2.5 Geology, Soils, and Seismicity

This section discusses potential impacts to existing geology and soils conditions, as well as potential exposure to risks associated with those conditions that may result from implementation of the proposed JVR Energy Park Project (Proposed Project). The analysis is based on review of existing resources, technical data, and applicable laws, regulations, and guidelines, as well as the following technical report prepared for the Proposed Project:

- Preliminary Geotechnical Evaluation: JVR Energy Park Project (Appendix F)
- Geology Mitigation Measures Memorandum (Appendix F in Final EIR)
- Proposed Project Revisions Technical Memorandum (Appendix R in Final EIR)

The comments received in response to the Notice of Preparation (NOP) did not include concerns specifically regarding geology and soils. A copy of the NOP and comment letters received in response to the NOP is included in Appendix A of this Environmental Impact Report (EIR).

The Proposed Project area has been revised by increasing the Project's setbacks and realignment of an existing water main, resulting in a net development footprint reduction of 17 acres (see Section 1.2 Project Description of Chapter 1 in the Final EIR). As described in the Proposed Project Revisions Technical Memorandum (Appendix R of the Final EIR), these Proposed Project changes will result in geology, soils, and seismicity impacts that are equal to or less than those presented in the Draft EIR and will not change any significance determinations in this Section 2.5 Geology, Soils and Seismicity. Accordingly, this Section has not been updated to account for this changed Project area and conservatively reports impacts associated with a 643-acre Project.

2.5.1 Existing Conditions

Geologic Setting

The Project site is located on the eastern portion of the Peninsular Range Geomorphic Province of Southern California. The Peninsular Range Geomorphic Province is typified by northwest to southeast trending mountain ranges extending approximately 900 miles from the Transverse Ranges and the Los Angeles Basin to the southern tip of Baja California. The province varies in width from approximately 30 to 100 miles. In general, the province consists of rugged mountains underlain by Jurassic metavolcanic and metasedimentary rocks, and Cretaceous igneous rocks of the Southern California batholith (Appendix F). The portion of the province in San Diego County that includes the Project site generally consists of uplifted granitic mountains and alluvial valleys. Portions of the Project site are also underlain by Miocene-age volcanic and sedimentary rocks.

Soils and Geologic Units

A variety of soil types typical of those found in the surrounding geologic region occur within the Project site (Appendix F, Figure 4, Geology within the Proposed Project Site). The Preliminary Geotechnical Evaluation (Appendix F) found that the geologic units encountered within the Project site during subsurface exploration included primarily fill, alluvium, and terrace deposits. Additional descriptions of the subsurface units and soils found within the Project site are provided below.

Fill

Fill soils were encountered on the Project site from the ground surface to depths of up to five feet. As encountered, the fill generally consisted of various shades of brown, moist, loose to medium dense, silty sand, along with scattered gravel. Additionally, gravel, cobbles, and boulders were observed on the ground surface within the Project site, and stockpiled material was observed in some areas of the site.

Alluvium

Quaternary-age alluvium underlies the majority of the Project site. Alluvium was encountered in borings underlying fill materials up to the maximum boring depth of approximately 41.5 feet. As encountered, the alluvium generally consisted of various shades of brown, moist to wet, stiff to very stiff, clayey silt and sandy clay, and loose to dense, silty sand. Scattered gravel layers were also encountered in the alluvium. Where located adjacent to outcrops of bedrock, the alluvium appeared to be relatively shallow (i.e., less than five feet in thickness).

Terrace Deposits

Quaternary-age terrace deposits were mapped in the eastern portions of the Project site and were encountered in borings from the ground surface to a depth of approximately 20 feet. As encountered, the terrace deposits generally consisted of light brown and reddish brown, dry to moist, medium dense to very dense, silty sand. Scattered gravel was also encountered in the terrace deposits, and gravel and cobbles were observed on the ground surface in areas mapped as being underlain by terrace deposits.

Anza Formation

Although not encountered during subsurface exploration, materials of the Miocene-age Anza Formation have been mapped in portions of the Project site (Appendix F). The Anza Formation consists of reddish-brown sandstone and conglomerate. Gravel to boulder-sized clasts are anticipated in the conglomerate portion of the Anza Formation.

Jacumba Volcanics

Although not encountered during subsurface exploration, Miocene-age Jacumba Volcanics have been mapped in several areas of the Project site and are anticipated to underlie portions of the alluvium in much of the Project site (Appendix F). The Jacumba Volcanics are a mix of basalt flows, breccias, and pyroclastic rocks.

Metamorphic Rock and Granitic Bedrock

Metamorphic rock has been mapped in the southwest and northwest portions of the Project site and granitic rock has been mapped along the northeast margin of the site. The metamorphic rock consists of the Jurassic-age Migmatitic Schist and Gneiss of Stephenson Peak, while the granitic bedrock consists of the Cretaceous-age Tonalite of La Posta.

Soils

According to the U.S. Department of Agriculture's Natural Resources Conservation Service (USDA 2019) database, 12 soil types are mapped within the Project site:

1. Acid Igneous Rock Land (AcG)
2. Carrizo Very Gravelly Sand, 0% to 9% slopes (CeC)
3. Indio Silt Loam, 0% to 2% slopes (InA)
4. Indio Silt Loam, 2% to 5% slopes (InB)
5. Indio Silt Loam, Saline, 0% to 2% slopes (IoA)
6. La Posta Rocky Loamy Coarse Sand, 5% to 30% slopes, eroded (LcE2)
7. Ramona Sandy Loam, 5% to 9% slopes (RaC)
8. Ramona Sandy Loam, 9% to 15% slopes, eroded (RaD2)
9. Reiff Fine Sandy Loam, 0% to 2% percent slopes (RkA)
10. Rositas Loamy Coarse Sand, 2% to 9% slopes (RsC)
11. Sloping Gullied Land (SrD)
12. Stony Land (SvE)

Additional information on these soil types found within the Project site can be found in Table 2.5- 1 (USDA NRCS 2014) and in Section 3.1.1, Agriculture and Soils, of this EIR.

Topography

The Project site varies from relatively level land in the central and southern portions of the site to moderately to steeply sloping hillsides along the western and eastern margins. Elevations range from approximately 2,745 feet above mean sea level in the lower, northern portion of the Project site to 3,365 feet above mean sea level at the top of Round Mountain in the northwestern portion

of the Project site. The Project site is sparsely developed with structures located in the southeast associated with prior dairy and ranching operations, transmission lines, and unpaved roads. A section of the San Diego and Arizona Eastern Railway that is no longer in service and a tributary to Carrizo Creek are present along the west portion of the Project site.

Faults and Seismicity

The Project site is not located within a State of California Earthquake Fault Zone (formerly known as Alquist-Priolo Special Studies Zone), nor is it located in a County of San Diego Special Study Zone (County of San Diego 2007a). The closest mapped faults to the Project site are pre-Quaternary in age and are generally considered to have little to no potential to generate an earthquake. The closest active fault is the Holocene-active Coyote Mountain segment of the Elsinore Fault Zone, located approximately 14 miles northeast. Based on a review of geologic maps and site reconnaissance, the Project site is not underlain by known active or potentially active faults (see Figure 3, Fault Locations, in Appendix F).

Ground Shaking

The Project site is not located within a Near-Source Shaking Zone as identified in Figure 3 of the County's Geologic Hazards Guidelines (County of San Diego 2007a). The Project site, like most of Southern California and all of San Diego County, is located within Seismic Zone 4, which is the highest Seismic Zone. The most recent large seismic event to affect the Proposed Project vicinity was on April 4, 2010, when a magnitude 7.2 earthquake struck an area approximately 30 miles south of Mexicali (Sierra El Mayor Earthquake). The epicenter of the earthquake was well south of the international border, but resulted in observable surface slip on several faults, or portions of faults, in the southwestern part of the Salton Trough, near Ocotillo (approximately 13 miles northeast of the Project site). Most fault offsets were minor in magnitude—less than 20 millimeters (about 0.8 inches)—but offsets observed on the Yuha, Pinto Wash, and Ocotillo Faults were 50 to 60 millimeters (about 2 inches), 40 millimeters (1.5 inches), and 85 millimeters (3.3 inches), respectively (USGS and CGS 2011). These faults, occurring in a broad area of the Yuha Desert, were not previously zoned under the Alquist– Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) because it was the first time that surface fractures had been observed in the southwestern Salton Trough. Consequently, in 2012, the California Geological Survey (CGS, formerly California Division of Mines and Geology) updated its Alquist- Priolo maps to identify portions of the Laguna Salada Section of the Elsinore Fault, the Yuha Wells Fault, and other unnamed faults in the vicinity of Ocotillo as active earthquake fault zones under the Alquist-Priolo Act.

The Sierra El Mayor Earthquake is estimated to have resulted in a Modified Mercalli Intensity of VI (strong) to VII (very strong) in the vicinity of the Project site (USGS 2010). Typically, ground shaking associated with an intensity of VII is associated with negligible damage in buildings of

good design and construction, slight to moderate damage in well-built ordinary structures, and considerable damage in poorly built or badly designed structures (e.g., brick and unreinforced masonry) (USGS 2012). These are only estimates based on correlations between average peak ground accelerations (PGA) and the observed level of damage in past earthquakes—the actual level of shaking experienced and the level of damage caused in any one place is highly site- and earthquake-specific.

The primary tool that seismologists use to describe potential for future ground shaking hazards is a probabilistic seismic hazard assessment. The probabilistic seismic hazard assessment for the State of California takes into consideration the range of possible earthquake sources (including worst-case scenarios) and estimates their characteristic magnitudes to generate a probability map for ground shaking. The probabilistic seismic hazard assessment maps depict values of PGA with a 10% probability of being exceeded in 50 years (i.e., a 1 in 475 annual chance). Use of this probability level allows engineers to design structures to withstand ground motions with a 90% chance of not occurring in the next 50 years, making buildings safer than if they were merely designed for the most probable events.

The probabilistic seismic hazard assessment for the State of California indicates that the Project site is unlikely to experience severe or highly destructive levels of ground shaking, primarily as a result of its distance from historically active faults. In the Project area, there is only a 10% chance of exceeding PGA values of 0.27–0.33 acceleration due to gravity (g) over the next 50 years, with the lower values corresponding to areas over bedrock, and the higher values corresponding to areas over unconsolidated alluvium (CGS 2003). Values exceeding PGA 0.27–0.33 g are typically associated with an earthquake with a Modified Mercalli Intensity of VIII, which would likely cause substantial damage in buildings not constructed according to modern building standards, with older brick or unreinforced masonry buildings prone to collapse. Structures adequately designed to current standards could also suffer cosmetic or utility damage, but would be unlikely to experience either full or partial structural collapse.

When compared to other areas of California, particularly the urban areas of Southern California and the San Francisco Bay Area in Northern California, which are close to historically active faults, these levels of PGA are relatively low. This information is consistent with the County's Geologic Hazards Guidelines, which do not identify any of the Project site as being within a near-source shaking zone (see Figure 3 in County of San Diego 2007a). In addition, based on the review of the geologic maps as well as site reconnaissance, the Project site is not underlain by known active faults and is not within a State of California Earthquake Fault Zone (Appendix F), and the active Coyote Mountain segment of the Elsinore Fault Zone is located approximately 14 miles to the northeast of the site and no active faults are known to cross the Project site.

Liquefaction

Liquefaction occurs primarily in saturated, loose, fine- to medium-grained soils in areas where the groundwater table is generally 50 feet or less below the surface. The primary areas of potential liquefaction hazard in San Diego County are Jacumba; the lower San Dieguito, Sweetwater, and San Luis Rey River Valleys; Borrego Valley near the Borrego Sink; and parts of Ramona (County of San Diego 2007a). Liquefaction of saturated, cohesionless soils can be caused by strong vibratory motion due to earthquakes. Loose granular soils and non-plastic silts saturated by a relatively shallow groundwater table are susceptible to liquefaction. Although shallow groundwater was not encountered during the preliminary geotechnical evaluation (Appendix F) of the Project site, loose and medium dense, granular, alluvial soils situated below the groundwater table may be subject to liquefaction. In addition, the Project site is identified as having a high risk for liquefaction in Figure 4.3.6 of the County's Multi-Jurisdictional Hazard Mitigation Plan (County of San Diego 2017).

Landslides

Landslides have not been mapped on or adjacent to the Project site, and evidence of landsliding was not observed during review of aerial photographs or during the site reconnaissance (Appendix F). In addition, the Project site is not within a Landslide Susceptibility Area as mapped in the County's General Plan (County of San Diego 2011a) and Multi-Jurisdictional Hazard Mitigation Plan (County of San Diego 2017). Rockfall hazards are possible in the more steeply sloping portions of the Project site, such as at Round Mountain, where Proposed Project development would not occur.

Expansive Soils

Expansive soils generally result from specific clay minerals that have the capacity to shrink or swell in response to changes in moisture content. Shrinking or swelling of foundation soils can lead to damage to slabs, foundations, and other engineered structures, including tilting and cracking. The Project site is not identified as having expansive soils according to the County's Geologic Hazards Guidelines (see Figure 6 in County of San Diego 2007a).

2.5.2 Regulatory Setting

Federal Regulations

The following federal regulations pertaining to geologic hazards would apply to the Proposed Project.

Occupational Safety and Health Administration Regulations

Excavation and trenching are among the most hazardous construction operations. The Occupational Safety and Health Administration's (OSHA) Excavation and Trenching Standard, Title 29 of the Code of Federal Regulations, Part 1926.650, covers requirements for excavation and trenching operations. OSHA requires that all excavations in which employees could potentially be exposed to cave-ins be protected by sloping or benching the sides of the excavation, supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area. In California, the California Occupational Safety and Health Administration (Cal/OSHA) has responsibility for implementing federal rules relevant to worker safety, including slope protection during construction excavations. Cal/OSHA's requirements are more restrictive and protective than federal OSHA standards.

U.S. Geological Survey Landslide Hazard Program

In fulfillment of the requirements of Public Law 106-113, the U.S. Geological Survey created the Landslide Hazard Program in the mid-1970s. According to U.S. Geological Survey, the primary objective of the National Landslide Hazards Program is to reduce long-term losses from landslide hazards by improving understanding of the causes of ground failure and suggesting mitigation strategies. The federal government takes the lead role in funding and conducting this research, whereas the reduction of losses due to geologic hazards is primarily a state and local responsibility. In San Diego County, the Unified Disaster Council is the governing body of the Unified San Diego County Emergency Services Organization. The primary purpose of the Unified Disaster Council and the Emergency Services Organization is to provide for the coordination of plans and programs designed for the protection of life and property in San Diego County (County of San Diego 2011b).

State Regulations

The following state regulations pertaining to geologic hazards would apply to the Proposed Project.

The statewide minimum public safety standard for mitigation of earthquake hazards (as established through the California Building Code (CBC), Alquist–Priolo Earthquake Fault Zoning Act, and Seismic Hazards Mapping Act) is that the minimum level of mitigation for a project should reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy,[1] but in most cases, is not required to prevent or avoid the ground failure itself. It is not feasible to design all structures to completely avoid damage in worst-case earthquake scenarios. Accordingly, regulatory agencies have generally defined an "acceptable level" of risk as that which provides reasonable protection of the public safety, although it does

[1] A "structure for human occupancy" is any structure used or intended for supporting or sheltering any use or occupancy that is expected to have a human occupancy rate of more than 2,000 person-hours per year.

not necessarily ensure continued structural integrity and functionality of a project (14 CCR 3721[a]). Nothing in these acts, however, precludes lead agencies from enacting more stringent requirements, requiring a higher level of performance, or applying these requirements to developments other than those that meet the acts' definitions of "project."

Alquist–Priolo Earthquake Fault Zoning Act

The Alquist–Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. In accordance with this act, the State Geologist established regulatory zones, called "earthquake fault zones," around the surface traces of active faults, and published maps showing these zones. Earthquake fault zones are designated by the CGS and are delineated along traces of faults where mapping demonstrates surface fault rupture has occurred within the past 11,000 years. Construction within these zones cannot be permitted until a geologic investigation has been conducted to prove that a building planned for human occupancy would not be constructed across an active fault. These types of site evaluations address the precise location and recency of rupture along traces of the faults, and are typically based on observations made in trenches excavated across fault traces.

The Project site is not within an Alquist-Priolo earthquake fault zone, and, therefore, is not subject to the requirements of this act (Appendix F).

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (California Public Resources Code, Chapter 7.8, Section 2690 et seq.) directs the CGS to protect the public from earthquake-induced liquefaction and landslide hazards (these hazards are distinct from fault surface rupture hazard regulated by the Alquist–Priolo Act). This act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones (i.e., zones of required investigation). Before a development permit may be granted for a site within a seismic hazard zone, a geotechnical investigation of the site must be conducted and appropriate mitigation measures incorporated into project design. Evaluation and mitigation of potential risks from seismic hazards within zones of required investigation must be conducted in accordance with the CGS Special Publication 117A, adopted March 13, 1997, updated in 2008, by the State Mining and Geology Board (CGS 2008).

Seismic Hazard Zone Maps have been prepared for portions of populated areas of Southern California and the San Francisco Bay Area; however, no seismic hazard zones have yet been delineated for the Project site. As a result, the provisions of the Seismic Hazards Mapping Act would not apply to the Proposed Project.

California Building Code

The CBC has been codified in the California Code of Regulations as Title 24, Part 2. Title 24 is administered by the California Building Standards Commission, which is responsible for coordinating all building standards. Under state law, all building standards must be centralized in Title 24 or they are not enforceable. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. The CBC is based on the International Building Code published by the International Code Conference. The CBC contains California amendments based on the ASCE Minimum Design Standards 7-05. ASCE 7-05 provides requirements for general structural design and includes means for determining earthquake loads and other loads (such as wind loads) for inclusion into building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

Local Regulations

The following local/regional regulations pertaining to geology, soils, and seismicity would apply to the Proposed Project.

San Diego County Special Studies Zones

The Alquist–Priolo Act provides that a city or county may establish more restrictive policies than those within the Alquist–Priolo Act, if desired. The County established Special Study Zones that include late-Quaternary faults mapped by the CGS. Late-Quaternary faults (movement during the past 700,000 years) were mapped for the County based on geomorphic evidence similar to that of Holocene faults except that tectonic features are less distinct. As indicated by the CGS, these faults may be younger, but the lack of younger overlying deposits precludes more accurate age classification. Traces of faults within "Special Study Zones" are treated by the County as active unless a fault investigation can prove otherwise. Before any construction is allowed, a geologic study must be conducted to determine if any active fault lines are located on or within the vicinity of a project site. For areas where active faulting is identified, the County's Fault Displacement Area regulations regulate new development in areas subject to potential loss of life and property from earthquake fault displacement in order to mitigate such losses (County of San Diego 2007a). The Proposed Project would not be located in a County Special Study Fault Zone or a fault rupture hazard zone as identified by the Alquist–Priolo Act.

San Diego County General Plan

The 2011 County General Plan guides future growth in the unincorporated areas of the County and considers projected growth anticipated to occur within various communities. The following goals and policies of the County General Plan Safety Element are applicable to the Proposed Project (County of San Diego 2011a):

- **Goal S-7: Reduced Seismic Hazards.** Minimize personal injury and property damage resulting from seismic hazards.
  - **Policy S-7.1: Development Location.** Locate development in areas where the risk to people or resources is minimized. In accordance with the California Department of Conservation Special Publication 42, require development be located a minimum of 50 feet from active or potentially active faults, unless an alternative setback distance is approved based on geologic analysis and feasible engineering design measures adequate to demonstrate that the fault rupture hazard would be avoided.
  - **Policy S-7.2: Engineering Measures to Reduce Risk.** Require all development to include engineering measures to reduce risk in accordance with the CBC, Uniform Building Code, and other seismic and geologic hazard safety standards, including design and construction standards, that regulate land use in areas known to have or potentially have significant seismic and/or other geologic hazards.
  - **Policy S-7.3: Land Use Location.** Prohibit high occupancy uses, essential public facilities, and uses that permit significant amounts of hazardous materials within Alquist–Priolo and County special studies zones.
- **Goal S-8: Reduced Landslide, Mudslide, and Rock Fall Hazards.** Minimized personal injury and property damage caused by mudslides, landslides, or rock falls.
  - **Policy S-8.1: Landslide Risks.** Direct development away from areas with high landslide, mudslide, or rock fall potential when engineering solutions have been determined by the County to be infeasible.
  - **Policy S-8.2: Risk of Slope Instability.** Prohibit development from causing or contributing to slope instability.

San Diego County Code

Grading Ordinance

Division 7 of Title 8 of the San Diego County Code (County of San Diego 2011c), Grading Ordinance, establishes the requirement to obtain a grading permit prior to grading operations. The Grading Ordinance requires the submittal of Grading Plans or improvement plans for review by

the County Official (Director of Public Works or Director of Planning & Development Services, or her/his authorized representative) prior to issuance of a grading permit. The Grading Ordinance contains design standards and performance requirements that must be met to avoid or reduce to an acceptable level the potential for slope instabilities, expansive soils, excessive erosion, and sedimentation to adversely affect a proposed development (Chapter 4 of the Grading Ordinance). The ordinance sets forth the maximum slope allowed for cut and fill slopes; the requirement for drainage terraces on cut or fill slopes exceeding 40 feet in height; expansive soil requirements for cuts and fills; minimum setback requirements for buildings from cut or fill slopes; and reporting requirements, including a soil engineer's report and a final engineering geology report by a California Certified Engineering Geologist that includes specific approval of the grading as affected by geological factors. The Grading Ordinance also contains requirements to reduce effects on air quality (Section 87.428, Dust Control), native habitat (Section 87.503), cultural and paleontological resources (Sections 87.429 and 87.430), and watercourses (Chapter 6 of the Grading Ordinance). Upon review of Grading Plans, the County Official has the authority to approve, attach conditions of approval, or deny the permit application.

On-Site Wastewater Treatment System Ordinance

Chapter 3, Division 8, of Title 6 of the San Diego County Code, On-Site Wastewater Treatment System Ordinance (County of San Diego 2011d), establishes the requirements for on-site wastewater treatment systems in the County. The purpose of this ordinance is to implement state laws and regulations associated with waste discharge requirements (State Water Resources Control Board and the California Regional Water Quality Control Board for the San Diego Region), and to implement additional standards for septic systems and graywater systems that are necessary to protect the health and safety of the community. It also makes it unlawful for any person to cause, suffer, or permit the disposal of sewage, human excrement, or other liquid wastes in any place or manner except through and by means of an approved plumbing and drainage system and an approved sewage disposal system. If no public sanitary sewer system is available, the ordinance allows for installation of on-site wastewater treatment systems, provided that the requirements and standards of the ordinance are complied with and a permit issued by the Department of Environmental Health is obtained. Standards and requirements include soil percolation tests to determine soil suitability, the selection of a treatment system appropriate for site conditions, and specific setback requirements from lakes, streams, ponds, slopes, and other utilities and structures. Chapter 6, Division 8, of Title 6 of the County Code pertains to Septic Tank and Cesspool Cleaners, which establishes processes, fees, and requirements for the examination, cleaning, and collection of sewage from septic tanks and cesspools. The Proposed Project does not include any septic or on-site wastewater systems. As such, this ordinance does not apply to the Proposed Project.

2.5.3 Analysis of Proposed Project Effects and Determination as to Significance

The Proposed Project is a solar energy generation and storage facility, which includes the~~a switchyard~~ Switchyard Facilities that would be transferred to San Diego Gas & Electric after construction. For the purposes of this analysis, the ~~switchyard~~ Switchyard Facilities (as described in Chapter 1, Project Description, of this EIR) is a component of the Proposed Project and has been analyzed as a part of the whole of the action. However, this EIR highlights the specific analysis of the ~~switchyard~~ Switchyard Facilities under each threshold of significance in the event that responsible agencies have California Environmental Quality Act (CEQA) obligations related to the ~~switchyard~~ Switchyard Facilities.

This section characterizes the geologic and seismic hazards of the Project site to evaluate their potential adverse effects on the Proposed Project as well as the potential for the Proposed Project to create or worsen such hazards for the public and/or surrounding properties. For geology and soil conditions, the study area is typically limited to the development footprint of the Proposed Project, whereas for seismic hazards, the study area is regional, because earthquakes on distant faults can produce ground shaking on the Project site.

The scope of the impact analysis reflects the significance thresholds contained in the County's Geologic Hazards Guidelines (County of San Diego 2007a), which address fault rupture, ground shaking, liquefaction, landslides, and expansive soils. Baseline information against which potential impacts of the Proposed Project are compared is derived from a variety of sources, including maps and surveys from the U.S. Geological Survey, the U.S. Department of Agriculture, the CGS, and the County General Plan. The impact analysis is based in large part on the Preliminary Geotechnical Evaluation completed by Ninyo & Moore (see Appendix F) in March 2020, and the County Geologic Hazards Guidelines.

The County's Guidelines for Determining Significance are generally intended to address the questions posed in Appendix G of the CEQA Guidelines. In 2018, the CEQA Guidelines were updated and several of the questions listed in Appendix G were revised, deleted, or modified. The County's Guidelines for Determining Significance have yet to be updated to address these amendments. Accordingly, this EIR analyzes the impacts from the Proposed Project using the County's Guidelines for Determining Significance and the questions posed in Appendix G. Where the questions in Appendix G have not been revised, only the County's Guidelines for Determining Significance are identified and analyzed. Where the questions in Appendix G have been significantly altered or additional questions have been posed, the Proposed Project's impacts are analyzed as against the questions in Appendix G and, to the extent they remain consistent with Appendix G, the County's Guidelines for Determining Significance.

2.5.3.1 Fault Rupture

Guidelines for the Determination of Significance

For the purposes of this EIR, the County's Geologic Hazards Guidelines (County of San Diego 2007a) apply to both the direct impact analysis and the cumulative impact analysis. These significance guidelines have been developed by the County to address question VI(a)(i) in the CEQA Guidelines, Appendix G (14 CCR § 15000 et seq.), and to ensure compliance with Fault Displacement Area regulations within the County Zoning Ordinance.

A significant impact would result if:

- The project would propose any building or structure to be used for human occupancy over or within 50 feet of the trace of an Alquist–Priolo fault or County Special Study Zone fault.
- The project proposes the following uses within an Alquist-Priolo Zone which are prohibited by the County: i) uses containing structures with a capacity of 300 people or more; ii) uses with the potential to severely damage the environment or cause major loss of life; iii) specific civic uses including police and fire stations, schools, hospitals, rest homes, nursing homes, and emergency communication facilities.

Analysis

As discussed in Section 2.5.1, Existing Conditions, the Proposed Project would not be located in a County Special Study Fault Zone or a fault rupture hazard zone as identified by the Alquist–Priolo Act, nor would it be underlain by an active or potentially active fault. The closest mapped faults to the Project site are pre-Quaternary in age, and are generally considered to have little to no potential to generate an earthquake. The closest active fault to the Project site is the Holocene-active Coyote Mountain segment of the Elsinore Fault Zone, located approximately 14 miles northeast of the Project site.

In addition, none of the proposed structures would be constructed for human occupancy. Once operational, the Proposed Project would be an un-staffed facility that would be monitored remotely, and no on-site personnel would regularly occupy the site. Humans would only occupy the site periodically for routine panel cleaning, inspections and maintenance. Therefore, the Proposed Project would have a **less than significant** impact from the exposure of people or structures to adverse effects from a known fault-rupture hazard zone.

Switchyard Facilities

Construction of the ~~switchyard~~ Switchyard Facilities would not be located in a County Special Study Fault Zone or a fault rupture hazard zone as identified by the Alquist-Priolo Act, nor would it be underlain by an active or potentially active fault. The ~~switchyard~~ Switchyard Facilities would

also not be constructed for human occupancy. Therefore, this Proposed Project component would have a **less than significant** impact from the exposure of people or structures to adverse effects from a known fault-rupture hazard zone.

2.5.3.2 Ground Shaking

Guidelines for the Determination of Significance

For the purposes of this EIR, the County's Geologic Hazards Guidelines (County of San Diego 2007a) applies to both the direct impact analysis and the cumulative impact analysis. These significance guidelines have been developed by the County to address question VI a) ii) in the CEQA Guidelines, Appendix G. A significant impact would result if:

> The project would be located within a County Near-Source Shaking Zone or within Seismic Zone 4 and the project does not conform to the Uniform Building Code (UBC).

Analysis

As discussed in Section 2.5.1, Existing Conditions, the Project site is not located within a Near-Source Shaking Zone as identified in Figure 3 of the County's Geologic Hazards Guidelines (County of San Diego 2007a). However, the Project site is within Seismic Zone 4, as is all of San Diego County, and is subject to ground shaking.

The Project site could be subject to strong ground shaking in the event of a large earthquake on any of the active or potentially active faults in the greater Southern California region. The Project site is not within a near-source shaking zone identified on the county hazard maps (see Figure 4 in County of San Diego 2007a), and the PGA with a 2% chance of occurring in the next 50 years (i.e., equivalent to a 1 in 2,475 annual chance) is estimated to be approximately 0.526 g. Such levels of ground shaking have in the past been associated with a Modified Mercalli Intensity of VI (strong), which can cause substantial damage and possible collapse in old brick and unreinforced-masonry-type structures, but only minor damage to newer buildings constructed in accordance with modern building standards. Building codes currently in effect are intended to prevent substantial damage and structural collapse of buildings in "design earthquakes," which are usually equivalent to earthquakes with a 10% chance of occurring in the next 50 years.

The Proposed Project consists of PV modules, a solar energy battery storage system, ~~switchyard~~ Switchyard Facilities and collector substation, and associated infrastructure. The closest distance between an occupied residence and a proposed component of the Proposed Project would be approximately 110 feet in the town of Jacumba Hot Springs. The maximum height of the solar facilities that would be constructed would be up to ~~four~~ five ~~80~~ 70 to 115-foot tall poles located in the ~~switchyard~~ Switchyard Facilities, which would be located in the center of the Project site, approximately 4,500 feet from the occupied residences. Thus, the tallest structures would not be in

the proximity of the residences. The solar facilities that would be located near the occupied residences would be a maximum of 12 feet tall. Therefore, the public safety implications of damage or collapse of these structures would be negligible, as the surrounding properties are beyond the range of impact from structural toppling of the solar modules (which would be highly improbable for properly designed, seismically compliant structures). The Proposed Project would not be located in a densely populated area, nor would the Proposed Project include structures for human occupancy. The Proposed Project would be an unmanned facility that is operated remotely, and would only have workers occupying the site periodically for routine panel cleaning, inspections, and maintenance. The entire solar facility would be fenced and would be off limits to the public. The fencing would meet National Electrical Safety Code requirements for protective arrangements in electric supply stations. The fencing would be seven feet in height total, with a six-foot-high chain-link perimeter fence and one foot of three strands of barbed wire along the top, and would be constructed with anti-climbing material(s), such as small-ring chain-link fencing. Signage in Spanish and English for electrical safety would also be placed along the perimeter of the solar facility, warning the public of the need to keep out.

To ensure the structural integrity of all structures, the Proposed Project components would conform to the seismic design requirements that are outlined within the CBC, which contains universal standards for proper site preparation and grading practices, adequate design of foundations, and guidelines for the appropriate selection and use of construction materials. The local agency that enforces the CBC is the County Department of Planning & Development Services, which reviews applications for building permits for compliance with the CBC, local amendments to the CBC, and County Zoning Ordinance Section 87.209. Grading Plans would also be reviewed for compliance with state and local standards (as discussed in Section 2.5.2, Regulatory Setting). As part of the development review process, the County requires a Soil Investigation Report that includes data regarding the nature, distribution, and strength of existing soils and rock on the site; the soil engineer's conclusions and recommendations for grading requirements, including the correction of weak or unstable soil conditions and treatment of any expansive soils that may be present; and the soil engineer's opinions as to the adequacy of building sites to be developed. The recommendations contained therein will be refined as necessary based on final designs and incorporated into the Proposed Project's plans and specifications as a condition of final Proposed Project approval. Further detail regarding soils will be included in the final Soil Investigation Report that will be prepared as site and facility design advances, and must be approved by a County official as part of the grading permit process (County Ordinance No. 9634 [N.S.]).

Because site design would be required to comply with state and local building and grading standards, substantial adverse effects from strong seismic ground shaking would be avoided or reduced to acceptable levels. Potential adverse effects from strong seismic ground shaking would, therefore, be **less than significant**.

Switchyard Facilities

Construction of the ~~switchyard~~ Switchyard Facilities could be subject to strong ground shaking if a large earthquake on any of the active or potentially active faults in the greater Southern California region. The ~~switchyard~~ Switchyard Facilities would include the construction of up to ~~four~~ five ~~80~~ 70 to 115-foot-high poles to support the 138- kilovolt overhead transmission line; however, since the ~~switchyard~~ Switchyard Facilities would consist of a stand-alone facility that would not house operational employees, the public safety implications of damage or collapse of this facility would be negligible. Additionally, the ~~switchyard~~ Switchyard Facilities would not be located in a densely populated area and would not include structures for long-term human occupancy. Moreover, the switchyard would be off limits to the public, with a seven-foot-high security fence surrounding the entire facility. Lastly, the ~~switchyard~~ Switchyard Facilities would only require periodic maintenance that would be conducted on an as-needed basis; therefore, employees would not frequent this portion of the site.

To ensure the structural integrity of the ~~switchyard~~ Switchyard Facilities, construction of ~~the facility~~ this component would conform to the seismic design requirements outline within the CBC, which contains universal standards for the appropriate selection and use of construction materials.

Because the ~~switchyard~~ Switchyard Facilities site design would be required to comply with state-mandated building and grading standards, substantial adverse effects from strong seismic ground shaking would be avoided or reduced to acceptable levels. Potential adverse effects from strong ground shaking would, therefore, be **less than significant**.

2.5.3.3 Liquefaction

Guidelines for the Determination of Significance

For the purposes of this EIR, the County's Geologic Hazards Guidelines (County of San Diego 2007a) apply to both the Proposed Project impact analysis and the cumulative impact analysis. The following significance guidelines have been developed by the County to address question a) iii) and the portion of question c) that addresses on-site and off-site lateral spreading or liquefaction in the CEQA Guidelines, Appendix G. A significant impact would result if:

- The project site has potential to directly or indirectly cause potential substantial adverse effects because i) the project site has potentially liquefiable soils, ii) the potentially liquefiable soils are saturated or have the potential to become saturated, and iii) in-situ soil densities are not sufficiently high to preclude liquefaction.

Analysis

Liquefaction is a phenomenon that can occur under a specific set of circumstances that can substantially amplify the normally expected magnitude of shaking and can lead to loss of bearing pressure in normally competent soils. As indicated in the significance criteria, an area that has low in-situ soil densities (which typically include loose sandy soils) and a shallow or perched groundwater table has the potential to liquefy if subject to a strong earthquake. The most severe liquefaction effects occur when the thickness of loose sandy soils is high and when those soils are saturated close to the ground surface; however, the potential for liquefaction to occur in any given area is highly dependent on site-specific conditions. Typical effects of liquefaction include sinking foundations, tilting structures, and rupture and/or substantial damage to underground utility lines.

Although historically groundwater has been encountered in wells in the Jacumba Valley area at depths ranging from approximately 50 to 75 feet (SCS Engineers 2011; Stantec 2016), during preparation of the Groundwater Resources Investigation Report for the Proposed Project in 2020 (Appendix O), groundwater was encountered at depths ranging from 34.14 to 59.74 feet below the ground's surface. This shallow groundwater was likely due to a high amount of rainfall in 2018 and 2019, making it possible for locally perched groundwater to be encountered. The shallow groundwater coupled with the loose and medium dense, granular, alluvial soils situated above and below the groundwater table may make the Project site subject to liquefaction. This site is also identified as having a high risk for liquefaction in Figure 4.3.6 of the County's Multi-Jurisdictional Hazard Mitigation Plan (County of San Diego 2017).

Although the factors for liquefaction are present, the Proposed Project will be designed in accordance with the seismic design requirements of the CBC, which contains universal standards for seismically sound site preparation and grading practices, foundations design, and guidelines for the appropriate selection and use of construction materials. County Planning & Development Services also reviews applications for building permits for compliance with the CBC, local amendments to the CBC, and County Zoning Ordinance Section 87.209. Grading Plans would also be reviewed for compliance with state and local standards (as discussed above in Section 2.5.2, Regulatory Setting). However, the Proposed Project may still create a potentially significant impact associated with ground failure due to liquefaction, seismically induced settlement, and/or lateral ground spread that could result in the collapse of a structure; therefore, impacts would be **potentially significant (Impact GEO-1)**.

Switchyard Facilities

As explained above and in the Groundwater Resources Investigation Report for the Proposed Project (Appendix O), groundwater was encountered at depths ranging from 34.14 to 59.74 feet at the site. The shallow groundwater coupled with loose and medium dense, granular, alluvial soils

situated above and below the groundwater table may make the site subject to liquefaction. In addition, the site is identified as having a high risk for liquefaction in Figure 4.3.6 of the County's Multi-Jurisdictional Hazard Mitigation Plan (County of San Diego 2017).

The ~~switchyard~~ Switchyard Facilities would be designed in accordance with the seismic design requirements of the CBC, which contains universal standards for seismically sound site preparation and grading practices, foundations design, and guidelines for the appropriate selection and use of construction materials. County Planning & Development Services also reviews applications for building permits for compliance with the CBC, local amendments to the CBC, and County Zoning Ordinance Section 87.209. Grading Plans would also be reviewed for compliance with state and local standards (as discussed above in Section 2.5.2, Regulatory Setting). However, the ~~switchyard~~ Switchyard Facilities may still create a potentially significant impact associated with ground failure due to liquefaction, seismically induced settlement, and/or lateral ground spread that could result in the collapse of a structure; therefore, impacts would be **potentially significant (Impact GEO-1)**.

2.5.3.4 Landslides

Guidelines for the Determination of Significance

For the purposes of this EIR, the County's Geologic Hazards Guidelines (County of San Diego 2007a) apply to both the direct impact analysis and the cumulative impact analysis. The following significance guidelines have been developed by the County to address question VI(a)(iv) and the portion of question (c) that relates to on-site or off-site landslide or collapse in the CEQA Guidelines, Appendix G. A significant impact would result if:

- The project would directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides.
- The project is located on a geologic unit or soil that is unstable, or would become unstable as a result of the project, potentially resulting in an on-site or off-site landslide.
- The project site lies directly below or on a known area subject to rockfall which could result in collapse of structures.

Analysis

The Project site is not within a landslide susceptibility area as identified in the County's Geologic Hazards Guidelines (County of San Diego 2007a). Landslides have not been mapped on or adjacent to the site and evidence of landsliding was not observed during review of aerial photographs or during site reconnaissance (Appendix F). Rockfall hazards are possible in the more steeply sloping portions of the Project site, such as at Round Mountain. However, the proposed

development would generally be limited to the relatively flat, low-lying areas of Jacumba Valley. Therefore, because the Proposed Project is not located within an identified landslide susceptibility area; the geologic environment has a low probability to become unstable; and the Proposed Project would avoid areas subject to rockfall, the Proposed Project would have a **less than significant** impact from the exposure of people or structures to potential adverse effects from landslides.

The Proposed Project involves site grading for installation of the solar facility that would result in the creation of areas of cut and areas underlain by fill. To ensure that any proposed structures (including those proposed on the Project site) are adequately supported (whether on native soils, cut, or fill), a Soils Investigation Report would be required as part of the building permit process. This report would evaluate the strength of underlying soils and make recommendations on the design of building foundation systems. Grading plans must be compliant with standards in County Grading Ordinance addressing the stability, incline, and compaction of cuts and fills. The Soils Investigation Report must demonstrate that a proposed building meets the structural stability standards required by the CBC and the local grading ordinance. Additionally, during trenching and excavation, the Proposed Project would be required to comply with OSHA standards to protect slopes and prevent cave-ins and other hazards related to soil stability. The report must be approved by the County prior to the issuance of a building permit. With this standard requirement, impacts would be **less than significant**.

Switchyard Facilities

The ~~switchyard~~ Switchyard Facilities are not located within a landslide susceptibility area as identified in the County's Guidelines for Determining Significance, Geologic Hazards (County of San Diego 2007a). The ~~switchyard~~ Switchyard Facilities would not be located on steep slopes (slopes with a grade of 25% or greater) and would avoid areas subject to rockfall. Additionally, slope stability is not anticipated to be an issue at the ~~switchyard~~ Switchyard Facilities site, due to the relatively flat nature of the site and the subsurface materials (Appendix F). Therefore, impacts relative to landslides as they pertain to the Switchyard Facilities would be **less than significant**.

2.5.3.5 Expansive Soils

Guidelines for the Determination of Significance

For the purposes of this EIR, the County's Geologic Hazards Guidelines (County of San Diego 2007a) apply to both the direct impact analysis and the cumulative impact analysis. The following significance guidelines have been developed by the County to address question (d) in the CEQA Guidelines, Appendix G. A significant impact would result if:

- The project would be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), and does not conform with the Uniform Building Code, creating direct or indirect risks to life or property.

Analysis

The Project site is not located in an area identified as having expansive soils as determined by the County's Geologic Hazards Guidelines (see Figure 6 in County of San Diego 2007a). However, the County's Geologic Hazards Guidelines maps are used for basic project screening purposes and are based on regional data as opposed to site specific studies. The Proposed Project would be designed in accordance with the seismic design requirements of the CBC, which contains universal standards for seismically sound site preparation and grading practices, foundations design, and guidelines for the appropriate selection and use of construction materials. In accordance with the CBC, an evaluation of the soils would be conducted that evaluates the soils underlying the Project site. With implementation of these standard practices, as required by the CBC and local ordinances, it is anticipated that potential for impacts due to expansive soils would be low. However, the Preliminary Geotechnical Evaluation (Appendix F) found that a more comprehensive evaluation of the soils underlying the Project site would be needed to determine the soil expansion risk and to ensure that potentially expansive soils, if encountered, are adequately addressed; therefore, impacts associated with expansive soils would be **potentially significant (Impact GEO-2)**.

Switchyard Facilities

The ~~switchyard~~ Switchyard Facilities site is not located in an area identified as having expansive soils as determined by the County's Geologic Hazards Guidelines (see Figure 6 in County of San Diego 2007a). Required compliance with the CBC would ensure that potentially expansive soils, if encountered, are adequately addressed. Standard practices include removing expansive soils and placing a mat of properly compacted, non-expansive fill prior to placing foundations, structures, utilities, and road beds. In some cases, potentially expansive soils can be treated or mixed with other materials to reduce its expansive potential to acceptable levels. With implementation of these standard practices as required by the CBC it is anticipated that the potential for impacts to occur on the ~~switchyard~~ Switchyard Facilities site due to expansive soils would be low. However, impacts associated with expansive soils would be **potentially significant (Impact GEO-2)**.

2.5.3.6 Adequate Soils for Septic Systems or Other On-Site Wastewater Systems

Guidelines for the Determination of Significance

The County's Geologic Hazards Guidelines and its Guidelines for Determining Significance – Surface Water Quality (County of San Diego 2007a, 2007b) do not contain a significance criterion that addresses adequate soils for septic systems or other on-site wastewater systems. However, the following analysis is provided to address question e) in the CEQA Guidelines, Appendix G, which states that a significant impact would result if:

- The project would have soils incapable of supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

Analysis

The Proposed Project does not include any septic or on-site wastewater systems. As such, the Proposed Project would result in **no impact**.

Switchyard Facilities

The ~~switchyard~~ Switchyard Facilities do~~es~~ not include any septic or on-site wastewater systems. As such, the ~~switchyard~~ Switchyard Facilities would result in **no impact**.

2.5.4 Cumulative Impact Analysis

All of Southern California lies within a seismically active region with an extremely diverse range of geologic and soil conditions that can vary substantially within short distances. However, impacts from geologic and soil conditions are also site-specific and would only have potential to combine with impacts of the Proposed Project if they occurred in the same general location, on similar soils and topographies. Thus, the geographic extent of the cumulative study area for potential impacts to people and structures related to geologic and seismic hazards is restricted to the Project site and the area immediately surrounding the site.

2.5.4.1 Fault Rupture

It is unlikely that past, existing, and/or future projects could contribute to the cumulative effects of geology and soils creating the acceleration of erosion, slope failures, fault or ground rupture, and/or earthquake-induced ground failure. These types of conditions would be limited to the areas within and adjacent to the boundaries of individual projects or structural components of the project. In order for impacts to be cumulatively considerable, these conditions would have to occur at the same time and in the same location as the Proposed Project. Therefore, potential seismic impacts (ground shaking, earthquake-induced ground failure, and fault rupture) as a result of local and regional faults, as well as soils that underlie individual projects, comprise an impact to the geologic environment that would not be cumulatively considerable. Additionally, each individual project would be designed in accordance with seismic design criteria as required by the CBC and with other specific design criteria from state and local building and grading regulations, and would be subject to CEQA, including analysis of and mitigation for geologic and soil impacts on an individual basis. Therefore, the Proposed Project **would not contribute, even incrementally, to potentially cumulative impacts** related to fault rupture.

2.5.4.2 Ground Shaking, Liquefaction, Landslides, Expansive Soils, and Adequate Soils for Septic Systems or Other On-Site Wastewater Systems

Potential geologic and soils impacts associated with the Proposed Project are restricted to potential facility damage from earthquake-related ground shaking, liquefaction, landslides, expansive soils, and general soil suitability. County Planning & Development Services reviews applications for building permits for compliance with the CBC, local amendments to the CBC, and County Zoning Ordinance Section 87.209. Grading Plans would also be reviewed for compliance with state and local standards. As part of the development review process, the County requires a Soil Investigation Report for all projects that includes data regarding the nature, distribution, and strength of existing soils and rock on the site; and the soil engineer's conclusions and recommendations for grading requirements, including the correction of weak or unstable soil conditions, and treatment of any expansive soils that may be present.

The Proposed Project would be designed in accordance with the seismic design requirements of the CBC, which contains universal standards for seismically sound site preparation and grading practices, foundations design, and guidelines for the appropriate selection and use of construction materials. Potential impacts within the Project site would be less than significant with mitigation, and no other projects identified on the list of cumulative projects would occur on the Project site, therefore, impacts associated with liquefaction would **not be cumulatively considerable**.

The Proposed Project does not include any septic or on-site wastewater systems. As such, the Proposed Project would **not contribute to a cumulative impact** related to adequate soils for septic tanks or on-site wastewater systems. In all cases, the impacts were determined to be less than significant because the existing regulatory framework controlling the design and construction of structures in California, and actions required to obtain a grading and/or development permits at the local level are sufficient to avoid or substantially reduce the potential impacts. All other cumulative projects in the cumulative projects would be required to comply with the same or similar set of laws, regulations, and ordinances.

Therefore, because all cumulative projects would be designed in accordance with seismic design criteria as required by the CBC and with other specific design criteria from state and local building and grading regulations, impacts would be **less than cumulatively considerable** as it relates to ground shaking, liquefaction, landslides, expansive soils, or adequate soils for septic systems.

2.5.5 Significance of Impact Prior to Mitigation

The Proposed Project's impacts associated with fault rupture, groundshaking, and landslides are **less than significant**. Impacts resulting from implementation of the Proposed Project associated with liquefaction (**Impact GEO-1**) and expansive soils (**Impact GEO-2**) during construction and

operation are **potentially significant. No impacts** would occur related to septic systems or other wastewater systems. Cumulative impacts are **not cumulatively considerable.**

2.5.6 Mitigation Measures

M-GEO-1 Prior to the issuance of a building permit, the Project applicant shall retain a California Certified Engineering Geologist or Civil Engineer specializing in geotechnical engineering to perform a detailed site-specific subsurface report or preliminary geotechnical investigation, consistent with the California Building Code. The California Building Code (which incorporates the International Building Code) is contained in the California Code of Regulations, Title 24, Part 2, which is a portion of the California Building Standards Code, and includes design and construction requirements related to life safety and structural safety. The geotechnical study shall include subsurface investigation, laboratory testing, and additional deep explorations using borings ~~of 60 feet or more~~ and/or cone penetrometer tests ~~across the alluviated portions~~ in the vicinity of the substation and Switchyard Facilities ~~of the Proposed Project site~~ ~~to~~ sufficient, as determined by the California Certified Engineering Geologist or Civil Engineer specializing in geotechnical engineering in accordance with applicable regulations, to further define the alluvium profile and ~~quantitatively~~ qualitatively address the potential for soil liquefaction and lateral spreading ~~across the site~~. The subsurface geotechnical study shall also include recommendations for the proposed construction and grading such as remedial grading, ground improvement techniques, special foundation design, and other recommendations to ensure that construction of the Proposed Project does not pose risk to human life in a seismic event as the result ~~in~~ of substantial liquefaction, subsidence, or seismic- related ground failure due to lateral spread. In addition, the Proposed Project shall implement any necessary measures required to comply with existing building codes and regulations.

2.5.7 Conclusion

The Proposed Project's impacts associated with fault rupture, groundshaking, and landslides are **less than significant**. Within implementation of mitigation measure **M-GEO-1,** [2] impacts associated with liquefaction (**Impact GEO-1**) and expansive soils (**Impact GEO-2**) would be reduced to **less than significant**. **No impacts** would occur related to septic systems or other wastewater systems. Cumulative impacts are **not cumulatively considerable.**

[2] This mitigation measure has been revised to comport with applicable geotechnical standards and practices for a utility-scale solar project. See the Geology Mitigation Measures Memorandum in Appendix F in Final EIR.

Table 2.5-1
Soil Units within the Project Site

Map Unit, Soil Name	Acres	Depth (inches)
AcG, Acid igneous rock land	131.1	0–4
CeC, Carrizo very gravelly sand 0%–9% slopes	91.04	0–60
InA, Indio silt loam, 0%–2% slopes	42.10	0–60
InB, Indio silt loam 2%–5% slopes	119.78	0–60
IoA, Indio silt loam, saline, 0%–2% slopes	305.0	0–60
LcE2, La Posta rocky loamy coarse sand, 5%–30% slopes, eroded	4.82	0–31
RaC, Ramona Sandy Loam, 5%–9% slopes	6.05	0–74
RaD2, Ramona sandy loam, 9%–15% slopes	24	0–74
RkA, Reiff fine sandy loam, 0%–2% slopes	272	0–60
RsC, Rositas loamy coarse sand, 2%–9% slopes	72.62	0–60
SrD, Sloping gullied land	61.70	0–60
SvE, Stony land	225.06	0–60
Total*	**1355.56**	

Source: Appendix I.

* Totals may not sum precisely due to rounding. The Project site itself is 1,345 acres. The additional 10 acres shown here includes the easement for Old Highway 80, which traverses the Project site.

AcG, Acid igneous rock land; CeC, Carrizo very gravelly sand 0–9% slopes; InA, Indio silt loam, 0–2% slopes; InB, Indio silt loam 2–5% slopes; IoA, Indio silt loam, saline, 0–2% slopes; LcE2, La Posta rocky loamy coarse sand, 5–30% slopes, eroded; RaC, Ramona Sandy Loam, 5–9% slopes; RaD2, Ramona sandy loam, 9–15% slopes; RkA, Reiff fine sandy loam, 0–2% slopes; RsC, Rositas loamy coarse sand, 2–9% slopes; SrD, Sloping gullied land; SvE, Stony land