

### 5.7. Geology and Soils

<b>GEOLOGY AND SOILS</b>				
<b>Would the project:</b>	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

\*Geology and Soils question (d) reflects the current 2022 California Building Code (CBC), which is based on the International Building Code (2021), effective January 1, 2023. The CBC is updated every three years. Significance criteria established by CEQA Guidelines, Appendix G.

#### 5.7.1. Setting

This section describes geology, soils, and seismic conditions and analyzes the environmental impacts related to geologic and seismic hazards that could result from the implementation of the proposed Project. The following discussion addresses existing environmental conditions in the affected area, identifies and analyzes environmental impacts, and recommends measures to reduce or avoid any adverse impacts anticipated from Project construction, operation, and decommissioning. In addition, existing laws and regulations relevant to geologic and seismic hazards are described. In some cases, compliance with these existing laws and regulations would serve to reduce or avoid certain impacts that might otherwise occur with the implementation of the Project.

Baseline geologic, seismic, and soils information were collected for the Project site and surrounding area from published and unpublished literature, GIS data, and online sources. Data sources included geologic literature from the U.S. Geological Survey and California Geological Survey, and other readily available online reference materials. The study area was defined as the Project site and the areas immediately adjacent to the proposed Project for most geologic and soils issue areas with the exception that the study area related to seismically induced ground shaking includes significant regional active and potentially active faults within 50 miles of the proposed Project.

### 5.7.1.1. Regional Geologic Setting

The proposed Project site is located in the Goleta Valley, a coastal plain in southern Santa Barbara County that lies between the Santa Ynez Mountains and the Pacific Ocean. Santa Barbara County lies partly in the Transverse Range geomorphic province and partly in the southern Coast Range province. The boundary between these two provinces is usually drawn along the Santa Ynez River. The Transverse Ranges of the County include the Santa Ynez Range, the Santa Barbara Channel offshore, and the Channel Islands (Santa Barbara County, 2023, p. 16). The Santa Ynez Mountains consist mainly of variably deformed and faulted marine and nonmarine sedimentary rocks and deposits that range in age from Jurassic to the present (LGC, 2024 – Appendix G [Geotechnical Report], p. 4).

The County is underlain mainly by marine sedimentary rocks of late Mesozoic and Cenozoic ages. Commonly found sedimentary rocks include thick sandstone, shale with lesser amounts of conglomerate, alluvial fan deposits, and dune sand (Santa Barbara County, 2023, p. 17). Fanglomerate, or older alluvium, is a type of conglomerate rock that is made up of similarly-sized rock fragments deposited in alluvial fans. The fanglomerate which occurs discontinuously in the lower foothills of the Santa Ynez Range is characterized by boulders and cobbles. The Santa Barbara formation, which occurs in patches on the coastal hills and in the lower foothills of Goleta, is weakly cemented and prone to being gullied and washed wherever the protective vegetative cover is removed (Santa Barbara County, 2023, p. 24). The local geology has also been influenced by a drop in sea level resulting in a series of abandoned terrace deposits, both marine and non-marine (LGC, 2024 - Appendix G [Geotechnical Report], p. 4).

### 5.7.1.2. Local Geology

The City of Goleta lies within the Goleta Valley, a relatively flat and narrow coastal plain. California Geological Survey (CGS, 2022) mapping shows the City is primarily situated on late Holocene alluvial fan deposits (Qf), undifferentiated surficial deposits (Qsu), and lacustrine, playa, and estuarine deposits (Ql); late to middle Pleistocene old marine terrace deposits (Qot) and old alluvial valley deposits (Qoa); and fine-grained Quaternary age bedrock formations of Pleistocene age and younger (Qsh). Late Holocene eolian and dune deposits (Qe) and beach deposits (Qb), along with fine-grained Tertiary age bedrock formations (Tsh), underlie Goleta's coastline with the Pacific Ocean. The proposed Project site is situated on old marine terrace deposits (Qot) (CGS, 2022).

LGC Geotechnical, Inc (LGC) conducted geologic mapping and a subsurface geotechnical evaluation consisting of five infiltration borings for the proposed Project site. The typical onsite characteristics of the materials are described as follows, from youngest to oldest (LGC, 2024 - Appendix G [Geotechnical Report], p. 4-5):

- **Artificial Fill (Not Mapped).** Minor amounts of undocumented fill material may be present in the near-surface of the site. The extent of the undocumented fill has not been mapped due to its thin nature and lack of lateral continuity. For the purposes of the geotechnical evaluation report, the undocumented fill material is not differentiated from the weathered, upper portion of the terrace deposits.
- **Quaternary Terrace Deposits.** Quaternary terrace deposits were encountered at the surface and extend to a depth of approximately 10 to 15 feet below the surface. The terrace deposits overlie the Tertiary Monterey Formation bedrock. The terrace materials consist of generally hard, sandy, silty clay. In general, the basal portion of the terrace, originally deposited on a wave-cut platform into the Capistrano Formation bedrock, is composed of ancient beach deposits consisting of medium to coarse sand and some gravel.
- **Tertiary Monterey Formation.** Tertiary Monterey Formation bedrock underlies the entire site at depth. This material generally consists of massive to thinly bedded hard sandy and silty claystone and very dense clayey and silty sandstone.

### 5.7.1.3. Soils

Soils within the Project site and the immediate surroundings reflect the underlying rock type, the extent of weathering of the rock, the degree of slope, and the degree of human modification. The Project site is entirely underlain by Milpitas-Positas fine sandy loams, 2 to 9 percent slopes (NRCS, 2025). The soil unit composition is about 45 percent Milpitas, 35 percent Positas, and 20 percent minor components. This soil unit is moderately well drained with a very high surface runoff class, which means it has a very slow water infiltration rate when thoroughly wet (NRCS, 2025).

Expansive soils are characterized by their ability to undergo significant volume change (shrink and swell) due to variations in soil moisture content. Changes in soil moisture can result from rainfall, landscape irrigation, utility leakage, roof drainage, and/or perched groundwater. Expansive soils are typically very fine grained with a high to very high percentage of clay. Such soil conditions can affect the structural integrity of buildings and other structures. Soils with moderate to high shrink-swell potential would be classified as expansive soils. NRCS reports the expansion potential of the Milpitas-Positas fine sandy loams, 2 to 9 percent slopes soil underlying the Project site is moderate (NRCS, 2025). The soil unit has a low linear extensibility rating, with linear extensibility below 3 percent (NRCS, 2025). Expansion Index (EI) testing conducted by LGC as part of the geotechnical site evaluation indicated EI values of 19 and 64, corresponding to “Very Low” and “Medium” expansion potential (LGC, 2024 - Appendix G [Geotechnical Report], p. 9).

Weak (loose or poorly consolidated) soils can compress, collapse, or spread laterally under the weight of buildings and fill, causing settlement relative to the thickness of the weak soil. Usually, the thickness of weak soil would vary and differential settlement would occur. Weak soils also tend to amplify shaking during an earthquake and can be susceptible to liquefaction, as discussed further in sections below. The NRCS soil report rates the soil unit’s susceptibility to compaction as “Medium,” meaning the potential for compaction is significant, and the growth rate of seedlings may be reduced following compaction (NRCS, 2025). After the initial compaction (i.e., the first equipment pass), this soil is able to support standard equipment with only minimal increases in soil density. The soil is intermediate between moisture insensitive and moisture sensitive (NRCS, 2025).

Potential soil erosion hazards vary depending on the use, conditions, and textures of the soils. The properties of soil that influence erosion by rainfall and runoff are those that affect the infiltration capacity of a soil, and those that affect the resistance of a soil to detachment and being carried away by falling or flowing water. Additionally, soils on steeper slopes would be more susceptible to erosion due to the effects of increased surface flow (runoff) on slopes where there is little time for water to infiltrate before runoff occurs. Soils containing high percentages of fine sands and silt and that are low in density, are generally the most erodible. With increasing clay and organic matter content of these soils, the potential for erosion decreases. Clays act as a binder to soil particles, thus reducing the potential for erosion. The Milpitas component of the soil unit is 69 percent sand, 16 percent silt, and 15 percent clay. The Positas component of the soil unit is 68 percent sand, 21 percent silt, and 11 percent clay. The proposed Project site has a wind erodibility group (WEG) rating of 5, indicating a moderate WEG factor where 1 is the most susceptible and 8 is the least susceptible to wind erosion. Furthermore, the water erosion factor ( $K_w$ ) is 0.15 for Milpitas and 0.24 for Positas, indicating a low-to-moderate susceptibility to water erosion (where 0.02 is the least susceptible and 0.69 is the most susceptible) (NRCS, 2025).

### 5.7.1.4. Subsidence

Land subsidence can occur in valleys containing aquifer systems that are, in part, made up of fine-grained sediments and that have undergone extensive groundwater withdrawal. As the groundwater is withdrawn, the pore-fluid pressure in the sediments decreases allowing the weight of the overlying sediment to permanently compact or compress the fine-grained units. This effect is most pronounced in younger,

unconsolidated sediments. Land subsidence is generally characterized by a broad zone of deformation where differential settlements are small. The main cause of subsidence in California is groundwater pumping. The effects of subsidence include damage to buildings and infrastructure, increased flood risk in low-lying areas, and lasting damage to groundwater aquifers and aquatic ecosystems (USGS, 2025a).

Interferometric Synthetic Aperture Radar (InSAR) data used to evaluate land subsidence consist of relative displacement measurements—typically reported in millimeters or centimeters—along a satellite’s line-of-sight between two or more temporal observations, where negative values (movement away from the satellite) generally indicate subsidence and positive values (movement toward the satellite) suggest uplift. InSAR data for the proposed Project site shows a positive rather than negative displacement value (increased between 0.09 and 0.11 feet) for the time period of June 13, 2015 to January 1, 2025 (DWR, 2025). Therefore, little to no subsidence has occurred in the past 10 years. Furthermore, soils that are not organic are rated “mineral soil,” which are soils that do not subside due to organic matter oxidation – the chemical process that occurs when organic matter decomposes (NRCS, 2025). Organic matter oxidation reduces soil volume, which leads to subsidence. Milpitas-Positas fine sandy loams, 2 to 9 percent slopes are rated as “mineral soil” and have a subsidence rating of 0, meaning they are not at risk of subsiding as a result of the drainage of wet soil (NRCS, 2025).

#### **5.7.1.5. Slope Stability**

Important factors that affect the slope stability of an area include the steepness of the slope, the relative strength of the underlying rock material, and the thickness and cohesion of the overlying colluvium and alluvium. The steeper the slope and/or the less strong the rock, the more likely the area is susceptible to landslides. The steeper the slope and the thicker the colluvium, the more likely the area is susceptible to debris flows. Another indication of unstable slopes is the presence of old or recent landslides or debris flows.

Slope-failure hazards such as landslides and rockfalls are generally confined to areas with steep (greater than 25-percent) slopes and unstable soils. Areas within Goleta that may be susceptible to slope failure include coastal bluffs, steep stream banks, railroad and road cuts, and areas north of Cathedral Oaks Road with steep ground slopes. The Rincon geologic formation is susceptible to landslides, but outcrops of this formation are limited to portions of northwestern and northeastern Goleta (City of Goleta, 2006a, p. 5-4). According to landslide hazard mapping compiled by the City of Goleta, the proposed Project site is not within a landslide hazard zone (City of Goleta, 2006a – Figure 5-1).

The topography of the site and surrounding area is generally flat, and the proposed Project site slopes from north to south from elevations of approximately 115 feet above mean sea level to elevations of approximately 102 feet above mean sea level (LGC, 2024 - Appendix G [Geotechnical Report], p. 1). LGC’s research and field observations do not indicate the presence of landslides on the site or in the immediate vicinity. Review of regional geologic maps of the area do not indicate the presence of known or suspected landslides in the vicinity of the site. Therefore, the possibility of landslides at the site is considered nil (LGC, 2024 - Appendix G [Geotechnical Report], p. 5).

#### **5.7.1.6. Seismicity**

Per the Alquist-Priolo Act (A-P Act), seismic faults can be classified as Holocene active, Pre-Holocene, Age-undetermined, or inactive, based on the following criteria (CGS, 2018):

- Holocene-active faults: Faults that have moved during the past 11,700 years. This age boundary is an absolute age (number of years before present) and is not a radiocarbon ( $^{14}\text{C}$ ) age determination, which requires calibration in order to derive an absolute age.

- **Pre-Holocene faults:** Faults that have not moved in the past 11,700 years, thus do not meet the criteria of “Holocene-active fault” as defined in the A-P Act and State Mining and Geology Board regulations. This class of fault may be still capable of surface rupture but is not regulated under the A-P Act. Depending on available site-specific and regional data such as proximity to other active faults, average recurrence, variability in recurrence, the timing of the most recent surface rupturing earthquake, and case studies from other surface rupturing earthquakes, the Project geologist may, but is not required to, recommend setbacks. Engineered solutions can also be considered by a licensed engineer operating within his or her field of practice.
- **Age-undetermined faults:** Faults where the recency of fault movement has not been determined. Faults can be “age-undetermined” if the fault in question has simply not been studied in order to determine its recency of movement. Faults can also be age-undetermined due to limitations in the ability to constrain the timing of the recency of faulting. Examples of such faults are instances where datable materials are not present in the geologic record, or where evidence of recency of movement does not exist due to stripping (either by natural or anthropogenic processes) of Holocene-age deposits. Within the framework of the A-P Act, age-undetermined faults within regulatory Earthquake Fault Zones are considered Holocene-active until proved otherwise.
- **Inactive:** A fault may only be presumed to be inactive based on satisfactory geologic evidence; however, the evidence necessary to prove inactivity sometimes is difficult to obtain and locally may not exist.

Although it is difficult to quantify the probability that an earthquake would occur on a specific fault, this classification assumes that if a fault has moved during the Holocene epoch, it is likely to produce earthquakes in the future and is considered an active fault.

The proposed Project site is located between two pre-Holocene faults, the Glenn Annie Quaternary fault (age undifferentiated) and the More Ranch Late Quaternary fault (displaced during the past 700,000 years) (CGS, 2015). The geotechnical evaluation performed by LGC found that the proposed Project site is not located within an Alquist-Priolo Earthquake Fault Zone and identified no active faults on or near the site (LGC, 2024 - Appendix G [Geotechnical Report], p. 6).

#### **5.7.1.7. Fault Rupture**

Fault rupture is the surface displacement that occurs when movement on a fault deep within the earth breaks through to the surface. Fault rupture and displacement almost always follows preexisting faults, which are zones of weakness; however, not all earthquakes result in surface rupture (i.e., earthquakes that occur on blind thrusts do not result in surface fault rupture). Rupture may occur suddenly during an earthquake or slowly in the form of fault creep. In addition to damage caused by ground shaking from an earthquake, fault rupture is damaging to buildings and other structures due to the differential displacement and deformation of the ground surface that occurs from the fault offset leading to damage or collapse of structures across this zone.

The site is not located within a mapped State of California Earthquake Fault-Rupture Hazard Zone per compiled maps released by the CGS (2018), and there are no known active or potentially active faults on-site (LGC, 2024 - Appendix G [Geotechnical Report], p. 4). Thus, the possibility of damage due to ground rupture is considered low since no active faults are known to cross the site (LGC, 2024 - Appendix G [Geotechnical Report], p. 6).

#### **5.7.1.8. Ground Shaking**

An earthquake is classified by the amount of energy released, which traditionally has been quantified using the Richter scale. Recently, seismologists have begun using a Moment Magnitude (M) scale because it provides a more accurate measurement of the size of major and great earthquakes. For earthquakes of

less than M 7.0, the Moment and Richter Magnitude scales are nearly identical. For earthquake magnitudes greater than M 7.0, readings on the Moment Magnitude scale are slightly greater than a corresponding Richter Magnitude. Six earthquakes of M 5.5 or higher have occurred within 50 miles of the proposed Project site since 1900, including four earthquakes of M 5.5 to 6.0 (USGS, 2025a). There were two larger earthquakes, including a M 6.8 in Santa Barbara in 1925, and a M 6.9 in Lompoc in 1927 (USGS, 2025a).

The intensity of the seismic shaking, or strong ground motion, at the Project site during an earthquake is dependent on the distance between the site and the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions underlying and surrounding the Project site. Earthquakes occurring on faults closest to the Project site would most likely generate the largest ground motion. Earthquake damage resulting from ground shaking is determined by several factors: the magnitude of an earthquake, depth of focus, distance from the fault, intensity and duration of shaking, local groundwater and soil conditions, presence of hillsides, structural design, and the quality of workmanship and materials used in construction. The USGS National Seismic Hazard Maps (NSHM) were used to estimate approximate peak ground accelerations (PGAs) in the proposed Project site. The NSHMs depict PGAs with a 2 percent probability of exceedance in 50 years which corresponds to a return interval of 2,475 years and for a maximum considered earthquake.

The City is located in a region prone to earthquakes and characterized by a moderate to high ground shaking hazard (City of Goleta, 2006a, p. 5-3). The estimated approximate PGA from large earthquakes for the Project site is 1.0504 g (acceleration due to gravity), which corresponds to very strong seismically induced ground shaking (USGS, 2025b).

#### **5.7.1.9. Liquefaction**

Liquefaction is the phenomenon in which saturated granular sediments temporarily lose their shear strength during periods of earthquake-induced strong ground shaking. The susceptibility of a site to liquefaction is a function of the depth, density, and water content of the granular sediments and the magnitude and frequency of earthquakes in the surrounding region. Studies indicate that saturated, loose near surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential (LGC, 2024 – Appendix G [Geotechnical Report], p. 7). In addition, densification of the soil resulting in vertical settlement of the ground can also occur. In order to determine liquefaction susceptibility of a region, three major factors are considered: the density and textural characteristics of the alluvial sediments; the intensity and duration of ground shaking; and the depth to groundwater.

Lateral spreading is a type of liquefaction induced ground failure associated with the lateral displacement of surficial blocks of sediment resulting from liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluid mass, gravity plus the earthquake inertial forces may cause the mass to move down-slope towards a free face (such as a river channel or an embankment). Lateral spreading may cause large horizontal displacements and such movement typically damages pipelines, utilities, bridges, and structures.

According to liquefaction hazard mapping by Santa Barbara County, the proposed Project site is not located in a liquefaction zone (Santa Barbara County, 2025). Additionally, in the geotechnical evaluation for the proposed Project, LGC encountered terrace deposits over dense/hard bedrock of the Tertiary Monterey Formation. These soils, due to their apparent density and consistency (as indicated by high blow counts from Standard Penetration Tests, which reflect the number of hammer strikes needed to penetrate the soil), are not considered susceptible to liquefaction and liquefaction-induced settlement. LGC found the potential for liquefaction at the proposed Project site to be considered very low (LGC 2024, - Appendix G [Geotechnical Report], p. 7)

Due to the very low potential for liquefaction, the project site's potential for lateral spreading is considered very low (LGC, 2024 - Appendix G [Geotechnical Report], p. 7).

## Paleontology

Paleontological resources are the fossilized remains of organisms from prehistoric environments found in geologic strata. These are valued for the information they yield about the history of the earth and its past ecological settings. According to the City of Goleta General Plan EIR, the city is situated on alluvial fan deposits of the Quaternary age (Pleistocene and Holocene) and marine terrace deposits of the Quaternary (Pleistocene) and Neogene (Pliocene and Miocene) ages (City of Goleta, 2006b – Table 3.5-1). Geologic units of Holocene epoch are generally not considered sensitive for paleontological resources, because biological remains younger than 10,000 years are not usually considered fossils.

Older alluvium of the Quaternary age has the potential for scattered occurrences of terrestrial mammal fossils in the western half of the City of Goleta. A 1.5-acre outcrop of the Santa Barbara formation of the Pleistocene epoch has the potential for well-preserved marine mollusks, vertebrates, birds, and marine mammals, located 800 feet east of the Cathedral Oaks and Fairview intersection. The Sisquoc formation of the Pliocene epoch has the potential for microfossils, invertebrates, marine mammals, and body fish where exposed on the seacliff in the Ellwood Mesa area at the western edge of the city. Finally, the Monterey and Rincon formations of the Miocene epoch have the potential for microfossils, invertebrates, marine mammals, and bony fish where exposed at the Ellwood Mesa seacliff and in the foothills north of the Cathedral Oaks and Fairview intersection (City of Goleta, 2006b – Table 3.5-1).

The Project site is underlain by Quaternary marine terrace deposits of the upper Pleistocene epoch and by the Tertiary Monterey formation, which have a moderate to high potential for paleontological resources, particularly marine fossils (Wiseman et al., 2025 – Appendix F [Cultural Assessment], p. 64). The Project site is not located near a known historic, cultural, or paleontological resource (City of Goleta, 2006b – Figure 3.5-1). An Extended Phase I (XPI) study was conducted as part of a cultural resources assessment by Environmental Resources Management, Inc. (ERM) for the proposed Project. During XPI testing, ERM observed marine terrace sediment at testing depth (4 feet below ground surface). However, no unique paleontological or geologic features were observed at the Project site (Wiseman et al., 2025 – Appendix F [Cultural Assessment], p. 19). The greatest anticipated depth of any excavation at the site would be no more than 14 feet and no less than 12 feet of embedment for pile depths. All other excavations, such as for the gen-tie line, foundations, or pads, would be at shallower depths, approximately 10 feet or less.

### 5.7.2. Regulatory Background

#### Federal

**The Clean Water Act.** The Clean Water Act establishes the basic structure for regulating discharges of pollutants into the Waters of the U.S. The Act authorized the Public Health Service to prepare comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries and improving the sanitary condition of surface and underground waters with the goal of improvements to and conservation of waters for public water supplies, propagation of fish and aquatic life, recreational purposes, and agricultural and industrial uses. The proposed Project construction may disturb a surface area greater than one acre; therefore, the applicant would be required to obtain a National Pollution Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity under Clean Water Act regulations. Compliance with the NPDES would require that the applicant prepare and submit a Storm Water Pollution Prevention Plan (SWPPP).

**The International Building Code (IBC).** The International Building Code (IBC) is published by the International Code Council (ICC). The scope of this code covers major aspects of the design and construction

and structures and buildings, except for three-story one- and two-family dwellings and town homes. The International Building Code has replaced the Uniform Building Code as the basis for the California Building Code and contains provisions for structural engineering design. The 2021 IBC addresses the design and installation of structures and building systems through requirements that emphasize performance. The IBC includes codes governing structural as well as fire- and life-safety provisions covering seismic, wind, accessibility, egress, occupancy, and roofs.

## State

**The 2022 California Building Code, Title 24, Part 2.** The California Building Code, Title 24, Part 2 provides building codes and standards for design and construction of structures in California. The 2022 CBC is based on the 2021 International Building Code with the addition of more extensive structural seismic provisions. Chapter 16 of the CBC contains definitions of seismic sources and the procedure used to calculate seismic forces on structures.

**The 2022 California Fire Code, Title 24, Part 9, Chapter 12).** The California Fire Code, Title 24, Part 9, Chapter 12 provides codes and standards for design and construction of Energy Systems as it relates to fire safety. Section 1207 specifically applies to electrical Energy Storage Systems (ESS) and provides information on permit, construction, hazard mitigation, and operational requirements. It also includes a requirement that ESS structures shall comply with seismic design requirements of CBC Chapter 16.

**The Alquist-Priolo Earthquake Fault Zoning Act of 1972, Public Resources Code (PRC), sections 2621–2630 (formerly the Special Studies Zoning Act).** The Alquist-Priolo Earthquake Fault Zoning Act regulates development and construction of buildings intended for human occupancy to avoid the hazard of surface fault rupture. While this Act does not specifically regulate transmission and telecommunication lines; it does help define areas where fault rupture is most likely to occur. This Act groups faults into categories of active, potentially active, and inactive faults. Historic and Holocene age faults are considered active, Late Quaternary and Quaternary age faults are considered potentially active, and pre-Quaternary age faults are considered inactive. These classifications are qualified by the conditions that a fault must be shown to be “sufficiently active” and “well defined” by detailed site-specific geologic explorations in order to determine whether building setbacks should be established.

**The Seismic Hazards Mapping Act (the Act) of 1990 (Public Resources Code, Chapter 7.8, Division 2, sections 2690–2699).** The Act directs the California Department of Conservation, Division of Mines and Geology [now called California Geological Survey (CGS)] to delineate Seismic Hazard Zones. The purpose of the Act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards. Cities, counties, and State agencies are directed to use seismic hazard zone maps developed by CGS in their land-use planning and permitting processes. The Act requires that site-specific geotechnical investigations be performed prior to permitting most urban development projects within seismic hazard zones.

**Public Resources Code Section 5097.5.** PRC Section 5097.5 provides for the protection of cultural resources. This PRC section prohibits the removal, destruction, injury, or defacement of archaeological features on any lands under the jurisdiction of State or local authorities.

PRC Section 5097.5 also affirms that no person shall willingly or knowingly excavate, remove, or otherwise destroy a vertebrate paleontological site or paleontological feature without the express permission of the overseeing public land agency. It further states under PRC Section 30244 that any development that would adversely impact paleontological resources shall require reasonable mitigation. These regulations apply to projects located on land owned by or under the jurisdiction of the State or any city, county, district, or other public agency (PRC §5097.5). The importance of paleontological resources is based on their scientific and educational value. The Society of Vertebrate Paleontology identifies vertebrate fossils, their taphonomy (fossilization process) and associated environmental data, and fossiliferous deposits as scientifically

significant nonrenewable paleontological resources (Society of Vertebrate Paleontology, 2010). Botanical and invertebrate fossils and assemblages may also be significant. Absent specific agency guidelines, most professional paleontologists in California adhere to guidelines set forth in “Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources” (Society of Vertebrate Paleontology, 2010). These categories include high, undetermined, low, and no potential.

## Local

**City of Goleta General Plan.** The purpose of the City’s safety policies regarding geology and soils is to reduce the potential loss of both public and private property in areas subject to seismic events, seismically induced hazards, steep slopes, erosion hazards. The following policies in the General Plan relate to the proposed Project (City of Goleta, 2006a):

- **Policy SE 4.3 Geotechnical and Geologic Studies Required.** Where appropriate, the City shall require applications for planning entitlements for new or expanded development to address potential geologic and seismic hazards through the preparation of geotechnical and geologic reports for City review and acceptance (Safety Element, p. 5-18).
- **Policy SE 4.4 Setback from Faults.** New development shall not be located closer than 50 feet to any active or potentially active fault line to reduce potential damage from surface rupture. Nonstructural development may be allowed in such areas, depending on how such nonstructural development would withstand or respond to fault rupture or other seismic damage (Safety Element, p. 5-18).
- **Policy SE 4.5 Adoption of Updated California Building Code Requirements.** The City shall review, amend, and adopt new California Building Code requirements, when necessary, to promote the use of updated construction standards. The City shall consider and may adopt new optional state revisions for Seismic Hazards (Safety Element, p. 5-18).
- **Policy 4.10 Avoidance of Liquefaction Hazard Areas for Critical Facilities.** The City shall discourage the construction of critical facilities in areas of potential liquefaction. In cases where construction of such facilities cannot avoid liquefaction-hazard areas, the City shall require implementation of appropriate mitigation as recommended in site-specific geotechnical and soils studies (Safety Element, p. 5-18).
- **Policy SE 4.11 Geotechnical Report Required.** The City shall require geotechnical and/or geologic reports as part of the application for construction of habitable structures and essential services buildings (as defined by the building code) sited in areas having a medium-to-high potential for liquefaction and seismic settlement. The geotechnical study shall evaluate the potential for liquefaction and/or seismic-related settlement to impact the development, and identify appropriate structural-design parameters to mitigate potential hazards (Safety Element, p. 5-19).
- **Policy SE 5.1 Evaluation of Slope-Related Hazards.** The City shall require geotechnical/geological, soil, and structural engineering studies for all development proposed in areas of known high and moderate landslide potential or on slopes equaling or exceeding 25 percent. The studies shall evaluate the potential for landslides, rockfalls, creep, and other mass movement processes that could impact the development; they shall also identify mitigation to reduce these potential impacts, if needed. The studies shall be included as part of an application for development (Safety Element, p. 5-19).
- **Policy SE 5.2 Evaluation of Soil-Related Hazards.** The City shall require structural evaluation reports with appropriate mitigation measures to be provided for all new subdivisions, and for discretionary projects proposing new nonresidential buildings or substantial additions. Depending on the conclusions of the structural evaluation report, soil and geological reports may also be required. Such studies shall evaluate the potential for soil expansion, compression, and collapse to impact the development; they shall also identify mitigation to reduce these potential impacts, if needed (Safety Element, p. 5-19).

### 5.7.3. Environmental Impacts and Mitigation Measures

#### Thresholds of Significance

A significant impact on geology/soils would occur if the proposed project resulted in any of the impacts noted in the above checklist. Impacts are considered potentially significant if the project, and/or implementation of required mitigation measures, could result in increased erosion, landslides, soil creep, mudslides, and/or unstable slopes. Additionally, impacts are considered significant when people or structures would be exposed to major geologic hazards upon implementation of the Project.

The County of Santa Barbara's Environmental Thresholds and Guidelines Manual (2021), which has been adopted by the City of Goleta (adopted by Resolution 08-40) stipulates that a proposed project would result in a potentially significant impact on geological processes if:

**Threshold GEO-1.** The project site or any part of the project is located on land having substantial geologic constraints, as determined by the City of Goleta. Areas constrained by geology include parcels located near active or potentially active faults and property underlain by rock types associated with compressible/collapsible soils or susceptible to landslides or severe erosion.

**Threshold GEO-2.** The project results in potentially hazardous geologic conditions such as the construction of cut slopes exceeding a grade of 1.5 horizontal to 1.0 vertical.

**Threshold GEO-3.** The project proposes construction of a cut slope over 15-feet in height as measured from the lowest finished grade.

**Threshold GEO-4.** The project is located on slopes exceeding 20% grade.

#### Impact Analysis

Threshold GEO-1 is addressed in Checklist Items (a.i), (a.ii), (a.iii), (b), (c), (d), and (e). Thresholds GEO-2, GEO-3, and GEO-4 are addressed in Checklist Items (a.iv) and (c).

**(a) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:**

- i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.**

*NO IMPACT.* No Alquist-Priolo mapped or other known active faults cross the proposed Project site or are immediately adjacent to it (LGC, 2024 - Appendix G [Geotechnical Report], p. 6). Therefore, there is no potential for the Project to be damaged by fault rupture, and no project activities associated with its construction, operation, or decommissioning would trigger or directly or indirectly cause primary fault rupture. Therefore, no impact would occur.

- ii. Strong seismic ground shaking?**

*LESS THAN SIGNIFICANT.* The proposed Project would be located in an area mapped as likely to experience strong to very strong ground shaking in the event of a large earthquake with a PGA of 1.0508 g (acceleration due to gravity) for a 2 percent probability of exceedance in 50 years for the Project site (USGS, 2025b). The area has historically experienced moderate to severe ground shaking due to the numerous earthquakes that have occurred in the Santa Barbara County area (USGS, 2025a; City of Goleta, 2006a, p. 5-3).

Once constructed, there would be no full-time onsite workers at the site. There would be no occupied structures as part of the Project; workers would be onsite periodically for as needed inspections and maintenance during Project operation. The proposed BESS system (including the BESS units and

enclosures and the power conversion systems and their enclosures) may be subject to strong to very strong ground shaking during the Project's lifetime. The underground 66 kV gen-tie line would not be significantly impacted by strong ground shaking because underground cables are typically installed with some slack and are made of materials that can tolerate ground movement without breaking. Moreover, buried lines are shielded from surface-level hazards like falling debris, which can damage above-ground infrastructure during an earthquake. Project decommissioning would not be significantly impacted by strong ground shaking because it involves the removal of the surface-level equipment and infrastructure that is vulnerable to collapse or damage during an earthquake.

While the potential for seismically induced ground shaking in the proposed Project site during Project operation is unavoidable, the BESS and 66 kV gen-tie line would be designed to comply with all applicable local and State seismic design criteria. Design of these structures to all appropriate seismic design criteria reduces the potential for loss, injury, or death of workers or the public to less than significant.

### **iii. Seismic-related ground failure, including liquefaction?**

*LESS THAN SIGNIFICANT.* The proposed Project site is not within a liquefaction hazard zone identified by Santa Barbara County (Santa Barbara, 2025). Additionally, in the geotechnical evaluation for the proposed Project, LGC found the potential for liquefaction and the potential for lateral spreading to be considered very low (LGC, 2024 - Appendix G [Geotechnical Report], p. 7). While the potential for seismic-related ground failure in the proposed Project site during construction, operation, and decommissioning is low, the BESS system and 66 kV gen-tie line would be designed to appropriate local and State guidelines to reduce the potential for loss, injury, or death of workers or the public to less than significant.

### **iv. Landslides?**

*NO IMPACT.* The topography of the proposed Project site is relatively flat ground and slopes from north to south from approximately 115 feet above mean sea level to approximately 102 feet above mean sea level (LGC, 2024 - Appendix G [Geotechnical Report], p. 1). According to landslide hazard mapping compiled by the City of Goleta, the proposed Project site is not within a landslide hazard zone (City of Goleta, 2006a – Figure 5-1). Furthermore, LGC's geotechnical evaluation for the proposed Project site did not indicate the presence of landslides on the site or in the immediate vicinity (LGC, 2024 - Appendix G [Geotechnical Report], p. 5). Therefore, landslides and other slope failures are highly unlikely to occur during Project construction, operation, or decommissioning, and there would be no impact related to landslides or slope instability.

### **(b) Would the project result in substantial soil erosion or the loss of topsoil?**

*LESS THAN SIGNIFICANT.* The Project site is relatively flat with a gentle north-south slope from 115 feet to 102 feet above mean sea level (LGC, 2024 - Appendix G [Geotechnical Report], p. 10). Based on the hydrological analysis, the watershed erosion estimate (which is calculated as a product of the site's sedimentation R Factor, erodibility K Factor, and slope length LS factor) for the site is 8.8 tons per acre, which indicates a "Low" sediment risk (under 15 tons per acre) (ERM, 2025 – Appendix K [Construction SWPPP], p. 87). The proposed Project would therefore have a less than significant impact on drainage patterns or runoff generation and would not create on- or off-site erosion or siltation.

Surface disturbing activities such as trenching, grading, equipment staging, and landscaping would be required for construction of the proposed Project but would be done in compliance with regulations pertaining to sediment and runoff control, including silt fencing on the site perimeter. Sediment controls would be implemented to prevent water or wind disturbance and migration of the earth.

As noted in Section 5.7.1 "Regulatory Background", construction of the proposed Project would disturb a surface area greater than one acre; therefore, the applicant would be required to obtain a National Pollution Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated

with Construction Activity under Clean Water Act regulations. Compliance with the NPDES would require that the applicant prepare and submit a Storm Water Pollution Prevention Plan (SWPPP). Adherence to a SWPPP, as required by the condition of approval, GEO2, below, would ensure that the potential erosion or loss of topsoil is limited and reduced to a less than significant impact during construction and decommissioning of the Project. The operation of the Project would not have a significant impact on soil erosion or the loss of topsoil.

**(c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?**

*LESS THAN SIGNIFICANT.* As discussed above in Item (a)(iii) regarding liquefaction, the proposed Project site is not within a liquefaction hazard zone identified by Santa Barbara County (Santa Barbara, 2025), and LGC found a very low potential for liquefaction and lateral spreading in the geotechnical evaluation for the site (LGC, 2024 - Appendix G [Geotechnical Report], p. 7). The BESS system and 66 kV gen-tie line would be designed to appropriate local and State guidelines to reduce the potential for loss, injury, or death of workers or the public to less than significant.

As discussed above in item (a)(iv) Landslides, there would be no impact from landslides as the proposed Project is located on and traverses flat to gently sloping terrain and would not be subject to landslides. The proposed Project site is not within a landslide hazard zone identified by the City of Goleta (City of Goleta, 2006a – Figure 5-1), and LGC’s research, field observations, and review of regional geologic maps of the area did indicate the presence of landslides on the site or in the immediate vicinity (LGC, 2024 - Appendix G [Geotechnical Report], p. 5). Therefore, landslides and other slope failures are highly unlikely to occur and there would be no impact related to landslides or slope instability.

InSAR land subsidence data for the proposed Project site shows a positive rather than negative displacement value (increased between 0.09 and 0.11 feet) for the time period of June 13, 2015 to January 1, 2025 (DWR, 2025). Therefore, little to no subsidence has occurred in the past 10 years. Furthermore, soils that are not organic are rated “mineral soil,” which are soils that do not subside due to organic matter oxidation (decomposition) (NRCS, 2025). Milpitas-Positas fine sandy loams, 2 to 9 percent slopes are rated as “mineral soil” and have a subsidence rating of 0, meaning they are not at risk of subsiding as a result of the drainage of wet soil (NRCS, 2025). Thus, there would be no impact from subsidence.

In sum, the proposed Project would not be located on geologic units or soils that are unstable or would become unstable as a result of Project construction, operation, or decommissioning due to landslides, slope instability, or land subsidence. While the potential for seismic-related ground failure or liquefaction in the proposed Project site is low, the BESS system and 66 kV gen-tie line would be designed to appropriate local and State guidelines to reduce the potential for loss, injury, or death of workers or the public to less than significant. There would be a less than significant impact overall.

**(d) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?**

*LESS THAN SIGNIFICANT.* Mapping by the NRCS indicates that the Project site is underlain by Milpitas-Positas fine sandy loams, 2 to 9 percent slopes, which has low linear extensibility and moderate expansion potential (NRCS, 2025). Expansion Index (EI) testing conducted by LGC as part of the geotechnical site evaluation indicated EI values of 19 and 64, corresponding to “Very Low” and “Medium” expansion potential (LGC, 2024 - Appendix G [Geotechnical Report], p. 9). Expansive soils could impact the integrity and stability of BESS system foundations, damaging structures and potentially injuring workers. Compliance with local and State design requirements would reduce potential impacts from expansive soils.

The condition of approval GEO1 requires that all grading and earthwork recommendations from the Project’s geotechnical engineering report, including any updates, shall be incorporated into the final

Project design. Final grading, foundation, utility, and infrastructure plans shall be reviewed and approved by City staff prior to approval of a grading permit. During construction, all grading activities would be supervised by a registered civil engineer or certified engineering geologist, ensuring compliance. Based on the geotechnical evaluation (see Appendix G [Geotechnical Report]), LGC recommended the following design measures for Project construction, which would be implemented as required in the condition of approval GEO1, below:

- Moisture conditioning of the subgrade for equipment pad slabs will be required due to site expansive soils. Time duration for presoaking from completion of rough grading to trenching of foundations should be accounted for in the construction schedule (typically 1 to 2 weeks). The subgrade moisture condition of the equipment pad soils should be maintained at 120 percent of optimum moisture content to a depth of 18 inches up to the time of concrete placement. Presoaking is not necessary for foundations supported by a deep foundation system.
- A mat foundation can be used for support of the proposed battery storage and equipment pads. Mat foundations can be useful in helping distribute structural loads, to span local irregularities in the supporting capacity of the foundation soils, and to reduce the impact of expansive soils. The mat slab should have a thickened perimeter edge with a minimum embedment of 12-inches below lowest adjacent grade. Mat slabs are to be supported on compacted fill soils properly prepared in accordance with the recommendations provided in this report.
- The inclusion of control joints at a maximum of 15-foot on center for any proposed freestanding walls to reduce the potential for unsightly cracks due to differential settlement or expansive soils. If the soil-moisture content below the wall foundation varies significantly, some wall movement should be expected; however, this movement is unlikely to cause more than cosmetic distress.

With implementation of the condition of approval GEO1 during construction, the potential for expansive soils at the project site to create substantial direct or indirect risks to life or property during operation and decommissioning will be less than significant.

**(e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?**

*NO IMPACT.* The proposed Project would not include any components requiring septic tanks or alternative wastewater systems. Therefore, no impacts would occur as a result of Project construction, operation, or decommissioning.

**(f) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?**

*LESS THAN SIGNIFICANT, WITH MITIGATION INCORPORATED.* The Project site is underlain by Quaternary marine terrace deposits of the upper Pleistocene epoch and by the Tertiary Monterey formation, which have a moderate to high potential for paleontological resources, particularly marine fossils (Wiseman et al., 2025 – Appendix F [Cultural Assessment], p. 64). The Project site is not located near a known historic, cultural, or paleontological resource (City of Goleta, 2006b – Figure 3.5-1). During Extended Phase I testing conducted as part of the cultural resources assessment for the Project site, ERM observed marine terrace sediment at testing depth (4 feet below ground surface). However, no unique paleontological or geologic features were observed at the Project site (Wiseman et al., 2025 – Appendix F [Cultural Assessment], p. 19).

The proposed Project is anticipated to disturb the ground surface for grading, equipment staging, and landscaping. The greatest anticipated depth of any excavation at the site would be no more than 14 feet and no less than 12 feet of embedment for pile depths. All other excavations, such as for the gen-tie line, foundations, or pads, would be at shallower depths, approximately 10 feet or less. While there is a

moderate to high potential for paleontological resources of the underlying geologic units, no unique paleontological or geologic features were observed during XPI testing. Thus, the likelihood of encountering a unique paleontological resource or geologic feature on the proposed Project site is low. If encountered, any paleontologically or geologically significant resources would be evaluated and protected by a qualified paleontologist. Therefore, the impact to unique paleontological resources or geologic features during Project construction and decommissioning would be less than significant with incorporation of MM GEO-1. There would be no impact to unique paleontological or geologic resources as a result of the Project's operation.

**MM GEO-1 Inadvertent Discovery of Unique Paleontological Resources or Geologic Features.** If previously unidentified paleontological resources or geologic features are uncovered during construction activities, construction work within 50 feet of the find shall be halted and directed away from the discovery until a qualified paleontologist or geologist assesses the significance of the resource. The paleontologist or geologist, in consultation with the City of Goleta, and any other responsible public agency, shall make the necessary plans for treatment of the find(s) and for the evaluation and mitigation of impacts.

### 5.7.3.1. Impact Conclusions and Mitigation Measures

The proposed Project would result in potentially significant impacts to geology and soils, and thus, mitigation measure MM GEO-1 is recommended. The proposed Project would result in less than significant Geology and Soils impacts, with implementation of MM GEO-1.

Additionally, the following recommended condition of approval includes requirements to ensure potential project-related impacts are reduced to a less than significant level.

**GEO1. Recommended Condition of Approval: Geotechnical Recommendations.** All grading and earthwork recommendations from the project's geotechnical engineering report, including any updates, shall be incorporated into the final project design, including the final grading, foundation, utility, and infrastructure plans. All grading activities shall be supervised by a registered civil engineer or certified engineering geologist.

**Plan Requirements and Timing:** Final grading, foundation, utility, and infrastructure plans shall be reviewed and approved by City staff prior to approval of a grading permit.

**Monitoring:** The Planning and Environmental Review Director, or designee, shall verify compliance prior to any grading permit approval. Public Works staff shall periodically spot check in the field.

**GEO2. Recommended Condition of Approval: Stormwater Pollution Prevention Plan (SWPPP) Development and Implementation.** Following Project approval, the applicant will prepare and implement a SWPPP to minimize construction impacts on surface water and groundwater quality. Implementation of the SWPPP will help stabilize graded or disturbed areas and reduce erosion and sedimentation. The plan will designate BMPs that will be adhered to during construction activities. Erosion and sediment control measures, such as straw wattles, covers, and silt fences, may be installed before the onset of winter rains or any anticipated storm events if soils are not stabilized. Suitable stabilization measures will be used to protect exposed areas during construction activities, as necessary. During construction activities measures will be in place to prevent contaminant discharge.

The Project SWPPP will include erosion control and sediment transport BMPs to be used during construction. BMPs, where applicable, will be designed by using specific criteria from recognized BMP design guidance manuals. Erosion-minimizing efforts may include measures such as properly containing stockpiled soils.

Erosion control measures identified will be installed in an area before construction begins during the wet season and before the onset of winter rains or any anticipated storm events. Temporary measures such as silt fences or wattles, intended to minimize sediment transport from temporarily disturbed areas, will remain in place until disturbed areas have stabilized. The plan will be updated during construction as required by the SWRCB.

A worker education program shall be established for all field personnel prior to initiating fieldwork to provide training in the appropriate application and construction of erosion and sediment control measures contained in the SWPPP. This education program will also discuss appropriate hazardous materials management and spill response. Compliance with these requirements will be ensured by the on-site construction contractor.