4.6 Geology, Soils, and Paleontological Resources

This section describes the existing geology, soils, paleontological resources, and seismic conditions on the Fanita Ranch Project (proposed project) site and analyzes the potential physical environmental effects related to seismic hazards, underlying soil characteristics, slope stability, erosion, and excavation. This section is based on information provided in the following geotechnical investigation reports prepared by Geocon Consultants, Inc. (Geocon) (2020): (1) Fanita Ranch – Fanita Commons, Orchard Village, and Vineyard Village; (2) Fanita Ranch – Fanita Parkway Widening and Extension Station 9+35 to 111+50; (3) Fanita Ranch – Off-Site Improvement to Cuyamaca Street; and (4) Fanita Ranch – Off-Site Improvements to Magnolia Avenue. The geotechnical investigations are provided as Appendices G1, G2, G3, and G4, respectively. Paleontological resources information is based on the Paleontological Resource Assessment prepared by the San Diego Natural History Museum (2020) and provided as Appendix G5.

4.6.1 Environmental Setting

4.6.1.1 Regional Geology

The proposed project consists of approximately 2,638 acres of land located in the northwestern quadrant of the City of Santee (City) in the eastern portion of the County of San Diego (County). The overall project site is situated in the coastal section of the Peninsular Range's geomorphic province. The northwesterly trending mountain ranges of this province generally consist of Jurassic metamorphic rocks intruded by Cretaceous igneous rocks. During the past 54 million years, the coastal flank of this mountainous area experienced several episodes of marine inundation and subsequent regression (in an area known as the "San Diego Embayment" the western part of the County). This resulted in deposition of a thick sequence of marine and nonmarine sediments (claystones, siltstones, sandstones, and conglomerates) on basement rocks of the Southern California batholith. Lower base levels, a result of post-Pleistocene sea-level lowering, allowed stream erosion to create the steep, deeply incised canyons present in the area. During formation of the canyons, streams deposited alluvial sediments in canyon bottoms and locally perched on slopes as stream terrace deposits. Many of the large-scale, deep-seated landslides in the general area probably occurred when initial downcutting created oversteepened canyon walls.

Geologic conditions on the project site include compressive and expansive soils, shallow groundwater, and slope instability. Landslides, or landslide prone material, exist predominantly in the southern portion of the project site, generally below the 600-foot elevation. Some of this area has been previously altered to remediate the potential effects of slope instability. Compressible and expansive soils (primarily in Friars Formation slopes) and shallow groundwater are located in the Sycamore Canyon Creek drainage.

4.6.1.2 Soils and Geologic Formations

The geologic investigations prepared by Geocon (Appendices G1, G2, G3, and G4) included consolidating information from previous geotechnical reports, reviewing aerial photographic and

geologic literature, and conducting field investigations and laboratory testing. The field investigations of the proposed village development area, Cuyamaca Street and Magnolia Avenue off-site extension areas, and improvements to Fanita Parkway included site reconnaissance, drilling large-diameter borings and air-track borings, performing seismic refraction traverses, and excavating exploratory and backhoe trenches.

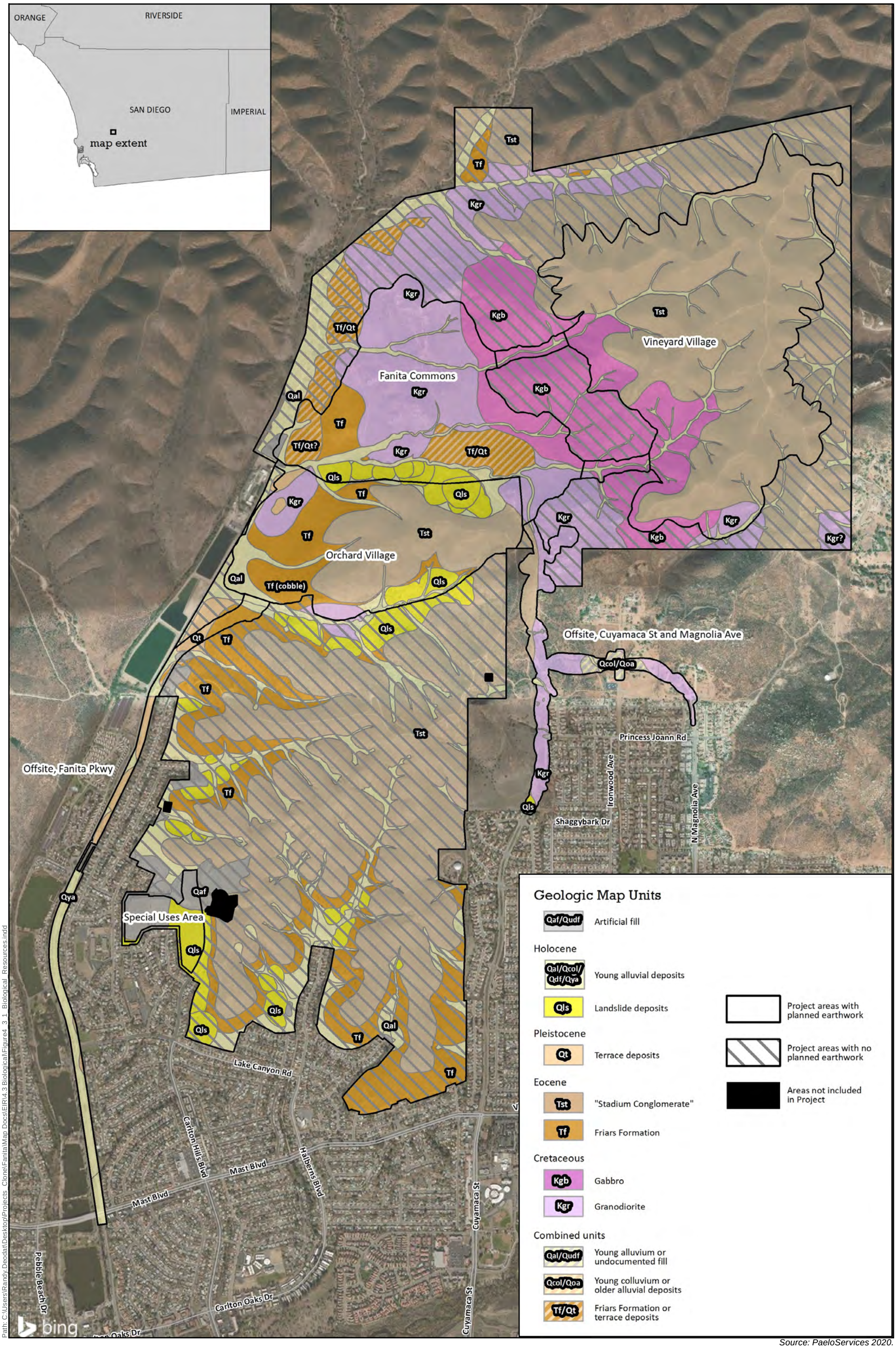
Nine surficial soil types and three geologic formations were encountered during field investigations of the three village sites, Cuyamaca Street and Magnolia Avenue off-site extension areas, and improvements to Fanita Parkway.

The surficial soil deposits consist of undocumented fill, artificial fill, topsoil, alluvium, colluvium, debris flow deposits, landslide deposits, and terrace deposits. Formational units include Eocene-age Stadium Conglomerate, Eocene-age Friars Formation, and Cretaceous-age granitic rocks (gabbro and granodiorite). Soils and geologic formations that occur on the project site and in off-site improvement areas are illustrated on Figure 4.6-1, Geologic Map of the Project Site. The Special Use area was rough graded during previous geotechnical mitigation operations. Minor regrading may be required for the proposed uses, including clearing, grubbing, and fine grading. The introduction of irrigation or infiltration of water as part of landscaping or stormwater best management practices (BMPs) in the Special Use area would be restricted as part of the development conditions. Table 4.6-1 distinguishes which soils and formations occur on the proposed village sites and in roadway improvement areas. Each of the surficial soil types and geologic units encountered is described below.

Table 4.6-1. Soils and Geologic Formations Found on the Project Site and Improvement Areas

Soils and Geologic Formations	Village Development Area	Fanita Parkway (On-Site Improvement)	Cuyamaca Street (Off-Site Improvement)	Magnolia Avenue (Off-Site Improvement)
Undocumented Fill (Qudf)	X	X	X	—
Artificial Fill (Qaf/Qudf)	—	—	X	X
Topsoil (unmapped)	X	X	X	X
Alluvium (Qal)	X	X	X	X
Colluvium (Qcol)	X	—	X	X
Debris Flow Deposits (Qdf)	X	—	X	—
Landslide Deposits (Qls)	X	—	X	—
Terrace Deposits (Qt)	X	X	—	—
Stadium Conglomerate (Tst)	X	—	X	—
Friars Formation (Tf)	X	X	X	—
Granitic Rock (Kgr/Kgb)	X	X	X	X

Sources: Appendices G1, G2, G3, G4, and G5.



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Source: PaeloServices 2020.

Harris & Associates

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Figure 4.6-1

Geologic Map of the Project Site

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Undocumented Fill (Qudf). Undocumented fill is mapped north of the Padre Dam Municipal Water District's Ray Stoyer Water Recycling Facility along the southwestern boundary of the proposed Fanita Commons site. Undocumented fill soils were also found along the majority of the proposed Fanita Parkway improvement area. The deposits consist of medium dense, damp to moist, silty/clayey sands, and sandy clays with varying degrees of gravel and cobble. Several relatively small areas of undocumented fill were also mapped within the proposed off-site extension of Cuyamaca Street. These fills likely contain vegetation and debris unsuitable for use in properly compacted fill.

Artificial Fill (generally unmapped, Qaf). Limited amounts of artificial fill deposits associated with the northern end of the existing Magnolia Avenue and scattered dirt streets were observed along the proposed roadway alignment. These soils appear to be relatively minor and are not considered suitable for support of structural fill or other improvements in their current condition. A limited amount of artificial fill was also observed along the Cuyamaca Street off-site improvement area. The condition of this fill is unknown; however, it is suspected that it was placed in conjunction with compaction testing and observation services associated with roadway construction.

Topsoil (unmapped). Topsoil blankets the majority of the project site and the proposed off-site improvement areas. It ranges in thickness from approximately 1 to 4 feet thick. Topsoil is characterized as loose to medium dense, brown to dark brown, silty/clayey fine to medium sand, and sandy clay.

Alluvium (Qal). Alluvial soils cover portions of the proposed village sites and were found within drainage and tributary channels throughout the project site and off-site improvement areas. These deposits consist of relatively loose/soft, silty/clayey sands and sandy clays with varying amounts of gravel and cobble derived from the bedrock units in modern streambeds. The alluvial deposits are poorly consolidated and compressible. The Fanita Parkway improvement area encountered deposits characteristic of alluvial soils in several of the exploratory excavations with boulders up to 16 inches in diameter. Alluvial soils were generally limited to the bottom of the three ravines that cross the proposed Cuyamaca Street alignment. Younger alluvium was mapped within a Y-shaped drainage along the central portion of the existing Magnolia Avenue roadway.

Colluvium (unmapped). Colluvial deposits were encountered throughout the village development area and the off-site improvement areas in the gentle, low lying, slope areas near alluvial drainages primarily overlying the Friars Formation. Colluvium was not discovered along Fanita Parkway. Colluvial materials were also found to overlay landslide deposits. The maximum colluvium thickness was observed up to 15 feet thick. These deposits generally possess a medium to high expansion potential and are poorly consolidated.

Debris Flow Deposits (Qdf). Debris flow deposits cover portions of the proposed village sites, primarily within drainage and tributary channels and within the downslope terminus of the existing

portion of Cuyamaca Street. The alluvium and debris flow materials in the proposed Vineyard Village site were not differentiated. The debris flow deposits originated from the higher elevations of the site along steep slopes within the Stadium Conglomerate formation, and followed pre-existing alluvial channels. Previous excavations in these deposits revealed a relatively unconsolidated cobbly/clayey sand mixture similar to that of nearby alluvial deposits. The alluvial and debris flow deposits in all areas are poorly consolidated and compressible.

Landslide Deposits (Qls). The landslide deposits primarily occur along north- and south-facing slopes of prominent ridges in the proposed Orchard Village site, the southern border of the proposed Fanita Commons site, within the proposed Special Use area, and along the southerly end of the proposed Cuyamaca Street extension. Nearly all of the landslides mapped on the project site occur along relatively gentle slopes within the Friars Formation and exhibit a characteristic morphology of steep areas and elevated, uneven topography, as well as deflected drainages. Some slide areas expressed a more subdued topography showing initial signs of landslide development. The landslide deposits are primarily characterized as deep-seated, relatively intact, block-glide type movements, or shallow to deep-seated bedrock slides with a varying degree of slip plane development and slide mass disturbance. The landsliding appears to have occurred along inherently weak, sheared, low angle bedding planes, or weak, thinly laminated claystones within the Friars Formation. The prominent landslide complex along the north-facing slope north of the proposed Orchard Village site appears to exhibit a variation of deep-seated block-glide geometry, and shallow slide movements. The difference in slip plane elevation across the slide complex suggests that failure along the slope likely occurred as several episodes of slope instability. A similar variation in landslide elevation exists in the canyon area south of the proposed Fanita Commons site. The maximum thickness of landslide material encountered was approximately 33 feet. The landslide debris varied from medium dense sandstone/claystone blocks to a variable mixture of intensely sheared and pulverized claystone suspended in a stiff clay matrix.

A landslide was also encountered at the southerly end of the proposed Cuyamaca Street off-site improvement area. The outcropping of granitic rock along the northeastern margins of the landslide appears to have formed a natural buttress to deep-seated movement in an easterly direction with the slide being considerably deeper to the south. No evidence of landslides was detected on the proposed Magnolia Avenue off-site improvement area or within 300 feet of the proposed Fanita Parkway improvement area.

Terrace Deposits (Qt). Terrace deposits were encountered along and above the active floodplain within Sycamore Canyon Creek on the border of the proposed Fanita Commons and Orchard Village sites and in the trenches of the proposed Fanita Parkway improvement area. These deposits are relatively limited in extent and consist of locally cemented, medium dense to dense, damp to moist, orange/grayish brown gravelly cobble conglomerate and clayey sand. In several areas, the

terrace deposits were not differentiated from the Friars Formation. The Fanita Parkway roadway includes terrace deposits in several trenches.

Stadium Conglomerate (Tst). The Pomerado Conglomerate (42–37 million years old) and the Stadium Conglomerate (44–42 million years old) are the upper and lower formations, respectively, within the Poway Geologic Group, separated by marine sandstones of the Mission Valley Formation. The Friars Formation (47–46 million years old), which contains a conglomerate character, is the uppermost unit of the La Jolla Geologic Group and is overlain by the Stadium Conglomerate. The Stadium Conglomerate is characterized by light brown to orange brown, sandy to clayey, gravel and cobble conglomerate with interbedded silty and clayey sands. The Eocene-age Stadium Conglomerate underlies the majority of the proposed village sites and the majority of the proposed Cuyamaca Street off-site improvement area. Stadium Conglomerate overlies the Friars Formation in the proposed Orchard Village site at an elevation estimated to range from approximately 620 to 670 feet above mean sea level (amsl) and the proposed Cuyamaca Street improvement area above an elevation of 700 amsl. Stadium Conglomerate overlies granitic rock units at varying elevations in the proposed Vineyard Village site and comprises the easternmost approximately two-thirds of this village site. Geomorphically, Stadium Conglomerate forms the characteristic uneven ridges within the upper elevations of both the proposed Orchard and Vineyard Village sites. As encountered in exploratory excavations, this deposit generally consists of dense to very dense, light brown to orange brown, sandy to clayey, gravel and cobble conglomerate interbedded silty/clayey sands. The Stadium Conglomerate, in either a natural or properly compacted condition, generally possesses good slope stability and bearing capacity characteristics.

Friars Formation (Tf). The middle Eocene-age (approximately 47 to 46 million years old) Friars Formation underlies the Stadium Conglomerate and is a primarily terrestrial rock unit that consists of light gray, medium-grained sandstones; greenish, reddish, and brown siltstones and mudstones; and cobble conglomerate units deposited on an erosion surface formed on crystalline basement rock of the Southern California batholith. The Eocene-age Friars Formation occurs throughout the south, central, and southwestern portions of the project site, the central and northern portions of the proposed Fanita Parkway improvement area, and throughout areas of the proposed Cuyamaca Street off-site improvement area. Specifically, weak, waxy claystone, and thinly laminated siltstone/claystone, sandstone, and conglomerate occur at the project site below an approximate elevation of 620 to 670 amsl, with the exception of the western portion of the Orchard Village site, which is dominated by relatively thick conglomerate. Soils derived from the Friars Formation typically possess a medium to high expansion potential and low shear strength. The weak nature of the claystones within this formation, in combination with the occurrence of bedding-plane shear zones, has resulted in landsliding at the project site. Bedding-plane shears are relatively common within the Friars Formation and represent inherent planes of weakness within the formation.

Granitic Rocks (Kgr/Kgb). Cretaceous-age granitic rock of the Southern California batholith is the oldest geologic unit in the region and is believed to underlie the entire project site at depth. It is exposed over a large portion of the northern half of the proposed village sites, primarily the Fanita Commons and Vineyard Village sites, and directly underlays the Friars Formation and to a lesser extent Stadium Conglomerate. Granitic rock was also observed throughout the southern portion of the proposed Fanita Parkway extension in two trenches and in two off-site improvement areas: along the majority of the proposed Cuyamaca Street off-site improvement area, and at the eastern and western ends of the proposed Magnolia Avenue off-site improvement area. Field classification indicates that two units of differing composition occur in the area, each characterized by a different mineralogy, outcrop morphology, and topsoil color. White, bouldery outcrops of granodiorite were mapped in the southeastern area of the project site, whereas dark gray, less prominent surface exposures of gabbroic rock were mapped in the eastern central area of the project site. Distinct, reddish-brown topsoil distinguishes the gabbroic unit from outcrops of granodiorite. The residual soils derived from the weathering of both granitic units often consist of medium to high expansive, sandy clays with abundant rock fragments.

4.6.1.3 Topography and On-Site Soils

The following section discusses the on-site topography based on the proposed three village sites, the Special Use area, and three Santee General Plan Mobility Element street improvement areas, as well as the location of the specific soil groups on the project site.

Fanita Commons

The proposed Fanita Commons site would be located in the northwestern portion of the project site south of Goodan Ranch/Sycamore Canyon County Preserve. Topographically, the development area occupies a broad, northwest-trending valley with a central, conical-shaped promontory. According to the Geotechnical Investigation for Fanita Ranch – Fanita Commons, Orchard Village, and Vineyard Village (Appendix G1), the topography of the proposed Fanita Commons site is relatively benign, with terrace deposits associated with Sycamore Canyon Creek underlying the western development margin and topsoil, granitic, and gabbroic rock underlying the eastern approximately two-thirds of the proposed development area. A remnant of Friars Formation underlies the general vicinity of the proposed school site and the adjacent proposed park site. Two alluvial-filled natural drainages cross the village in a generally east–west direction. Natural slope gradients range from approximately 1.5:1 (horizontal:vertical) within the granitic rocks at the eastern portion of the Fanita Commons site to 10:1 along the Sycamore Canyon Creek drainage. The highest elevation is a conical-shaped peak in the southeastern corner at approximately 1,000 feet amsl. The lowest elevation is approximately 450 feet amsl in the southwestern portion of the proposed Fanita Commons village.

Vineyard Village

The proposed Vineyard Village site would occupy the northeastern approximately one-third of the overall project site and would be situated at the highest elevations of the project site. The Vineyard Village site is south of the Goodan Ranch/Sycamore Canyon County Preserve, west of Eucalyptus Hills, and east of Sycamore Canyon. The northern and western project boundaries abut undeveloped natural open space, whereas rural residential development occurs along the southern (the City) and eastern (Eucalyptus Hills in the County) project boundaries.

According to the Geotechnical Investigation for Fanita Ranch – Fanita Commons, Orchard Village, and Vineyard Village (Appendix G1), the proposed Vineyard Village site is characterized by a series of generally north–south- and northeast–southwest-trending ridges dissected by moderately steep-sided canyons and tributaries. The site topography is characteristic of the geologic units present where surface morphology is dictated by the resistance of each unit to erosion. As such, moderately steep to steep lobed ridges comprise the majority of areas that expose Stadium Conglomerate whereas generally conical topography occurs in areas underlain by granitic and gabbroic rock. Alluvium is present in the drainages. The highest elevation is a series of peaks located in the southern portion of the proposed Vineyard Village site at approximately 1,200 feet amsl. The lowest elevation is approximately 630 feet amsl in the northwestern portion of the proposed Vineyard Village site. Natural runoff is primarily accomplished by a series of west and southwest draining tributaries that originate from a prominent north–south-trending ridge along the eastern property margin. Less prominent tributaries convey runoff southeast toward Eucalyptus Hills from the eastern flank of the ridge. The majority of the surface runoff discharges into a broad valley west of the proposed Vineyard Village site, which ultimately flows into Sycamore Canyon.

Orchard Village

The proposed Orchard Village site would be situated directly south of a tributary to Sycamore Canyon Creek, north of the 150-foot-wide, east–west trending San Diego Gas & Electric Company transmission easement, and north of an ephemeral stream that also conveys runoff from the eastern foothills westward to Sycamore Canyon Creek. These drainages contain relatively shallow alluvial deposits.

According to the Geotechnical Report for Fanita Ranch – Fanita Commons, Orchard Village, and Vineyard Village (Appendix G1), the central portion of Orchard Village exhibits a series of east–west-trending ridges dissected by moderately steep-sided canyons and tributaries. The topography is characteristic of terrain underlain by the Stadium Conglomerate formation, which consists of dense to very dense sandy gravel, cobble, and boulders. This formation occurs at the site generally above an elevation of 675 amsl and has been mined throughout the County for its aggregate properties. The highest elevation is a conical-shaped peak located in the northeastern corner of the proposed Orchard Village at approximately 1,000 feet amsl. The lowest elevation is approximately 470 feet amsl in the northwestern portion of the proposed village site.

The Friars Formation underlies the Stadium Conglomerate and forms the gentle slopes at the base of hillsides generally below 675 feet amsl. This formation consists of weak claystones, siltstones, and sandstones and can contain weak bedding planes. The sheared bedding planes are also the cause for ancient landslides that are present along the natural north-facing slope in the northern portion of the proposed village site. To a lesser extent, ancient landslides are also present in the southern portion of the proposed Orchard Village site along the south-facing natural slope. The eastern portion of the Orchard Village site is underlain by granitic rock.

Special Use Area

A 31.9-acre Special Use area is planned south of the proposed Orchard Village site in the southwestern portion of the project site. Specifically, the area is west of the northern terminus of Carlton Hills Boulevard and Padre Dam Municipal Water District's existing 6-million-gallon water reservoir. The site was previously graded during repair of the Oak Hills Landslide in the late 1970s to early 1980s and consists of four relatively level sheet-graded pads. Since the Special Use area was part of a previous geotechnical stabilization measure, introduction of irrigation or infiltration of water as part of landscaping or stormwater BMPs would be restricted in this area as part of the development conditions.

On-Site Improvement Area: Fanita Parkway

The southerly segment of Fanita Parkway presently supports an asphalt concrete-paved, two-lane street extending from Mast Boulevard to Ganley Road. From Ganley Road north to the southern boundary of the proposed Orchard Village site, the future roadway has been rough graded but is otherwise unimproved. The area slated for improvement south of the Orchard Village site is essentially in its natural state, with the exception of a San Diego Gas & Electric Company easement with overhead power lines and a large stockpile located outside the roadway extension. Existing facilities consisting of storm drains, sewer, water, and dry utilities currently traverse the developed portions of Fanita Parkway. Several drainage channels and collection points are located along the eastern portion of Fanita Parkway. In general, the roadway surface varies from 440 feet amsl at the northern end of the roadway to 355 feet amsl at the southern end near Mast Boulevard. The Santee Lakes Recreation Preserve borders the western side of Fanita Parkway. The eastern side of the existing paved portion of Fanita Parkway abuts an existing City residential neighborhood of Carlton Hills.

Off-Site Improvement Area: Cuyamaca Street

Cuyamaca Street currently terminates at the northernmost edge of residential development in the City. The proposed Cuyamaca Street improvement area would be approximately 4,600 feet long and would traverse undeveloped land in the City. The roadway is relatively straight and would ascend from a low elevation of 570 feet amsl at its southern end near Mast Boulevard to a high of 790 feet amsl at the boundary of the project site. Topographically, the Cuyamaca Street extension

area generally parallels the natural contours of the east-facing hillsides, which would form the eastern boundary of the open space south of the proposed Orchard Village site. Natural slope gradients along the alignment vary from approximately 6:1 (horizontal to vertical) to 2.5:1.

Off-Site Improvement Area: Magnolia Avenue

The existing Magnolia Avenue currently terminates at the northeastern edge of residential development in the City near Princess Joann Road. The Magnolia Avenue extension area would be approximately 3,000 feet long and would connect the northern terminus of existing Magnolia Avenue with future Cuyamaca Street to the west. The alignment would cross rural land occupied by several estate homes and associated structures. Topographically, the Magnolia Avenue extension area traverses two drainages and a broad valley with a natural ground elevation of 540 amsl. The eastern and western ends of the area are elevated to approximately 580 and 650 feet amsl, respectively, at their connection points with future Cuyamaca Street and existing Magnolia Avenue.

4.6.1.4 Groundwater/Seepage

Perched groundwater or seepage was encountered within alluvial drainages and hillside areas on the project site during the geotechnical investigation. The groundwater/seepage in drainage courses is presumed to be associated with surface runoff of rainwater along the natural watershed. However, a static, near-surface groundwater table was not encountered on the project site (Appendix G1). Seepage conditions were also encountered in bedrock materials, landslide materials, and at the base of landslide areas. Additionally, relatively minor natural surface seeps were observed in other portions of the site where the Friars Formation and Stadium Conglomerate meet. Areas where perched water or seepage was not encountered may exhibit groundwater during rainy periods.

No seeps or groundwater were observed along the proposed Fanita Parkway improvement area. However, during previous studies, standing water and vegetation suggestive of shallow groundwater were noted along the drainage swales that currently border the western side of Fanita Parkway.

No groundwater or seepage was observed or encountered during a reconnaissance of the Cuyamaca Street off-site improvement area. It is possible that areas of localized seepage, perched groundwater, or wet soil may be encountered after periods of heavy rainfall, particularly within the ravines, which cross the proposed roadway alignment.

Shallow groundwater is expected to occur in the Magnolia Avenue off-site improvement area during the winter months where the roadway alignment crosses two younger alluvial areas.

4.6.1.5 Geologic Hazards

The following discussion is an assessment of the existing setting pertaining to potential geologic hazards, including faulting and seismicity, liquefaction, landslides, seiches and tsunamis, flooding, subsidence and seismic settlement, and expansive soils.

Faulting and Seismicity

Based on the geotechnical investigations prepared for the proposed project (Appendices G1, G2, G3, and G4), the project site and three street improvement areas are not located on any known "active," "potentially active" or "inactive" fault traces as defined by the California Geological Survey.

The Newport-Inglewood Fault Zone and Rose Canyon Fault Zone, both located approximately 15 miles west of the project site, are the closest known active faults. The California Geological Survey considers a fault seismically active when evidence suggests seismic activity within roughly the last 11,000 years. The California Geological Survey has included portions of the Rose Canyon Fault Zone within an Alquist-Priolo Earthquake Fault Zone. An Alquist-Priolo Earthquake Fault Zone is a regulatory zone that encompasses active faults in California and has the potential to rupture the surface and damage existing structures. Before a new project is permitted, cities and counties require a geologic investigation to demonstrate that proposed buildings would not be constructed on active faults (USGS 2020). Table 4.6-2 lists all known active faults within a 50-mile radius of the project site and their associated maximum earthquake moment magnitude.

Table 4.6-2. Known Active or Potentially Active Faults in the Vicinity of the Project Site

Fault Name	Maximum Distance from Project Site (miles)	Maximum Earthquake Moment Magnitude (Mw)
Newport-Inglewood	15	7.5
Rose Canyon	15	6.9
Elsinore	26	7.9
Coronado Bank	28	7.4
Palos Verdes Connected	28	7.7
Earthquake Valley	31	6.8
San Jacinto	47	7.9

Source: Appendix G1.
Notes: Mw = moment magnitude

Liquefaction

Liquefaction typically occurs when a site is located in a zone with seismic activity, on-site soils are cohesionless, groundwater is encountered within 50 feet of the surface, and soil relative density is less than approximately 70 percent. The potential for liquefaction during a strong earthquake is limited to those soils which are in a relatively loose, unconsolidated condition and located below the water table. Due to the relatively high density and grain-size distribution characteristics of the fill and formational materials at the project site and associated off-site improvement areas, and the absence of a permanent water table in the proposed development area, the risk of seismically induced soil liquefaction occurring at the project site and off-site improvements is considered to be very low.

Landslides and Debris Flow Deposits

Areas having the potential for earthquake-induced landslides generally occur within areas of previous landslide movement, or where local topographic, geological, geotechnical, and subsurface water conditions indicate a potential for permanent ground displacement. Debris flows are caused by high rainfall, steep slopes, loss of vegetation cover, and thick overburden. The primary difference between ancient landslides and debris flows is that, by definition, debris flows do not possess a basal slip surface. Therefore, debris flows are less likely to become reactivated by grading than ancient landslides.

Numerous ancient landslides are known to have occurred in the Friars Formation in the project vicinity. As described previously, landslides primarily occur in the south-central portion of the project site in the proposed Orchard Village, in the proposed Special Use area, and in the proposed Cuyamaca Street off-site improvement area. Debris flow deposits are limited to a small area along the proposed Cuyamaca Street improvement area and in drainage and tributary channels on the project site.

4.6.1.6 Paleontological Resources

Paleontological resources are the buried remains and traces of prehistoric organisms (animals, plants, microbes) excluding humans. Fossil remains such as bones, teeth, shells, leaves, and wood are found in the geologic deposits within which they were originally buried. The primary factor determining whether an object is a fossil is not how the organic remain or trace is preserved (e.g., petrified), but rather the age of the organic remain or trace. Paleontological resources can be thought of as including not only the actual fossil remains but also the collecting localities and the geologic formations containing those remains. This section incorporates information from the Paleontological Resource Assessment (Appendix G5).

Geologic formations in the San Diego region are rated according to the potential, or sensitivity, for yielding paleontological resources. The County (2009) has developed its own guidelines for assigning paleontological potential, which include a five-tiered scale of high potential, moderate potential, low potential, marginal potential, or no potential ratings.

A description of each paleontological potential rating, as outlined by the County is provided below:

- **High Potential:** Geologic units with high potential are known to contain paleontological areas with rare, well preserved, critical fossil materials for stratigraphic or paleoenvironmental interpretation, and fossils providing important information about the paleoclimatic, paleobiological, and/or evolutionary history (phylogeny) of animal and plant groups. Highly sensitive formations contain vertebrate fossil remains or are considered to have the potential to contain such remains.
- **Moderate Potential:** Moderate potential is assigned to geologic units known to contain paleontological areas with fossil material that is poorly preserved, common elsewhere,

or stratigraphically unimportant. This category is also applied to formations judged to have strong, but unproven, potential for containing important remains.

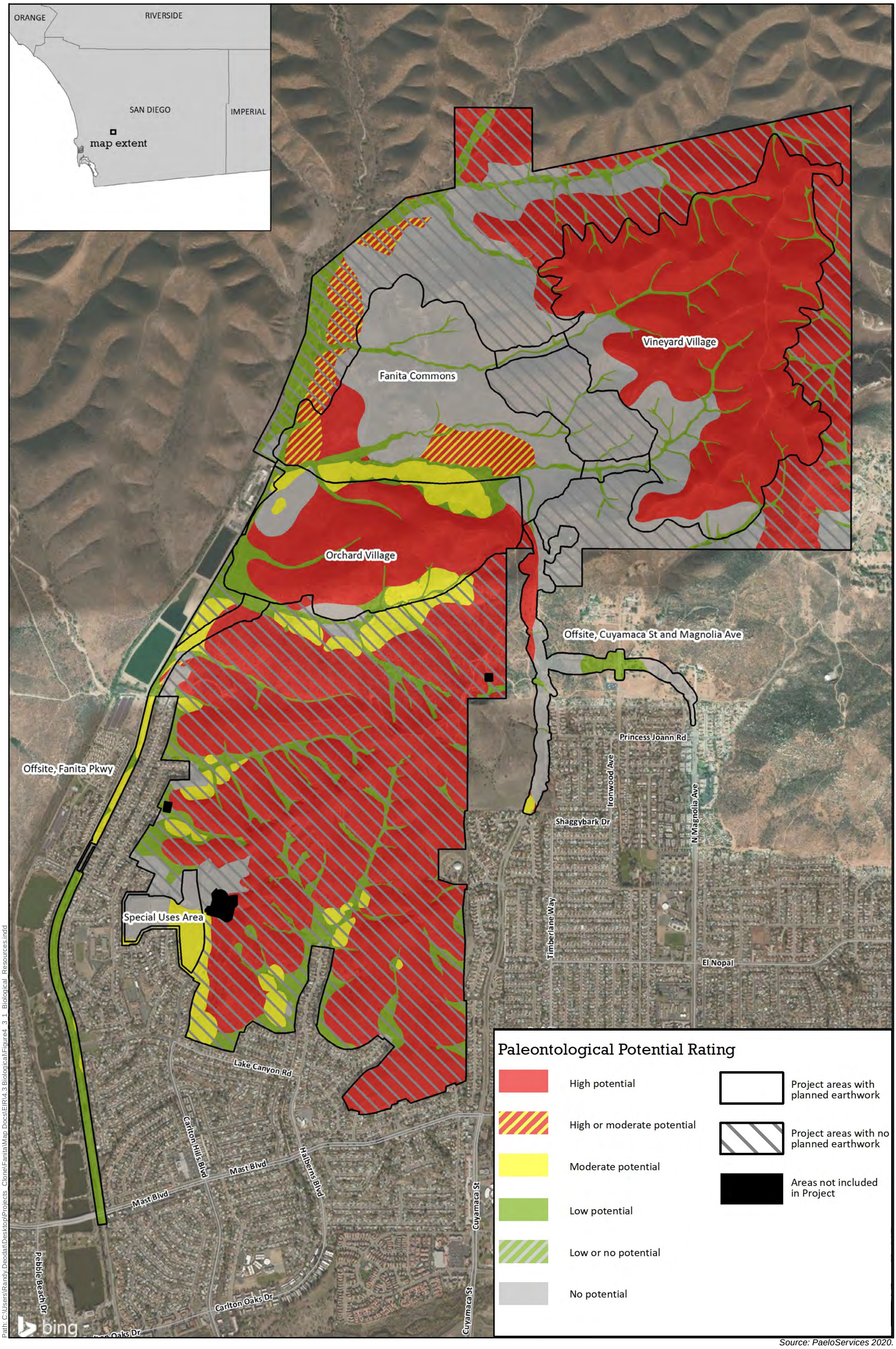
- **Low Potential:** Low potential is assigned to geologic units that, based on their relatively young age and/or high-energy depositional history, are judged unlikely to produce important fossil remains. Typically, low potential units produce fossil remains in low abundance, or only produce common/widespread invertebrate fossils whose taphonomy, phylogeny, and ecology is already well understood.
- **Marginal Potential:** Marginal potential is assigned to geologic units that are composed either of volcaniclastic (derived from volcanic sources) or metasedimentary rocks (metamorphized sediment), but that nevertheless have a limited probability for producing fossils from certain formations at localized outcrops.
- **No Potential:** Geologic units with no potential are either entirely igneous in origin and therefore do not contain fossil remains, or are moderately to highly metamorphosed and thus any contained fossil remains have been destroyed. Artificial fill materials also have no potential, because the stratigraphic and geologic context of any contained organic remains (i.e., fossils) has been lost.

A Paleontological Resource Assessment (Appendix G5) was prepared for the proposed project to identify and evaluate paleontological resources on the project site. An institutional records search and a literature review were conducted, and a limited paleontological field survey was performed on the project site and off-site improvement areas. The records search and literature review revealed that there are 6 known fossil localities within a 1-mile radius and an additional 50 recorded fossil localities within a 2-mile radius of the project site.

The paleontological resource potential of each geologic unit present on the project site and in off-site improvement areas is assessed below and depicted on Figure 4.6-2, Paleontological Potential Map of the Project Site. Note, the Special Use area is shown as not being planned for earthwork because it has already been rough graded. However, minor finish grading may still be required.

Artificial Fill. Artificial fill may be encountered along the proposed Fanita Parkway improvement area and off-site Cuyamaca Street and Magnolia Avenue improvement areas. Artificial fill has no paleontological potential because of the disturbed nature of the sediments and any contained fossils.

Young Alluvial Deposits. Holocene-age (less than 11,000 years old) alluvial deposits were documented in active drainages across the project site, along existing areas of Fanita Parkway, and crossing the proposed Cuyamaca Street and Magnolia Avenue off-site improvement areas. Holocene alluvial deposits on the project site and in off-site improvement areas are assigned a low paleontological potential based on the high-energy depositional environment of these strata and their relatively young geologic age.



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Source: PaeloServices 2020.

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Figure 4.6-2

Paleontological Potential Map of the Project Site

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Landslide Deposits. Landslide deposits are typically assigned no paleontological potential because any contained fossils have been disturbed. However, a portion of the landslides on the project site were characterized by Geocon (Appendix G1) as deep-seated landslides containing intact blocks of fine-grained sandstone/claystone deposits of the Friars Formation. Useful stratigraphic data may still be recovered for fossils discovered within these blocks; therefore, these landslides are assigned a moderate paleontological potential.

Older Terrace Deposits. During the pedestrian survey performed for the paleontological resources assessment, older terrace deposits were observed along the eastern side of Sycamore Canyon in the western portions of the proposed Fanita Commons and Orchard Village sites and along the eastern side of the existing and proposed Fanita Parkway improvement area. Fossils known from Pleistocene-age alluvial floodplain deposits in the coastal County are somewhat rare, but have been collected at several locations. Because these deposits have limited potential to yield scientifically important terrestrial vertebrate fossils, they are assigned a moderate paleontological potential.

Stadium Conglomerate. The Stadium Conglomerate formation underlies major portions of the proposed Orchard Village and Vineyard Village sites and also appears along the northern part of the planned Cuyamaca Street off-site improvement area. While the finer-grained deposits that typically yield fossils were not observed at the surface during the paleontological pedestrian survey, silty and clayey sands within the Stadium Conglomerate formation were noted in the geotechnical investigations and are likely to be encountered during site grading and excavation on the project site. The Stadium Conglomerate is, therefore, assigned a high paleontological resource potential based on the recovery of scientifically significant fossils, particularly land mammals, in the southern County and the presence of documented fossil localities from Eocene conglomerates in the vicinity of the project site.

Friars Formation. The Friars Formation has yielded marine micro fossils and fossils of macroinvertebrates, and is known to be rich in fossils of terrestrial animals such as opossums, insectivores, primates, rodents, artiodactyls, and perissodactyls. These deposits are exposed in the walls of Sycamore Canyon along the western boundary of the project site and sporadically throughout the footprints of the proposed Fanita Commons and Orchard Village sites, as well as along the existing and proposed Fanita Parkway improvement area and at the southern end of the proposed Cuyamaca Street off-site improvement area. The Friars Formation is assigned a high paleontological resource potential based on the diverse and scientifically important terrestrial mammalian fossils recovered from this geologic unit in the southern County. The presence of abundant fossil areas from the Friars Formation in the vicinity of the project site further support the high paleontological potential of these deposits.

Plutonic Rocks. Cretaceous-age plutonic rocks comprise part of the northern end of the Peninsular Ranges Batholith that extends from the County of Riverside several hundred miles south into Baja

California, Mexico. Batholithic rocks in the County range in composition from granite to gabbro. Granodiorite and gabbro are exposed along the western boundary and southernmost portion of the proposed Vineyard Village site, throughout the central portion of the proposed Fanita Commons site, and in the northwestern and northeastern corners of the proposed Orchard Village site. These rocks also primarily underlie the planned off-site improvement areas of Cuyamaca Street and Magnolia Avenue. The rocks mapped as granodiorite and gabbro on the project site, as elsewhere in the County, are assigned no paleontological potential. The conditions present during the formation of plutonic igneous rocks preclude the potential presence of fossils.

4.6.2 Regulatory Framework

Applicable federal, state, and local regulations pertaining to geology and soils are discussed below. The treatment of paleontological resources is also governed under the federal and state regulations described below. Under these regulations, paleontological resources have been interpreted by agencies to be covered by the references to "scientific" or "informational" values.

4.6.2.1 Federal

National Earthquake Hazards Reduction Act

The National Earthquake Hazards Reduction Act was passed to reduce the risks to life and property resulting from earthquakes. The act established the National Earthquake Hazards Reduction Program (NEHRP). The mission of NEHRP includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improved building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improved mitigation capacity; and accelerated application of research results. NEHRP designates the Federal Emergency Management Agency as the lead agency of the program and assigns several planning, coordinating, and reporting responsibilities. Other NEHRP agencies include the National Institute of Standards and Technology, National Science Foundation, and the U.S. Geological Survey.

Uniform Building Code

The Uniform Building Code is a model building code that provides the basis for the California Building Code (CBC). The Uniform Building Code defines different regions of the United States and ranks them according to their seismic hazard potential. There are four types of these regions, which include Seismic Zones 1 through 4, with Zone 1 having the least seismic potential and Zone 4 having the highest seismic potential. The project site is located in Seismic Zone 4.

4.6.2.2 State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Zoning Act was signed into law in 1972. The purpose of this act is to prohibit the location of most structures for human occupancy across the traces of active faults and to thereby mitigate the hazard of earthquake fault rupture. Under the act, the State Geologist is required to delineate "Earthquake Fault Zones" along known active faults in California. Cities and counties affected by the zones must regulate certain development projects within the zones. They must withhold development permits for the site within the zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting.

California Building Code

California law provides a minimum standard for building design through the CBC. The CBC is based on the Uniform Building Code, with amendments for California conditions. Chapter 16 of the CBC deals with general design requirements, including but not limited to regulations governing seismically resistant construction (Chapter 16, Division IV) and construction to protect people and property from hazards associated with excavation cave-ins and falling debris or construction materials. Chapter 23 of the CBC contains specific requirements for seismic safety. Chapter 29 of the CBC regulates excavation, foundations, and retaining walls. Chapter 33 of the CBC contains specific requirements pertaining to site demolition, excavation, and construction to protect people and property from hazards associated with excavation cave-ins and falling debris or construction materials. Chapter 70 of the CBC regulates grading activities, including drainage and erosion control. Construction activities are subject to occupational safety standards for excavation, shoring, and trenching as specified in California Occupational Safety and Health Administration (Cal-OSHA) regulations (Title 8 of the California Code of Regulations) and in Section A33 of the CBC. The City has formally adopted the 2019 CBC, Part 2, Title 24, as its building code.

California Code of Regulations, Title 14, Division 3, Chapter 1

Title 14, Division 3, Chapter 1 of the California Code of Regulations prohibits any person from destroying, disturbing, or mutilating geological features including paleontological resources. This applies to all excavation and grading activities that would be performed under the proposed project.

Seismic Hazards Mapping Act

The California Geologic Survey, formerly the California Department of Conservation, Division of Mines and Geology (CDMG), provides guidance with regard to seismic hazards. Under CDMG's Seismic Hazards Mapping Act (1990), seismic hazard zones are to be identified and mapped to assist local governments in land use planning. The intent of the mapping is to protect the public from the effects of strong ground shaking, liquefaction, landslides, ground failure, or other hazards caused by earthquakes. In addition, CDMG's Special Publications 117, Guidelines for Evaluating

and Mitigating Seismic Hazards in California, provides guidance for the evaluation and mitigation of earthquake-related hazards for projects within designated zones of required investigations.

4.6.2.3 Local

Santee General Plan

Divided into nine elements, the Santee General Plan is a statement of intent by the City on the future development of the community. This is accomplished through objectives and policies that serve as a long-term policy guide for physical, economic, and environmental growth.

The Santee General Plan consists of a series of objectives, standards, and plan policies related to geology and geologic hazards in the Safety Element. The Safety Element contains specific procedures and regulations for the types of geotechnical studies, including seismic hazard studies, required for proposed projects in the City. The Safety Element of the Santee General Plan contains the following goal and policies relative to geologic hazards as they relate to the proposed project (City of Santee 2003):

- **Objective 2.0:** Minimize the loss of life and destruction of property in Santee caused by seismic and geologic hazards.
  - **Policy 2.1:** The City should utilize existing and evolving geologic, geophysical and engineering knowledge to distinguish and delineate those areas that are particularly susceptible to damage from seismic and other geologic conditions.
  - **Policy 2.2:** The City should ensure that if a project is proposed in an area identified herein as seismically and/or geologically hazardous, the proposal shall demonstrate through appropriate geologic studies and investigations that either the unfavorable conditions do not exist in the specific area in question or that they may be avoided or mitigated through proper site planning, design and construction.
  - **Policy 2.3:** The City shall require that all potential geotechnical and soil hazards be fully investigated at the environmental review stage prior to project approval. Such investigations shall include those identified by Table 8.1, Determination of Geotechnical Studies Required, and such soil studies as may be warranted by results of the Initial Environmental Study.

4.6.3 Thresholds of Significance

According to the CEQA Guidelines, Appendix G, the proposed project would have a significant geological impact if it would:

- **Threshold 1:** Directly or indirectly cause potential substantial adverse effects, including the risk of loss, or 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. Refer to Division of Mines and Geology Special Publication 42;
  - Strong seismic ground shaking;
  - Seismic-related ground failure, including liquefaction; or
  - Landslides.

- **Threshold 2:** Result in substantial soil erosion or the loss of topsoil.
- **Threshold 3:** 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.
- **Threshold 4:** Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1997), creating substantial direct or indirect risks to life or property.
- **Threshold 5:** 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.
- **Threshold 6:** Directly or indirectly destroy, disturb, or remove a unique paleontological resource, site, or geologic feature.

4.6.4 Method of Analysis

This section of this EIR gives full consideration to the development of the proposed project and acknowledges the physical changes that would occur to the existing setting from implementation of the proposed project. The analysis of geology and soils is based on the results of the four geotechnical investigations (Appendices G1, G2, G3, and G4) prepared for the proposed project. The methods for the proposed project's geotechnical investigations consisted of geological reconnaissance, including the observation of geologic conditions and the evaluation of possible geologic hazards, and a subsurface exploration, including drilling, logging, and sampling of exploratory soil borings to evaluate subsurface conditions. Additionally, the analysis of paleontological resources is based on a Paleontological Resource Assessment (Appendix G5). The methods for analyzing paleontological resources included the results of an institutional records search and a limited paleontological field survey. Regardless of the ultimate development on the proposed school site (school or residential), the impacts to geology, soils, and paleontological resources would be the same due to similar disturbance to the site. Therefore, the analysis below adequately addresses both the proposed project preferred land use plan with school and the land use plan without school.

4.6.5 Project Impacts and Mitigation Measures

4.6.5.1 Threshold 1: Exposure of Persons to the Hazards of Seismic Ground Shaking

Would the proposed project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic related ground failure, including liquefaction, or landslides?

Impact: The proposed project would not expose people and structures to seismically induced hazards.

Mitigation: No mitigation is required.

Significance Before Mitigation: Less than significant.

Significance After Mitigation: Less than significant.

Impact Analysis

Significant adverse geologic impacts not directly related to seismic activity including topsoil loss, soil stability, landslides, lateral spreading, subsidence, collapse, and expansive soils are discussed below in Thresholds 2 through 4.

Construction of the proposed project would involve extensive excavation and grading into the native terrain. Earthwork would involve approximately 27 million cubic yards of cut and fill materials, which would be balanced on site. The potential seismic hazards and their potential impacts as a result of the proposed project are described below.

Fault Rupture. The geotechnical investigations (Appendices G1, G2, G3, and G4) prepared for the proposed project indicated that no known active, potentially active, or inactive faults are on the project site or in off-site improvement areas. In addition, the proposed project is not on the Alquist-Priolo Earthquake Fault Zoning Map. The nearest known active faults are the Newport-Inglewood Fault and Rose Canyon Fault Zone, both located approximately 15 miles west of the project site. As a result, ground surface rupture is not likely to occur due to an earthquake or seismic event. Due to the distance of these faults from the project site, the proposed project is not anticipated to be at risk from ground surface rupture at these faults. In addition, all new structures associated with the proposed project would be constructed in compliance with the 2019 CBC or most current code at the time of construction. Therefore, because no active faults are located on or near the project site and project construction would comply with the CBC, implementation of the proposed project would result in a less than significant impact associated with the rupture of a known earthquake fault.

Ground Shaking. The project site is located in a seismically active area that has the potential to experience strong ground shaking. Ground shaking has the potential to dislodge objects from walls, ceilings, and shelves and to damage and destroy buildings and other structures. People in the area would be exposed to these hazards. The proposed project would minimize hazards associated with damage or destruction to buildings and other structures through compliance with the CBC, which

includes specific structural seismic safety provisions. Given the proposed project's compliance with the CBC, impacts associated with ground shaking would be less than significant.

Liquefaction. Soil liquefaction typically occurs when loose, saturated, and relatively cohesionless soil deposits found below the water table lose strength during strong seismic ground motions. Seismically induced soil liquefaction is a phenomenon in which loose to medium dense, saturated granular materials undergo matrix rearrangement, develop high pore water pressure, and lose shear strength due to cyclic ground vibrations induced by earthquakes. Due to the relatively high density and grain-size distribution characteristics of the fill and formational materials at the project site, and the absence of a permanent water table in the proposed development area, the risk of seismically induced soil liquefaction occurring at the project site is very low. In addition, due to the dense formational material encountered, lack of significant deposits of saturated soils that could be susceptible to liquefaction, and compliance with the CBC, liquefaction occurrence at the off-site improvement areas is also low. Therefore, impacts related to liquefaction would be less than significant.

Landslides. The stability and potential impacts of ancient landslides located on the project site and off-site improvement areas were evaluated in the geotechnical investigations (Appendices G1, G2, G3, and G4) prepared for the proposed project. The geotechnical investigations found that landslide instability due to seismic ground shaking is not anticipated and that there are no known ancient landslides within the Friars Formation in the County that have reactivated due to natural causes. Therefore, the potential for seismically induced landslides occurring on the project site is low. Impacts would be less than significant.

Mitigation Measures

The proposed project would not result in a significant impact associated with seismic-related hazards such as fault rupture, strong seismic ground shaking, seismic-related ground failure, liquefaction, or landslides. Therefore, no mitigation measures are required.

4.6.5.2 Threshold 2: Soil Erosion or Topsoil Loss

Would implementation of the proposed project result in substantial soil erosion or the loss of topsoil?

Impact: Construction of the proposed project could potentially accelerate erosion rates in areas of the project site that have generally loose and unconsolidated soils and old fill areas, resulting in soil erosion or the loss of topsoil.	**Mitigation:** Geotechnical Recommendations (GEO-1).
Significance Before Mitigation: Potentially significant.	**Significance After Mitigation:** Less than significant.

Impact Analysis

Erosion Impacts

Erosion, or loss of topsoil can occur as a result of, and can be accelerated by, activities such as construction, logging and mining, off-road vehicle use, and farming. Construction of the proposed project would involve extensive excavation and grading into the native terrain. Earthwork would involve approximately 27 million cubic yards of cut and fill materials, which would be balanced on site (see Figure 3-15, Conceptual Cut and Fill Plan, in Chapter 3, Project Description). The on-site aggregate plant would help balance the cut and fill by producing approximately 300,000 cubic yards of building materials required for the proposed project. Construction would include cuts up to 165 feet and fills up to 142 feet. Although over 63 percent of the project site would be retained as Habitat Preserve, those areas to be developed (graded) would be subject to wind and water erosion hazards due to the proposed project's removal of stabilizing vegetation and the construction of manufactured slopes. Construction activity would potentially accelerate erosion rates in currently undeveloped areas, and the erosion potential would be the highest in drainages or manufactured slopes. Soil removal associated with grading and excavation activities would reduce soil cohesion due to the generally loose and unconsolidated nature of graded areas and fill materials. Furthermore, excavated soils would be stockpiled for subsequent construction phases, which would be potentially exposed to erosive forces such as wind and water. The erosion effects of the proposed project would depend largely on the nature of the areas disturbed, the quantity of disturbance, and the length of time soils are subject to conditions that would be affected by erosion processes.

Village Development Areas

The proposed project would result in ground disturbance, including excavation, grading, and soil removal. Construction of the three proposed villages would have the potential to cause erosion or loss of topsoil due to the extensive amount of cut and fill required in the native terrain (27,000,000 cubic yards). In the proposed Fanita Commons site, grading would primarily consist of filling operations to create large sheet-graded pads that would support commercial/retail uses and the residential Active Adult area. It is anticipated that a significant portion of the embankment material that would be needed to create the proposed Fanita Commons would originate from a large excavation in Stadium Conglomerate in the Orchard Village site, which would provide adequate materials for capping and slope construction. Relatively significant excavations are also planned along the northeastern and eastern boundaries of the proposed Fanita Commons site. The primary geotechnical consideration for grading in the Fanita Commons site is the extent of remedial grading that would be required to remove and compact potentially compressible surficial deposits beneath the proposed embankments and the rippability of the rock excavation planned in the northeastern corner of the village site.

Proposed grading in the Orchard Village site would generally consist of significant excavations in the central portions of the site and fill placement along the flanks of the ridges. The majority of the excavations would occur in Stadium Conglomerate which would provide adequate materials for capping the site and grading shear keys and buttresses in the event that stabilization procedures are necessary. Orchard Village contains areas underlain by the Friars Formation and ancient landslides that would have the potential to result in a significant impact related to soil erosion or topsoil loss and, thus, require mitigation.

In the proposed Vineyard Village site, significant excavations are proposed in Stadium Conglomerate and gabbroic rock along the ridge tops which would be used to fill canyon areas. The primary geotechnical considerations for grading in the proposed Vineyard Village site are the excavation characteristics of the Stadium Conglomerate and underlying granitic and gabbroic rocks, and the thickness and extent of surficial deposits (alluvium, colluvium). Thus, a potentially significant soil erosion or topsoil loss impact may occur, which would require mitigation.

Street Improvement Areas

Improvements associated with Fanita Parkway would consist of grading along the eastern side of the proposed parkway from Mast Boulevard to Ganley Road, and placing additional embankments at several locations along the western edge of the existing roadway. Proposed grading would generally consist of cut and fill slopes of less than 10 feet. Several retaining walls measuring equal to or less than 12 feet in height are also proposed.

Improvements to Cuyamaca Street would cross at least three easterly draining ravines. Cut and fill on the order of 85 feet and 70 feet, respectively, are proposed. It is anticipated that the proposed embankments would be constructed from materials excavated from the roadway cut areas.

For the proposed extension of Magnolia Avenue, cut and fill on the order of 60 feet and 45 feet, respectively, are proposed. Due to extensive alteration of the natural ground surface during grading operations associated with the construction of the proposed villages and roadway improvements, there is a high possibility for erosion and topsoil loss. Project impacts would be potentially significant.

Hydrologic Erosion Impacts

Erosion can also occur in connection with the hydrology of a project. Increases in flow, typically associated with increased impermeable surfaces, can result in increased erosion to on- and off-site drainage courses. Implementation of the proposed project would result in an increase of impervious surfaces throughout the site from construction of new development and roadways. As stated in Section 4.9, Hydrology and Water Quality, the proposed project would comply with the City's Stormwater Permit and the National Pollutant Discharge Elimination System general permit for construction activities. The proposed project would also implement several erosion control BMPs including preserving existing vegetation, mulching, and hydroseeding, which would be

included as part of a stormwater pollution prevention plan prepared for the proposed project. Examples of wind erosion control BMPs include applying water or other dust suppressants to exposed soils on the site or applying coverings to stockpiles located throughout the site. Additionally, all construction activities under the proposed project would comply with the City's Excavation and Grading Ordinance as well as the CBC, specifically Chapter 18, Soils and Foundations, which regulates excavation activities, grading activities, and the construction of foundations and retaining walls. However, due to the extensive amount of earth disturbance and grading required for the proposed project, the potential for substantial erosion to occur associated with construction activities would be potentially significant.

Mitigation Measures

Implementation of Mitigation Measure GEO-1, which requires the proposed project to implement the recommendations set forth in the geotechnical investigations including remedial grading, as well as compliance with the National Pollutant Discharge Elimination System, implementation of BMPs, and compliance with the City's Excavation and Grading Ordinance, would reduce the proposed project's impacts to a less than significant level. For a complete list of required recommendations and specifications, refer to Appendices G1, G2, G3, and G4.

GEO-1: Geotechnical Recommendations. Prior to the issuance of a grading permit, the applicant shall demonstrate that the recommendations and specifications contained in the geotechnical investigations conducted for the project site and off-site areas have been incorporated into the final project design and construction documents as minimum project requirements to the satisfaction of the City of Santee Development Services Director. The recommendations are discussed in detail in the following reports prepared by Geocon Consultants, Inc. in 2020: Geotechnical Investigation for Fanita Ranch – Fanita Commons, Orchard Village, and Vineyard Village; Geotechnical Investigation for Fanita Ranch – Fanita Parkway Widening and Extension Station 9+35 to 111+50; Geotechnical Investigation for Fanita Ranch – Off-Site Improvement to Cuyamaca Street; and Geotechnical Reconnaissance for Fanita Ranch – Off-Site Improvements to Magnolia Avenue. The geotechnical recommendations include but are not limited to general geotechnical recommendations, recommendations for the Special Use area, soil and excavation characteristics, terrace drains, grading, seismic design criteria, slope stability, corrosive potential, foundation and concrete slab on-grade, retaining walls and lateral loads, slope maintenance, site drainage and moisture protection, Fanita Parkway flexible pavement, Cuyamaca Street pavement design, Lake Canyon Road Pavement section recommendations, grading plan review, and recommended grading specifications.

4.6.5.3 Threshold 3: Geologic Stability

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

Impact: The project site contains areas of geologic instability, and the proposed development could potentially increase the instability of slopes.

Mitigation: Geotechnical Recommendations (GEO-1).

Significance Before Mitigation: Potentially significant.

Significance After Mitigation: Less than significant.

Impact Analysis

The proposed project includes new development and roadways involving construction activities that would result in ground disturbance, including excavation, grading, and soils extraction. Construction of the proposed project would involve extensive excavation and grading into the native terrain. Earthwork would involve approximately 27 million cubic yards of cut and fill materials, which would be balanced on site (see Figure 3-15 in Chapter 3). Construction would include cuts up to 165 feet and fills up to 142 feet. Grading operations that would occur as a part of the proposed project are described in Section 4.6.5.2. The potential exists for unstable soils to occur on site from this disturbance.

The geotechnical investigations prepared for the proposed project (Appendices G1, G2, G3, and G4) identified that the surficial soil units, including topsoil, undocumented fill, artificial fill, alluvium, colluvium, debris flow deposits, and terrace deposits, are not suitable for support of fill or structural loads, such as the proposed residences and street improvements, in their current condition and are incapable of supporting the proposed project development. Impacts regarding geologic stability of these soil types would be potentially significant and are described below.

Undocumented fill is found along the majority of the proposed Fanita Parkway improvement area. These fills likely contain vegetation and debris unsuitable for use in properly compacted fill. Artificial fill is found on the northern end of existing Magnolia Avenue and within the proposed Cuyamaca Street off-site improvement area. Only a minor portion of this fill would be impacted by the proposed alignment of Cuyamaca Street. The upper portions of the undocumented fill are considered unsuitable for support of fill or structural loads in their current condition and are incapable of supporting the proposed roadway improvements. Therefore, this is a potentially significant impact requiring mitigation.

Topsoil essentially blankets the project site and proposed off-site improvement areas. Topsoil deposits are considered unsuitable for support of fill or structural loads in their current condition. The clayey topsoil possesses a medium to high expansion potential and should be placed in deeper fill areas. This topsoil is incapable of supporting the proposed project and road improvements in its current condition. Therefore, this is a significant impact requiring mitigation.

Alluvium and colluvium soils are found throughout the project site and off-site improvement areas, not including Fanita Parkway. The alluvial and colluvium deposits are poorly consolidated and compressible, generally possess a medium to high expansion potential, and are not considered suitable for support of fill or structural loads in their current condition and are incapable of supporting the proposed villages and roadway improvements. This is a potentially significant impact requiring mitigation.

Debris flow deposits cover portions of the project site primarily in drainage and tributary channels and pose a condition of concern for some areas of the future development. Should reactivation of the debris flow occur, it is unlikely that the roadway embankment would be breached by the flow. In areas of proposed village development, the presence of these materials is not likely to impact the proposed improvements (Appendix G1). However, other areas of the development may be affected. Therefore, the presence of the debris flow deposits on the project site is a potentially significant impact requiring mitigation.

Terrace deposits would likely be encountered during grading for the westernmost portion of the Fanita Commons site. The proposed Fanita Parkway improvement area includes terrace deposits in several trenches, which are suitable for the support of fill or structural loads in their current condition.

The Friars Formation and Stadium Conglomerate underlying the proposed Orchard and Vineyard Village site, the central and northern portions of Fanita Parkway, and the Cuyamaca Street and Magnolia Avenue off-site improvement areas include the random occurrence of highly cemented zones. The Friars Formation is prone to surficial instability where exposed in cut slopes on the project site, which poses a condition of concern for some areas of the future development. Excavating in the granitic materials on the project site would generally vary in difficulty with the depth of excavation. This is a potentially significant impact requiring mitigation.

It is anticipated that several of the proposed on-site cuts would encounter hard granitic rock on the project site and in the Cuyamaca Street off-site improvement area. To evaluate the rippability characteristics of the rock, a geophysical survey consisting of seismic refraction traverses was performed in the proposed Fanita Commons site, Vineyard Village site, and Cuyamaca Street off-site improvement areas. The results determined that the depths to nonrippable material in the granitic rock are variable on the project site. Excavations beyond the depths indicated at specific locations would likely require blasting to efficiently excavate the materials. Therefore, this is a potentially significant impact requiring mitigation.

The stability and potential impacts of ancient landslides located on the project site and off-site improvement areas were evaluated in the geotechnical investigations prepared for the proposed project (Appendices G1, G2, G3, and G4). The reports identified that development is proposed on known landslide areas mapped on the site. These areas specifically include the north- and south-facing slopes of prominent ridges in the proposed Orchard Village site and southern border of the proposed Fanita

Commons site, within the proposed Special Use area, and along the southerly end of the proposed Cuyamaca Street off-site improvement area. No obvious signs of slope instability were observed along the proposed Fanita Parkway improvement area and no evidence of landslides were detected on the Magnolia Avenue off-site improvement area. Proposed project construction would have the potential to disturb the stabilized conditions in these areas and could expose people and structures to landslides. Impacts to landslides would be potentially significant requiring mitigation.

Furthermore, existing slopes that are 3:1 (horizontal: vertical) or steeper would potentially be susceptible to near-surface slope instability. The instability is typically limited to the outer 3 feet of the slope and does not directly impact the improvements on the pad areas above or below the slope. The occurrence of surficial instability is more prevalent on fill slopes and is generally preceded by a period of heavy rainfall, excessive irrigation, or the migration of subsurface seepage. Because the proposed project proposes an extensive amount of earthwork in native terrain, it has the potential to result in significant impacts associated with unstable soils, potentially resulting in landslides, lateral spreading, subsidence, or collapse. Therefore, impacts would be potentially significant requiring mitigation.

Mitigation Measures

Implementation of Mitigation Measure GEO-1 in compliance with the CBC would reduce the proposed project's impacts associated with geologic instability to a less than significant level. Some recommendations in Mitigation Measure GEO-1 that are specific to unstable soils are described below. For a complete list of required recommendations and specifications, refer to Appendices G1, G2, G3, and G4.

Upper portions of these undocumented fill deposits found along Fanita Parkway shall require remedial grading prior to placement of structural fill or settlement-sensitive improvements. Where encountered during grading of the roadway, such fills shall be cleaned of debris and deleterious matter, removed, and properly compacted or exported from the site. Remedial grading in the form of removal and compaction of artificial fills in Cuyamaca Street and Magnolia Avenue shall be required.

Topsoil, colluvium, and alluvium deposits found throughout the project site and street improvement areas are considered unsuitable in their current condition and shall require removal and compaction in areas planned to receive structural fill or settlement-sensitive structures. Areas of colluvium and alluvium shall require remedial grading. The anticipated maximum depth of removal based on the exploratory excavations is approximately 11 feet. Deeper removals may be encountered in the main drainage areas.

Stadium Conglomerate found under the majority of the proposed development areas and along the majority of the proposed Cuyamaca Street off-site improvement area shall require moderately heavy to very heavy ripping and possible blasting during grading due to randomly occurring highly cemented zones. Blasting would likely be required for most excavations deeper than 10 to 20 feet.

The Friars Formation is prone to surficial instability where exposed in cut slopes and shall require stability fills. Where weak, waxy, or highly weathered portions of the Friars Formation are exposed, deeper remedial grading shall be required to provide a competent surface to support the fills. In addition, blasting would likely be required in the granitic rocks in the Cuyamaca Street and Magnolia Avenue off-site extensions as well as certain areas of the village development.

The debris flow deposits found throughout the project site and street improvement areas shall require remedial grading. The anticipated maximum depth of removal, based on the exploratory excavations, is approximately 5 feet with deeper removals possible in the main drainage areas. The existing debris flow deposits shall be removed below the proposed Cuyamaca Street embankment and the roadway shall be elevated above the deposit. Remedial grading measures such as complete removal and compaction of landslide materials or grading of shear keys or buttresses is anticipated to remove landslide deposits. Development plans for the Special Use area shall be reviewed by a geotechnical engineer prior to final design to comply with a focused geotechnical study that no significant grading or introduction of water shall be introduced into the unstable soil. The introduction of irrigation or infiltration of water as part of landscaping or stormwater BMPs would be restricted as part of the development conditions.

4.6.5.4 Threshold 4: Expansive Soils

Would the proposed project be located on expansive soils as defined in Table 18-1-B of the Uniform Building Code, creating substantial direct or indirect risks to life or property?

Impact: Expansive soils on the project site could cause damage to proposed structures.	**Mitigation:** Geotechnical Recommendations (GEO-1).
Significance Before Mitigation: Potentially significant.	**Significance After Mitigation:** Less than significant.

Impact Analysis

Expansive soils are soils that are high in clays or silts and that swell and shrink with wetting and drying, respectively. This shrinking and swelling can be detrimental to foundations, concrete slabs, flatwork, and pavement. However, proper fill selection, moisture control, and compaction during construction can prevent these soils from causing significant damage. Where practical, highly expansive soils can be treated by removal (typically the upper 3 feet below finish grade) and replacement with low expansive soils, lime-treatment, or moisture conditioning.

According to the project-specific geotechnical investigations (Appendices G1, G2, G3, and G4), the soil conditions encountered on the project site and off-site roadway improvement areas vary from low expansion, sandy gravel and cobble conglomerate and silty sands to highly expansive, clayey topsoil, and claystones/siltstones within the Friars Formation. Due to the potential for highly expansive soils on the project site, portions of the Friars Formation and Stadium Conglomerate would be subject to expansion effects due to the water holding capacity of clay materials.

Relatively minor natural surface seeps were observed in other portions of the site along where the Friars Formation and Stadium Conglomerate meet. A static, near-surface groundwater table was not encountered on the project site (Appendix G1). The existing perched groundwater levels in alluvial areas can be expected to fluctuate seasonally and may affect remedial grading. Remedial grading may encounter wet soils and excavation and compaction difficulty, particularly if construction is planned during the winter months. Areas where perched water or seepage were not encountered may exhibit groundwater during rainy periods.

No seeps or groundwater were observed along the proposed Fanita Parkway improvement area. However, during previous studies, standing water and vegetation suggestive of shallow groundwater were noted along the drainage swales that presently border the western side of Fanita Parkway. In addition, on-site geologic units have permeability characteristics that are conducive to water transmission, natural or otherwise, and may result in future seepage conditions. Therefore, localized seepage or perched groundwater may be encountered. Materials within drainages may be very moist to saturated during the winter or early spring depending on preceding precipitation. This is a potentially significant impact requiring mitigation.

Shallow groundwater is expected to occur in the Magnolia Avenue off-site improvement area during the winter months where the proposed roadway alignment crosses the two younger alluvial areas. Perched groundwater levels in drainages could seasonally affect on-site excavations and site grading, causing a condition of concern in some areas of the project site. This is a potentially significant impact requiring mitigation.

The proposed project would be required to comply with the CBC, which includes provisions for construction on expansive soils. Complying with the provisions of the CBC requires that a geotechnical investigation be performed to provide data for the architect and engineer to responsibly design the proposed project in a manner that mitigates or avoids concerns related to expansive soils. This mandate has been satisfied through the Geocon investigations for the proposed project (Appendix G1, G2, G3, and G4). Due to the potential for highly expansive soils on the project site and the extensive earthwork that would occur in native terrain, the proposed project's impacts would be potentially significant requiring mitigation.

Mitigation Measures

Implementation of Mitigation Measure GEO-1, which sets forth site-specific geotechnical recommendations for expansive soils in compliance with the CBC, would reduce the proposed project's impacts associated with geologic instability to a less than significant level. For a complete list of required recommendations and specifications, refer to Appendices G1, G2, G3, and G4.

Recommendations for expansive soils shall include the use of subdrain systems in areas of proposed development to intercept and convey seepage migrating along impervious strata. In

particular, subdrains shall be required in the main drainages, in stability/buttress fill areas, and where impervious layers daylight near the ultimate graded surface. This measure shall also require remedial grading of surficial deposits and materials within drainages to mix with drier material or drying prior to use as compacted fill along Fanita Parkway. Localized dewatering along Magnolia Avenue may be required in order to perform remedial grading operations during construction.

4.6.5.5 Threshold 5: Septic Tanks or Alternative Wastewater Disposal Systems

Would the proposed project 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?

Impact: No septic tanks or alternative wastewater disposal systems would be utilized on the project site.	**Mitigation:** No mitigation is required.
Significance Before Mitigation: No impact.	**Significance After Mitigation:** No impact.

Impact Analysis

The proposed project proposes connections to existing sewer lines within the City. No septic systems or other alternative wastewater disposal systems are proposed. Refer to Section 4.17, Utilities and Service Systems, for a description of the proposed sanitary sewer system for the proposed project. Additionally, refer to Figure 3-11, Conceptual Sanitary Sewer Plan, in Chapter 3 for an illustration of the proposed sanitary sewer system. Therefore, no further analysis is required.

Mitigation Measures

No impact would occur; therefore, no mitigation measures are required.

4.6.5.6 Threshold 6: Paleontological Resources

Would the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?

Impact: The proposed project could potentially impact significant paleontological resources during construction grading and excavation.	**Mitigation:** Paleontological Monitoring Program (GEO-2).
Significance Before Mitigation: Potentially significant.	**Significance After Mitigation:** Less than significant.

Impact Analysis

Impacts to paleontological resources generally take the form of physical destruction of fossil remains by excavation operations that cut into geologic formations. Paleontological resources can potentially occur in any soils or geologic formation and are generally not apparent until revealed by excavation. Development of the proposed project would involve the excavation and grading into the native terrain of approximately 27 million cubic yards with cuts up to 165 feet and fills up to 142 feet. Though paleontological resources are known to reside within a 1-mile radius of the project site, no known paleontological sites have been identified on the project site.

As described in Section 4.6.1.6, the project site is underlain by artificial fill, young alluvial deposits, landslide deposits, terrace deposits, Stadium Conglomerate, Friars Formation, and plutonic rocks. These geologic units are assigned paleontological potential ratings based on their potential to yield significant fossil remains (see Figure 4.6-2). According to the Paleontological Resource Assessment (Appendix G5) prepared for the proposed project, artificial fill, young alluvial deposits, and plutonic rocks have been assigned a no to low potential and are not anticipated to reveal paleontological resources. However, young alluvial deposits and landslide deposits are considered to have a moderate potential, while Stadium Conglomerate and Friars Formation are assigned a high potential for significant fossil remains. The predicted impact of each geologic unit by village/area is described below.

Mass grading on the proposed Fanita Commons site would primarily involve the importation of fill materials from the proposed Orchard Village site to create large sheet-graded pads for the proposed development. According to the Paleontological Resource Assessment (Appendix G5), remedial grading to prepare areas for placement of fill materials and removal and recompaction of young alluvial deposits, ancient landslide deposits, and fine-grained portions of the Friars Formation is likely to be extensive. It appears that the majority of earthwork proposed in this area would primarily impact geologic units of no paleontological potential, such as those underlying the proposed Community Park and the Active Adult area. However, a portion of the proposed earthwork would impact geologic units of moderate (ancient landslides, older terrace deposits) and high paleontological potential (Friars Formation) occurring in the vicinity of the proposed fire station and the K–8 school. If the school is not developed, the underlying Medium Density Residential land use would take effect, and 59 residences would be constructed on this site. Due to similar ground disturbance, the physical geological impacts on this site would be the same whether it is developed with a school or residences.

Preliminary earthwork plans for the proposed Orchard Village site indicate large areas of proposed cuts along east–west-trending ridgelines to generate fill material for importation to the other two proposed villages and to create level sheet-graded pads for the development proposed in Orchard Village. Remedial grading to remove and stabilize a series of ancient landslides along the southern side of Sycamore Canyon Creek is likely to be extensive. Mass grading on the proposed Orchard Village site would primarily impact geologic units of high paleontological potential, including the Stadium Conglomerate along ridgelines generally above 675 feet in elevation and the Friars Formation along canyon slopes generally below 675 feet in elevation. It is likely that remedial grading associated with the ancient landslides would also impact high paleontological potential geologic units (Friars Formation) in those portions of landslides that have moved as large, intact blocks of unbroken strata.

Preliminary earthwork plans for the proposed Vineyard Village site indicate significant excavations along ridgelines and large fills along canyon heads to create level sheet-graded pads

for the proposed development. Remedial grading for removal and recompaction of young alluvial deposits is likely to be relatively minor. Mass grading of the proposed Vineyard Village site would largely impact geologic units of high paleontological potential (Stadium Conglomerate) that compose the highest peaks in the proposed project but would also impact geologic units of no paleontological potential (plutonic rocks) that occur on the western flanks of these peaks.

In addition to the earthwork in the three proposed villages, there would be off-site mass grading activities associated with construction of the Cuyamaca Street and Magnolia Avenue extensions, which would require locally extensive cuts and fills to create the roadway alignments. The majority of this grading would impact geologic units of no paleontological potential (plutonic rocks). However, mass grading in the extreme northern and southern portions of the proposed Cuyamaca Street alignment would impact geologic units of high paleontological potential, including the Stadium Conglomerate to the north and the Friars Formation to the south.

Finally, widening and the northward extension of Fanita Parkway would involve relatively minor grading that would primarily impact geologic units of no paleontological potential (existing artificial fill) or low paleontological potential (young alluvial deposits) but could impact units of moderate potential (older terrace deposits) and high potential (the Friars Formation) in the vicinity of Lake Canyon Road and northward.

Development of the proposed project would have the potential to reveal paleontological resources because it would involve excavation and grading at depths that would impact underlying formations with moderate to high paleontological potential. Therefore, project impacts to paleontological resources would be potentially significant.

Mitigation Measures

Implementation of Mitigation Measure GEO-2 would reduce potentially significant impacts to paleontological resources to below a level of significance.

GEO-2: Paleontological Monitoring Program. To address potentially significant impacts to paleontological resources, a monitoring program shall be implemented and involve the following:

1. **Preconstruction Personnel and Repository:** Prior to the commencement of construction, a qualified project paleontologist shall be retained to oversee the mitigation program. A qualified project paleontologist is a person with a doctorate or master's degree in paleontology or related field and who has knowledge of the County of San Diego paleontology and documented experience in professional paleontological procedures and techniques. In addition, a regional fossil repository, such as the San Diego Natural History Museum, shall be designated by the City of Santee to receive any discovered fossils.

2. **Preconstruction Meeting:** The project paleontologist shall attend the preconstruction meeting to consult with the grading and excavation contractors concerning excavation schedules, paleontological field techniques, and safety issues.
3. **Preconstruction Training:** The project paleontologist shall conduct a paleontological resource training workshop to be attended by earth excavation personnel.
4. **During-Construction Monitoring:** A project paleontologist or paleontological monitor shall be present during all earthwork in formations with moderate to high paleontological sensitivity. A paleontological monitor (working under the direction of the project paleontologist) shall be on site on a full-time basis during all original cutting of previously undisturbed deposits of Pleistocene terrace deposits (moderate paleontological potential), ancient landslide deposits (moderate paleontological potential), Stadium Conglomerate (high paleontological potential), and Friars Formation (high paleontological potential) to inspect exposures for unearthed fossils. Areas to be monitored shall include but would not be limited to the majority of the proposed Orchard Village and Vineyard Village footprints and approximately the southern half of the Fanita Commons footprint, the improvements to Fanita Parkway in the vicinity of Lake Canyon Road and northward, and the northern half and southernmost end of the off-site extension of Cuyamaca Street.
5. **During-Construction Fossil Recovery:** If fossils are discovered, the project paleontologist (or paleontological monitor) shall recover them. In most cases, fossil salvage can be completed in a short period of time. However, some fossil specimens (e.g., a bone bed or a complete large mammal skeleton) may require an extended salvage period. In these instances, the project paleontologist (or paleontological monitor) has the authority to temporarily direct, divert, or halt grading to allow recovery of fossil remains in a timely manner.
6. **Post-Construction Treatment:** Fossil remains collected during monitoring and salvage shall be cleaned, repaired, sorted, and cataloged.
7. **Post-Construction Curation:** Prepared fossils, along with copies of all pertinent field notes, photos, and maps, shall be deposited in the designated fossil repository.
8. **Post-Construction Final Report:** A final summary paleontological mitigation report that outlines the results of the mitigation program shall be completed and submitted to the City of Santee within 2 weeks of the completion of each construction phase of the proposed project. This report shall include discussions of the methods used, stratigraphic section(s) exposed, fossils collected, inventory lists of cataloged fossils, and significance of recovered fossils.

4.6.6 Cumulative Impacts and Mitigation Measures

Would implementation of the proposed project have a cumulatively considerable contribution to a cumulative geology and soils impact considering past, present, and probable future projects?

Cumulative Impact	Significance	Proposed Project Contribution
Threshold 1: Exposure of Persons to the Hazards of Seismic Ground Shaking	Less than significant	Not cumulatively considerable
Threshold 2: Erosion or Loss of Topsoil	Less than significant	Not cumulatively considerable
Threshold 3: Geologic Stability	Less than significant	Not cumulatively considerable
Threshold 4: Expansive Soils	Less than significant	Not cumulatively considerable
Threshold 5: Septic Tanks or Alternative Wastewater Disposal Systems	Less than significant	Not cumulatively considerable
Threshold 6: Paleontological Resources	Potentially significant	Not cumulatively considerable

4.6.6.1 Cumulative Threshold 1: Exposure of Persons to the Hazards of Seismic Ground Shaking

The geographic context for the analysis of impacts resulting from seismic ground shaking is generally site-specific, rather than cumulative in nature, because each cumulative project site has unique geologic considerations that would be subject to uniform site development and construction standards. Potential cumulative impacts resulting from geological, seismic, and soil conditions would be minimized on a site-by-site basis to the extent that modern construction methods and code requirements provide. Nevertheless, even though adequate study, design, and construction measures can be taken to reduce potential impacts, cumulative development in the region would contribute to the cumulative increase in the number of persons exposed to these hazards (e.g., the general seismic risk that exists throughout Southern California).

The project site is not within an Earthquake Fault Zone as defined by the Alquist-Priolo Earthquake Fault Zoning Act. Development on the project site would comply with the CBC, which sets stringent seismic safety standards, as well as follow the recommendations set forth in the geotechnical investigations (Appendices G1, G2, G3, and G4), as required by Mitigation Measure GEO-1. Therefore, the contribution of the proposed project to impacts associated with exposing people and property to ground shaking effects would not be cumulatively considerable.

4.6.6.2 Cumulative Threshold 2: Soil Erosion or Topsoil Loss

The geographic context for the analysis of impacts regarding soil erosion or topsoil loss would be limited to each cumulative project site and the immediately surrounding area. Proposed cumulative projects listed in Table 4-2, Cumulative Impacts, of Chapter 4, Environmental Impact Analysis, directly south of the village development area and north of the proposed Magnolia Avenue off-site improvement area that could potentially cause a cumulative effect include a six-single-family

detached residential subdivision (GA Development, LLC). Erosion, including loss of topsoil, could occur as a result of site preparation activities associated with development of these projects. However, development of cumulative projects in the City (see Table 4-2 in Chapter 4), including the adjacent projects, are subject to state and local runoff and erosion prevention requirements, including the general construction permit, applicable BMPs, and National Pollutant Discharge Elimination System requirements, as well as implementation of fugitive dust control measures of the San Diego Air Pollution Control District. Construction activities under the proposed project would comply with the aforementioned requirements as well as the City's Excavation and Grading Ordinance and the CBC, specifically Chapter 18 Soils and Foundations, which regulates excavation activities, grading activities, and the construction of foundations and retaining walls. These measures are implemented as conditions of approval for all development projects and are subject to continuing enforcement.

The proposed project would follow the recommendations set forth in the site-specific geotechnical investigations (Appendices G1, G2, G3, and G4) under Mitigation Measure GEO-1. Similar to the proposed project, cumulative projects would also be expected to follow recommendations of their site-specific geotechnical studies, the City's Excavation and Grading Ordinance, and the CBC. Therefore, the proposed project would not contribute to a significant cumulative impact associated with soil erosion and loss of topsoil. The proposed project's contribution would not be cumulatively considerable.

4.6.6.3 Cumulative Threshold 3: Geologic Stability

The geographic context for the analysis of impacts resulting from unstable soils is generally site-specific rather than cumulative in nature. The cumulative development projects listed in Table 4-2 in Chapter 4 would result in ground disturbance, including excavation, grading, and soils removal that could potentially result in unstable soils. However, potential geology and soils effects are inherently restricted to the areas proposed for development and would not contribute to cumulative impacts associated with other planned or proposed development. Nevertheless, when considering the impacts in a larger geographic context, the project site and surrounding projects are required to undergo analysis of geological and soil conditions applicable to the development site in question. Additionally, the proposed project would be required to comply with the recommendations set forth in the site-specific geotechnical investigations (Appendices G1, G2, G3, and G4), as required by Mitigation Measure GEO-1. Because restrictions on development would be applied in the event that geological or soil conditions pose a risk to safety, cumulative impacts from development of other projects on soil subject to soil instability would be less than significant and the proposed project's contribution would not be cumulatively considerable.

4.6.6.4 Cumulative Threshold 4: Expansive Soils

The geographic context for the analysis of impacts resulting from expansive soils is generally site-specific rather than cumulative in nature. Potential impacts related to the proposed project are not

additive with other projects and are therefore not cumulatively significant. The site-specific geotechnical investigations found that there is potential for highly expansive soils on the project site and portions of the Friars Formation and Stadium Conglomerate, which underlie the site, that would be subject to expansion effects due to the water holding capacity of clay materials. The proposed project would comply with all requirements regarding expansive soils in the CBC and with the recommendations set forth in in the geotechnical investigations (Appendices G1, G2, G3, and G4), as required by Mitigation Measure GEO-1. Therefore, potential geological impacts associated with expansive soils would not be cumulatively significant. The proposed project's contribution would not be cumulatively considerable.

4.6.6.5 Cumulative Threshold 5: Septic Tanks or Alternative Wastewater Disposal Systems

The geographic context for the cumulative septic tanks or wastewater disposal systems analysis is defined as the City. The proposed project and cumulative projects would not propose the use of septic tanks or alternative wastewater systems because they would be served by the City's sewer system, as described in detail in Section 4.17. Therefore, no significant cumulative impact related to wastewater disposal systems would occur, and the proposed project's contribution would not be cumulatively considerable.

4.6.6.6 Cumulative Threshold 6: Paleontological Resources

The geographic context for the analysis of cumulative impacts to paleontological resources is considered to be the County. According to the San Diego County General Plan, there are a number of distinct geological rock units (i.e., formations) within the County that contain paleontological resources, such as bones, teeth, shells, and wood (County of San Diego 2011). Cumulative projects in the County have the potential to disturb these geologic formations and the fossils that they contain. However, previous development has also led to the discovery of many fossil sites that have been documented and added to the natural history records for the region. Nonetheless, future development in the region could impact unrecorded paleontological resources, which would result in a significant cumulative impact.

The continued development of projects in the County has the potential to disturb sensitive paleontological units; however, monitoring for paleontological resources is now typically required for projects that involve significant earthwork in geologic units with higher paleontological sensitivities. Because the proposed project would require implementation of a paleontological monitoring program for areas with the highest potential for buried fossil resources (i.e., Mitigation Measure GEO-2), additional discoveries may be added to the regional natural history record as a result of project development. Mitigation would prevent the harm or destruction of potentially highly valuable paleontological resources and allow these resources to be properly documented and preserved. Therefore, the proposed project's contribution would not be cumulatively considerable.

4.6.7 References

City of Santee. 2003. Santee General Plan. Adopted August 27.

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