

## 4.6 Geology and Soils

This section evaluates the potential for impacts on geology and soils resulting from implementation of the Perris Airport Logistics Center Project (Proposed Project or Project). Information presented in this section is primarily based on the following documents:

- Geotechnical Investigation Proposed Industrial Building Perris Airport Center prepared by Southern California Geotechnical (2021) and included in Appendix E of this Environmental Impact Report (EIR)

### 4.6.1 Environmental Setting

#### 4.6.1.1 Regulatory Setting

This section describes the federal, state, and local regulatory framework adopted to address geology and soils.

#### **Federal**

##### ***Antiquities Act (16 USC 431–433)***

The Antiquities Act of 1906 states, in part, the following:

That any person who shall appropriate, excavate, injure or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States, without the permission of the Secretary of the Department of the Government having jurisdiction over the lands on which said antiquities are situated, shall upon conviction, be fined in a sum of not more than five hundred dollars or be imprisoned for a period of not more than ninety days, or shall suffer both fine and imprisonment, in the discretion of the court.

Although there is no specific mention of natural or paleontological resources in the act itself or in the act’s uniform rules and regulations (43 CFR 3), the term “objects of antiquity” has been interpreted to include fossils by the National Park Service, Bureau of Land Management, U.S. Forest Service, and other federal agencies. Permits to collect fossils on lands administered by federal agencies are authorized under this act. However, given the large gray areas left open to interpretation due to the imprecision of the wording, agencies are hesitant to interpret this act as governing paleontological resources.

##### ***Paleontological Resources Preservation, Omnibus Public Lands Act, Public Law 111-011, Title VI, Subtitle D***

This legislation directs the Secretaries of the U.S. Department of the Interior and U.S. Department of Agriculture to manage and protect paleontological resources on federal land using “scientific

principles and expertise.” To formulate a consistent paleontological resources management framework, the act incorporates most of the recommendations from the Secretary of the Interior’s report Assessment of Fossil Management on Federal and Indian Lands (USDI 2000). In passing the act, Congress officially recognized the scientific importance of paleontological resources on some federal lands by declaring that fossils from these lands are federal property that must be preserved and protected. The act codifies existing policies of the Bureau of Land Management, National Park Service, U.S. Forest Service, Bureau of Reclamation, and U.S. Fish and Wildlife Service and provides the following:

- Uniform criminal and civil penalties for illegal sale and transport and theft and vandalism of fossils from federal lands
- Uniform minimum requirements for paleontological resource-use permit issuance (terms, conditions, and qualifications of applicants)
- Uniform definitions for “paleontological resources” and “casual collecting”
- Uniform requirements for curation of federal fossils in approved repositories

## **State**

### ***Alquist-Priolo Earthquake Fault Zoning Act (California Public Resources Code, Section 2621, et seq.)***

The Alquist-Priolo Earthquake Fault Zoning Act was signed into state law in 1972. Its primary purpose is to mitigate the hazard of fault rupture by prohibiting the location of structures for human occupancy across the trace of an active fault. The act delineates “Earthquake Fault Zones” along faults that are “sufficiently active” and “well defined.” The act also requires that cities and counties withhold development permits for sites within an earthquake fault zone until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting. Pursuant to this act, structures for human occupancy are not allowed within 50 feet of the trace of an active fault.

### ***California Building Code (California Code of Regulations, Title 14, Part 2)***

The National Model Code Standards adopted into Title 24, Part 2, of the California Code of Regulations, also referred to as the California Building Code (CBC), apply to all occupancies in California except for modifications adopted by state agencies and local governing bodies. The CBC establishes general standards for the design and construction of buildings, including provisions related to seismic safety. The CBC provides standards that must be met 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 in its jurisdiction. CBC Chapter 18, Soils and Foundations, specifies the level of soil investigation required by law in California. Requirements in Chapter 18 apply to building and foundations systems and consider reduction of potential seismic hazards. The most recent building

standard adopted by the legislature and used throughout the state is the 2022 version of the CBC (effective January 1, 2023). The 2022 CBC would apply to the Proposed Project.

***California Public Resources Code, Section 5097.5***

Paleontological sites are protected under a variety of state policies and regulations in the California Public Resources Code. In addition, paleontological resources are recognized as nonrenewable resources and receive protection under the California Public Resources Code and California Environmental Quality Act (CEQA). California Public Resources Code, Section 5097.5, states the following:

A person shall not knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over the lands. A violation of this section is a misdemeanor.

This statute prohibits the removal, without permission, of any paleontological site or feature from lands under the jurisdiction of the state or any city, county, district, authority, public corporation, or any agency thereof. As a result, local agencies are required to comply with California Public Resources Code, Section 5097.5, for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others. California Public Resources Code, Section 5097.5, also establishes the removal of paleontological resources as a misdemeanor and requires reasonable mitigation of adverse impacts to paleontological resources from developments on public (state, county, city, and district) lands.

***Natural Hazards Disclosure Act (California Civil Code, Section 1103.2)***

The Natural Hazards Disclosure Act requires that sellers of real property and their agents provide prospective buyers with a Natural Hazard Disclosure Statement when the property being sold lies within one or more state-mapped hazard areas, including a seismic hazard zone. California law also requires that, when houses built before 1960 are sold, the seller must give the buyer a completed earthquake hazards disclosure report and the booklet *The Homeowners Guide to Earthquake Safety*. This publication was written and adopted by the California Seismic Safety Commission.

***Seismic Hazard Mapping Act (California Public Resources Code, Sections 2690–2699.6)***

The Seismic Hazard Mapping Act was adopted by the state in 1990 to protect the public from the effects of non-surface fault rupture earthquake hazards, including strong ground shaking, liquefaction, seismically induced landslides, or other ground failure caused by earthquakes. The goal of the act is to minimize loss of life and property by identifying and mitigating seismic hazards. The California Geological Survey prepares and provides local governments with seismic hazard zone maps that identify areas susceptible to amplified shaking, liquefaction, earthquake-

induced landslides, and other ground failures. The act requires responsible agencies to only approve projects within seismic hazard zones following a site-specific investigation to determine if the hazard is present, and if so, the inclusion of appropriate mitigation. In addition, the act requires real estate sellers and agents at the time of sale to disclose if a property is in one of the designated seismic hazard zones.

### ***Soils Investigation Requirements***

California Health and Safety Code, Sections 17953–17955, and CBC Section 1802 include requirements for soils investigations for subdivisions requiring tentative and final maps and for other specified types of structures. Testing of samples from subsurface investigations, such as from borings or test pits, is required. Studies must be done as needed to evaluate slope stability, soil strength, position and adequacy of load-bearing soils, the effect of moisture variation on load-bearing capacity, compressibility, liquefaction, differential settlement, and expansiveness.

## **Local**

### ***City of Perris General Plan***

The specific policies outlined in the City of Perris General Plan that are related to geology and soils and that apply to the Proposed Project are listed in Table 4.10-2, City of Perris General Plan Consistency Analysis, of Section 4.10, Land Use and Planning, of this EIR. Notably, the Safety Element policies applicable to the analysis of geology and soils include:

**Policy I.E.** All development will be required to include adequate protection from damage due to seismic incidents.

**Measure I.E.1** Require geological and geotechnical investigations by State-licensed professionals, in areas with potential for earthquake-induced liquefaction, landsliding, other slope instability, or settlement as part of the environmental and development review process.

**Measure I.E.2** Require implementation of mitigation measures identified in such investigations mentioned above [in Measure I.E.1], prior to the issuance of grading and building permits.

**Measure I.E.5** Adopt and enforce the most current version of the California Building Code (CBC).

### ***City of Perris Building Code***

Chapter 16.08 (Building, Plumbing and other Codes Adopted), of the City of Perris Municipal Code includes the City’s Building Code. Building construction is governed by the CBC; however, the City has amended and provided exemptions to the CBC that address specific geologic considerations in

the City. As identified in Chapter 16.08.050 (Adoption of the 2022 California Building Code), the 2022 CBC shall become the building codes of the City for regulating the erection, construction, enlargement, alteration, repair, moving, removal, demolition, conversion, occupancy, equipment, use, height, area, and maintenance of all buildings and structures in the City.

#### **4.6.1.2 Existing Conditions**

##### **Soils and Geology**

Regional geologic conditions were obtained from the Preliminary Geologic Map of the Perris 7.5' Quadrangle, Riverside County, California, by Douglas M. Morton, published by the U.S. Geological Survey Department of Sciences University of California Riverside, 1996. This map indicates that the majority of the site is underlain by older alluvial deposits (Map Symbol Qvof), with a small area in the eastern region of the site consisting of younger alluvial deposits (Map Symbol Qv).

Southern California Geotechnical, Inc. previously performed a geotechnical investigation for a previously proposed RV storage lot, with the only structure consisting of an approximately 10,000-square-foot office building located in the northwestern region of the Project Site. As part of this investigation six borings (identified as Boring Nos. B-1 through B-6) were advanced to depths of approximately 5 to 20 feet below the existing site grades. Native alluvium was encountered at the ground surface at all of the boring locations. The near-surface alluvial soils generally consist of loose to medium dense silty sands and clayey sands, and stiff to very stiff sandy clays, extending to depths of approximately 2.5 to 6.5 feet below the existing site grades. The underlying native alluvium generally possesses higher strengths and densities and consists of clayey sands, silty sands, and sandy clays.

The subsurface exploration conducted for the Proposed Project consisted of five borings (identified as Boring Nos. B-7 through B-11) advanced to depths of approximately 5 to 50 feet below the existing site grades. One of these borings was advanced to a depth of approximately 50 feet as a part of the preliminary liquefaction evaluation. Native older alluvium was encountered at the ground surface at all of the boring locations, extending to depths of approximately 5 to 32 feet below the existing site grades. The alluvium generally consists of dense to very dense clayey sands and silty sands, and stiff to hard sandy clays, with occasional near-surface strata consisting of medium dense clayey sands, silty sands and sandy silts.

Cretaceous Val Verde Formation tonalite (Map Symbol Kvt) was encountered beneath the older alluvium at Boring No. B-7. The Val Verde Formation is described on this map as gray, weathered, relatively homogeneous, massive, medium- to coarse- grained tonalite.

Bedrock materials were encountered at Boring No. B-7 at a depth of approximately 32 to 50 feet below the existing site grades. Based on the bedrock encountered at this boring location, it is our opinion that the near-surface older alluvium in the western region of the site is underlain by tonalite

bedrock of the Val Verde Formation (Map Symbol Kvt). The bedrock is weathered, friable, and fine to coarse grained.

### **Groundwater**

Free water was encountered during drilling at Boring Nos. B-7 and B-8, at depths of at depths of 30 and 23.5 feet, respectively, below the ground surface. Delayed groundwater level readings were taken at Boring No. B-7. This measurement was taken approximately 3 hours after the drilling was completed and the augers were removed. This reading indicated that the groundwater was at a depth of 25 feet at Boring No. B-7. Delayed groundwater readings could not be taken at Boring No. B-8 based on the shallower cave depth caused by the removal of the augers. Based on these observations, the static groundwater table is considered to have been present at a depth of 23.5 to 30 feet below the existing site grades at the time of the subsurface exploration.

According to the Geotechnical Investigation (Appendix E), several monitoring wells on record are located approximately one mile north of the Project Site. Water level readings within these monitoring wells indicate a high groundwater level of 37 feet below the ground surface in June 2007.

### **Topography**

The Project Site consists of several irregular-shaped parcels which total approximately 81.64 acres in size. These parcels are located in the northern area of the Perris Valley Airport. The Project Site is currently vacant and generally undeveloped, apart from isolated areas in the north-central region of the Project Site. These areas are developed with what appears to be asphaltic concrete pavements. These pavements are located adjacent to the northern terminus of the existing Perris Valley Airport runway. The ground surface cover in the unpaved areas of the Project Site generally consists of exposed soil with moderate to extensive weed growth. Several large trees are present along the northern property line of the Project Site, and two large trees are present along the western property line.

The Project Site is relatively level with localized undulations of 1 to 2 feet.

### **Faulting and Seismicity**

The Project Site is not located within an Alquist-Priolo Earthquake Fault Zone. Additionally, the site is not located within a Riverside County fault zone. No evidence of faulting was identified during the geotechnical investigation (Southern California Geotechnical 2021). Accordingly, the potential for fault rupture at the Project Site is extremely low.

### **Surface Fault Rupture**

Ground surface rupture along an earthquake fault may cause damage to aboveground infrastructure and other features. The State of California has mapped known active faults that

may cause surface fault rupture in inhabited areas as part of the Alquist-Priolo Earthquake Fault Zoning Act. There are no known active faults crossing the Project Site and, as discussed above, the site is not located within an Alquist-Priolo Earthquake Fault Zone. The likelihood of surface fault rupture at the Project Site is relatively low. However, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

### **Seismically Induced Ground Shaking**

Strong ground shaking from an earthquake can result in damage associated with landslides, ground lurching, structural damage, and liquefaction. The Project Site is subject to moderate levels of seismically induced ground shaking due to its proximity to active faults capable of producing a maximum moment magnitude of 6.0 or more. According to the United States Geologic Survey, the de-aggregated mean magnitude for the Project Site is 6.97, based on the peak ground acceleration and soil classification C.

### **Liquefaction**

Liquefaction is the loss of soil strength or stiffness due to a build-up of water pressure between soil particles during severe ground shaking or other rapid loading. This condition is associated primarily with loose (low density), saturated, fine- to medium-grained, cohesionless soils that often make up alluvial materials. Lateral spreading is the finite, horizontal movement of material associated with pore pressure build-up or liquefaction. This process can occur in a shallow underlying deposit during an earthquake in areas susceptible to liquefaction. To occur, lateral spreading requires the existence of a continuous and laterally unconstrained liquefiable zone.

The Project Site is located within a zone of low to moderate liquefaction susceptibility as mapped by the County of Riverside. A potentially liquefiable soil stratum was encountered at a depth of 27 to 32 feet.

### **Lateral Spreading**

Lateral spreading is the finite, horizontal movement of material associated with pore pressure build-up or liquefaction. This process can occur in a shallow underlying deposit during an earthquake in areas susceptible to liquefaction. To occur, lateral spreading requires the existence of a continuous and laterally unconstrained liquefiable zone. Lateral spreading can occur on gently sloping and on flat ground close to rivers and lakes. The potential for lateral spreading affecting the Project Site is considered low.

### **Landslides**

Landslides are gravity-driven movements of earth materials that may include rock, soil, unconsolidated sediment, or combinations of such materials. The primary factors influencing the stability of a slope are the nature of the underlying soil or bedrock, the geometry of the slope

(height and steepness), and rainfall. The presence of historical landslide deposits is a good indicator of future landslides. Landslides are commonly triggered by unusually high rainfall and the resulting soil saturation, by earthquakes, or a combination of these conditions. The Slope Instability Map of the Safety Element of the City of Perris General Plan indicates that the Project Site is not mapped in an area susceptible to seismically induced landslides (Perris 2021).

### **Paleontological Setting**

Paleontological resources are nonrenewable scientific and educational resources. Projects subject to CEQA must determine if a project would “directly or indirectly destroy a unique paleontological resource.” An impact to paleontological resources would be considered a significant impact if a project results in the direct or indirect destruction of a unique or important paleontological resource or site. A project site is deemed paleontologically sensitive if (1) it has fossils that have previously been recovered from a particular geologic unit; (2) there are recorded fossil localities within the same geologic units as occur within the project area; and (3) the types of fossil materials that have been recovered from the geologic unit are unique or important.

### **Paleontological Resources**

The City of Perris General Plan Conservation Element Exhibit CN-7, Paleontological Sensitivity, identifies the potential for areas of the City to contain paleontological resources. The Project Site is located within Paleontological Sensitivity Area #5, low to high sensitivity, with younger alluvium overlying older fan alluvium at depth. Once excavation in this area reaches 5 feet below ground surface, the potential for impacts to paleontological resources changes from low to high potential.

#### **4.6.2 Thresholds of Significance**

According to Appendix G of the Guidelines for Implementation of the California Environmental Quality Act (CEQA Guidelines), the Proposed Project would have a significant impact on geology and soils if it would:

- **Threshold GEO-1:** Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42.
  - Strong seismic ground shaking.
  - Seismic-related ground failure, including liquefaction.
  - Landslides.
- **Threshold GEO-2:** Result in substantial soil erosion or the loss of topsoil.

- **Threshold GEO-3:** Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.
- **Threshold GEO-4:** Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.
- **Threshold GEO-5:** Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.
- **Threshold GEO-6:** Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

### 4.6.3 Regulatory Implementation

**RI GEO-1** The Proposed Project will comply with specific policies outlined in the City of Perris General Plan that are related to geology and soils including Policy I.E, Measure I.E.1, Measure I.E.2, and Measure I.E.5.

**RI GEO-2** The Project will comply with City of Perris Building Code – Chapter 16.08 (Building, Plumbing and other Codes Adopted).

### 4.6.4 Environmental Impacts

The following sections address potential impacts relating to geology and soils that could result from implementation of the Proposed Project.

#### 4.6.4.1 Threshold GEO-1: Exposure to Seismic-Related Hazards

##### Impact Analysis

Fault rupture can occur along pre-existing, known active fault traces; however, fault rupture also can splay from known active faults or rupture along unidentified fault traces. The site-specific Geotechnical Investigation indicates that the Project Site is not located within an Alquist-Priolo Earthquake Fault Zone nor a Riverside County fault zone, and Southern California Geotechnical did not identify any evidence of faulting during the geotechnical investigations. Accordingly, the Geotechnical Investigation concludes that the potential for fault rupture on the Project Site is extremely low. There would be no impact related to the potential to expose people or structures directly or indirectly to substantial adverse effects related to ground rupture.

The Project Proponent/Developer is required to implement seismic design considerations in accordance with the CBC, which is reflected in City of Perris General Plan Safety Element Implementation Measure I.E.5. Notably, the City would apply a mandatory condition of approval on the Proposed Project that would require all buildings to be constructed in accordance with the City of Perris Building Code, which incorporates the CBC.

The Project Site is located within a seismically active region and strong seismic ground shaking could occur. The Proposed Project would be required to be in conformance with the most recent CBC and Perris Municipal Code Title 16, Buildings and Construction. Further, as required by City of Perris General Plan Safety Element Policy S7.2, the Proposed Project would be built and maintained in accordance with the site-specific Geotechnical Investigation (Appendix E). The Geotechnical Investigation concluded that it is feasible to support the Proposed Project on shallow foundations. The Geotechnical Investigation includes site-specific seismic design parameters and provides design/construction recommendations for geotechnical design, grading, construction, foundations, floor slabs, exterior flatwork, retaining walls, and pavement. Consistent with the City of Perris General Plan policies cited above, the Proposed Project would be designed and constructed in accordance with all final Geotechnical Investigation recommendations (referred to as mitigation measures in Safety Element Implementation Measure I.E.2 above), which are based on CBC requirements. The investigation is required to be consistent with State of California guidelines for the preparation of seismic hazard evaluation reports. As such, potential impacts related to strong seismic ground shaking would be less than significant.

Liquefaction is a phenomenon in which loose, saturated, relatively cohesionless soil deposits lose shear strength during strong ground motions, which causes the soil to behave as a viscous liquid. Liquefaction is generally limited to the upper 50 feet of subsurface soils. Research and historical data indicate that loose granular soils of Holocene to late Pleistocene age below a near-surface groundwater table are most susceptible to liquefaction, while the stability of most clayey material is not adversely affected by vibratory motion.

The Riverside County GIS website indicates that the western portion of the Project Site is located within a zone of low liquefaction susceptibility and the eastern portion of the Project Site is located within a zone of moderate liquefaction susceptibility.

Potentially liquefiable soils were encountered at the 50-foot-deep boring location. A potentially liquefiable soil stratum was encountered at Boring No. B-7 at a depth of 27 to 32 feet. Settlement analysis was performed for the potentially liquefiable stratum.

The result of the settlement analysis indicates a potential total settlement of 0.77 inch at Boring No. B-7. Based on the settlement analysis, differential settlements are expected to be 0.5 inch or less. The estimated differential settlement can be assumed to occur across a distance of 100 feet, indicating a maximum angular distortion of less than 0.001 inch per inch.

It is considered feasible to support the structures contemplated by the Proposed Project (Buildings 1 and 2) on shallow foundations. Such a foundation system can be designed to resist the effects of the anticipated differential settlements, to the extent that the structure would not catastrophically fail. Designing the proposed structure to remain completely undamaged during a major seismic event is not considered to be economically feasible. Based on this understanding, the use of

shallow foundation systems is considered to be the most economical means of supporting the Proposed Project structures.

To support the Proposed Project buildings on shallow foundations (such as spread footings) the structural engineer would be required to verify that the structures would not catastrophically fail due to the predicted dynamic differential settlements. Any utility connections to the structures should be designed to withstand the estimated differential settlements. It should also be noted that minor to moderate repairs, including re-leveling, restoration of utility connections, and repair of damaged drywall and stucco, would likely be required after occurrence of the liquefaction-induced settlements.

The use of a shallow foundation system, as described in the Geotechnical Investigation (Appendix E), is typical for buildings of this type, where they are underlain by the extent of liquefiable soils encountered at the site. The post-liquefaction damage that could occur within the buildings proposed for the Project Site would be typical of similar buildings in the vicinity of the Proposed Project. Therefore, a less than significant impact would occur.

Landslides are mass movements of the ground that include rock falls, relatively shallow slumping and sliding of soil, and deeper rotational or transitional movement of soil or rock. The Project Site is relatively flat and is not located in an area mapped as an earthquake-induced landslide hazard area (California Department of Conservation 2024). Further, all structures and foundations requiring building permits would be required to meet CBC requirements to withstand ground shaking and minimizing potential impacts resulting from liquefaction. Adherence to the CBC would ensure that potential impacts from seismic-related ground failure, including liquefaction would be less than significant.

### **Significance of Impact**

Less Than Significant Impact.

#### **4.6.4.2 Threshold GEO-2: Soil Erosion or Topsoil Loss**

##### **Impact Analysis**

Erosion is the process by which the upper layers of the surface (such as soils) are worn and removed by the movement of water or wind. Soils with characteristics such as low permeability and low cohesive strength are more susceptible to erosion than those soils having higher permeability and cohesive strength. Wind erosion can damage land and natural vegetation by removing soil from one place and depositing it in another. It mostly affects dry, sandy soils in flat, bare areas, but wind erosion may occur wherever soil is loose, dry, and finely granulated. According to soil data compiled by the United States Department of Agriculture, soils on the Project Site and surrounding area primarily contain a low susceptibility to water erosion (USDA 2021). However, under existing conditions, the Project Site has the potential to contribute

windblown soil and sand because it is undeveloped with no or little vegetative cover and contains loose and dry topsoil conditions.

### ***Constructed-Related Erosion***

Grading and excavation during the construction phase of the Proposed Project could temporarily increase the potential for soils to be subject to wind and water erosion. Some of the near-surface soils possess appreciable silt and clay content and may become unstable if exposed to significant moisture infiltration or disturbance by construction traffic. In addition, based on their granular content, some of the on-site soils will also be susceptible to erosion. The Project Site should, therefore, be graded to prevent ponding of surface water and to prevent water from running into excavations.

As further discussed in Section 4.9, Hydrology and Water Quality, of this EIR, pursuant to the requirements of the State Water Resources Control Board, the Project Proponent/Developer would be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for construction activities, including grading. The NPDES permit is required for all development projects that include construction activities, such as clearing, grading, and excavation that disturb at least 1 acre of total land area. The City's municipal separate storm sewer system (MS4) NPDES Permit requires development projects to prepare and submit to the City for approval a site-specific Storm Water Pollution Prevention Plan to demonstrate compliance with the NPDES permit requirements. The Storm Water Pollution Prevention Plan is required to identify a combination of erosion control and sediment control measures (i.e., Best Management Practices) that would reduce or eliminate sediment discharge to surface water from stormwater and non-stormwater discharges during construction. Additionally, the Proposed Project would be constructed in accordance with the City of Perris Stormwater/Urban Runoff Management and Discharge Control Ordinance (Perris Municipal Code, Chapter 14.22). In addition, as discussed in Section 4.2, Air Quality, of this EIR, the Project Proponent/Developer would be required to comply with South Coast AQMD Rule 403's requirements related to fugitive dust control, which would reduce the amount of particulate matter in the air and minimize the potential for wind erosion. With mandatory compliance with all applicable regulatory requirements as presented in the Air Quality and Hydrology and Water Quality sections of this EIR, the potential for water and wind erosion on the Project Site during construction activities would be less than significant.

### ***Post-Construction Impacts***

Operation of the Proposed Project would result in an increase in impervious areas and uses that could increase runoff or pollutants into surface water or groundwater. The Proposed Project would comply with the Section G, "New Development and Redevelopment," of the Municipal Regional Stormwater Permit (NPDES Permit No. CAS 618033) which aims to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address soluble and insoluble stormwater runoff pollutant discharges and prevent

increases in runoff from projects. The provision requires regulated projects to include low-impact development practices, such as pollutant source control measures and stormwater treatment features aimed to maintain or restore the site's natural hydrologic functions.

The Municipal Regional Stormwater Permit also requires that stormwater treatment measures are properly installed, operated, and maintained to ensure long-term management of on-site flows.

Further, as required by the City's Stormwater/Urban Runoff Management and Discharge Control Ordinance, the Proposed Project would be required to submit a preliminary Water Quality Management Plan (WQMP) for review and approval, prior to the City's consideration of the first discretionary approval of the Project (land use entitlement permit); and a final WQMP, prior to the issuance of grading permits. The Project-specific WQMP would be consistent with the City's Ordinance and the Riverside County WQMP, and include appropriate site design, source control, and treatment control BMPs to minimize runoff and soil erosion throughout Project operations. Therefore, potential operational impacts related to substantial soil erosion or loss of topsoil would be less than significant.

### **Significance of Impact**

Less Than Significant Impact.

#### **4.6.4.3 Threshold GEO-3: Geologic Stability**

##### **Impact Analysis**

Seismic-related ground failure is addressed under Threshold GEO-1, above. Expansive soil is addressed under Threshold GEO-4, below. The following discussion of the potential settlement and shrinkage/subsidence potential is summarized from the Geotechnical Investigation, as applicable (Appendix E).

##### ***Settlement Potential***

Settlement refers to unequal compression of a soil foundation, shrinkage, or undue loads being applied to a building after its initial construction that affect the soil foundation. The potential total dynamic settlement at this boing location is estimated to be 0.77 inch. Based on the estimate magnitude of the differential settlements, the Proposed Project buildings may be supported on shallow foundations. Further, the potential for seismically induced settlement is considered low. Refer to Threshold GEO-1, Exposure to Seismic-Related Hazards, above for further discussion on liquefaction and settlement. The Project Proponent/Developer will comply with the site-specific ground preparation and construction recommendations contained in the Project's geotechnical investigations. Therefore, potential impacts would be less than significant.

***Shrinkage/Subsidence***

Potential Subsidence is a gradual settling or sudden sinking of the ground surface (i.e., loss of elevation). The principal causes of subsidence are aquifer-system compaction, drainage of organic soils, underground mining, and natural compaction. Shrinkage is the reduction in volume in soil as the water content of the soil drops (i.e., loss of volume).

Removal and recompaction of the near-surface native soils is estimated to result in an average shrinkage of 3 to 13 percent. However, shrinkage estimates for the individual samples range between 1 and 25 percent based on the results of density testing and the assumption that the on-site soils will be compacted to about 92 percent of the ASTM D-1557 maximum dry density. It should be noted that the shrinkage estimate is based on the results of dry density testing performed on small-diameter samples of the existing soils taken at the boring locations.

Minor ground subsidence is expected to occur in the soils below the zone of removal due to settlement and machinery working. The subsidence is estimated to be 0.1 foot. This estimate may be used for grading in areas that are underlain by native alluvial soils.

These estimates are based on previous experience and the subsurface conditions encountered at the boring locations. The Project Proponent/Developer would comply with the site-specific ground preparation and construction recommendations contained in the Proposed Project's geotechnical investigations. Based on the foregoing, potential impacts related to soil shrinkage/subsidence and collapse would be less than significant.

***Lateral Spreading***

The Project Site is relatively level with localized undulations of 1 to 2 feet. The Project Site is not located adjacent to any hillsides or other areas with significant slopes, and it is not subject to landslides from on-site areas or adjacent areas with steep slopes. Lateral spreading typically results when ground shaking moves soil toward an area where soil integrity is weak or unsupported.

Lateral spreading typically occurs on the surface of a slope, although it does not occur strictly on steep slopes. Lateral spreading is directly associated with areas of liquefaction, which is discussed in Threshold GEO-1, above. As previously discussed, the use of a shallow foundation system, as described in the Geotechnical Investigation (Appendix E), is typical for buildings of this type, where they are underlain by the extent of liquefiable soils encountered at the site. The post-liquefaction damage that could occur within the buildings proposed for the Project Site would be typical of similar buildings in the vicinity of the Proposed Project. The Proposed Project would be required to conform with the requirements set forth in the City of Perris Municipal Code as detailed in the above sections and all pertinent portions of the CBC. This would include approval of grading plans. In addition, adherence to all applicable regulations and conformance to applicable building codes added to the Proposed Project would ensure that potential impacts would be less than significant.

## Significance of Impact

Less Than Significant Impact.

### 4.6.4.4 Threshold GEO-4: Expansive Soils

#### Impact Analysis

Expansive soils are soils that exhibit cyclic shrink and swell patterns in response to variations in moisture content.

The expansion potential of the on-site soils was determined in general accordance with ASTM D-4829 methodology. Soil testing conducted as part of the Geotechnical Investigations identified some of the near-surface soils at this site possess a low expansion potential. Boring No. B-1 had a very low expansion potential (EI) of 5; Boring No. B-5 had a low EI of 24; and Boring No. B-7 had a low EI of 21.

The near-surface soils at the Project Site range from clayey sands, silty sands, and sandy clays. As previously indicated, laboratory testing performed on representative samples of the near-surface soils indicate that these materials possess very low to low expansion potential (EI's = 5, 21, and 24). Based on the presence of expansive soils at the Project Site, care should be given to proper moisture conditioning the building pad subgrade soils to a moisture content of 2 to 4 percent above the ASTM D-1557 optimum during site grading. In addition to adequately moisture conditioning the subgrade soils and fill soils during grading, special care must be taken to maintaining moisture content of these soils at 2 to 4 percent above the optimum moisture content. This would require the contractor to frequently moisture condition these soils throughout the grading process, unless grading occurs during a period of relatively wet weather.

As noted previously, the Project Site is underlain by low expansive soils. Support of new flatwork on low expansive soils carries a minor risk with respect to flatwork movement and potential distress.

The Proposed Project would be required to be constructed in conformance with the CBC and City of Perris Municipal Code Title 16. Additionally, provisions would be made to limit the potential for surface water to penetrate the soils immediately adjacent to the new structure. These provisions should include directing surface runoff into rain gutters and area drains, reducing the extent of landscaped areas around the structure, and sloping the ground surface away from the building. Where possible, it is recommended that landscaped planters not be located immediately adjacent to the proposed building. If landscaped planters around the building are necessary, it is recommended that drought-tolerant plants or a drip irrigation system be used, to minimize the potential for deep moisture penetration around the structure. Per Section 19.71.050 of the Perris Municipal Code, irrigation shall be provided as appropriate for tree species and location. No tree shall be planted on City property without automatic irrigation and controls. Highly drought-tolerant trees, or trees newly

planted in irrigated turf areas may have temporary irrigation systems as approved by the City's landscape architect for a minimum of 2 years. Tolerance for recycled water as provided by the Eastern Municipal Water District shall be ensured. With conformance with the CBC and Perris Municipal Code Title 16, and implementation of the provisions and recommendations outlined in the Geotechnical Investigation (Appendix E), a less than significant impact would occur.

### **Significance of Impact**

Less Than Significant Impact.

#### **4.6.4.5 Threshold GEO-5: Septic Tanks or Alternative Wastewater Disposal Systems**

### **Impact Analysis**

The Proposed Project would connect to existing sewer lines for conveyance of wastewater to treatment facilities, and there would be no impact related to on-site soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems.

### **Significance of Impact**

No Impact.

#### **4.6.4.6 Threshold GEO-6: Paleontological Resources**

### **Impact Analysis**

Paleontological resources are typically found in geologic strata that was deposited during the Pleistocene Epoch which includes the time between 2.6 million years ago until approximately 11,700 years ago. The Holocene Epoch began about 11,700 years ago and consists of younger sedimentary deposits and fossils that are considered less likely to be found. Construction of the Proposed Project would require grading and excavation of soils, and therefore, would have high potential to encounter paleontological resources during activities beyond this depth. Accordingly, City of Perris General Plan Conservation Element Implementation Measure IV.A.4 requires paleontological monitoring of development sites within Paleontological Sensitivity Area #5 once subsurface excavations reach 5 feet in depth, with monitoring levels reduced if appropriate, at the discretion of a certified Project paleontologist. This requirement is applied to the Proposed Project as mitigation measure MM GEO-1. Implementation of mitigation measure MM GEO-1 would reduce potential impacts to a less than significant level.

### **Significance of Impact**

Potentially Significant without mitigation.

#### **4.6.5 Cumulative Impacts**

The following sections address various potential cumulative impacts relating to geology and soils that could result from implementation of the Proposed Project.

Geology and soil-related impacts are generally site-specific and are determined by particular on-site soil characteristics, proximity to faults, topography, and proposed land uses. Development projects are analyzed on an individual basis and must comply with established requirements of the applicable jurisdiction's development standards and the CBC as they pertain to protection against known geologic hazards and potential geologic and soil-related impacts.

##### **4.6.5.1 Cumulative Threshold GEO-1: Exposure to Seismic-Related Hazards**

Cumulative effects related to geology resulting from the implementation of future development of the Proposed Project as well as surrounding areas could expose more people and property to potential impacts due to seismic activity. Long-term impacts related to geology include the exposure of people to the potential for seismically induced ground shaking. Implementation of other cumulative projects would incrementally increase the number of people and structures subject to a seismic event. Seismic and geologic significance is considered on a project-by-project basis through the preparation of design-level geotechnical studies. The potential for any project to be affected by or any project to exacerbate an existing geotechnical hazard would be minimized or not occur through strict engineering guidelines as they pertain to protection against known geologic hazards and potential geologic and soil-related impacts.

##### **4.6.5.2 Cumulative Threshold GEO-2: Soil Erosion or Topsoil Loss**

With respect to erosion, as discussed under Threshold GEO-2, regulatory requirements mandate that the Proposed Project incorporate measures design during construction and long-term operation to ensure that significant erosion impacts do not occur. Other development projects in the vicinity of the Proposed Project would be required to comply with the same regulatory requirements as the Proposed Project to preclude substantial adverse water and wind erosion impacts. Because the Proposed Project and other cumulative projects would be subject to similar mandatory regulatory requirements to control erosion hazards during construction and long-term operation, the Proposed Project would not result in a cumulatively considerable contribution to a significant cumulative impact related to erosion.

##### **4.6.5.3 Cumulative Threshold GEO-3: Geologic Stability**

##### **4.6.5.4 Cumulative Threshold GEO-4: Expansive Soils**

Development of the Proposed Project as well as all past, present, and future projects would be required to be constructed in accordance with the latest edition of the CBC and to adhere to all current earthquake construction standards, including those relating to soil characteristics set forth

by the City. Therefore, no elements of the Proposed Project would contribute to any cumulatively considerable geologic and soils impacts.

#### **4.6.5.5 Cumulative Threshold GEO-5: Septic Tanks or Alternative Wastewater Disposal Systems**

As previously indicated, the Proposed Project would connect to existing sewer lines and would not cause an impact with regard to septic tanks or alternative wastewater disposal systems, impacts would not be cumulatively considerable.

#### **4.6.5.6 Cumulative Threshold GEO-6: Paleontological Resources**

Although development activities on the Project Site would not impact any known paleontological resources, there is the potential that such resources are buried beneath the surface of the Project Site and could be impacted during construction. Other projects within the region would similarly have the potential to impact unknown, subsurface paleontological resources during ground-disturbing activities. However, implementation of mitigation measure MM GEO-1 for the Proposed Project, and similar mitigation requirements for development in the City, would ensure the proper identification and subsequent treatment of any paleontological resources that may be encountered during ground-disturbing activities associated. With implementation of mitigation measure MM GEO-1, the Proposed Project would not result in a cumulatively considerable contribution to a significant cumulative impact to paleontological resources.

### **4.6.6 Level of Significance Before Mitigation**

#### **4.6.6.1 Threshold GEO-1: Exposure to Seismic-Related Hazards**

With implementation of design considerations in accordance with the CBC and implementation of recommendations from the Geotechnical Investigation, the Proposed Project would have a less than significant impact with regard to exposure to seismic-related hazards.

#### **4.6.6.2 Threshold GEO-2: Soil Erosion or Topsoil Loss**

The Proposed Project would not result in a substantial adverse impact with regard to substantial soil erosion or the loss of topsoil.

#### **4.6.6.3 Threshold GEO-3: Geologic Stability**

With adherence to all applicable regulations and conformance to applicable building codes, the Proposed Project would not result in significant adverse impacts with regard to geologic stability.

#### **4.6.6.4 Threshold GEO-4: Expansive Soils**

With conformance with the CBC and City of Perris Municipal Code Title 16, and implementation of the provisions and recommendations outlined in the Geotechnical Investigation (Appendix E), a less than significant impact would occur.

#### **4.6.6.5 Threshold GEO-5: Septic Tanks or Alternative Wastewater Disposal Systems**

The Proposed Project would be connected to existing sewer lines, and there would be no impact related to on-site soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems.

#### **4.6.6.6 Threshold GEO-6: Paleontological Resources**

The Proposed Project would have the potential to directly or indirectly destroy a unique paleontological resource.

### **4.6.7 Mitigation Measures**

#### **4.6.7.1 Threshold GEO-6: Paleontological Resources**

**MM GEO-1:** Prior to the issuance of grading permits, the Project Proponent/Developer shall submit to and receive approval from the City, a Paleontological Resource Impact Mitigation Monitoring Program. The Paleontological Resource Impact Mitigation Monitoring Program shall include the provision of a qualified professional paleontologist (or his or her trained paleontological monitor representative) during on- and off-site subsurface excavation that exceeds 5 feet in depth below the pre-grade surface. Selection of the paleontologist shall be subject to approval of the City of Perris Planning Manager and no grading activities shall occur at the site or within off-site Project improvement areas until the Project paleontologist has been approved by the City.

Monitoring shall be restricted to undisturbed subsurface areas of older Quaternary alluvium, which might be present below the surface. The Project paleontologist shall be prepared to quickly salvage fossils as they are unearthed to avoid construction delays. The Project paleontologist shall also remove samples of sediments which are likely to contain the remains of small fossil invertebrates and vertebrates. The Project paleontologist shall have the power to temporarily halt or divert grading equipment to allow for removal of abundant or large specimens.

Collected samples of sediments shall be washed to recover small invertebrate and vertebrate fossils. Recovered specimens shall be prepared so that they can be identified and permanently preserved. Specimens shall be identified and curated

and placed into an accredited repository (such as the Western Science Center or the Riverside Metropolitan Museum) with permanent curation and retrievable storage.

A report of findings, including an itemized inventory of recovered specimens, shall be prepared upon completion of the steps outlined above. The report shall include a discussion of the significance of all recovered specimens. The report and inventory, when submitted to the City of Perris Planning Division, will signify completion of the program to mitigate impacts to paleontological resources.

#### **4.6.8 Level of Significance After Mitigation**

##### **4.6.8.1 Threshold GEO-6: Paleontological Resources**

The Proposed Project would have a less than significant impact with incorporation of mitigation measure MM GEO-1.