4.6 GEOLOGY AND SOILS

This section provides a discussion of the existing geologic and soils environment and an analysis of potential impacts from implementation of the proposed Ganahl Lumber Project (proposed project). This section also addresses the potential for structural damage due to the local geology underlying the project site, as well as slope stability, ground settlement, soil conditions, grading, and regional seismic conditions. In addition, this section analyzes the potential for the proposed project to affect unknown paleontological resources on or within the vicinity of the project site. This section summarizes information provided in the *Updated Geotechnical Investigation Report and Response to Third Party Review, Proposed Ganahl Lumber Facility Development San Juan Capistrano, California* (Geotechnical Investigation) (November 2018) prepared by Willdan Engineering Geotechnical Group and the *Paleontological Resources for the Proposed Ganahl Lumber Project, ECORP Project # 2017-208, in the City of San Juan Capistrano, Orange County, Project Area (*Paleontological Resources Records Search) (June 2018) prepared by Samuel A. McLeod at the Natural History Museum of Los Angeles County. The Geotechnical Investigation and the Paleontological Resources Records Search are included in Appendix F of this EIR.

4.6.1 Scoping Process

The City of San Juan Capistrano (City) received 11 comment letters during the public review period of the Initial Study/Notice of Preparation (IS/NOP). For copies of the IS/NOP comment letters, refer to Appendix A of this EIR. One of the comment letters included comments related to Geology and Soils. The letter from the City of Dana Point received on June 28, 2019, raised concerns regarding seismic and liquefaction hazards affecting the Stonehill Drive bridge and the San Juan Creek levee.

4.6.2 Methodology

4.6.2.1 Geology and Soils

To assess the impacts of the proposed project with respect to geologic and soil conditions, a field exploration was undertaken by Willdan Engineering as part of the Geotechnical Investigation. The scope of the exploration included background review, geologic mapping, field exploration including soil borings, laboratory tests, engineering analysis, and report preparation.

Soils and geologic and seismic hazards, as identified in the Geotechnical Investigation, were assessed with respect to significance within the context of Appendix G of the Guidelines for the California Environmental Quality Act (*State CEQA Guidelines*) and the City's Initial Study Checklist.

4.6.2.2 Paleontological Resources

The existing conditions for paleontological resources in the proposed project area were determined through a fossil locality search conducted at the Natural History Museum of Los Angeles County (LACM). The purpose of the locality search was to identify previously recorded or otherwise known fossil localities in or adjacent to the project area; and to obtain information about the geological setting of the project area and the potential for geological formations underlying the project area for containing fossils.

4.6.3 Existing Environmental Setting

4.6.3.1 Site Description and Topography

The existing project site is generally rectangular and is bound by Stonehill Drive to the South, the Los Angeles – San Diego – San Luis Obispo (LOSSAN) rail corridor to the east, an existing mobile home park to the north, and the San Juan Creek to the west. The San Juan Creek drainage extends in a southwesterly direction from the Santa Ana Mountains in the eastern area of Orange County to the area near the project site, where it eventually flows to the Pacific Ocean. Due to its proximity to the San Juan Creek, the project site is located within a historic floodplain.

The site is presently used as an automobile storage area and occasionally as an illegal dump site. Access to the site is restricted by perimeter fencing.

4.6.3.2 Regional and Local Geologic Setting

The project site is located within the southern portion of the Central Block of the Los Angeles Basin. The Los Angeles Basin is a northwest trending alluvial plain that is approximately 50 miles long and 20 miles wide. The Los Angeles Basin is part of the Peninsular Ranges Geomorphic Province of California, which is characterized by regional compression associated with the San Andres Fault and sub-parallel blocks sliced longitudinally by young, steep northwest trending fault zones. The Los Angeles Basin is in an area with active sedimentation.

4.6.3.3 Subsurface Conditions

The project site is located in an area generally underlined by estuarine deposits of the San Juan Creek floodplain. As such, some of these areas have been modified by the addition of artificial fill. Artificial fill materials predominately include fine-grained materials, such as silt and clay. Artificial fill materials also appear within the levee system of the San Juan Creek drainage near the western boundary of the project site. In this area, Artificial Fill consists of silty sand and poorly graded sand.

In the hillside areas east of the site, hills and ridges are composed of sedimentary bedrock of the Miocene age. Numerous landslides have been mapped within Capistrano Formation bedrock in these areas, and in other areas east of the site.

4.6.3.4 Groundwater Conditions

Groundwater depth is affected by seasonal fluctuations of rainfall and environmental changes, such as irrigation, pumping, or the flow of the adjacent San Juan Creek. Groundwater was encountered or measured between approximately 18 to 22 feet (ft) below ground surface (bgs) (between 117.7 and 131 ft above mean sea level (amsl) on the project site.

4.6.3.5 Seismicity and Faulting

As stated above, the project site is located within the Peninsular Range Geomorphic Province, which is dominated by northwest-trending, faults zones. A fault is described as the area where two tectonic or continental plates meet. An “active” fault is defined by the State of California as having had surface displacement within the Holocene time (i.e., within the last 11,000 years). A “potentially

active" fault is defined as showing evidence of surface displacement during the Quaternary time (i.e., during the last 1.6 million years).[1]

The project site would potentially be affected by seismically active faults in the region. Several active and potentially active faults have been mapped within several miles of the property. However, there are no known active or potentially active faults or fault traces crossing the site. Therefore, the project site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone.

Regional geologic mapping by the State shows that the closest active fault is the Newport-Inglewood-Rose Canyon Fault (Dana Point section), located approximately 3.7 miles south and southwest of the site. A significant contribution to potential ground motion is also associated with the San Joaquin Hills Fault, which is located 5.6 miles northwest of the site. The Newport-Inglewood-Rose Canyon Fault is a right-lateral fault in Southern California. The fault extends for 75 kilometers (46 miles) from the Santa Monica Mountains southeast to the offshore area of the City. This zone has a history of moderate to high seismic activity and has produced numerous earthquakes higher than magnitude (Mw) 4.0, including the March 11, 1993, Mw, 6.3 Long Beach earthquake. The fault is considered capable of producing an earthquake with an Mw of 6.0–7.4.[2]

Non-Seismic Geologic Constraints.

Erosion. The erosion potential of soil is governed by the physical properties of the soil along with environmental factors such as rainfall, wind, topography, and vegetative cover. Erosion typically occurs from concentrated runoff on unprotected slopes or along unlined channels underlain by relatively erosion-prone earth materials (e.g., topsoil, soft alluvium, uncemented sandstone).

As previously stated, the site contains Artificial Fill materials that consist primarily of fine-grained materials, such as silt and clay, which may be easily eroded under conditions of uncontrolled, concentrated surface runoff.

Expansive Soils. Expansive soils contain types of clay minerals that occupy considerably more volume when they are wet or hydrated than when they are dry or dehydrated. Volume changes associated with changes in the moisture content of near-surface expansive soils can cause uplift or heave of the ground when they become wet or, less commonly, cause settlement when they dry out.

As previously stated, upper layers of soil on the site consist of Artificial Fill. The expansion potential for on-site soils is unknown at this time; however, undocumented fill on site includes clay at varying moisture contents, and as such may be potentially expansive.

Subsidence. Subsidence is the sinking or settlement of the ground surface relative to the surrounding area, with little or no horizontal movement. Four types of land subsidence are known to occur in California. In descending order of significance, these are (1) subsidence

1 Department of Conservation, Division of Mines and Geology. Fault-Rupture Hazard Zones in California. 1997.

2 Southern California Earthquake Data Center. *Newport-Inglewood Fault Zone.* July 2009.

caused by aquifer system compaction related to the lowering of groundwater levels, generally due to pumping activities, (2) subsidence caused by hydrocompaction of soils above the groundwater table, (3) subsidence related to extraction of oil and gas deposits, and (4) subsidence related to seismic activity.

The project does not have an oil, gas, or water pump on site and has not been used for the extraction of any of these resources. In addition, the site is not located in an area with documented subsidence.[1]

Corrosive Soils. Corrosive soils contain chemical constituents that may cause damage to construction materials such as concrete and ferrous metals. One such constituent is water-soluble sulfate, which, if high enough in concentration, can react with and damage concrete. Electrical resistivity, chloride content, and percentage of hydrogen (pH) level are indicators of the soil's tendency to corrode ferrous metals.

The potential for corrosive soils on the site is unknown at this time.

Seismically Induced Hazards.

Ground Shaking and Surface Fault Rupture. The primary seismic effects associated with earthquakes are ground shaking and surface fault rupture.

Ground shaking due to seismic events (earthquakes) would typically be considered the greatest source of potential damage to structures. Seismic shaking is characterized by the physical movement of the land surface during and subsequent to an earthquake. Seismic shaking has the potential to cause destruction and damage to buildings and property, including damage resulting from damaged or destroyed gas or electrical utility lines; blockage of surface seepage and groundwater flow; changes in groundwater flow; dislocation of street alignments; displacement of drainage channels and drains; and possible loss of life. In addition, ground shaking can induce several kinds of secondary seismic effects, including liquefaction, differential settlement, and landslides, all of which are described below.

The intensity of seismic shaking during an earthquake depends largely on geologic formation conditions of the materials comprising the upper several hundred feet of the earth's surface. The greatest amplitudes and longest durations of ground shaking occur on thick, water-saturated, unconsolidated alluvial sediments. Ground shaking can also cause ground failure or deformation due to lurching and liquefaction.

Surface rupture is the displacement and cracking of the ground surface that occurs along a fault trace. Unlike seismically induced ground shaking, which can affect a wide geographic area, surface rupture is confined to the area very near the fault.

The project site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone. Known active faults capable of producing strong ground shaking at the site include the

[1] United States Geological Survey. California Water Center. Areas of Land Subsidence in California. Website: https://ca.water.usgs.gov/land_subsidence/california-subsidence-areas.html (accessed July 2, 2019).

Newport-Inglewood-Rose Canyon Fault and San Joaquin Hills Blind Thrust Fault. In order to determine how seismicity from these faults would affect the site, the United States Geological Survey (USGS) Unified Hazard Tool was employed as part of the Geotechnical Investigation.

Liquefaction and Ground Settlement. Liquefaction is caused by sudden temporary increases in pore water pressure due to seismic densification or other displacement of submerged granular soils. Intervals of loose sand may, therefore, be subject to liquefaction if these materials are or were to become submerged and are also exposed to strong seismic ground shaking. Seismic ground shaking of relatively loose granular soils that are saturated or submerged can cause the soils to liquefy and temporarily behave as a dense fluid. This loss of support can produce local ground failure such as settlement or lateral spreading that may damage overlying improvements.

Ground settlement is a secondary seismic effect that can result in damage to property when an area settles to different degrees over a relatively short distance. The sinking or settlement of a structure, area of fill, or other imposed load is usually the result of compaction or consolidation of the underlying soil. Soils susceptible to seismically induced settlement typically include loose granular materials.

The project site is located with a State-designated Liquefaction Hazard Zone for the Dana Point Quadrangle. In order to analyze the liquefaction potential on the site, the Geotechnical Investigation conducted cone penetration tests (CPT). Results of these tests indicate that sand and sandy silt layers within alluvial deposits on the site are likely to liquefy during earthquake. As such, these layers will likely experience a loss of shear strength resulting in ground deformation and settlement. In total, seismic settlements due to liquefaction could be up to 2 inches.

Lateral Spreading. Lateral spreading typically occurs as a form of horizontal displacement of relatively flat-lying alluvial material toward an open or "unconfined" face such as an open body of water, channel, or excavation. In soils, this movement is generally due to failure along a weak plane and may often be associated with liquefaction. According to the Geotechnical Investigation in Appendix F of this Draft EIR, lateral spreading is not anticipated to occur on the project site because the recently constructed sheet pile system along the San Juan Creek levee (a separate project) penetrates below the lowest liquefiable layer identified within the project site for protection of the levee.

Slope Instability and Seismically Induced Landslides. The downslope movement of loose rock or soil is also a potential secondary seismic effect that can occur during strong ground shaking. Geologic mapping for the site does not indicate that the site is susceptible to landslide. In addition, the project site is in a generally flat area with no evidence of historic landslides.

4.6.3.6 Existing Paleontological Setting

The existing conditions for paleontological resources in the project area were determined through a fossil locality search conducted at the LACM. Results of this locality search indicated that there are

no known vertebrate fossil localities within the project area; however, localities were identified nearby from sedimentary deposits similar to those that occur at depth in the project area.

According to the LACM, surface deposits throughout the project area consist of younger Quaternary Alluvium derived as fluvial deposits from the adjacent San Juan Creek. These deposits do not typically contain significant vertebrate fossils, but are usually underlain by older sedimentary deposits that may contain significant vertebrate fossil remains. In addition, a fossil locality south of the project site near Doheny State Beach has previously produced a fossil specimen of bison (*Bison*) (LACM 2028). The next closest vertebrate fossil locality is situated west-northwest of the project area in the Salt Creek area. This fossil locality produced fossil specimens of imperial mammoth (*Mammuthus imperator)*.

4.6.4 Regulatory Setting

4.6.4.1 Federal Regulations

National Pollution Discharge Elimination System. A Stormwater Pollution Prevention Plan (SWPPP) prepared in compliance with a National Pollutant Discharge Elimination System (NPDES) Phase I Permit describes erosion and sediment controls, runoff water quality monitoring, means of waste disposal, implementation of approved local plans, control of post-construction sediment and erosion control measures and maintenance responsibilities, and non-stormwater management controls. Dischargers are also required to inspect construction sites before and after storms to identify stormwater discharge from construction activity and to identify and implement controls where necessary.

Additionally, the City operates under a municipal separate storm sewer system (MS4) permit (South Orange County MS4 Permit) under the NPDES. MS4 permits require an aggressive water quality ordinance, specific municipal practices, and the use of best management practices (BMPs) in many development-related activities to further reduce the amount of contaminants in urban runoff. MS4 permits also require local agencies to cooperatively develop a public education campaign to inform people about what they can do to protect water quality.

Earthquake Hazards Reduction Act. In 1977, the United States Congress passed the Earthquake Hazards Reduction Act, which established the National Earthquake Hazards Reduction Program (NEHRP). When NEHRP was first established, the primary purpose of this program was to improve understanding, characterization, and prediction of earthquakes and associated vulnerabilities. However, in recent years, NEHRP has recently shifted its primary focus to minimizing losses from earthquakes. In order to minimize this risk, NEHRP helps to improve building codes and land use practices, risk reduction through post-earthquake investigations, development of new design and construction techniques, and mitigation. The Federal Emergency Management Agency (FEMA) is the lead agency for NEHRP, and as such, authorizes funding for earthquake preparedness and mitigation programs.

4.6.4.2 State Regulations

Alquist-Priolo Earthquake Fault Zoning Act (1972). Regulations that are applicable to geologic, seismic, and soil hazards include the 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 CBC. 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 (CGS) for investigations conducted in such zones do not specifically apply.

Seismic Hazard Mapping Act (1990). The Seismic Hazard Mapping Act (SHMA) was adopted by the state in 1990 for the purpose of protecting public safety from the effects of (non-surface fault rupture) earthquake hazards. The CGS prepares and provides local governments with seismic hazard zones maps that identify areas susceptible to amplified shaking, liquefaction, earthquake-induced landslides, and other ground failures. The seismic hazards zones are referred to as "zones of required investigation" because site-specific geological investigations are required for construction projects located within these areas. Before a project can be permitted, a geologic investigation, evaluation, and written report must be prepared by a licensed geologist to demonstrate that proposed buildings will not be constructed across active faults. If an active fault is found, a structure for human occupancy must be set back from the fault (generally 50 ft). In addition, sellers (and their agents) of real property within a mapped Seismic Hazard Zone must disclose that the property lies within such a zone at the time of sale.

California Building Code (2016). California Code of Regulations (CCR), Title 24, Part 2, the CBC, provides minimum standards for building design in the state. Local codes are permitted to be more restrictive than Title 24, but not less restrictive. The procedures and limitations for the design of structures are based on site characteristics, occupancy type, configuration, structural system height, and seismic zoning. 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 (CCR, Title 8).

California Health and Safety Code. 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 CBC, including a grading section. The City enforces these provisions (refer to Title 8 of the City's Municipal Code). Sections of Volume 2 of the CBC specifically apply to select geologic hazards. Chapter 16 of the 2016 CBC addresses requirements for seismic safety. Chapter 18 regulates excavation, foundations, and retaining walls. Chapter 33 contains specific requirements pertaining to site demolition, excavation, and construction.

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

4.6.4.3 Regional Regulations

There are no regional land use policies or regulations that are applicable to the proposed project with respect to geology or soils.

4.6.4.4 Local Regulations

City of San Juan Capistrano Municipal Code. The City adopted, with amendments, and enforces the 2016 edition of the CBC as published by the International Code Council. Chapter 2, Building Code, of Title 8, of the City's Municipal Code is the City's Building Code. The purpose of a building code is to provide minimum standards to safeguard life or limb, health, property, and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all buildings and structures within the City. Building Code provisions apply to the construction, alteration, moving, demolition, repair, and use of any building or structure within the City.

City of San Juan Capistrano General Plan.

Safety Element of the City's General Plan. The Safety Element provides goals and policies to reduce the potential risk of death, injuries, and property damage resulting from natural and human-induced hazards. This element specifically addresses geologic, seismic, flood, and fire hazards and disaster planning.

According to the Safety Element, the project site is located in an area with a high potential for liquefaction. The project site is also located within an area at risk for inundation as a result of a 100-year flood and/or a catastrophic failure of the Trampas Canyon Dam. The site is not located within an area at risk for wildfires or landslides.

Cultural Resources Element of the City's General Plan. The goals and policies of the Cultural Resources Element are intended to be a guide for preserving historic, archaeologic, and paleontological resources within the City. The purpose of the goals and policies in this element intended to preserve important cultural resources to enhance the character and tradition of the community as a whole.

According to the Cultural Resources Element, the project site is located within an area with potential prehistoric and archaeological resources.

City Council Historical, Archaeological, and Paleontological Resource Management Guidelines. In 1997, the City revised City Council Policy 601 and renamed this policy, "Historical, Archaeological, and Paleontological Resource Management Guidelines." The general intent and purpose of these guidelines is to protect and preserve the City's unique cultural heritage, including historic, archaeological, and paleontological resources. In addition, the guidelines aim to ensure that cultural resource evaluations, including paleontological resource assessment, for projects within the City are conducted by qualified individuals. The policy also establishes procedures for reviewing these reports and mitigation measures to address potential impacts to previously unknown cultural resources (including paleontological resources) during construction activities.

4.6.5 Thresholds of Significance

The thresholds for geology and soils impacts used in this analysis are consistent with Appendix G of the *State CEQA Guidelines* and the City's *Local Guidelines for Implementing CEQA* (2019). The

proposed project may be deemed to have a significant impact with respect to geology and soils if it would:

Threshold 4.6.1: **Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:**

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

ii: Strong seismic ground shaking?

iii: Seismic-related ground failure, including liquefaction?

iv: Landslides?

Threshold 4.6.2: **Result in substantial soil erosion or the loss of topsoil?**

Threshold 4.6.3: **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-site or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse?**

Threshold 4.6.4: **Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating direct or indirect substantial risks to life or property?**

Threshold 4.6.5: **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 4.6.6: **Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?**

The Initial Study, included as Appendix A, substantiates that there would be no impacts associated with Threshold 4.6.5 because the project does not propose the installation of, or connection to, a septic system or alternative wastewater disposal system. In addition, the Initial Study substantiates that impacts associated with Thresholds 4.6.1.i and 4.6.1.iv would be less than significant because the project site is not located within an established Alquist-Priolo Earthquake Fault Zone and because the site is not located in an area subject to earthquake-induced landslides or seismic slope instability. These thresholds will not be addressed in the following analysis.

4.6.6 Project Impacts

Threshold 4.6.1.ii: **Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: Strong seismic ground shaking?**

Less than Significant with Mitigation Incorporated. As with all of Southern California, the project site is subject to strong ground motion resulting from earthquakes on nearby faults. There are several faults near the project site that are capable of producing strong ground motion, including the Newport-Inglewood-Rose Canyon Fault and the San Joaquin Hills Fault. During an earthquake along any of these faults, seismically induced ground shaking would be expected to occur. The severity of the shaking would be influenced by the distance of the site to the seismic source, the soil conditions, and the depth to groundwater.

As previously stated, the USGS Unified Hazard Tool was used in the Geotechnical Investigation in order to determine how seismicity would affect the project site. Based on the site-specific evaluation that was performed, the peak horizontal ground acceleration for the project site was calculated to be approximately 0.55 g (acceleration due to gravity) with a two percent probability of exceedance in 50 years (recurrence interval of 2,475 years). These accelerations are consistent with other sites in this region of central California and indicate that strong seismic ground shaking generated by seismic activity is considered a potentially significant impact that may affect the proposed project. Mitigation Measures GEO-1 and GEO-2 require the City to comply with the recommendations of the project Geotechnical Investigation and the most current CBC, which stipulates appropriate seismic design provisions that shall be implemented with project design and construction. With implementation of Mitigation Measures GEO-1 and GEO-2, potential project impacts related to seismic ground shaking would be reduced to a less than significant level.

Threshold 4.6.1.iii: Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: Seismic-related ground failure, including liquefaction?

Less than Significant with Mitigation Incorporated. Liquefaction commonly occurs when three conditions are present simultaneously: (1) high groundwater; (2) relatively loose, cohesionless (sandy) soil; and (3) earthquake-generated seismic waves.

The project site is located with a State-designated Liquefaction Hazard Zone for the Dana Point Quadrangle. In addition, testing performed as part of the Geotechnical Investigation found that sand and sandy silt layers within alluvial deposits on the site would likely liquefy during earthquake. Mitigation Measures GEO-1 and GEO-2 require the City to comply with the recommendations of the project Geotechnical Investigation and the most current CBC, which stipulates appropriate design provisions (including provisions related to foundation design) that shall be implemented with project design and construction. With implementation of Mitigation Measures GEO-1 and GEO-2, potential project impacts related to seismically induced ground failure, including liquefaction, would be reduced to a less than significant level.

Threshold 4.6.2: Would the project result in substantial soil erosion or the loss of topsoil?

Less than Significant Impact. During construction activities, soil would be exposed and there would be an increased potential for soil erosion compared to existing conditions due to soil disturbance and the exposure of substantial amounts of soil to weather conditions (e.g., wind, rain). During a storm event, soil erosion could occur at an accelerated rate. The increased erosion potential could result in short-term water quality impacts as identified in Section 4.9, Hydrology and Water Quality.

During construction, the project Applicant is required to adhere to the requirements of the General Construction Permit and utilize typical BMPs specifically identified in the SWPPP (as required by Regulatory Compliance Measure WQ-1 in Section 4.9, Hydrology and Water Quality) for the project in order to prevent construction pollutants from contacting stormwater and to keep all products of erosion from moving off site into receiving waters. Additionally, the project Applicant is required to install and maintain erosion control devices year round in compliance with a City-approved pollution control plan, construction BMP plan, and/or erosion and sediment control plan (as required by Regulatory Compliance Measure WQ-2 in Section 4.9, Hydrology and Water Quality). Water-related impacts during construction would be less than significant through implementation of construction site BMPs, as specified in Regulatory Compliance Measures WQ-1 and WQ-2 (described in Section 4.9, Hydrology and Water Quality).

The proposed project would result in an increase in impervious area and a net increase in stormwater runoff; however, the proposed project would also install a stormwater runoff system to manage increased peak runoff from the site. Additionally, a Final Hydrology and Hydraulic Analysis would be required to be prepared and submitted to the City for Approval, to ensure the peak flow of stormwater runoff in the proposed condition would not exceed the outfall capacity (as required by Regulatory Compliance Measure WQ-5 in Section 4.9, Hydrology and Water Quality). As a result, any increase in peak discharge would be negligible. Therefore, the proposed project would not result in substantial on-site or downstream erosion, siltation, or flooding, and no mitigation is required.

Threshold 4.6.3: Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse?

Slope Stability.

Less than Significant with Mitigation Incorporated. As previously stated, no existing landslides are present on or adjacent to the property. Geologic mapping for the site does not indicate that the site is susceptible to landslide. In addition, the project site is in a generally flat area with no evidence of historic landslides. Therefore, the potential for seismically induced landslides on site is considered low.

Due to the topography of the project site and the design of the proposed project, grading would entail cut-and-fill slopes, and construction of earth-retaining structures, such as freestanding cantilever retaining walls and below-grade walls would be necessary in some areas. In addition, shoring would be required during excavation. Unstable cut-and-fill slopes and could create significant short-term and long-term hazards. Mitigation Measure GEO-1 requires planned grading and shoring to conform to the recommendations of the Geotechnical Investigation, which contains specific recommendations for addressing potential slope instability. With implementation of these recommendations, potential impacts related to slope instability would be reduced below a level of significance.

Unsuitable Soils.

Corrosive Soils and Soluble Sulfate Content.

Less than Significant with Mitigation Incorporated. Corrosive soils contain constituents or physical characteristics that attack concrete (water-soluble sulfates) and/or ferrous metals (chlorides, ammonia, nitrates, low pH levels, and low electrical resistivity). Corrosive soils could potentially create a significant hazard to the project by weakening the structural integrity of the concrete and metal used to construct the building and could potentially lead to structural instability. Structural damage and foundation instability caused by corrosive soils is a potentially significant impact.

As required by Mitigation Measure GEO-1, on-site soils anticipated to come into contact with pipes or concrete on the site shall be tested for pH, minimum resistivity, soluble chloride content, and soluble sulfate content. Where corrosive soils are identified, corrosion protection measures shall be implemented. Corrosion protection may include, but is not limited to, sacrificial metal, the use of protective coatings, and/or cathodic protection. With implementation of Mitigation Measure GEO-1, potential impacts related to corrosive soils would be reduced to a less than significant level.

Settlement Potential.

Less than Significant with Mitigation Incorporated. The amount of settlement for a site is dependent on the thickness of design fills, the loading conditions, and the nature of the native materials underlying the fill. Potential ground settlement may be separated into three types: (1) hydroconsolidation of alluvium left in place above the water table, (2) consolidation settlement of compressible alluvium left in place below the water table, and (3) liquefaction-induced settlement of a few loose, granular layers below the water table.

The site is underlain by sand and sandy silt layers within alluvial deposits, which are likely to liquefy during an earthquake. As such, these layers will likely experience a loss of shear strength resulting in ground deformation and settlement. In total, the Geotechnical Investigation found that seismic settlements due to liquefaction could be up to 2 inches on the project site. Compliance with the recommendations contained in the Geotechnical Investigation for the proposed project, including those related to earthwork activities and foundation design, would be required reduce potential impacts related to ground settlement. Implementation of Mitigation Measure GEO-1 would reduce potential impacts with respect to ground settlement to a less than significant level.

Subsidence.

Less than Significant Impact. The phenomenon of widespread land sinking, or subsidence, is generally related to substantial overpumping of groundwater or petroleum reserves from deep underground reservoirs. Overpumping and excessive groundwater withdrawal have not occurred in the project area. In addition, the project does not have an oil, gas, or water

pump on site and none are located near the site and has not been used for the extraction of either resource. Subsidence is therefore not considered a potential constraint or a potentially significant impact of the project, and no mitigation is required.

Lateral Spreading.

Less than Significant Impact. Lateral spreading typically occurs as a form of horizontal displacement of relatively flat-lying alluvial material toward an open or "unconfined" face such as an open body of water, channel, or excavation. In soils, this movement is generally due to failure along a weak plane and may often be associated with liquefaction. According to the Geotechnical Investigation, lateral spreading at the project site is not a concern because the proposed final ground surface would be relatively flat and the recently constructed sheet pile system along the San Juan Creek levee (a separate project), which penetrates below the lowest liquefiable layer identified within the project site for protection of the creek levee, would prevent lateral motion from occurring. Therefore, the soils on the project site are not subject to lateral spreading. Therefore, lateral spreading is not considered a potential constraint or a potentially significant impact of the project, and no mitigation is required.

Threshold 4.6.4: Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating direct or indirect substantial risks to life or property?

Less than Significant with Mitigation Incorporated. Expansive soils contain types of clay minerals that occupy considerably more volume when they are wet or hydrated than when they are dry or dehydrated. Volume changes associated with changes in the moisture content of near-surface expansive soils can cause uplift or heave of the ground when they become wet or, less commonly, cause settlement when they dry out.

Upper layers of soil on the site consist of Artificial Fill. The expansion potential for on-site soils is unknown at this time; however, undocumented fill on the site includes clay at varying moisture contents, and as such, may be potentially expansive. The Geotechnical Investigation contains specific construction recommendations to reduce project impacts associated with expansive soils to a less than significant level. Mitigation Measure GEO-1 incorporates the recommendations in the Geotechnical Investigation related to expansive soils, including a requirement that all imported materials be non-expansive. Therefore, adherence to Mitigation Measure GEO-1 will reduce project impacts related to expansive soils to a less than significant level.

Threshold 4.6.6: Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less than Significant with Mitigation Incorporated. The project site is located on sediments mapped as Quaternary Alluvium, but is underlain by older estuarine deposits of the San Juan Creek floodplain. There are no known localities on the project site but, based on the locality search conducted for the proposed project, sensitive sediments that may contain fossil remains do exist within the project areas. As such, there is the potential to encounter paleontological resources

during any ground-disturbing activities for the proposed project. Mitigation is required to reduce potential adverse impacts to unknown (buried) paleontological resources.

Mitigation Measure GEO-3 requires the project Applicant to prepare a Paleontological Resources Assessment to evaluate the potential for project implementation to significantly impact unknown paleontological resources on the site. In the event that the Paleontological Resources Assessment does not identify the potential for the project to impact such resources, no further action or mitigation is required. In the event that the Paleontological Resources Assessment identifies a low potential for the project to impact paleontological resources, the Developer/project Applicant shall retain a paleontologist on an on-call basis to address any unanticipated discoveries. If the Paleontological Resources Assessment determines that paleontological resources may be impacted by project development, a Paleontological Resources Impact Mitigation Program (PRIMP) shall be prepared, and paleontological monitoring, fossil collection and treatment (if necessary), and preparation of a final monitoring report shall occur as described in Mitigation Measure GEO-4. Implementation of Mitigation Measures GEO-3 and GEO-4 would reduce potential impacts to unknown paleontological resources to less than significant, and no additional mitigation is required.

4.6.7 Level of Significance Prior to Mitigation

The proposed project would result in potentially significant impacts with respect to strong seismic ground shaking, ground failure (including liquefaction), slope stability, corrosive soils, ground settlement, expansive soils, and the destruction of paleontological resources without the implementation of applicable mitigation measures.

4.6.8 Regulatory Compliance Measures and Mitigation Measures

4.6.8.1 Regulatory Compliance Measures (RCMs)

No regulatory compliance measures are required for the proposed project.

4.6.8.2 Mitigation Measures (MMs)

The proposed project would comply with the following mitigation measures.

MM GEO-1 **Incorporation of and Compliance with the Recommendations in the Geotechnical Investigation.** All grading operations and construction shall be conducted in conformance with the recommendations included in the geotechnical report on the proposed project site that has been prepared by Willdan Engineering Geotechnical Group, titled *Geotechnical Investigation Report and Response to Third Party Review, Proposed Ganahl Lumber Facility Development San Juan Capistrano, California* (Geotechnical Investigation) (November 2018). Design, grading, and construction shall be performed in accordance with the requirements of the City of San Juan Capistrano (City) Building Code and the California Building Code (CBC) applicable at the time of grading, appropriate local grading regulations, and the recommendations of the project geotechnical consultant as summarized in a final written report, subject to review by the Director of the City of San Juan Capistrano Development Services Department, or designee, prior to commencement of grading activities.

Recommendations in the Geotechnical Investigation are summarized below.

- **Site Grading/Earthwork.** Prior to grading activities on the site, organics and debris shall be removed and hauled off-site. Undocumented fill within the project limits shall be over-excavated to a minimum depth of 12 feet (ft). The bottom of the excavated area shall be underlain by a layer of filter fabric (which will prevent contamination of crushed aggregate from underlying fine soils) and overlain by a minimum of 2 ft of crushed rock and a geogrid layer(which will minimize the manifestation of vertical settlements to the surface). The excavated layer shall be backfilled with engineered fill, which shall be compacted to at least 90 percent. Compaction shall be verified by observation, probing, and testing by a Geotechnical Consultant.

- **Fill Material.** On-site soils with an Expansion Index (EI) less than 35 and free of organic materials, debris, and cobbles larger than 3 inches may be used for backfilling. Imported granular soils may be used in compacted fills within the project limits. All imported soil shall contain binder material. Imported materials shall also be non-expansive and free of organic materials, debris, and cobbles larger than 3 inches, with no more than 25 percent passing No. 200 Sieve. All fill materials within the upper 2 ft shall be free of particles greater than 2 inches in size. A bulk sample of import material, weighing at least 30 pounds, shall be submitted to the Geotechnical Consultant for approval at least 48 hours prior to fill operations.

- **Utility Trenching.** Bedding materials consisting of sand, gravel, or crushed aggregate shall be used to backfill around utility pipes. On-site soils having a Sand Equivalent (SE) of 30 or greater can also be used as bedding material. Prior to placing pipes, the pipe trench subgrade shall be observed by the Geotechnical Consultant. If exposed subgrade is loose or unstable, unsuitable subgrade shall be excavated and replaced with bedding material. Trenches in pavement areas shall be capped with at least 1 ft of compacted, on-site soil and shall be compacted to at least 95 percent relative compaction.

- **Temporary Excavations.** All temporary excavations shall be properly sloped or shored. Excavation of 3.5 ft or less in depth may be performed with vertical sidewalls. Deeper excavations up to a depth of 10 ft can be accomplished with Occupational Safety and Health Administration (OSHA) requirements for Type C soils and may be laid back 1H:1.5V gradient, or 1H:1V upon review by the Geotechnical Consultant.

- **Shoring.** Shoring systems feasible for the site are expected to include cantilever shoring, such as soldier piles. All shoring shall be designed in accordance with the latest edition of the *Trenching and Shoring Manual* (Caltrans 2011), and shall be approved by the Geotechnical Consultant. A licensed surveyor shall be retained to establish monuments on the shoring and surrounding area. These monuments shall be monitored for movement during construction.

- **Spread/Strip Footing Foundations.** Upon completion of the grading (cutting) required to establish the proposed building pad elevations, the proposed structures may be supported by a spread/strip footing foundation system. Spread/strip footings shall be at least 24 and 18 inches wide, respectively, and embedded at least 18 inches below the lowest adjacent grade in the engineered fill. The slab-on-grade should be at least 5 inches thick and reinforced with rebar. Footings shall be deepened as necessary in order to maintain adequate support for the foundations adjacent to utility trenches.

- **Matt Foundations:** Upon completion of the grading (cutting) required to establish the proposed building pad elevations, the proposed structures may be supported by a matt foundation system in areas where settlements cannot be tolerated by spread/strip footings. The mat should be at least 10 inches thick and embedded at least 18 inches below the lowest adjacent grade in the engineered fill.

- **Concrete Flatworks.** Frequent construction or control joints shall be provided in all concrete slabs where cracking is objectionable. Contraction or weakened plane joints shall extend deeper than one-quarter of the slab thickness. Control joints shall be spaced a minimum of 10 ft intervals. Exterior concrete slab-on-grade may be subjected to drying due to the fluctuation of moisture content in subgrade soils. Deepened edge sections will aid in reducing the potential for the shrinkage and swelling of underlying soils.

- **Retaining Walls.** The proposed development is expected to require various types of earth-retaining structures: freestanding cantilever retaining wall, temporary shoring, and below grade walls for several of the proposed structures. In general, retaining structures planned at the site shall be backfilled with compacted soil and be constructed with a backdrain.

- **Corrosive Soils.** A representative bulk sample of soils in contact with concrete and pipes shall be collected and tested or pH, minimum resistivity, soluble chloride content, and soluble sulfate content. The test results shall be used to determine the chemical properties of on-site soils and appropriate recommendations. Recommendations for corrosion protection may include, but are not limited to, sacrificial metal, the use of protective coatings, and/or cathodic protection.

- **Geotechnical Review and Future Testing.** Additional site testing and final design evaluation shall be conducted by the project Geotechnical Consultant to refine and enhance these recommendations. Grading plan review shall also be conducted by the Geotechnical Consultant and the Director of the City of San Juan Capistrano Development Services Department, or designee, prior to the start of grading to verify that the recommendations developed during the geotechnical design evaluation have been appropriately incorporated into the project plans. Final design shall be based on testing and analyses of the near-

surface soils following the completion of grading. Design, grading, and construction shall be conducted in accordance with the specifications of the Geotechnical Consultant as summarized in a final report based on the CBC applicable at the time of grading and building and the City of San Juan Capistrano Building Code. On-site inspection during grading shall be conducted by the Geotechnical Consultant and the City Building Official to ensure compliance with geotechnical specifications as incorporated into project plans.

MM GEO-2 **California Building Code Compliance and Seismic Standards.** Structures and retaining walls shall be designed in accordance with the seismic parameters presented in the Geotechnical Investigation (Willdan Engineering Geotechnical Group, November 2018) and applicable sections of Section 1613 of the 2007 California Building Code (CBC). Prior to issuance of building permits for planned structures, the project soils engineer and the Director of the San Juan Capistrano Development Services Department, or designee, shall review building plans to verify that structural design conforms to the recommendations of the Geotechnical Investigation and the City of San Juan Capistrano Building Code.

MM GEO-3 **Paleontological Resources Assessment.** In accordance with City of San Juan Capistrano Council Policy 601, a paleontologist certified by the County of Orange shall prepare a Paleontological Assessment that includes the following information: a clear map delineating the project boundaries, the results of a field survey of the project area, the results of background research and sources for that background information, criteria for evaluation of paleontological sensitivity of the property, and a determination of whether development of the project has the potential to impact paleontological resources. If the Paleontological Resources Assessment determines that project activities will not impact paleontological resources, no further paleontological resource impact mitigation is required. If the Paleontological Resources Assessment determines that there is a low possibility for project activities to impact paleontological resources, the Developer/project Applicant shall retain a paleontologist on an on-call basis to address any unanticipated discoveries. If the Paleontological Resources Assessment determines that paleontological resources may be impacted by project development, a Paleontological Resources Impact Mitigation Program shall be prepared, and paleontological monitoring, fossil collection and treatment (if necessary), and preparation of a final monitoring report shall occur as described in Mitigation Measure GEO-4.

MM GEO-4 **Paleontological Resources Impact Mitigation Program.** In the event the project specific Paleontological Resources Assessment determines that paleontological resources may be impacted by project development, a Paleontological Resources Impact Mitigation Program (PRIMP) shall be prepared prior to commencement of any grading activity on site, and approved by the Director of Planning, or designee. The PRIMP shall be prepared by a paleontologist who is listed on the County of Orange list of certified paleontologists, and shall include the methods that will be used to protect paleontological resources that may exist within the project site, as

well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of grading. The PRIMP shall be consistent with the guidelines of the Society of Vertebrate Paleontology (SVP) (2010).

The paleontologist or paleontological monitor shall attend one pre-construction meeting in order to explain the mitigation measures associated with the project, the potential for encountering paleontological resources, and the types of resources that may be found.

Ground-disturbing activities in deposits with high paleontological sensitivity shall be monitored by a paleontological monitor following the PRIMP. Spot check monitoring is required for ground disturbance in deposits with low paleontological sensitivity, and no paleontological monitoring is required for ground disturbance in deposits with no paleontological sensitivity. The monitor shall be equipped to salvage fossils and/or matrix samples as they are unearthed in order to avoid construction delays. The monitor shall be empowered to temporarily halt or divert equipment in the area of the find in order to allow removal of abundant or large specimens. In the event that paleontological resources are encountered when a paleontological monitor is not present, work in the immediate area of the find shall be redirected and a paleontologist shall be contacted to assess the find for significance.

Sediments shall be occasionally be spot-screened through one-eighth to one-twentieth-inch mesh screens to determine whether microfossils exist. If microfossils are encountered, additional sediment samples (up to 6,000 pounds) shall be collected and processed through one-twentieth-inch mesh screens to recover additional fossils.

Collected resources shall be prepared to the point of identification, identified to the lowest taxonomic level possible, cataloged, and curated into the permanent collections of a scientific institution.

At the conclusion of the monitoring program, a report of findings shall be prepared to document the results of the monitoring program. When submitted to the City of San Juan Capistrano Director of Development Services, or designee, the report and inventory would signify completion of the program to mitigate impacts to paleontological resources.

4.6.9 Level of Significance after Mitigation

The proposed project would result in less than significant impacts with respect to geology and soils following implementation of Mitigation Measures GEO-1 through GEO-4.

4.6.10 Cumulative Impacts

As defined in Section 15130 of the *State CEQA Guidelines,* cumulative impacts are the incremental effects of an individual project when viewed in connection with the effects of past, current, and probable future projects within the cumulative impact area for geology and soils.

For geology and soils, the cumulative study area consists of the area that could be affected by proposed project activities and the areas affected by other projects whose activities could directly or indirectly affect the geology and soils of the project site. The analysis above indicated no rare or special geological features or soil types on the project site that would be affected by project activities and no other known activities or projects with activities that affect the geology and soils of this site. In addition, the proposed project, as with all foreseeable projects, would be required to comply with the applicable state and local requirements, including the City of San Juan Capistrano Building Code. Therefore, the project's contribution to cumulative geotechnical and soil impacts is less than significant.

For paleontological resources, the cumulative study area is the geographical area of the City, which is the geographical area covered by the City's General Plan, including all goals and policies included therein. Future development in the City could include excavation and grading that could potentially affect paleontological resources. The cumulative effect of the proposed project is the continued loss of these resources. The proposed project, in conjunction with other development in the City, has the potential to cumulatively impact paleontological resources; however, it should be noted that each development proposal received by the City that requires discretionary approval would be required to undergo environmental review pursuant to CEQA. If there is a potential for significant impacts to paleontological resources, an investigation would be required to determine the nature and extent of the resources and identify appropriate mitigation measures. If subsurface cultural resources are assessed and/or protected as they are discovered, impacts to these resources would be less than significant. In addition, the City's General Plan policies would be implemented as appropriate to reduce the effects of additional development within the City. Therefore, the project's contribution to the cumulative destruction of known and unknown paleontological resources throughout the City would be reduced to a less than significant level.

4.6.11 Project Alternatives

4.6.11.1 Alternative 1

Alternative 1 would allow for the future construction of a 161,385-square-foot (sf) Ganahl Lumber hardware store and lumber yard and a 399-space vehicle storage facility, but no drive-through restaurant uses would be developed. This alternative represents a reduction of 6,000 sf of drive-through restaurant use as compared to the proposed project. Under Alternative 1, Area A would provide 150 parking spaces, compared to 62 parking spaces provided in Area A as part of the proposed project.

Most components of the proposed project, such as outdoor lighting, circulation and access, signage, utilities and drainage, sustainability features, landscaping, and construction phasing, and grading, would not significantly change with the implementation of Alternative 1. Components specific to Area A, such as the location of walkways, retaining walls fences, and gates, would also not change

under Alternative 1. The modification and installation of existing and new utilities and infrastructure associated with the proposed project would still occur under Alternative 1. Although Alternative 1 would not involve the development of structures on Area A as the proposed project would, the entirety of Area A would still be cleared, excavated, graded, and paved to accommodate surface parking.

Although Alternative 1 would construct fewer structures than the proposed project, it would be located on the same soils with the same geological conditions and would therefore result in potentially significant impacts with respect to strong seismic ground shaking, ground failure (including liquefaction), slope stability, corrosive soils, ground settlement, expansive soils, and the destruction of paleontological resources, similar to the proposed project. Therefore, Mitigation Measures GEO-1, GEO-2, GEO-3, and GEO-4 as stated above would be applicable to Alternative 1, similar to the proposed project. With the implementation of the mitigation measures, potential impacts for Alternative 1 with respect to geology and soils would be less than significant and similar to those of the proposed project.

Because impacts related to geology and soils for Alternative 1 would be less than those associated with the proposed project, implementation of Mitigation Measures CUL-1 and CUL-2 would also ensure that Alternative 1, together with cumulative projects, would not result in a significant cumulative impact to unique archaeological resources and previously undiscovered buried human remains.

4.6.11.2 Alternative 2

Alternative 2 would allow for the future construction of a 161,385 sf Ganahl Lumber hardware store and lumber yard, a 399-space vehicle storage facility, and 2,000 sf of drive-through restaurant uses, which represents a reduction of 4,000 sf of drive-through restaurant uses as compared to the proposed project. Specifically, Alternative 2 would provide 80 parking spaces, compared to 62 parking spaces provided in Area A as part of the proposed project.

Most components of the proposed project, such as outdoor lighting, circulation and access, signage, utilities and drainage, sustainability features, landscaping, and construction phasing and grading, would not significantly change with the implementation of Alternative 2. Components specific to Area A, such as the location of walkways, retaining walls, fences, and gates, would also not change under Alternative 2. The modification and installation of existing and new utilities and infrastructure associated with the proposed project would still occur under Alternative 2. Under Alternative 2, similar to the proposed project, the entirety of Area A would be cleared, excavated, graded, and paved to accommodate surface parking and a building pad.

Alternative 2 would construct less square footage than the proposed project, but would be located on the same soils with the same geological conditions as the proposed project and would therefore result in potentially significant impacts with respect to strong seismic ground shaking, ground failure (including liquefaction), slope stability, corrosive soils, ground settlement, expansive soils, and the destruction of paleontological resources without the implementation of mitigation measures. Therefore, Mitigation Measures GEO-1, GEO-2, GEO-3, and GEO-4 as stated above would be applicable under Alternative 2, similar to the proposed project. With implementation of the

mitigation measures, potential impacts for Alternative 2 with respect to geology and soils would be less than significant and similar to those of the proposed project.

4.6.11.3 Alternative 3

Alternative 3 would allow for the future construction of a 161,385 sf Ganahl Lumber hardware store and lumber yard, a 399-space vehicle storage facility, and 4,000 sf of drive-through restaurant uses, which represents a reduction of 2,000 sf of drive-through restaurant use as compared to the proposed project. Specifically, Area A would provide 101 parking spaces, compared to 62 parking spaces provided as part of the project. Under Alternative 3, these additional parking spaces would be used by the drive-through restaurant use.

Most components of the proposed project, such as outdoor lighting, circulation and access, signage, utilities and drainage, sustainability features, landscaping, construction phasing, and grading, would not significantly change under the implementation of Alternative 3. Components specific to Area A, such as the location of walkways, retaining walls, fences, and gates, would also not change under Alternative 3. The modification and installation of existing and new utilities and infrastructure associated with the proposed project would still occur under Alternative 3. Under Alternative 3, similar to the proposed project, the entirety of Area A would be cleared, excavated, graded, and paved to accommodate surface parking and a building pad.

Alternative 3 would construct less square footage than the proposed project, but would be located on the same soils with the same geological conditions as the proposed project and would therefore result in potentially significant impacts with respect to strong seismic ground shaking, ground failure (including liquefaction), slope stability, corrosive soils, ground settlement, expansive soils, and the destruction of paleontological resources without the implementation of mitigation measures. Therefore, Mitigation Measures GEO-1, GEO-2, GEO-3, and GEO-4 would be applicable to Alternative 3, similar to the proposed project. With the implementation of the mitigation measures, potential impacts with respect to geology and soils for Alternative 3 would be less than significant and similar to those of the proposed project.

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