proximity of BTM facilities to known earthquake faults; susceptibility of sites to landslides, liquefaction, and other geologic hazards, and potential for excavation associated with BTM facility construction to encountered paleontological resources is unknown.

In general, individual BTM facilities under Alternative BS-3 are anticipated to be installed within existing buildings and would be relatively small units in most cases that could fit on a wall or on the roof. In some cases, particularly for commercial or industrial customers that choose to participate in the BESS program, BTM BESSs could be larger units that may require a foundation and could be installed in undeveloped portions of existing parcels. Even in these cases, the potential for substantial adverse effects related to geology, soils, seismicity, and paleontological resources to occur from construction and operation of BTM solar and BESS facilities is considered low because installation would require minimal construction activities that require earthwork, such as grading and excavating. Individual BTM solar and BESS facilities would need to be designed and constructed in accordance with the CBC and generally would not be expected to decrease any existing structure's stability.

There is no evidence to suggest that construction and/or operation of BTM facilities under Alternative BS-3 would directly or indirectly cause earthquakes or exacerbate any seismic-related hazards, strong seismic ground shaking, seismic-related ground failure, or significant impacts related to liquefaction and landslide risk. Additionally, Alternative BS-3 would not require use of septic tanks or alternative wastewater disposal systems. Given the small scale of individual BTM projects, these activities would be unlikely to result in substantial erosion or loss of topsoil. Additionally, BTM facilities would be constructed in accordance with the CBC, thereby minimizing potential hazards from being located on unstable units or expansive soils. There is no evidence to suggest that the construction or operation of BTM facilities would exacerbate existing geologic hazards. Finally, because BTM facilities would be installed on or within existing buildings, or potentially in small unused portions of existing properties, they would be unlikely to uncover or result in significant adverse impacts to paleontological resources.

Overall, due to the fact that specific locations and characteristics of BTM resources procured under Alternative BS-3 are unknown at this time, project-level impact determinations are not possible as the impacts are speculative. Therefore, consistent with CEQA Guidelines Section 15145, no significance conclusion is reached under any of the significance criteria.