5.0 SOILS, GEOLOGY, SEISMICITY, AND MINERAL RESOURCES

This chapter summarizes the 2010 Hidden Falls Regional Park (HFRP) Certified Environmental Impact Report (EIR) soils, geology, seismicity, and mineral resources findings; describes the HFRP and proposed trail network expansion project area (project area) environmental setting and pertinent regulations; evaluates proposed project-related impacts associated with on-site geology, soils, seismic hazards, minerals, and paleontological resources; and provides mitigation measures as necessary to reduce those impacts.

5.1 SUMMARY OF COUNTY FINDINGS ON THE 2010 CERTIFIED EIR

Chapter 5, "Soils, Geology and Seismicity," of the 2010 HFRP Certified EIR included a detailed discussion of the park environmental and regulatory setting, potential impacts associated with soils, geology, and mineral resources resulting from implementation of the park project, and any needed mitigation measures to reduce these impacts.

5.1.1 FINDINGS OF FACT

The following is a summary of the 2010 EIR findings.

- Because of soil types and topography, the excavation and grading of soil could result in erosion during park construction. Preparing and implementing a Stormwater Pollution Prevention Plan (SWPPP) and Best Management Practices (BMPs), and obtaining a Regional Water Quality Control Board (RWQCB) permit to reduce the amount of soil eroding and entering area waterways and fulfilling all permit conditions, reduced this potentially significant impact to **less than significant**.

- Although risks to people from naturally occurring asbestos during park construction could expose workers to asbestos, conducting soil testing and implementing an Asbestos Dust Control Plan, if needed, reduced the potentially significant impact to **less than significant**.

- Obtaining and implementing seismic engineering design recommendations reduced potentially significant impacts on people and structures from seismic ground shaking or fault rupture to **less than significant**.

- Because construction on steep slopes would be avoided where possible and no areas of shallow slope instability and/or small landslide areas were identified in the park project area, the risks to people and structures caused by landslides was determined to be **less than significant**.

- On-site soil testing for the park project confirmed soils capable of supporting a conventional septic system; therefore, the impact was considered **less than significant**.

- The park project area is not delineated as a locally important mineral recovery site. Therefore, it was determined there was **no impact** with regard to mineral resources.

5.1.2 HFRP MITIGATION MEASURES ADOPTED BY THE COUNTY IN 2010

Implementation of the following mitigation measures, which were adopted by Placer County when the HFRP EIR was certified in 2010, reduced impacts of the project on soils, geology, and seismicity to less than significant.

- **Mitigation Measure S5-1:** Obtain Authorization for Construction and Operation Activities with the Central Valley Regional Water Quality Control Board and Implement Erosion and Sediment Control Measures as Required.

- **Mitigation Measure S5-2:** Obtain and Implement Seismic Engineering Design Recommendations.

5.2 2019 HFRP TRAILS EXPANSION PROJECT – ENVIRONMENTAL SETTING

The HFRP Trails Expansion Project Subsequent EIR describes the physical environmental conditions of the proposed trails network expansion. See Chapter 5.0 "Soils, Geology, Seismicity and Mineral Resources" of the 2010 HFRP EIR for information about the existing park.

5.2.1 PHYSIOGRAPHIC SETTING

As with the existing park, the proposed trails expansion area is located along the western slope of the Sierra Nevada Geomorphic Province. The Sierra Nevada Geomorphic Province is a tilted fault block nearly 400 miles long. Its east face is a high, rugged multiple scarp, in contrast with the western face, which slopes gently from the foothills and is buried underneath alluvial sedimentary deposits at the eastern margin of the Central Valley.

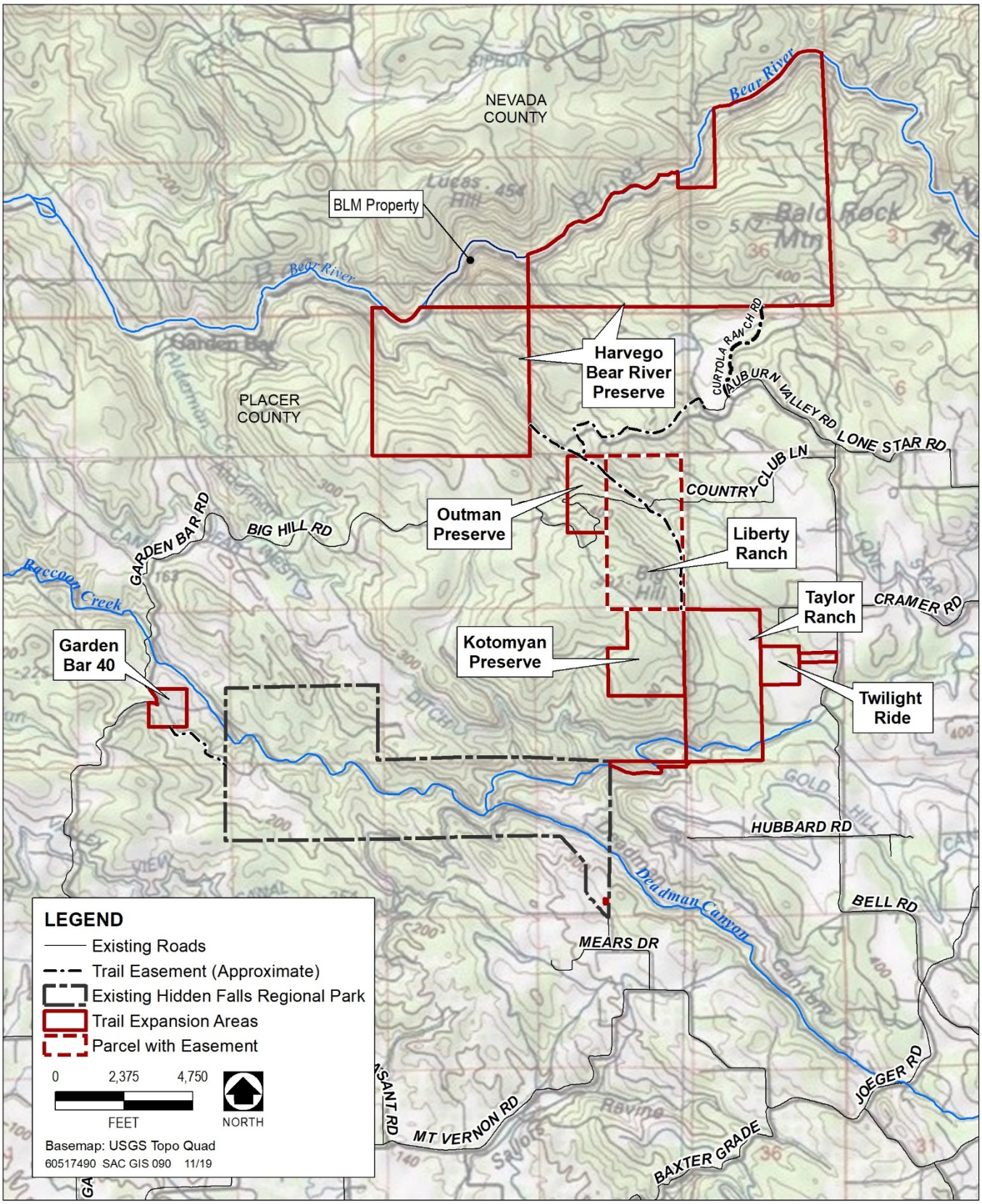
The western slope of the northern Sierra Nevada is underlain by a series of metamorphic rock assemblages that trend north-northwest to south-southeast between the Mesozoic granitics of the Sierra Nevada batholith on the east and the sediment-filled Sacramento Valley to the west. These metamorphic rocks were developed by convergent plate tectonics between the early Paleozoic era and the Late Jurassic period (400–120 million years Before Present [B.P.]) and consist of three northerly trending units bounded by faults and classified on the basis of age and lithology: the Eastern, Central, and Western metamorphic terranes. The project site is located in the Western Sierra Nevada Foothills Metamorphic Belt.

5.2.2 LOCAL GEOLOGY

TOPOGRAPHY

The trails expansion project areas are located northeast, west and east of the existing park and span across the U.S. Geological Survey (USGS) Gold Hill 7.5-minute quadrangle to the Wolf 7.5-minute quadrangle. Slope and aspect vary over the project area (Exhibit 5-1). The Harvego Preserve ranges from a low of approximately 500 feet above mean sea level (amsl) in the northwestern portion (along Bear River) to 1,694 feet amsl at Bald Rock Mountain.

The Outman Preserve ranges from 800 to 1,480 feet amsl. The northern half of the property has a generally northeast-facing aspect that slopes down to an un-named perennial stream. The southern portion of the property has a generally south-facing aspect. The majority of the Liberty Ranch extends north from the highest point on Big Hill with an elevation of 1,613 feet amsl and has a north-northeast facing aspect. The northern most third of the property, extending up from the creek bottom has a generally west-southwest facing aspect. The portion of the property extending north of the top of Big Hill drains into the Bear River. The southwest corner of the property slopes southwest from the highest point on Big Hill and eventually drains into Raccoon Creek.



Source: USGS Topo Quad Adapted by AECOM 2019

Exhibit 5-1. Project Area Topography

The Taylor Ranch and connectivity parcels to the existing HFRP range from 1,000 to 1,400 feet amsl. Running east to west, Raccoon Creek bisects the property. A little under one-quarter of the property extends south of Raccoon Creek, with the remaining majority of the property extending north from the Creek. The northern third of the property has a generally east-facing aspect and includes poorly-drained soils. The central portion of the property has a generally south-facing aspect that slopes downs to Raccoon Creek. The portion of the property on the south side of the creek is characterized by north facing slopes and large rock outcroppings. The Kotomyan Preserve ranges from approximately 1,300 to 1,500 feet amsl and the Twilight Ride parcel ranges from 1,100 to 1,200 feet amsl. The Garden Bar 40 parcel ranges from 490 to 650 feet amsl.

GEOLOGIC FORMATIONS

Based on a review of regional geologic maps (Saucedo and Wagner 1992, Gutierrez 2011), most of the project-related work areas are located in volcanic rocks of the Smartville Complex. The proposed parking and trail access at Garden Bar is located in area of pyroclastic rocks, which is also part of the Smartville Complex. These rock formations are discussed below.

Smartville Complex–Volcanic Rocks. The Smartville Complex is a Late Paleozoic to Mesozoic-age volcanic arc assemblage consisting of a mixture of sedimentary, volcanic, hypabyssal, and plutonic rocks. In the project area, volcanic rocks are present, consisting of pyroclastic and volcaniclastic rocks, pillow lavas, breccias, and massive flows.

Smartville Complex–Jurassic Volcanic Rocks. Part of the Smartville Complex, this formation consists of Jurassic-age metamorphosed mafic to felsic pyroclastic rocks, flows, and volcaniclastic rocks, along with some greywacke and meta-argillite.

5.2.3 PALEONTOLOGICAL RESOURCES

The potential paleontological sensitivity of a project area can be assessed by identifying the paleontological importance of rock units that are exposed there. A paleontologically sensitive rock formation is one that is rated high for potential paleontological productivity (i.e., the recorded abundance and types of fossil specimens, and the number of previously recorded fossil sites) and is known to have produced unique, scientifically important fossils. Exposures of a specific rock formation at any given project site are most likely to yield fossil remains representing particular species or quantities similar to those previously recorded from the rock formation in other locations. Therefore, the paleontological sensitivity determination of a rock formation is based primarily on the types and numbers of fossils that have been previously recorded from that rock unit.

An individual vertebrate fossil specimen may be considered unique or significant if it is identifiable and well preserved, and it meets one of the following criteria:

- a type specimen (i.e., the individual from which a species or subspecies has been described);
- a member of a rare species;
- a species that is part of a diverse assemblage (i.e., a site where more than one fossil has been discovered) wherein other species are also identifiable, and important information regarding life history of individuals can be drawn;

- a skeletal element different from, or a specimen more complete than, those now available for its species; or
- a complete specimen (i.e., all or substantially all of the entire skeleton is present).

The value or importance of different fossil groups varies depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions (such as for a research project). Marine invertebrates are generally common; the fossil record is well developed and well documented, and they would generally not be considered a unique paleontological resource. Identifiable vertebrate marine and terrestrial fossils are generally considered scientifically important because they are relatively rare.

In its standard guidelines for assessment and mitigation of adverse impacts on paleontological resources, the Society of Vertebrate Paleontology (1996) established three categories of sensitivity for paleontological resources: high, low, and undetermined. Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. Areas that are not sedimentary in origin and that have not been known to produce fossils in the past typically are considered to have low sensitivity. Areas that have not had any previous paleontological resource surveys or fossil finds are considered to be of undetermined sensitivity until surveys and mapping are performed to determine their sensitivity. In keeping with the SVP significance criteria, all vertebrate fossils are generally categorized as being of potentially significant scientific value.

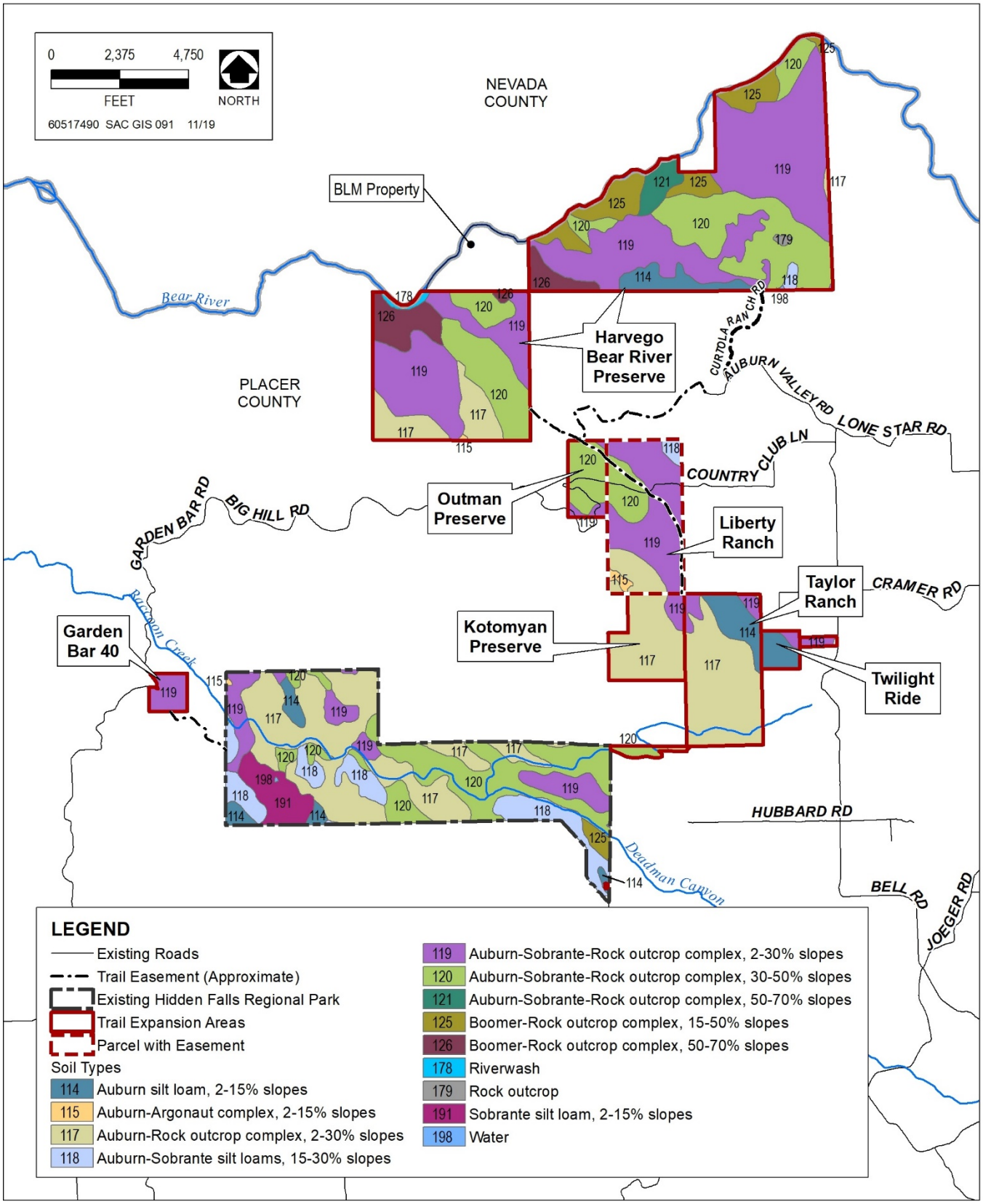
As discussed above, the project-related work areas are located in Late Paleozoic to Mesozoic volcanic and metavolcanic rocks, which are part of the Smartville Complex. These types of rocks have a low potential for sensitivity.

5.2.4 SOIL RESOURCES

Maps provided by the U.S. Natural Resources Conservation Service (NRCS) were reviewed to identify the distribution of soil types in the project area. Exhibit 5-2 provides a detailed map of the surficial soils in the project area. The physical and chemical characteristics of each soil type identified in the project area are presented below (NRCS 2018).

114 Auburn silt loam, 2–15% slopes—This soil is shallow and undulating to rolling. It is well drained and underlain by vertically tilted metamorphic rock. The soil forms in residuum on foothills. Typically, the surface layer is strong brown silt loam about 4 inches thick over yellowish-red silt loam subsoil. The erosion hazard for this soil is slight to moderate. This soil is used mainly for irrigated pasture and rangeland because of its shallowness.

115 Auburn-argonaut complex, 2–15% slopes—These soils are undulating to rolling and located on broad slopes, in swales, and on concave foot slopes of metamorphic rock foothills. The Auburn soil is shallow and well drained and forms in residuum from vertically tilted basic schist and slate. This soil's surface layer is typically strong brown silt loam about 4 inches thick over yellowish-red silt loam subsoil with basic schist at a depth of 20 inches. The soil erosion hazard for Auburn soil is slight to moderate. The Argonaut soil is moderately deep and well drained and forms in residuum from metabasic rock. Typically, this soil's surface layer is strong brown loam and yellowish-red silt loam about 9 inches thick over yellowish-red clay loam with weathered basic schist at a depth of 25 inches. The soil erosion hazard for Argonaut soil is slight to moderate. Most of these soils are used for annual grassland and some irrigated pasture.



Source: U.S. Natural Resources Conservation Service 2018

Exhibit 5-2. Soil Types in the Project Area

117 Auburn–rock outcrop, 2–30% slopes—These soils are undulating to hilly and rock outcrops are found on rocky side slopes of metamorphic rock hills. Typically, the Auburn soil surface layer is strong brown silt loam about 4 inches thick over yellowish-red silt loam subsoil with weather basic schist at a depth of 20 inches. Auburn soil is well drained and forms in residuum from vertically tilted metabasic bedrock. The erosion hazard for Auburn soil is slight to high. Rock outcrops consist of hard metamorphic rock that can reach 1–2 feet in height and cover up to 100 square feet. Surface runoff for rock outcrops is very rapid and there is no erosion hazard. Most of this soil is used for annual rangeland.

118 Auburn–Sobrante silt loams, 15–30% slopes—These hilly soils form on metamorphic rock foothills. The Auburn soil is shallow and well drained and forms in residuum from vertically tilted metabasic outcrop. Typically, the Auburn surface layer is strong brown silt loam about 4 inches thick over yellowish-red silt loam subsoil with weathered basic schist at a depth of 20 inches. The erosion hazard for Auburn soil is moderate to high. The Sobrante soil is moderately deep and well drained and forms in residuum from metabasic rock. Typically, the Sobrante soil surface layer is yellowish-red silt loam about 7 inches thick over yellowish-red silt and heavy loam subsoil with weathered basic schist at a depth of 33 inches. The erosion hazard for Sobrante soil is slight to high. This soil is used mostly for deciduous orchards and irrigated pasture.

119 Auburn–Sobrante–rock outcrop complex, 2–30% slopes—These undulating to hilly soils form on rock side slopes of metamorphic rock foothills. The Auburn soil is shallow and well drained and forms in residuum from vertically tilted metabasic bedrock. Typically, the Auburn soil surface layer is strong brown silt loam about 4 inches thick over yellowish-red silt loam subsoil with weathered basic schist at a depth of 20 inches. The erosion hazard for Auburn soil is slight to high. The Sobrante soil is moderately deep and well drained and forms in residuum from metabasic rock. Typically, the Sobrante soil surface layer is yellowish-red silt loam about 7 inches thick over yellowish-red silt and heavy loam subsoil with weathered basic schist at a depth of 33 inches.

The erosion hazard for Sobrante soil is slight to high. Rock outcrop consists of hard metamorphic rock that can reach 1 to 2 feet in height and cover up to 500 square feet. Surface runoff for rock outcrop is very rapid and there is no erosion hazard. These soils are mostly used for deciduous orchards and irrigated pasture.

120 Auburn–Sobrante–rock outcrop complex, 30–50% slopes—These steep soils form on rocky canyon sides of metamorphic rock foothills. The Auburn soil is shallow and well drained and forms in residuum from vertically tilted metabasic bedrock. Typically, the Auburn soil surface layer is strong brown silt loam about 4 inches thick over yellowish-red silt loam subsoil with weathered basic schist at a depth of 20 inches. The erosion hazard for Auburn is slight to high. The Sobrante soil is moderately deep and well drained and forms in residuum from metabasic rock. Typically, the Sobrante soil surface layer is yellowish red silt loam about 7 inches thick over yellowish-red silt and heavy loam subsoil with weathered basic schist at a depth of 33 inches. The erosion hazard for Sobrante is slight to high. Rock outcrops consist of hard metamorphic rock that can reach 1–2 feet in height and cover up to 500 square feet. Surface runoff for rock outcrop is very rapid and there is no erosion hazard. These soils are mostly used for annual rangeland and watershed.

121 Auburn-sobrante-rock outcrop complex, 50–70% slopes—This soil occurs on very steep soils and on rocky canyons of major drainageways in metamorphic foothills. Typically, the surface layer is brown silt loam about 4 inches thick and the subsoil is yellowish red silt loam. Surface runoff is very rapid and there is no erosion hazard. This unit is used mainly for watershed purposes and has limited grazing value.

125 Boomer–rock outcrop, 15–50% slopes—This steep soil and rock outcrop are found on rocky side slopes of mountainous uplands. Typically, the Boomer soil surface layer is brown and yellowish-red gravelly loam about 10 inches thick over reddish-yellow gravelly clay loam subsoil with weather basic schist at a depth of 58 inches. Boomer soil is well drained and deep over weathered metabasic rock and forms in the residuum from amphibolite schist or meta-andesite. The erosion hazard for Boomer soil is high. Rock outcrops consist of areas of scattered hard metamorphic rock that can reach 2–5 feet in height and cover up to 500 square feet. Surface runoff for rock outcrops is very rapid and there is no erosion hazard. Most of this soil is used for wood crops.

126 Boomer-rock outcrop complex, 50–70% slopes—This soil occurs on rocky canyons of mountainous uplands. Typically, the surface layer is brown and yellowish red gravelly loam about 10 inches thick and the subsoil is reddish yellow gravelly clay loam. The Boomer soil is well drained and is deep over weathered metabasic rock. The erosion hazard for this soil is high. This unit is used for wood crops and watershed and is suited to ponderosa pine production. The major limitation to timber production are steep slopes.

178 Riverwash—Riverwash occurs in and along channels of the Bear River. It is highly stratified stony and bouldery sand that is typically barren. It is inundated yearly by floodwater. About 50 percent of it is covered with water. Riverwash is subject to scouring or cutting as well as to deposition, depending on riverflow and bedload. Included are areas of tailings. Permeability is very rapid. The available water capacity and drainage are variable. Surface runoff is rapid. Riverwash is used for watershed. It also provides good habitat for wildlife.

179 Rock outcrop—Rock outcrop occurs on the rocky side slopes and canyons of mountainous uplands at elevations of 1,000 to 2,000 feet. Rock outcrop consists of scattered hard metamorphic rock, generally ranging in height from 1 to 5 feet. Surface runoff is rapid and there is no erosion hazard. Typically rock outcrop does not appreciably affect the use of surrounding soil units for grazing or timber production. However, it poses substantial limitations for construction of structures and infrastructure.

191 Sobrante silt loam, 2–15% slopes—This soil is moderately deep, undulating to rolling, and well drained. It is underlain by weathered metabasic rock and forms in residuum on foothills. Typically, the surface layer is yellowish-red silt loam about 7 inches thick over yellowish-red silt loam subsoil with highly weathered basic schist at a depth of 33 inches. The erosion hazard for this soil is slight to moderate. This soil is used mostly for deciduous orchards and irrigated pasture.

SHRINK-SWELL POTENTIAL

Shrink-swell potential is the amount of volume change related to a loss or gain in soil moisture; soils swell when wet and shrink when dry. If the shrink-swell potential is rated moderate to high, volume changes can eventually result in damage to subsurface structures if they are not designed and constructed appropriately to resist the changing soil conditions. Soils with high clay content tend to be most affected by shrink and swell. The potential for soil to undergo shrink and swell is greatly enhanced by the presence of a fluctuating, shallow groundwater table. Volume changes of expansive soils can result in the consolidation of soft clays after the water table drops or fill is placed. Project area soils are underlain by bedrock at a shallow depth (NRCS 2018). Therefore, the soils have a low expansion potential.

SOIL SUITABILITY FOR SEPTIC SYSTEMS

For a septic system to function properly, soils must percolate (or "perc")—that is, a certain volume of wastewater must flow through the soil in a certain time period, as determined by a licensed qualified consultant. Wastewater is "treated" as soil bacteria feed on the waste material and in the process, break down the material into more basic elements that are dispersed into the lower layers of the soil horizon. If wastewater percolates through the soil too quickly, the bacteria do not have enough time to digest the material. On the other hand, if wastewater percolates through the soil too slowly, the bacteria are killed by the lack of oxygen.

Soils in the HFRP Trail Expansion area consist of a shallow soil horizon underlain by bedrock. Therefore, NRCS (2018) has rated the soils as very limited for use with septic systems. This generally means that project site soils are unsuitable for conventional septic systems, and specifically engineered systems would have to be designed, permitted, and implemented.

Soil tests are used to identify the drainage characteristics of the soil, the seasonal high water table, and the depth of the "limiting zone," where the soil is unsuitable for treating sewage. Soil mantel testing and percolation testing conducted in 2019 at the proposed parking lots on the Twilight Ride, Garden Bar 40, and Harvego Preserve entries found areas suitable for use of engineered septic systems at each study location (with sufficient areas for replacement septic fields, should the primary septic fields ever need to be decommissioned) (Lindbloom 2019). The average percolation rate for the Twilight Ride was 28 minutes per inch of drop (mpi) at a depth of 17 to 20 inches. Soils at the proposed Harvego Preserve parking area percolated at a rate of 15 mpi at a depth of 12 to 24 inches, while the percolation rate at Garden Bar 40 was 28 mpi at a depth of 20 to 28 inches.

5.2.3 RECREATIONAL GEOLOGIC FEATURES

Recreational geologic resources typically include volcanoes, surface hydrothermal features, or surface expressions of geologic features unique enough to generate recreational interest in the general public (e.g., natural bridges, caves, features associated with glaciation, and geomorphic features such as waterfalls, cliffs, canyons, and badlands). The southeastern-most portion of the project area contains rock outcroppings. These rock outcroppings could be considered a recreational geologic resource for the project area.

5.2.5 REGIONAL SEISMICITY AND FAULT ZONES

The project area is not located within or near an Alquist-Priolo Earthquake Fault Zone (California Geological Survey [CGS] 2017). The Placer County foothills are traversed by a series of northwest-trending faults, called the Foothills Fault Zone. The Bear Mountains Fault Zone is the westernmost strand of the Foothills Fault Zone in the Western Sierra Metamorphic Belt. Based on a review of the *2010 California Fault Activity Map* (Jennings and Bryant 2010), the northern end of the Deadman Fault (in the Bear Mountains Fault Zone) crosses through the eastern portion of the expansion project area. The Deadman Fault has shown evidence of activity during the last 700,000 years (i.e., the Late Quaternary), and therefore is considered potentially active.

The closest active fault to the project area is the Cleveland Hills fault, approximately 36 miles to the northwest. In 1975, a magnitude 5.7 earthquake occurred along this fault, south of Lake Oroville. However, subsequent research conducted by the California Department of Water Resources (DWR) indicated that the earthquake mostly likely resulted from reservoir-induced stress (DWR 1979). The eastern portion of Placer County around Lake Tahoe contains several active and potentially active faults; however, these faults are approximately 57 miles east

of the project site. The western portion of Placer County, where the project site is located, has generally not been seismically active (Jennings and Bryant 2010).

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is fault ground rupture, also called surface faulting. Surface ground rupture along faults is generally limited to a linear zone a few meters wide. Common secondary seismic hazards include ground shaking, liquefaction, and subsidence. These hazards are discussed below.

SEISMIC GROUND SHAKING

The most important geologic hazard that could affect the project area is the risk to life and property from an earthquake generated by potentially active faults in the foothills fault system.

Peak horizontal ground acceleration (PGA), which is a measure of the projected intensity of ground shaking from seismic events, can be estimated by probabilistic method using a computer model. The CGS Probabilistic Seismic Hazards Assessment Model (CGS 2008) indicates there is a 1-in-10 probability that an earthquake within 50 years would result in a PGA of approximately 0.140. This estimate indicates that a very low level of seismic shaking would be anticipated in the project area.

GROUND FAILURE/LIQUEFACTION

Soil liquefaction occurs when ground shaking from an earthquake causes a sediment layer saturated with groundwater to lose strength and take on the characteristics of a fluid, thereby becoming similar to quicksand. Factors determining liquefaction potential are soil type, level and duration of ground motions, and depth to groundwater. Liquefaction is most likely to occur in low-lying areas with a shallow groundwater table, where the substrate consists of poorly consolidated to unconsolidated water-saturated sediments, recent Holocene-age sediments, or deposits of artificial fill. One consequence that may result from the occurrence of liquefaction is an associated surface expression. If a seismic event occurs over an extended duration, the liquefied soils may migrate toward the surface, resulting in ejection and subsequent sand boiling at the surface.

Liquefaction poses a hazard to engineered structures. Factors determining the liquefaction potential of a given site are the level and duration of possible seismic ground motions, the type and consistency of soils, and the depth to groundwater. Loose sands and peat deposits are susceptible to liquefaction. Liquefaction is particularly likely where land has been reclaimed from inundated areas by filling with loose sand. Clayey silts, silty clays, and clays deposited in freshwater environments are generally stable under the influence of seismic ground shaking.

Because the project-related work areas are located in Late Paleozoic to Mesozoic age bedrock, the project would not be susceptible to ground failure or liquefaction.

SUBSIDENCE AND LATERAL SPREADING

Subsidence of the land surface can be induced by tectonic deformations and seismically-induced settlements.

Lateral spreading is the horizontal movement or spreading of soil toward an open face, such as a streambank, the open side of fill embankments, or the sides of levees. The potential for failure from lateral spreading is highest in areas where there is a high groundwater table, where there are relatively soft and recent alluvial deposits, and where creek banks are relatively high.

The project area is underlain by consolidated volcanic and metavolcanic rocks; therefore, the project area is not considered susceptible to subsidence or lateral spreading.

LANDSLIDING AND SLOPE STABILITY

A landslide is the downslope movement of soil and rock material under the influence of gravity. The potential for landslide occurrence depends on several factors: steepness of slopes, amount of rainfall, vegetation type, proximity to areas undergoing active erosion, seismic ground shaking, and proximity of earthmoving activities to slopes. Some slopes within the project area could be prone to sliding or slumping because gradients reach 70% in some areas. Two soil types in the project area—Auburn–Sobrante–rock outcrop complex and Boomer–rock outcrop—occur on slopes up to 70%.

5.2.6 NATURALLY OCCURRING ASBESTOS

Asbestiform minerals occur naturally in rock and soil as the result of natural geologic processes, often in veins near earthquake faults in the Coast Range and the foothills of the Sierra Nevada. Naturally occurring asbestos can take the form of long, thin, separable fibers. Natural weathering or human disturbance can break naturally occurring asbestos down to microscopic fibers that are easily suspended in air.

There is no health threat if asbestos fibers in soil remain undisturbed and do not become airborne. When inhaled, however, these thin fibers irritate tissues and resist the body's natural defenses. Asbestos, a known carcinogen, causes cancers of the lung and the lining of internal organs, as well as asbestosis and other diseases that inhibit lung function.

The California Geological Survey of the California Department of Conservation (DOC) completed a special report in 2006 that studies the likelihood for the presence of naturally occurring asbestos in Placer County. According to this special report, the project area is located in an area moderately likely to contain naturally occurring asbestos (DOC 2006).

The potential presence of and hazards posed by naturally occurring asbestos are discussed in greater detail in Section 9.2.3, "Existing Air Quality—Toxic Air Contaminants," in Chapter 9.0, "Air Quality."

5.3 REGULATORY SETTING

FEDERAL EARTHQUAKE HAZARDS REDUCTION ACT

In October 1977, the U.S. Congress passed the Earthquake Hazards Reduction Act to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in October 2004 by the National Earthquake Hazards Reduction Program Act (NEHRPA), which refined the description of agency responsibilities and program goals and objectives.

The NEHRP's mission includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improved building codes and land use practices; risk reduction through postearthquake investigations and education; development and improvement of design and construction techniques; improved mitigation capacity; and accelerated application of research results. The NEHRPA designates the Federal

Emergency Management Agency as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Other NEHRPA agencies are the National Institute of Standards and Technology, the National Science Foundation, and USGS.

5.3.1 STATE PLANS, POLICIES, REGULATIONS, AND LAWS

CALIFORNIA BUILDING STANDARDS CODE

The State of California provides minimum standards for building design through the California Building Standards Code (CBC) (Title 24 of the California Code of Regulations). Where no other building codes apply, Chapter 29 of the CBC regulates excavation, foundations, and retaining walls. The CBC also applies to building design and construction in the state and is based on the federal Uniform Building Code, which is used widely throughout the country and generally adopted on a state-by-state or district-by-district basis. The CBC has been modified for California conditions with numerous more detailed and/or more stringent regulations.

The state earthquake protection law (California Health and Safety Code Section 19100 et seq.) requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. The CBC requires that any structure designed for a project site undergo a seismic-design evaluation that assigns the structure to one of six categories, A–F; Category F structures require the most earthquake-resistant design. The CBC philosophy focuses on “collapse prevention,” meaning that structures are to be designed to prevent collapse during the maximum level of ground shaking that could reasonably be expected to occur at a site. CBC Chapter 16 specifies exactly how each seismic-design category is to be determined on a site-specific basis, based on site-specific soil characteristics and proximity to potential seismic hazards.

Chapter 18 of the CBC regulates the excavation of foundations and retaining walls, as well as the preparation of a preliminary soil report, engineering geologic report, geotechnical report, and supplemental ground-response report. Chapter 18 also regulates the analysis of expansive soils and the determination of depth to the groundwater table. For structures in Seismic Design Category C, Chapter 18 requires analysis of slope instability, liquefaction, and surface rupture attributable to faulting or lateral spreading. For structures in Seismic Design Categories D, E, and F, Chapter 18 requires these same analyses plus an evaluation of lateral pressures on basement and retaining walls, liquefaction and loss of soil strength, and lateral movement or reduction of the foundation’s soil-bearing capacity.

Chapter 18 also requires that mitigation measures be considered in structural design. Mitigation measures may include stabilizing the ground, selecting appropriate foundation types and depths, selecting appropriate structural systems to accommodate anticipated displacements, or using any combination of these measures. The potential for liquefaction and soil strength loss must be evaluated for site-specific peak-ground-acceleration magnitudes and source characteristics consistent with the design earthquake ground motions. The peak ground acceleration must be determined in a site-specific study, the contents of which are specified in CBC Chapter 18.

Finally, Appendix J of the CBC regulates grading activities, including drainage and erosion control and construction on expansive soils, areas subject to liquefaction, and other unstable soils.

CALIFORNIA SEISMIC HAZARDS MAPPING ACT

The California Seismic Hazards Mapping Act of 1990 (Public Resources Code Sections 2690–2699.6) addresses seismic hazards other than surface rupture, such as liquefaction and induced landslides. The Seismic Hazards Mapping Act specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

ALQUIST-PRIOLO FAULT ZONING ACT

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code Sections 2621–2630) was passed by the California Legislature in 1972 to mitigate the hazard of surface faulting to structures. The main purpose of the act is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The act addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. Local agencies must regulate most development in fault zones established by the State Geologist. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.

ASBESTOS AIRBORNE TOXIC CONTROL MEASURE

The California Air Resources Board has promulgated an Asbestos Airborne Toxic Control Measure (AATCM) for Construction, Grading, Quarrying, and Surface Mining Operations (California Code of Regulations Title 17, Section 93105). In accordance with Section 39666(d) of the California Health and Safety Code, the AATCM became enforceable by the air quality management districts (AQMDs) on November 19, 2002. In general, the AATCM specifies that an asbestos dust mitigation plan must include the following measures:

- measures for preventing vehicle track-out;
- measures for wetting or covering of active storage piles;
- controls for inactive disturbed areas and storage piles;
- control of traffic on on-site unpaved roads, parking lots, and staging areas;
- controls for earthmoving activities;
- control of off-site transport;
- post-construction stabilization measures;
- ambient air monitoring, if required by the air pollution control officer, and reporting of any results; and
- recordkeeping and reporting requirements.

5.3.2 LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

PLACER COUNTY GRADING ORDINANCE

The grading and erosion prevention ordinance of Placer County, referred to herein as the County Grading Ordinance) (Article 15.48 of the County Code) regulates grading on property within the unincorporated areas of Placer County.

The County Grading Ordinance requires project applicants to obtain a grading permit depending on the amount of soil disturbance. In Placer County, any fill or excavation of greater than 250 cubic yards (equivalent to approximately 15 truck and transfers) or cuts or fills over 4 feet in depth requires a grading permit. As part of the

permit process, applicants must submit grading plans, a drainage report, and (where projects would disturb more than 1 acre of land) evidence of coverage under the National Pollutant Discharge Elimination System (NPDES) Construction General Permit. A site-specific geotechnical report is also required in areas where any of the following conditions are present: cut-and-fill would exceed a depth of 10 feet; areas where expansive soils are present; or areas of known or suspected geological hazards, including landslide hazards and hazards of ground failure stemming from seismically-induced ground shaking.

PLACER COUNTY GENERAL PLAN

The County's General Plan describes assumptions, goals, and planning principles that provide a framework for land use decisions throughout the County. The following are the relevant goals and policies identified in the 2013 General Plan for soils, geology, seismicity, and paleontological resources.

GOAL 8.A: To minimize the loss of life, injury, and property damage due to seismic and geological hazards.

- **Policy 8.A.1.** The County shall require the preparation of a soils engineering and geologic-seismic analysis prior to permitting development in areas prone to geological or seismic hazards (i.e., ground shaking, landslides, liquefaction, critically expansive soils, avalanche).
- **Policy 8.A.4.** The County shall ensure that areas of slope instability are adequately investigated and that any development in these areas incorporates appropriate design provisions to prevent landsliding.
- **Policy 8.A.5.** In landslide hazard areas, the County shall prohibit avoidable alteration of land in a manner that could increase the hazard, including concentration of water through drainage, irrigation, or septic systems; removal of vegetative cover; and steepening of slopes and undercutting the bases of slopes.
- **Policy 8.A.6.** The County shall require the preparation of drainage plans for development in hillside areas that direct runoff and drainage away from unstable slopes.
- **Policy 8.A.9.** The County shall require that the location and/or design of any new buildings, facilities, or other development in areas subject to earthquake activity minimize exposure to danger from fault rupture or creep.
- **Policy 8.A.10.** The County shall require that new structures permitted in areas of high liquefaction potential be sited, designed, and constructed to minimize the dangers from damage due to earthquake-induced liquefaction.
- **Policy 8.A.11.** The County shall limit development in areas of steep or unstable slopes to minimize hazards caused by landslides or liquefaction.

GOAL 5.D: To identify, protect, and enhance Placer County's important historical, archaeological, paleontological, and cultural sites and their contributing environment.

- **Policy 5.D.2.** The County shall solicit the cooperation of the owners of cultural and paleontological resources, encourage those owners to treat these resources as assets rather than liabilities, and encourage the support of the general public for the preservation and enhancement of these resources.

- **Policy 5.D.6.** The County shall require that discretionary development projects identify and protect from damage, destruction, and abuse, important historical, archaeological, paleontological, and cultural sites and their contributing environment. Such assessments shall be incorporated into a Countywide cultural resource data base, to be maintained by the Division of Museums.

- **Policy 5.D.7.** The County shall require that discretionary development projects are designed to avoid potential impacts to significant paleontological or cultural resources whenever possible. Unavoidable impacts, whenever possible, shall be reduced to a less than significant level and/or shall be mitigated by extracting maximum recoverable data. Determinations of impacts, significance, and mitigation shall be made by qualified archaeological (in consultation with recognized local Native American groups), historical, or paleontological consultants, depending on the type of resource in question.

5.4 IMPACTS

5.4.1 ANALYSIS METHODOLOGY

The focus of this analysis considers how the trail expansion areas would or would not change the conclusions of the prior environmental review. Evaluation of potential impacts on soils, geology, seismicity, and paleontology was based on a field review of the project area; review of geologic maps; and review of published and unpublished geologic and paleontologic literature. Impacts related to soils, geology, seismicity and paleontological resources that would result from implementation of the proposed project have been identified by comparing existing data and environmental information with proposed project features.

5.4.2 THRESHOLDS OF SIGNIFICANCE

CEQA THRESHOLDS

Based on the Placer County CEQA checklist and the State CEQA Guidelines, the proposed project would result in a significant impact related to soils, geology, seismicity, and mineral resources if it would:

- directly or indirectly expose people or structures to potential 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;

- be susceptible to strong seismic ground shaking;

- be susceptible to seismic-related ground failure, including liquefaction, landslides;

- 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, creating substantial direct or indirect risks to life or property;

- 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; or
- directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

ISSUES NOT ANALYZED FURTHER

The proposed project would have no impact associated with the following issues, and these issues will not be analyzed further in this chapter:

- **Ground Failure/Liquefaction:** The project area is underlain by consolidated volcanic and metavolcanic rocks that are not susceptible to liquefaction. In addition, regional groundwater levels are expected to be greater than 50 feet in depth. Therefore, the potential for liquefaction is low.
- **Subsidence and Lateral Spreading:** The project area is underlain by consolidated volcanic and metavolcanic rocks that are not susceptible to liquefaction. In addition, regional groundwater levels are expected to be greater than 50 feet in depth. Therefore, the risk of subsidence and lateral spreading is low.
- **Expansive Soils:** The soils in the project area are underlain at shallow depth by bedrock. Thus, they have a low shrink-swell potential and are, therefore, not expansive.
- **Mineral Resources:** The proposed HFRP trail expansion will travel across land that is under conservation easement that restricts activity to a list of approved actions. Mining is not an approved use, the site is not in an area designates as valuable mineral area, and there are no active mines on the site.
- **Paleontological Resources:** The project-related work areas are underlain by Late Paleozoic and Mesozoic age volcanic and metavolanic rocks that are part of the Smartville Complex. Because of the way these rocks were formed, under conditions of high temperature and pressure underneath the earth's surface and/or ejected as magma from volcanic eruptions, they do not contain fossils. Therefore, project-related earthmoving activities would have no impact on unique paleontological resources.
- **Unique Geologic Features:** The project area contains unique geologic features such as scenic rock outcroppings, streams, waterfalls, and canyons that would form the backdrop to views along the proposed trail system. New trails would be designed to blend in with the surrounding scenery and would be sited to provide vistas of these geologic features for recreationists. The siting of overlooks would occur such that unique formations are avoided. New structures in the form of restrooms, and trailhead parking would not be located in areas that contain unique geologic features.

5.4.3 IMPACT ANALYSIS

IMPACT 5-1	Soils, Geology, and Seismicity—Construction- and Operation-Related Erosion Hazards. *Based on soil types and topography, the excavation and grading of soil could result in erosion during construction, particularly during periods of strong winds or storm events. In addition, use and maintenance of the project area could result in erosion over time. However preparing and implementing a SWPPP and Best Management Practices (BMPs)as part of a project-specific Central Valley Regional Water Quality Control Board (RWQCB) permit to reduce the amount of soil eroding and entering area waterways, would reduce to these potential impacts to* ***less-than-significant****.*
Significance	*Potentially Significant (No new significant impact relative to prior analysis in the 2010 Certified EIR)*
Mitigation Proposed	*Mitigation Measure S5-1: Obtain Authorization for Construction and Operation Activities from the Central Valley Regional Water Quality Control Board and Implement Erosion and Sediment Control Measures as Required*
Residual Significance	*Less than Significant*

2010 HFRP Certified EIR Impact Summary

Because of soil types in the park and park area topography, the potential for erosion was considered to be high. Earthwork such as the excavation and grading of soil during construction of parking lot, access driveway or improvements along Garden Bar Road and other related improvements could result in erosion. In addition, use of the trails and other park facilities will wear the surface material and maintenance related activity within the park could cause long-term erosion. Mitigation Measure 5-1 required the County to obtain authorization for construction and operation activities from the Central Valley Regional Water Quality Board and implement erosion and sediment control measures as required, including stormwater, construction, and post-development BMPs, to reduce the amount of soil eroding and entering area waterways. With the implementation of Mitigation Measure 5-1, the County found that impact of soil erosion would be reduced by the use of BMPs contained in the permit to **less than significant** levels.

2019 HFRP Trails Expansion Project Impact Analysis

Rock outcrop complexes located in the project area are characterized as having no erosion potential. However, the various soil types (i.e., Auburn, Argonaut, Boomer, Sobrante) in the project area are characterized as having slight to high erosion hazards. Grading activity requiring use of heavy equipment would occur at locations where new structures are planned, such as the parking lots, restrooms, bridges and overlooks. Construction of the proposed trail network would occur by use of small gas-powered machinery (i.e., SWECO Dozers) as well as hand tools including rakes, picks and shovels.

The topography of the access and parking areas exposed to grading and earthwork is relatively flat to gently rolling so disturbance in these areas are limited. The areas near Racoon Creek planned for improvement including bridges and overlooks would require more substantial excavations (Refer to Exhibits 5-3 through 5-6).

The Racoon Creek channel is very irregular and contains many boulders, overgrown banks, and steep vertical drops. Upstream of the bridge sites the channel is wide and shallow with slow moving water. The proposed bridge location along Racoon Creek is a narrow "pinch point" where the channel has been eroded to bedrock (Carlton Engineering 2012). Structures proposed in these locations must be constructed on foundations or bridge abutments designed to protect against scour and erosion and anchored into the bedrock. Refer to Section 11.0 "Hydrology" for more information.

The volume of earthwork required to implement the project is estimated in Table 5-1. All ground disturbing activities could result in localized erosion during construction by removing vegetative cover and exposing disturbed areas to wind and storm events. Sedimentation in Racoon Creek could impede beneficial uses and harm the water quality. Without implementation of measures to control erosion of soil would be potentially significant.

Table 5-1. Soil Grading Amounts by Facility Type

Project Facility	Grading Activity	
	Soil Volume (Cubic Yards)	Permanent Footprint (Acreage)
Road Improvements/On-Site Facilities		
Harvego Preserve Park Entry, Access Road, and Parking Areas[1]	5,210	7.20
Mears Road Parking Lot	493	0.3
Garden Bar 40 Park Entry, Access Road, and Parking Areas [2]	5,965	1.4
Twilight Ride Park Entry, Access Road, and Parking Areas [1]	19,626	4.4
Multi-Use Trails (Includes Bridges[3]/Overlooks)	-	7.7
Total	**31,294**	**21**

Source: Helix 2019, AECOM

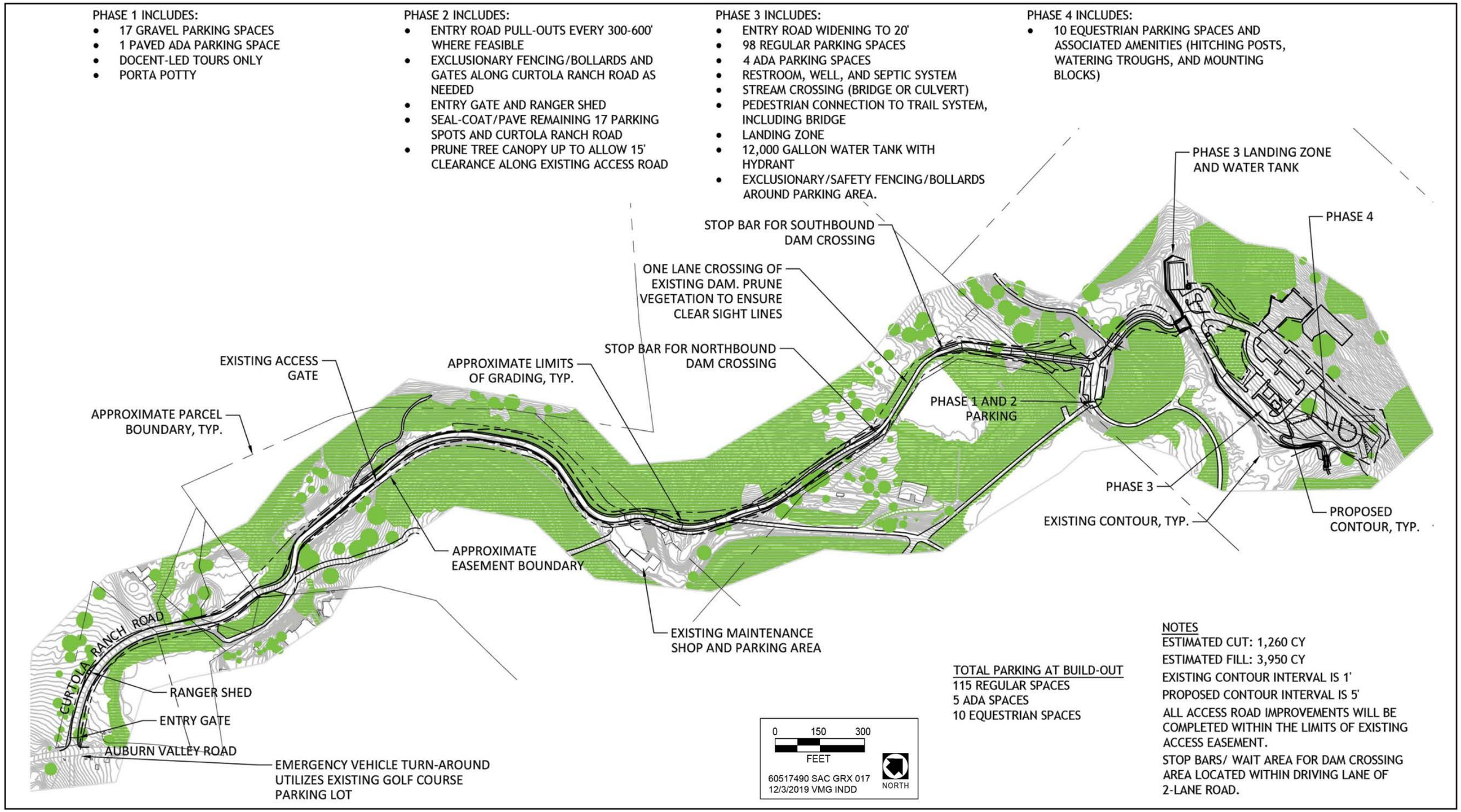
[1] Acreage includes parking access road, access road bridges/culverts, parking, helipad, water tank and septic system.

[2] Acreage Includes parking, water tank, septic system and new access road.

[3] For 2 new bridges across Raccoon Creek

Natural surface trails would be constructed using smaller equipment and hand tools except at the proposed bridge location where abutments would require excavation with larger machinery. Soil generated by full-bench trail excavation would be side cast below the location of excavation, eliminating the need for soil export. Soil would be directed away from tree trunks. Trail construction features would include grade reversals and out sloping, as well as BMPs to prevent erosion, such as preservation of existing vegetative buffer, rock-protected outfalls, and topical seeding/straw mulch application. Inclusion of these design features have been shown to be effective in erosion prevention and trail stability at the existing park.

Long term maintenance is required to support improved structures and trail network. The proposed trail system would be maintained as a natural-surface trail system that would increase the amount of soil exposed to wind and water erosion, and use of the trails by hikers, bikers, and equestrians could cause some long-term erosion. Regular maintenance in the project area in areas of exposed soil could also cause erosion during operation of the park. Mitigation Measure S5-1would reduce construction- and operation-related erosion hazards resulting from park and project area implementation to **a less-than-significant** level.



Source: Data provided by Helix and adopted by AECOM in December 2019

Exhibit 5-3. Proposed Grading at Harvego Preserve Entry

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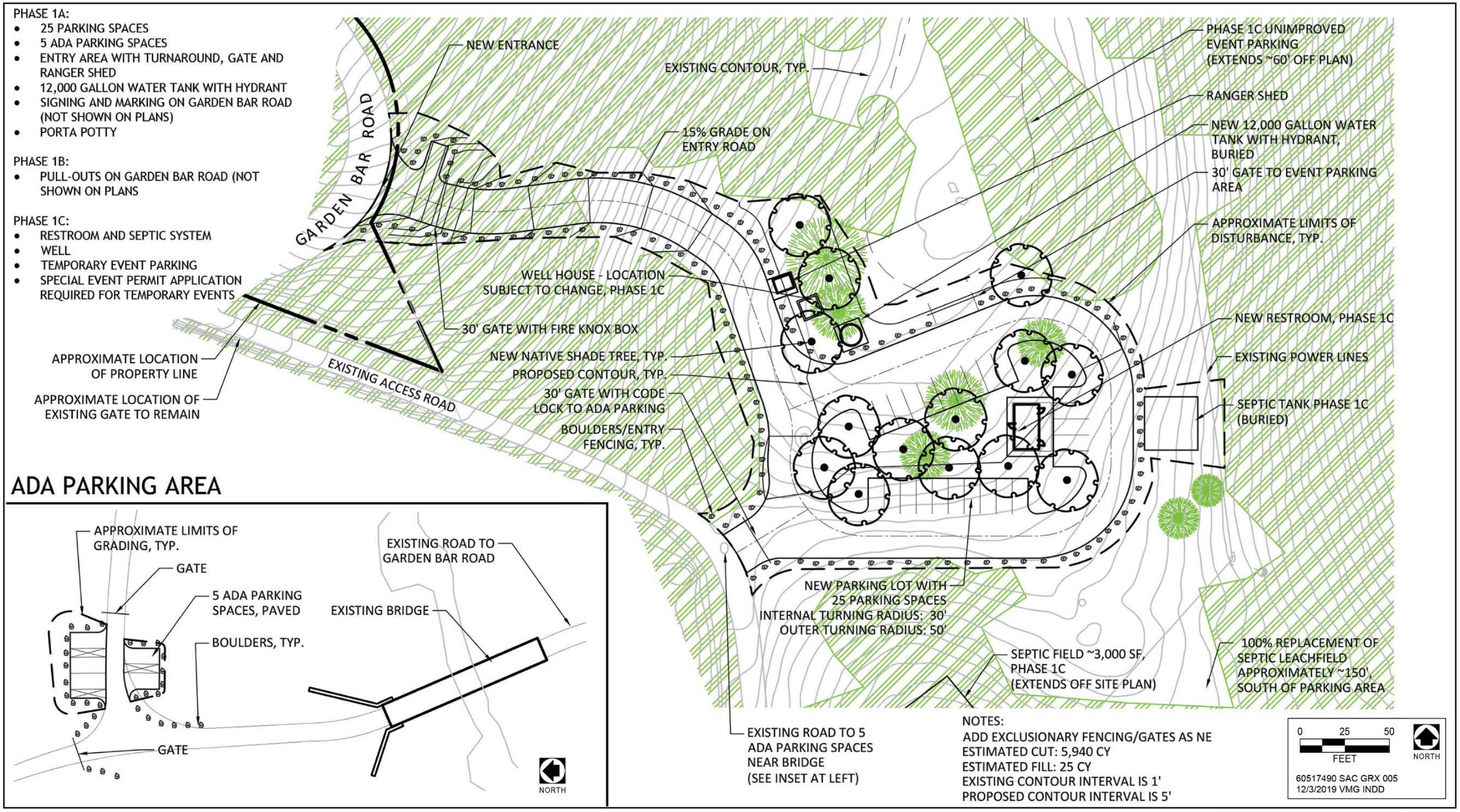

Source: Data provided by Foothill Associates and adopted by AECOM in December 2019

Exhibit 5-4. Proposed Grading at Garden Bar Entry

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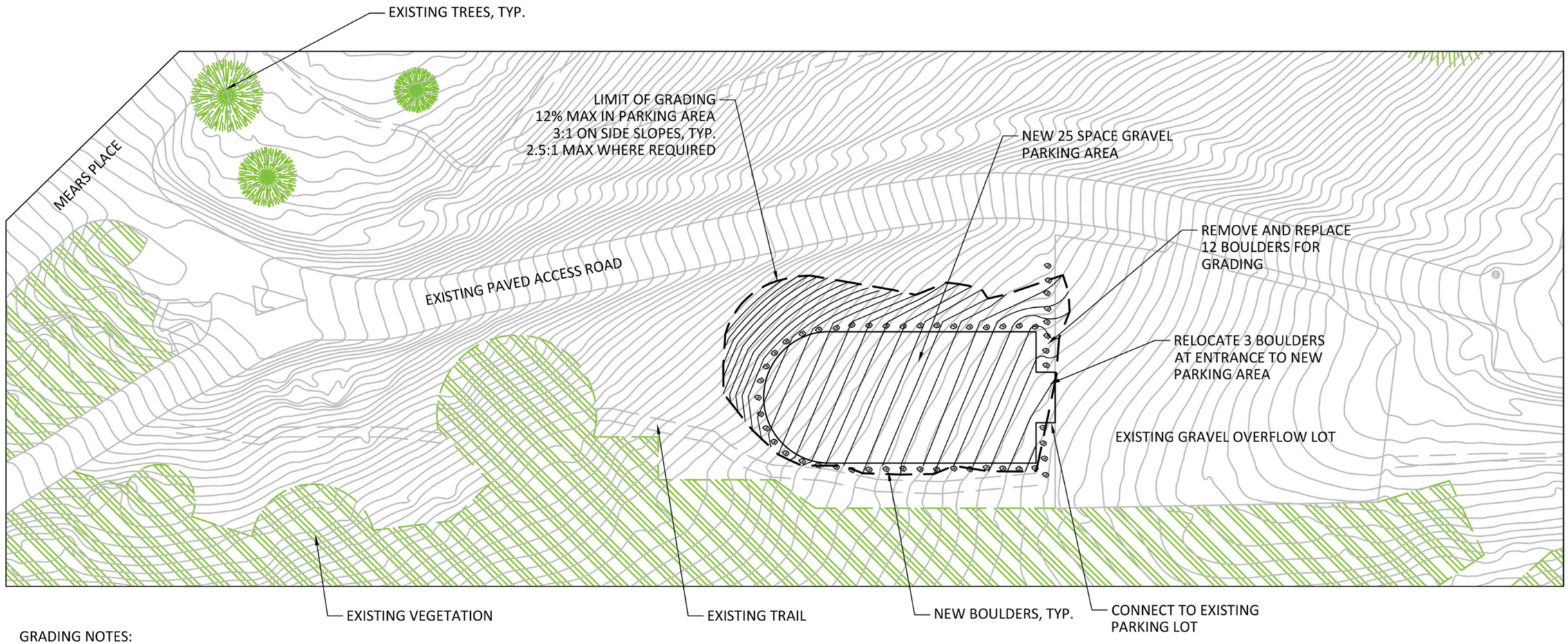

GRADING NOTES:
EXISTING CONTOUR INTERVAL IS 1'-0"
NEW CONTOUR INTERVAL IS 1'-0"
ESTIMATED CUT: 493 CY
ESTIMATED FILL: 5 CY

0 25 50
FEET
NORTH
60517490 SAC GRX 019
10/15/2019 VMG INDD

Exhibit 5-5. Proposed Grading at Mears Lot Expansion

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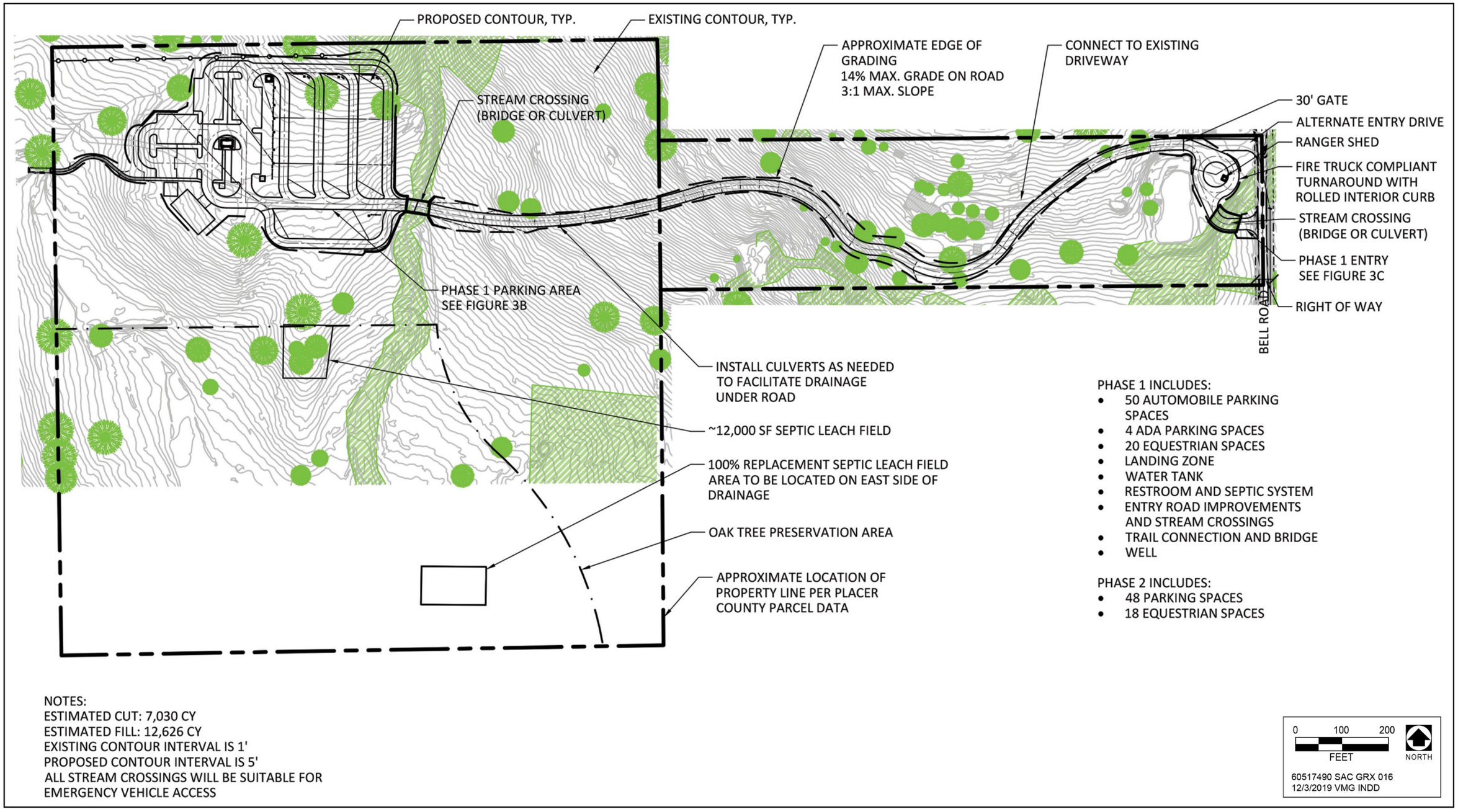

Exhibit 5-6. Proposed Grading at Twilight Ride

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The proposed expansion of the HFRP trails network would not result in new significant environmental effects or substantially increase the severity of previously identified significant effects based on changes in the project, circumstances or new information.

IMPACT 5-2	Soils, Geology, and Seismicity—Risks to People from Naturally Occurring Asbestos. *Disturbance of naturally occurring asbestos fibers could create a health hazard. The proposed project is located in an area that is moderately likely to contain naturally occurring asbestos, and disturbance of soil during construction could expose workers to asbestos. However, implementation of on-site soil testing and preparation and implementation of an Asbestos Dust Control Plan, as needed, would reduce the impact to less than significant.*
Significance	*Potentially Significant (No new significant impact relative to prior analysis in the 2010 Certified EIR)*
Mitigation Proposed	*Mitigation Measure 9-1 in Chapter 9.0, "Air Quality": Conduct On-Site Soil Testing and Prepare and Implement an Asbestos Dust Control Plan, If Needed*
Residual Significance	*Less than Significant*

2010 HFRP Certified EIR Impact Summary

The 2010 Certified HFRP EIR disclosed that the boundary of the "proposed park" was located in an area identified as moderately likely to contain naturally occurring asbestos and of faulting or shearing rock that may locally increase the relative likelihood of the presence of naturally occurring asbestos. Construction activities that involve soil disturbance (e.g., grading, excavation) for new facilities and structures (e.g., roadways, trails, restrooms, bridges and overlooks) could expose workers to increased health risks from inhaling dust that contains asbestos. For this reason, the 2010 HFRP EIR found the impact to be potentially significant. Although park construction could expose workers to asbestos, implementing Mitigation Measure 9-1 (see Chapter 9.0, "Air Quality") to conduct soil testing and implement an asbestos dust control plan, if needed, was found to reduce the impact to **less than significant**.

2019 HFRP Trails Expansion Project Impact Analysis

The alignment of trails under the HFRP Trails Expansion Project travels through land identified as moderately likely to contain naturally occurring asbestos because of the types of metamorphic and igneous rocks that are present. The most likely settings for naturally occurring asbestos in these areas are in fault zones and shear zones that contain slivers of serpentinite and/or talc-chlorite schists. Small sheets and slivers of serpentinite too small to show on geologic maps (some of them less than 1 foot thick) are widely distributed in shear zones in the Sierra Nevada foothills. Also according to DOC, the project area is located in an area of faulting or shearing rock that may locally increase the relative likelihood of the presence of naturally occurring asbestos (DOC 2006).

Soil disturbance during construction activities (e.g., grading, excavation) for new facilities and structures (e.g., roadways, trails, restrooms, bridges, overlooks, access and parking areas) could expose workers and nearby recreationists to increased health risks from inhaling dust that contains asbestos. The potential to impact human health from exposure to asbestos material is potentially significant. Application of Mitigation Measure 9-1 would

reduce risks to people from naturally occurring asbestos resulting from HFRP and the trails expansion project area implementation to a **less-than-significant** level.

The proposed HFRP trails expansion project would not result in new significant environmental effects or substantially increase the severity of previously identified significant effects of risks to people from naturally occurring asbestos based on changes in the project, circumstances or new information.

IMPACT 5-3	Soils, Geology, and Seismicity—Risks to People and Structures Caused by Strong Seismic Ground Shaking or Fault Rupture. *The potentially active Deadman Fault (part of the Bear Mountains Fault Zone) crosses the eastern portion of the expansion project area. Although all park and expansion project facilities would be designed and constructed in accordance with the current design requirements for the California Building Standards Code (CBC) and the park and project area is not located in an Alquist-Priolo Earthquake Fault Zone, the project could construct buildings or structures across a known fault.*
Significance	*Potentially Significant (No new significant impact relative to prior analysis in the 2010 Certified EIR)*
Mitigation Proposed	*Mitigation Measure S5-2: Obtain and Implement Seismic Engineering Design Recommendations*
Residual Significance	*Less than Significant*

2010 HFRP Certified EIR Impact Summary

The 2010 HFRP Certified EIR indicated the project could potentially construct or renovate buildings or structures (e.g., caretaker residence) across an active fault trace or within 50 feet of such a trace (i.e., Bear Mountain fault). The 2010 HFRP EIR noted that USGS states the fault as having "been active in the last 2 million years and is thought to pose a measurable hazard." Because the Bear Mountain fault was identified as being "active," the 2010 HFRP Certified EIR indicated the potential for surface rupture to occur. Despite assuming compliance with all design and construction recommendations, and that the proposed park site was not crossed by an Alquist-Priolo Earthquake Fault Zone (PCWA 2007), the County determined the HFRP project could create a substantial increased risk of injury or property damage from strong seismic ground shaking and/or fault rupture. This potential risk was avoided with application of Mitigation Measure 5-2 requiring the County to obtain engineered studies and implement seismic engineering design recommendations. This reduced the potentially significant impact to **less than significant.**

2019 HFRP Trails Expansion Project Impact Analysis

As described above, the Deadman Fault (part of the Bear Mountains Fault Zone) has shown evidence of activity in the last 700,000 years and therefore is considered potentially active. Based on the *2010 California Fault Activity Map* (Jennings and Bryant 2010), the Deadman Fault appears to cross through the eastern portion of the HFRP trails expansion project area. Although the exact location of the fault line is not known, buildings on-site would be used for human occupancy (e.g., restrooms).

The project would increase human activity and presence in the area by developing new access, parking and trail expansion areas and would include structures such as new restrooms, bridges, overlooks and buildings on-site at the locations depicted earlier in Exhibit 3-4 “Trail Expansion Area, Access and Bridges with Overlooks.” Based on the most recent mapping available, the potential exists for new buildings or structures to be located across a fault trace or within 50 feet of such a trace (i.e., Deadman Fault in the Bear Mountains Fault Zone). Although all project-related facilities and structures would be designed and constructed in accordance with the current design requirements for the CBC and the project area is not located in an Alquist-Priolo Earthquake Fault Zone (CGS 2017), the project could construct buildings and/or structures across a known fault trace. Because the project could create a substantial increased risk of injury or property damage from strong seismic ground shaking and/or fault rupture, this impact could be potentially significant. Implementation of Mitigation Measure S5-2 would reduce the impact to a **less-than-significant** level.

The proposed expansion of the HFRP trails system would not result in new significant environmental effects or substantially increase the severity of previously identified significant effects with regards to risks to people and structures caused by strong seismic ground shaking or fault rupture based on changes in the project, circumstances or new information.

IMPACT 5-4	Soils, Geology, and Seismicity—Risks to People and Structures Caused by Landslides. *Although stable slope conditions and drainage patterns may change with site alterations (e.g., cuts, fills) associated with construction of recreation facilities in the park and expansion project area, the project area does not contain areas of shallow slope instability and/or small landslide areas. Therefore, the risk of a landslide is considered low.*
Significance	*Less than Significant (Consistent with prior analysis in 2010 HFRP Certified EIR)*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less than Significant*

2010 HFRP Certified EIR Impact Summary

In the 2010 Certified EIR, the HFRP site was described as containing steep slopes along Raccoon Creek and along smaller valleys and gullies located in other currently inaccessible portions of the proposed park. Construction of new trails and bridges across Raccoon Creek and road improvements along Garden Bar Road (i.e., widening) would require grading to create a level foundation for lying new pavement and potentially excavation of existing pavement. The 2010 HFRP indicated soils were well-drained, and field review of land along Garden Bar Road identified no areas of shallow slope instability or small landslide areas. Because construction on steep slopes was to be avoided and no areas of shallow slope instability were identified, this impact was determined to be **less than significant**.

2019 HFRP Trails Expansion Project Impact Analysis

Construction activities could affect steep slopes within the project area as a result of constructing new bridges, overlooks, roadways, or trails and currently stable conditions could be changed by slope alterations (e.g., cuts, fills). Slope alterations required to construct new facilities or structures could also result in removing existing ground vegetation that could be needed to stabilize steep slopes.

The location of parking lots, restrooms, picnic areas, and water tanks are to be sited where the topography is relatively flat to gently rolling with little potential for slope instability. Trail alignment, bridge location, and placement of overlooks would be subject to micro siting during final design in order to avoid sensitive natural resources and to provide sustainable trail design, while also providing opportunities to view the landscape from carefully sited overlooks. Placement of all structures is subject to revision during final design in the field. Soils in the project area are well-drained, and field review identified no areas of shallow slope instability or small landslide areas.

However, trails must cross the Racoon Creek channel, which is very irregular and contains many boulders, overgrown banks, and steep vertical drops which possess the potential for soil instability and limit opportunities for crossing. Two bridges are proposed across Raccoon Creek at locations where preliminary study suggests the abutments can be supported on existing rock. Based on the high compressive strengths of the rock, and assuming all recommendations of the Geotechnical Engineering Study are adhered to, the proposed bridges would not be subject to hazards from slope instability (Carlton Engineering 2012).

Because the trail alignment would be routed in a manner to provide physical and ecological sustainability, and the proposed parking lots and entry improvements are planned in areas that are relatively flat, and no areas of shallow slope instability are known to occur, the project would not result in exposure of structures or people to landslides. This impact would be **less than significant**.

The proposed expansion of the HFRP would not result in new significant environmental effects or substantially increase the severity of previously identified significant effects of risks to people and structures caused by landslides based on changes in the project, circumstances or new information.

IMPACT 5-5	Soils, Geology, and Seismicity—Limited Ability for Soils to Support Operation of a Wastewater Disposal System. On-site soil testing conducted in 2019 at the trail expansion parking areas has confirmed soils capable of supporting engineered septic systems. The park and expansion project would comply with Central Valley RWQCB and County Department of Environmental Health regulations which would ensure that on-site systems are properly engineered and designed to suit the on-site soil conditions. Therefore, this impact would be less than significant.
Significance	*Less than Significant (Consistent with prior analysis in 2010 HFRP Certified EIR)*
Mitigation Proposed	*None Warranted*
Residual Significance	*Less than Significant*

2010 HFRP Certified EIR Impact Summary

The 2010 HFRP Certified EIR evaluated impacts of septic systems to dispose of effluent generated by on-site restroom facilities and visitor structures (e.g., nature center, caretaker facility). Soil testing conducted as part of the original evaluation determined soils in the western portion of the park could support a septic system sized to accommodate maximum permitted daily use. Because soils were found to be capable of accommodating a septic system designed to meet Central Valley RWQCB and Placer County Environmental Health Division standards, the conclusion was that impacts associated with operation of a septic system would be **less than significant.**

2019 HFRP Trails Expansion Project Impact Analysis

The trails expansion project would include the construction and operation of septic systems to dispose of effluent generated by on-site restroom facilities proposed for the Twilight Ride, Harvego Preserve and Garden Bar 40 entries.

Septic systems in Placer County are regulated under the Local Agency Management Program (LAMP) for Placer County, adopted by the Central Valley RWQCB (Order No. R5-2017-0048) in 2017. The entire project site is subject to LAMP regulations regarding septic systems that are enforced by the Placer County Department of Environmental Health (DEH). Before a septic system can be installed, County regulations require that the applicant obtain a septic system permit from DEH. During the application process, DEH consults with applicants to determine the specific requirements at the project site prior to issuance of a permit, which would include a percolation test conducted by a registered qualified consultant. For this project, DEH would also require the use of engineered systems based upon the soils testing.

Soil mantel and percolation testing conducted in 2019 at each of the proposed parking areas found appropriate areas suitable for a pretreatment septic system. Drip field calculations conducted for each new entry determined the amount of area required to treat the waste. This evaluation was based on the projected maximum number of visitors at each location, and assumed average sewage flows of 5 gallons/visitor consistent with Table 2 of the Placer County On-Site Sewage Manual. The analysis determined enough space was available at each proposed entry to accommodate maximum sewage flows (Lindbloom 2019).Until such time as permanent toilets are constructed, portable toilets would be made available.

The proposed HFRP trails expansion project would not result in new significant environmental effects or substantially increase the severity of previously identified significant effects with regards to operation of wastewater disposal systems based on changes in the project, circumstances, or new information.

5.5 MITIGATION MEASURES

Mitigation Measure S5-1: Obtain Authorization for Construction and Operation Activities with the Central Valley Regional Water Quality Control Board and Implement Erosion and Sediment Control Measures as Required.

A. Implement Stormwater BMPs.

Water quality treatment facilities/Best Management Practices (BMPs) shall be designed according to the guidance of the California Stormwater Quality Association Stormwater Best Management

Practice Handbooks for Construction, for New Development / Redevelopment (2015), and for Industrial and Commercial (or other similar source as approved by the County).

Storm drainage from on- and off-site impervious surfaces (including roads) shall be collected and routed through specially designed catch basins, vegetated swales, vaults, infiltration basins, water quality basins, filters, etc. for entrapment of sediment, debris and oils/greases or other identified pollutants, as approved by the County. BMPs shall be designed in accordance with the West Placer Storm Water Quality Design Manual for sizing of permanent post-construction Best Management Practices for stormwater quality protection. No water quality facility construction shall be permitted within any identified wetlands area, floodplain, or right-of-way, except as authorized by appropriate regulatory authorities.

All permanent BMPs shall be maintained as required to ensure effectiveness.

B. Obtain RWQCB Permit and Implement Construction BMPs.

Prior to any construction commencing on projects with ground disturbance exceeding 1 acre, the applicant shall provide evidence of a WDID number generated from the State Regional Water Quality Control Board's Stormwater Multiple Application & Reports Tracking System (SMARTS). This serves as the Regional Water Quality Control Board approval or permit under the National Pollutant Discharge Elimination System (NPDES) construction storm water quality permit.

BMPs shall be designed to ensure that pollutants contained in project-related storm water discharges are reduced to the maximum extent practicable and that non-storm water discharges are prevented from leaving the site, both during and after construction, as required by Placer County's Stormwater Quality Ordinance.

Construction (temporary) BMPs for the project include, but are not limited to:

- Use temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils;
- Store materials and equipment to ensure that spills or leaks cannot enter the storm drain system or surface water;
- Use water for dust control;
- Construct sediment control basins;
- Regular sweeping of entry and exit areas to minimize off-site sediment transport;
- Install traps, filters, or other devices at drop inlets to prevent contaminants from entering storm drains; and
- Use barriers, such as straw bales, perimeter silt fences, or placement of hay bales, to minimize the amount of uncontrolled runoff that could enter drains or surface water.

C. Implement Post-Development BMPs.

Post-development (permanent) BMPs for the project include, but are not limited to:

- The project will have an effective system of erosion and sedimentation control, consisting of vegetative and structural measures and management practices, to reduce the damage of erosion and costly clean-up procedures.
- Following trail construction, wattles/fiber rolls and/or gravel-filled bags will remain in place until permanent stabilization measures have proven successful.
- For the duration of the project, storm drainage within ditch systems associated with switchback construction will have stabilized ditch protection. This will consist of filter fabric, mulch, or a 3-inch gravel base.
- Plan development to fit the particular topography, soils, waterways, and natural vegetation of the site, to avoid the creation of erosion problems on the site.
- Reduce erosion hazards and runoff volumes and velocity by limiting the length and steepness of slopes. Slopes subject to erosion should not be steeper than 2:1 horizontal to vertical.
- Break up long steep slopes by benching, terracing, or diversion structures.
- Use existing vegetation to control erosion to (a) shield the soil surface from rain, (b) increase infiltration, (c) reduce velocity of runoff and (d) hold soil in place and act as a filter.
- Time the project so that grading and construction occur during the normal dry season to the extent feasible.
- The County shall also consult with the RWQCB to acquire the appropriate regulatory approvals that may be necessary to obtain Section 401 water quality certification.

Mitigation Measure S5-2: Obtain and Implement Seismic Engineering Design Recommendations.

a. Prior to issuance of grading permits, the applicant shall obtain the services of a qualified, licensed geotechnical engineer to examine for traces of any relevant fault zone within the project area, and develop engineering design recommendations for the project area. The recommendations shall include calculation of seismic shaking hazards using the appropriate computer modeling software, and shall include specific structural design recommendations to minimize potential damage to buildings and structures from seismic events. The recommendations shall also include an examination of the traces of the Bear Mountain fault system within the project area, including surface reconnaissance, and shall make recommendations for building foundation and infrastructure design accordingly. All appropriate design recommendations shall be implemented during the project design and construction phases.

b. No structures intended for human occupancy shall be constructed within a 100-foot-wide no building zone over the Bear Mountain fault traces. However, following completion of the seismic study required in (a) above, the no building zone may be modified if recommended by the geotechnical engineer.

c. Prior to issuance of grading permits, the applicant shall obtain the services of a qualified, licensed geotechnical engineer to prepare a comprehensive final geotechnical report for the entire project area with specific design recommendations sufficient to ensure the safety of soil conditions, project structures, and site occupants. The report shall include project design and construction recommendations to address:

- Site preparation and grading, including surface and subsurface prep work, engineered fill materials, fill placement and compaction, trench backfill, erosion/winterization, slope stability, and surface drainage;
- Foundation requirements specific to the location of each component of the proposed project;
- Concrete slabs-on-grade, both interior and exterior;
- Retaining and below grade walls; and
- Road, pavement, and parking area design.
- The seismic engineering design recommendations shall be incorporated into the project design. Adequate field inspection shall occur during construction.

  It is the responsibility of the applicant to provide for engineering inspection and certification that earthwork has been performed in conformity with recommendations contained in the report.