V. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The following impact analysis was developed based on the information provided in Sections I, Introduction, through IV, Environmental Setting. All impacts in the EIR have been classified according to the following criteria:

- **Class I – Significant, unavoidable, adverse impacts:** Significant impacts that cannot be effectively mitigated. No measures could be taken to avoid or reduce these adverse effects to insignificant or negligible levels.
- **Class II – Significant, but mitigable impacts:** These impacts are potentially similar in significance to those of Class I, but can be reduced to a level of insignificance or avoided by the implementation of mitigation measures.
- **Class III – Less than significant impacts:** Mitigation measures may still be required for these impacts as long as there is rough proportionality between the environmental impacts caused by the project and the mitigation measures imposed on the project.
- **Class IV – Beneficial impacts:** Effects that are beneficial to the environment.

The term "significance" is used throughout the EIR to characterize the magnitude of the projected impact. For the purpose of this EIR, a significant impact is a substantial or potentially substantial change to resources in the local proposed project area or the area adjacent to the proposed project. In the discussions of each issue area, thresholds are identified that are used to distinguish between significant and insignificant impacts. To the extent feasible, distinctions are also made between local and regional significance and short- versus long-term duration.

Where applicable, mitigation measures have been identified to reduce project impacts to less than significant levels. CEQA requires that public agencies should not approve projects as proposed if there are feasible mitigation measures available which would substantially lessen the environmental effects of such projects (CEQA Statute §21002). Included with each mitigation measure are the plan requirements needed to ensure that the mitigation is included in the plans and construction of the project and the required timing of the action (e.g., prior to recordation of final map, prior to occupancy clearance, prior to issuance of building permits).

The impact analysis sections within this chapter of the EIR are structured based on the type of resource affected relative to the physical changes resulting from the project. Impacts that would occur over a project-wide basis are discussed as such. Impacts specific to phases (i.e., Phase One, Phase Two, Phase Three, and Future Development), and elements within each phase (i.e., residential development, ranch headquarters, equestrian facility, wastewater treatment facility, and dude ranch) are assessed in sub-headings following the project-wide impact discussion, as applicable.

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A. GEOLOGY AND SOILS

This section was prepared by Dennis Shallenberger, Registered Geotechnical and Civil Engineer, and Richard T. Gorman, Registered Geologist and Certified Engineering Geologist of Earth Systems Pacific, based on the *Engineering Geology Investigation and Preliminary Soil Engineering Report* (GeoSolutions, Inc.; December 10, 2004) previously prepared for the proposed project. The report was based upon a site reconnaissance and 13 exploratory borings that were drilled at the site, as well as review of available published and unpublished geologic data, geotechnical publications, maps, reports, and aerial photographs. Mr. Shallenberger and Mr. Gorman of Earth Systems Pacific conducted a peer review of the report, and conducted field inspections at the project site. A response to the peer review was provided by GeoSolutions, Inc. on March 16, 2006. The report, peer review, and response to the peer review are available for review at the County of San Luis Obispo Department of Planning and Building.

1. Existing Conditions

a. General Site Conditions

The project site lies within the Coast Range Geomorphic Province along the southern flank of the south terminus of the San Luis Range. The proposed development would be situated in an area of rolling terrain, with elevations varying from approximately 250 to 1,000 feet. The Coast Ranges trend northwesterly along the California coast, between the Pacific Ocean and the Sacramento-San Joaquin Valley.

The southwestern margin of the San Luis Range is bordered by a complex system of Late Quaternary reverse faults that separate the San Luis Range from the subsiding onshore Santa Maria Valley to the southwest. In the vicinity of the project site, a narrow, gently sloping wave-cut platform extends from the base of the range to the ocean. In this area, the San Luis Range comprises Lower to Upper Miocene-age rocks, which are part of the southern structural terminus of the Pismo syncline. Due to folding and faulting of geologic units in the area, the geologic conditions are complex. According to Lettis (1990), the structural components within this coastal area are unique and represent a transition between the west-trending Transverse Ranges to the south (Santa Maria area) and the north-northwest trending Santa Lucia Range.

b. Local Geologic Formations

The project site lies within a geologic terrain unit known as the Newsome Ridge Sub-block of the San Luis/Pismo Structural Block (Lettis, 1990). The block is characterized by a basement of Jurassic-Cretaceous age (205 to 96 million years before present) Franciscan Complex, and is bounded by the Los Osos fault approximately two miles to the northeast, and the Oceano fault, which lies approximately three miles to the southwest.

The lower slopes at the project site consist of Obispo formation (volcanic tuff) and Paso Robles formation, while the upper slopes consist of shales of younger Monterey formation. The geologic units generally dip eastward. A map depicting the geologic formations at the site is presented in Figure V.A.-1.

1) Phase One

(a) Bedrock Units

The majority of the Phase One area is underlain by Lower Miocene-age (15 to 16.5 million years before present) Obispo formation. The Obispo formation comprises rock of volcanic origin known as tuff or welded volcanic ash. Hall (1973) mapped much of the site as being underlain by claystone (Tmot), a tuffaceous member of the Obispo formation. This unit is described as very soft to moderately hard, poorly to well-indurated, and generally moderately weathered where exposed. It varies from slightly fractured to intensely fractured. A second Obispo formation subunit encountered during the geologic study was a zeolitized, very resistant, and hard tuff (classified by Hall, 1973, as Tmor). This unit outcrops throughout the property, and is described as very hard to moderately hard, moderately to very well-indurated, and generally slightly to moderately weathered where exposed. It is slightly fractured to intensely fractured.

Rock of the Monterey formation is found only in the northeastern-most section of Phase One. This unit, also Miocene-age, is geologically younger than the Obispo formation. In this phase it consists of a silty shale unit (Tmmb). This silty shale consists of bedded, blocky claystone and siltstone that is intensely to very intensely fractured.

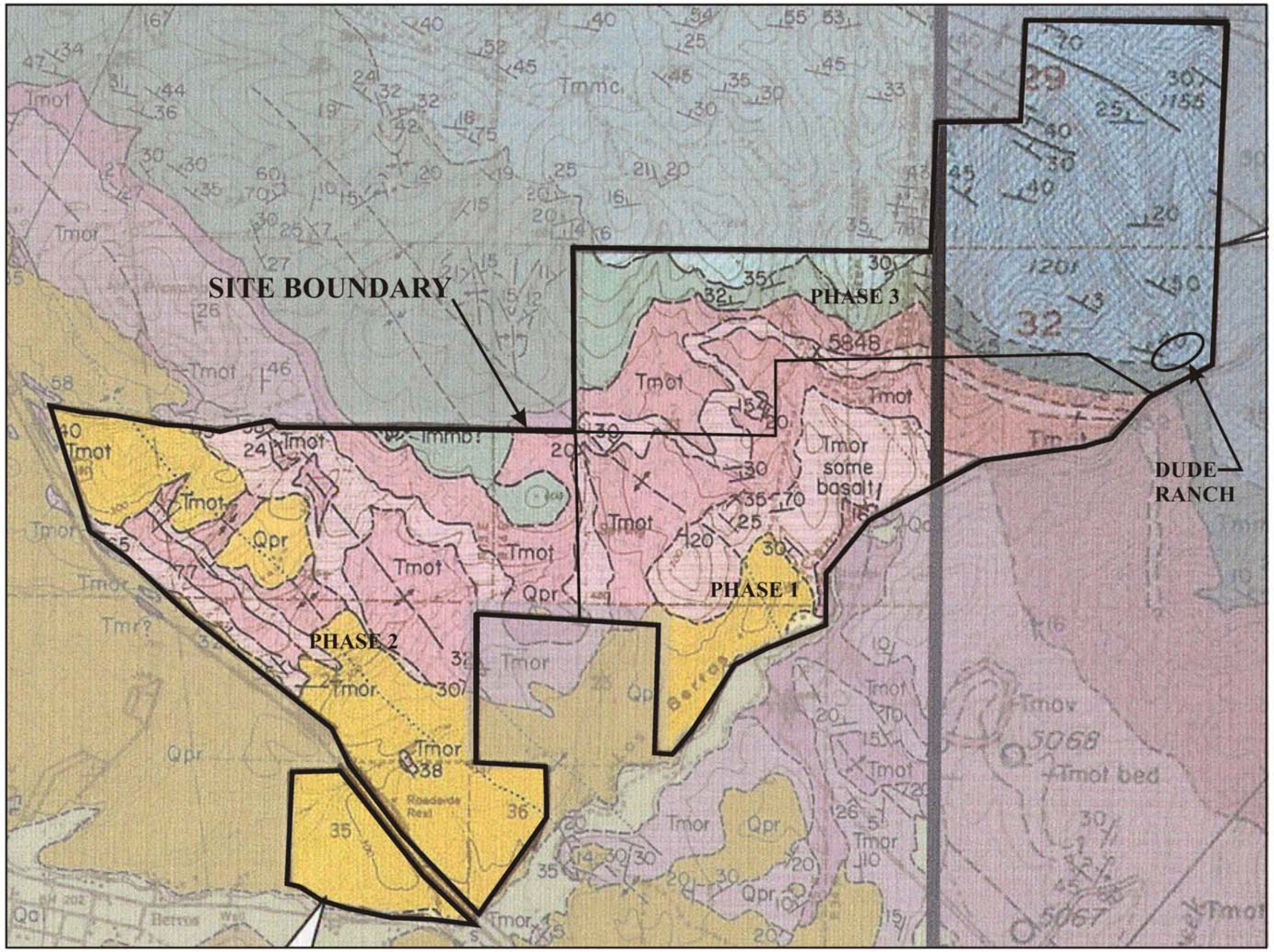
(b) Surficial and Soil Units

During reconnaissance mapping by GeoSolutions, Inc., surface deposits (colluvium) consisting of sand, silty sand, silty clay, and clay, were observed. The thickness of the surficial units varied depending upon location, but generally ranged from three to eight feet. Also encountered were localized alluvial deposits of recent age, that comprised sand, silt, clay, and unconsolidated pebbles. The alluvial deposits were found within and along the Los Berros Stream corridor, which forms the southern property boundary for Phase One.

Also observed along the southern boundary of Phase One is the lower Pleistocene-age (10,000 years to two million years before present) Paso Robles formation. This formation, the thickness of which is generally greater than 100 feet (Hall, 1973), encompasses poorly sorted and bedded conglomerate, with local lenses of coarse- to fine-grained sandstone with some pebbles.

(c) Surface and Groundwater Conditions

Surface drainage is along local drainages toward Los Berros Creek. Per the GeoSolutions report, the depth to groundwater varies depending upon location; near Los Berros Creek, groundwater is within several feet of the ground surface, while in upslope areas, groundwater is deep. No borings drilled by GeoSolutions encountered groundwater. An *Environmental Assessment of Water Resources Availability* report prepared by Morro Group (1996) for the Bartelson Development Plan, which lies across Highway 101 to the southwest, was reviewed. Groundwater in this area is found predominantly in two ground water storage units; the alluvial ground water basin along Los Berros Canyon and the fractured tuff reservoir within the Obispo formation (Cleath & Associates, 1995). A composite groundwater contour map developed utilizing data from 1990 and 1994 estimated groundwater elevations in the fractured rock reservoir ranging from about 220 msl to 320 msl, with a westerly gradient. Groundwater elevations within the alluvial basin fluctuated seasonally.



EXPLANATION

Geologic Units

Qal — Alluvial deposits
Qal, unconsolidated pebbles, sand, silt, and clay. Locally includes older alluvial deposits and beach sand

Qpr — "Paso Robles Formation"
Sandstone, siltstone, claystone, Monterey clasts
Qprt – "Paso Robles ?" angular clasts of tuff

Tmmc (s, d, sl, sh, t, ts, b) — Monterey Formation
Tmmb, siltstone or chert and blocky weathering dolomitic claystone or silt.; Tmmts, tuffaceous silt., Tmmc, opaline or cherty shale, some dolomite; Tmmd, diatomite, some blue tuff, locally interbedded with opaline shale and sandstone (Tmms, sandstone loc dolomitic or tuffaceous); Tmmsh, siliceous siltstone and claystone with *Pecten discus*; Tmmt, white or blue vitric tuff, locally includes some tuff ss.; Tmmsl, claystone and siltstone

Tmo (r, d, t, f, p) — Obispo Formation
Tmop, perlitic breccia; Tmot, fine- to coarse-grained white tuff or crystalline tuff; Tmor, res., silicified or zeolitized tuff; Tmof, tuffaceous bedded claystone and silt, fine-gr bedded tuff; Tmod, diabase and some tuffaceous siltstone or tuff

Geologic Symbols

Contact
Dashed where approximately located or inferred

High-angle fault
Dashed where approximately located or inferred; dotted where concealed

Thrust or reverse fault
Dashed where approximately located or inferred; dotted where concealed. Saw-teeth on upper plate. Dip of fault plane between 30° and 80°

Anticline
Showing axis at surface. Dashed where approximately located; dotted where concealed

Syncline
Showing axis at surface. Dashed where approximately located; dotted where concealed

⊕ Horizontal — 30 Inclined — 90 Vertical
Strike and dip of beds

N

Approx. Scale: 1" = 2400'

Source: Earth Systems Pacific

Extract from: Geologic Map of the Arroyo Grande Quadrangle, C.A. Hall, 1973 and Geologic Map of the Nipomo Quadrangle, Hall and Corbato, 1967

Geologic Map
FIGURE V.A.-1

Back of Figure V.A.-1

2) Phase Two

(a) Bedrock Units

The majority of the Phase Two area is underlain by claystone (Tmot), a tuffaceous member of the Obispo formation. This unit is described as very soft to moderately hard, poorly to well-indurated, and generally moderately weathered where exposed. It varies from slightly fractured to intensely fractured. The area is also underlain by the second Obispo formation subunit (Tmor) a zeolitized, very resistant and hard tuff. This unit is described as very hard to moderately hard, moderately to very well-indurated, and generally slightly to moderately weathered where exposed. It is slightly fractured to intensely fractured.

Rock of the Monterey formation forms the upslope areas of the northernmost area of Phase Two. This unit (Tmmb) is a silty shale consisting of bedded, blocky claystone and siltstone that is intensely to very intensely fractured.

(b) Surficial and Soil Units

During reconnaissance mapping by GeoSolutions, Inc., surface deposits (colluvium) consisting of sand, silty sand, silty clay, and clay, were observed. The thickness of the surficial units varied depending upon location, but generally ranged from three to eight feet. Also encountered were localized alluvial deposits of recent age, that comprised sand, silt, clay, and unconsolidated pebbles. The alluvial deposits were found within and along the Los Berros Stream corridor, which forms the southeastern property boundary for Phase Two.

Also observed along the western boundary of Phase Two is the lower Pleistocene-age (10,000 years to two million years before present) Paso Robles formation. This formation, the thickness of which is generally greater than 100 feet (Hall, 1973), encompasses poorly sorted and bedded conglomerate, with local lenses of coarse- to fine-grained sandstone with some pebbles.

(c) Surface and Groundwater Conditions

Surface drainage is along local drainages toward Los Berros Creek. Per the GeoSolutions report, the depth to groundwater varies depending upon location; near Los Berros Creek, groundwater is within several feet of the ground surface, while in upslope areas, groundwater is deep. No borings drilled by GeoSolutions encountered groundwater. The 1996 Water Resources Availability report prepared by Morro Group for the Bartelson Development Plan was reviewed. Groundwater in this area is found predominantly in two ground water storage units; the alluvial ground water basin along Los Berros Canyon and the fractured tuff reservoir within the Obispo formation, (Cleath & Associates, 1995). A composite groundwater contour map developed utilizing data from 1990 and 1994 estimated groundwater elevations in the fractured rock reservoir ranging from about 220 msl to 320 msl, with a westerly gradient. Groundwater elevations within the alluvial basin fluctuated seasonally.

3) Phase Three

(a) Bedrock Units

Phase Three is underlain by claystone (Tmot), a tuffaceous member of the Obispo formation. This unit is described as very soft to moderately hard, poorly to well-indurated, and generally moderately weathered where exposed. It varies from slightly fractured to intensely fractured. The area is also underlain by the second Obispo formation subunit (Tmor) a zeolitized, very resistant and hard tuff. This unit is described as very hard to moderately hard, moderately to very well-indurated, and generally slightly to moderately weathered where exposed. It is slightly fractured to intensely fractured.

Rock of the Monterey formation forms the upslope areas and the tops of the ridges along the northern and eastern boundaries of Phase Three. This unit is geologically younger than the Obispo formation. It is divided into two sub-units at the site, a silty shale (Tmmb) and a cherty shale (Tmmc). The silty shale consists of bedded, blocky claystone and siltstone that is intensely to very intensely fractured. The cherty shale is dense, brittle, and bedded, and also intensely to very intensely fractured.

(b) Surficial and Soil Units

During reconnaissance mapping by GeoSolutions, Inc., surface deposits (colluvium) consisting of sand, silty sand, silty clay, and clay, were observed. The thickness of the surficial units varied depending upon location, but generally ranged from three to eight feet.

(c) Surface and Groundwater Conditions

Surface drainage is along local drainages toward Los Berros Creek. Per the GeoSolutions report, the depth to groundwater varies depending upon location; near Los Berros Creek, groundwater is within several feet of the ground surface, while in upslope areas, groundwater is deep. No borings drilled by GeoSolutions encountered groundwater, and no groundwater was observed in a piezometer completed within Phase Three to a depth of 50 feet (within a landslide area). The 1996 Water Resources Availability report prepared by Morro Group for the Bartelson Development Plan was reviewed. Groundwater in this area is found predominantly in two ground water storage units; the alluvial ground water basin along Los Berros Canyon and the fractured tuff reservoir within the Obispo formation, (Cleath & Associates, 1995). A composite groundwater contour map developed utilizing data from 1990 and 1994 estimated groundwater elevations in the fractured rock reservoir ranging from about 220 msl to 320 msl, with a westerly gradient. Groundwater elevations within the alluvial basin fluctuated seasonally.

4) Wastewater Treatment Facility

(a) Bedrock Units

The sites for the proposed wastewater treatment facility and Ponds 1, 2, and 3 are underlain by materials of the Paso Robles formation.

(b) Surficial and Soil Units

The sites of the proposed wastewater treatment facility and Ponds 1, 2, and 3 are underlain predominantly by the lower Pleistocene-age (10,000 years to two million years before present) Paso Robles formation. This formation, the thickness of which is generally greater than 100 feet (Hall, 1973), encompasses poorly sorted and bedded conglomerate, with local lenses of coarse- to fine-grained sandstone with some pebbles. Alluvium is present in the areas of the drainages.

The wastewater treatment facility would be sited on an existing cut and fill pad, where the vineyard operations/shop building is currently located. Pond 1 would be located on gently sloping land adjacent to a tributary of Los Berros Creek; the pond would be setback a minimum distance of 20 feet from the creek. Ponds 2 and 3 would be built on the gently rounded nose of a ridge that is currently planted with vines that are surrounded by an unimproved road. Beyond the road to the north, east, and southeast are relatively steep descending slopes vegetated with oaks and brush.

(c) Surface and Groundwater Conditions

Surface drainage is along local drainages toward Los Berros Creek. Pond 1 would be sited adjacent to one of these drainages, which is about six feet deep; at the time of site reconnaissance, the drainage was dry. Per the GeoSolutions report, the depth to groundwater varies depending upon location; near Los Berros Creek, groundwater is within several feet of the ground surface, while in upslope areas, groundwater is deep. While no borings drilled by GeoSolutions encountered groundwater, there were no borings drilled in the proposed pond or wastewater treatment facility areas; subsequently, the depth to groundwater in these areas is unknown. The 1996 Water Resources Availability report prepared by Morro Group for the Bartelson Development Plan was reviewed. Groundwater in this area is found predominantly in two ground water storage units; the alluvial ground water basin along Los Berros Canyon and the fractured tuff reservoir within the Obispo formation, (Cleath & Associates, 1995). A composite groundwater contour map developed utilizing data from 1990 and 1994 estimated groundwater elevations in the fractured rock reservoir ranging from about 220 msl to 320 msl, with a westerly gradient. Groundwater elevations within the alluvial basin fluctuated seasonally.

5) Dude Ranch

(a) Bedrock Units

The site of the proposed Dude Ranch is underlain by rock of the Monterey formation. This unit is divided into two sub-units at the site, a silty shale (Tmmb) and a cherty shale (Tmmc). The silty shale consists of bedded, blocky claystone and siltstone that is intensely to very intensely fractured. The cherty shale is dense, brittle, and bedded, and also intensely to very intensely fractured.

(b) Surficial and Soil Units

During reconnaissance mapping by GeoSolutions, Inc., surface deposits (colluvium) consisting of sand, silty sand, silty clay, and clay, were observed. The thickness of the surficial units varied depending upon location, but generally ranged from three to eight feet. Also encountered were localized alluvial deposits of recent age, that comprised sand, silt, clay, and unconsolidated pebbles. The alluvial deposits were found within and along the Los Berros Stream corridor, which forms the southern boundary of the Dude Ranch.

(c) Surface and Groundwater Conditions

Surface drainage is along local drainages toward Los Berros Creek. Per the GeoSolutions report, the depth to groundwater varies depending upon location; near Los Berros Creek, groundwater is within several feet of the ground surface, while in upslope areas, groundwater is deep. No borings drilled by GeoSolutions encountered groundwater. The 1996 Water Resources Availability report prepared by Morro Group for the Bartelson Development Plan was reviewed. Groundwater in this area is found predominantly in two ground water storage units; the alluvial ground water basin along Los Berros Canyon and the fractured tuff reservoir within the Obispo formation, (Cleath & Associates, 1995). A composite groundwater contour map developed utilizing data from 1990 and 1994 estimated groundwater elevations in the fractured rock reservoir ranging from about 220 msl to 320 msl, with a westerly gradient. Groundwater elevations within the alluvial basin fluctuated seasonally.

c. Soil Classifications

Based on the *Soil Survey of San Luis Obispo County, California Coastal Part* soil survey maps, 17 soil units are present within the project site (United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS); September 1984). General soil characteristics are shown in Table V.A.-1.

TABLE V.A.-1
General Soil Characteristics

Soil Type	Available water capacity	Permeability	Shrink-swell Potential	Rate of Surface Water Runoff	Water Erosion Hazard
Chamise shaly loam, 9-15% slopes	Very low to low	Very slow	M	Medium	Moderate
Chamise shaly loam 15-30% slopes	Very low to low	Very slow	M	Rapid	High
Chamise shaly sandy clay loam 5-9% slopes	Very low to low	Very slow	M	Medium	Moderate
Diablo and Cibo clays 9-15% slopes	Moderate to very high	Slow	H	Medium	Moderate
Diablo and Cibo clays 15-30% slopes	Very low to moderate	Slow	H	Rapid	Moderate
Gazos-Lodo clay loams 30-50% slopes	Very low to low	Moderate	M	Rapid	High
Lodo-rock outcrop complex 9-30% slopes	Very low to low	Moderate	M	Medium to rapid	Moderate to high
Lopez very shaly clay loam 30-75% slopes	Very low	Moderate	L	Rapid to very rapid	High to very high

Soil Type	Available water capacity	Permeability	Shrink-swell Potential	Rate of Surface Water Runoff	Water Erosion Hazard
Nacimiento silty clay loam 15-30% slopes	Low to moderate	Moderately slow	M	Rapid	High
Nacimiento silty clay loam 30-50% slopes	Low to moderate	Moderately slow	M	Rapid	High
Nacimiento silty clay loam 50-75% slopes	Low to moderate	Moderately slow	M	Very rapid	Very high
Nacimiento-Calodo complex 30-50% slopes	Very low to low	Moderately slow	M	Rapid	High
Rock outcrop – Lithic Haploxerolls complex 30-75% slopes	n/a	n/a	n/a	n/a	n/a
Santa Lucia shaly clay loam 30-50% slopes	Very low to low	Moderate	L	Rapid	Moderate to high
Still gravelly sandy clay loam 0-2% slopes	Moderate	Moderately slow	M	Slow	Slight
Still gravelly sandy clay loam 2-9% slopes	Moderate to high	Moderately slow	M	Slow to medium	Slight
Xerorthents, escarpment	n/a	n/a	n/a	Rapid	High

Source: Soil Survey of San Luis Obispo County, California Coastal Part, United States Department of Agriculture Soil Conservation Service (September 1984)

d. Regional Faulting and Seismicity

The project site is located in a region traditionally characterized by moderate to high seismic activity, with several active faults. The Los Osos, Hosgri, Los Alamos, and San Andreas faults are the most significant regional active faults within a 65-mile radius of the site, which could affect the proposed development during its anticipated lifespan (refer to Figure V.A.-2, Historic Earthquake/Fault Map). The locations of the mapped Holocene active faults, their distance from the site, and moment magnitudes are presented in Table V.A.-2.

The closest mapped fault to the site, but not considered active, is the San Luis Range fault system. The San Luis Range fault system is generally defined as late Pleistocene age. The San Luis Range fault system includes the San Luis Bay fault, the Wilmar Avenue fault, the Olsen fault, and the Santa Maria River fault. The exact location of the Wilmar Avenue fault is unknown; it has poor geomorphic expression and is exposed only in the seacliff near Wilmar Avenue in Pismo Beach. In the vicinity of the site, two alignments of the Wilmar fault along the U.S. Highway 101 corridor have been depicted by Hanson, et al (1994) and Fugro (1995). One of these alignments crosses the western portion of the site. The Wilmar Avenue fault and the Santa Maria River fault were classified by Jennings (1994) as potentially active; GeoSolutions states that Pliocene to possibly early Pleistocene age suggests this is a “Quaternary active” fault (GeoSolutions, 2006). While the Wilmar fault is not classified as active by any of the references cited by GeoSolutions (2004), Nitchman and Slemmons (1994) state that, in reference to the eastern section of the Wilmar Avenue fault, “because there is no surface expression of the blind master fault, the lack of fault scarps or other surface phenomena does not preclude the possibility of Holocene activity along this section."

The Oceano fault is a 13-mile long northwest-trending fault that lies approximately 1.5 miles southwest of the site. This fault was characterized by Jennings (1994) as potentially active; offshore geophysical data suggest that the fault has not been active in the late Pleistocene or Holocene.

A moment magnitude 6.5 earthquake occurred in the San Simeon area on December 22, 2003. This event may have occurred on the Oceanic-West Huasna fault; a trace of this fault lies approximately one mile east of the property. GeoSolutions, Inc. states that until more specific information regarding this fault is available, this fault should be considered an active fault.

The site is not located within an identified Alquist Priolo Earthquake Fault Zone (Jennings, 1994). Documented faults are shown in Figure V.A.-2.

TABLE V.A.-2
Significant Mapped Faults and Their Characteristics in the Site Region

Fault Name (Age of Most Recent Movement)	Closest Distance to Site[1] (mi)	Moment Magnitude[1] (mw)	Est. Slip Rate[1] (mm/yr)	Recurrence Interval[2]	Fault Type
Hosgri (Holocene)	15	7.3	1.26	646	B
Los Osos, Irish Hills segment (Holocene)	15	6.8	0.50	1925	B
Los Alamos (Holocene)	26	6.8	0.70	1512	B
San Andreas, 1857 rupture (historical)	39	7.8	34.00	206	A
San Andreas, Parkfield segment (historical)	55	6.7	34.00	25	A

[1] Appendix A, Peterson, CDMG Open File Report 96-08.
[2] Table 16 A-U - Seismic Source Type, CBC

e. Geologic Hazards

Grading of approximately 48.39 acres of the project site to construct internal roads, water infrastructure, drainage improvements, utility installation, the equestrian facility, and the ranch headquarters is proposed; approximately 300,500 cubic yards of cut and 150,500 cubic yards of fill are anticipated.

1) Phase One

(a) Landslide and Rockfall Hazard

A landslide is defined as downslope movement, under gravitational influence, of soil and rock materials en masse. Typically, the displaced material moves over a relatively confined zone or a surface of shear. Based upon site reconnaissance and subsurface investigation, GeoSolutions identified several landslides in the vicinity of the proposed development areas. None of these lots are situated in Phase One; however, it appears that soil movement has recently occurred in the vicinity of lot 15. GeoSolutions attributes this to a surficial failure of a cut slope for an access roadway (GeoSolutions, 2006).

Rockfall is precipitous movement of rocks or newly detached segments of bedrock down the face of a steep slope or cliff. Movement may be straight down or in a series of leaps or bounds; it is not confined or guided by an underlying slip surface. The potential for rockfall, as described in the GeoSolutions report, was considered low based upon the lack of boulders or perched rocks on upslope areas, and the absence of these rocks on lower areas. During our site reconnaissance, we observed that some lots (such as lot 11) were situated in steep terrain studded with boulders. In one area, numerous cobbles and small boulders that had rolled down a slope and accumulated behind a fence were observed. GeoSolutions attributes the boulders to disturbance by past grading activities and grazing of livestock (GeoSolutions, 2006).

(b) Cut and Fill Slopes

In addition to road, utility, and facility improvements, each residential lot would be graded individually; grading activities are expected to result in disturbance to the entire lot. Due to the topography, grading of some lots is likely to entail significant cut and fill slopes, and construction of retaining walls may be necessary in some areas. Grading activities can create a potential for slope failure, such as when material is improperly removed from the base of a slope.

(c) Erosion

Generally, due to their clayey nature, the surface materials in their natural state are considered to have a low erosion potential. The potential for erosion could be significant, however, if site development activities result in concentration of drainage, or uncontrolled surface drainage, or if soils that are more prone to erosion are imported to the site during grading.

(d) Asbestos

Naturally-occurring asbestos is generally associated with serpentinite, a material that is often present within the Franciscan Complex. According to Cross Section A-A' of the Geosolutions report, (Geosolutions, Inc. 2004) bedrock of the Franciscan complex underlies the Paso Robles formation in the area of the project south of Highway 101 at depths ranging from approximately 50 to 100 feet below ground surface. Rocks of the Franciscan complex are not depicted as underlying any other portion of the project area to depths in excess of 500 feet (Geosolutions, Inc. 2004). Figures B-1 through B-3 of the *Environmental Assessment of Water Resources Availability for the Bartleson Development Plan* (Morro Group, 1996), depict Blue Shale bedrock of the Franciscan complex at a depth of approximately 80 feet south of Highway 101 near the project site. On the north side of the highway, the Franciscan bedrock has been cut off by the Wilmar Avenue fault. These findings are supported by the Geologic Map of the Arroyo Grande Quadrangle (C. A Hall, 1973).

As no Phase One development is proposed that would directly overlie the Franciscan Complex material, and the depth to this bedrock unit is such that it would not be encountered during trenching, the potential for asbestos to impact the project is considered low.

(e) Subsidence

Subsidence is the sinking, or downward settling, of the ground surface relative to the surrounding area, with little or no horizontal movement. Significant land subsidence in California is generally related to dewatering or withdrawal of oil or gas from the soil, hydrocompaction of dry, loose, clayey soils, or oxidation of organic materials. Due to the presence of shallow bedrock, the potential for subsidence to occur at the site is considered low.

(f) Volcanic Eruption

Volcanoes and volcanic activity in California are typically confined to the Cascade Ranges Geomorphic Province (Northern California) and the Basin and Range Province on the eastern side of the Sierra Nevada Mountains. The potential for volcanic eruption to impact the site is considered to be low.

(g) Expansive Soils

Colluvium, which is found throughout the site, is considered expansive.

(h) Springs and Seeps

No springs or seeps were observed within the Phase One area.

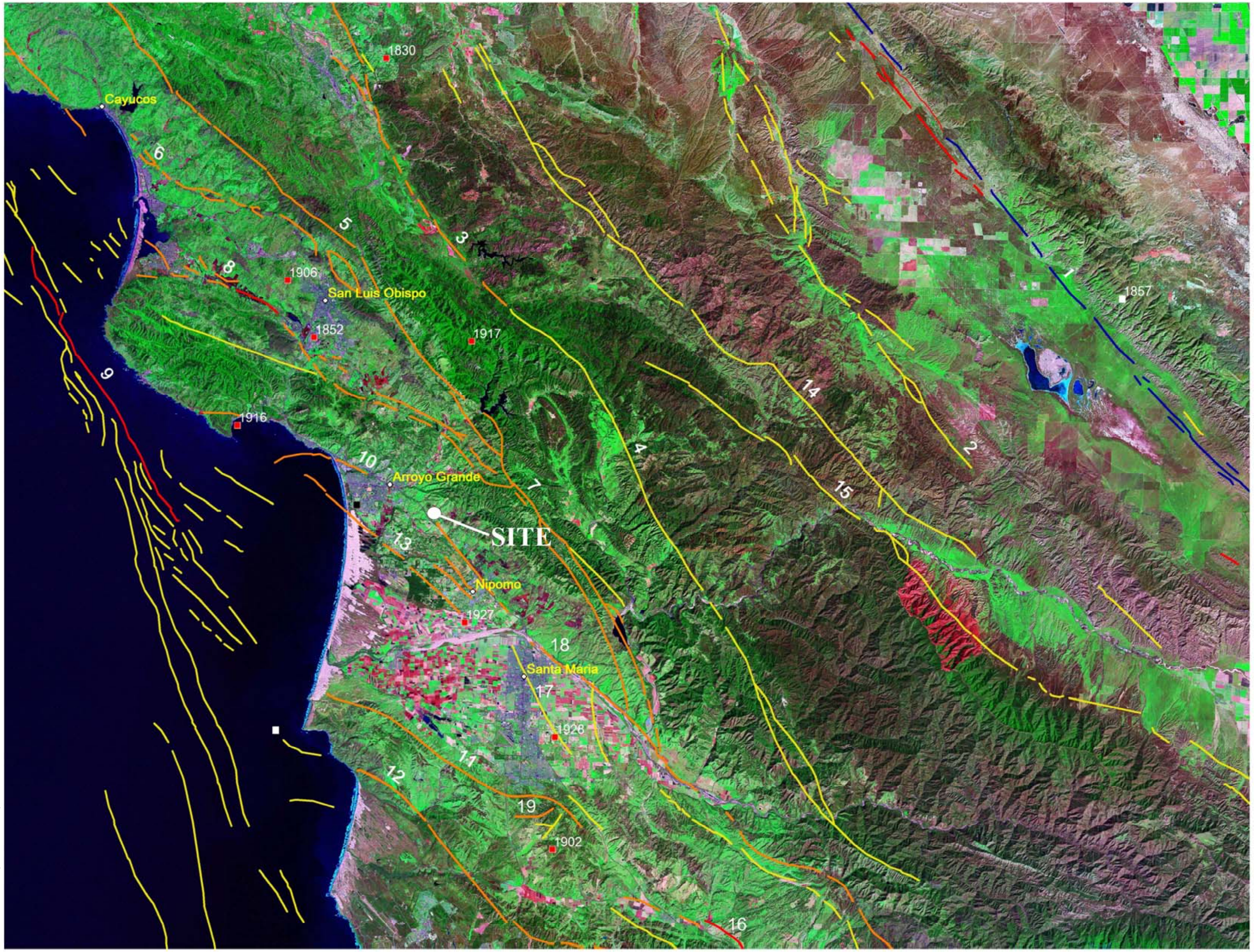
(i) Radon Gas

The Monterey formation is a potential source of radon (Churchill, 1997). Monterey formation is present along the northeastern most portion of Phase One. Based upon the geologic maps prepared by GeoSolutions, it appears to underlie the proposed building sites for Lots 37 and 38.

2) Phase Two

(a) Landslide and Rockfall Hazard

A landslide is defined as downslope movement, under gravitational influence, of soil and rock materials en masse. Typically, the displaced material moves over a relatively confined zone or a surface of shear. Based upon site reconnaissance and subsurface investigation, GeoSolutions identified several landslides in the vicinity of the proposed development areas. These identified areas do not underlie any of the proposed lots in Phase Two. However, on Lot 54, the ground surface is hummocky, the soil appears loose and disturbed, and there is an arcuate, scarp-like feature at the transition between the outcropping rock and the soil. GeoSolutions states that the location of the proposed residence on this lot lies outside of this area within an area of shallow bedrock.



Source: Earth Systems Pacific

FAULT MAP
LAETITIA AGRICULTURAL CLUSTER SUBDIVISION
U.S. Highway 101
Arroyo Grande, California

LEGEND

- Historic rupture (<200 years)
- Holocene fault (<10,000 years)
- Late Quaternary (<700,000 years)
- Quaternary fault (<1.6 million)

HISTORICAL EARTHQUAKE MAGNITUDE

5.0 to 5.9 | 6.0 to 6.9 | 7.0 to 7.9

FAULTS

1	San Andreas	11	Casmalia (Orcutt Frontal)
2	San Juan	12	Lions Head
3	Rinconada	13	Oceano
4	East Huasna	14	La Panza
5	Oceanic	15	South Cuyama
6	Cambria	16	Los Alamos
7	West Huasna	17	Santa Maria
8	Los Osos	18	Santa Maria River
9	Hosgri-San Simeon	19	Casmalia/Orcutt
10	San Luis Range		

Note: Not all faults are shown on map

REFERENCES

Blake, T.F., EQSEARCH, updated 2003
Jennings, C.W, 1994

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(Approximate Scale: 1" = 6 miles)

Historic Earthquake/Fault Map
FIGURE V.A.-2

Back of Figure V.A.-2

Rockfall is precipitous movement of rocks or newly detached segments of bedrock down the face of a steep slope or cliff. Movement may be straight down or in a series of leaps or bounds; it is not confined or guided by an underlying slip surface. The potential for rockfall, as described in the GeoSolutions report was considered low based upon the lack of boulders or perched rocks on upslope areas, and the absence of these rocks on lower areas.

(b) Cut and Fill Slopes

Each residential lot would be graded individually; grading activities are expected to result in disturbance to the entire lot. Due to the topography, grading of some lots is likely to entail significant cut and fill slopes, and construction of retaining walls may be necessary in some areas. Grading activities can create a potential for slope failure, such as when material is improperly removed from the base of a slope.

(c) Erosion

Generally, due to their clayey nature, the surface materials in their natural state are considered to have a low erosion potential. The potential for erosion could be significant, however, if site development activities result in concentration of drainage, or uncontrolled surface drainage, or if soils that are more prone to erosion are imported to the site during grading.

(d) Asbestos

Naturally-occurring asbestos is generally associated with serpentinite, a material that is often present within the Franciscan Complex. According to Cross Section A-A' of the Geosolutions report, (Geosolutions, Inc. 2004) bedrock of the Franciscan complex underlies the Paso Robles formation in the area of the project south of Highway 101 at depths ranging from approximately 50 to 100 feet below ground surface. Rocks of the Franciscan complex are not depicted as underlying any other portion of the project area to depths in excess of 500 feet (Geosolutions, Inc. 2004). Figures B-1 through B-3 of the Morro Group *Water Resources Availability* report depict Blue Shale bedrock of the Franciscan complex at a depth of approximately 80 feet south of Highway 101 near the project site. On the north side of the highway, the Franciscan bedrock has been cut off by the Wilmar Avenue fault. These findings are supported by the Geologic Map of the Arroyo Grande Quadrangle (C. A Hall, 1973).

As no Phase Two development is proposed that would directly overlie the Franciscan Complex material, and the depth to this bedrock unit is such that it would not be encountered during trenching, the potential for asbestos to impact the project is considered low.

(e) Subsidence

Subsidence is the sinking, or downward settling of the ground surface relative to the surrounding area, with little or no horizontal movement. Significant land subsidence in California is generally related to dewatering or withdrawal of oil or gas from the soil, hydrocompaction of dry, loose, clayey soils, or oxidation of organic materials. Due to the presence of shallow bedrock, the potential for subsidence to occur is considered low.

(f) Volcanic Eruption

Volcanoes and volcanic activity in California is typically confined to the Cascade Ranges Geomorphic Province (Northern California) and the Basin and Range Province on the eastern side of the Sierra Nevada Mountains. The potential for volcanic eruption to impact the site is considered to be low.

(g) Expansive Soils

Colluvium, which is found throughout the site, is considered expansive.

(h) Springs and Seeps

No springs or seeps were observed within areas proposed for Phase Two development.

(i) Radon Gas

The Monterey formation is a potential source of radon (Churchill, 1997). While Monterey formation is present along the northernmost portion of Phase Two, it does not underlie any of the proposed Phase Two building sites.

3) Phase Three

(a) Landslide and Rockfall Hazard

A landslide is defined as downslope movement, under gravitational influence, of soil and rock materials en masse. Typically, the displaced material moves over a relatively confined zone or a surface of shear. Based upon site reconnaissance and subsurface investigation, GeoSolutions identified several landslides in the vicinity of the proposed development areas. According to GeoSolutions, Lots 94 through 97, 100, and 101 lie within landslide debris, depicted as Qls on Figure 1. One of these landslide areas is above Lots 90 and 91; however, GeoSolutions indicates that that, in their opinion, the trajectory of the landslide debris is not likely to be toward Lots 90 and 91. Borings drilled in landslide areas encountered landslide deposits to depths of up to 47 feet. The report states that the landslide debris is considered ancient, as no features suggesting recent movement were observed. During a site reconnaissance performed by this firm, a break in the slope was observed on Lots 82 through 85, which could be indicative of landslide activity. After reviewing this feature, GeoSolutions has stated that it is their opinion that the topographic break in slope is due to a formational contact rather than landslide activity.

Rockfall is precipitous movement of rocks or newly detached segments of bedrock down the face of a steep slope or cliff. Movement may be straight down or in a series of leaps or bounds; it is not confined or guided by an underlying slip surface. The potential for rockfall, as described in the GeoSolutions report was considered low based upon the lack of boulders or perched rocks on upslope areas, and the absence of these rocks on lower areas.

(b) Cut and Fill Slopes

Each residential lot would be graded individually; grading activities are expected to result in disturbance to the entire lot. Due to the topography, grading of some lots is likely to entail significant cut and fill slopes, and construction of retaining walls may be necessary in some areas. Grading activities can create a potential for slope failure, such as when material is improperly removed from the base of a slope.

(c) Erosion

Generally, due to their clayey nature, the surface materials in their natural state are considered to have a low erosion potential. The potential for erosion could be significant, however, if site development activities result in concentration of drainage, or uncontrolled surface drainage, or if soils that are more prone to erosion are imported to the site during grading.

(d) Asbestos

Naturally-occurring asbestos is generally associated with serpentinite, a material that is often present within the Franciscan Complex. According to Cross Section A-A' of the Geosolutions report, (Geosolutions, Inc. 2004) bedrock of the Franciscan complex underlies the Paso Robles formation in the area of the project south of Highway 101 at depths ranging from approximately 50 to 100 feet below ground surface. Rocks of the Franciscan complex are not depicted as underlying any other portion of the project area to depths in excess of 500 feet (Geosolutions, Inc. 2004). Figures B-1 through B-3 of the Morro Group *Water Resources Availability* report depict Blue Shale bedrock of the Franciscan complex at a depth of approximately 80 feet south of Highway 101 near the project site. On the north side of the highway, the Franciscan bedrock has been cut off by the Wilmar Avenue fault. These findings are supported by the Geologic Map of the Arroyo Grande Quadrangle (C. A Hall, 1973).

As no Phase Three development is proposed that would directly overlie the Franciscan Complex material, and the depth to this bedrock unit is such that it would not be encountered during trenching, the potential for asbestos to impact the project is considered low.

(e) Subsidence

Subsidence is the sinking, or downward settling, of the ground surface relative to the surrounding area, with little or no horizontal movement. Significant land subsidence in California is generally related to dewatering or withdrawal of oil or gas from the soil, hydrocompaction of dry, loose, clayey soils, or oxidation of organic materials. Due to the presence of shallow bedrock, the potential for subsidence to occur at the site is considered low.

(f) Volcanic Eruption

Volcanoes and volcanic activity in California is typically confined to the Cascade Ranges Geomorphic Province (Northern California) and the Basin and Range Province on the eastern side of the Sierra Nevada Mountains. The potential for volcanic eruption to impact the site is considered to be low.

(g) Expansive Soils

Colluvium, which overlies the bedrock and is present throughout the site, is considered expansive.

(h) Springs and Seeps

No springs or seeps were observed within areas proposed for development, except in landslide deposits near Lot 92, which lie within the Phase Three area.

(i) Radon Gas

The Monterey formation is a potential source of radon (Churchill, 1997). Monterey formation is present along the northernmost portion of Phase Three. It underlies the proposed building sites for Lots 87, 88, and 89.

4) Wastewater Treatment Facility

(a) Landslide and Rockfall Hazard

A landslide is defined as downslope movement, under gravitational influence, of soil and rock materials en masse. Typically, the displaced material moves over a relatively confined zone and a surface of shear. Based upon site reconnaissance and subsurface investigation, GeoSolutions identified several landslides in the vicinity of the proposed development areas. These identified areas do not underlie the areas for the proposed wastewater treatment facility or the ponds. Our site reconnaissance confirmed that no landslides were visible in the areas of the wastewater treatment facility or the pond sites.

Rockfall is precipitous movement of rocks or newly detached segments of bedrock down the face of a steep slope or cliff. Movement may be straight down or in a series of leaps or bounds; it is not confined or guided by an underlying slip surface. The potential for rockfall, as described in the GeoSolutions report was considered low based upon the lack of boulders or perched rocks on upslope areas, and the absence of these rocks on lower areas.

(b) Cut and Fill Slopes

As the wastewater treatment facility would be constructed on an existing cut and fill pad, only minor additional grading in this area is anticipated. The existing pad appears to be primarily in cut, with fill placed along the eastern margin. More significant grading is planned at the pond sites. With a proposed bottom elevation of 292+/- and a berm elevation of 308+/-, the planned depth of Pond 1 would be about 16 feet. Ponds 2 and 3 would also have depths of about 16 feet, based upon bottom elevations of 340+/- and berm elevations of 356+/-. The slopes surrounding the ponds are planned at grades of 2:1. To achieve the desired configurations of the ponds, excavations of up to 30 feet and fills of up to 6 feet are anticipated, with the most significant grading planned at Pond 1.

(c) Erosion

Generally, due to their clayey nature, the surface materials in their natural state are considered to have a low erosion potential. The potential for erosion could be significant, however, if site development activities result in concentration of drainage, or uncontrolled surface drainage, or if soils that are more prone to erosion are imported to, or excavated from, the site during grading.

(d) Asbestos

Naturally-occurring asbestos is generally associated with serpentinite. According to Cross Section A-A' of the Geosolutions report, (Geosolutions, Inc. 2004) bedrock of the Franciscan complex underlies the Paso Robles formation in the area of the project south of Highway 101 at depths ranging from approximately 50 to 100 feet below ground surface. Rocks of the Franciscan complex are not depicted as underlying any other portion of the project area to depths in excess of 500 feet (Geosolutions, Inc. 2004). Figures B-1 through B-3 of the Morro Group *Water Resources Availability* report depict Blue Shale bedrock of the Franciscan complex at a depth of approximately 80 feet south of Highway 101 near the project site. On the north side of the highway, the Franciscan bedrock has been cut off by the Wilmar Avenue fault. These findings are supported by the Geologic Map of the Arroyo Grande Quadrangle (C. A Hall, 1973).

As the wastewater treatment facility and the ponds will not directly overlie the Franciscan Complex material, and the depth to this bedrock unit is such that it would not be encountered during trenching, the potential for asbestos to impact the project is considered low.

(e) Subsidence

Subsidence is the sinking or settlement of the ground surface relative to the surrounding area, with little or no horizontal movement. Significant land subsidence in California is generally related to dewatering or withdrawal of oil or gas from the soil, hydrocompaction of dry, loose soils, or oxidation of organic materials. Due to the relatively dense nature of the Paso Robles formation, the potential for subsidence to occur is considered low.

(f) Volcanic Eruption

Volcanoes and volcanic activity in California is typically confined to the Cascade Ranges Geomorphic Province (Northern California) and the Basin and Range Province on the eastern side of the Sierra Nevada Mountains. The potential for volcanic eruption to impact the site is considered to be low.

(g) Expansive Soils

Some soil layers within the Paso Robles formation may be expansive.

(h) Springs and Seeps

No natural springs or seeps were observed within the areas proposed for the wastewater treatment facility or Ponds 1, 2, or 3. The construction of the ponds, however, would create a potential for seepage. It is assumed that the ponds would be lined. Seepage could occur, however, in the event of a breach or failure of the pond liner.

(i) Radon Gas

The sites of the wastewater treatment facility and the ponds are underlain by Paso Robles formation, which is not considered a source of radon. While the Monterey formation, which is considered a potential source of radon (Churchill, 1997), is present along the northernmost portion of Phase Two, it does not extend into the wastewater treatment facility or pond sites.

5) Dude Ranch

(a) Landslide and Rockfall Hazard

A landslide is defined as downslope movement, under gravitational influence, of soil and rock materials en masse. Typically, the displaced material moves over a relatively confined zone or a surface of shear. No landslides or topographic features suggestive of landsliding were noted in the area of the Dude Ranch.

Rockfall is precipitous movement of rocks or newly detached segments of bedrock down the face of a steep slope or cliff. Movement may be straight down or in a series of leaps or bounds; it is not confined or guided by an underlying slip surface. The potential for rockfall, as described in the GeoSolutions report was considered low based upon the lack of boulders or perched rocks on upslope areas, and the absence of these rocks on lower areas.

(b) Cut and Fill Slopes

Future grading of the site would be required to construct access roads, water infrastructure, drainage improvements, utility installation, equestrian trails, and structural development. Due to the topography, grading may require significant cut and fill slopes, and construction of retaining walls.

(c) Erosion

Generally, due to their clayey nature, the surface materials in their natural state are considered to have a low erosion potential. The potential for erosion could be significant, however, if site development activities result in concentration of drainage, or uncontrolled surface drainage, or if soils that are more prone to erosion are imported to the site during grading.

(d) Asbestos

Naturally-occurring asbestos is generally associated with serpentinite, a material that is often present within the Franciscan Complex. According to Cross Section A-A' of the Geosolutions report, (Geosolutions, Inc. 2004) bedrock of the Franciscan complex underlies the Paso Robles formation in the area of the project south of Highway 101 at depths ranging from approximately 50 to 100 feet below ground surface. Rocks of the Franciscan complex are not depicted as underlying any other portion of the project area to depths in excess of 500 feet (Geosolutions, Inc. 2004). Figures B-1 through B-3 of the Morro Group *Water Resources Availability* report depict Blue Shale bedrock of the Franciscan complex at a depth of approximately 80 feet south of Highway 101 near the project site. On the north side of the highway, the Franciscan bedrock has been cut off by the Wilmar Avenue fault. These findings are supported by the Geologic Map of the Arroyo Grande Quadrangle (C. A Hall, 1973).

As the dude ranch will not directly overlie the Franciscan Complex material, and the depth to this bedrock unit is such that it would not be encountered during trenching, the potential for asbestos to impact the project is considered low.

(e) Subsidence

Subsidence is the sinking, or downward settling, of the ground surface relative to the surrounding area, with little or no horizontal movement. Significant land subsidence in California is generally related to dewatering or withdrawal of oil or gas from the soil, hydrocompaction of dry, loose, clayey soils, or oxidation of organic materials. Due to the presence of shallow bedrock, the potential for subsidence to occur at the site is considered low.

(f) Volcanic Eruption

Volcanoes and volcanic activity in California is typically confined to the Cascade Ranges Geomorphic Province (Northern California) and the Basin and Range Province on the eastern side of the Sierra Nevada Mountains. The potential for volcanic eruption to impact the site is considered to be low.

(g) Expansive Soils

Colluvium, which is present across the site, is considered expansive.

(h) Springs and Seeps

No springs or seeps were observed at the Dude Ranch site.

(i) Radon Gas

The Monterey formation is a potential source of radon (Churchill, 1997). Monterey formation underlies the proposed location of the Dude Ranch.

f. Seismically Induced Hazards

1) Ground Shaking

The project site is likely to be subject to strong, and possibly violent, seismic ground shaking within the design life of the development. GeoSolutions, Inc. estimated peak ground accelerations (PGA) at the site. PGA is a measure of ground acceleration due to shaking, and is a function of the distance of the site from a seismic source, the type and magnitude of the fault movement, the density (as indirectly indicated by shear wave velocity) of the soil or rock, and the period of time under consideration. The California Building Code (CBC) requires use of the PGA with a 10 percent probability of being exceeded in 50 years, or a 475-year return period (CDMG, 1999, ICBO, 2001). According to CDMG Map Sheet 48, the PGA for the site is approximately 0.2g to 0.4g. A probabilistic seismic hazard performed by GeoSolutions using the computer model program FRISKSP (Blake, 2000), resulted in a PGA with a ten percent probability of being exceeded in 50 years of approximately 0.38g. This event is also referred to as the Design Basis Earthquake (DBE).

2) Ground Surface Rupture Due to Faulting

The potential for ground rupture to occur during ground shaking is considered low as the site is not located within an identified Earthquake Fault Zone and the closest known Holocene-age active fault is the Hosgri fault, which is about 15 miles from the site.

3) Liquefaction

According to GeoSolutions (2004), due to the density of the subsurface deposits and the presence of near surface bedrock, the liquefaction potential at the site is considered to be low.

4) Seismic Settlement Potential

Due to the density of the subsurface deposits and the clayey composition of the subsurface soil, the potential for seismically-induced settlement is considered to be low.

5) Tsunamis and Seiches

Tsunamis and seiches are two types of water waves that are generated by earthquake events. The potential for a tsunami to affect the site is very low due to its distance from the ocean. A seiche is a single water wave that can be generated in a reservoir, pond, or swimming pool as the result of long-period surface waves normally generated by strong local earthquakes or larger earthquakes at farther distances. Currently, there are two reservoirs at the site. The applicant proposes to remove and relocate the northern reservoir, which is currently located in the vicinity of Lots 1 through 3. When this occurs, there would be no potential for seiche to affect the project due to the absence of water bodies upslope of the proposed development area.

There are no water bodies in the immediate vicinity of the wastewater treatment facility; consequently the potential for a seiche to affect this structure is low. There is a potential for seiches to occur in the proposed ponds.

6) Seismically Induced Slope Failure

There is a moderate to high potential for slope failure due to seismic activity in areas of existing landslides as well as in areas of moderate to steeply sloping sites with a thick soil layer overlying the bedrock. There are no mapped landslides within the Phase One and Phase Two areas. In Phase Three, there are several lots located within landslide debris that have a moderate to high potential for seismically-induced slope failure. Lots 94 through 97, 100, and 101 are shown in the report as lying within landslide debris, depicted as Qls on Figure V.A.-1. Borings drilled in landslide areas encountered landslide deposits to depths of up to 47 feet.

No landslides or topographic features suggestive of landsliding were noted in the area of the Dude Ranch. There were no borings drilled by GeoSolutions at the Dude Ranch site, however, so the depth of soil overlying the bedrock is unknown.

2. Regulatory Setting

a. Federal Polices and Regulations

There are no known federal policies or regulations relating to geologic hazards that are applicable.

b. State Policies and Regulations

Regulations that are applicable to geologic, seismic, and soil hazards may include Alquist-Priolo Earthquake Fault Zoning Act of 1972 and updates (AP, Public Resources Code, Section 2621, et seq.), State-published Seismic Hazards maps, and provisions of the applicable edition of the California Building Code. There are no Earthquake Fault Zones established at or in the near vicinity of the site, and procedures and regulations as recommended by the California Geological Survey for investigations conducted in such zones do not specifically apply.

Sections 17922 and 17951-17958.7 of the California Health and Safety Code requires cities and counties to adopt and enforce the current edition of the California Building Code (CBC), including a grading section. The County of San Luis Obispo enforces these provisions, and has elected to utilize Appendix Chapter 33 of the 2001 CBC with respect to grading regulations, rather than adopt Appendix J of the 2007 CBC. Sections of Volume 2 of the California Building Code specifically apply to select geologic hazards. Chapter 16 of the 2007 CBC addresses requirements for seismic safety, including criteria for construction of earthquake resistant structures. Information typically required for design includes soil profile type, ground shaking parameters, and proximity to significant faults. Chapter 18 regulates excavation, foundations, and retaining walls. Chapter 33 contains specific requirements pertaining to site demolition, excavation and construction. Appendix Chapter 33 of the 2001 CBC addresses grading activities, including drainage and erosion control.

c. Local Policies and Regulations

Government Code Sections 65302.1 requires a safety element for the protection of the community from geologic hazards that must include features to minimize risks associated with these hazards. Safety Element, San Luis Obispo County General Plan, adopted by the County of San Luis Obispo Board of Supervisors December 14, 1999, Resolution 99-559, presents policies and implementation measures with respect to geologic and seismic hazards, with the objective of minimizing the potential for loss of life and property. The policies address hazards associated with seismicity, fault rupture, groundshaking, liquefaction and seismic settlement, slope instability, landslides, and coastal bluff erosion. In accordance with this regulation, the proposed project shall be designed to comply and be consistent with the Safety Element of the San Luis Obispo County General Plan.

Also applicable to the project are Chapter 22 of the County of San Luis Obispo Land Use Ordinance (LUO), 2002 edition, and Title 19, Building and Construction Ordinance of the San Luis Obispo County Code. Article 5, Chapter 22.52 of the LUO establishes standards for grading and excavation activities. Grading, sedimentation, and erosion control are addressed in Section 19.20.090 of Title 19, Building and Construction Ordinance of the San Luis Obispo County Code.

3. Thresholds of Significance

The thresholds of a significant soils hazard, geologic, or seismic impact is that which could result in the following:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State

Geologist…or other substantial evidence of a known fault, as well as strong seismic ground shaking, seismic-related ground failure, or landslides.
- Result in substantial soil erosion or the loss of topsoil.
- Result in the loss of a unique geologic feature.
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Be located on expansive soil, creating substantial risks to life or property.

4. Impact Assessment and Methodology

To assess the impacts of the proposed project with respect to geologic and soil conditions, the referenced above *Engineering Geology Investigation and Preliminary Soil Engineering Report* prepared by GeoSolutions was peer reviewed. Comments presented in the peer review were addressed by GeoSolutions (GeoSolutions, 2006). In addition, a site reconnaissance was undertaken by Morro Group sub-consultants, Richard T. Gorman and Dennis Shallenberger, a Certified Engineering Geologist and a Registered Geotechnical Engineer, respectively. The soil/geologic conditions were visually observed in each of the phases proposed for development. Available maps, geologic literature, and aerial photographs were also reviewed.

Soils, along with geologic and seismic hazards, as identified based upon the report/literature reviews and the site reconnaissance, were evaluated with respect to significance within the context of Appendix G of the CEQA Guidelines.

5. Project-specific Impacts and Mitigation Measures

a. Project-wide

1) Geologic and Soils Hazards

(a) Insignificant Hazards

The potentials for impacts to the project related to subsidence, volcanic eruption, asbestos, and springs/seeps are considered insignificant (Class III) due to the absence of site conditions that would create a significant potential for such occurrences. For the wastewater treatment facility and residential lots, the potential for springs/seeps is considered insignificant (Class III).

(b) Landslide and Rockfall

A landslide is defined as downslope movement, under gravitational influence, of soil and rock materials en masse. Rockfall is precipitous movement of rocks or newly detached segments of bedrock down the face of a steep slope or cliff. Landslide deposits have been identified in or above proposed lots in Phase Three, within and adjacent to Lots 94 through 97, 100, and 101.

GEO Impact 1 **Portions of the project site lie within areas that could be affected by landslides.**

GEO/mm-1 Prior to issuance of grading or building permits for Lots 94 though 97, 100, and 101 (as shown on Tentative Tract Map 2606, refer to Figure III-4) the applicant shall submit a final report prepared by a Certified Engineering Geologist that contains specific recommendations for stabilization of the landslide materials, consistent with the recommendations of the *Engineering Geology Investigation and Preliminary Soil Engineering Report* (GeoSolutions, Inc.; December 10, 2004). The report shall be based upon downhole logging of borings to assess the depth and character of the landslide materials. A numerical slope stability analysis may be necessary to verify slope stability.

Residual Impact With implementation of the above measure, this impact would be considered *less than significant with mitigation, Class II*.

2) Site Alteration and Slope Stability

Grading of the site for the tract improvements (i.e., onsite roads) would involve approximately 200,000 cubic yards of cut and 100,000 cubic yards of fill. Construction of the proposed ranch headquarters and equestrian facility would require approximately 7,500 and 3,000 cubic yards of cut and fill, respectively. For the wastewater treatment facility and the ponds, approximately 90,000 cubic yards of cut and 40,000 cubic yards of fill are anticipated. Due to the sloping topography of the site, grading would require significant cut and fill slopes (i.e., cuts of up to 30 feet are planned to construct Pond 1). It is anticipated that the entirety of each residential lot would be disturbed by future grading activities. Such grading activities can result in slope instability if slope support is compromised (such as when material is removed from the base of slopes) if slopes are over steepened, or if drainage is allowed to flow in an uncontrolled manner over the faces of slopes. Drainage patterns can be disturbed, and concentration of runoff can occur if grading is performed in an improper manner. Slope stability could be compromised in the event of seepage from the ponds into the natural and graded slopes surrounding the ponds.

GEO Impact 2 **Grading activities would result in potentially unstable cut and fill slopes throughout the project, potentially creating a significant hazard. Stability of the natural descending slope in the vicinity of Ponds 2 and 3 could also be compromised if seepage from the ponds occurred.**

GEO/mm-2 Prior to issuance of grading or building permits for tract improvements, the applicant shall submit plans showing that the design and construction of the tract improvements conform to the recommendations presented in the *Engineering Geology Investigation and Preliminary Soil Engineering Report* (GeoSolutions, Inc.; December 10, 2004). Excavation, fill, and construction activities shall conform to Title 19 of the County of San Luis Obispo Building and Construction Ordinance, and the California Building Code.

GEO/mm-3 Prior to issuance of grading permits, the project Engineering Geologist and Soils Engineer shall review the final grading plan. During construction, the project Engineering Geologist and Soils Engineer shall observe grading operations to document conformance with the recommendations of the *Engineering Geology Investigation and Preliminary Soil Engineering Report* (GeoSolutions, Inc.; December 10, 2004). Any unusual subsurface conditions encountered during grading should be brought to the attention of the project Engineering Geologist and Soils Engineer.

GEO/mm-4 Upon application for grading or building permits for individual lot development, individual soils engineering reports, prepared by a Soils Engineer, shall be submitted. The report shall conform to the California Building Code.

GEO/mm-5 Prior to issuance of grading or building permits for the ranch headquarters structures, equestrian facility structures, the dude ranch, the wastewater treatment facility, and the ponds, the applicant shall submit soils engineering reports prepared by a Soils Engineer, and conforming to Sections 1804.2 through 1804.5 and 3309.5 (or other applicable sections) of the California Building Code. As part of the soils engineering report for the ponds, the natural and proposed slopes surrounding the ponds shall be analyzed for stability under static and seismic conditions, and under the conditions that would be present if seepage from the ponds occurred. The recommendations of the individual soils engineering reports shall be implemented during construction, including but not limited to recommendations specific to building pad preparation, roadway grading and construction, foundation preparation and construction, underground facilities construction, retaining wall preparation and construction, and surface and subsurface drainage management..

Residual Impact With implementation of the above measures, this impact would be considered *less than significant with mitigation, Class II*.

3) Expansive Soils

All three phases of the site are mantled with colluvium, which exhibits varying degrees of expansiveness. In the area of the wastewater treatment facility and the ponds, Paso Robles formation materials are present, some of which may also be expansive. Expansive soils tend to swell, or expand, with seasonal increases in soil moisture, and shrink, or contract, as the soils become drier during the summer months. The expansion-contraction cycle can create a substantial risk to property, and can contribute to downslope creep of soils on slopes.

GEO Impact 3 **The surficial soils at the site where development is proposed have the potential to be expansive.**

GEO/mm-6 Prior to issuance of grading or building permits, the project Engineering Geologist and Soils Engineer shall review the final foundation plans for all proposed structures.

GEO/mm-7 Prior to issuance of grading or building permits for individual lot development, the ranch headquarters, equestrian facility structures, the dude ranch, the wastewater treatment facility, and treated effluent storage ponds, the applicant shall submit individual soils engineering reports prepared by a Soils Engineer. The reports shall conform to Sections 1804.2 through 1804.5 and 3309.5 (or other applicable sections) of the California Building Code. The soils reports shall address expansion potential and provide appropriate recommendations, which shall include, but not be limited to: the replacement of expansive native soils with non-expansive engineered fill, conventional continuous and spread footings connected with grade beams, drilled cast-in-place concrete caissons connected with grade beams, post-tensioned foundations, or mat foundations. The recommendations of the soils engineering reports shall be implemented during construction.

Residual Impact With implementation of the above measures, this impact would be considered *less than significant with mitigation, Class II*.

4) Radon Gas Exposure

Radon is a colorless, odorless gas that occurs naturally in some soil and rock formations. When buildings are constructed above radon-bearing soil or rock, the gas can seep upward and gain entrance to the structure via cracks in concrete floors or walls, through floor drains, joints, bricks, or other conduits. Accumulation of radon gas within a structure can create significant health risks. The Monterey formation, which is known to be a potential source of radon, underlies portions of areas to be developed during Phase Two and Phase Three, as well as the dude ranch.

GEO Impact 4 **Buildings sited over Monterey formation materials may be subjected to radon gas.**

GEO/mm-8 Prior to issuance of grading or building permits for development that overlies Monterey formation as determined by individual soils engineering reports (anticipated to be Lots 37 and 38 in Phase 1, Lots 87, 88, and 89 in Phase Three, and the dude ranch) radon gas testing shall be conducted, and the results shall be submitted to the County Planning and Building Department. In the event that radon gas is determined to be present, buildings shall be designed and constructed in accordance with Environmental Protection Agency (EPA) guidelines for minimizing impacts associated with radon gas exposure.

Residual Impact With implementation of the above measure, this impact would be considered *less than significant with mitigation, Class II*.

5) Seismic Hazards

(a) Insignificant Seismic Hazards

The potentials for seismically-induced settlement, liquefaction, and flooding due to tsunamis or seiches are considered insignificant due to the absence of site conditions that would create a significant potential for such occurrences where the lots are proposed and in the areas of the community buildings, the dude ranch, and the wastewater treatment facility. Seiches could occur in the proposed ponds; however, there are no significant improvements planned immediately downslope of the ponds and overflow from the ponds would drain to nearby drainages or Los Berros Creek. As the site is not located in an Earthquake Fault Zone and no structures are planned within 300 feet of the postulated alignments of the Wilmar fault, the potential for fault rupture to affect the project is considered less than significant (Class III). The primary seismic hazards that could impact the project are ground shaking, and seismically-induced slope failure.

(b) Ground Shaking

There is no evidence of active faulting on the project site, therefore the potential for ground rupture is considered to be less than significant (Class III). The site, however, is located in a region traditionally characterized by moderate to high seismic activity, which could result in damage to structures and other improvements. There is a moderate to high potential for seismically induced slope failure in the areas of existing landslides.

GEO Impact 5 **Structures may be subjected to strong ground shaking and associated damage due to seismic activity.**

Implement GEO/mm-4.

GEO/mm-9 Prior to issuance of grading or building permits, the applicant shall submit plans for structures that shall be designed in accordance with the seismic parameters presented in the *Engineering Geology Investigation and Preliminary Soil Engineering Report* (GeoSolutions, Inc.; December 10, 2004) and the applicable sections of the California Building Code. The project Engineering Geologist and Soils Engineer shall review the final foundation plans. If any inhabitable structures are planned within 300 feet of either of the postulated alignments of the Wilmar fault, a fault investigation by a Certified Engineering Geologist should be performed to determine the absence or presence of faulting.

Residual Impact With implementation of the above measures, this impact would be considered *less than significant with mitigation, Class II*.

GEO Impact 6 **Seismically-induced slope failure could occur in areas of existing landslides or in the slopes surrounding the ponds.**

GEO/mm-10 Prior to issuance of a construction permits for development within Phase Three, including individual lot development, water tank construction, and tract road improvements, the applicant shall submit individual soil engineering reports prepared by a Certified Engineering Geologist. The recommendations of the report shall be implemented during construction. The report shall include, but not be limited to, the following:

a. Specific recommendations for stabilization of the landslide materials, including but not limited to removal of landslide debris and replacement with engineered fill.
b. A numerical slope stability analysis under seismic conditions may be necessary to verify slope stability.
c. Analysis of the stability of the slopes surrounding the ponds under seismic conditions, and under the conditions that would be present in the event of seepage from the ponds.

Residual Impact With implementation of the above measure, this impact would be considered *less than significant with mitigation, Class II*.

6. Cumulative Impacts

Implementation of the pending and approved projects listed in the cumulative development scenario would increase development in the immediate region. Additional development, including the proposed project, would increase the number of people and structures exposed to a variety of geologic and soils hazards within the County. Potential impacts related to geologic, soils, and seismic hazards are all site-specific, and mitigation measures are applied to each project to minimize the potential for significant geologic impacts. All development projects are required to comply with State and local regulations regarding grading and construction; therefore, no cumulative impacts related to these issues have been identified.

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