4.8 Geology, Soils, and Coastal Processes

This section describes the existing geological conditions, soils, paleontological resources, and coastal processes in the project area, identifies applicable regional and local rules and regulations regarding geology, soils, paleontology, and coastal processes, provides significance thresholds, assesses the Proposed Project's impacts to geology, soils, paleontology, and coastal processes and their significance, and recommends measures to avoid or substantially reduce any effects found to be potentially significant.

Scoping Comments Received. During the scoping comment period for the EIR, written and verbal comments were received from agencies, organizations, and the public. These comments identified various substantive issues and concerns relevant to the EIR analysis. Appendix B includes all comments received during the scoping comment period. The following list provides a summary of scoping comments applicable to this issue area and considered in preparing this section:

- Assess retaining non-radioactive demolished materials on-site and mixed with on-site soils to minimize truck trips through Avila.
- Analyze the extent to which high-level wastes, pre-empted by the Nuclear Regulatory Commission, are treated in earthquake fault areas.
- Review engineering plans for the cofferdam and the restoration of the Discharge Structure, after demolition, as well as placement of riprap as potential erosion control.
- Include rigorous monitoring and testing of fill materials used on-site that is engineered from crushed clean concrete and soils.
- Identify to what soil depth would contamination be monitored and addressed.
- Identify and assess any floodplain impacts due to the location of the Pismo Beach Materials Handling Facility in relation to Pismo Creek.
- Assess any potential secondary impacts from using fill engineered from crushed clean concrete and soils used on-site.

4.8.1 Environmental Setting

The Proposed Project includes the Diablo Canyon Power Plant (DCPP), the Pismo Beach Railyard (PBR), and Santa Maria Valley Railyard – Betteravia Industrial Park (SMVR-SB). The project site is located in the Central Coast of California, a geographical region that spans from Pigeon Point in San Mateo County southward to Point Conception in Santa Barbara County.

4.8.1.1 Geology and Soils

Regional Geology

The DCPP site is in the Irish Hills in the southern part of the Coast Ranges Geomorphic Province of Central California. The Irish Hills lie west of the Santa Lucia Mountain range, a major topographic feature of the province. The Santa Lucia Mountains is approximately 140 miles long, extending from Monterey to Cuyama River, and approximately 20 to 25 miles wide and consists of Franciscan bedrock and Salinian granitic basement rocks overlain by Cretaceous sedimentary

sequences, Cenozoic sedimentary and volcanic rocks, and Quaternary sediments and volcanic deposits. The Irish Hills are composed predominantly of Tertiary marine sedimentary rock folded in a broad syncline (Pismo syncline) with older Cretaceous rocks exposed along the north and south limbs. The south limb exposures are offshore near DCPP (PG&E, 2014). The Central Coast Ranges are a product of tectonic forces that continue to influence the geological and topographic development of the region, which has included folding, faulting, and uplift, which in turn has resulted in erosion and deposition of sediments in the Project area.

The topography of this area is generally defined by elongated ranges and narrow valleys that generally parallel the coast but trend slightly more northwest than the coastline. Elevations are generally moderate, however, several peaks of the Santa Lucia range that are within 1 mile of the coast reach elevations of more than 2,500 feet (Norris and Webb, 1976). Along the coast, the western side of the hills and valleys have been modified by erosion into a narrow, gently sloping plain. This generally flat and gently sloping surface is an ancient, erosional marine terrace that has been uplifted by tectonic activity in the area.

The PBR site is located within the southern portion of the Coast Ranges Geological Province on the southwestern margin of the San Luis Range. The SMVR-SB site is in the Santa Maria Valley, an east-west trending valley bounded to the north by the San Rafael Range and to the south by the Casmalia Hills and the Solomon Hills.

Topography

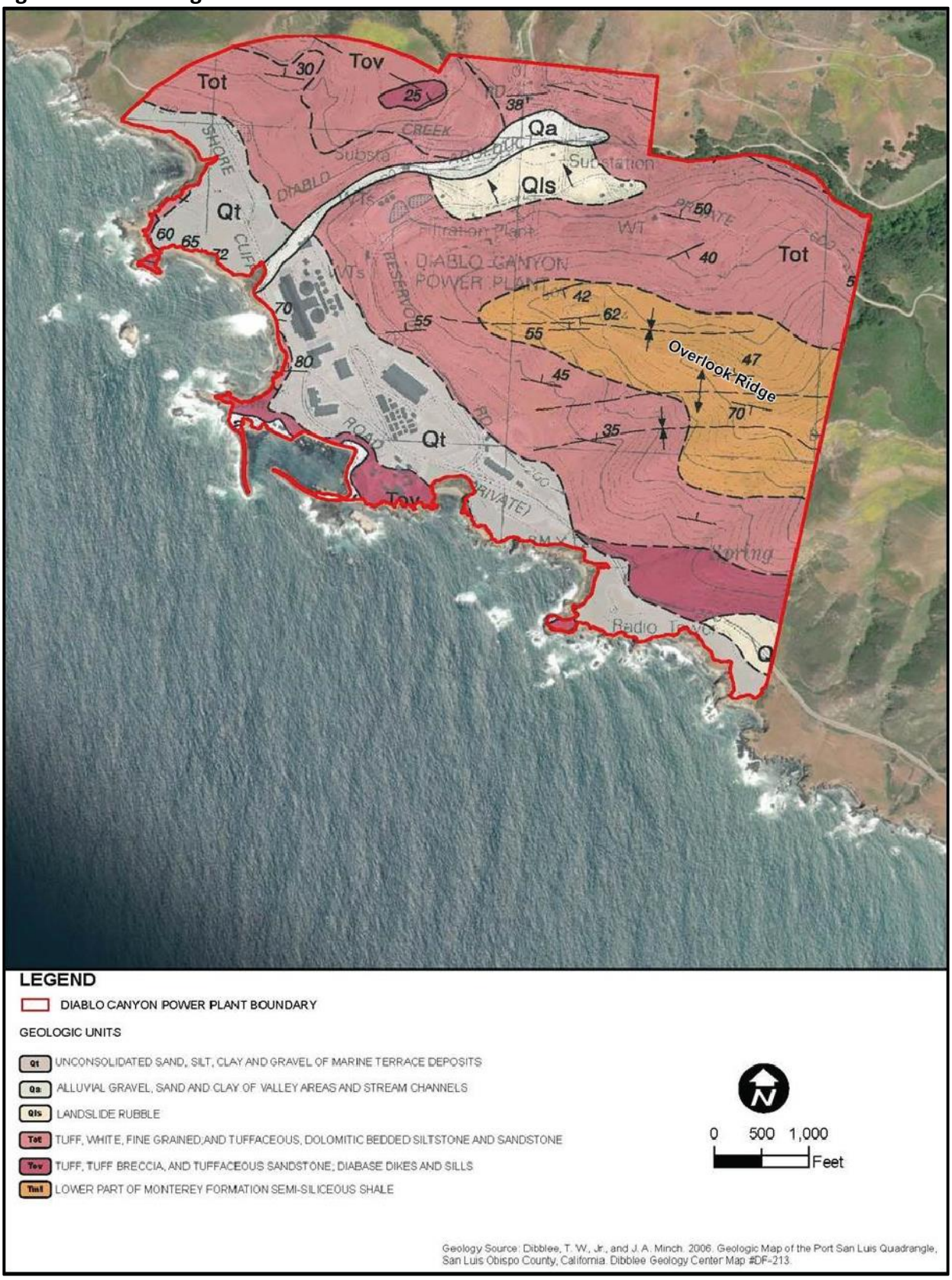
The DCPP site is located along the southwestern slope of the Irish Hills, within the Santa Lucia Mountains and on the erosional coastal marine terrace. Elevations within the DCPP area range from approximately 0 feet above mean sea level (MSL) along the shoreline to approximately 1,000 feet above MSL in the hills near the eastern edge of the DCPP site.

The PBR is located within an alluvial valley and the area ranges in elevation from approximately 30 to 100 feet above MSL and slopes gently to the southwest towards the coast. The SMVR-SB site is located within the Santa Maria Valley, in a relatively flat area with an elevation of approximately 200 feet above MSL.

Geology

The DCPP area is primarily underlain by Quaternary Terrace deposits (Qt), and Tertiary Monterey (Tm and Tml) and Obispo Formations (Tot and Tov) (Dibblee and Minch, 2006a; PG&E, 2014; PG&E, 2023b). Quaternary alluvium (Qa) is mapped along Diablo Creek and landslide deposits (Qls) are mapped in the East Canyon area on the south side of Diablo Creek (Dibblee and Minch, 2006a; PG&E, 2023b). Figure 4.8-1 shows the distribution of these geologic units within the DCPP.

Figure 4.8-1. Geologic Units within the DCPP Site



The general characteristics of the units in the DCPP area are described below:

- Qa – Alluvium. Alluvial gravel, sand, and clay in stream channels and valleys. This material is found along Diablo Creek.
- Qt –Terrace deposits. Unconsolidated sand, silt, and clay formed on marine and river terraces. Primarily found on marine terraces in the DCPP area. The terrace deposits overlie an erosional bench cut into Obispo Formation bedrock and both units are exposed in the natural ocean bluffs in Diablo Cove (Discharge Cove).
- Qls – Landslide deposits. Unconsolidated deposits derived from upslope source material of soil and Obispo Formation tuff and tuffaceous siltstone and claystone.
- Tm/Tml – Monterey Formation. Thin bedded, white weathering siliceous shale, somewhat cherty ™ and lower part of Monterey Formation (Tml) consisting of thin bedded semi-siliceous shale weathering cream white, includes layers of soft fissile shale, platy siliceous shale, siltstone, calcareous shale, and thin hard layers with dolomite concretions.
- Tot/Tov – Obispo Formation. White fine-grained tuff and tuffaceous, dolomitic, fine to medium-bedded siltstone and fine sandstone (Tot) with tuff breccia and small clasts of pumice and perlite and volcanic rocks (Tov) consisting mostly of zeolitic tuff, tuff breccia and tuffaceous sandstone, and includes diabase dikes and sills.

In the 2023 Preliminary Engineering Geology Report for the Decommissioning of the Diablo Canyon Power Plant (Preliminary Engineering Geology Report) by PG&E, the DCPP area mapped can be described in two main geographic areas divided by Overlook Ridge (PG&E, 2023b). North of Overlook Ridge consists of coarse-grained Obispo formation (Tmofb) consisting of dolomite, dolomitic sandstone, sandstone, and siliceous shales (PG&E, 2023b). Overlying the Obispo formation three mapped Pleistocene landslides (Qpls#1, Qpls#3, and Qpls#2 from east to west) extend from near the top of the divide at Overlook Ridge to Diablo Creek. Holocene landslides (Qls) are mapped near the base of the north facing slope. In East Canyon, the toe of the Qpls#2 landslide underlies a narrow trough filled by marine estuarine deposits (PG&E, 2023b). Near the 230 and 500 kV switchyards, and the East Canyon area, artificial fill (af), colluvium and debris flow, and alluvial fan deposits are mapped which overlie marine deposits. Obispo formation mapped south of Overlook Ridge include Obispo tuff forming the resistant seacliffs and finegrained claystone, shale, and siltstone and underlie the marine terrace (PG&E, 2023b). The PBR is underlain by alluvium along Pismo Creek (Dibblee and Minch, 2006b). The SMVR-SB site is underlain by Dune sand deposits (Qos) and remnants of weakly consolidated stream terrace and alluvial fan deposits (Qoa) (Dibblee et al., 2009).

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. Another indication of unstable slopes is the presence of old or recent landslides or debris flows. The term landslide is a general term for the dislodging and fall of a mass of soil or rocks along a sloped surface, or for the dislodged mass itself. The term is used commonly for varying phenomena, including mudflows, mudslides, debris flows, rockfalls, rockslides, debris avalanches, debris slides, and slump-earth flows.

Geologic mapping (Dibblee and Minch, 2006a) maps the DCPP area as underlain by Quaternary alluvium, terrace deposits and landslide deposits, and Tertiary Monterey and Obispo Formations. Both the Monterey and Obispo Formations have mapped landslides in the hills near to the DCPP and are considered susceptible to landslides (Dibblee and Minch, 2006a). A large, ancient landslide complex within the Obispo Formation is mapped along the slopes on the southeast side of Diablo Creek east of the 500 kV substation (PG&E, 2002; Dibblee and Minch, 2006a). There are three separate Pleistocene landslides and several smaller Pleistocene and Holocene landslides mapped north and east of Overlook Ridge (PG&E, 2023b). The smaller landslides are considered to be reactivated parts of the Pleistocene landslides and the surface landforms suggest Holocene movement although there is no evidence of recent activity (PG&E, 2023b). Reactivated Holocene and/or reactivated Pleistocene landslide deposits are mapped within the revised OCA, above the planned Firing Range, Heavy Haul Loading Road Ramp, and the SE Borrow Site (PG&E, 2023b).

The Patton Cove (the cove located east of the Intake Cove) landslide occupies the majority of the approximately 50-foot-high bluff face (PG&E, 2002). Slide movement was first documented in 1970 and over time, the landslide has been periodically reactivated by heavy rain and wave erosion at the toe of the slide (PG&E, 2002). During the winter of 1996, reactivation of the landslide caused cracks in Shore Cliff Road and a water line break, which suggest encroachment of the landslide into Diablo Ocean Drive (PG&E, 2002). The Patton Cove landslide is actively encroaching the intersection of Diablo Ocean Drive and Reservoir Road (PG&E, 2023b).

Multiple debris flow chutes are mapped on the west side of Overlook Ridge, above Hillside Drive and the Fire Station (PG&E, 2023b). Sources of debris flows are the colluvium-filled hollows below the top of Overlook Ridge (PG&E, 2023b). At the time of DCPP construction, a catchment bench, concrete culverts, and rip rap were installed to reduce the extent of potential debris flows (PG&E, 2023b).

Soils

The soils underlying Project components reflect the underlying rock type, the extent of weathering of the rock, the degree of slope, and the degree of human modification. Potential hazards/impacts from soils include erosion, shrink-swell (expansive soils), corrosion, and compressibility. Soil mapping by the US Department of Agriculture (USDA) National Resource Conservation Service (NRCS) was reviewed for information about unsuitable characteristics of surface and near-surface subsurface soil materials (NRCS, 2022). A summary of the notable characteristics of the soil units underlying the DCPP, PBR, and SMVR-SB sites, listed in numerical not geographic order, are presented in Table 4.8-1. Figure 4.8-2 shows the distribution of these soil associations within the DCPP.

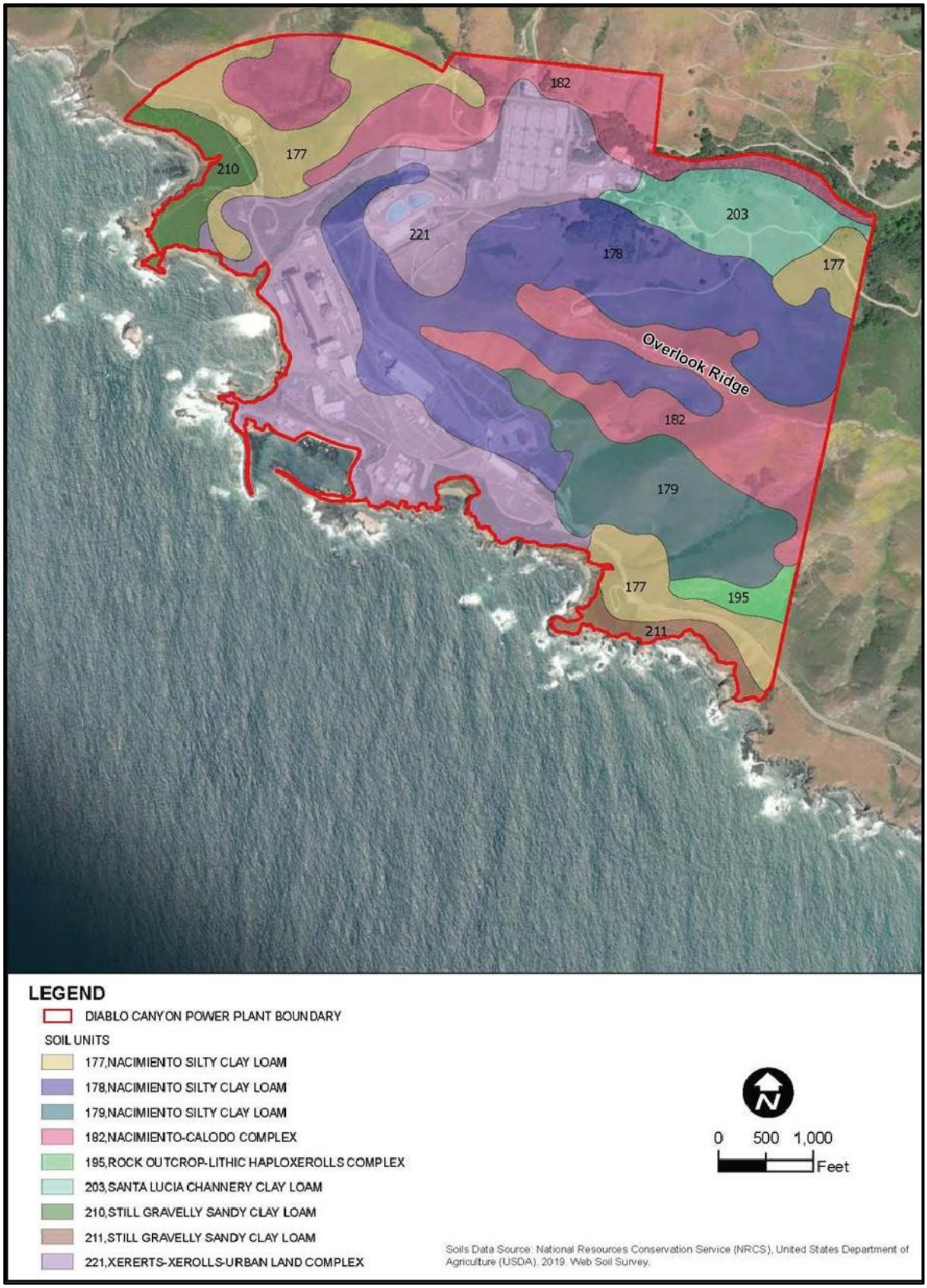
Table 4.8-1. Soil Units Underlying the Proposed Project

		Erosion Class		Expansion Potential (shrink-swell)	Corrosion Potential	
Unit ID	Unit Name	Water	Wind		Uncoated Steel	Concrete
DCPP						
177	Nacimiento silty clay loam	Moderate	Low	Moderate	Moderate	Low
178	Nacimiento silty clay loam	Moderate	Low	Moderate	Moderate	Low
179	Nacimiento silty clay loam	Moderate	Low	Moderate to High	Moderate	Low
182	Nacimiento-Calodo complex	Moderate	Low	Low to Moderate	Low to Moderate	Low
195	Rock outcrop-Lithic Haploxerolls complex	NA	NA	NA	NA	NA
203	Santa Lucia channery clay loam	Low	Low	Low to Moderate	High	Moderate
210	Still gravelly sandy clay loam	Low	Low	Moderate	High	Low
211	Still gravelly sandy clay loam	Low	Low	Moderate	High	Low
221	Xererts-Xeroll-Urban-land complex	NA	NA	NA	NA	NA
PBR						
111	Camarillo sandy loam	Moderate	High	Low to Moderate	Moderate	Moderate
155	Lopez very shaly clay loam	Low	Low	Low	Moderate	Low
179	Nacimiento silty clay loam	Moderate	Low	Moderate to High	Moderate	Low
207	Santa Lucia very shaly clay loam	Low	Low	Low	High	Moderate
SMVR-SB						
GsD	Gazos clay loam	Moderate	Low	Low to Moderate	Moderate	Low
NvA	Narlon sand, hardpan variant	Low to Moderate	High	Low to Very High	High	Moderate

Source: NRCS, 2022.

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 affect the infiltration capacity of a soil, as well as the resistance of a soil to detachment and being carried away by falling or flowing water. Sheet erosion occurs when water runs over a large uniform area picking up and distributing soil particles. Rill erosion occurs as concentrated surface runoff begins to remove soil along concentrated zones which numerous small, but conspicuous, water channels or tiny rivulets. 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. As the clay and organic matter content of soils increases, the potential for erosion decreases. Clays act as a binder to soil particles, thus reducing the potential for erosion. Erosion potential, as mapped by the NRCS, of the soils underlying the Proposed Project varies from low to moderate for water and is low for wind at DCPP, from low to moderate for water and low to high for wind at PBR, and from low to high for water and low to high for wind at the SMVR-SB, as presented in Table 4.8-1.

Figure 4.8-2. Soil Units Underlying the DCPP Site



Septic Tank Absorption Fields

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Septic tank absorption field ratings evaluate only the soil between depth of 24 and 60 inches and is based on the soil properties that affect the absorption of the effluent, construction and maintenance of the system, and public health. The following soil characteristics affect absorption of the effluent: saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented hard pan, and flooding. Lateral seepage and surfacing of the effluent in downslope areas may occur on slopes. This rating indicates the extent to which the soil absorption is limited by the soil features. A "not limited" rating indicates that the soil has features that are very favorable for the absorption field use, while "very limited" rating indicates that the soil has one or more features that are unfavorable for the specified use. The septic tank absorption field ratings for the majority of soils underlying the DCPP, with the exception of Soil Units 221 and 195, are very limited (NRCS, 2023). For Soil Units 221 and 195, the septic tank absorption field rating is not limited and not rated, respectively (NRCS, 2023).

At the DCPP, there is an existing septic system located on the slope between the East Canyon area and the lower Diablo Creek terrace south of the Diablo Creek gauging station, which was designed and implemented circa 1968 (PG&E, 2023b). There is also an abandoned leach field located at Hillside Drive near the DCPP Fire Station and north of the existing firing range (PG&E, 2023b).

Subsidence

Land subsidence is a gradual settling or sudden sinking of the ground surface due to removal or displacement of subsurface earth materials. The principal causes include compaction associated with withdrawal of fluids such as groundwater or petroleum, compaction of organic soils, underground mining, or natural compaction or collapse, such as with sinkholes or thawing permafrost. In California, subsidence is typically caused by human withdrawal of fluids (water or petroleum). None of the Proposed Project sites (DCPP, PBR, or SMVR-SB) are located with an area of known subsidence (United States Geological Survey [USGS], 2022c).

Seismicity

The Project area is in a geologically complex and seismically active region which includes both the north-south trending Coast Ranges and the east-west Transverse Ranges. The seismicity of the Project area is dominated by the intersection of the north-northwest trending San Andreas and Coast Ranges faults and the east-west trending Transverse Ranges fault system. These systems are all responding to strain produced by the relative motions of the Pacific and North American Tectonic Plates. This strain is relieved by right-lateral strike-slip faulting on the San Andreas and related faults in the Coast Ranges and offshore, and by vertical, reverse-slip or left-lateral strike-slip displacement on faults in the Coast and Transverse Ranges. The effects of this strain and deformation includes mountain building, basin development, deformation of Quaternary marine terraces, widespread regional uplift, and generation of earthquakes. Both the Transverse Ranges and Coast Ranges areas are characterized by numerous geologically young

faults. These faults can be classified as historically active, active, potentially active, or inactive, based on the following criteria (California Geological Survey [CGS], 1999):

- Faults that have generated earthquakes accompanied by surface rupture during historic time (approximately the last 200 years) and faults that exhibit aseismic fault creep are defined as Historically Active.
- Faults that show geologic evidence of movement within Holocene time (approximately the last 11,000 years) are defined as Active.
- Faults that show geologic evidence of movement during the Quaternary time (approximately the last 1.6 million years) are defined as Potentially Active.
- Faults that show direct geologic evidence of inactivity during all of Quaternary time or longer are classified as Inactive.

Although it is difficult to quantify the probability that an earthquake will occur on a specific fault, this classification is based on the assumption that if a fault has moved during the Holocene epoch, it is likely to produce earthquakes in the future. Activity classification of blind thrust faults and offshore faults are predominantly based on geologic data from deep oil wells, geophysical profiles, historic earthquakes, and microseismic activity along the fault.

Active regional faults capable of producing significant ground shaking at the DCPP, PBR, and SMVR-SB sites are strike-slip faults associated with the San Andreas Fault System, offshore Santa Barbara Channel faults, and reverse and blind thrust faults associated with the compressional folding and faulting of the Coast and Transverse Ranges. Periodic earthquakes accompanied by surface displacement can be expected to continue in the study area through the lifetime of the Proposed Project. Active faults and potentially active faults that represent a significant seismic threat to the Proposed Project are listed in Table 4.8-2. Data presented in this table include estimated earthquake magnitudes, and type of fault. Figure 4.8-3 shows locations of significant active and potentially active faults and historic earthquakes in the Project area and surrounding region.

No active faults or Alquist-Priolo zoned faults cross or are in the immediate vicinity of the Project sites (DCPP, PBR, SMVR-SB). The northwest trending Hosgri fault is located offshore extending 85 miles from San Simeon to west of Lompoc and is estimated to be capable of strong earthquakes. Near DCPP the Hosgri fault is located about 3 miles offshore. The offshore Shoreline fault is the closest fault to the DCPP site and trends north-northwest parallel to the local coastline and does not extend to the Hosgri fault. Little is known about the geometry and activity of the Shoreline fault, and therefore, this fault is not included in Figure 4.8-3. The closest fault to PBR is the San Luis Range fault system (South Margin) located approximately 0.25 miles south of the site. The closest fault to the SMVR-SB site is the Casmalia fault zone located approximately 2.5 miles to the southwest.

While numerous earthquakes of up to magnitude (M) 4.0 commonly occur throughout the region, larger earthquakes are somewhat rare. Only two earthquakes of M5.0 or greater have occurred within 50 miles of the DCPP, with only one of those greater than M6.0 (USGS, 2022b). The largest earthquakes to occur near the Project area was the offshore 1927 M7.1 Lompoc

Earthquake, which caused little damage due to the sparse population onshore near the earthquake at the time (Southern California Earthquake Data Center [SCEDC], 2022).

Table 4.8-2. Significant Active and Potentially Active Faults within 50 miles of DCPP

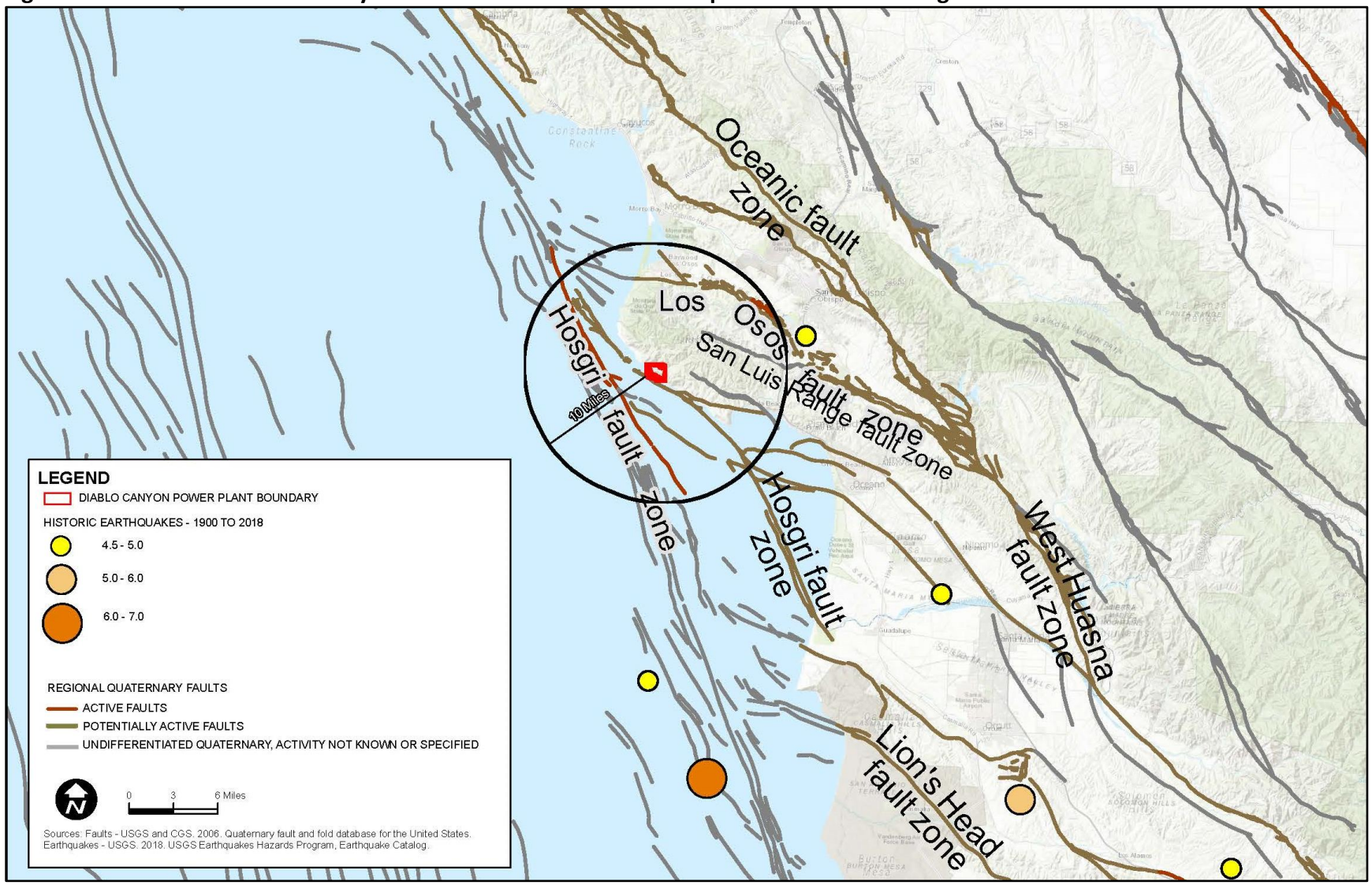
Fault Name	Closest Distance to DCPP (miles)[1]	Estimated Maximum Earthquake Magnitude[2]	Fault Type and Dip Direction[1]
Shoreline (offshore fault)	0.2	NA	Right Lateral Strike Slip, 90°
San Luis Bay (Offshore fault)	1.5	NA	Thrust, 45°SW
Hosgri	3.1	7.3	Right Lateral Strike Slip, 80°E
San Luis Range (South Margin)	4.2	7.2	Thrust, 45°N
Los Osos	6.0	7.0	Thrust, 45°SW
Oceanic-West Huasna	14.0	NA	Thrust, 58°SW
Rinconada	17.9	7.5	Right Lateral Strike Slip, 90°
Casmalia (Orcutt Frontal)	22.5	6.7	Reverse, 75°SW
Lions Head	27.5	6.8	Reverse, 75°NE
Los Alamos – West Baseline	43.6	6.9	Thrust, 30°S
S. San Andreas	47.5	7.1-8.0[3]	Right Lateral Strike Slip, 90°

[1] Fault distances and parameters obtained from USGS Earthquake Hazards Program, 2008 National Seismic Hazard Maps - Source Parameters website (USGS, 2022a) and CGS Quaternary Fault and Fold Database of the United States, (USGS & CGS, 2006).
[2] Maximum Earthquake Magnitude – the maximum earthquake that appears capable of occurring under the presently known tectonic framework, magnitude listed is "Ellsworth-B" magnitude from the USGS Earthquake Hazards Program, 2008 National Seismic Hazard Maps - Source Parameters website (USGS, 2022a), unless otherwise noted.
[3] Range of magnitudes represents varying rupture scenarios of one or more segments along a fault.

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 pre-existing 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. In California, Alquist-Priolo Earthquake Fault Zones have been defined by the CGS along active faults with the potential for surface rupture. However, not all active faults have been zoned, as the criteria specifies that a fault must be shown to be "sufficiently active" and "well defined" by detailed site-specific geologic explorations in order to determine whether an Alquist-Priolo Earthquake Hazard Zone can be established with associated building setbacks. Many known active faults are not sufficiently "well defined" at the surface to qualify to be Alquist-Priolo zoned but could still cause significant surface fault rupturing.

Figure 4.8-3. Active and Potentially Active Faults and Historic Earthquakes in the DCPP Region



No known active or potentially active faults cross the DCPP, PBR, and SMVR-SB sites. The offshore Shoreline fault is in close proximity to the DCPP site; however, it is not considered a significant seismic source (PG&E, 2011; United States Nuclear Regulatory Commission, 2012). The closest Alquist-Priolo zoned fault to the DCPP site is a small section of the Los Osos fault, located approximately 6 miles northeast of the DCPP site. Therefore, fault rupture within the DCPP site is unlikely.

Strong 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 M7.0, the Moment and Richter Magnitude scales are nearly identical. For earthquake magnitudes greater than M7.0, readings on the Moment Magnitude scale are slightly greater than a corresponding Richter Magnitude.

The intensity of the seismic shaking, or strong ground motion, during an earthquake is dependent on the distance between the Project area and the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions underlying and surrounding the Project area. Earthquakes occurring on faults closest to the Project area would most likely generate the largest ground motion. The intensity of earthquake-induced ground motions can be described using peak ground accelerations (PGAs), represented as a fraction of the acceleration of gravity (g). Peak ground acceleration is the maximum acceleration experienced by a particle on the Earth's surface during the course of an earthquake, and the units of acceleration are most commonly measured in terms of fractions of g, the acceleration due to gravity (980 cm/sec^2).

The CGS Probabilistic Seismic Hazards Ground Motion Interpolator website was used to estimate PGAs at the Project sites. The interpolator uses data from the 2008 Probabilistic Seismic Hazard Assessment Maps (PSHA) to interpolate peak ground accelerations with a 2 percent probability of exceedance in 50 years (return interval of 2,475 years for a maximum considered earthquake) and with a 10 percent probability of exceedance in 50 years (a return interval of 475 years for the maximum considered earthquake) (CGS, 2022). PGAs at the DCPP site for 2 percent probability of exceedance in 50 years is approximately 0.62g and approximately 0.30g for a 10 percent probability of exceedance in 50 years, which correspond to moderate ground shaking. PGAs at the PBR site for 2 percent probability of exceedance in 50 years is approximately 0.58g and approximately 0.28g for a 10 percent probability of exceedance in 50 years, which correspond to low to moderate ground shaking. PGAs at the SMVR-SB site for 2 percent probability of exceedance in 50 years average about 0.47g and approximately 0.27g for a 10 percent probability of exceedance in 50 years, which correspond to low to moderate ground shaking.

Seismic analysis for the Diablo Canyon area is based on the Hosgri fault and concluded that PGAs at the ISFSI for 2 percent probability of exceedance in 50 years is approximately 0.70g and approximately 0.30g for a 10 percent probability of exceedance in 50 years, which correspond to moderate ground shaking (CCC, 2004).

In contrast to the ISFSI seismic analysis for a bedrock site, site conditions at the GTCC Waste Storage facility, indoor Firing Range, Security Building, and Storage Buildings in the revised OCA, are underlain by artificial fill, colluvium, and alluvium (PG&E, 2022a). Seismic analysis for the new

buildings in the OCA is required as part of final engineering design. The Vertical Cask Transporter (VCT) Warehouse would be located on an existing level building pad underlain by Obispo formation (sandstone, dolomitic sandstone, and siltstone) (PG&E, 2023b). The temporary decommissioning office building would be located on Obispo formation (sandstone, siltstone), terrace deposits, and possibly debris deposits (PG&E, 2023b).

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. Saturated, unconsolidated silts, sands, and silty sands within 50 feet of the ground surface are most susceptible to liquefaction. Liquefaction-related phenomena include lateral spreading, ground oscillation, flow failures, loss of bearing strength, subsidence, and buoyancy effects (Youd and Perkins, 1978). In addition, densification of the soil resulting in vertical settlement of the ground can also occur.

To determine liquefaction susceptibility of a region, three major factors must be analyzed. These include: (a) the density and textural characteristics of the alluvial sediments, (b) the intensity and duration of ground shaking, and (c) the depth to groundwater. Unconsolidated sandy sediments with groundwater levels of 50 feet below ground surface (bgs) or less in areas with expected moderate to strong ground shaking are the most susceptible to liquefaction related phenomena.

The DCPP site has three on-site water wells located in Diablo Canyon in the East Canyon area. Two wells are used for monitoring purposes, and one well is an active permitted water supply well (Well #2). In 2021, groundwater levels were measured at Wells #1, #2, and #4 (PG&E, 2021). Wells #1, #2, and #4 are located within 200 to 800 feet south of Diablo Creek, near the north-central DCPP site boundary. Well #1 is located near Diablo Creek and intercepts unconsolidated alluvium. The groundwater depth measured at Well #1 was approximately 38 feet below ground surface (bgs). Wells #2 and #4 are in the Obispo Formation and groundwater levels are much deeper. Depth to water at Well #2 during Spring of 2021 was approximately 150 feet bgs. Groundwater depth measured at Well # 4, located approximately 800 feet south of Diablo Creek, was approximately 248 feet bgs.

The DCPP area is underlain by consolidated and/or cemented sedimentary and volcanic bedrock formations that would not be susceptible to liquefaction. Static groundwater levels were measured at two borehole explorations located in East Canyon, which ranged between 83 and 92 feet bgs (PG&E, 2022a). Due to deep groundwater levels greater than 50 feet in East Canyon and within consolidated Obispo Formation bedrock, specifically within the revised OCA, near the proposed GTCC Waste Storage facility, indoor Firing Range, Security Building, and Storage Buildings, it is unlikely that liquefaction would occur in this area. Within the East Canyon area, landslide deposits are mapped along the steep slopes of the hillsides adjacent to the proposed facilities, as well as the existing septic system and leach field. The landslides deposits are comprised of soil and bedrock rubble and would not be susceptible to liquefaction. There are no proposed facilities located on landslide deposits (PG&E 2022a). The new VCT Warehouse would be located on an existing level building pad underlain by Obispo formation (sandstone, dolomitic

sandstone, and siltstone) (PG&E, 2023b) that would not be susceptible to liquefaction. The temporary decommissioning office building is located on Obispo formation (sandstone, siltstone), terrace deposits, and possibly debris deposits, and may be in an existing cut area likely underlain by competent material (no landslide or fill). The temporary decommissioning office area is underlain by consolidated material that would not be susceptible to liquefaction.

The PBR is underlain by alluvium along Pismo Creek (Dibblee and Minch, 2006b). Groundwater depths in the vicinity of the PBR are approximately 10 feet below ground surface (CDWR, 2022). The PBR is mapped in an area of low to moderate liquefaction potential (San Luis Obispo, 2013).

The SMVR-SB site is underlain by Dune sand deposits and remnants of weakly consolidated stream terrace and alluvial fan deposits (Dibblee et al., 2009). A review of the California Department of Water Resources (CDWR) Water Data Library website indicates water levels in these areas of greater than 100 feet below ground surface. Groundwater measured at a well located approximately 0.2-mile west of the SMVR-SB measured approximately 127 feet below ground surface in 2020 (CDWR, 2022). The sedimentary deposits underlying the SMVR-SB site are not generally expected to be liquefiable due to deep groundwater levels.

Seismically Induced Landslides

Other forms of seismically induced ground failures that may affect the Project area include ground cracking, and seismically induced landslides. Landslides triggered by earthquakes have been a significant cause of earthquake damage. In Southern California, large earthquakes such as the 1971 San Fernando and 1994 Northridge earthquakes triggered landslides that were responsible for destroying or damaging numerous structures, blocking major transportation corridors, and damaging life-line infrastructure. Areas that are most susceptible to earthquake-induced landslides are steep slopes in poorly cemented or highly fractured rocks, areas underlain by loose, weak soils, and areas on or adjacent to existing landslide deposits. As noted above, the DCPP area is located within an area of moderate to steep slopes with existing landslides mapped throughout the hills. An assessment of seismic slope stability was conducted for numerous areas throughout the DCPP where landslides could impact key structures (PG&E, 1997). The assessment revealed that while small slumps, mudslides, and rock topples may occur in an earthquake none of the structures/facilities would be negatively impacted by these slope failures. The PBR and SMVR-SB sites are in flat alluvial valleys and are not subject to seismically induced slope failures.

4.8.1.2 Paleontology

Paleontological resources are any fossilized remains, traces, or imprints of organisms that are preserved in the Earth's crust and are of paleontological interest and provide information about the history of life on Earth. Fossil remains may include bones, teeth, shells, leaves, and wood. They are found in geological deposits within which they were originally buried. Paleontological resources include not only the actual fossils, but also the collecting localities and the geological deposits that contain the fossils. Paleontological resources are considered nonrenewable resources because the organisms they represent no longer exist. Thus, once destroyed, these resources can never be replaced. The following discussion relies heavily on the paleontological

inventory and evaluation report (PIER) for the 2016 Diablo Canyon North Access Road Improvements (Applied Earthworks, Inc., 2016). The PIER was prepared for PG&E, and included a review of the project geotechnical report, scientific literature, geologic mapping, and online records from the University of California Museum of Paleontology (UCMP).

The geologic units underlying the DCPP site, include the following: Quaternary alluvium (Qa), Landslide deposits (Qls), Terrace deposits (Qt), Monterey (Tm and Tml) and Obispo Formations (Tot and Tov). An analysis of the geologic units within the DCPP area (described below) is based on an assessment of the following criteria of paleontological potential of each unit, as defined by the Society of Vertebrate Paleontology (SVP, 2010).

- High Potential: Rock units from which vertebrate or scientifically significant invertebrate, plant, or trace fossils have been recovered have a High Potential for containing additional scientifically significant paleontological resources.
- Low Potential: Rock units poorly represented by fossil specimens in institutional collections, or based on general scientific consensus, are only preserved in rare circumstances; the presence of fossils is the exception, not the rule (e.g., basalt flows or recent colluvium). Rock units with low potential typically do not require impact mitigation measures.
- No Potential: Some rock units have no potential to contain scientifically significant paleontological resources (e.g., high-grade metamorphic rocks, such as gneisses and schists, and plutonic igneous rocks, such as granites and diorites) and require no protection or mitigation measures relative to paleontological resources.
- Undetermined Potential: Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environmental have undetermined potential. They require further study (e.g., a field survey) by a qualified professional paleontologist, as defined by the SVP (2010), to determine the paleontological resource potential of these rock units before a paleontological resource impact mitigation program can be developed. Where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

The geologic units within the DCPP area are described below and shown in Figure 4.8-1. However, some areas around and beneath existing structures may contain artificial fill of an undetermined thickness. Numerical ages for the geologic units within the DCPP area, except for artificial fill, are based on information provided by the International Commission on Stratigraphy (2022) and are as follows:

- Qa and Qls – Alluvium and Landslide Deposits. These deposits date to the Holocene (11,700 years ago to present). No previously recorded fossils have been documented within the Quaternary alluvial and landslide deposits in the vicinity of the DCPP (Applied Earthworks, Inc., 2016). The Quaternary alluvial and landslide deposits are determined to have a low potential for buried paleontological resources, as the units are generally too young or coarse to contain fossilized remains (Applied Earthworks, Inc., 2016). Holocene-age alluvial deposits, particularly those younger than 5,000 years old, are generally too young to contain fossilized material, but they may overlie sensitive older deposits (e.g., the Monterey Formation and Pleistocene marine terrace deposits) at an unknown depth (SVP, 2010).

- Qt – Terrace deposits. These deposits date to the Pleistocene (2.58 million (Ma) years to 11,700 years ago). The Terrace deposits have produced several fossil localities in the immediate vicinity of the DCPP, thus, the unit is determined to have a high potential for buried paleontological resources (Applied Earthworks, Inc., 2016). Late Pleistocene vertebrates have been found less than 2 miles from the DCPP site, including a fossil specimen of *Microgadus* (cod). Also, three additional vertebrate localities yielded fossil remains of unspecified terrestrial mammal, camel, horse, ground sloth, whale, and dolphin, were found approximately 4 miles south of the DCPP (Applied Earthworks, Inc., 2016).
- Tm/Tml – Monterey Formation. These deposits date to the Middle to Late Miocene (15.97 to 5.33 Ma years ago). The Monterey Formation is a well-documented geologic deposit that has proven to yield significant fossils in the vicinity of the Project, San Luis Obispo County, and throughout California, thus, the unit is determined to have a very high potential for buried paleontological resources (Applied Earthworks, Inc., 2016). Many vertebrate localities have been documented from within the Monterey Formation, including specimens of large sea turtles, whale, dolphins, sea lions, shark bones and teeth, sea cows, desmostylians (extinct marine mammal), fish, birds, among others (Applied Earthworks, Inc., 2016). Within the Monterey Formation, specimens have typically been recovered from within the diatomite and shale deposits, but the limestone and sandstone beds have also yielded abundant remains (Applied Earthworks, Inc., 2016). Also, numerous species of scientifically significant invertebrates, foraminifera, and plants have been found in the Monterey Formation (Applied Earthworks, Inc., 2016). Recent paleontological monitoring took place from August to September 2020, during preconstruction excavations and grading for the North Ranch/Pecho Valley Road Upgrade Project (SWCA Environmental Consultants [SWCA], 2021). This project extends approximately 4.25 miles along Pecho Valley Road on the North Ranch of the DCPP site (SWCA, 2021). Several potentially significant paleontological resources were collected; however, only one specimen (fossil fish skull with pectoral fin) collected from the Monterey Formation, was ultimately deemed significant by the Natural History Museum of Los Angeles County (NHMLA), where it was delivered for curation (SWCA, 2021).
- Tot/Tov – Obispo Formation. These deposits date to the Miocene (23.03 to 5.33 Ma years ago). The Obispo Formation has proven to yield only rare invertebrate specimens; thus, the unit is determined to have a low potential for buried paleontological resources (Applied Earthworks, Inc., 2016). Vertebrate fossils have not been identified in the Obispo Formation (Applied Earthworks, Inc., 2016).

As shown on Figure 4.8-1, the DCPP site includes the Terrace Deposits and the Monterey Formation, which have the potential for high and very high paleontological sensitivity, respectively. The alluvium and landslide deposits in addition to the Obispo Formation have a low sensitivity for paleontological resources.

Quaternary-aged alluvial deposits have a low potential for containing paleontological resources in accordance with criteria set forth by the SVP (2010). Surficial deposits of Holocene age or previously disturbed sediments are determined to have a low paleontological sensitivity because these sediments are too young or unlikely to preserve fossilized remains. No previously recorded fossils have been documented within the Dune sand deposits in the vicinity of the SMVR-SB (Woodring and Bramlette, 1950). Paleontological resources are found within the geologic

deposits or bedrock that underlie the soil layer. Substantial ground disturbance is not expected at the PBR or SMVR-SB sites, thus, the likelihood of encountering paleontological resources during the Proposed Project is low.

4.8.1.3 Coastal Processes

Coastal Zone

The coastal zone boundary for most of California extends approximately 1,000 yards inland and represents the jurisdictional boundary of the CCC. However, this boundary extends farther inland in several areas of the Counties of San Luis Obispo and Santa Barbara because of important habitat, recreational, and agricultural resources. Those areas include the lands surrounding Nipomo Dunes, Hearst Ranch, and other north coast areas; Morro Bay watershed in San Luis Obispo; lands surrounding Guadalupe Dunes and Point Conception; and most of the Carpinteria Valley in Santa Barbara. The DCPP site is located within the unincorporated San Luis Obispo County adjacent to the Pacific Ocean. Approximately two-thirds of the DCPP site is within the coastal zone and approximately one-third is outside the coastal zone (see Figure 1-2). The coastline along the DCPP site is fairly open with several small shallow coves, including Diablo Cove (the Discharge Cove) and Patton Cove (the cove east of the Intake Cove). The PBR site is located within the City of Pismo Beach, with the very southern portion of the PBR site within the coastal zone (see Figure 2-3). The SMVR-SB site is located within unincorporated Santa Barbara County and is not within the coastal zone.

Ocean Circulation

Ocean circulation in California is controlled by a complex set of warm and cold-water masses that produce seasonally driven upwelling events and three major dynamic currents: the Davidson, the California Current, and the Southern California Countercurrent, all of which influence ocean circulation at the project area. The California Current is a north Pacific Ocean current setting southeastward along the west coast of the United States and Baja California (National Oceanic and Atmospheric Administration [NOAA], 2000). The California Current is countered by the Davidson Current, a narrow countercurrent that moves water northwards between the California Current and the coasts of California, Oregon, and Washington during winter months (NOAA, 2000).

Generally, the currents flow north or south parallel to the coast, at various depths, and sometimes in opposite directions from each other depending on the season. During the upwelling season (March through July), strong northwest winds and the south flowing California Current combine with the earth's rotation to drive surface waters away from the shore. These surface waters are replaced by an upwelling of deeper water from offshore. The winter storm season (mid-November through February) is dominated by rough seas and greater mixing of ocean water and the Davidson Current, which flows from south to north within 20 miles of the coast. Further out (50 to 100 miles), the California Current moves north to south. In March, the Davidson Current generally begins to weaken, and the California Current dominates within the nearshore environment. These currents, along with other climatic conditions, influence water temperatures along the coast, with Northern and Central California generally having cooler water than Southern California. The Santa Barbara Channel area is considered a "transition zone" between

the warmer Southern California waters and cooler Central and Northern California waters (California Sea Grant, 2021).

Water Levels

Ocean and coastal water levels within the project area are influenced by four primary factors: (1) astronomical tides, (2) cyclic climatic variations, (3) storm surge and tsunamis, and (4) sea level rise. Sea level rise is discussed as part of Section 7.1, *Climate Change and Sea Level Rise*.

Tides

Tides are the alternate rising and falling of the sea due to gravitational pull of the moon and sun on the earth. Most tides in California, including tides in the project area, are mixed semidiurnal; that is, there are typically two high and two low tides in a 24-hour period (NOAA, 2021). Because the coves in the immediate area of the DCPP site are small and open to the ocean, tides are not amplified by geography (US Atomic Energy Commission, 1972).

Tidal benchmarks and tidal predictions shown in Table 4.8-3 are based on the current 19-year tidal epoch covering the period from 1983 through 2001 at the closest tidal station. The next tidal datum epoch will be based on measurements from 2002 to 2020; however, that is not expected to be published by NOAA until 2025.

Table 4.8-3. Tidal Characteristics at Port San Luis, California

Tidal Benchmark [1]	MLLW (feet)	NAVD88 [2] (feet)
Highest Observed (1/18/1973)	7.65	7.57
Mean Higher High Water	5.33	5.25
Mean High Water	4.62	4.54
Mean Tide Level	2.83	2.75
Mean Sea Level	2.80	2.72
Mean Low Water	1.04	0.96
NAVD88	0.08	0.00
Mean Lower Low Water	0.00	-0.08
Lowest Observed (1/7/1951)	-2.40	-2.48

Source: NOAA, 2003.
[1] NOAA Tidal Station 9412110 for Port San Luis, California
[2] NAVD88: North American Vertical Datum of 1988

Cyclic Climatic Variations

El Niño and the Southern Oscillation (ENSO) is a periodic fluctuation in sea surface temperature and the air pressure of the overlying atmosphere across the equatorial Pacific Ocean (National Centers for Environmental Information, 2021). The warm phase of ENSO is El Niño, while the cool phase is La Niña; these phases are determined by sea surface temperatures in the central equatorial region of the Pacific Ocean. During an El Niño, sea level in the eastern Pacific is well above average, while during a La Niña, the increased flow of cold deep water to the surface acts to lower the sea level.

While ENSO phases represent the sea conditions in the central equatorial region of the Pacific Ocean, the Pacific Decadal Oscillation (PDO) phases represent conditions in the northern Pacific. Similar to ENSO, the warmer or cooler coastal water from the PDO phases results in increases or decreases to the sea level, respectively. Both ENSO phases and the PDO phases influence the Project area.

Storm Surge, Storm Waves, and Tsunamis

Storm surge is the rising of ocean water associated with low-pressure weather systems. PG&E developed a probable maximum storm surge utilizing local buoy data and numerical modeling, which is outlined fully in its *Diablo Canyon Power Plant Units 1 and 2 Flood Hazard Reevaluation Report* (PG&E, 2015). Comparing the average and minimum recorded pressures from an offshore buoy (National Data Buoy Center, Buoy 46028), a storm surge of 2.9 feet was estimated and added to the high-water level model. In addition to storm surge, localized water levels can be greatly affected by storm waves and their associated runup at the shoreline. The maximum estimated wave height outside of the DCPP breakwaters was found to be 44.6 feet (10.3 meters), and the maximum wave crest elevation inside the breakwaters was 12.8 feet North American Vertical Datum of 1988 (NAVD88; PG&E, 2015).

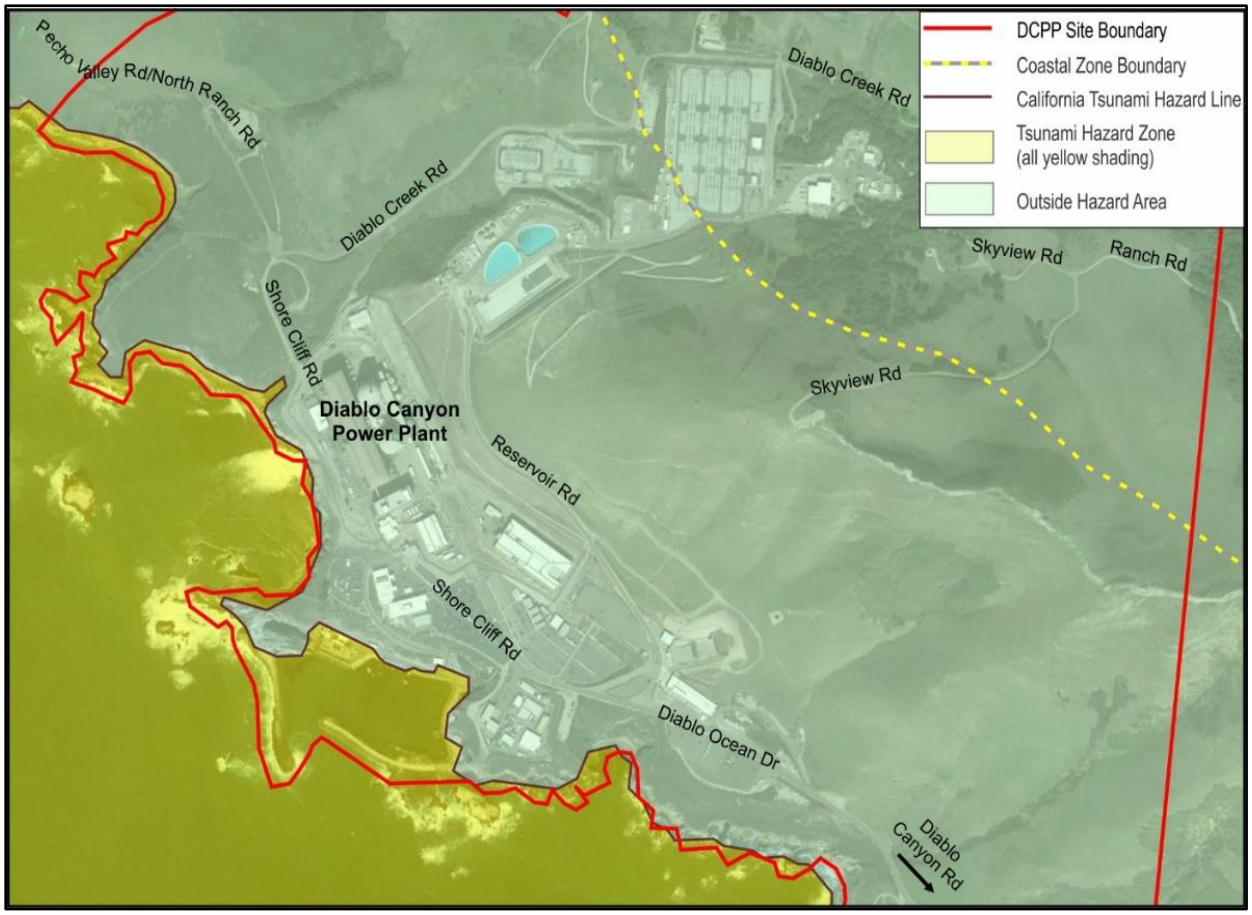
A tsunami is a series of waves in a waterbody caused by the displacement of a large volume of water, such as an earthquake, volcanic eruption, or landslide. Tsunami waves can travel over 600 miles per hour across the open ocean, slowing as the wave approaches land to less than 30 miles per hour and growing significantly in height (San Luis Obispo, 2016).

Historically, large tsunamis have not been common on the Central Coast of California, and few incidents have been recorded. For the County of San Luis Obispo, no tsunamis have exceeded the normal tidal range, though it is expected that faults in the offshore area could generate tsunami wave heights as great as 6 feet (San Luis Obispo, 2016). Most recently, the Hunga Tonga eruption on January 15, 2022, resulted in a tsunami that caused surges that ranged from 2.5 feet over to 4 feet below predicted tide levels throughout the day in the (NOAA, 2022).

The local threat of tsunami-related damage is primarily confined to low-lying coastal areas less than 50 feet above mean sea level (San Luis Obispo, 2016). The Discharge Structure is at the base of the cliffs, the Intake Structure is situated between approximately 20 and 30 feet NAVD88, and the breakwaters have a maximum crest elevation of approximately 20 feet NAVD88. Therefore, the Intake and Discharge Structures, as well as the Marina and Breakwater areas, are within the potential tsunami impact zones. The upper plant area, on top of the cliffs, is all above approximately 85 feet NAVD88, and therefore not within the potential tsunami impact zones.

The California Geological Survey Tsunami Hazard Area Map for San Luis Obispo County (State of California, 2021 shows that tsunamis are not expected to impact the main upland portion of the project site (see Figure 4.8-4). The American Society of Civil Engineers (ASCE)'s Tsunami Hazard Mapping Tool was also used to map risk; the extent of the risk of impact is the same as shown on Figure 4.8-4 (ASCE, 2022).

Figure 4.8-4. Local Tsunami Hazard Map



Source: State of California, 2021.

Littoral Processes

Ocean currents, waves, and winds influence the natural movement of sediment along shorelines, defined as the littoral drift. The California coast primarily has a southerly littoral drift, meaning while sediment moves both north and south along the coast, most sediment gets transported to the south. Various features interrupt the littoral drift patterns, including shoreline direction changes, cliffs, river mouths, and fabricated obstructions like jetties, creating discrete littoral cells along the coast. The California coast is broken into 25 littoral cells; however, the project area is not located within a major littoral cell (Patsch and Griggs, 2007). The *San Luis Obispo County Coastal Regional Sediment Management Plan* (Coastal California Sediment Management Workgroup [CCSMW], 2016) further delineates littoral cells and places the DCPP at the north end of the Santa Maria Cell, with net longshore transport to the southeast, with negligible sediment contribution from bluff erosion (CCSMW, 2016). Most of the sediment for the Santa Maria Cell comes from the Santa Maria River and remains to the southeast of DCPP along Avila Beach, Pismo Beach, and the Oceano Dunes.

The coastline in the area of the DCPP consists of a series of small coves, resistant headlands, sea stacks, and pocket beaches that have been eroded into bedrock sea cliffs (William Lettis &

Associates, Inc. [WLA], 2004).[19,20] The sea cliffs range from 50 degrees to vertical and consist of rock layers, including resistant zeolitized tuff (hard rock made from compressed volcanic ash) and marine sandstone, siltstone, and dolomite. Sea cliff erosion (and associated shoreline retreat) of the bedrock shoreline in the project area is strongly controlled by the wave erosion process and failure mechanisms of the sea cliff. The coves and pocket beaches have formed where waves eroded the softer shale and siltstone rock, leaving resistant rock buttresses and headlands.

A maximum sea cliff retreat over the next 75-year period is anticipated to be 1.0 to 4.5 meters for Diablo Cove and 0.5 to 2.5 meters for Patton Cove (cove southeast of the Intake Cove) (WLA, 2004). The maximum retreat will be localized along the weaker rock beds and will form narrow slots and gullies in the sea cliff on the order of 1 to 5 meters wide, while other areas will experience lesser magnitudes of retreat. The average retreat of the DCPP area sea cliffs is conservatively estimated to be about 3 meters (10 feet) over the next 75-year period.

4.8.2 Regulatory Setting

4.8.2.1 Geology and Soils

California Environmental Quality Act (CEQA). This law encourages the protection of all aspects of the environment by requiring state and local agencies to prepare multidisciplinary analyses of the environmental impacts of a proposed project, and to make decisions based on the findings of those analyses. CEQA also takes into account the laws and procedures of local California jurisdictions.

An evaluation of a project's impacts relating to geology and soils is required under CEQA. The evaluation should include a project's potential to directly or indirectly cause adverse effects in relation to earthquake faults, ground shaking, liquefaction, landslides, erosion, geologic stability, and paleontological resources.

CEQA includes in its definition of historical resources, "any object [or] site …that has yielded or may be likely to yield information important in prehistory" (14 CCR 15064.5[3]), which is typically interpreted as including fossil materials and other paleontological resources. More specifically, destruction of a "unique paleontological resource or site or unique geologic feature" constitutes a significant impact under CEQA (State CEQA Guidelines Appendix G). CEQA does not provide an explicit definition of a "unique paleontological resource," but a definition is implied by comparable language within the act relating to archeological resources: "The procedures, types of activities, persons, and public agencies required to comply with CEQA are defined in: Guidelines for the Implementation of CEQA, as amended March 29, 1999" (Title 14, Chapter 3, California Code of Regulations: 15000 et seq.).

Treatment of paleontological resources under CEQA is generally similar to treatment of cultural resources, requiring evaluation of resources in the project; assessment of potential impacts on

[19] Headlands are areas of the seaside cliffs that are more resistant to erosion than the areas around them, leaving a portion of rocky land projecting into the sea as portions of the cliffs to either side erode.

[20] Sea stacks are columns of rocky land left standing in the sea after the erosion of the cliffs around them.

significant or unique resources; and development of mitigation measures for potentially significant impacts, which may include avoidance, monitoring, or data recovery excavation.

California Public Resources Code. Public Resources Code (PRC) 5097.5 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. Section 5097.5 specifies that any unauthorized removal of paleontological remains is a misdemeanor. Under PRC 30244, 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 city, county, district, or other public agency.

California Penal Code. Section 622.5 sets the penalties for damage or removal of paleontological resources.

County of San Luis Obispo County General Plan, Safety Element. The San Luis Obispo County General Plan Safety Element outlines the County's applicable goals and policies regarding seismic and geologic hazards (San Luis Obispo, 1999).

Goal S-5: Minimize the potential for loss of life and property resulting from geologic and seismic hazards.

> Policy S-17: Information on faults and geologic hazards in the County should continue to be updated. The County will enforce the General Plan and applicable building codes that require developments, structures, and public facilities to address geologic and seismic hazards through the preparation and approval of geotechnical and geologic reports. Appointment of a County Geologist will improve implementation of the goals, policies, programs and standards of this Element by assuring more objective review and consistent enforcement of hazard mitigation measures county-wide than is possible under the present system of project review.
>
> Policy S-18: Locate new development away from active and potentially active faults to reduce damage from fault rupture. Fault studies may need to include mapping and exploration beyond project limits to provide a relatively accurate assessment of a fault's activity. The County will enforce applicable regulations of the Alquist-Priolo Earthquake Fault Zoning Act pertaining to fault zones to avoid development on active faults.
>
> Policy S-19: The County will enforce applicable building codes relating to the seismic design of structures to reduce the potential for loss of life and reduce the amount of property damage.
>
> Policy S-20: The County will require design professionals to evaluate the potential for liquefaction or seismic settlement to impact structures in accordance with the currently adopted Uniform Building Code.
>
> Policy S-21: The County acknowledges that areas of known landslide activity are generally not suitable for residential development. The County will avoid development in areas of known slope instability or high landslide risk when possible and continue to encourage that developments on sloping ground use design and construction techniques appropriate for those areas.

Policy S-22: Fire and law enforcement agencies will maintain and improve their ability to respond to seismic emergencies throughout the County.

Policy S-23: Development shall not be permitted near the top of eroding coastal bluffs.

County of San Luis Obispo County General Plan, Conservation and Open Space Element. The San Luis Obispo County General Plan Conservation and Open Space Element outlines the County's applicable goals and policies regarding natural resources (San Luis Obispo, 2010).

Goal CR-4: The County's known and potential Native American, archeological, and paleontological resources will be preserved and protected.

Policy CR 4.5 Paleontological Resources: Protect paleontological resources from the effects of development by avoiding disturbance where feasible.

Implementation Strategy CR-4.5.1 Paleontological Studies: Require a paleontological resource assessment and mitigation plan to 1) identify the extent and potential significance of the resources that may exist within the proposed development and 2) provide mitigation measures to reduce potential impacts when existing information indicates that a site proposed for development may contain biological, paleontological, or other scientific resources.

Implementation Strategy CR-4.5.2 Paleontological Monitoring: Require a paleontologist and/or registered geologist to monitor site-grading activities when paleontological resources are known or likely to occur. The monitor will have the authority to halt grading to determine the appropriate protection or mitigation measures. Measures may include collection of paleontological resources, curation of any resources collected with an appropriate repository, and documentation with the County.

County of San Luis Obispo County General Plan, Local Coastal Program, Geologic Study Area Considerations. The Combining Designations and Proposed Public Facilities chapter in the County General Plan, Local Coastal Program (LCP) describes goals, objectives, and implementing strategies for review of projects proposed in the Geologic Study Area (San Luis Obispo, 2018).

Objective 1. Structures for human occupancy are not to be constructed over an active fault area (identified by the Alquist-Priolo Geologic Hazards Zone Act Maps of the San Andreas Fault, on file in the Department of Planning and Building), without county review and approval.

Objective 2. Proposed projects in the Geologic Study Area are subject to site-specific soil and geologic evaluations by a registered civil engineer or engineering geologist (as appropriate) as to the suitability of the site for development in accordance with the Coastal Zone Land Use Ordinances.

County of San Luis Obispo Department of Planning and Building, Onsite Wastewater Treatment Systems Local Agency Management Program. The State Water Resources Control Board adopted Resolution No. 2012-0032, the Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems (OWTS policy) on June 19, 2012. The OWTS policy became effective on May 13, 2013 and established a statewide, risk-based tiered approach for the regulation and management of OWTS. The purpose of Local Agency Management Program (LAMP) is to allow continued use of OWTS within the jurisdiction of the County of

San Luis Obispo as well as to expand the local program to permit and regulate non-conventional OWTS while protecting water quality and public health. The Central Coast Water Board has jurisdiction over the County of San Luis Obispo and authorizes the County of San Luis Obispo Planning and Building Department to issue certain OWTS permits.

The County of San Luis Obispo Department of Planning and Building oversees OWTS permits, projects, and reviews and approves the plans. To obtain a construction permit for the installation of a new or replacement septic system, the applicant shall submit a percolation test design and results of percolation testing performed by a registered civil engineer, registered geologist, or registered environmental health specialist. The qualified professional must develop and submit a layout design for the proposed building project and specific OWTS for review. Prior to approval of the layout design, additional testing (including depth to groundwater measurements during an average rainfall year or grading permits) may be required. Some OWTS permits require County Planning and Building grading permits. Before approval of the OWTS construction permit, the applicant must prove that a potable water supply is available for the project. After approval of the OWTS construction permit, the OWTS can be installed. An inspection prior to backfill of the OWTS is required and appropriate stormwater best management practices must be implemented during construction. At the time of inspection, the engineer's report of system construction shall be collected.

City of Pismo Beach General Plan, Safety Element. The City of Pismo Beach General Plan, Safety Element contains the following relevant policies (Pismo Beach, 2014).

Policy S-1: Risk Identification. The City shall continually provide for the identification and evaluation of existing structural hazards, and abate those hazards to acceptable levels of risk. Specifically:

- Structures within the City's jurisdiction that are old, or suspect of hazards from fire, flooding and geologic events, including bluff retreat, should be inspected by qualified personnel to determine the degree of the hazards. Critical facilities should be inspected prior to non-critical facilities, and public-owned facilities prior to private owned facilities. Structural inspections are a major seismic concern. Susceptibility to damage from flooding should be determined based on the 100-year flood. Fire hazards are best evaluated on a building-by-building basis, by qualified inspection personnel.
- CALTRANS should review its facilities and roadways within the area to determine the potential impact of expected earthquakes and floods and should forward comments to the City.
- The Pacific Gas and Electric Company and the Southern California Gas Company should continue the review of their facilities and distribution/transmission networks and centers, especially with regard to fire and earthquake hazards to ensure adequate and safe service pursuant to the standard of construction, operation and maintenance mandated by the California Public Utilities Commission. Where local standards differ significantly with those of the Commission, the City should inform the commission accordingly in order that such differences be taken into consideration.
- Structures, which have been inspected and found to have a high degree of hazard from earthquake, landslide, fire or flooding should be brought up to an acceptable level of risk or mitigated to reduce the level of risk. Programs used to bring structures up to standards should

include, but not be limited to, structural rehabilitation, flood proofing, occupancy reduction, and demolition and reconstruction.

- The City shall initiate abatement proceedings against structures found to be unsafe.

Policy S-2: New Development. New development within the City's jurisdiction shall be designed to withstand natural and manmade hazards to acceptable levels of risk by:

- Adoption of the most recent safety requirements in the Building and Fire Code.
- Using the planning and technical criteria presented in the Safety Element, as basic guidelines for all new public facilities.
- Evaluating new development, particularly industrial, commercial or utility development, to ensure that construction or operation of the project will not cause hazardous conditions at an unacceptable level of risk.
- Requiring new development to avoid portions of sites with high hazard levels.

Policy S-3: Bluff Set-Backs. All structures shall be set back a safe distance from the top of the bluff in order to retain the structures for a minimum of 100 years, and to neither create nor contribute significantly to erosion, geologic instability or destruction of the site or require construction of protective devices that would substantially alter natural landforms along bluffs and cliffs. The City shall determine the required setback based on the following criteria:

- For development on single-family residential lots subdivided prior to January 23, 1981, the minimum bluff setback shall be 25 feet from the top of the bluff (bluff-top is defined as the point at which the slope begins to change from near horizontal to more vertical). A geologic investigation may be required at the discretion of the City Engineer, and a greater setback may be applied as the geologic study would warrant.
- For all other development, a geologic study shall be required for any development proposed.

Policy S-4: Bluff-top Guidelines/Geologic Studies. Site-specific geologic reports shall incorporate the information requirements contained in the State Coastal Commission's guidelines for Geologic Stability of Bluff-top Development, as adopted May 3, 1977 and updated on December 16, 1981. This guideline is included in the Appendix. The report shall consider, describe and analyze the following:

- A site-specific erosion control plan to assure that the development would not contribute to the erosion or failure of any bluff face shall be prepared by a licensed engineer qualified in hydrology and soil mechanics for all bluff-top development.
- Cliff geometry and site topography, extending the surveying work beyond the site as needed to depict unusual geomorphic conditions that might affect the site.
- Historic, current and foreseeable cliff erosion, including investigation of recorded land surveys and tax assessment records in addition to the use of historic maps and photographs where available and possible changes in shore configuration and sand transport.
- Geologic conditions, including soil, sediment and rock types and characteristics in addition to structural features, such as bedding, joints, and faults.

- Evidence of past or potential landslide conditions, the implications of such conditions for the proposed development and the potential effects of the development on landslide activity.
- Impact of construction activity on the stability of the site and adjacent area.
- Ground and surface conditions and variations, including hydrologic changes caused by the development (i.e., introduction of irrigation water to the ground water system); alterations in surface drainage.
- Potential erodibility of the site and mitigating measures to be used to ensure minimized erosion problems during and after construction (i.e., landscaping and drainage design).
- Effects of marine erosion on sea cliffs;
- Potential effects of seismic forces resulting from a maximum credible earthquake; and
- Any other factors that might affect slope stability.

Policy S-5: Development on Bluff Face. No additional development shall be permitted on any bluff face, except engineered staircases or access-ways to provide public beach access, and pipelines for scientific research or coastal dependent industry. Drain-pipes shall be allowed only where no other less environmentally damaging drain system is feasible and the drainpipes are designed and placed to minimize impacts to the bluff face, toe and beach. Drainage devices extending over the bluff face shall not be permitted if the property can be drained away from the bluff face, toe and beach.

Policy S-6: Shoreline Protective Devices. Shoreline protective devices, such as seawalls, revetments, groins, breakwaters, and riprap shall be permitted only when necessary to protect existing principal structures, coastal dependent uses, and public beaches in danger of erosion. If no feasible alternative is available, shoreline protection structures shall be designed and constructed in conformance with Section 30235 of the Coastal Act and all other policies and standards of the City's Local Coastal Program. Devices must be designed to eliminate or mitigate adverse impacts on local shoreline sand supply, and to maintain public access to and along the shoreline. Design and construction of protective devices shall minimize alteration of natural landforms, and shall be constructed to minimize visual impacts. The city shall develop detailed standards for the construction of new and repair of existing shoreline protective structures and devices. As funding is available, the city will inventory all existing shoreline protective structures within its boundaries.

Policy S-7: Hazards Overlay Zone. Areas where bluff-top hazards exist shall be included within and subject to the requirements of the Hazards Overlay Zone.

Policy S-10: Hazardous Overlay Zone. Land areas subject to hazards associated with steep slope, slope instability and drainage problems shall be included within the Hazardous Overlay and Protection Zone. Generally, all lands in excess of 10% slope shall be included.

Policy S-11: Development Review in Hazardous Overlay Zone. Geologic reports may be required and shall be re- viewed by the appropriate decision-making body, prior to approval of any development permits for projects located within the Hazardous Overlay Zone.

Policy S-12: Education Programs. The City should develop an information program to familiarize citizens with seismic safety issues. School districts and agencies related to aged, handicapped and seismically susceptible industries should be encouraged to develop education programs relative to seismic awareness.

Policy S-13: Development Regulations. The Technical Appendix should be made available to developers for review and use when proposing land development projects.

Development shall be prohibited in:

- Landslide risk areas without site-specific slope stability investigations.
- Areas of high potential liquefaction without site-specific analysis of liquefaction potential.

Policy S-14: Critical Facilities. All critical facilities constructed prior to 1948 should be reviewed by a structural engineer for potential hazards. Since many of these structures have regional impact, the source of funding for the inspection program ought to be at the regional level. All new critical facilities shall be designed to continue functioning after a major earthquake. Emergency communication centers, fire stations, and other emergency service facilities should be examined as to their earthquake resistant capacities. If found below acceptable standards, a program to mitigate potential hazards should be immediately established.

Policy S-15: Brick and Masonry Non-Reinforced Buildings. The City shall adopt ordinance or other mitigation programs to reduce the hazards from brick or masonry non-reinforced buildings. Such regulations shall require building strengthening or demolition.

Policy S-16: Community Programs. Community programs that train volunteers to assist police, fire, and civil defense personnel how to perform effectively after an earthquake, shall be supported.

Policy S-17: New Construction Across Faults Prohibited. New construction directly astride or across known faults, or fault zones, shall be prohibited. Non-structural land uses, however, should not be prohibited.

County of Santa Barbara County Comprehensive Plan, Seismic and Safety Element. The Santa Barbara County Comprehensive Plan Seismic and Safety Element outlines the County's applicable goals and policies regarding geologic and seismic hazards (Santa Barbara, 2015).

Geologic and Seismic Goal 1: Protect the community to the extent feasible from risks associated with the effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche and dam failure; slope instability leading to mudslides and landslides; subsidence, liquefaction and other seismic hazards pursuant to Government Code §65302(g)(1), Chapter 7.8 (commencing with Section 2690) of Division 2 of the Public Resources Code, and other geologic hazards known to the legislative body.

Policy 1: The County shall minimize the potential effects of geologic, soil, and seismic hazards through the development review process.

Policy 2: To maintain consistency, the County shall refer to the California Building Code, the Land Use Development Code, County Ordinances, the Coastal Land Use Plan, and the Comprehensive

General Plan when considering the siting and construction of structures in seismically hazardous areas.

Policy 3: The County shall ensure compliance with State seismic and building standards in the evaluation, design, and siting of critical facilities, including police and fire stations, school facilities, hospitals, hazardous material manufacture and storage facilities, bridges, large public assembly halls, and other structures subject to special seismic safety design requirements pursuant to the California Code of Regulations, Title 24, Part 2 California Building Code.

Policy 4: The County Office of Emergency Services (OES) shall continue coordinating emergency planning for the Santa Barbara Operational Area pursuant to the California Emergency Services Act of 1970.

Policy 5: Pursuant to County Code Section 21-7(d)(4) and (5), the County shall require a preliminary soil report prepared by a qualified civil engineer be submitted at the time a tentative map is submitted. This requirement may be waived by the Planning Director if he/she determines that no preliminary analysis is necessary. A preliminary geological report prepared by a qualified engineering geologist may also be required by the Planning Director.

Policy 6: The County should reference the Santa Barbara County Multi-Jurisdiction Hazard Mitigation Plan when considering measures to reduce potential harm from seismic activity to property and lives.

As described in Section 1.3.3.2, *Surface Transportation Board*, railroads are under the jurisdiction of the federal government such that local agencies are preempted from exercising jurisdiction over railyards (e.g., SMVR-SB).

4.8.2.2 Coastal Processes

The primary federal and state laws, regulations, and policies that are applicable to the Proposed Project are summarized in Appendix C. Local and regional laws, regulations, and policies are presented in this subsection.

California Coastal Act. The California Coastal Act of 1976 (Coastal Act) mandates that local governments prepare a land use plan and schedule of implementing actions to carry out the policies of the Coastal Act. The policies established by the Coastal Act focus on the protection of coastal resources and regulate development in the coastal zone, specifically by developing policies to govern land resources, which include environmentally sensitive habitat areas and prime agricultural lands, recreational resources, the marine environment (i.e., streams, wetlands, and coastal waters), scenic resources such as views to and along the ocean, and air quality.

The California Coastal Commission (CCC) originally released their sea-level rise (SLR) policy guidance in August 2015 and then released a science update in November 2018 based on the Ocean Protection Council's (OPC's) 2018 updated *State of California Sea-Level Rise Guidance* (OPC, 2018). The CCC *Sea Level Rise Policy Guidance: Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits* document outlines how to address SLR in new and updated Local Coastal Programs and Coastal Development Permits according to the policies of the California Coastal Act (CCC, 2018). While the OPC evaluated

multiple emission scenarios, the CCC recommendations only include the high emission scenarios. The projected SLR estimates for the high emission scenario are shown in Table 4.8-4.

Table 4.8-4. Projected Sea-Level Rise (in Feet) for Port San Luis

	Probabilistic Projections (in feet)		H++ Scenario *Single Scenario
	Low Risk Aversion	Medium-High Risk Aversion	Extreme Risk Aversion
	Upper limit of "likely range" (~17% probability SLR exceeds…)	*1-in-200 chance (0.5% probability SLR exceeds…)*	*Single scenario (no associated probability)*
2030	0.5	0.7	1.0
2040	0.7	1.2	1.6
2050	1.0	1.8	2.6
2060	1.3	2.5	3.7
2070	1.7	3.3	5.0
2080	2.1	4.3	6.4
2090	2.6	5.3	8.0
2100	3.1	6.7	9.9
2110*	3.2	7.0	11.6
2120	3.7	8.2	13.8
2130	4.3	9.6	16.2
2140	4.8	11.1	18.7
2150	5.4	12.6	21.5

Source: Adapted from OPC, 2018.
* "Most of the available climate model experiments do not extend beyond 2100. The resulting reduction in model availability causes a small dip in projections between 2100 and 2110, as well as a shift in uncertainty estimates (see Kopp et al., 2014). Use of 2110 projections should be done with caution and acknowledgment of increased uncertainty around these projections." (OPC, 2018)

County of San Luis Obispo Coastal Plan Policies. The *County of San Luis Obispo Coastal Plan Policies* was adopted by the Board of Supervisors in March 1988; it details the County's plan to implement the Coastal Act through both general plan policies and identification of detailed land use recommendations. The County's proposed Land Use Element (LUE)/Land Use Ordinance (LUO) system has been amended to include the standards, programs, and specific actions required to implement the Local Coastal Program (San Luis Obispo, 2007).

The County of San Luis Obispo has special tools available to implement the Local Coastal Program. The County has adopted an LUE and LUO system that has replaced typical general plan designations and zoning districts. The LUE serves as both a graphic statement of County land use policies and intentions about future growth, as well as a precise guide for day-to-day land use decisions. The LUE also coordinates policies and programs in other County general plan elements that have land use implications and serves as a reference point and guide for future planning studies throughout the County. The LUO contains standards for development based more on the effects of specific land uses, than on separate zoning districts (San Luis Obispo, 2007).

Policy 3 (Abandonment of Facilities) of the County's Local Coastal Program is relevant to the Proposed Project and states: "Upon completion or abandonment, all above-ground oil production and processing facilities shall be removed from the site, and the area in which they were located shall be restored by appropriate contouring, reseeding, and planting to conform with surrounding topography and vegetation" (San Luis Obispo, 2007).

County of Santa Barbara Coastal Plan Policies. The County of Santa Barbara's Coastal Land Use Plan (CLUP) lays out the general patterns of development throughout the coastal areas of Santa Barbara County (Santa Barbara, 2019). The CLUP was adopted in 1989 and reissued in 2019. Its purpose is to protect coastal resources while accommodating land use development within the coastal zone (Santa Barbara, 2019). As the Proposed Project is not located in the coastal zone within Santa Barbara County, specific policies are not relevant.

4.8.3 Significance Criteria

For purposes of this EIR, the following thresholds, which are based on Appendix G of the California Environmental Quality Act Guidelines (Environmental Checklist) and the Proposed Project's coastal location, were used to determine if the Proposed Project would result in impacts related to geological conditions, soils, and coastal processes.

4.8.3.1 Geology and Soils

- Directly or indirectly result in substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.
- Directly or indirectly result in substantial adverse effects, including the risk of loss, injury, or death involving seismically induced ground shaking or seismically induced ground failures such as landslides or liquefaction related phenomena.
- Exacerbate any existing geologic hazard, including coastal hazards such as flooding, wave runup, tsunamis, and bluff erosion and instability.
- Result in substantial soil erosion or the loss of topsoil.
- 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.
- 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.
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

4.8.3.2 Coastal Processes

- Place new structures in locations that would be exposed to coastal hazards within the Project design life.
- Substantially impair nearshore sediment properties, characteristics, or processes including changes to bluff, beach, or nearshore resources, and sediment transport in a manner which would:
  - Impair longshore and cross shore sediment transport or wind transport of sediment;
  - Increase or decrease bluff erosion; or
  - Increase beach narrowing and shoreline erosion, and beach or nearshore profile steepening.
- Result in changes to nearshore wave, water current, or water circulation properties, characteristics, or patterns.
- Include a design element that would increase the effects of sea level rise or storm events due to climate change.

4.8.4 Environmental Impact Analysis and Mitigation

4.8.4.1 Geology and Soils

This section presents discussion of impacts related to geologic, soil, and seismic conditions and mitigation measures for the Proposed Project. Geologic conditions were evaluated with respect to the impacts the Project may have on local geology and soils, as well as the potential for the Project to create new or exacerbate existing specific geologic hazards.

Impact GEO-1: Expose structures, workers, and the public to damage or injury due to surface fault rupture, strong earthquake-induced ground shaking, seismically induced slope failures, liquefaction-related phenomena, expansive or unsuitable soils (Class II: Less than Significant with Mitigation).

Phase 1

DCPP Project Site

The closest fault to the DCPP is the offshore Shoreline fault, located 0.2 mile from the DCPP. The closest Alquist-Priolo zoned fault to the DCPP is the Los Osos fault, located 6 miles northeast of the DCPP. Near DCPP the Hosgri fault is located about 3 miles offshore. No known active or potentially active faults cross or are in the immediate DCPP vicinity.

The DCPP would be subject to ground shaking from a large earthquake on any of the major faults in the region. Moderate ground shaking should be expected in the event of an earthquake on the faults near the DCPP, with estimated PGAs of 0.62g for a 2 percent probability of exceedance in 50 years and of 0.30g for a 10 percent probability of exceedance in 50 years (CGS, 2022). While the shaking would be less severe from small earthquakes or earthquakes that originate farther from the DCPP, the effects from nearby or regional earthquakes could be damaging to existing Project structures and proposed new structures, such as the GTCC Waste Storage Facility, indoor Firing Range, Security Building, and Storage Buildings.

The DCPP is located within an area of moderate to steep slopes with deep-seated bedrock landslides mapped south of Diablo Creek near the existing switchyards (PG&E, 1997). PG&E (1997) assessed seismic slope stability for numerous areas throughout the DCPP where landslides could impact key structures. The assessment revealed that while small slumps, mudslides, and rock topples may occur in response to earthquake shaking, none of the structures/facilities would be negatively impacted by these slope failures (PG&E, 1997).

The Patton Cove landslide does not presently impact new buildings; however, it has encroached to a point where Diablo Ocean Drive will need to be re-routed inland to allow for continued plant operation and decommissioning. Rerouting of the road will be undertaken as a separate project tied to the operation of the power plant. The Pleistocene and Holocene reactivated landslides mapped east of Overlook Ridge may impact the indoor firing range, heavy haul loading ramp, and the SE Borrow Site. These landslides are required to be evaluated to identify corrective grading or stabilization options, alternative foundation schemes, or setback requirements during final design and preparation of the SE Borrow Site excavation and reclamation plan.

The DCPP is underlain by consolidated and/or cemented sedimentary and volcanic bedrock formations that would not be susceptible to liquefaction. Due to groundwater levels greater than 50 feet in East Canyon, specifically near the proposed GTCC Waste Storage facility, indoor Firing Range, Security Building, and Storage Buildings, it is unlikely that liquefaction would occur in this area. Within the East Canyon area, landslide deposits are mapped along the steep slopes of the hillsides adjacent to these proposed facilities, as well as the existing septic system and leach field. Landslide deposits may extend below the proposed structures. The landslides deposits are not susceptible to liquefaction. The new VCT Warehouse would be located on an existing level building pad underlain by Obispo formation (sandstone, dolomitic sandstone, and siltstone) (PG&E, 2023b) that would not be susceptible to liquefaction. The temporary decommissioning office is underlain by consolidated material that would not be susceptible to liquefaction.

Most of the soils underlying the DCPP have low to moderate expansive potential. Expansive soils may cause differential and cyclical movements of foundations that can cause damage and/or distress to structures and equipment. Soils within the DCPP have corrosion potential of low to high for corrosion of uncoated steel and low to moderate for corrosion of concrete. In areas where corrosive subsurface soils underlie the DCPP, the corrosive soils could have a detrimental effect on concrete and metals. Depending on the degree of corrosivity of subsurface soils, concrete and reinforcing steel in concrete structures and bare-metal structures exposed to these soils could deteriorate, eventually leading to structural failures.

The Proposed Project would be designed and constructed in accordance with all applicable federal, state, and local codes relative to seismic criteria. Construction of the GTCC Waste Storage Facility would be similar in design to the ISFSI and constructed in accordance with NRC regulations. New facilities at the DCPP site are located in a Geologic Study Area as outlined in the County's Coastal Zone Land Use Ordinance and require a site-specific soil and geologic evaluation (Geotechnical Engineering Report) prepared by a California registered civil engineer and engineering geologist prior to approval of a Land Use Permit. Once the County issues a building permit, the design recommendations in the Geotechnical Engineering Report are enforced by the County through inspections and close monitoring of building construction.

In March 2023, PG&E completed a Preliminary Engineering Geology Report for the DCPP site (PG&E, 2023b). This report included compiled data from previous studies at the DCPP site and describes, at a preliminary level, geologic constraints and hazards for decommissioning activities with reference to current building and engineering codes. Geologic hazards evaluated in the report included landslides, earthquakes, liquefaction, tsunami, seiche, erosion, and expansive soils. Mitigation Measure (MM) GEO-1 (*Final Engineering Geology Report and Geotechnical Investigation*) requires submittal of a construction-level Engineering Geology Report updating the Preliminary Engineering Geology Report (PG&E, 2023b) with a seismic hazard assessment and site-specific recommendations for the East Canyon area to guide design and County building permitting of the proposed new structures including the new GTCC Waste Storage Facility, indoor Firing Range, Security Building, and Storage Buildings. The report shall also address the Coastal area site grading, Blufftop Road realignment and the Diablo Creek crossing. In addition, a Geotechnical Engineering Report prepared by a County-approved geotechnical engineer must also be submitted and address all proposed project activities to support the project's submittals for County building permits. The Geotechnical Report would provide site-specific recommendations for County building permitting of the proposed new structures including the GTCC Waste Storage Facility, indoor Firing Range, Security Building, and Storage Buildings, and provide recommendations for cut and fill grading, use of concrete fill, and final site restoration activities for the project, including the Blufftop Road relocation and Diablo Creek Road crossing.

The County would review these reports and ensure that all recommendations and requirements are incorporated to Building permits for the site prior to permit issuance. The potential for Project impacts related to surface fault rupture, strong earthquake-induced ground shaking, seismically induced liquefaction phenomena, and expansive and corrosive soils at the DCPP, would be less than significant with implementation of MM GEO-1 (Class II).

Railyards

Pismo Beach Railyard. The closest fault to PBR is San Luis Range fault system (South Margin), located 0.25 mile to the south. No known active or potentially active faults cross or are in the immediate PBR vicinity, thus, there is no potential for damage to the approximately 1,100 feet of railroad track to be refurbished at the PBR or hazards to people from the Proposed Project from surface fault rupture. Therefore, there would be no impact related to surface fault rupture at the PBR.

Low to moderate ground shaking should be expected in the event of an earthquake on the faults near the PBR, with estimated PGAs of 0.58g for a 2 percent probability of exceedance in 50 years and approximately 0.28g for a 10 percent probability of exceedance in 50 years (CGS, 2022). These PGA values correspond to low to moderate ground shaking, which could cause damage to structures. The Proposed Project would refurbish the PBR, including replacing a portion of railroad track, wood railroad ties, and adding gravel. Proposed infrastructure modifications at PBR do not include any planned new structures, grading, or substantial ground disturbance (see Section 2.3.4, *Modifications and Operations at Rail Facilities*).

While the potential for strong earthquake-induced ground shaking at the PBR is unavoidable, no habitable structures are planned that would expose people to significant hazards due to

seismic shaking. The impact related to strong earthquake-induced ground shaking at the PBR would be less than significant (Class III).

The PBR site is in a flat alluvial valley and is not subject to seismically induced slope failures. Therefore, there would be no impact related to seismically induced slope failures at the PBR.

The PBR site is mapped in an area of low to moderate liquefaction potential (San Luis Obispo, 2013). While the potential for liquefaction related phenomena at the PBR is unavoidable, the Proposed Project would not cause or accelerate geologic hazards related to liquefaction, which would expose people or structures to potential adverse effects, including the risk of loss, injury, or death. The impact related to liquefaction related phenomena at the PBR would be less than significant (Class III).

Soils mapped in the PBR site have low to high shrink-swell potential. Soils within the PBR site have corrosion potential of moderate to high for uncoated steel and low to moderate for concrete. Shrink-swell potential and corrosion potential of soils underlying the PBR site would not be affected by, nor would it affect, infrastructure modifications proposed at PBR.

Expansive or unsuitable soils would only be a problem for components of the Proposed Project at the PBR where new structures are being installed at or below the ground surface within native soils. Proposed infrastructure modifications at PBR do not include any planned new structures, grading, or substantial ground disturbance (see Section 2.3.4, *Modifications and Operations at Rail Facilities*). Therefore, there would be no impact related to expansive or unsuitable soils at the PBR.

SMVR-SB. The closest fault to the SMVR-SB site is the Casmalia fault zone, located about 2.4 miles from the SMVR-SB site. No known active or potentially active faults cross or are in the immediate SMVR-SB vicinity, thus, there is no potential for damage to the refurbishment of the existing rail spurs or hazards to people from the Proposed Project related to surface fault rupture. Therefore, there would be no impact related to surface fault rupture at the SMVR-SB site.

Low to moderate ground shaking should be expected in the event of an earthquake on the faults near the SMVR-SB site, with estimated PGAs averaging about 0.47g for a 2 percent probability of exceedance in 50 years and approximately 0.27g for a 10 percent probability of exceedance in 50 years (CGS, 2022). These PGA values correspond to low to moderate ground shaking, which could cause damage to structures; however, no new structures are being constructed at the SMVR-SB site.

Proposed infrastructure modifications at the SMVR-SB site includes mostly at-grade temporary components. The existing rail spurs at the SMVR-SB site would be refurbished and no grading is planned as part of the proposed site improvements (see Section 2.3.4, *Modifications and Operations at Rail Facilities*).

While the potential for seismically induced ground shaking at the SMVR-SB site is unavoidable, no habitable structures are planned in the SMVR-SB site that would expose people to significant hazards due to seismic shaking. The impact related to strong earthquake-induced ground shaking at the SMVR-SB would be less than significant (Class III).

The SMVR-SB site is in a flat alluvial valley and is not subject to seismically induced slope failures. Therefore, there would be no impact related to seismically induced slope failures at the SMVR-SB site.

Liquefaction related phenomena are unlikely to occur in the SMVR-SB site as the area is not likely to experience strong ground shaking. The sedimentary deposits underlying the SMVR-SB are not generally expected to be liquefiable due to deep groundwater levels. Groundwater measured at a well located approximately 0.2-mile west of the SMVR-SB measured approximately 127 feet below ground surface in 2020 (CDWR, 2022). The impact related to liquefaction related phenomena at the SMVR-SB site would be less than significant (Class III).

Soils mapped in the SMVR-SB site have low to very high shrink-swell potential. Soils within the SMVR-SB site have corrosion potential of moderate to high for uncoated steel and low to moderate for concrete. Shrink-swell potential and corrosion potential of soil underlying the SMVR-SB site would not be affected by nor would it affect infrastructure modifications proposed at the SMVR-SB site.

Expansive or unsuitable soils would only be a problem for components of the Proposed Project at the SMVR-SB site where new structures are being installed at or below the ground surface within native soils. Proposed infrastructure modifications at the SMVR-SB site do not include any new structures, grading, or substantial ground disturbance (see Section 2.3.4, *Modifications and Operations at Rail Facilities*). Therefore, there would be no impact related to expansive or unsuitable soils at the SMVR-SB site.

Phase 2

Phase 2 geology and soils impacts (Impact GEO-1) are the same as Phase 1. The remaining demolition, site grading, and final site restoration planned for Phase 2 would have the same impact related to surface fault rupture, strong earthquake-induced ground shaking, seismically induced liquefaction phenomena, and expansive and corrosive soils at the DCPP, which would be less than significant with mitigation (Class II).

Additionally, Phase 2 includes the continued demolition and backfill of the Discharge Structure.

Following full removal of the Discharge Structure, which includes the tunnel extending 30 feet into the bluff, a void would be left in the bluff. This void would be restored through installation of layers of different materials that blend with the natural stratigraphy of the bluff. The bluff restoration is comprised of four different zones with each zone utilizing a different material that progressively decreases in size as elevation along the bluff increases (see Figures 2-27 and 2-28). Each zone represents a gradual transition in material from 1-ton quarry rock at the base to soil at the crest. The volume of material for the bluff restoration was developed considering loss of material within the voids of the underlying zone such that a separation geotextile is not needed, and no grouting is proposed. The geometric configuration of the bluff restoration was selected by PG&E to match as closely as possible the configuration of the surrounding bluff. The larger 1-ton quarry rock, which is expected to be sourced from Santa Catalina Island, placed at the base would function to resist erosion from wave action.

Based on the conceptual design, the bluff restoration area would exhibit a slope of approximately 43 degrees, which is equivalent to or less than the commonly accepted angle of repose of angular rock/gravel. The different layers would create flexible infill that is able to resist erosion while adapting to the evolving configuration of the surrounding bluff. This approach to backfilling is inherently stable and would maintain the natural profile of the bluff and allow for upland and intertidal restoration (PG&E, 2023a). Additional geotechnical evaluation of the bluff restoration configuration, including slope stability analysis under static and dynamic conditions, would be completed as part of the detailed design (PG&E, 2023b).

The backfill design needs to consider the seismic and coastal processes (e.g., wave erosion, sea level rise) within Diablo Cove. MM GEO-2 (*Seismic Hazard and Coastal Processes Assessment of Discharge Structure Backfill*) requires an analysis of seismic conditions affecting the final design of the Discharge Structure backfill. Final selection of backfill materials, size, and construction methods shall follow standard coastal engineering practice for rock revetments. The analysis shall consider effects of wave erosion and sea level rise. Marine engineering analyses shall consider design standards such as the US Army Corps of Engineers (USACE) *Shore Protection Manual* (USACE, 1984), USACE *Coast Engineering Manual* (USACE, 2008), and California Coastal Commission's *Sea Level Rise Policy Guidance: Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits* document (CCC, 2018). The County is responsible for reviewing, approving, and enforcing the construction materials and methods discussed in the conclusions of the seismic analysis. The potential for impacts related to strong earthquake-induced ground shaking and coastal processes on the Discharge Structure backfill would be less than significant with implementation of MM GEO-2 (Class II).

Post-Decommissioning Operations

New Facility Operations. No active or potentially active faults cross or are in the immediate Project vicinity. Thus, there is no potential for fault rupture during Project operation. Seismically induced ground shaking and landslides, liquefaction, and expansive or corrosive soils could cause structural damage during Project operation; however, the Proposed Project components, such as the GTCC Waste Storage Facility, indoor Firing Range, Security Building, and Storage Buildings would be designed and constructed in accordance with all applicable federal, state, and local codes relative to seismic criteria. Operation impacts associated with the continued use of the GTCC Waste Storage Facility, indoor Firing Range, Security Building, and Storage Buildings would be the same as Phase 1. The impacts related to surface fault rupture, strong earthquake-induced ground shaking, seismically induced liquefaction phenomena, and expansive and corrosive soils at the DCPP site during Project operation, would be less than significant (Class III).

Future Actions. Following full closure of the DCPP site, the site and facilities would undergo Final Status Surveys to confirm that any residual levels of radionuclides have been removed and or decreased to the NRC-approved site release criteria. At that time, the Marina could be released for recreational, educational, or commercial purposes. PG&E would lease the Marina to a third party, which would perform limited site improvements and operate the facility. The limited site improvement planned for the Marina would have the same impact related to surface fault rupture, strong earthquake-induced ground shaking, seismically induced liquefaction phenomena, and expansive and corrosive soils at the DCPP, which would be less than significant (Class III).

Mitigation Measures for Impact GEO-1.

GEO-1 **Final Engineering and Geology Report and Geotechnical Investigation.** At least 90 days prior to the submittal of any construction permits related to Decommissioning or new any structures on the site, the Applicant shall submit the following to the County for review and approval:

A Project-specific, construction-level geologic hazard assessment for the DCPP Project site area, updating the Preliminary Engineering Geology Report (PG&E, 2023b), is required to be submitted. The Final Engineering Geology Report prepared by a California licensed engineering geologist would include a detailed seismic hazard assessment and site-specific recommendations for the East Canyon area to guide design and County building permitting of the proposed new structures including the GTCC Waste Storage Facility, indoor Firing Range, Security Building, and Storage Buildings. The report shall also address the Coastal area site grading, Blufftop Road realignment and the Diablo Creek Road crossing. The geologic hazard assessment and site-specific design-level recommendations must comply with the requirements of California Geological Survey SP-117A (CGS, 2008) and the County General Plan Safety Element Policies S-17, S-19, S-20, and S-21 to evaluate and address geologic and seismic hazards, landslides, slope stability, liquefaction, and seismic settlement, and must satisfy the performance standards established therein.

1. Preparation of a Project-specific geotechnical investigation is required. Submittal of a Geotechnical Engineering Report prepared by a County-approved geotechnical engineer that covers the entire project site area and addresses all proposed project activities to support the project's construction submittals for building permit. The Geotechnical Report shall reference prior soils reports prepared for the site as well as the Final Engineering Geology seismic hazard assessment and shall provide site-specific geotechnical recommendations for the East Canyon area to guide design and County building permitting of the proposed new structures including the GTCC Waste Storage Facility, indoor Firing Range, Security Building, and Storage Buildings. The report shall also provide geotechnical recommendations for subgrade demolition, cut and fill grading, use of concrete fill, the Discharge Structure, and final site restoration activities for the project, including the Blufftop Road relocation and Diablo Creek Road crossing.

2. The County Department of Planning & Building shall review and accept these reports and obtain concurrence from the County Geologist, prior to acceptance of any applications for construction permits to ensure that all recommendations and requirements are incorporated to permits submitted. Prior to any construction Permit Final or Certificate for all construction permits related to the Decommissioning, the applicant's Geotechnical Engineer and Engineering Geologist shall provide written verification to County Planning and Building that all geologic and geotechnical requirements were adhered to during construction under that permit.

GEO-2 **Seismic Hazard and Coastal Processes Assessment of Discharge Structure Backfill.** At least 90 days prior to County issuance of any permit for decommissioning activities, the Applicant or its designee shall prepare and submit an assessment of seismic and coastal processes effects to support final design of the backfill for the Discharge Structure area. The Discharge Structure-specific Seismic Hazard and Coastal Processes Assessment analysis shall address the seismic, wave erosion, and sea level rise conditions within Diablo Cove. The analysis shall include seismic analysis and coastal engineering to determine the material, size, and placement of the backfill material to withstand local conditions. Engineering analysis shall consider standard design standards such as the US Army Corps of Engineers (USACE) *Shore Protection Manual* (USACE, 1984) and the USACE *Coast Engineering Manual* (USACE, 2008), as well as the California Coastal Commission's *Sea Level Rise Policy Guidance: Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits* document (CCC, 2018). The analysis and design shall consider the backfill of the Discharge Structure removal area and the adjacent shoreline and bluff that may be disturbed during removal and backfill activities. Recommendations shall be incorporated into the final design of the backfill for the Discharge Structure area.

Impact GEO-2: Trigger erosion of loosened sediments or cause slope failure due to grading, excavation, and removal of surface impervious materials (Class II: Less than Significant with Mitigation).

Phase 1

DCPP Project Site

The demolition/removal of DCPP structures and other Project-related components, as well as grading, could loosen soil and accelerate erosion. Soils containing high percentages of fine sands and silt and that are low in density, are generally the most erodible. As the clay and organic matter content of soils increases, the potential for erosion decreases. Clays act as a binder to soil particles, thus reducing the potential for erosion. Soils underlying the DCPP site have a low to moderate susceptibility to sheet and rill erosion by water and a low susceptibility to erosion by wind.

The Proposed Project would comply with all NPDES permit requirements, including the Construction General Permit (CGP) (AC WQ-1, *Construction General Permit*), which would be implemented by PG&E. The CGP includes implementation of a site-specific Stormwater Pollution Prevention Plan (SWPPP) (AC BIO-3, *Site-Specific Stormwater Pollution Prevention Plan*), which would contain erosion and sediment control plans that would provide guidance for placement of erosion and sediment controls per CGP requirements. Chapter 70 of the CBC regulates grading activities, including drainage and erosion control. Additionally, erosion and the loss of topsoil at areas of ground disturbance within the Proposed Project would be further minimized by provisions, such as sediment basins, silt fences, straw wattles, drainage devices, drainage inlet protection, and appropriate outlet devices, which would be included in the grading permit required by San Luis Obispo County. Compliance with these requirements would result in a less than significant impact (Class III).

Railyards

Pismo Beach Railyard. Proposed infrastructure modifications at the PBR could loosen soil and accelerate erosion; however, the exposure of soils is not anticipated. Soils underlying the PBR site have a low to moderate susceptibility to sheet and rill erosion by water and a low to high susceptibility to erosion by wind. The PBR is in a flat alluvial valley and is not subject to landslides or other slope stability issues.

Use of the PBR site during decommissioning activities would be similar to its current use, and there would be no removal of structures or changes to impervious surfaces. As such, there would be no increased risk of soil erosion. The impact from construction triggered erosion or slope failure at the PBR site would be less than significant (Class III).

SMVR-SB. Proposed infrastructure modifications at the SMVR-SB site could loosen soil and accelerate erosion; however, the exposure and disturbance of soils is not anticipated. Soils underlying the SMVR-SB site have a low to high susceptibility to sheet and rill erosion by water and a low to high susceptibility to erosion by wind. The SMVR-SB site is in a flat alluvial valley and is not subject to landslides or other slope stability issues.

No new development is proposed at the SMVR-SB site, and only minor infrastructure modifications are anticipated. There would be no removal of structures or changes to impervious surfaces; therefore, there would be no increased risk of soil erosion. The impact from construction triggered erosion or slope failure at the SMVR-SB site would be less than significant (Class III).

Phase 2

Phase 2 includes continued removal of the Discharge Structure extending from the shoreline to the top of bluff. This work would be completed behind a temporary coffer dam in dry, contained conditions and would not cause additional erosion impacts. The Proposed Project would comply with all NPDES permit requirements, including the CGP (AC WQ-1, *Construction General Permit*), which would be implemented by PG&E. The CGP includes implementation of a site-specific SWPPP (AC BIO-3, *Site-Specific Stormwater Pollution Prevention Plan*), which would contain erosion and sediment control plans that would provide guidance for placement of erosion and sediment controls per CGP requirements. To further ensure the Proposed Project would not violate any water quality standards or waste discharge requirements or create substantial additional sources of polluted runoff during and post Phase 2, MMs HWQ-1 and HWQ-2 are recommended, which require a Long-Term Drainage Plan and a Long-Term Erosion and Sediment Control Plan for the final surface conditions following demolition of all decommissioned structures. The Long-Term Erosion and Sediment Control Plan would be included in the Stormwater Management Plan (SWMP). With implementation of the required plans, permits, and MMs HWQ-1 and HWQ-2, impacts would be reduced to a less-than-significant level (Class II).

Post-Decommissioning Operations

New Facility Operations. Erosion and the loss of topsoil at areas of ground disturbance within the Proposed Project would be minimized by provisions, such as sediment basins, silt fences, straw wattles, drainage devices, drainage inlet protection, and appropriate outlet devices, which

would be included in the grading permits required by San Luis Obispo County. Operation at the Project site, including the new GTCC Waste Storage Facility, indoor Firing Range, Security Building, and Storage Buildings including routine or periodic maintenance of facilities would not require any substantial ground disturbance, therefore significant soil erosion would not be triggered or accelerated. No exposed areas subject to erosion would be created or affected by Project operations. Compliance with requirements of the grading permits would result in a less than significant impact (Class III).

Future Actions. Marina operations would be limited to car parking, restrooms, and use of boats and non-motorized vessels, such as kayaks and stand-up paddleboards. Any construction at the site following decommissioning would be required to comply with standard regulatory controls such as a construction-SWPPP to minimize erosion and runoff concerns. MM HWQ-1 and MM HWQ-2 are recommended, which require a Long-Term Drainage Plan and a Long-Term Erosion and Sediment Control Plan for the final surface conditions following demolition of all decommissioned structures. The Long-Term Erosion and Sediment Control Plan would be included in the SWMP.

MM GEO-3 (*Monitoring and Reporting of Potential Subsurface Structure Exposure*) requires an inspection and monitoring plan to ensure that subgrade piping and structures are not exposed by natural erosion or storm conditions, with the specifications for inspection and storm event to be defined in the Bluff Retreat and Erosion Monitoring Plan. The inspection of bluffs at the Discharge Cove and east of the Intake Cove is to be completed every three years and after a major storm event, and must be conducted by a certified engineering geologist approved by the County. An inspection report must also be prepared by a California Certified Engineering Geologist and submitted to the County for review and approval prior to any removal of potentially exposed piping/structures. With implementation of the required plans, permits, and MMs HWQ-1, HWQ-2, and GEO-3, impacts would be reduced to a less-than-significant level (Class II).

Mitigation Measures for Impact GEO-2.

GEO-3 **Monitoring and Reporting of Potential Subsurface Structure Exposure.** At least ninety (90) days prior to completion/County Final signoff of Phase 2 Final Site Restoration grading permits and initiation of the five-year biological monitoring, or, at least 90 days prior to transfer of the property to a third party for site reuse (whichever is first), the Applicant or its designee shall submit to the County a Bluff Retreat and Erosion Monitoring Plan (Plan). The purpose of the Plan is to (1) provide a map of all subsurface structures that remain following Final Site Restoration (Phase 2) at the DCPP site; and (2) establish periodic site and bluff erosion monitoring and reporting at a minimum of every three years and following rainstorm events of 2-inches or more in a 24-hour period. The Plan would facilitate identification, monitoring, and removal of any remaining subsurface features (i.e., building foundations, utility piping and structures, etc.) that could be potentially exposed in the future by natural erosion or natural storm conditions. This monitoring and reporting requirement shall continue in perpetuity and shall follow the property landowner or lessee (as specified in a lease agreement) and shall be recorded in a manner approved by the County prior to any transfer of the lands or structures identified in this permit.

The Bluff Retreat and Site Erosion Monitoring Plan shall include the following at minimum:

- Map and supporting table of all surface areas of the Project Site that may have subsurface foundations, piping, or other remaining facility components, including location, depth, dimension, and volume, that could be exposed over time
- Requirements and criteria for inspection of restoration areas as well as the coastal bluffs from Diablo Cove south to the cove below the radio tower (south of Patton Cove) – Inspections shall be conducted every three years, and after any major storm event (to be defined in the Plan)
- Report content (i.e., text description, figures/tables, photos, and other supporting data) and criteria for making recommendations on removal of piping or other structures
- Where removal is recommended by the Applicant's certified engineering geologist, the County Planning and Building Department and the County Geologist shall consider whether incremental or full removal of exposed features is necessary, and whether the scope requires permitting by the County.

Within 30 days from each inspection, a report shall be submitted to the County for approval, prior to any removal being conducted. The Plan's map depicting areas of required monitoring may be modified and approved by the County where full removal of subsurface piping/structures has been approved and completed. The frequency of required monitoring and reporting may be modified upon approval by the County and based on information gained by monitoring and reporting activities. Future land use and construction permits for new uses on the site shall address remaining subsurface facility components through methods such as capping, removal, and continued monitoring under a revised Plan.

HWQ-1 Prepare and Implement Drainage Plans. See Section 4.11.

HWQ-2 Long-Term Erosion and Sediment Control Plan. See Section 4.11.

Impacts of Mitigation. Implementation of MM GEO-3 (*Monitoring and Reporting of Potential Subsurface Structure Exposure*) may lead to additional impacts associated with future removals of subsurface structures if such removals are triggered. Such removals are considered speculative at this time, and if they occur would happen in a piecemeal fashion. It is anticipated that any such removals would either occur as part of a development project and be assessed as part of that project or would occur much further in the future at a time when construction equipment may be cleaner, and regulations may be stricter. Additionally, such removals may be exempt from CEQA, such as the removal of existing pipelines (State CEQA Guidelines §15282(k)) or removals to prevent an emergency (State CEQA Guidelines §15269(c)). Impacts associated with such removals may include additional air quality and greenhouse gas emissions associated with earth movement, use of construction equipment and trucks; biological resources impacts in areas that may have otherwise been restored under the Proposed Project; potential for exposing and impacting potentially sensitive cultural or tribal cultural resources; potential for soil erosion and associated water quality impacts; and noise associated with off-site trucking. These impacts

would be assessed on a case-by-case basis and the appropriate CEQA documentation completed. Such impacts are anticipated to be substantially less than the alternative requiring full removal of all subsurface structures (see Section 5.3.3, *Full Removal of Onshore Subsurface Structures*).

Impact GEO-3: Destroy unique paleontological resources due to grading and excavation in geologic units of Moderate to High Paleontological Sensitivity (Class II: Less than Significant with Mitigation).

Phase 1

DCPP Project Site

As shown on Figure 4.8-1, the DCPP site includes the Terrace deposits (Qt) that has a high sensitivity for paleontological resources (Applied Earthworks, Inc., 2016). The DCPP site also includes the Monterey Formation (Tm and Tml) which has a very high sensitivity for paleontological resources (Applied Earthworks, Inc., 2016). Ground disturbing activities within the geologically sensitive units including the Terrace deposits and Monterey Formation have the potential to damage or destroy paleontological resources. As part of the Proposed Project, PG&E would limit adverse impacts to unknown paleontological resources during Project excavation (AC GEO-1, *Unknown Paleontological Resources*), which would halt or redirect construction if paleontological resources are encountered. PG&E has included worker training as part of the Proposed Project (AC CR-2, *Worker's Environmental Awareness Training*) which includes an onsite monitor and a training module on cultural and paleontological resources for all field personnel prior to the start of construction. MM GEO-4 (*Prepare and Implement Paleontological Resource Monitoring and Mitigation Plan and Worker Environmental Awareness Program*) requires a Paleontology Resources Monitoring and Mitigation Plan (PRMMP) to be prepared and a County-approved qualified paleontologist to provide training to all new workers prior to any new worker beginning work on the Project site. This training includes protocols to follow should material suspected to be a fossil is encountered. With implementation of MM GEO-4, impacts would be reduced to a less-than-significant level (Class II).

Railyards

Proposed infrastructure modifications at the PBR and SMVR-SB sites do not include any planned new structures, grading, or substantial ground disturbance (see Section 2.3.4, *Modifications and Operations at Rail Facilities*). MM GEO-4 (*Prepare and Implement Paleontological Resource Monitoring and Mitigation Plan and Worker Environmental Awareness Program*) requires a qualified paleontologist to provide training to all new workers prior to any new worker beginning work on the PBR and SMVR-SB sites. This training includes protocols to follow should material suspected to be a fossil be encountered. With implementation of MM GEO-4, impacts would be reduced to a less-than-significant level (Class II).

Phase 2

Paleontological resource impacts would be increased in Phase 2, as additional grading and ground disturbance would occur. Phase 2 activities at the DCPP site include contaminant remediation, demolition of remaining utilities and structures, soil grading and landscaping, long-term stormwater management, and continued removal and restoration of the Discharge Structure.

Ground disturbing activities within the geologically sensitive units, including the Terrace deposits and Monterey Formation, have the potential to damage or destroy paleontological resources. As part of the Proposed Project, PG&E would limit adverse impacts to unknown paleontological resources during Project excavation (AC GEO-1, *Unknown Paleontological Resources*), which requires an on-site monitor and would halt or redirect construction if paleontological resources are encountered. PG&E has included worker training as part of the Proposed Project (AC CR-2, *Worker's Environmental Awareness Training*) which includes a training module on cultural and paleontological resources for all field personnel prior to the start of construction.

MM GEO-4 (*Paleontological Resource Monitoring and Mitigation Plan and Worker Environmental Awareness Program*) requires a qualified paleontologist to provide training to all new workers prior to any new worker beginning work on the Project site. This training includes protocols to follow should material suspected to be a fossil is encountered. With implementation of MM GEO-4, impacts would be reduced to a less-than-significant level (Class II).

Post-Decommissioning Operations

New Facility Operations. Operation at the DCPP site would not require any substantial ground disturbance. Therefore, no impacts related to paleontological resources would occur.

Future Actions. The site and facilities would undergo Final Status Surveys to confirm that any residual levels of radionuclides have been removed and or decreased to levels below site-specific levels that equate to the NRC-approved site release criteria. At that time, the Marina could be released for recreational, education, or commercial purposes to be approved under a separate County Land Use and Coastal Development Permit. PG&E would lease the Marina to a third-party operator, who would perform limited site improvements and operate the facility.

Following release of the NRC Part 50 License, PG&E or the lessee Marina operator would submit an application for Marina improvements to include parking lots (upper and lower), public restrooms (upper and lower), paving over the top of the Intake Structure, and installing a pier-mounted boat hoist and articulated stairs.

Construction related to Marina improvements would include grading and ground disturbance within the geologically sensitive Terrace deposits. PG&E would limit adverse impacts to unknown paleontological resources during Project excavation (AC GEO-1, *Unknown Paleontological Resources*), by retaining a qualified County-approved paleontological monitor who would halt or redirect construction if paleontological resources are encountered. PG&E has included worker training as part of the Proposed Project (AC CR-2, *Worker's Environmental Awareness Training*) which includes a training module on cultural and paleontological resources for all field personnel prior to the start of construction.

MM GEO-4 (*Prepare and Implement Paleontological Resource Monitoring and Mitigation Plan and Worker Environmental Awareness Program*) requires a qualified County-approved paleontologist to provide training to all new workers prior to any new worker beginning work on the Project site. This training includes protocols to follow should material suspected to be a fossil is encountered. With implementation of MM GEO-4, impacts would be reduced to a less-than-significant level (Class II).

Mitigation Measures for Impact GEO-3.

GEO-4 Prepare and Implement Paleontological Resource Monitoring and Mitigation Plan and Worker Environmental Awareness Program.

GEO-4.1: At least 90 days prior to issuance of any construction permits related to decommissioning, the applicant shall provide a Paleontological Resource Monitoring and Mitigation Plan (PRMMP) for review and approval by the County. The PRMMP shall include at a minimum:

a. The name and qualifications of the Project Paleontologist and associated site monitor(s). The Project Paleontologist shall be retained by the Applicant or its designee prior to beginning decommissioning activities. They shall have an advanced degree (masters or higher) in geology, paleontology, biology, or related disciplines (exclusive of archaeology). Additionally, they shall have at least 5 years professional experience with paleontological (not including cultural) resources, including the collection, identification, and curation of the resources.

b. A site map of the project area showing geologic locations of paleontological resource potential (very high, high, moderate, etc.), based on the Final Engineering Geology Report; the mapping shall be included on all grading and construction plans and shall updated to reflect identified sensitive areas (or areas confirmed as non-sensitive) at the start of Phase 2.

c. Full-time monitoring will be required during all ground-disturbing activities in the Terrace Deposit and Monterey Formation, which have been determined to have a very high paleontological resource potential.

d. In areas of high sensitivity, monitoring efforts can be reduced or eliminated at specific sites at the discretion of the Project Paleontologist if no fossil resources are encountered after 50 percent of the excavations are completed.

e. Spot-checking or part-time monitoring will be required for all significant ground-disturbing activities at depths greater than 3 feet in previously undisturbed geologic units with a high paleontological resource potential (i.e., Pismo Formation and Quaternary Marine Terrace Deposits).

f. Monitoring will entail the visual inspection of excavated areas, sidewalls, and spoils piles, with photographic documentation as appropriate.

g. Worker Environmental Awareness Training Program (WEAP) shall be developed by the Project Paleontologist based on the PRMMP and may be conducted concurrent with other environmental training (e.g., cultural and natural resources awareness training, safety training, etc.).

h. In the event that a paleontological resource is discovered, the monitor will have the authority to temporarily divert the construction equipment around the find until it is assessed for scientific significance and collected.

i. The County shall be notified within one week of any significant discovery, and reports shall be provided on monitoring efforts (by permit, where multiple permits are underway) at least biannually.

j. A procedure for fossil preparation, curation, and reporting.

GEO-4.2: Worker Environmental Awareness Program. Prior to and for the duration of any ground disturbance, the Applicant or its designee shall provide Paleontological WEAP training to all new workers prior to any new worker beginning work on the DCPP, PBR, and SMVR-SB sites. The training program shall be developed by the Project Paleontologist and may be presented in the form of a video. A draft of the training program shall be provided to the County of San Luis Obispo Planning and Building Department for review and approval no fewer than 90 days prior to issuance of Decommissioning-related permits or any associated ground disturbance at the DCPP, PBR, or SMVR-SB sites. The training may be conducted concurrent with other environmental training (e.g., biological and cultural resources awareness training, safety training, etc.).

The training shall include, at a minimum:

a. A brief overview by the Project Paleontologist of what Pleistocene fossils look like in general, where they may be encountered during decommissioning;

b. Steps to follow in the event of an unanticipated discovery;

c. Contact information for the County of San Luis Obispo Planning and Building Department, Project Paleontologist;

d. Information that the Project Paleontologist shall have the authority to halt ground disturbing activities in the event material suspected to be a fossil is encountered;

e. Instructions that workers are to halt work on their own in the vicinity of a potential paleontological discovery, shall contact their supervisor and the Project Paleontologist, and that redirection of work shall be determined by the Project Paleontologist;

f. An information brochure that identifies reporting procedures in the event of a discovery;

g. An acknowledgement form signed by each worker indicting that the worker has received the training and will abide by the Project requirements; and

h. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Impact GEO-4: Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater (Class III: Less than Significant).

Phase 1

DCPP Project Site

The new Security Building located in the East Canyon would include restroom facilities for on-site personnel. Wastewater would be treated and disposed at the site using a septic system and leach field. There is an existing septic system located on the slope between East Canyon area and the lower Diablo Creek terrace, south of the Diablo Creek gauging station which would be upgraded or replaced as necessary as part of the Proposed Project. New or replacement onsite wastewater treatment systems shall be designed and constructed to satisfy all applicable requirements of the County of San Luis Obispo Department of Building and Planning Local Agency Management Program (LAMP) for Onsite Wastewater Treatment Systems (OWTS), such as percolation testing, layout design, and proof of a potable water source. The impact related to having soils incapable of adequately supporting the use of septic tanks would be less than significant (Class III).

Railyards

No septic tanks or alternative wastewater disposal systems would be installed at the railyards. Therefore, there would be no impact related to having soils incapable of adequately supporting the use of septic tanks.

Phase 2

Phase 2 work within DCPP would not require the installation of a septic tank or alternative wastewater disposal system. The upgraded or replaced septic system in the East Canyon area may require routine maintenance during operation. No impacts related to having soils incapable of adequately supporting the use of septic tanks would occur.

Post-Decommissioning Operations

New Facility Operations. New facility operations would not require the installation of a septic tank or alternative wastewater disposal system. The upgraded or replaced septic system in the East Canyon area may require routine maintenance during operation. No impacts related to having soils incapable of adequately supporting the use of septic tanks would occur.

Future Actions. Marina improvements would include restroom facilities for visitors. Sanitary wastewater would be treated and disposed at the site using a septic system and leach field. A new leach field in a disturbed area of the site, such as Parking Lot 48 (which would be removed as part of the Proposed Project), would be constructed. New or replacement onsite wastewater treatment systems shall be designed and constructed to satisfy all applicable requirements of the County of San Luis Obispo LAMP. The impact related to having soils incapable of adequately supporting the use of septic tanks would be less than significant (Class III).

Mitigation Measures for Impact GEO-4. No mitigation measures are required.

Impacts of Mitigation. The abandoned leach field along Hillside Drive would be reused or reconstructed to support the ongoing operations of the Fire Station required per MM PSU-2 (Retain the Diablo Canyon Fire Department and Emergency Facilities). New or replacement onsite wastewater treatment systems shall be designed and constructed to satisfy all applicable requirements of the County of San Luis Obispo LAMP. The impact related to having soils incapable of adequately supporting the use of septic tanks would be less than significant (Class III).

Impact GEO-5: Expose structures, workers, and the public to damage or injury due to coastal hazards, including but not limited to flooding, wave runup, tsunamis, and bluff erosion and instability (Class II: Less than Significant with Mitigation).

Phase 1

DCPP Project Site

As discussed in Section 4.8.1.1, the maximum estimated wave height outside of the DCPP Breakwaters was found to be 44.6 feet, and the maximum wave crest elevation inside the Breakwaters was 12.8 feet NAVD88 (PG&E, 2015), including the effects of storm surges. The local threat of tsunami-related damage is primarily confined to areas less than 50 feet above mean sea level (San Luis Obispo, 2016). Therefore, the local threat of coastal hazards at the DCPP site is primarily confined to low-lying coastal areas less than 50 feet above mean sea level. The upper plant area, on top of the cliffs, is all above approximately 85 feet NAVD88, and not at risk from coastal flooding wave runup, or tsunamis. The Discharge Structure extends from the base of the cliffs to approximately 91 feet NAVD88, the Intake Structure and Marina are situated between approximately 20 and 30 feet NAVD88, and the Breakwaters have a maximum crest elevation of approximately 20 feet NAVD88; therefore, these structures are most at risk from coastal flooding wave runup or tsunamis.

While all structures lower than 50 feet above mean sea level are existing and are currently exposed to coastal hazards, Phase 1 includes dismantling the Discharge Structure, which could result in structural changes that could make these areas more susceptible to coastal hazards.

Dismantling the Discharge Structure could make the structure more susceptible to the effects of coastal processes. A circular cell steel sheet pile cofferdam would be constructed around the Discharge Structure prior to demolition and remain in place throughout construction which would offer protection to the structure by isolating the demolition area from the ocean. The cofferdam design requires that the top of cofferdam be approximately 2 feet above elevation at which overtopping is estimated for a 50-year storm event, which would ensure protection from storm generated waves. Concrete plugs and conventional sheet pile walls would likely be required to tie-in the cofferdam with the shore which would further protect the structure. The Discharge Structure would be removed in its entirety back to the water tunnels and the water tunnels would be sealed with a concrete bulkhead to isolate them from ocean processes. After the Discharge Structure has been demolished and while the cofferdam is still in place, the area in which the Discharge Structure was located would be backfilled with layers of different materials, including 1/4-ton and 1-ton quarry rock, gravel, and topsoil (see Figure 2-27). The different

layers would create flexible infill that is able to resist erosion while adapting to the evolving configuration of the surrounding bluff. This approach to backfilling is inherently stable and would maintain the natural profile of the bluff and allow for upland and intertidal restoration (PG&E, 2023a).

Approximately 35 feet of poorly consolidated terrace deposits overlie the more resistant Obispo Formation bedrock as exposed in the bluff. Bluff erosion and landward retreat is controlled by slow wave erosion of the bedrock at the base of the bluff. Bluff retreat rates of the bedrock in Diablo Cove during the period of 1969 to 2004 are estimated to be 0.03 to 0.2 feet per year (0.002 to 0.06 meters per year) (CCC, 2004). The overlying terrace deposits would retreat at comparable rates given that surface water runoff over the top of the slope would not increase after decommissioning with implementation of the post-final site restoration construction Stormwater Management Plan (SWMP). However, eventually a steady state of bluff top erosion would be achieved as controlled by the bedrock erosion rate at the base of the bluff. The natural bedrock and terrace deposits, disturbed by removal of the Discharge Structure, are anticipated to erode and retreat at greater rates than the 1-ton and ¼-ton rock placed in the removal area. Consequently, annual monitoring and reporting of the rock backfill, adjacent bluffs, and bluffs where decommissioning removes structures within 20 feet of the bluff top (bluff top defined as point where the level terrace transitions to a slope descending to the shoreline) should be completed to ensure stability and structural integrity to withstand natural bluff erosion and wave action as required by MM GEO-5 (*Discharge Structure Backfill and Natural Bluff Site Inspection*) and San Luis Obispo County LCP County Code Title 23, Section 23.04.118 (Blufftop Setbacks), Subsection (a)(2) (San Luis Obispo, 2004). The CCC CDP A-3-SLO-04-035 for the existing ISFSI requires PG&E to conduct annual surveys of the shoreline nearest the ISFSI transport road and Soil Disposal Site #2. The first survey was required during the first year of ISFSI construction. PG&E must continue conducting annual surveys through the life of the ISFSI. The survey must be conducted by a licensed Surveyor or Civil Engineer (CCC, 2004). A site stability evaluation report must also be prepared by a California Certified Engineering Geologist and submitted to the County for review and approval, based upon an on-site geologic evaluation that indicates that the bluff setback is adequate to allow for bluff erosion over the 75-year period (CCC, 2004). With implementation of these conditions and MM GEO-5, impacts would be reduced to less than significant (Class II).

While Phase 1 activities would have fewer workers and a lower level of activity compared to existing DCPP operations overall, decommissioning activities (i.e., decontamination, dismantlement) at the Discharge Structure have the potential to put more workers within the coastal zone where they could be exposed to coastal hazards, particularly during construction and removal of the cofferdam. Once in place, the cofferdam would offer protection to workers from flooding and waves. In addition, the DCPP facility has safety protocols in place that would continue to be followed throughout decommissioning activities, minimizing accidents from occurring. The occurrence of damaging tsunamis is low; NOAA also maintains an active tsunami monitoring system that provides early warning and allow workers time to evacuate low lying areas for higher ground. Therefore, impacts to workers would be less than significant (Class III).

Due to the nature of activities on the site and NRC-required perimeter controls, the DCPP site would not be open to the public during Phase 1 and Phase 2, until the NRC Part 50 facility

operating licenses are terminated. Therefore, the Proposed Project would not expose the public to damage or injury due to coastal hazards and there would be no impact.

Railyards

The PBR site is partially within the coastal zone but is elevated above sea level and located approximately 0.6 miles from the shoreline, which would put it outside the area at risk from wave run up or coastal flooding. The California Geological Survey Tsunami Hazard Area Map for San Luis Obispo County (State of California, 2021) shows the Tsunami Hazard Area for the region extending up Pismo Creek from the ocean but terminates just before the PBR site; therefore, the site is beyond the area where tsunamis would likely affect the project area. There are no coastal bluffs in the immediate project area. The SMVR-SB site is located outside of coastal zone and therefore would not impact coastal processes. Therefore, there would be no impact to structures, workers, and the public due to coastal hazards, including but not limited to flooding, wave runup, tsunamis, and bluff erosion.

Phase 2

Phase 2 work within the low-lying coastal area includes closure of the Intake Structure, construction of a bluff top road, continuation of the removal and restoration of the Discharge Structure area, and sitewide restoration activities. Similar to Phase 1, construction in these areas may expose structures and workers to coastal hazards. The blufftop road segment is to be constructed to connect Shore Cliff Road with North Ranch Road/Pecho Valley Road. The road would be established in front of the existing Power Block area and traverse over Diablo Creek via an existing culverted road. The blufftop road segment would be located above coastal water impact areas, including beyond the tsunami hazard level, and far enough back from the cliff edges to not be exposed to coastal hazards (see Section 4.8.1.3 under *Littoral Processes*; cliff retreat is estimated to be less than 5 meters for a 75-year period). The existing culvert crossing in Diablo Creek is above tsunami impact area as well. There would be no impact.

Work in the area of the Intake Structure would occur in areas protected by the Breakwaters, which provides protection from wave run up and flooding. In addition, safety protocols and tsunami warning system would reduce the potential for impacts. The bulkheads would be located entirely within the water, below low tide and therefore designed to withstand coastal processes. Therefore, impacts would be less than significant (Class III).

The openings of the Intake Structure would be sealed with concrete bulkheads, which would be located entirely within the water, below low tide and therefore designed to withstand coastal processes. The top of the Intake Structure would be cleared to support reuse by a third party, under separate County entitlement (see Future Actions discussion below). While the process of sealing the Intake Structure could make the structure more susceptible to the effects of coastal processes, once sealed, the Intake Structure would be protected from the effects of coastal processes (Class III).

Removal and restoration of the Discharge Structure area would continue into Phase 2. The cofferdam constructed during Phase 1 would continue to provide protection to the bluff until the backfill is complete. Like in Phase 1, the cofferdam would offer protection to workers from flooding and waves. In addition, the DCPP facility has safety protocols in place that would

continue to be followed throughout decommissioning activities, minimizing accidents from occurring. The occurrence of damaging tsunamis is low; NOAA also maintains an active tsunami monitoring system that provides early warning and allow workers time to evacuate low lying areas for higher ground. Therefore, impacts to workers would be less than significant (Class III).

Post-Decommissioning Operations

New Facility Operations. All new infrastructure is outside the coastal zone. The new GTCC Waste Storage Facility is outside of the coastal zone (see Figure 1-2), therefore there would be no impact. The Security Building and Indoor Firing Range, and Storage Buildings are located over a quarter mile inland from the coastal bluffs, above an elevation of 300 feet NAVD88, putting them outside the area at risk from wave runup or coastal flooding. The California Geological Survey Tsunami Hazard Area Map for San Luis Obispo County (State of California, 2021) shows the Tsunami Hazard Area ending at the cliffs and only impacting the Intake Structure area. Therefore, no impact to structures, workers, and the public due to coastal hazards would occur, including but not limited to flooding, wave runup, tsunamis, and bluff erosion.

Future Actions. The site and facilities would undergo Final Status Surveys to confirm that any residual levels of radionuclides have been removed and or decreased to levels below site-specific levels that equate to the NRC-approved site release criteria. At that time, the Marina could be released for recreational, education, or commercial purposes. PG&E would lease the Marina to a third-party operator, who would perform limited site improvements and operate the facility to be approved under a separate County Land Use and Coastal Development Permit.

Following release of the NRC Part 50 facility operating licenses, PG&E or the lessee Marina operator would submit an application for Marina improvements. The Marina improvements described in the Project Description would include parking lots (upper and lower), public restrooms, and installing a pier-mounted boat hoist and articulated stairs. The stairs would extend to the water and provide a small platform at the water level. All these structures would be new, and except for the upper parking and upper public restrooms, could be exposed to coastal hazards, including but not limited to flooding, wave runup, and tsunamis. The new stairs would be steel and would be constructed to withstand weather and seawater. Structural risks would be addressed via compliance with design standards and codes to limit the risks from coastal hazards.

Construction related to Marina improvements would expose workers to coastal processes, and operation of the Marina would provide a new source of public access to the project site, which would increase the risk of injury to the public from flooding, wave runup, tsunamis. However, the Breakwaters would remain which would provide protection from waves and coastal flooding. In addition, the risk of tsunamis is low, and a tsunami warning system would provide an early alert the public, allowing them to avoid the area or seek higher ground. Therefore, impacts would be less than significant (Class III).

Mitigation Measures for Impact GEO-5.

GEO-5 **Discharge Structure Backfill and Natural Bluff Site Inspection.** The Applicant or its designee shall complete a site inspection one year after placement of the Discharge Structure backfill. The inspection shall be completed by a California Certified Engineer-

ing Geologist and include the entire area of Discharge Structure backfill and the adjacent natural bluffs. The inspection shall note settlement, tension cracks at top of bluff, loss of material, and change of slope, if any. The Applicant or its designee shall submit a report of findings to the County for review within 45 days following completion of each annual inspection, documenting the overall performance of the backfill and natural bluffs and shall provide recommendations for repair or replenishment of the backfill, as necessary. Annual inspections shall continue for a period of five years. The fifth annual report shall present conclusions and recommendations for additional monitoring if necessary. If repairs are recommended by the Applicant's certified engineering geologist, the County Geologist shall review the scope of repairs and approve within 30 days.

Impacts of Mitigation. Implementation of MM GEO-5 (*Discharge Structure Backfill and Natural Bluff Site Inspection*) may lead to additional impacts associated with future repairs of the Discharge Structure backfill, if such repairs are identified. Such repairs are considered speculative at this time, and if they occur would happen in a piecemeal fashion. It is anticipated that any such repairs would occur much further in the future at a time when construction equipment may be cleaner, and regulations may be stricter. Additionally, such repairs may be exempt from CEQA, such as repairs to prevent an emergency (State CEQA Guidelines §15269(c)), restoration of deteriorated or damaged structures (State CEQA Guidelines §15301(d)), or filling of earth into previously excavated land with material compatible with the natural features of the site (State CEQA Guidelines §15304(c)). Impacts associated with such repairs may include additional air quality and greenhouse gas emissions associated with earth movement, use of construction equipment and trucks; biological resources impacts in areas that may have otherwise been restored under the Proposed Project; and potential for soil erosion and associated water quality impacts. These impacts would be assessed on a case-by-case basis and the appropriate CEQA documentation completed, as needed.

Impact GEO-6: Impair nearshore sediment properties, characteristics, or processes during and after decontamination and dismantlement activities (Class II: Less than Significant with Mitigation).

Phase 1

DCPP Project Site

Because the DCPP site includes built structures in the coastal zone (see Figure 1-2), decommissioning activities (i.e., decontamination, dismantlement) have the potential to impact nearshore sediment properties, characteristics, or processes. The upland portions of the DCPP site, including the structures northeast of Diablo Canyon Road/Diablo Ocean Drive, are set back from the shoreline and cliffs, all above approximately 85 feet NAVD88. Therefore, decontamination and dismantlement of the upland portions would have no effect on nearshore sediment properties, characteristics, or processes as the structures are outside of the immediate coastal area and do not affect coastal processes.

The Discharge Structure, Intake Structure, Intake Cove/Marina, and Breakwaters are all located within, or directly adjacent to, the shoreline and coastal waters. Construction in these areas may

affect nearshore coastal processes. Under the Proposed Project, the Intake Structure, Marina, and Breakwaters would remain in place. The Intake Structure opening would be closed by a concrete bulkhead in Phase 2.

The Discharge Structure including the tunnel extending 30 feet into the bluff, would be demolished and removed in Phase 1, which would create a void in the coastal bluff. The entire void would be backfilled with layers of different materials, including 1-ton and ¼-ton quarry rock, gravel, and topsoil (see Figure 2-27), with restoration continuing into Phase 2. Rocks would be placed within the void from either a land-based crane or barge-mounted crane using rock tongs specifically designed to place individual or small groups of boulders. In addition, quarry rocks would be placed on either side of the Discharge Structure within the intertidal zone to augment the rocky intertidal habitat. This design would create a hardened area of the bluff which would protect against future increased erosion. The different layers would create flexible infill that is able to resist erosion while adapting to the evolving configuration of the surrounding bluff. This approach to backfilling is inherently stable and would maintain the natural profile of the bluff and allow for upland and intertidal restoration (PG&E, 2023a).

Prior to construction, a cofferdam would be constructed around the Discharge Structure and remain in place for the entirety of the demolition and rock placement, which would prevent sediment from entering the littoral system. There is expected to be some discharge of water from inside the cofferdam during demolition, such as through seams between the sheet piles or seepage captured on the inside of the cofferdam. PG&E developed a Turbidity Monitoring Plan for decommissioning activities associated with the demolition and removal of the Discharge Structure and restoration activities, and addresses barging activities in the Intake Cove during decommissioning (PG&E, 2022b). The Turbidity Monitoring Plan contains recommendations to avoid and minimize impacts to water quality associated with the demolition of the Discharge Structures and restoration of this area following removal, including the following:

- Sediment removal prior to placement of cofferdam should utilize a water lift to remove any sand or sediment and reduce air entrainment and sediment dispersion.
- Prior to installation of the sheet pile, any discharge of excavated material (water and sand) should occur within 10 feet of the terminus of the discharge pipe location and within 3 feet of the seafloor.
- The discharge hose may need to be periodically repositioned to avoid accumulation of excavated material in a particular location.
- If turbidity levels exceed or approach Ocean Plan limits during disposal, a shroud should be fabricated to fit on the end of the discharge pipe to reduce sediment plume dispersion.

The plan describes protocols and methods to be implemented to minimize impacts to water quality, specifically turbidity, in accordance with standards in the California Ocean Plan. This plan also helps to minimize the effects of erosion during the removal of the Discharge Structure. As discussed in Section 4.4, *Biological Resources – Marine*, under impact MBIO-1, MM MBIO-3 (*Water Quality Monitoring Plan*) is recommended, which requires PG&E to update the Turbidity Monitoring Plan to include permit requirements for monitoring for turbidity and other water quality parameters such as dissolved oxygen to ensure that Project-related activities are not

contributing to conditions that could degrade sensitive marine habitats. If water quality monitoring detected persistent and elevated levels of turbidity, Best Management Practices (BMPs) would be implemented to avoid turbidity impacts to receiving waters and adjacent habitats. Additionally, MM MBIO-4 (*Cofferdam Installation and Dewatering Plan*) requires PG&E to develop a plan to avoid impacts to marine biological resources, receiving waters, sensitive habitats, and potentially protected species from all aspects associated with cofferdam construction and removal. The plan shall include tasks such as a pre-construction habitat and biological survey, an approach to relocate marine life, and dewatering controls to minimize turbidity, and inspection schedule to ensure compliance. With implementation of these measures, impacts would be reduced to a less-than-significant level (Class II).

While the Intake Structure would remain in place, operations of both the Intake and Discharge Structures would cease in Phase 1. Local ocean water circulation caused by the operations at the Intake and Discharge Structures would be altered during the period of redirected flow and once they are no longer operable, and has the potential to change very localized sediment movement. However, natural sediment flow within the Intake Cove is already potentially impeded by the Breakwaters, which would remain in place under the Proposed Project. Within the Discharge Cove, with cessation of Discharge Structure flows, circulation would revert to natural patterns and sediment flow would no longer be impeded in this area. The impact would be less than significant (Class III).

Railyards

The PBR site is partially within the coastal zone but is located approximately 0.6 miles from the existing shoreline, and therefore, there would be no effect to nearshore sediment processes. The SMVR-SB site is located outside of the coastal zone and therefore would not impact coastal processes. There would be no impact.

Phase 2

Structures in and directly adjacent to coastal waters and the shoreline potentially impede natural sediment flow. As described in Impact GEO-5, work within the low-lying coastal area includes sealing the Intake Structure, continued removal and restoration of the Discharge Structure area, and construction of a bluff top road. As the bluff top road is set back from the cliff tops, impacts associated with cliff erosion are not expected; therefore, there would be no impacts to local sediment processes.

The Intake Structure would be sealed with concrete bulkheads. The bulkheads would be placed in the water and could potentially impede sediment flow. However, the bulkheads would be within the area protected by the Breakwaters which already impede natural sediment flow.

The continued removal and restoration of the Discharge Structure area during Phase 2 would have the same impacts as outlined for Phase 1 (above). With implementation of the outlined measures, impacts would be reduced to a less-than-significant level (Class II).

Post-Decommissioning Operations

New Facility Operations. All new infrastructure is outside the coastal zone. The new GTCC Waste Storage Facility is outside of the Coastal Zone (see Figure 1-2), therefore there would be no

impact. The Security Building, Indoor Firing Range, and Storage Buildings are located over a quarter mile inland from the coastal bluffs, and therefore, would not be affected by nearshore sediment processes. There would be no impact.

Future Actions. As part of the Marina improvements for re-use (to be authorized under separate County land use permits), the top of the closed Intake Structure would be cleared and repurposed with parking on top, and a boat hoist and stairs/platform installed to provide access to the water. All these structures would be located on land or above the water (the platform may be submerged during extreme high tides during coastal storms but would not affect sediment flow). As such, Phase 2 impacts on nearshore sediment would be less than significant (Class III).

Marina operations would likely include overnight anchoring of boats, which could create localized pockets of scour erosion on the seafloor. The effects are expected to be minor, given the small area. As discussed in Section 4.4, *Biological Resources – Marine*, under Impact MBIO-1, MM MBIO-9 (*Mooring Placement Habitat Survey*), which prohibits all non-emergency anchoring and that up to five mooring buoys be installed in the Marina prior to commencing overnight use by private vessels. It also requires a pre-construction habitat survey be conducted prior to mooring installation to delineate sensitive habitats such as eelgrass beds and rocky reefs. Moorings would be installed and include a buffer zone to avoid impacts to these habitats from the mooring anchor, as well as potential chain scour. Inclusion of the requirements specified in MM MBIO-9 in the Land Use and Coastal Development Permit for marina operations would reduce impacts on nearshore sediment to a less-than-significant level (Class II).

Mitigation Measures for Impact GEO-6. See Section 4.4 for full text of measures.

MBIO-3 Water Quality Monitoring Plan

MBIO-4 Cofferdam Installation and Dewatering Plan

MBIO-9 Mooring Placement Habitat Survey

Impact GEO-7: Impair coastal wave, current, or circulation patterns during and after decontamination and dismantlement activities (Class III: Less than Significant).

Phase 1

DCPP Project Site

As described in Impacts GEO-4 and GEO-5, portions of the DCPP site, including the structures east of Diablo Canyon Road/Diablo Ocean Drive, are set back from the shoreline and cliffs, with no direct connection to the coastal waters. Therefore, decontamination and dismantlement of structures and facilities within the upper DCPP site would have no effect on coastal hydrodynamics outside of the immediate coastal area and do not affect coastal processes. There would be no impact.

The Discharge Structure, Intake Structure, Intake Cove/Marina, and Breakwaters are all located along the coast and may affect nearshore processes. As noted, the Intake Structure, Marina, and Breakwaters are not being demolished and would remain under the Proposed Project. These existing structures are currently affecting natural coastal processes (e.g., by reducing waves and

altering natural circulation patterns) and the structures would not be changed by the Proposed Project. While the Discharge Structure is to be removed, the void left in the cliff would be backfilled with layers of different materials, including 1-ton and ¼-ton quarry rock, gravel, and topsoil that would maintain the natural profile of the bluff. Therefore, removal of the Discharge Structure would not alter the local coastal wave, current, or circulation patterns. There would be no impact.

Operations of both the Intake and Discharge Structures would cease in Phase 1. Local ocean water circulation caused by the operations at the Intake and Discharge Structures would be altered once they are no longer operable. However, natural circulation within the Intake Cove is already to some extent impeded by the Breakwaters, which would remain in place under the Proposed Project. Within the Discharge Cove, with cessation of Discharge Structure flows, circulation would revert to natural patterns. This impact would be less than significant (Class III).

Railyards

As described in Impact GEO-5, the PBR site is partially within the coastal zone but is located approximately 0.6 miles from the existing shoreline, and would not impact the coastal waves, currents, or circulation patterns. The SMVR-SB site is located outside of the coastal zone and therefore would not impact coastal processes. There would be no impact.

Phase 2

Work within the low-lying coastal area of the DCPP site includes sealing the Intake Structure, continued removal and restoration of the Discharge Structure, and construction of a bluff top road. As the bluff top road would be set back from the cliff tops, there would be no impacts to coastal wave, current, or circulation patterns. Existing Marina structures would remain in place, except for the stairs that would extend to the water with a small platform. The stairs and platform would not affect coastal processes; they are relatively small and would not extend far into the water column. The Intake Structure opening would be closed with concrete bulkheads. The Intake Structure bulkheads would be within the area protected by the Breakwaters, which already to some extent limits circulation and wave action. The continued removal and restoration of the bluff in the Discharge Structure area would happen within the cofferdam, which could modify wave action and circulation patterns slightly. Once restoration is complete, the cofferdam would be removed and the bluff would maintain a similar shoreline profile, and therefore would not impact the coastal wave, current, or circulation patterns beyond the changes caused in Phase 1 due to the ceasing of operations. The potential impact would therefore be less than significant (Class III).

Post-Decommissioning Operations

New Facility Operations. All new infrastructure is outside the coastal zone. The new GTCC Waste Storage Facility is outside of the Coastal Zone (see Figure 1-2), therefore there would be no impact. The Security Building, Indoor Firing Range, and Storage Buildings are located over a quarter mile inland from the coastal bluffs, and therefore, would not alter the local coastal wave, current, or circulation patterns. There would be no impact.

Future Actions. Future operation of the Marina following release of the NRC Part 50 facility operating licenses would likely include overnight anchoring of boats within the Intake Cove/ Marina, which is an area protected by the Breakwaters. The effect on coastal wave, current, or circulation patterns would be less than significant (Class III).

Mitigation Measures for Impact GEO-7. No mitigation measures are required.

Impact GEO-8: Increase the effects of coastal flooding or erosion associated with sea level rise during and after decontamination and dismantlement activities (Class II: Less than Significant with Mitigation).

Phase 1

DCPP Project Site

SLR has the potential to affect erosion rates along the shoreline. The CCC provides standard SLR projections specific to California coastal regions. While the CCC *Sea Level Rise Policy Guidance* (CCC, 2018) is advisory, the CCC encourages projects to be consistent with the guidance to ensure that projects consider SLR in planning, design, and engineering throughout the life of the projects and that alternatives that minimize risks to the projects and minimize risks to coastal resources are pursued. In addition, the CCC bases their SLR projections on the "Best Available SLR Science" and establishes one set of SLR projections for consistent planning.

As discussed previously and further in Section 7.1, *Climate Change and Sea-Level Rise*, portions of the DCPP site, including the structures east of Diablo Canyon Road/Diablo Ocean Drive, are set back from the shoreline and cliffs, with no direct connection to the coastal waters. While the upland area of the DCPP site is unlikely to be impacted by SLR, the Discharge Structure, Intake Structure, Intake Cove/Marina, and Breakwaters are located along the coast and may be affected by SLR. As noted, the Intake Structure, Marina, and Breakwaters would not be demolished and would remain in place. The Intake Structure, Marina and associated infrastructure and road elevations are approximately 20 to 25 feet North American Vertical Datum of 1988 (NAVD88). The elevation of the Breakwaters is approximately 18 to 20 feet NAVD88. Given a local mean higher high water (MHHW) of approximately 5.3 feet NAVD88, and a 0.5 percent probability of SLR exceeding 6.7 feet by 2100, the resulting 2100 MHHW would be approximately 12 feet NAVD88, which is below the pier, roadway, and crest elevations of the Breakwaters. However, with SLR and the smaller freeboard, there is a greater chance of waves overtopping the Breakwaters, resulting in the Breakwaters being less effective, and larger waves forming within the Intake Cove. Such waves could lead to more localized effects of coastal processes, exposing the Intake Structure and Marina to greater effects from erosion. However, the hardened shoreline and natural rocky shoreline directly around these structures would reduce the effects of erosion on the structures themselves. This impact would be less than significant (Class III).

In addition to direct effects from flooding, SLR may increase the speed of cliff and shoreline erosion. As discussed in Section 4.8.1.3, under *Littoral Processes*, the cliffs in the area of the DCPP consists of resistant headlands and sea stacks. The sea cliffs range from 50 degrees to vertical and consist of rock layers, including resistant zeolitized tuff (hard rock made from compressed volcanic ash) and marine sandstone, siltstone, and dolomite. Sea cliff erosion (and associated

shoreline retreat) of the bedrock shoreline in the DCPP area is strongly controlled by the wave erosion process, and coves and pocket beaches have formed where waves have eroded the softer shale and siltstone rock, leaving resistant rock buttresses and headlands.

As further discussed in Section 4.8.1, under *Littoral Processes*, based on geological processes alone, a maximum sea cliff retreat over the next 75-year period is anticipated to average 3 meters (10 feet) along the cliffs at the DCPP site. The maximum retreat will be localized along the weaker rock beds and form narrow slots and gullies in the sea cliff on the order of 1 to 5 meters wide, while other areas will experience lesser magnitudes of retreat. SLR has the potential to exacerbate erosion in the weaker areas and accelerate retreat in all areas. As most of the DCPP site and associated structures are set back from the cliffs and would be demolished as part of the Proposed Project, the areas at most risk are the Discharge Structure, Intake Structure, Marina, and Breakwaters located in the immediate coastal area. The Intake Structure is protected by a seawall and the next closest infrastructure is Diablo Canyon Road/Diablo Ocean Drive which is set back on average 60 feet from the cliffs and bluff edge. Assuming the 10 feet of future erosion along the cliffs, the road would continue to be a reasonable distance from the edge. Therefore, SLR-exacerbated erosion of the cliffs is not expected to affect the uplands structures, Intake Structure, or related infrastructure. Removing the Discharge Structure may exacerbate retreat due to SLR in the immediate area by removing a hardened structure that provides support for the cliff immediately behind the structure. However, this area would be backfilled in a manner which would be protective against bluff erosion and minimize potential for impacts. The area in which the Discharge Structure was located would be backfilled with layers of different materials, including 1/4-ton and 1-ton quarry rock, gravel, and topsoil (see Figure 2-27). The different layers would create flexible infill that is able to resist erosion while adapting to the evolving configuration of the surrounding bluff (PG&E, 2023a). As described for Impact GEO-5, the natural bedrock and terrace deposits, disturbed by removal of the Discharge Structure, are anticipated to erode and retreat at greater rates than the 1-ton and ¼-ton rock placed in the removal area. Consequently, annual monitoring and reporting of the rock backfill, adjacent bluffs, and bluffs where decommissioning removes structures within 20 feet of the bluff top (bluff top defined as point where the level terrace transitions to a slope descending to the shoreline) should be completed to ensure stability and structural integrity to withstand natural bluff erosion and wave action as required by MM GEO-5 (*Discharge Structure Backfill and Natural Bluff Site Inspection*). With MM GEO-5 this impact would be reduced to less than significant (Class II).

Railyards

As described in Impact GEO-5, the PBR site is partially within the coastal zone but is located approximately 0.6 miles from the existing shoreline and would not be affected by SLR. The SMVR-SB site is located outside of the coastal zone and therefore would not impact coastal flooding impacts. There would be no impact.

Phase 2

As described previously, work within the coastal zone for Phase 2 includes constructing a bluff top road and closing the Intake Structure. As the bluff top road and the upper portion of the Marina development are beyond the coastal waters and beyond the expected 75-year erosion rates, there would be no impact to SLR effects.

Work in the lower areas of the Marina and at the Intake Structure are potentially within the influence of future SLR flood levels and waves. The openings of the Intake Structure would be sealed, and the top cleared. The existing dock would remain in place. As discussed under the Phase 1 impacts, the potential for greater future waves could potentially increase erosion at the edges of these hardened structures. As noted above, the elevation of the Breakwaters is approximately 18 to 20 feet NAVD88. Given a local MHHW of approximately 5.3 feet NAVD88, and a 0.5 percent probability of SLR exceeding 6.7 feet by 2100, the resulting 2100 MHHW would be approximately 12 feet NAVD88, which is below the crest elevations of the Breakwaters. However, with SLR and the smaller freeboard, there is a greater chance of waves overtopping the Breakwaters, resulting in the Breakwaters being less effective, and larger waves forming within the Intake Cove, which could affect Marina structures, especially the existing dock. While larger waves could form in the cove, the Breakwater would continue to provide sufficient protection from damaging waves. In addition, the articulated stairs would be steel and be constructed to withstand weather and seawater. Impacts would be less than significant (Class III).

Similar to Phase 1, as the removal and restoration of the Discharge Structure area continues into Phase 2, the removal of the Discharge Structure may exacerbate shoreline retreat due to SLR in the immediate area by removing a hardened structure that provides support for the cliff immediately behind the structure. However, as discussed above, the area would be backfilled in a manner which would be protective against bluff erosion. This impact would be less than significant (Class III).

Post-Decommissioning Operations

New Facility Operations. All new infrastructure is outside the coastal zone. The new GTCC Waste Storage Facility is outside of the Coastal Zone (see Figure 1-2), therefore there would be no impact. The Security Building, Indoor Firing Range, and Storage Buildings are located over a quarter mile inland from the coastal bluffs, and therefore, would not increase coastal hazards due to SLR. There would be no impact.

Future Actions. Permit application for operation of the Marina would likely include overnight anchoring of boats within the Intake Cove, which would have no impact on coastal flooding or erosion associated with sea level rise.

Mitigation Measures for Impact GEO-8.

GEO-5 Discharge Structure Backfill and Natural Bluff Site Inspection

4.8.5 Cumulative Impact Analysis

4.8.5.1 Geology and Soils

Geographic Extent Context

Geologic and soils impacts, including seismic hazards are typically site-specific and therefore limited to the Proposed Project sites (DCPP, PBR, and SMVR-SB). The impacts of each past, present, and reasonably foreseeable project would be specific to the respective site and its users and would not be in common with or contribute to (or shared with, in an additive sense) the impacts on other sites. In addition, development of each site would be subject to site development and

construction guidelines and standards (local, State, and federal) that are designed to protect public safety. In order to be cumulatively considerable, adverse geologic conditions would have to occur at the same time and in the same location and under the same or similar conditions of the Proposed Project. As discussed in Section 3.3.2, *Relevant Cumulative Projects*, only one project at the DCPP site is planned that has the potential to result in cumulative geology and soils impacts in combination with the Proposed Project: Orano System ISFSI Modifications (#1).

For paleontological resources, the cumulative study area is the geographical area of the County of San Luis Obispo, which is the geographical area covered by the County's General Plan, including all goals and policies therein. As listed in Table 3-1, cumulative projects in San Luis Obispo County that are considered for potential cumulative impacts related to paleontology include:

Diablo Canyon Power Plant

- Orano System ISFISI Modifications (#1)
- Communications Facility (#2)
- Avila Beach Drive at Highway 101 Interchange (#3)
- Flying Flags Campground (#4)
- Bob Jones Trail Construction (#5)
- Avila Beach Resort Phased Expansion Development Plan/Coastal Development Permit (#6)

Pismo Beach Railyard

- Signal at Bello and Price Canyon Road (#7)
- U.S. 101 Pismo Congestion Relief Project (#8)
- Public Safety Center (#9)
- Bello Road Paving (#10)
- Price Street Sidewalk Pavers (#11)
- Realign Frady Lane (#12)
- Storm Drain on Wadsworth from Bello to Judkins Middle School (#13)

Additional future development projects in the County, which are not included in Table 3-1 but are reasonably foreseeable pending development proposals consistent with the County's General Plan, could also include excavation that could affect paleontological resources. The cumulative effect of the Proposed Project is the loss of these resources. The Proposed Project, in conjunction with other development in the County, has the potential to cumulatively impact paleontological resources; however, it should be noted that each development proposal received by the County that requires discretionary approval would be required to undergo environmental review pursuant to CEQA. Due to existing laws and regulations in place to prevent significant impact to paleontological resources, the potential incremental effect of the Proposed Project would not be cumulatively considerable.

Cumulative Impact Analysis

Phase 1

The Proposed Project would not create new hazards or exacerbate existing seismic hazards. The Proposed Project would not exacerbate the likelihood or severity of fault rupture impacts during a seismic event, and impacts would not be cumulatively considerable.

Large earthquakes on regional faults could result in strong seismically induced ground shaking and slope failures, and liquefaction in the general Project area; however, the Project impacts would be less than significant with implementation of MM GEO-1 (*Geologic Hazard Assessment and Geotechnical Investigation*). The Proposed Project would not exacerbate or introduce new seismic impacts such as seismically induced ground shaking and slope failures, and liquefaction related phenomena, as MM GEO-1 would require a Final Engineering Geology Report, Project-specific geotechnical investigation, a geologic hazard assessment, and site-specific design-level recommendations to evaluate and address geologic and seismic hazards, landslides, slope stability, liquefaction, and seismic settlement. Therefore, impacts would not be cumulatively considerable.

Unsuitable soils such as expansive and corrosive soils occur within the Project area; however, the Project impacts related to unsuitable soils would be less than significant with implementation of MM GEO-1 (*Geologic Hazard Assessment and Geotechnical Investigation*). Therefore, impacts related to unsuitable soils would not be cumulatively considerable.

PG&E has proposed the Orano System ISFSI Modifications (#1), a new dry cask storage system for the long-term storage of spent nuclear fuel at the existing ISFSI. Modifications would include placement of precast horizontal storage modules (HSMs) on top of the existing ISFSI pad. Per the County's 2004 ISFSI EIR, the structural design of the facility would incorporate the design earthquake (Stantec, 2022 – Table 1, MM GR-5). Additionally, portions of Shore Cliff Road, which would be used to transport SNF and the new Orano System components, was previously identified (as part of the analysis of the Holtec ISFSI) to be near the mapped Patton Cove landslide area (Stantec, 2022). Geologic monitoring systems, including slope inclinometers or time-domain reflectometry, were installed and monitored during and after construction of the existing Holtec ISFSI to ensure the stability of this route (Stantec, 2022). As such, impacts related to seismic shaking have been reduced to a less-than-significant level and are not cumulatively considerable.

Potential erosion related to excavation and grading for the Proposed Project would be limited to areas of ground disturbance that are underlain by soils with moderate to high erosion potential. The Proposed Project would comply with all NPDES permit requirements, including the CGP (AC WQ-1, *Construction General Permit*), which would be implemented by PG&E. The CGP includes implementation of a site-specific SWPPP (AC BIO-3, *Site-Specific Stormwater Pollution Prevention Plan*), which would contain erosion and sediment control plans that would provide guidance for placement of erosion and sediment controls per CGP requirements. Also, provisions for Erosion and Sediment Control required in every grading permit issued for the DCPP project by San Luis Obispo County would further reduce this impact. The potential for this impact to combine with similar effects of other projects would only occur if other projects were implemented in the same area at the same time as the Proposed Project. However, construction of the Proposed Project would preclude other projects from being implemented concurrently in the same location. Therefore, Proposed Project impacts would not have the potential to combine with similar effects from other projects and would not be cumulatively considerable.

As part of the Proposed Project, PG&E would limit adverse impacts to unknown paleontological resources during Project excavation (AC GEO-1, *Unknown Paleontological Resources*), which would halt or redirect construction if paleontological resources are encountered. PG&E has included worker training as part of the Proposed Project (AC CR-2, *Worker's Environmental*

Awareness Training) which includes an onsite monitor and a training module on cultural and paleontological resources for all field personnel prior to the start of construction. MM GEO-4 (*Prepare and Implement Paleontological Resource Monitoring and Mitigation Plan and Worker Environmental Awareness Program*) requires a qualified County-approved paleontologist to provide training to all new workers prior to any new worker beginning work on the Project site. This training includes protocols to follow should material suspected to be a fossil is encountered. With implementation of MM GEO-4, impacts would be reduced to a less-than-significant level and would not be cumulatively considerable.

Phase 2

Phase 2 geology and soils impacts are the same as Phase 1 and are not cumulatively considerable. The remaining demolition, site grading, and final site restoration planned for Phase 2 would have the same soil erosion, unsuitable soil, ground shaking, slope stability, fault rupture, and paleontological impacts which are project-specific and are not cumulatively considerable. Potential erosion related to excavation and grading for the Proposed Project would be limited to areas of ground disturbance that are underlain by soils with moderate to high erosion potential. The Proposed Project would comply with all NPDES permit requirements, including the CGP (AC WQ-1, Construction General Permit), which would be implemented by PG&E. The CGP includes implementation of a site-specific SWPPP (AC BIO-3, Site-Specific Stormwater Pollution Prevention Plan), which would contain erosion and sediment control plans that would provide guidance for placement of erosion and sediment controls per CGP requirements. Also, provisions for Erosion and Sediment Control required in every grading permit issued for the DCPP project by San Luis Obispo County would further reduce this impact. Phase 2 includes the demolition and backfill of the Discharge Structure. The potential for impact related to strong earthquake-induced ground shaking, seismically induced liquefaction phenomena, expansive and corrosive soils, and coastal processes at the Discharge Structure backfill, would be less than significant with implementation of MM GEO-1 (Class II).

Post-Decommissioning Operations

New Facility Operations. New Facility Operations would result in less than significant impacts related to surface fault rupture, strong earthquake-induced ground shaking, seismically induced liquefaction phenomena, and expansive and corrosive soils. Operation at the Project site, including routine or periodic maintenance of facilities, would not require any substantial ground disturbance, therefore significant soil erosion would not be triggered or accelerated. Compliance with requirements of the grading permits would result in a less than significant impact related to erosion. Additionally, no impacts related to paleontological resources would occur. Impacts to geology and soils would therefore be project-specific and not cumulatively considerable.

Future Actions. The limited site improvement planned for the Marina would have the same impact related to surface fault rupture, strong earthquake-induced ground shaking, seismically induced liquefaction phenomena, and expansive and corrosive soils at the DCPP, which would be less than significant.

Any construction at the site following decommissioning would be required to comply with standard regulatory controls such as a construction-SWPPP to minimize erosion and runoff concerns.

MMs HWQ-1 and HWQ-2 are recommended, which requires a Long-Term Drainage Plan and a Long-Term Erosion and Sediment Control Plan for the final surface conditions following demolition of all decommissioned structures. The Long-Term Erosion and Sediment Control Plan would be included in the SWMP. An inspection of bluffs at the Discharge Cove and east of the Intake Cove should be completed every three years and after a major storm event to ensure that piping/structures are not exposed by natural erosion or natural storm conditions as required by MM GEO-3 (*Monitoring and Reporting of Potential Subsurface Structure Exposure*). The inspection must be conducted by a certified engineering geologist and approved by the County. An inspection report must also be prepared by a California Certified Engineering Geologist and submitted to the County for review and approval prior to any removal of potentially exposed piping/ structures. With implementation of these conditions and MM GEO-3, impacts would be reduced to a less-than-significant level (Class II). With implementation of the required plans, permits, and MMs HWQ-1, HWQ-2, and GEO-3, impacts would be reduced to a less-than-significant level (Class II). With implementation of the required plans, permits, and MMs HWQ-1, HWQ-2, and MM GEO-3 erosion impacts would be reduced to a less-than-significant level.

Construction related to Marina improvements would include grading and ground disturbance within the geologically sensitive Terrace deposits. PG&E would limit adverse impacts to unknown paleontological resources during Project excavation (AC GEO-1, *Unknown Paleontological Resources*), which would halt or redirect construction if paleontological resources are encountered. PG&E has included worker training as part of the Proposed Project (AC CR-2, *Worker's Environmental Awareness Training*) which includes a training module on cultural and paleontological resources for all field personnel prior to the start of construction. MM GEO-4 (*Worker Environmental Awareness Training*) requires a qualified paleontologist to provide training to all new workers prior to any new worker beginning work on the Project site. This training includes protocols to follow should material suspected to be a fossil is encountered. With implementation of MM GEO-4, impacts would be reduced to less than significant (Class II).

4.8.5.2 Coastal Processes

Geographic Extent Context

For coastal processes, the geographic scope for cumulative impact would extend further from the DCPP site. Generally, natural sedimentation in coastal areas are into littoral cells, which is an area of coastline that contains a complete cycle of sedimentation including sources, transport paths, and sinks. The presence of sand on any particular beach depends on the transport of sand within the cell. Impacts have the potential to combine with other projects within the Morro Bay Littoral Cell which extends along the coast from Ragged Point, California (approximately 70 miles north of the DCPP site) to the DCPP site. The railyards are all in the uplands located outside of the coastal zone; therefore, they would not be affected by coastal processes.

Most of the cumulative projects listed in Table 3-1 are in the uplands, and because the railyards are located outside of the coastal zone, the projects which would be proximate to the railyards would also be outside the coastal zone, not affected by coastal processes, and would not contribute to a cumulative impact to coastal processes. The projects which are in close proximity

to the Proposed Project, all of which involve some degree of construction and could contribute to a cumulative impact to coastal processes, include:

Diablo Canyon Power Plant

- Orano System ISFISI Modifications (#1)
- Communications Facility (#2)

Offshore/Energy Projects

- Port San Luis Breakwater Repair (#25)

Cumulative Impact Analysis

Phase 1

While most of the DCPP site is located in the uplands, the Discharge Structure, Intake Structure, Intake Cove/Marina, and Breakwaters are all located within, or adjacent to, coastal waters, and construction in these areas may affect nearshore processes. The Intake Structure, Marina, and Breakwaters are not being demolished and would remain in place, but the Intake Structure would become inoperable in Phase 1. As most of the upland sites are set back from the cliffs and being demolished as part of the Proposed Project, the areas at most risk are the Discharge Structure, Intake Structure, Marina, and Breakwaters located in the immediate coastal area. The Intake Structure is protected by a seawall and the next closest infrastructure is the Marina Road which is set back on average 60 feet from the cliffs. Therefore, SLR-exacerbated erosion of the cliffs is not expected to affect the upland structures, Intake Structure or related infrastructure. Removing the Discharge Structure may exacerbate retreat due to SLR in the immediate area by removing a hardened structure that provides support for the cliff immediately behind the structure. However, this area would be backfilled with quarry rock to avoid or substantially lessen potential impacts.

The PBR site is partially within the coastal zone but is located approximately 0.6 miles from the existing shoreline, and well above potential floodwater levels, including potential tsunami levels, and therefore would not be affected by coastal processes. The SMVR-SB site is located outside of the coastal zone and therefore would not impact coastal processes. The projects which would be proximate to the railyards would also be outside the coastal zone, not affected by coastal processes, and would not contribute to a cumulative impact to coastal processes.

The Orano System ISFSI Modifications (#1) would occur at the DCPP site within the coastal zone. The Communications Facility (#2) is located in proximity to the main DCPP site and is within the coastal zone. This project includes construction of a small communications station in the uplands and has been on hold since 2018. The projects could entail an adverse impact to coastal processes because of their locations. However, similar to the Proposed Project, the Orano System ISFSI Modification (#1), and any future projects not currently contemplated, would be required to adhere to the applicable NPDES permit requirements and other state and federal permitting requirements. Therefore, Phase 1 of the Proposed Project would not be expected to result in a cumulatively considerable contribution to cumulative coastal processes impacts.

Phase 2

Work within the coastal zone for Phase 2 includes sealing the Intake Structure continued removal and restoration of the Discharge Structure, and construction of a bluff top road that would extend Shore Cliff Road from the south across the existing main facility site to connect to the existing Diablo Creek crossing and North Ranch Road/Pecho Valley Road north of the DCPP site.

The blufftop road segment to be constructed is located above coastal water impact areas, including beyond the tsunami hazard level, and far enough back from the cliff edges to avoid exposure to coastal hazards (see Section 4.8.1.3 under *Littoral Processes*; cliff retreat is estimated to be less than 5 meters for a 75-year period).

The Port San Luis Breakwater Repair (#25) is the only project which could pose a cumulative impact in combination with Phase 2 of the Proposed Project. It is not in close proximity to the Proposed Project, but because it involves breakwater repair in the same coastal area as the Proposed Project, it could impact coastal processes, which would be in addition to any impact on coastal processes related to Discharge Structure removal and restoration as part of the Proposed Project. However, because the Port San Luis Breakwater Repair is expected to be complete in 2023 and the Discharge Structure removal and restoration elements of the Proposed Project are scheduled for 2030-2031, no overlap would be anticipated. Therefore, Phase 2 of the Proposed Project would not result in a cumulative considerable contribution to cumulative coastal processes impacts.

Post-Decommissioning Operations

New Facility Operations. Operation of the new facilities installed as part of decommissioning would not impact coastal processes as they are all located outside the Coastal Zone and therefore would not contribute to cumulative impacts from other projects.

Future Actions. The Marina development would include parking lots (upper and lower), public restrooms, paving the top of the Intake Structure, and installing a boat hoist and articulated stairs. All these facilities, besides the upper parking area, could be exposed to coastal hazards, including but not limited to flooding, wave runup, and tsunamis. However, the Breakwaters would remain which would provide protection from waves and coastal flooding. The Port San Luis Breakwater Repair (#25) is the only project which could pose a cumulative impact in combination with Future Actions of the Proposed Project. It is not in close proximity to the Proposed Project, but because it involves breakwater repair in the same coastal area as the Proposed Project, it could impact coastal processes, which would be in addition to any impact on coastal processes related to coastal hazards.

4.8.6 Summary of Significance Findings

Table 4.8-5 presents a summary of the environmental impacts, significance determinations, and mitigation measures for the Proposed Project.

Table 4.8-5. Summary of Impacts and Mitigation Measures – Geology, Soils, and Coastal Processes

	Impact Significance Class				
	Phase 1		Phase 2 Post-Decom		
Impact Statement	***DCPP***	***PBR/SB***	***DCPP***	***Ops/Marina***	**Mitigation Measures**
GEO-1: Expose structures, workers, and the public to damage or injury due to surface fault rupture, strong earthquake-induced ground shaking, seismically induced slope failures, liquefaction-related phenomena, expansive or unsuitable soils	II	III/III	II	III/III	**GEO-1:** Final Engineering and Geology Report and Geotechnical Investigation **GEO-2:** Seismic Hazard and Coastal Processes Assessment of Discharge Structure Backfill
GEO-2: Trigger erosion of loosened sediments or cause slope failure due to grading, excavation, and removal of surface impervious materials	III	III/III	II	III/II	**GEO-3:** Monitoring and Reporting of Potential Subsurface Structure Exposure **HWQ-1:** Prepare and Implement Drainage Plans **HWQ-2:** Long-Term Erosion and Sediment Control Plan
GEO-3: Destroy unique paleontological resources due to grading and excavation in geologic units of Moderate to High Paleontological Sensitivity	II	II/II	II	NI/II	**GEO-4:** Prepare and Implement Paleontological Resources Monitoring and Mitigation Plan and Worker Environmental Awareness Program
GEO-4: Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater	III	NI/ NI	NI	III	None required
GEO-5: Expose structures, workers, and the public to damage or injury due to coastal hazards, including but not limited to flooding, wave runup, tsunamis, and bluff erosion and instability	II	NI/ NI	III	NI/NI	**GEO-5:** Discharge Structure Backfill and Natural Bluff Site Inspection
GEO-6: Impair nearshore sediment properties, characteristics, or processes during and after decontamination and dismantlement activities	II	NI/NI	III	NI/NI	**MBIO-3:** Water Quality Monitoring Plan **MBIO-4:** Cofferdam Installation and Dewatering Plan **MBIO-9:** Mooring Placement Habitat Survey
GEO-7: Impair coastal wave, current, or circulation patterns during and after decontamination and dismantlement activities	III	NI/ NI	III	NI/NI	None required

Table 4.8-5. Summary of Impacts and Mitigation Measures – Geology, Soils, and Coastal Processes

	Impact Significance Class				
	Phase 1		Phase 2 Post-Decom		
Impact Statement	***DCPP***	***PBR/SB***	***DCPP***	***Ops/Marina***	**Mitigation Measures**
GEO-8: Increase the effects of coastal flooding or erosion associated with sea level rise during and after decontam-ination and dismantlement activities	II	NI/NI	III	NI/NI	**GEO-5:** Discharge Structure Backfill and Natural Bluff Site Inspection
Cumulative Impact	Not cumulatively considerable		Not cumulative considerable		None required

Acronyms: PBR = Pismo Beach Railyard, SB = Betteravia Industrial Park (Santa Barbara County), Post-Decom = Post-Decommissioning, Ops = Long-Term Operations, Class I = Significant and Unavoidable, Class II = Less than Significant with Mitigation, Class III = Less than Significant, Class IV = Beneficial, NI = No Impact.