3.1.3 Geology, Soils, and Seismicity

This section discusses potential impacts to existing geology and soils conditions and potential exposure to risks associated with those conditions that may result from implementation of the Campo Wind Project with Boulder Brush Facilities (Project). The analysis is based on review of existing resources; technical data; applicable laws, regulations, and guidelines; and the following technical report prepared for the Boulder Brush Facilities:

- Boulder Brush Facilities Geology and Soils Evaluation Report prepared by Ninyo & Moore, July 2019 (Appendix M)

One comment was received in response to the Notice of Preparation regarding the carbon sequestration capacities of soils. This concern was considered and addressed in Section 2.2, Air Quality, of this Environmental Impact Report (EIR). No other comments regarding geology, soils, and seismicity were received. A copy of the Notice of Preparation and comment letters received in response to the Notice of Preparation are included in Appendix A of this EIR.

3.1.3.1 Existing Conditions

The approximately 2,520-acre Project Site is located in southeastern San Diego County, California (see Figure 1-1, Project Location, and Figure 1-2, Project Area, in Chapter 1, Project Description, Location, and Environmental Setting, of this EIR). The Project would consist of both the Campo Wind Facilities, which would be located on Campo Band of Diegueño Mission Indians Reservation (Reservation) land within the Reservation Boundary under the jurisdiction of the Bureau of Indian Affairs (BIA), and the Boulder Brush Facilities, which would be located on adjacent private lands under the land use and permitting jurisdiction of the County of San Diego (County) within the Boulder Brush Boundary. The BIA is the Lead Agency for the Project under the National Environmental Policy Act (NEPA) and has prepared an Environmental Impact Statement (EIS) for the Project.

The Campo Wind Facilities would be located within the approximately 2,200-acre Campo Corridor inside the Reservation Boundary. The Boulder Brush Facilities would be located within the approximately 320-acre Boulder Brush Corridor inside the Boulder Brush Boundary. Collectively, the Campo Corridor and the Boulder Brush Corridor compose the approximately 2,520-acre Project Site.

Topography

The Project Site is located west of the In-Ko-Pah Mountains and bisected by the Tecate Divide. The landscape of the Project Site consists of a series of ridgelines separating numerous small mountain valleys and canyons. Elevations across the Project Site range from approximately 3,280 feet above

mean sea level to 4,120 feet above mean sea level. Topography within the Boulder Brush Boundary includes uplands consisting of gentle ridgelines and rock outcroppings bisected by the alluvial-filled McCain Valley. Topography within the Reservation Boundary features gently rolling hillsides and valleys separated by elongated ridgelines. The majority of hillsides greater than 25% slope are located on the southwestern portion of the Reservation Boundary and generally trend northwest to southeast (Figure 3.1.3-1, Project Soils, Topography, Slopes, and Liquefaction Map).

Geology

The Project Site is located in the eastern portion of the Peninsular Ranges geomorphic province, which consists of northwest-oriented mountain ranges and fault systems. The underlying geology of the Project Site consists entirely of granitic rock classified as Cretaceous age La Posta Tonalite (Todd et al. 2004). Much of the Project Site is overlain by residual soils and weathered granitic rock. The low-lying areas of the Project Site consist of locally derived alluvium that fills the valley floors (USDA 2019). These alluvium-filled valleys are likely shallow in depth. A site reconnaissance was performed within the Boulder Brush Boundary as part of a geology and soils evaluation completed by Ninyo & Moore (Appendix M). Based on the site reconnaissance and published geologic maps, geology within the Boulder Brush Boundary includes fill soils, alluvium, and La Posta Tonalite. Fill soils were observed on graded slopes and unpaved roads; alluvium was observed in drainages, creeks, and spring areas; and La Posta Tonalite rock was observed throughout the Boulder Brush Boundary as scattered corestone and boulders (Appendix M). Although no site reconnaissance was performed within the Reservation Boundary, the geology is similar based on geologic and soils maps.

Soils

Overlying the geologic units described above is a mantle of soil that varies in thickness and character. In general, soil characteristics are strongly governed by slope, relief, climate, vegetation, and the geologic unit upon which they form. Soil types are important in describing engineering constraints such as susceptibility to soil erosion (from both water and wind); corrosion risks; and various behaviors that affect structures, such as expansion and settlement. The type, aerial extent, and some key physical and hydrological characteristics of soils within the Project Site were identified based on a review of a soil survey of San Diego County completed by the U.S. Department of Agriculture's Natural Resources Conservation Service (USDA 2019). Soil units are shown in Figure 3.1.3-1 and described in Table 3.1.3-1, Soil Types within the Project Site. Aside from alluvial soils present within stream valleys (e.g., loamy alluvial land and riverwash) and the Tollhouse rock loam, the soil units mapped within the upland portions of the Project Site have low erosion and runoff potential (e.g., the Calpine, Kitchen Creek, La Posta, Mottsville, and Tajunga soil series). This is because the soils consist of weathered granite, which has a predominantly coarse sandy texture.

Land within the Boulder Brush Boundary is generally underlain by fill, alluvium, and granitic rock in various states of weathering (Appendix M). Fill soils were observed along the unpaved roads and on graded slopes. It is assumed that these fills are relatively shallow and are generally composed of locally derived, reworked decomposed granitic rock (Appendix M). These soils occur anywhere access roads have been constructed over sloped terrain, and differ from natural soils only in their degree of compaction. Although no site reconnaissance was performed within the Reservation Boundary, the mapped soils, geology, and topography is similar to those observed within Boulder Brush Boundary; unpaved access roads may similarly be locally underlain by fill soils.

Faults and Seismicity

An active fault is defined by the State of California as a fault that has had surface displacement within Holocene time (last 11,000 years). For the purpose of delineating fault rupture zones, the California Geological Survey historically defined a potentially active fault as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years). Pre-Quaternary-age faults are not considered capable of producing an earthquake (Appendix M).

Based on a review of geologic maps and the site reconnaissance conducted within the Boulder Brush Boundary, the Boulder Brush Boundary is not underlain by known active or potentially active faults (Appendix M). The nearest active fault to the Boulder Brush Boundary is the Coyote Mountain segment of the Elsinore Fault Zone, located approximately 7.5 miles northeast of the Boulder Brush Boundary (Appendix M). The nearest potentially active faults are age-undifferentiated Quaternary faults that are within 5 miles of the Boulder Brush Boundary, the closest of which is an unnamed fault (Jennings ID 494A) located less than 1.5 miles west (DOC 2010). The Boulder Brush Boundary is not located within an Alquist-Priolo Earthquake Fault Zone, nor is it located in a County Special Study Zone (County of San Diego 2007a). The Alquist-Priolo Earthquake Fault Zoning Act establishes statewide standards for the investigation and delineation of earthquake fault zones, and prohibits most structures for human occupancy from being sited across the trace of an active fault. The Act allows cities and counties to map additional fault zones and set stricter siting and/or seismic design standards for structures proposed within fault zones. The County has adopted special study zones that, in addition to the Alquist-Priolo Earthquake Fault Zone, also include late-Quaternary faults mapped by the California Geological Survey (CGS). The Boulder Brush Boundary is not located within a County Special Study Zone (County of San Diego 2011a).

Based on a review of geologic maps of the Reservation, the Reservation Boundary is not underlain by active or potentially active faults (DOC 2010). The nearest active fault to the Reservation Boundary is the Coyote Mountain segment of the Elsinore Fault Zone, located approximately 10 miles northeast of the Reservation Boundary. The nearest potentially active faults are age undifferentiated Quaternary faults, some of which are located immediately north/northwest of the

Reservation Boundary, within and just west of the Manzanita Reservation; the closest of which is an unnamed fault (Jennings ID 494A) located less than 1 mile north (DOC 2010). The Reservation is not located within an Alquist-Priolo Earthquake Fault Zone, nor is it located in a County Special Study Zone (County of San Diego 2007a). The Alquist-Priolo Earthquake Fault Zoning Act establishes statewide standards for the investigation and delineation of earthquake fault zones, and prohibits most structures for human occupancy from being sited across the trace of an active fault. The Act allows cities and counties to map additional fault zones and set stricter siting and/or seismic design standards for structures proposed within fault zones. The County has adopted special study zones that, in addition to the Alquist-Priolo Earthquake Fault Zone, also include late-Quaternary faults mapped by CGS. The Reservation is not located within a County Special Study Zone (County of San Diego 2011a).

Ground Shaking

The Project Site, and the entirety of San Diego County, is located within Seismic Zone 4 (Section 1629.4.1 of the California Building Code [CBC]), which is the highest seismic zone according to the U.S. Geological Survey (USGS n.d.), and, like most of Southern California, is prone to ground shaking. The principal seismic hazard at the Project Site is strong ground motion. The Project Site is not located within a County Near-Source Shaking Zone (County of San Diego 2011a).[1]

A primary tool that seismologists use to describe a ground-shaking hazard is a probabilistic seismic hazard assessment. The probabilistic seismic hazard assessment for California takes into consideration the range of possible earthquake sources (including worse-case scenarios) and estimates their characteristic magnitudes to generate a probability map for ground shaking. The probabilistic seismic hazard assessment maps depict values of peak ground acceleration (PGA) that have a certain probability of being exceeded within a specified time frame.[2] A commonly used design standard for typical lower-risk structures are values of PGA with a 10% probability of being exceeded in 50 years (i.e., a 1 in 475 chance), and more sensitive structures or critical infrastructure may be designed for a PGA with a 2% probability of being exceeded in 50 years (i.e., a 1 in 2,500 chance). This probability level allows engineers to design buildings for ground motions that have a very low probability of occurring, making them safer than if they were simply designed for the most likely events.

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1 In 1997, the Uniform Build Code (now the International Building Code) incorporated Near-Source Zones for calculating base shear, which accounts for high ground motion and damage that have been observed within a few kilometers of historic earthquake ruptures. These Near-Source Zones were developed by the Strong Ground Motion Ad-Hoc Subcommittee of the Seismology Committee of the Structural Engineers Association of California.

2 The peak ground acceleration (PGA) for a given component of motion is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as a percentage of the constant value of acceleration due to gravity (g) (approximately 980 centimeters per second squared). For reference, 1.0 g of acceleration is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.

Within the Boulder Brush Boundary, it is estimated that there is a 2% chance of exceeding a PGA value of 0.48 g [gravity] over the next 50 years (Appendix M). Such values of PGA have historically been 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, constructed with older brick, or constructed with unreinforced masonry prone to collapse.[3] 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.

Within the Reservation Boundary, it is estimated that there is a 2% chance of exceeding a PGA value of 0.46 g over the next 50 years (USGS 2019). Similar to the PGA values estimated for the Boulder Brush Boundary, these values have historically been associated with an earthquake with a Modified Mercalli Intensity of VIII.[3]

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. Liquefaction of 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. Fluctuations in the level of groundwater may occur due to variations in the ground surface topography, subsurface stratification, rainfall, irrigation practices, groundwater pumping, and other factors. Liquefaction can occur when an adequate amount of ground shaking occurs in an area of loose, saturated sediment.

The subsurface of the Boulder Brush Boundary primarily consists of solid granitic rock, which is not liquefiable. However, alluvium, where it is mapped along the lowland valleys of the Boulder Brush Boundary, is susceptible to liquefaction under the right conditions, which include an appreciable thickness of sand, low density, high saturation, and sufficient shaking intensity to trigger the effect (County of San Diego 2017) (Figure 3.1.3-1). The regional depth to groundwater exceeds 50 feet, but perched groundwater may be locally present beneath stream corridors above the boundary between weathered and unweathered granite. Although these areas are susceptible to liquefaction, it would require an unlikely confluence of conditions (i.e., a strong enough earthquake and saturated soils) for liquefaction to actually occur. Boulder Brush Facilities features that are underlain by potentially liquefiable soils include access roads and Off-Reservation gen-tie line poles and pole foundations (Figure 3.1.3-1).

[3] The Modified Mercalli Intensity Scale assigns an intensity value (increasing from I to XII) based on the observed effects of ground shaking produced by an earthquake. Unlike measures of earthquake magnitude and PGA, the Modified Mercalli intensity scale is based on actual observed effects rather than measured values.

The subsurface of the Reservation Boundary consists of similar conditions to that of the Boulder Brush Boundary. Similarly, the subsurface primarily consists of solid granitic rock with occasional instances of alluvium in lowland valleys. Although these alluvial areas are susceptible to liquefaction, it would require an unlikely confluence of conditions (i.e., a strong enough earthquake and saturated soils) for liquefaction to actually occur. The only Campo Wind Facilities underlain by potentially liquefiable soils are access roads (Figure 3.1.3-1).

Landslides/Slope Stability

A slope failure is a mass of rock, soil, and debris displaced down a slope under the influence of gravity by sliding, flowing, or falling. Several factors can affect the susceptibility of a slope to failure, including the steepness of the slope; strength and bulk density of the soil or bedrock; width, orientation, and pervasiveness of bedrock fractures, faults, or bedding planes; prevailing groundwater conditions; and type and distribution of vegetation. Those features, among others, are important factors that determine the predisposition of a sloped surface to fail, while external processes such as exceptionally heavy rainfall, earthquakes, or human disturbances (e.g., quarrying, road cuts, and large-scale vegetation removal) may trigger a new or reactivate an existing slope failure.

No mapped landslides are known to underlie or be adjacent to the Project Site (DOC 2019). The Project Site is not included in an area of landslide susceptibility as defined by the County General Plan (County of San Diego 2011a).

The CGS developed the Susceptibility to Deep-Seated Landslides map originally published in 2011 as CGS Map Sheet 58, which covers the entire state of California (CGS 2011). The map expresses landslide susceptibility from 0 to 10 (low to high) based on slope and material strength. Areas of high slope and week material have increased landslide susceptibility. Areas of low slope have low landslide susceptibility, regardless of the strength of the material. According to the map, areas of landside susceptibility on the Project Site range from 0 to 8, the majority of which are identified as low (0) landslide susceptibly. Areas of landslide susceptibly on the Project Site include ridgelines and isolated areas with steeper slopes and boulder outcrops.

Based on the geology and soil evaluation performed by Ninyo & Moore (Appendix M), slope stability is not anticipated to be an issue within the Boulder Brush Boundary due to the relatively competent nature of the subsurface materials composing the majority of the site. Additionally, unconsolidated sediment located in low-lying areas are relatively flat and have little to no susceptibility to landslides. The overall potential for landslides within the Boulder Brush Boundary is considered low (Appendix M).

Because the geology and general topography within the Reservation Boundary is the same as within the Boulder Brush Boundary, and because CGS Map 58 shows that it has a low landslide susceptibility, the potential for landslides within the Reservation Boundary is likewise low.

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 shrink/swell potential of expansive soils on the Project Site is provided in Table 3.1.3-1. The majority of soils on the Project Site have low shrink/swell potential. One soil type, Loamy alluvial land, has moderate shrink/swell potential and is on 2% of the Project Site (USDA 2019).

Loamy alluvial land is mapped within the lowland valleys of the western portion of the Boulder Brush Boundary. The only Boulder Brush Facilities mapped on potentially expansive soils are access roads (USDA 2019).

Similar to the Boulder Brush Boundary, Loamy alluvial land is the only soil type within the Reservation Boundary that has a moderate shrink/swell potential. This soil type is mapped within a lowland valley in the central portion of the Reservation Boundary. The only Campo Wind Facilities underlain by potentially expansive soils are access roads (Figure 3.1.3-1).

3.1.3.2 Regulatory Setting

Tribal Regulations

The Campo Band of Diegueño Mission Indians (Tribe) Land Use Code (Campo Land Use Code) was adopted by the Tribe on June 15, 1992, and amended on June 1, 2011. As stated in the Campo Land Use Code, the Tribe is guided by the goals set forth in the Campo Land Use Plan, which guides future development within the Reservation. The Campo Land Use Code is enforced by Muht-Hei Inc. and the Campo Environmental Protection Agency (CEPA) (Campo Band of Diegueño Mission Indians 2011). The Campo Land Use Plan is described in more detail in the Project's EIS (BIA 2019).

The Tribe and Muht-Hei may involve CEPA in development projects when the proposed use may potentially impact the environment of the Reservation. Such involvement may include development of regulations and procedures, including permitting, for submittal to the Tribe's General Council to address environmental concerns raised by the development; review of development applications and submittals; and monitoring of operation and closure activities (Campo Band of Diegueño Mission Indians 2010).

The Tribe has also designated a Campo Renewable Energy Zone, within which renewable energy projects may be developed. This area may be used for commercial wind, solar, geothermal, hydrological, and other types of renewable energy generation that use existing energy resources not created by combustion or chemical or radioactive sources, and that leverage market opportunities associated with the renewable energy sector for the benefit of the Tribe. The Campo Renewable Energy Zone may include overhead and underground electrical distribution, collection, transmission, and communications lines; electric transformers; electric substations; energy storage facilities; telecommunications equipment; power generation facilities for the transmission of electrical energy, including the electrical energy generated by any wind turbines or solar panels; roads and crane pads; meteorological towers; wind and solar measurement equipment; control buildings, maintenance yards, and related facilities and equipment; and any other undertakings or activities reasonably necessary, useful, or appropriate to accomplish development of renewable energy resources and related renewable energy business enterprises (Campo Band of Diegueño Mission Indians 2010).

As stated in the Campo Land Use Code, the Tribe has adopted the International Building Code (IBC) as the standard for development on the Reservation (Campo Band of Diegueño Mission Indians 2011); therefore, the Developer (Terra-Gen Development Company LLC) will design to IBC standards for Campo Wind Facilities on the Reservation.

Federal Regulations

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

Occupational Safety and Health Administration Regulations

Excavating and trenching are among the most hazardous construction operations. The Occupational Safety and Health Administration (OSHA) Excavation and Trenching Standard, Title 29 of the Code of Federal Regulations, Part 1926.650, covers requirements for excavating and trenching operations. OSHA requires that all excavations for 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 the 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, but 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).

International Building Code

The IBC is the foundation of the complete Family of International Codes. It is a tool to preserve public health and safety that provides safeguards from hazards associated with the built environment. It addresses design and installation of innovative materials that meet or exceed public health and safety goals. As a model code, the IBC is intended to be adopted in accordance with the laws and procedures of a governmental jurisdiction. When adopting a model code like the IBC, some jurisdictions amend the code in the process to reflect local practices and laws (International Code Council 2019).

State Regulations

The following state regulations pertaining to geologic hazards would apply to the Boulder Brush Facilities. The Reservation is not under the jurisdiction of the state of California, and therefore, the Campo Wind Facilities are not required to conform to state regulations. The Developer for the Campo Wind Facilities (Terra-Gen Development Company LLC) would design to IBC standards on the Reservation. The Boulder Brush Developer would design to CBC standards for the Boulder Brush Facilities. As such, the Project would be designed to both IBC and CBC standards, as required.

The statewide minimum public safety standard for mitigation of earthquake hazards (as established through the 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 any structure for human occupancy.[4] In most cases, these standards do not require a project 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 one that provides reasonable protection of the public safety, although it does not necessarily ensure continued structural integrity and functionality of a project (14 CCR 3721[a]).

[4] 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.

Nothing in these laws 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 various 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 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.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (California Public Resources Code, Chapter 7.8, Section 2690 et seq.) directs 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 CGS Special Publication 117A, adopted March 13, 1997, by the State Mining and Geology Board (as updated in 2008).

As of 2012, 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, provisions of the Seismic Hazards Mapping Act would not apply to the Project.

California Building Code

The CBC has been codified in the California Code of Regulations (CCR) 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 buildings and structures within its jurisdiction. The CBC is based on the IBC published by the International Code Conference. The CBC contains California amendments based on the American Society of Civil Engineers (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 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 within the jurisdiction of the state of California.

Local Regulations

The following local/regional regulations pertaining to geology, soils, and seismicity would apply to the Boulder Brush Facilities. The Reservation is not under the jurisdiction of the state of California, and, therefore, the Campo Wind Facilities are not required to conform to state regulations.

San Diego County General Plan

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

Goal S-7: Reduced Seismic Hazards. Minimized 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 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 in order 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 Grading 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 an engineering geologist that includes specific approval of the grading as affected by geological factors (Section 87.209 of the Grading Ordinance). 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.

3.1.3.3 Analysis of Project Effects and Determination as to Significance

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

The scope of this impact analysis reflects the significance thresholds contained in the County's Guidelines for Determining Significance – Geologic Hazards (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 Project are compared is derived from a variety of sources, including maps and surveys from the U.S. Geological Survey, U.S. Department of Agriculture, CGS, and County General Plan. The impact analysis is based in part on the County's Geologic Hazards Guidelines and the Boulder Brush Facilities Geology and Soils Evaluation prepared by Ninyo & Moore (Appendix M), which evaluates geological and soils conditions within the Boulder Brush Boundary. Additionally, the impact analysis for the Campo Wind Facilities draws upon the baseline information presented in Section 3.1.3.1, Existing Conditions, and is based on similar sources reviewed as part of the Ninyo & Moore Geology and Soils Evaluation.

Although the County as Lead Agency is analyzing the Project as a whole, the County's land use jurisdiction is limited to the Boulder Brush Facilities. The BIA has jurisdiction over the Campo Wind Facilities, and has prepared an EIS to evaluate Project effects under NEPA. This CEQA analysis hereby adopts and incorporates by reference the EIS. In addition, this section provides an analysis of Project impacts, both on the Reservation and on private lands, pursuant to the requirements of the California Environmental Quality Act (CEQA) and consistent with the County's Geologic Hazards Guidelines.

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 Project 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 occur 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

Project

As discussed in Section 3.1.3.1, the Project Site is not located in a County Special Study Fault Zone or a fault rupture hazard zone as identified by the Alquist–Priolo Act, nor is it underlain by an active or potentially active fault. Since the Project does not propose any facilities within or near an Alquist–Priolo fault or County Special Study Zone fault, there would be **no impact** associated with fault rupture as a result of implementation of the Project.

Boulder Brush Facilities

Land within the Boulder Brush Boundary is not located in a County Special Study Fault Zone or a fault rupture hazard zone as identified by the Alquist–Priolo Act, nor is it underlain by an active or potentially active fault. Therefore, there would be **no impact** associated with fault rupture as a result of implementation of the Boulder Brush Facilities.

Campo Wind Facilities

The BIA has jurisdiction over the Campo Wind Facilities and has prepared an EIS to evaluate Project effects under NEPA. Generally, the EIS analysis finds that the potential for fault rupture and other seismically induced hazards to occur is low because the geologic unit underlying land within the Reservation Boundary is considered to be stable. The analysis and conclusions contained in the EIS are hereby incorporated by reference into this analysis.

In addition, land within the Reservation Boundary is not located in a County Special Study Fault Zone or a fault rupture hazard zone as identified by the Alquist–Priolo Act, nor is it underlain by an active or potentially active fault. Therefore, there would be **no impact** associated with fault rupture as a result of implementation of the Campo Wind Facilities.

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) 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)(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) [now the International Building Code].

Analysis

Project

As discussed in Section 3.1.3.1, the Project Site is not located within a County Near-Source Shaking Zone; however, it is located within Seismic Zone 4. As such, the Project could be subject to strong ground shaking, lurching, or ground cracking in the event of a large earthquake on any of the active or potentially active faults in the greater Southern California region, including the Coyote Mountain segment of the Elsinore Fault Zone, located approximately 7.5 miles northeast of the Project Site. However, the Project would comply with the seismic design requirements outlined within the IBC for development on the Reservation and the CBC for development within the Boulder Brush Boundary. The IBC and CBC contain universal standards for proper site preparation and grading practices, adequate design of foundations, and guidelines for the appropriate selection and use of construction materials. Compliance with the IBC and CBC for development of the Campo Wind Facilities and Boulder Brush Facilities, respectively, would ensure the structural integrity of all proposed structures. Additionally, because it would be highly improbable for properly designed, seismically compliant wind energy infrastructure to fail, even in the event of strong ground shaking, any risk of toppling would be low. Moreover, because surrounding properties are located beyond the range of any impacts that might be associated with structural toppling of Project infrastructure, the public safety implications of facility damage in an earthquake would be low. Therefore, potential adverse impacts associated with strong seismic ground shaking as a result of implementation of Project would be **less than significant**.

Boulder Brush Facilities

The Boulder Brush Boundary is not located within a County Near-Source Shaking Zone, although it is located within Seismic Zone 4. As such, the Boulder Brush Facilities could be subject to strong ground shaking, lurching, or ground cracking in the event of a large earthquake on any of the active or potentially active faults in the greater Southern California region, including the Coyote Mountain segment of the Elsinore Fault Zone, located approximately 7.5 miles northeast of the Project Site. However, the Boulder Brush Facilities would comply with the seismic design requirements that are outlined within the CBC, which incorporates the IBC and 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. Compliance with the

CBC would ensure the structural integrity of all Boulder Brush Facilities. The local agency that enforces the CBC on private lands within the County 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 the County Grading Ordinance (e.g., Section 87.209). Additionally, because it would be highly improbable for properly designed, seismically compliant energy infrastructure (Off-Reservation gen-tie line, switchyard, and substation) to fail, even in the event of strong ground shaking, any risk of toppling would be low. Moreover, because the Boulder Brush Facilities would be on private land, and because surrounding properties are located beyond the range of any impacts that might be associated with structural toppling of Project infrastructure, the public safety implications of facility damage in an earthquake would be low. Grading Plans would also be reviewed by the County Department of Planning & Development Services for compliance with state and local standards (as discussed in Section 3.1.3.2, Regulatory Setting).

As part of the grading and building permit review process, a Soil Investigation Report would be prepared that includes data regarding the nature, distribution, and strength of existing soils and rock on land within the Boulder Brush Corridor; 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 would be refined as necessary based on final designs and incorporated into the Boulder Brush Facilities' plans and specifications as a condition of final grading and building permit approval. Further detail regarding soils will be included in the 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 Grading Ordinance), which requires that structures be designed to withstand strong seismic ground shaking.

Therefore, potential adverse effects associated with strong seismic ground shaking as a result of implementation of the Boulder Brush Facilities would be **less than significant**.

Campo Wind Facilities

The BIA has jurisdiction over the Campo Wind Facilities, and has prepared an EIS to evaluate Project effects under NEPA. Generally, the EIS analysis finds that the potential for damage due to seismic ground shaking is less than significant as a result of Project compliance with all applicable building and industry engineering standards, as well as adherence to the specifications outlined in the site-specific geotechnical investigation that will be prepared for the Campo Wind Facilities (BIA 2019). The analysis and conclusions contained in the EIS are incorporated by reference in this analysis.

Land within the Reservation Boundary is not located within a County Near-Source Shaking Zone, although it is located within Seismic Zone 4. The Campo Wind Facilities include one building for

human occupancy, the operations and maintenance (O&M) facility. The Developer (Terra-Gen Development Company LLC) anticipates that approximately 10 to 12 O&M staff members would be employed at a time throughout the life of the Project. The Campo Wind Facilities, including the O&M facility and the approximately 10 to 12 O&M staff members, could be subject to strong ground shaking, lurching, or ground cracking in the event of a large earthquake on any of the active or potentially active faults in the greater Southern California region, including the Coyote Mountain segment of the Elsinore Fault Zone, located approximately 7.5 miles northeast of the Project Site. However, CEPA, the agency that would enforce the IBC for development on the Reservation, would review engineering plans, drawings, and third-party inspections for compliance with the IBC, 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. Additionally, because it would be highly improbable for properly designed, seismically compliant wind energy infrastructure to fail, even in the event of strong ground shaking, any risk of toppling would be low. Moreover, because surrounding properties are located beyond the range of any impacts that might be associated with structural toppling of Project infrastructure, the public safety implications of facility damage in an earthquake would be low.

As part of CEPA's plan review process, a site-specific geotechnical investigation would be prepared that includes data regarding the nature, distribution, and strength of existing soils and rock on land within the Campo Corridor; 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 would be refined as necessary based on final designs and incorporated into the Campo Wind Facilities' plans and specifications. Further detail regarding soils would be included in the site-specific geotechnical investigation that would be prepared as site and facility design advances, and the geotechnical investigation would be reviewed by CEPA for compliance with the IBC.

Because design of the Campo Wind Facilities is required to comply with all applicable building and grading standards, the risks to public safety (i.e., surrounding properties) would be low, and substantial adverse impacts from strong seismic ground shaking would be avoided or reduced to acceptable levels. Potential adverse impacts associated with strong seismic ground shaking as a result of implementation of the Campo Wind Facilities would be **less than significant**.

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 Project impact analysis and the cumulative impact analysis. The following significance guidelines have been developed by the County to address question VI(a)(iii) and the

portion of question VI(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

Project

The Project Site is primarily underlain by granitic rock, and the potential for liquefaction is low. Some lowland areas on the Project Site consist of unconsolidated alluvial material that has the potential for liquefaction. In general, near-surface fill and alluvial soils are compressible and considered unsuitable in the current condition for structural support. Figure 3.1.3-1 shows areas mapped as being underlain by potentially liquefiable soils. The only Project components within these areas would be access roads and one Off-Reservation gen-tie line pole and foundation. The O&M facility would be located in an upland area underlain by La Posta Tonalite, and outside of zones of liquefaction susceptibility.

As discussed previously, the Project would comply with the seismic design requirements applicable to each Project component, and a Soil Investigation Report and a site-specific geotechnical investigation for both the Boulder Brush Facilities and Campo Wind Facilities would be prepared that include data regarding the nature, distribution, and strength of existing soils and rock on land within the Project Site. Where potentially liquefiable soils are found to exist, appropriate engineering design and construction measures would be incorporated into Project design, as deemed appropriate by the Project's engineers. Design measures that would reduce the possibility for liquefaction-related impacts to occur could include excavation of near-surface fill and alluvial materials found within areas proposed for structural development; construction of pile foundations; installation of flexible bus connections; and incorporation of slack in cables to allow for ground deformations without damage to structures. Implementation of these design recommendations, if determined to be necessary based on the conclusions of the Soil Investigation Report for the Boulder Brush Facilities and the site-specific geotechnical investigation for the Campo Wind Facilities, would be incorporated into the Project's Resource Management Plan between the Tribe (i.e., CEPA or the County) and the Developer (Terra-Gen Development Company LLC).

Compliance with the applicable seismic design requirements and implementation of recommended engineering considerations would ensure the structural integrity of Project components and reduce potential structural damage due to liquefaction should an earthquake

occur during the periods when soils are saturated. Even with compliance with the applicable seismic design requirements, damage to roads and the Off-Reservation gen-tie line pole and foundation could occur in the event of a strong earthquake due to liquefaction; however, such damage would be greatly diminished due to the Project's compliance with applicable seismic design requirements, and damage would be an inspection, maintenance, and repair issue rather than a significant impact to the environment or public safety.

The potential for liquefaction on a majority of the Project Site is considered low. For Project components within areas mapped as being underlain by potentially liquefiable soils (i.e., access roads and one Off-Reservation gen-tie line pole and foundation), compliance with the applicable seismic design requirements would ensure that impacts associated with liquefaction as a result of implementation of Project would be **less than significant**.

Boulder Brush Facilities

As determined by the Geology and Soils Evaluation prepared for the Boulder Brush Facilities (Appendix M), based on the dense nature of the subsurface materials, the potential for liquefaction within the Boulder Brush Boundary is considered low. However, some lowland areas within the Boulder Brush Boundary consist of unconsolidated alluvial material that has the potential for liquefaction. In general, near-surface fill and alluvial soils are compressible and considered unsuitable in the current condition for structural support. Figure 3.1.3-1 shows areas mapped as being underlain by potentially liquefiable soils. The only Boulder Brush Facilities within these areas would be access roads and an Off-Reservation gen-tie line pole and foundation.

As discussed previously, the Boulder Brush Facilities would comply with the CBC seismic design requirements, and a Soil Investigation Report would be prepared that includes data regarding the nature, distribution, and strength of existing soils and rock on land within the Boulder Brush Corridor; the soil engineer's conclusions and recommendations for grading requirements, including the correction of liquefiable soils that may be present; and the soil engineer's opinions as to the adequacy of building sites to be developed. Where potentially liquefiable soils are found to exist, appropriate engineering design and construction measures would be incorporated into facility design in accordance with the applicable standards set out in the CBC, as deemed appropriate by the Project engineer. Design would also be to the satisfaction of the County Department of Planning & Development Services. Design measures that would reduce the possibility for liquefaction-related impacts to occur could include excavation of near-surface fill and alluvial materials found within areas proposed for structural development, construction of pile foundations, installation of flexible bus connections, and incorporation of slack in cables to allow for ground deformations without damage to structures. Implementation of these design recommendations, if determined to be necessary based on the conclusions of the Soil Investigation Report, would be incorporated into the Boulder Brush Facilities' plans and specifications as a condition of final grading and building permit approval.

Compliance with the seismic design requirements outlined in the CBC would ensure the structural integrity of Boulder Brush Facilities and reduce potential structural damage due to liquefaction should an earthquake occur during the periods when soils are saturated. Even with compliance with the applicable seismic design requirements, damage to roads and the Off-Reservation gen-tie line pole and foundation could occur in the event of a strong earthquake due to liquefaction; however, such damage would be greatly diminished due to the Project's compliance with applicable seismic design requirements, and damage would be an inspection, maintenance, and repair issue rather than a significant impact to the environment or public safety. Therefore, impacts associated with liquefaction as a result of implementation of Boulder Brush Facilities would be **less than significant**.

Campo Wind Facilities

Generally, the EIS analysis found that the potential for liquefaction to occur is low for the majority of the Campo Corridor, although low-lying areas of alluvial sediments have the potential for liquefaction (BIA 2019). The analysis and conclusions contained in the BIA's EIS are incorporated by reference in this analysis.

Figure 3.1.3-1 shows areas mapped as being underlain by potentially liquefiable soils. The only Campo Wind Facilities within these areas would be unpaved access roads. The O&M facility would be located in an upland area underlain by La Posta Tonalite and outside of zones of liquefaction susceptibility. As outlined in the BIA's EIS, and for the reasons stated above, impacts associated with liquefaction as a result of implementation of the Campo Wind Facilities would be **less than significant**.

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 Project 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 VI(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.

Project

Site grading for installation of Project components would result in the creation of cut and fill areas. To ensure that Boulder Brush Facilities are adequately supported (whether on native soils, cut, or fill), a Soil Investigation Report would be required as part of the building and grading permit process for the Boulder Brush Facilities, as discussed below. For the Campo Wind Facilities, a site-specific geotechnical investigation would be prepared, and the CEPA would review engineering plans, drawings, and third-party inspections for compliance with the IBC. Furthermore, during trenching and excavation, the Project would be required to comply with OSHA standards to protect slopes and prevent cave-ins and other hazards related to soil stability.

Besides the aforementioned stability of constructed slopes (i.e., cut and fill), the potential for naturally occurring landslides have been determined to be low. The Project Site is not located within a landslide susceptibility area as identified in the County's Geologic Hazards Guidelines (County of San Diego 2007a). The topography of the Project Site varies from gently rolling hillsides and lowland valleys to rocky peaks. The steepest portions of the Project Site are composed primarily of solid granitic rock, which have a low likelihood of landslide susceptibility. Areas where slopes exceed 25% are shown in Figure 3.1.3-1. Additionally, loose sediments located in the lowland valleys do not present potential for landslides due to the flat nature of these alluvial valleys. Slope stability is not anticipated to be an issue at the Project Site due to the relatively competent nature of the subsurface materials and the flat topography of landside-susceptible material.

Because there are no mapped landslides on the Project Site, and the site is not within a landslide susceptibility area, impacts would be **less than significant**.

Boulder Brush Facilities

Construction of the Boulder Brush Facilities would involve site grading resulting in the creation of cut and fill areas. To ensure that Boulder Brush Facilities are adequately supported (whether on native soils, cut, or fill), a Soil Investigation Report would be required as part of the building and grading permit process for the Boulder Brush Facilities. The Soil Investigation Report would evaluate the strength of underlying soils and make design recommendations for the Boulder Brush Facilities. Grading Plans for the Boulder Brush Facilities must be compliant with standards in the County Grading Ordinance addressing the stability, incline, and compaction of cuts and fills. Further, the Boulder Brush Developer must demonstrate that any proposed structures meet the structural stability standards required by the CBC and the County Grading Ordinance. Furthermore, the Boulder Brush Developer would be required to comply with OSHA standards during trenching and excavating to protect slopes and prevent cave-ins and other hazards related to soil stability.

As described above, the potential for naturally occurring landslides to occur within the Boulder Brush Boundary is low. The Boulder Brush Corridor is not located within a landslide susceptibility

area as identified in the County's Geologic Hazards Guidelines (County of San Diego 2007a). Slope stability is not anticipated to be an issue within the Boulder Brush Boundary due to the relatively competent nature of the subsurface materials and the flat topography of landside-susceptible material. Furthermore, Boulder Brush Facilities do not include structures for human occupancy.

Because the Boulder Brush Facilities are not within a landslide susceptibility area and there are no mapped landslides, impacts as a result of implementation of the Boulder Brush Facilities would be **less than significant**.

Campo Wind Facilities

Generally, the BIA's EIS analysis found that the potential for seismically induced hazards, including landslides, to occur within the Campo Corridor is low due to the stability of the underlying geologic unit, and Project compliance with all applicable building and industry engineering standards, as well as adherence to the specifications outlined in the site-specific geotechnical investigations that will be prepared for the Campo Wind Facilities (BIA 2019). The analysis and conclusions contained in the EIS are incorporated by reference in this analysis.

The Campo Corridor is not located within a landslide susceptibility area as identified in the County's Geologic Hazards Guidelines (County of San Diego 2007a). In addition, CEPA would review engineering plans, drawings, and third-party inspections for compliance with the IBC. Additionally, during trenching and excavation, the Project would be required to comply with OSHA standards to protect slopes and prevent cave-ins and other hazards related to soil stability.

Because the Campo Corridor is not within a landslide susceptibility area and there are no mapped landslides within the Reservation Boundary, impacts as a result of implementation of the Campo Wind Facilities would be **less than significant**.

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 Project impact analysis and the cumulative impact analysis. The following significance guidelines have been developed by the County to address question VI(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

Project

The shrink/swell potential of expansive soils on the Project Site are low (refer to Table 3.1.3-1). One soil type, loamy alluvial land, has moderate shrink/swell potential and is on 2% of the Project Site (USDA 2019). For the Boulder Brush Facilities, compliance with the CBC and the County Grading Ordinance would ensure that potentially expansive soils, if encountered, are adequately addressed. For the Campo Wind Facilities, compliance with the IBC would ensure that potentially expansive soils, if encountered, are adequately addressed. CBC and IBC requirements include activities such as 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.

Implementation of the IBC or CBC for the Campo Wind Facilities and Boulder Brush Facilities, respectively, would ensure that potential impacts associated with expansive soils as a result of implementation of Project components would be **less than significant**.

Boulder Brush Facilities

Soils within the Boulder Brush Boundary are anticipated to have a low potential for expansion based on the findings of the Geology and Soils Evaluation prepared for the Boulder Brush Facilities (Appendix M). Required compliance with the CBC and the County Grading Ordinance would ensure that potentially expansive soils, if encountered, are adequately addressed. As previously described, CBC requirements include activities such as 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.

Implementation of the CBC and local ordinances would ensure that potential impacts associated with expansive soils as a result of implementation of the Boulder Brush Facilities would be **less than significant**.

Campo Wind Facilities

The BIA's EIS analysis found that the Campo Wind Facilities would not be located on expansive soils, and impacts associated with expansive soils would not be significant (BIA 2019). The analysis and conclusions contained in the EIS are incorporated by reference in this analysis. Additionally, as described in Section 3.1.3.1, the shrink/swell potential of expansive soils within the Campo Corridor is low (refer to Table 3.1.3-1). Loamy alluvial land is the only soil type within

the Campo Corridor that has a moderate shrink/swell potential. This soil type is mapped within a lowland valley in the central portion of the Reservation Boundary. The only Campo Wind Facilities underlain by potentially expansive soils are access roads (Figure 3.1.3-1). For the Campo Wind Facilities, compliance with the IBC and preparation of a site-specific geotechnical investigation for review by CEPA would ensure compliance with the IBC and that potentially expansive soils, if encountered, are adequately addressed. IBC requirements include activities such as 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.

Implementation of the IBC would ensure that potential impacts associated with expansive soils as a result of implementation of the Campo Wind Facilities would be **less than significant**.

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

Guidelines for the Determination of Significance

The County's Geologic Hazards Guidelines and the County's 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 VI(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

Project

The Project would involve construction of a septic system and leach field for the O&M facility within the Reservation Boundary. Compliance with the IBC and applicable regulations would ensure that the soils underlying the proposed septic systems can adequately support the proposed septic systems prior to operation of the Project. These measures require, among other things, siting septic tanks on soils that are permeable enough to accept the liquid, yet fine enough to filter out the remaining bacteria before the water returns to the aquifer, and requires that areas with high groundwater levels are avoided. According to the Soil Survey of the San Diego Area (USDA 2019), the Project Site principally consists of three soil associations: the La Posta-Kitchen Creek Association, the Tollhouse-La Posta-Rockland Association, and the Mottsville-Calpine Association (see Figure 3.1.3-1). These soils are predominantly fine- to medium-grained silty sands. In addition to silty sand, local occurrences of clayey sands, sandy or silty clays, and gravelly sands also occur (Dames & Moore 1992).

Prior to siting of the proposed septic tank, a site-specific geotechnical investigation, which will include a soil percolation test, will be prepared for the proposed septic tank and leach field site to ensure Project compliance with all applicable regulations governing the placement of septic systems. Therefore, through compliance with applicable regulations, impacts to soils from septic system components of the Project would be **less than significant**.

Boulder Brush Facilities

The Boulder Brush Facilities would not include septic systems. As such, **no impact** to soils from septic system components would occur within the Boulder Brush Boundary.

Campo Wind Facilities

The Campo Wind Facilities would include construction of a septic system and leach field for the O&M facility. Compliance with the IBC and the Campo Land Use Code would ensure adequate support of the proposed septic system. Compliance would include, among other things, siting septic tanks on soils that are permeable enough to accept the liquid, yet fine enough to filter out the remaining bacteria before the water returns to the aquifer, and avoiding areas with high groundwater levels.

Prior to siting of the proposed septic tank, a site-specific geotechnical investigation that would include a soil percolation test would be prepared for the proposed septic tank and leach field site to ensure compliance with all applicable regulations governing the placement of septic systems (i.e., the IBC and the Campo Land Use Code). Therefore, for the reasons stated above, and through compliance with applicable regulations, impacts to soils from septic system components as a result of implementation of the Campo Wind Facilities would be **less than significant**.[5]

3.1.3.4 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. Impacts of the Project would be cumulatively considerable if the Project, in combination with other nearby projects, would result in significant cumulative impacts (see Table 1-4, Cumulative – Reasonably Foreseeable, Approved, and Pending Projects, and Figure 1-11, Cumulative Projects, in Chapter 1, Project Description, Location, and Environmental Setting, of this EIR). However, impacts from geologic and soil conditions are also site-specific and would only have the potential to combine with impacts of the Project if they occurred in the same general location and on similar soils or topographies. Thus, the geographic extent of the cumulative study area for potential impacts to

[5] The BIA's EIS does not analyze potential impacts to soils from septic system components of the Project because this topic is not generally analyzed under NEPA.

people and structures related to geologic and seismic hazards is restricted to the Project Site and the area immediately surrounding the Project Site.

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 a project. For impacts to be cumulatively considerable, these conditions would have to occur at the same time and in the same location as the Project. Therefore, potential seismic impacts (ground shaking, earthquake-induced ground failure, and fault rupture) as a result of local and regional faults and soils that underlie individual projects would not be cumulatively considerable. Additionally, each individual project on private land subject to County jurisdiction 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 Project would not contribute, even incrementally, to potentially cumulative impacts related to fault rupture, and impacts would **not be cumulatively considerable**.

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 Project are restricted to potential facility damage from earthquake-related ground shaking, liquefaction, landslides, expansive soils, and general soil suitability. The County Department of Planning & Development Services reviews applications for building permits on private land 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 grading and building permit 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. In all cases for the Project, impacts would be less than significant because the existing regulatory framework controlling the design and construction of structures (i.e., the CBC for the Boulder Brush Facilities and the IBC for the Campo Wind Facilities), and actions required to obtain a grading and/or development permit at the local level, are sufficient to avoid or substantially reduce potential impacts. Additionally, based on the analysis above, due to the dense nature of the subsurface materials, potential for liquefaction and landslides on the Project Site would be low. Therefore, since all other cumulative projects would be required to comply with the same or similar set of

laws, regulations, and ordinances, impacts associated with ground shaking, liquefaction, landslides, expansive soils, and adequate soils for septic systems and other on-site wastewater systems would **not be cumulatively considerable**.

3.1.3.5 Significance of Impact Prior to Mitigation

Project

Based on the analysis above, Project impacts related to geology, soils, and seismicity would be **less than significant**.

Boulder Brush Facilities

Impacts related to geology, soils, and seismicity as a result of the Boulder Brush Facilities would be **less than significant**.

Campo Wind Facilities

Impacts related to geology, soils, and seismicity as a result of the Campo Wind Facilities would be **less than significant**.

3.1.3.6 Conclusion

Project

Project compliance with applicable regulations pertaining to geologic and seismic hazards and standard requirements for the approval of plans and specifications by the applicable agency would be sufficient to reduce risks from seismic ground shaking, liquefaction, and expansive soils to acceptable levels; therefore, impacts would be **less than significant**.

Boulder Brush Facilities

Compliance with the CBC and state and local regulations pertaining to geologic and seismic hazards, and compliance with standards for the approval of building and grading permits would be sufficient to reduce risks from seismic ground shaking, liquefaction, and expansive soils to acceptable levels for the Boulder Brush Facilities; therefore, impacts would be **less than significant**.

Campo Wind Facilities

Compliance with the IBC and all applicable regulations pertaining to geologic and seismic hazards, including CEPA review of engineering plans and drawings, and third-party inspections for compliance with the IBC, would reduce risks from seismic ground shaking, liquefaction, and expansive soils to acceptable levels for the Campo Wind Facilities; therefore, impacts would be **less than significant**.

Table 3.1.3-1
Soil Types within the Project Site

Soil Unit	Acres (Percentage of Project Site)	Depth to Soil Restrictive Layer (inches)	Shrink/Swell Potential[a]	Corrosion Risk[b]		Erosion and Runoff	
				Uncoated Steel	*Concrete*	*Hydrologic Soil Group[c]*	*Erosion Factor (Kf)[d]*
Acid igneous rock land	17.8 (0.10%)	4	—	—	—	D	—
Calpine coarse sandy loam, 5%–9% slopes	60.9 (0.40%)	72	Low	High	Moderate	A	0.15–0.20
Calpine coarse sandy loam, 5%–9% slopes, eroded	294.7 (1.70%)	72	Low	High	Moderate	A	0.15–0.20
Calpine coarse sandy loam, 9%–15% slopes, eroded	156.5 (0.90%)	72	Low	High	Moderate	A	0.15–0.20
Kitchen Creek loamy coarse sand, 5%–9% slopes	1,033.90 (6.00%)	58	Low	Low	Moderate	A	0.05–0.20
Kitchen Creek loamy coarse sand, 9%–15% slopes, eroded	81.8 (0.50%)	58	Low	Low	Moderate	A	0.05–0.20
La Posta loamy coarse sand, 5%–30% slopes, eroded	4,110.00 (23.80%)	33	Low	Low	Low	A	0.02–0.24
La Posta loamy coarse sand, 5%–30% slopes, severely eroded	188.4 (1.10%)	31	Low	Low	Low	A	0.02–0.24
La Posta rocky loamy coarse sand, 5%–30% slopes, eroded	5,304.70 (30.70%)	31	Low	Low	Low	A	0.02–0.24
Loamy alluvial land	354.1 (2.00%)	≥60	Moderate	High	Low	C	0.37–0.43
Mottsville loamy coarse sand, 0%–2% slopes	44.6 (0.30%)	≥60	Low	High	Moderate	A	0.02–0.10

Table 3.1.3-1
Soil Types within the Project Site

Soil Unit	Acres (Percentage of Project Site)	Depth to Soil Restrictive Layer (inches)	Shrink/Swell Potential[a]	Corrosion Risk[b]		Erosion and Runoff	
				Uncoated Steel	*Concrete*	*Hydrologic Soil Group*[c]	*Erosion Factor (Kf)*[d]
Mottsville loamy coarse sand, 2%–9% slopes	1,350.90 (7.80%)	≥60	Low	High	High	A	0.02–0.10
Mottsville loamy coarse sand, 9%–15% slopes	398.9 (2.30%)	≥60	Low	Moderate	Moderate	A	0.02–0.10
Riverwash	3.4 (0.00%)	≥60	Low	—	—	D	0.02
Tollhouse rocky coarse sandy loam, 5%–30% slopes, eroded	777.8 (4.50%)	≥60	Low	Low	Low	D	0.24
Tollhouse rocky coarse sandy loam, 30%–65% slopes	3,107.80 (18.00%)	20	Low	Low	Low	D	0.24
Tujunga sand, 0%–5% slopes	0.7 (0.00%)	≥60	Low	High	Low	A	0.02–0.15

Source: USDA 2019.
Notes: — = no value

[a] "Shrink/Swell potential" of soils pertains to the volume change experience by soils, particularly clays, under cycles of wet and dry conditions. This is measured by the linear extensibility of soils, or the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The shrink/swell potential is low if the soil has a linear extensibility of less than 3%; moderate if 3% to 6%; high if 6% to 9%; and very high if more than 9%. The ratings in this table refer to the maximum linear extensibility reported for the range of soil horizons present within each soil map unit.

[b] "Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete.

[c] Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups (A through D) according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms. Soils in Group A have a low runoff potential and high infiltration rates even when thoroughly wetted. Soils in Group C have a slow infiltration and transmission rates and consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. Soils in Group D have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted.

[d] Erosion factor Kf indicates the susceptibility of a soil to sheet and rill erosion by water. Values of Kf range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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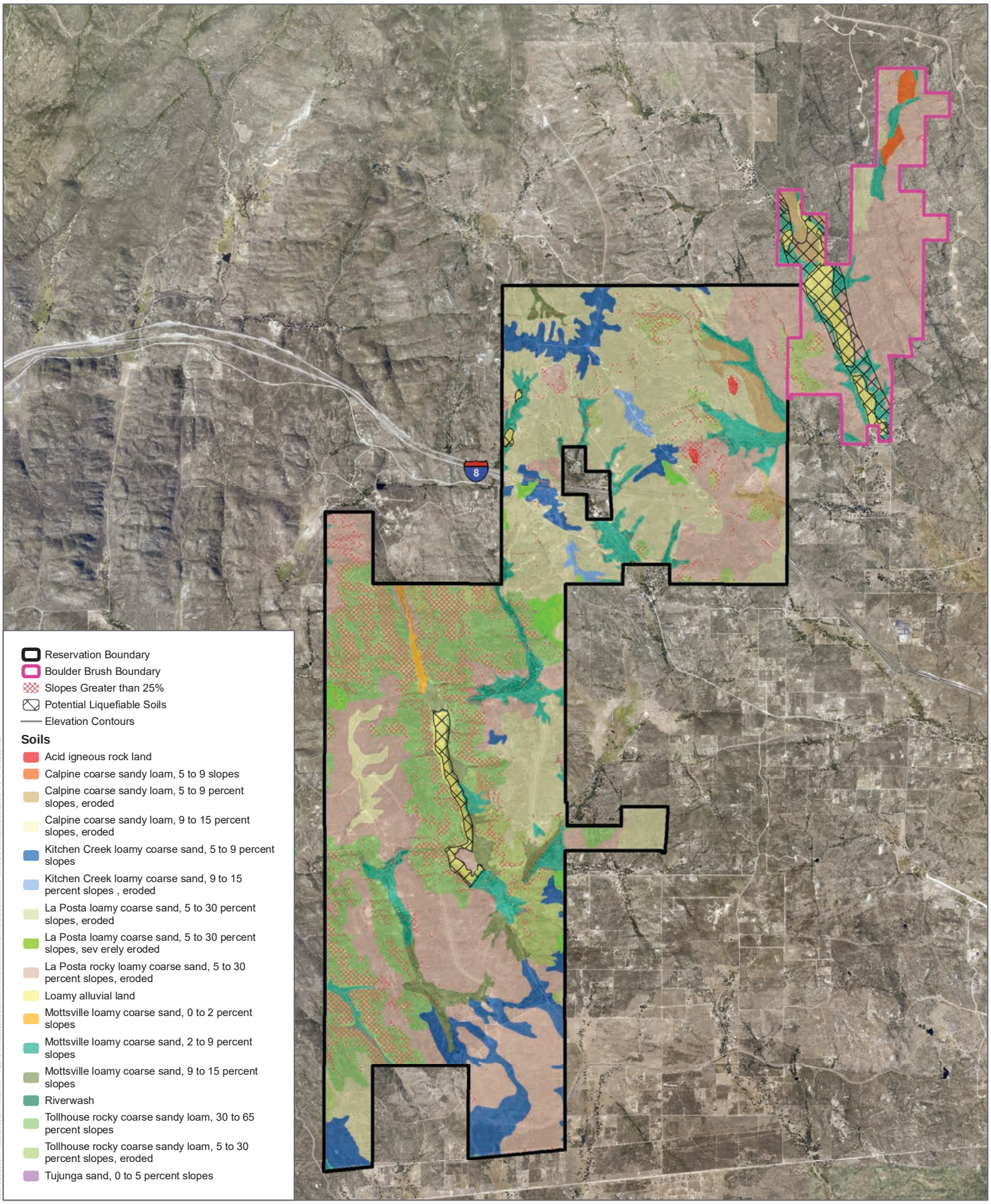

SOURCE: SANGIS 2017; SSURGO 2018

DUDEK

0 3,000 6,000 Feet

FIGURE 3.1.3-1

Project Soils, Topography, Slopes, and Liquefaction Map

Campo Wind Project with Boulder Brush Facilities

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