3.6 GEOLOGY AND SOILS

The purpose of this section is to describe the existing regulatory and environmental conditions related to the geologic, soil, and seismic characteristics within the Project area. This section identifies potential impacts that could result from implementation of the Project, and as necessary, recommends mitigation measures to reduce the significance of impacts. The issues addressed in this section are risks associated with faults, strong seismic ground shaking, seismic-related ground failure such as liquefaction, landslides, substantial erosion or the loss of topsoil, and unstable geological units and/or soils.

The environmental setting discussion is based largely on review of the Geotechnical Feasibility Study Proposed Industrial Development by Southern California Geotechnical, Inc. ("*Geotechnical Feasibility Study*") (SCE, 2018; Attached as ***Appendix F***), review of aerial photographs and maps of the Project and its surroundings. Other information in this section, such as regulatory framework, is derived from the various planning documents including the City of Beaumont General Plan, Riverside County General Plan, Federal Occupational Safety and Health Administration (OSHA) Regulations, Seismic Hazards Mapping Act (SHMA) of 1990, and pertinent State of California Building Codes (CBC).

3.6.1 ENVIRONMENTAL SETTING

Topographic information for the 31.26-acre Warehouse Site was obtained from an ALTA survey prepared by ATLAS Geospatial, dated October 18, 2018. Based on this survey, site elevations range between a maximum grade of 2,452± feet above mean sea level (amsl) in the northeast property corner to a minimum grade of 2,367± feet amsl at the southwest property corner. As discussed above, the major topographic features of the site are the southwest-draining canyon in the central to the southern portion of the site, generally hilly topography, and embankment fills located along the southern and eastern property lines. Based on the ALTA survey, the fill embankments along the east property line possess heights of up to 30± feet with inclinations ranging between 4h:1v and 2h:1v. Along the south property line of the Warehouse Site, the fill slope possesses heights of up to 271 feet with an inclination of about 2h: 1v.

Outside of the Warehouse Site, the Project Site includes similar landforms, landform features, past deposition and erosion patterns, and similar soil types. The Project Site contains Greenfield sandy loam (8-15 percent slopes), riverwash, and terrace escarpments. The 28.41-acre Annexation Area portion of the Project Site is shown, based on the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), to also contain San Emigdio loam (2 to 8 percent slopes), the soil profiles consist of loam, fine sandy loam, and stratified sandy loam to silt loam, which are similar to the Greenfield sandy loam and both are well drained.

NATURAL SETTING

The approximately 31.26-acre Warehouse Site is currently vacant and undeveloped, except for recently placed embankment fills along the eastern and southern property lines. Within this area and within the overall Project Site that includes the annexation areas, there are multiple dirt roads that traverse the site and off-road vehicle use is prevalent. The Project Site is characterized as hilly with a southwest-draining

canyon that extends from the existing drain outlet at the eastern embankment fill to near the southwest corner of the Project Site where roadway improvement activities have impaired the natural flow of the stream.

The westerly portion of the Project Site including the 28.41 Annexation Area also includes undisturbed areas with native vegetation and landforms as well as areas that have been disturbed. The easterly portion of this area contain similar landscaping and vegetative patterns, with a series of small hills and lower lying depressional areas as well as areas that have been heavily disturbed. This includes areas that have been used as a construction staging for ongoing development to the west and earthmoving activities to prepare for the 4th Street extension.

REGIONAL GEOLOGIC SETTING

The Project Site is located on the western approach to the San Gorgonio Pass between the San Bernardino Mountains of the Transverse Range geologic province to the north, and the San Jacinto Mountains of the Peninsular Range geologic province to the south. Each of the adjacent mountain ranges are over 11,000 feet amsl and are composed of Jurassic and Cretaceous granitic rocks, which have intruded and metamorphosed older rocks. Finer local sediments range in age from late Miocene, Pliocene, Pleistocene, and Holocene.[1]

LOCAL GEOLOGIC SETTING

The Project Site and general surrounding area is underlain by Quaternary alluvial deposits identified as younger alluvium (Qa) and older alluvium (Qoa). Younger alluvial soils are typically located within the southwest-draining erosional canyon and in the northeastern portion of the Project Site. The geologic conditions at the ground surface of the areas of higher elevations generally consist of older alluvium. Weathered bedrock/formational materials were encountered below the older alluvial soils and appear to be consistent with the San Timoteo formation.

The Project Site is located at the junction of the Transverse Ranges and Peninsular Ranges which are both prominent natural geomorphic provinces in southwestern California. The Peninsular Ranges can be characterized by steep, elongated ranges and valleys. The Transverse Ranges manifest themselves as a series of roughly parallel steep ridges dissected by young, steep streams of relatively low flow rate. Tectonic activity along numerous faults has created the geomorphology present within this region.

The documented subsurface materials within the Project Site generally consist of younger and older alluvium and weathered bedrock. Although not encountered at sampling locations, some artificial fills were observed in the embankment areas for the proposed streets along the east and south property lines. Descriptions for documented materials are as follows as described in SCE's feasibility study for the Project[2]:

- **Younger Alluvium:** Soils classified as younger alluvium were encountered at the ground surface within the southwest-draining canyon and in the northeast portion of the site. The younger alluvium encountered at these locations generally consists of very loose to medium dense silty

[1] BCR Consulting, Inc. (2019*). Cultural Resources Assessment*. Page 1.
[2] Southern California Geotechnical, Inc. (2018). *Geotechnical Feasibility Study, Proposed Industrial Development*. Pages 7-8.

fine sands and fine sands with occasional trace to little clay content, loose clayey fine to coarse sands, and very stiff fine sandy clays. Some of the younger alluvial soils possess appreciable porosity and calcareous cementation. The younger alluvium was encountered to depths of 12 to 22± feet in the southwest-draining canyon area, and to a depth of 12± feet in the northeast portion of the site. Occasional traces of fine gravel were encountered in some of the younger alluvial strata.

- **Older Alluvium:** Soils classified as older alluvium were encountered at the ground surface in the northwest and central portions of the Project Site and beneath the younger alluvium at the remaining areas of the site. The older alluvial soils generally consist of medium dense to very dense silty fine sands, fine to medium sands, clayey sands, fine sandy silts, and hard silty clays and fine sandy clays. The older alluvium generally possesses relatively high strengths and medium dense to very dense relative densities. Some of the recovered samples of the older alluvial materials are weakly cemented. Occasional traces of fine gravel were encountered throughout the older alluvial materials. The older alluvial soils generally extended to depths of 17 to 27± feet at the sampling locations. The southeast sampling location was terminated in older alluvium at a depth of 25± feet.
- **Bedrock:** Weathered bedrock materials were encountered beneath the older alluvium at all locations except for the southwest portion, which was terminated in older alluvium at a depth of 25± feet. The weathered bedrock materials generally consist of dense to very dense fine to coarse-grained sandstone, fine-grained sandstones, silty sandstones, and clayey sandstones. The bedrock materials were generally weakly to moderately cemented and friable. The weathered silty fine-grained sandstone bedrock extended to the maximum depth explored of 50± feet below the existing site grade in the southeast portion of the site.
- **Groundwater:** Free water was encountered at a depth of 49± feet at the sampling location in the southeast portion of the site. This depth corresponds to an elevation of about 2,341± feet. Additionally, very moist soils were encountered in the southwest corner of the Project Site, between depths of 16 and 20± feet. The soil obtained from these depths possess moisture contents of 13 and 27 percent and possessed a very moist to wet appearance. Based on their moisture contents and appearance, a perched groundwater table may be present between depths of 16 and 20± feet in the southwest, although no seepage was observed in the borehole during or at the completion of drilling. The underlying older alluvial soils encountered at a depth of 24 to 25± feet in the southwest possessed a moisture content of 12 percent and possessed a "moist" appearance, in contrast to the "very moist to wet" overlying soils.

Based on these considerations, the static groundwater table is expected to have been present at a depth of about 49± feet below the existing site grades is the southeast portion of the site at the time of subsurface exploration. Shallower zones of perched ground water may also be present, especially within the southwest-draining canyon.

As part of the research, review of available groundwater data was conducted to determine the historic high groundwater level for the Project Site. The primary reference used to determine the groundwater depths in this area is the California Department of Water Resources website. The nearest monitoring well is located approximately 2.1 miles southeast of the site. The water level reading within this monitoring well indicates high groundwater levels of 58± feet (Fall 2017).

FAULTING AND SEISMICITY

Regional Faulting

The Project Site is located within a seismically active region. The closest mapped active fault, the San Jacinto Fault, is located approximately five miles southwest of the Project Site. Other known regionally active faults that could affect the Project Site include Cucamonga, Elsinore-Glen Ivy, Puente Hills Thrust, San Andreas, San Jose, and Whittier faults. Due to the proximity of the Project Site to the San Jacinto Fault and other faults, significant seismic shaking could impact the Project Site within the design life of the proposed development.

Local Faulting

The Project Site is not located within an Earthquake Fault Zone as delineated by the Alquist-Priolo Earthquake Fault Zoning Act.[3] Additionally, the Project Site is not within a Riverside County Fault Hazard Zone. It should be noted that some of the parcels located within one-half mile east of the Project Site are located within a Riverside County Fault Zone.[4] Additionally, based on knowledge of other properties near this Project Site, evidence of inactive faults was observed within the San Timoteo formation bedrock materials located one-half to one mile west of the Project Site. Based on the presence of an earthquake fault zone located east of the Project, and evidence of faulting found west of the site, it is possible that some unmapped faults are present within the Project Site. Based on the fact that no mapped fault zones are within the Project Site, it is not expected that any active faults are present.

Ground Shaking

Strong ground shaking can be expected during moderate to severe earthquakes in this general region and is common in the majority of southern California. Intensity of ground shaking at a given location depends primarily upon earthquake magnitude, site distance from the source, and site response (soil type) characteristics.

Secondary Seismic Hazards

Secondary seismic hazards generally associated with severe ground shaking during an earthquake include ground rupture, lurching, ridgetop shatter, landsliding and rockfall, and liquefaction and dynamic settlement.

- Ground Rupture - Ground Rupture is generally considered most likely to occur along pre-existing active faults. Based on a previous site investigation, there are no active faults located within the Project area; therefore, the potential for ground rupture is considered low.
- Lurching - Soil lurching refers to the rolling motion on the ground surface by passage of seismic surface waves. Lurching is considered severe in areas where the thickness of soft sediments varies appreciably under structures. As previously discussed, the Project site is partially underlain by younger alluvium soils. The younger alluvium encountered generally consisted of very loose to

[3] California Department of Conservation. (ND). The Alquist-Priolo Earthquake Fault Zoning Act - Earthquake Zones of Required Investigation. https://maps.conservation.ca.gov/cgs/EQZApp/app/ (accessed November 2021).
[4] Riverside County (2019). Riverside County Mapping Portal – Fault Zones. Accessible at https://gisopendata-countyofriverside.opendata.arcgis.com/datasets/fault-zones.

medium dense silty fine sands and fine sands with occasional trace to little clay content, loose clayey fine to coarse sands, and very stiff fine sandy clays. The younger alluvial soils possess low relative densities, relatively low strengths, and some porosity. Laboratory testing indicated that the younger alluvium is compressible when loaded and collapsible when inundated with water. Remedial grading is considered warranted to remove the younger alluvium from the Project Site in its entirety[5]; therefore, impacts from lurching are not anticipated.

- Ridgetop Shatter - Strong ground shaking during earthquakes can result in the shattering of certain geologic deposits where they form elevated ridges. As mentioned previously, the Project Site has hilly topography; therefore, ridgetops exist on the Project Site. However, significant cuts and fills on the order of 30 to 40± feet would be required to achieve the proposed site grades. It is also anticipated that some significant retaining walls and/or slopes would be necessary, including the northwest and the southwest portion of the Project Site.[6] Ultimately, the existing landscape on the Project Site would be altered to accommodate the grades and pad elevations needed to enable the proposed improvements. The Project does propose development in ridgetop areas and therefore, the risk of ridgetop shatter is low.
- Landsliding and Rockfall - The Project Site terrain is comprised of rolling hills. No evidence of previous land sliding was observed during review of the California Geological Survey Landslide Inventory (available at https://maps.conservation.ca.gov/cgs/lsi/app/). There are no boulder outcrops or potential rockfall hazards present within the Project Site. The risk of landslide and rockfall is considered low for the Project Site.
- Liquefication and Dynamic Settlement - Liquefaction of cohesionless soils can be caused by strong vibratory motion due to earthquakes. Liquefaction is characterized by a loss of shear strength in the affected soil layers, thereby causing the soil to behave as a viscous liquid. When insufficient confining overburden is present, liquefaction may be manifested at the ground surface by settlement or sand boils. For the potential effects of liquefaction to be manifested at the ground surface, the soils generally must be granular, loose to medium dense, saturated relatively near the ground surface and must be subjected to a sufficient magnitude and duration of ground shaking. Ground accelerations generated from a seismic event can produce settlements in sands or granular earth materials both above and below the water table, posing a potential hazard to land uses on the surface.

  Liquefaction data from the Riverside County Mapping Portal (https://gisopendata-countyofriverside.opendata.arcgis.com/datasets/liquefaction) indicates that the Project Site is located within zones of low to moderate liquefaction susceptibility. However, the soil conditions encountered are not considered to be conducive to liquefaction. These conditions consist of surficial younger alluvial sediments underlain by medium dense to very dense older alluvium and dense to very dense weathered bedrock. Some of the younger alluvial soils may be susceptible to liquefaction; however, preliminary remedial grading recommendation indicate that the younger alluvium should be removed in its entirety and replaced as compacted structural fill prior to construction. Therefore, any younger alluvium which may be presently susceptible to liquefaction

[5] Southern California Geotechnical, Inc. (2018). *Geotechnical Feasibility Study, Proposed Industrial Development*. Page 1.
[6] Ibid. Page 5.

will be mitigated as a part of the recommended remedial grading. Therefore, liquefaction is not considered to be a design concern for this Project.[7]

PALEONTOLOGICAL SETTING

The Project Site is located on the western approach to the San Gorgonio Pass between the San Bernardino Mountains of the Transverse Range geologic province to the north, and the San Jacinto Mountains of the Peninsular Range geologic province to the south (Diblee 1982; Morton 1978a, 1978b, and others as cited by BCR Consulting 2018). Each of the adjacent mountain ranges are over 11,000 feet amsl and are composed of Jurassic and Cretaceous granitic rocks, which have intruded and metamorphosed older rocks. Finer local sediments range in age from late Miocene, Pliocene, Pleistocene, and Holocene (Rewis et al. 2006 as cited by BCR Consulting 2018). The near surface soils are comprised of undocumented artificial fill, surficial soils, young alluvium, older alluvium.

According to the Riverside County General Plan Multipurpose Open Space Element, Riverside County has been inventoried for geologic formations known to potentially contain paleontological resources. Lands with high, low, or undetermined potential for finding paleontological resources are mapped. According to the map, the Project Site is in an area with undetermined paleontological sensitivity.[8]

However, due to the presence of older Quaternary alluvium soils in the Project Site, there is a possibility of encountering significant vertebrate fossils that may be disturbed during construction. The closest vertebrate fossil locality from older Quaternary deposits is LACM 4540, situated southwest of the Project area on the northeast side of the San Jacinto Valley near the intersection of Jackrabbit Trail and Gilman Springs Road, that produced fossil specimens of horse, Equidae.[9]

3.6.2 REGULATORY SETTING

FEDERAL

U.S. Geological Survey (USGS) Landslide Hazard Program

The USGS Landslide Hazard Program provides information on landslide hazards including information on current landslides, landslide reporting, real-time monitoring of landslide areas, mapping of landslides through the National Landslide Hazards Map, local landslide information, landslide education, and research.

STATE

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code [PRC] §§ 2621-2624, Division 2, Chapter 7.5) was passed in 1972 following the destructive February 9, 1971 moment magnitude (Mw) 6.6 San Fernando earthquake to mitigate the hazard of surface faulting to structures intended for human

[7] Southern California Geotechnical, Inc. (2018). *Geotechnical Feasibility Study, Proposed Industrial Development*. Page 13.

[8] Riverside County. (2015). *General Plan Chapter 5: Multipurpose Open Space Element*. Figure OS-8: Paleontological Sensitivity. Page OS-55. https://planning.rctlma.org/Portals/14/genplan/general_Plan_2017/elements/OCT17/Ch05_MOSE_120815.pdf?ver=2017-10-11-102103-833 (accessed November 2021).

[9] BCR Consulting, Inc. (2019). *Cultural Resources Assessment, Appendix B: Paleontological Overview*.

occupancy. The Act's main purpose is to prohibit siting buildings used for human occupancy across traces of active faults that constitute a potential hazard to structures from surface faulting or fault creep. The Act requires the State Geologist to establish regulatory zones, known as "Earthquake Fault Zones," delineating appropriately wide earthquake fault zones to encompass potentially active and recently active traces of faults. Local agencies must regulate most development projects within these zones. Before a project can be permitted, cities and counties must require a geologic investigation to demonstrate that proposed human occupancy structures would not be constructed across active faults. An evaluation and written report of a specific site must be prepared by a licensed geologist. If an active fault is found, a structure for human occupancy cannot be placed over the trace of the fault and must be set back from the fault (typically at least 50-foot setbacks are required).[10]

Effective June 1, 1998, 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 Earthquake Fault Zones.

Seismic Hazards Mapping Act of 1990 (SHMA)

The SHMA of 1990 (California PRC, § 2690 et seq.) directs the California Department of Conservation's California Geological Survey to identify and map areas prone to liquefaction, earthquake-induced landslides, and amplified ground shaking. The purpose of the SHMA is to minimize loss of life and property through the identification, evaluation, and mitigation of seismic hazards.

The SHMA provides a statewide seismic hazard mapping and technical advisory program to assist cities and counties in fulfilling their responsibilities for protecting the public health and safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and other seismic hazards caused by earthquakes. Mapping and other information generated pursuant to the SHMA is to be made available to local governments for planning and development purposes. The state requires (1) local governments to incorporate site-specific geotechnical hazard investigations and associated hazard mitigation as part of the local construction permit approval process, and (2) the agent for a property seller, or the seller if acting without an agent, to disclose to any prospective buyer if the property is located within a seismic hazard zone. The State Geologist is responsible for compiling seismic hazard zone maps. The SHMA specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

California Building Code

California building standards are published in the California Code of Regulations (CCR), Title 24, also known as the California Building Standards Code (CBSC). The CBSC, which applies to all applications for building permits, consists of 11 parts that contain administrative regulations for the California Building Standards Commission and for all state agencies that implement or enforce building standards. Local agencies must ensure development complies with the CBSC guidelines. Cities and counties can adopt additional building standards beyond the CBSC. CBSC Part 2, named the California Building Code (CBC), is based upon the

[10] California Department of Conservation. (2019). The Alquist-Priolo Earthquake Fault Zoning Act. https://www.conservation.ca.gov/cgs/alquist-priolo (accessed November 2021).

2016 International Building Code (IBC). The 2016 CBSC (CCR, Title 24) went into effect on January 1, 2017. In addition, proposed building code changes are underway. Part 1, California Administrative Code, of the 2019 CBSC went into effect January 8, 2019. The remaining approved standards went into effect January 1, 2020. Significant changes to Part 1 include 1) clarifying when an addition is required to have a dedicated egress system and 2) revising project inspector certification examinee eligibility criteria to better recognize appropriate qualifying experience and/or education. For a summary of additional 2019 CBSC changes visit: https://www.dgs.ca.gov/-/media/Divisions/DSA/Publications/other/2019-CBC-CodeChangeSummary.ashx. Project construction will comply with the 2016 and 2019 CBSC.

Given the State's susceptibility to seismic events, the CBC's seismic standards are among the strictest in the world. The CBC applies to all development in the State, except where stricter standards have been adopted by local agencies. CBC Chapter 16 addresses structural design requirements governing seismically resistant construction (CBC § 1604), including (but not limited to) factors and coefficients used to establish seismic site class and seismic occupancy category for the soil/rock at the building location and the proposed building design (CBC §§ 1613.5 through 1613.7). CBC Chapter 18 includes (but is not limited to) the requirements for foundation and soil investigations (CBC § 1803); excavation, grading, and fill (CBC § 1804); allowable load-bearing values of soils (CBC § 1806); and the design of footings, foundations, and slope clearances (CBC § 1808 and 1809), retaining walls (CBC § 1807), and pier, pile, driven, and cast-in-place foundation support systems (CBC § 1810). CBC Chapter 33 includes (but is not limited to) requirements for safeguards at worksites to ensure stable excavations and cut or fill slopes (CBC § 3304).

Construction activities are subject to occupational safety standards for excavation and trenching as specified in the California OSHA regulations (Title 8 of the CCR) and in Chapter 33 of the CBC. These regulations specify the measures to be used for excavation and trench work where workers could be exposed to unstable soil conditions. The Project would be required to employ these safety measures during excavation and trenching.

State Earthquake Protection Law

The State Earthquake Protection Law (California Health and Safety Code [HSC] § 19100 et seq.) requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. Specific minimum seismic safety and structural design requirements are set forth in Chapter 16 of the CBC. The CBC requires a site-specific geotechnical study to address seismic issues and identifies seismic factors that must be considered in structural design. Because the Project area is not located within an Alquist–Priolo Earthquake Fault Zone, special provisions would not be required for Project development related to fault rupture.

REGIONAL

Riverside County General Plan

Multipurpose Open Space Element

This element addresses protecting and preserving natural resources, agriculture and open space areas, managing mineral resources, preserving and enhancing cultural resources, and providing recreational opportunities for the citizens of Riverside County. Paleontological resources are the fossilized biotic

remains of ancient environments. They are valued for the information they yield about the history of the earth and its past ecological settings.[11]

The following policies are intended to ensure that paleontological resources are appropriately considered:

Policy OS 19.6: Whenever existing information indicates that a site proposed for development has high paleontological sensitivity as shown on Figure OS-8, a paleontological resource impact mitigation program (PRIMP) shall be filed with the County Geologist prior to site grading. The PRIMP shall specify the steps to be taken to mitigate impacts to paleontological resources.

Policy OS 19.7: Whenever existing information indicates that a site proposed for development has low paleontological sensitivity as shown on Figure OS-8, no direct mitigation is required unless a fossil is encountered during site development. Should a fossil be encountered, the County Geologist shall be notified, and a paleontologist shall be retained by the project proponent. The paleontologist shall document the extent and potential significance of the paleontological resources on the site and establish appropriate mitigation measures for further site development.

Policy OS 19.8: Whenever existing information indicates that a site proposed for development has undetermined paleontological sensitivity as shown on Figure OS-8, a report shall be filed with the County Geologist documenting the extent and potential significance of the paleontological resources on-site and identifying mitigation measures for the fossil and for impacts to significant paleontological resources prior to approval of that department.

Policy OS 19.9: Whenever paleontological resources are found, the County Geologist shall direct them to a facility within Riverside County for their curation, including the Western Science Center in the City of Hemet.

Safety Element

The Safety Element serves the following functions:

- Develops a framework by which safety considerations are introduced into the land use planning process;
- Facilitates the identification and mitigation of hazards for new development, and thus strengthens existing codes, project review, and permitting processes;
- Presents policies directed at identifying and reducing hazards in existing development; and
- Strengthens earthquake, flood, inundation, and wildland fire preparedness planning and post-disaster reconstruction policies.

Policy S 2.2: Require geological and geotechnical investigations in areas with potential for earthquake-induced liquefaction, landsliding or settlement, for any building proposed for human

[11] Riverside County (2015). *Riverside County General Plan, Multipurpose Open Space Element*. Accessible at https://planning.rctlma.org/Zoning-Information/General-Plan.

occupancy and any structure whose damage would cause harm, except for accessory buildings. (AI 81).

Policy S 2.3: Require that a state-licensed professional investigate the potential for liquefaction in areas designated as underlain by "Susceptible Sediments" and "Shallow Ground Water" for all general construction projects, except for accessory buildings (Figure S-3).

Policy S 2.5: Require that engineered slopes be designed to resist seismically-induced failure. For lower-risk projects, slope design could be based on pseudo-static stability analyses using soil engineering parameters that are established on a site-specific basis. For higher-risk projects, the stability analyses should factor in the intensity of expected ground shaking, using a Newmark-type deformation analysis.

Policy S 2.6: Require that cut and fill transition lots be over-excavated to mitigate the potential of seismically-induced differential settlement.

Policy S 2.7: Require a 100% maximum variation of fill depths beneath structures to mitigate the potential of seismically-induced differential settlement.

Policy S 3.1: Require the following in landslide potential hazard management zones, or when deemed necessary by the California Environmental Quality Act: (AI 104)

Preliminary geotechnical and geologic investigations.

Evaluations of site stability, including any possible impact on adjacent properties, before final project design is approved.

Consultant reports, investigations, and design recommendations required for grading permits, building permits, and subdivision applications be prepared by state-licensed professionals.

Policy S 3.3: Before issuance of building permits, require certification regarding the stability of the site against adverse effects of rain, earthquakes, and subsidence.

Policy S 3.4: Require adequate mitigation of potential impacts from erosion, slope instability, or other hazardous slope conditions, or from loss of aesthetic resources for development occurring on slope and hillside areas.

Policy S 3.5: During permit review, identify and encourage mitigation of on-site and off-site slope instability, debris flow, and erosion hazards on lots undergoing substantial improvements.

Policy S 3.6: Require grading plans, environmental assessments, engineering and geologic technical reports, irrigation and landscaping plans, including ecological restoration and revegetation plans, as appropriate, in order to assure the adequate demonstration of a project's ability to mitigate the potential impacts of slope and erosion hazards and loss of native vegetation.

Policy S 3.8: Require geotechnical studies within documented subsidence zones, as well as zones that may be susceptible to subsidence, as identified in Figure S-7 and the Technical Background Report, prior to the issuance of development permits. Within the documented subsidence zones of the Coachella, San Jacinto, and Elsinore valleys, the studies must address the

potential for reactivation of these zones, consider the potential impact on the project, and provide adequate and acceptable mitigation measures.

Policy S 3.13: Require buildings to be designed to resist wind loads.

LOCAL

City of Beaumont General Plan

Safety Element

The Safety Element establishes goals and policies to maintain and improve the safety of the City's residents. This Element complies with the State requirements for a Safety Element. The Project's consistency with these goals and policies is discussed in ***Table 3.10-3: Beaumont General Plan Consistency Analysis*** of this EIR. The following goals and policies are applicable to geologic resources:

Goal 9.7: A City that protects safety of human life, land, and property from the effects of earthquakes and geotechnical hazards.

Policy 9.7.1: As new versions of the California Building Code (CCR Title 24, published triennially) are released, adopt and enforce the most recent codes that contain the most recent seismic requirements for structural design of new development and redevelopment to minimize damage from earthquakes and other geologic activity.

City of Beaumont Municipal Code

Beaumont Municipal Code Title 15

The City of Beaumont adopted the Building and Construction Codes in Title 15, Chapter 15.04. These codes regulate the erection, construction, enlargement, alteration, repair, moving, removal, demolition, conversion, occupancy, equipment, use, height, area and maintenance of all buildings and/or structures in the City. Building permits are required and may be issued, as stated above, for projects that conform to the CBC.

3.6.3 STANDARDS OF SIGNIFICANCE

Appendix G of the State CEQA Guidelines contains the Environmental Checklist Form, which includes questions related to geologic and soil resources. The questions presented in the Environmental Checklist Form have been utilized as significance thresholds in this section. Accordingly, the Project may create a significant environmental impact if one or more of the following occurs:

a) 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 evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

   ii. Strong seismic ground shaking?

iii. Seismic-related ground failure, including liquefaction?

iv. Landslides?

b) Result in substantial soil erosion or the loss of topsoil?

c) 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?

d) 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?

e) 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?

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

PROJECT DESIGN FEATURES

As summarized in ***Section 2.0, Project Description***, the Project includes components that are referred to as Project Design Features.

The Project Design Features related to geology and soils are:

- Project construction would re-use on-site soils, where applicable, as fill during grading provided that they are free of organic matter to the satisfaction of the geotechnical engineer.

3.6.4 PROJECT IMPACTS AND MITIGATION MEASURES

Impact 3.6-1: Would the Project 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 evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

Level of Significance: Less than Significant Impact with Mitigation Incorporated

CONSTRUCTION

None of the Project components are in proximity to any known active earthquake fault as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map. Nor is the Project Site within a Riverside County Fault Hazard Zone. However, the Project Site is within a seismically active region in southern California. The closest mapped active fault, the San Jacinto Fault, is located approximately five miles southwest of the Project Site. Other known regionally active faults that could affect the Project Site include Cucamonga, Elsinore-Glen Ivy, Puente Hills Thrust, San Andreas, San Jose, and Whittier faults. Due to the proximity of the Project Site to the San Jacinto Fault and other faults, seismic shaking could impact the Project Site within the design life of the proposed development.

It should be noted that some of the parcels located within one-half mile east of the Project Site are located within a Riverside County Fault Zone. Additionally, based on knowledge of other projects near this Project Site, evidence of inactive faults was observed within the San Timoteo formation bedrock materials on other properties located one-half to one mile west of the Project Site. Although there is a mapped fault zone to the east of the Project Site, and some evidence of faulting west of the site, there are no mapped fault zoned within the Project Site, and therefore it is not anticipated that any active faults are present.

Construction of the Project, and associated building materials and landscape features, would be in accordance with applicable City and County general plan goals and policies; City municipal codes; and State/Federal regulations pertaining to earthquake-resistant structures. Nonetheless, during future subsurface exploration as part of the future geotechnical evaluation, trenches (including trenches perpendicular to known fault strike directions) should be dug to determine if unknown faults are present. Mitigation Measure (MM) GEO-1 includes a requirement that would include recommendations to determine if an existing unknown fault is present. Implementation of this measure would reduce this impact to less than significant and further mitigation for this geologic hazard would not be required.

OPERATIONS

As previously discussed, the Project is not located near any known active fault lines. All Project operations and Project components would adhere to all applicable City regulations and engineering standards and specifications. Further implementation of MM-GEO-1, would reduce impacts in this regard to less than significant because the Project design would follow-Project specific design recommendation based on soil conditions at the Warehouse Site.

Mitigation Measures

MM-GEO-1: The Project applicant shall prepare and submit a final geotechnical engineering report produced by a California Registered Civil Engineer or Geotechnical Engineer for City of Beaumont Public Works review and approval. The report shall address and make recommendations on the following:

a) Potential presence of unknown faults and fault rupture to occur (including digging trenches perpendicular to known off-site fault strike directions);

b) Requirements for volumes and areas of needed over-excavation of unsuitable soils;

c) Requirements for mixing and re-compaction of soils to account for liquefaction and expansion potential;

d) Benching of sidewalls during fill placement to reduce the inclination of the native fill contact to 3:1 (horizontal: vertical) or flatter.

e) Special problems discovered on-site, (i.e., groundwater, expansive/unstable soils, etc.)

Once approved by the City of Beaumont Public Works, two copies of the final report shall be provided to the City of Beaumont Public Works for its use. It is the responsibility of the Project applicant to provide for engineering inspection and certification that earthwork has been performed in conformity with recommendations contained in the report.

Impact 3.6-2: Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

ii. Strong seismic ground shaking?

Level of Significance: Less than Significant Impact with Mitigation Incorporated

Intensity of ground shaking at a given location depends primarily upon earthquake magnitude, site distance from the source, and site response (soil type) characteristics. The site-specific seismic coefficients based on the 2016 CBC are provided in ***Table 3.6-1: Site-Specific Seismic Coefficients*** below.

Table 3.6-1: Site-Specific Seismic Coefficients

CBC Categorization/Coefficient Heading	Value (g*)
Spectral Response Acceleration at 0.2s Period, S_S	1.649
Mapped Spectral Response Acceleration at 1s Period, S_1	0.717
Short Period Site Coefficient at 0.2s Period, F_a	1.0
Long Period Site Coefficient at 1s Period, F_V	1.5
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS}	1.649
Adjusted Spectral Response Acceleration at 1s Period, S_{M1}	0.932
Design Spectral Response Acceleration at 0.2s Period, S_{DS}	1.099
Design Spectral Response Acceleration at 1s Period, S_{D1}	0.622
Notes: * g - Gravity acceleration 1) Site Longitude (decimal degrees): - 117.01877672 2) Site Latitude (decimal degrees): 33.93101084 3) Site Class Definition: C	
Source: 2016 CBC Site-Specific Seismic Design Parameters. Using OSHPD Seismic Design Maps. Accessible at https://seismicmaps.org/.	

The Project is not located within an Alquist-Priolo Earthquake Fault Zone. The Project is in the southern California region, which is prone to strong seismic ground shaking, hence there is a possibility that the Project Site could experience shaking from seismic activity. All Project components would be constructed to current Uniform Building Code standards and would be designed in conformance with all applicable standards to resist the harmful effect of strong seismic ground shaking and to reduce the potential for damage resulting from seismic-related events include ground shaking, ground failure, and ground displacement. Strong levels of seismic ground shaking can cause damage, particularly to older and/or poorly constructed buildings. Construction of the Project would be required to conform to the seismic design parameters of the CBC that is current at the time of construction, as adopted by the City. As required by law, the City must review all Project plans for grading, foundation, structural, infrastructure, and all other relevant construction permits relative to the *Geotechnical Feasibility Study* and Code requirements. Compliance with the requirements of the Uniform Building Code and existing laws and regulations would reduce potential impacts related to strong seismic ground shaking to a less than significant level. This would be accomplished by requiring that all new construction be reviewed to ensure that the most current seismic design parameters are incorporated into Project design and construction.

To reduce impacts, compliance with MM GEO-1 would require a qualified geologist and geotechnical engineer to implement the recommendations from the *Geotechnical Feasibility Study,* and to incorporate measures such as site stripping; over-excavation of unsuitable soils; compaction of soils; and benching of

sidewalls during fill placement to reduce the inclination of the native fill contact to 3:1 (horizontal: vertical) or flatter, as may be determined appropriate for the Project site. This mitigation measure would ensure the impacts for seismic ground shaking on Project operation would be reduced to less than significant.

Mitigation Measures

See MM-GEO-1.

Impact 3.6-3: Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

iii. Seismic-related ground failure, including liquefaction?

Level of Significance: Less than Significant Impact with Mitigation Incorporated

The site is located within a mapped zone of low to moderate liquefaction susceptibility. Liquefaction is the loss of strength in generally cohesionless, saturated soils when the pore-water pressure induced in the soil by a seismic event becomes equal to or exceeds the overburden pressure. The primary factors which influence the potential for liquefaction include groundwater table elevation, soil type and plasticity characteristics, relative density of the soil, initial confining pressure, and intensity and duration of ground shaking. The depth within which the occurrence of liquefaction may impact surface improvements is generally identified as the upper 50 feet below the existing ground surface. Liquefaction potential is greater in saturated, loose, poorly graded fine sands with a mean grain size in the range of 0.075 to 0.2 millimeter. Non-sensitive clayey (cohesive) soils which possess a plasticity index of at least 18 are generally not considered to be susceptible to liquefaction, nor are those soils which are above the historic static groundwater table.[12]

The site is generally underlain by older alluvium and dense to very dense bedrock materials. However, there are some areas revealed by boring locations in which younger surficial alluvial sediments are present and are underlain by medium-dense to very-dense older alluvium and dense to very-dense weathered bedrock. In their existing condition, some of the younger alluvial soils may be susceptible to liquefaction. Based on the recommended remedial grading recommendations and the requirements of MM-GEO-1 and MM-GEO-2, the loose, younger alluvial sediments that may be susceptible to liquefaction would be removed and replaced as compacted structural fill. This would reduce potential impacts from liquefaction to less than significant.

CONSTRUCTION

Loose granular soils 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 Project Site contains surficial younger alluvial sediments underlain by medium-dense to very-dense older alluvium and dense to very-dense weathered bedrock. In their existing condition, some of the younger alluvial soils may be susceptible to liquefaction. In order to reduce the potential for excessive differential settlement and liquefaction due to the differing conditions provided by the native soils, notably the younger alluvium, soils would require overexcavation and recompaction of fill soils. These would underlie the building pads

[12] Southern California Geotechnical, Inc. (2018). *Geotechnical Feasibility Study, Proposed Industrial Development*. Page 13.

in accordance with the subsequent final geotechnical engineering report that will be prepared for the Project. The depth of overexcavation in the cut portions of the building pad area would be dependent upon the depths of the fill and the steepness of the cut/fill transition.

As part of the final geotechnical engineering report, and based on the evaluation of constituents of the overexcavated and exposed soils, the geotechnical engineer would verify the suitability to serve as the structural fill subgrade, suitability to support the foundation loads of the proposed new structure, and any importation, mixing, and compaction of soils that would be needed. The evaluation of the soils would follow standard methods to determine what specific grading procedures would need to be undertaken. Methods could include proof-rolling with a heavy rubber-tired vehicle and probing to identify any soft, loose, or otherwise unstable soils that must be removed, and measurements of exposed materials at the base of overexcavations to ensure a minimum relative compaction of 85 percent of the maximum dry density as determined by American Society for Testing and Materials (ASTM) D-1557 maximum dry density. If there are localized areas of loose, porous, or low-density soils encountered at the bottom of the overexcavation, deeper excavation may be required. The exposed subgrade soils should then be scarified to a depth of 12 inches, moisture conditioned to two to four percent above optimum moisture content, and recompacted, or as determined necessary by the geotechnical engineer.[13]

MM GEO-2 has been included to reduce these potential impacts to less than significant. MM GEO-2 requires that the younger alluvium would be removed in its entirety and replaced or mixed and recompacted as compacted structural fill prior to construction. This would reduce potential impacts associated with liquefaction of any younger alluvium which may present. Implementation of MM-GEO-2 would reduce impacts associated with liquefaction to less than significant.

OPERATIONS

Overall, Project development could result in potential impacts to persons and structures involving liquefaction. There is a possibility of strong seismic ground shaking in the Project area due to the nature of the geographic region of southern California and its seismic activity. The industrial structure would be susceptible to ground shaking and liquefaction effects. To further reduce potential impacts due to liquefaction, compliance with MM GEO-1 and MM GEO-2 would be required. Mitigation would include any necessary recommendations for soils remediation and/or foundation systems necessary to reduce seismic-related hazards, such as liquefaction, to a less than significant level. Compliance with the then current CBSC and MM GEO-2, would ensure that persons and structures associated with the Project would not be exposed to potential seismic-related liquefaction. Impacts would be less than significant with mitigation.

Mitigation Measures

MM GEO-2 The final geotechnical engineering report shall identify the younger alluvial soils within the development areas and prepare a plan for removal/excavation as needed and to the satisfaction of the City of Beaumont Public Works Department prior to issuance of the first grading permit**.** The material may be remixed and compacted or exported and fully replaced to reduce the potential for excessive settlement of the proposed improvements

[13] Southern California Geotechnical, Inc. (2018). *Geotechnical Feasibility Study, Proposed Industrial Development*. Pages 17-18.

based on the findings of the final geotechnical engineering report. All removals shall extend to a depth of firm, competent older alluvium deposits or weathered bedrock/formational soils. The younger alluvium soils should be removed in their entirety to expose suitable older alluvial soils or weathered bedrock/materials. The actual depth of removals shall be determined during grading by the geotechnical engineer to the satisfaction of the City of Beaumont Public Works Department.

Impact 3.6-4 Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss injury, or death involving:

iv. Landslides?

Level of Significance: Less than Significant Impact with Mitigation Incorporated

CONSTRUCTION

The Project Site terrain is comprised of rolling hills, and no boulder outcrops or potential rockfall hazards are present within the Project Site. No evidence of on-site landslides/debris flow was documented on the California Geologic Survey Landslide inventory. The risk of land sliding and rockfall is considered low for the Project Site as the area is not suspect for having landslide hazards due to the moderate sloping conditions. While the Project Site does not contain any steep slopes, grading needed to create building pad elevations, however, could require relatively steep cut/fill contacts in the southwest-draining canyon. MM GEO-3 would require that areas with steep cut/fill contacts would require benching of the sidewalls during fill placement. The horizontal extent of the benching is anticipated to be sufficient to reduce the inclination of the native fill contact to 3h:1v or flatter. While not anticipated to be needed outside the areas of the proposed building foundation influence zones, depending on the outcome of the geotechnical report, benching may be required outside these areas. With the implementation of MM GEO-3, impacts from natural landslides and confined movements of materials during earthmoving activities would be less than significant.

OPERATIONS

Due to the active seismicity of the region, the industrial development would conform to the then current CBSC standards as well as any applicable building code regulations from the City of Beaumont. Overall, Project developments could expose persons and structures to potential substantive adverse effects involving strong seismic ground shaking, seismic-related ground failure (liquefaction/lateral spreading), and seismically-induced landslides. Landslides due to unstable slopes are not anticipated on the Project Site, given the lack of steep slopes, the location of the construction improvements on the site, and the Project's location. In addition, all manufactured slopes would be no steeper than 2:1 and would be seismically engineered for stability and revegetated or covered with other erosion control measures, further reducing this potential.

Therefore, implementation of MM GEO-1, MM GEO-2, and MM GEO-3 would reduce potential impacts from landslides to less than significant.

Mitigation Measures

MM GEO-3: The final geotechnical engineering report produced by a California Registered Civil Engineer or Geotechnical Engineer shall address the anticipated steep cut/fill contacts in the southwest-draining canyon. The report shall be verified by the City of Beaumont Public Works Department prior to issuance of any grading permit. As part of the report, measures that include benching of the sidewalls in areas with steep cut/fill contacts shall be used during fill placement. The horizontal extent of the benching shall be sufficient to reduce the inclination of the native fill contact to 3h:1v or flatter. This measure shall be used in all areas of the proposed building foundation influence zones. Depending on the outcome of the geotechnical report, benching may be required outside these areas.

Impact 3.6-5: Would the Project result in substantial soil erosion or the loss of topsoil?

Level of Significance: Less than Significant Impact with Mitigation Incorporated

CONSTRUCTION

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 contents, some of the on-site soils would also be susceptible to erosion. Construction activities such as excavation and grading may have the potential to cause soil erosion or the loss of these and other topsoil. In order to address unstable soils, MM GEO-4 would be implemented which would require remedial grading.

A southwest draining erosional canyon currently traverses the Project Site. Deeper fills, exceeding the 30 to 40 feet anticipated for the Project site, may be necessary in the drainage. The off-site drainage from the east is currently routed through an existing reinforced concrete pipe (RCP) that is present beneath the recently graded embankment fill along the east property line. Based on the conceptual storm drain plan, this public line would be extended around the southeasterly Project boundary to 4th Street, where it would be located within the 4th Street right-of-way. On-site drainage would flow into scattered catch basins located throughout the site and be conveyed to the on-site extended detention basins via private high-density polyethylene (HDPE) pipes of varying diameters. Overflow from the extended detention basins would be conveyed via private HDPE pipes to the public RCP beneath 4th Street.

The new drainage would be sized to accommodate maximum anticipated flows and would be designed to be a hydrologically separate system to prevent mixing with the on-site flows to avoid any potential water quality issues with the off-site flows.

Construction activities related to the Project would be required to comply with the National Pollutant Discharge Elimination System (NPDES) General Construction Permit. Refer to ***Section 3.9: Hydrology and Water Quality*** for discussion of the Project's anticipated NPDES permitting process. The construction would be required to comply with the erosion control measures stipulated through the then current CBSC and the Beaumont MC Title 13, Chapter 13.16 - Water Quality Control, which requires compliance with NPDES permits and implementation measures. Further, all grading and building activities would comply with Beaumont MC Title 16, Chapter 16.28 - Improvements and Grading; the Grading Manual; other

applicable ordinances; Federal, State, and local permits; and other applicable requirements. Conformance to the NPDES permit includes preparation of a storm water pollution prevention plan (SWPPP) that defines best management practices (BMPs) such as use of silt fencing, hay bales, straw wattles, water bars, sediment basins, etc., would ensure that substantial erosion and loss of topsoil does not occur. As discussed in ***Section 3.9: Hydrology and Water Quality***, associated impacts with erosion after implementation of the erosion control plan would reduce impacts to less than significant.

OPERATIONS

While loss of topsoil and erosion from sites is typically most common during the construction phases when bare soils are exposed to water and wind driven erosion, some loss may occur post construction. The Project would incorporate designs to maximize water infiltration through the use of plantings, protection of slopes, and other storm water control measures to reduce the potential for substantial post construction runoff. Accordingly, all reasonable precautions would be taken to minimize deep soil moisture penetration within the slope soils. The volume of slope irrigation would be the minimum that is required to maintain plant growth, but still provide adequate ground cover to minimize post construction erosion. The Project's drainage management plan would be designed to ensure that all surface water runoff is diverted away from the top of any associated retaining walls. Gutters would be installed to divert runoff. In addition, the condition of the slopes would be continually maintained to reduce the potential for surficial failures leading to erosion. This would include maintenance of all drainage pathways, any diversion structures, maintenance of the vegetation, and repair of rodent damage.

To further minimize potential erosion that would occur, the Project would implement MM GEO-5, requiring that erosion protective measures are implemented to reduce potential impacts from excessive erosion and runoff both during and after construction. Although these are considered a long-term erosion protection measures, MM GEO-5 requires plantings be incorporated during the construction phase upon the completion of manufactured slopes.

The Project also would include a network of storm drains and gutters, and retention basins, naturally vegetated swales, and other areas to facilitate infiltration would be implemented and maintained throughout the life of the Project. These features, in addition to regularly landscaped areas and groundcovers, would prevent post construction soil erosion or loss of topsoil. With implementation of MM-GEO-5, Project operations would not result in substantial soil erosion that may cause significant property damage or result in the loss of topsoil/sedimentation into local drainage facilities and off-site water bodies.

Mitigation Measures

MM GEO-4 Remedial grading is warranted to remove the loose and potentially compressible and collapsible younger alluvium from the Project development area in its entirety. The younger alluvial soils shall be replaced as compact structural fill. With that, the on-site soils are geotechnically suitable for re-use as compacted fill during proposed grading, provided they are relatively free of organic matter, other deleterious material, or oversize rock fragments. Fill soils placed at depths greater than 20 feet below proposed pad grade

within the building pad shall be compacted to at least 95 percent of the ASTM D-1557 maximum dry density.

MM GEO-5 Prior to issuance of a grading permit, a landscape architect shall create a plan for post-construction slope stabilization and long-term maintenance, and submit the plan to the City for review and approval. The natural slopes and any manufactured slopes created on-site shall be planted immediately after construction is completed, to achieve well-established and deep-rooted vegetation. The slopes should be planted and irrigated if recommended by the landscape architect, with shrubs that will develop root systems to depths of five feet or more, such as ground acacia. Intervening areas may be planted with the same plants, or lightweight surface plantings with shallower root systems. The selected plantings shall be lightweight and drought tolerant. Due to its high weight, the use of iceplant shall not be permitted.

Impact 3.6-6: 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- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Level of Significance: Less than Significant Impact with Mitigation Incorporated

CONSTRUCTION

The principle source of seismic activity is movement along the northwest-trending regional fault systems such as the San Andreas, San Jacinto, and Elsinore fault zones. The Project Site is not included within an Earthquake Fault Zone as identified by the Alquist-Priolo Earthquake Fault Zoning Act. However, the Project Site is in a seismically active area. The site is located within a mapped zone of low to moderate liquefaction susceptibility. However, the Project Site is generally underlain by older alluvium and dense to very-dense bedrock materials. In order to mitigate the potential for liquefaction in the loose younger alluvial sediments that may be susceptible to liquefaction, MM GEO-2 recommends the removal and replacement of this alluvial layer as compacted structural fill. With implementation of this measure, impacts from liquefaction are considered less than significant. Implementation of MM GEO-1 and MM GEO-2 would be required, which contain specific designs and standards regarding re-compaction and soil stabilization. Furthermore, Project construction would be temporary and therefore would not be susceptible to on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. Impacts would be less than significant in this regard.

OPERATION

Project implementation could expose persons and structures to potential adverse impacts involving strong seismic ground shaking, seismic-related ground failure (liquefaction/lateral spreading), and seismically-induced landslides. Implementation of MM GEO-1 and MM GEO-2 would reduce impacts to a less than significant level by incorporating earthwork measures during construction phases, such as site preparation, soil removal, cut/fill transition lots, soil compaction, structural fills, and removal of boulders, to provide greater site stabilization. Further, Project designs would be subject to compliance with the then current CBSC. Implementation of the Project design feature discussed previously, as well as compliance

with the then current CBSC, MM GEO-1 and MM GEO-2, would address impacts related to unstable soils. Impacts would be less than significant with mitigation incorporated.

Mitigation Measures:

MM GEO-1, MM GEO-2, and MM GEO-3 are applicable.

Impact 3.6-7: Would the Project 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?

Level of Significance: Less than Significant Impact with Mitigation Incorporated

Soils that expand and contract in volume ("shrink-swell" pattern) are considered to be expansive and may cause damage to aboveground infrastructure as a result of density changes that shift overlying materials. Fine-grain clay sediments are most likely to exhibit shrink-swell patterns in response to changing moisture levels. According to the *Geotechnical Feasibility Study* prepared for the Project, soil and bedrock materials encountered within the Project area include younger alluvium, older alluvium, bedrock, and groundwater. While not encountered at sampling locations, some artificial fills were observed in the embankment areas for proposed streets along the east and south property lines.

CONSTRUCTION

According to the *Geotechnical Feasibility Study*, the near-surface on-site soils possess a very low to low expansion potentials (Expansion Index = 0 to 35 at sampled locations) and would require proper moisture conditioning to a subgrade soil moisture content of 2 to 4 percent above the Modified Proctor optimum during site grading. In addition, the site may have localized deposits of medium or higher expansive soils that may be encountered during grading of surficial soils. If encountered, these soils would be subject to various controls to reduce the exposure of people and structures to the effects of expansive soils. Accordingly, based on the presence of expansive soils and potential presence of medium or high expansion, adequate moisture conditioning of the subgrade soils and fill soils would be necessary during grading. Future construction would be required to maintain and appropriate moisture content (two to four percent above the Modified Proctor Optimum) of these soils. This would require the contractor to frequently monitor the moisture condition of these soils throughout the grading process. In addition, to ensure on-site soils are not overly expansive and properly watered and mixed, the Project would only use imported fill soils with very low expansive characteristics.

Based on the low expansion potential of some of the on-site soils, reinforcement consisting of No. 3 bars placed at 18 inches on center in both directions may be necessary. The actual need for reinforcement and the amount to reinforcing steel would be determined after the subsurface soils have been more thoroughly characterized through additional subsurface exploration.

In addition to any geotechnical design elements, the Project would be subject to compliance with requirements set forth in the then current CBSC. Further, despite the low expansion potential of soils on site and compliance with CBSC, the Project would include MM GEO-6, which would require Additional Expansion Index testing by the structural engineer. These tests would be required to be performed to develop needed soil mixing, watering, and compaction at the time of the design level investigation.

Therefore, compliance with MM GEO-1 and MM GEO-6 and conformance with the current CBSC would ensure that Project construction would result in a less than significant impact related to risks to life or property associated with expansive soils.

OPERATION

Due to the potential of the site to contain expansive soils, the Project would be designed and would be subject to compliance with requirements set forth in the CBSC current at the time of construction. This would limit the potential for surface water to penetrate the soils immediately adjacent to the proposed warehouse structure, by 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 buildings. However, some potential for impacts relating to expansive soils could potentially still remain. Therefore, MM GEO-6 and MM GEO-7 have been identified. These measures address settlement considerations, foundation design, and earthwork considerations related to soil removal and compaction by identifying potentially expansive soils and addressing these areas through removal/excavation, remixing, and watering such that adequate moisture contents would be maintained, and expansion potential would be reduced. Therefore, Project operations would result in a less than significant impact related to risks to life or property associated with expansive soils.

Mitigation Measures:

MM GEO-6 The final geotechnical engineering report shall identify the presence of expansive soils. Adequate moisture conditioning of the subgrade soils and fill soils would be necessary during grading, and special care must be taken to maintain the moisture content of these soils at two to four percent above the Modified Proctor Optimum. Based on the findings of the final geotechnical engineering report, a plan to account for expansive soils and need for removal/excavation, remixing, and watering shall be developed to the satisfaction of the City of Beaumont Public Works Department. The plan shall be completed prior to issuance of a grading permit, but subject to adjustment if certain findings occur, such as the discovery of locations with expansive soils. As part of this process, the contractor shall frequently monitor moisture condition in on-site soils throughout the grading process, which shall be done to the satisfaction of the City of Beaumont Public Works Department throughout the construction process.

MM GEO-7 Due to the anticipated expansive potential of the soils at this site, provisions shall be made to the satisfaction of the City of Beaumont Public Works Department throughout the construction process. Provisions shall include measures that would limit the potential for surface water to penetrate the soils immediately adjacent to the structure. These provisions shall 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 buildings. Other provisions, as determined by the civil engineer, may also be appropriate.

Impact 3.6-8: Would the Project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Level of Significance: No Impact

CONSTRUCTION AND OPERATIONS

The Project would connect to the existing City sewer system and would not use septic or alternative waste systems. Because the Project would connect to the City's existing sewer system and because no septic tanks or alternative wastewater disposal systems are proposed as part of the Project, the Project would result in no impacts related to septic tanks or alternative wastewater disposal systems, and no mitigation is required.

Mitigation Measures

No mitigation is necessary.

Impact 3.6-9: Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Level of Significance: Less than Significant Impact with Mitigation Incorporated

CONSTRUCTION

According to a communication from the Vertebrate Paleontology Section of the Natural History Museum of Los Angeles County (***Appendix E***), in the drainages along the northern margin and in the southern portion of the Project area, the surficial deposits consist of younger Quaternary Alluvium. These younger Quaternary deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers, but they may be underlain by finer-grained older Quaternary deposits that do contain significant vertebrate fossil remains. Surface deposits in the slightly more elevated terrain in the remainder of the Project area consist of older Quaternary Alluvium, derived as alluvial fan deposits from the San Bernardino Mountains to the northeast. The closest vertebrate fossil locality from older Quaternary deposits is LACM 4540, situated southwest of the Project area on the northeast side of the San Jacinto Valley near the intersection of Jackrabbit Trail and Gilman Springs Road, that produced fossil specimens of horse, *Equidae*.

Shallow excavations in the younger Quaternary deposits exposed in the drainages of the Project area probably would not uncover significant fossil vertebrate remains. Deeper excavations in the drainages that may extend down into older and perhaps finer-grained Quaternary deposits, and any excavations in the older Quaternary deposits exposed elsewhere in the Project area, however, may encounter significant vertebrate fossils. Excavations within the Project area, shall be closely monitored by a certified paleontologist to quickly and professionally recover any potential vertebrate fossils without impeding development. MM GEO-8 requires preparation of and compliance with a Paleontological Construction Monitoring and Compliance Program and sets forth the required components of such a program and the measures that shall be implemented if paleontological resources are discovered. Also, sediment samples should be collected and processed to determine the small fossil potential in the Project area. A determination of the value of any fossils recovered during monitoring and the need for preservation shall

be determined. If required, the fossil shall be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

With implementation of MM GEO-8 (Paleontological Construction Monitoring and Compliance Program), construction of the Project components would not destroy a unique paleontological resource or site, or unique geologic feature, thereby reducing impacts to a less than significant level.

OPERATIONS

Project implementation and operation would not involve any activities that would impact paleontological resources. Therefore, Project operations would not impact a unique paleontological resource or unique geologic feature.

Mitigation Measures

MM GEO-8: **Paleontological Construction Monitoring and Compliance Program.** The following measures would be implemented to reduce potential impacts to paleontological resources to less than significant:

a) **Retain a Qualified Paleontologist.** Prior to initial ground disturbance, the Project Applicant shall retain a Project paleontologist who meets the Society of Vertebrate Paleontology's definition of a Qualified Professional Paleontologist (Principal Investigator or Project Paleontologist)]

b) **Paleontological Mitigation and Monitoring Program.** After Project design has been finalized to determine the precise extent and location of planned ground disturbances, and prior to construction activity, a qualified paleontologist would prepare a Paleontological Mitigation and Monitoring Program (PMMP) to be implemented during ground disturbance activity for the Project. The PMMP would outline the procedures for the construction staff Worker Environmental Awareness Program (WEAP) training, paleontological monitoring extent and duration, salvage and preparation of fossils, the final mitigation and monitoring report, and paleontological staff qualifications. The PMMP would be prepared in accordance with the standards set forth by current Society of Vertebrate Paleontology guidelines (http://vertpaleo.org/The-Society/Governance-Documents/SVP_Impact_Mitigation_Guidelines.aspx, 2010) and provided to the City.

c) **Paleontological Worker Environmental Awareness Program.** Prior to the start of construction, the Project paleontologist or his/her designee shall conduct training for construction personnel regarding the appearance of fossils and the procedures for notifying paleontological staff should fossils be discovered by construction staff. The WEAP shall be presented at a preconstruction meeting that a qualified paleontologist shall attend. In the event of a fossil discovery by construction personnel, all work in the immediate vicinity of the find shall cease and a qualified paleontologist shall be contacted to evaluate the find before restarting work in the area. If it is determined that the fossil(s) is (are) scientifically significant, the qualified paleontologist shall complete the following conditions to mitigate impacts to significant fossil resources.

d) **Paleontological Monitoring.** Ground disturbing construction activities (including grading, trenching, foundation work, and other excavations) in areas mapped as having high paleontological sensitivity should be monitored on a full-time basis by a qualified paleontological monitor during initial ground disturbance. Areas mapped as low to high paleontological sensitivity should be monitored when ground-disturbing activities exceed five feet in depth, because underlying sensitive sediments could be impacted. Areas considered to have an undetermined paleontological sensitivity should be inspected and further assessed if construction activities bring potentially sensitive geologic deposits to the surface. The PMMP shall be supervised by the Project paleontologist. Monitoring should be conducted by a qualified paleontological monitor, who is defined as an individual who has experience with collection and salvage of paleontological resources. The duration and timing of the monitoring would be determined by the Project paleontologist. If the Project paleontologist determines that full-time monitoring is no longer warranted, he/she may recommend that monitoring be reduced to periodic spot-checking or cease entirely. Monitoring would be reinstated if any new or unforeseen deeper ground disturbances are required and reduction or suspension would need to be reconsidered by the Supervising Paleontologist. Ground disturbing activity that does not exceed five feet in depth would not require paleontological monitoring.

e) **Salvage of Fossils.** If fossils are discovered, the Project paleontologist or paleontological monitor should recover them. Typically, fossils can be safely salvaged quickly by a single paleontologist and not disrupt construction activity. In some cases, larger fossils (such as complete skeletons or large mammal fossils) require more extensive excavation and longer salvage periods. In this case, the paleontologist would have the authority to temporarily direct, divert, or halt construction activity to ensure that the fossil(s) can be removed in a safe and timely manner.

f) **Preparation and Curation of Recovered Fossils.** Once salvaged, the City would ensure that significant fossils would be identified to the lowest possible taxonomic level, prepared to a curation-ready condition, and curated in a scientific institution with a permanent paleontological collection (such as the Western Science Center), along with all pertinent field notes, photos, data, and maps. Fossils of undetermined significance at the time of collection may also warrant curation at the discretion of the Project paleontologist. Field collection and preparation of fossil specimens would be performed by the Project paleontologist with further preparation as needed by an accredited museum repository institution at the time of curation.

g) **Final Paleontological Mitigation Report.** Upon completion of ground-disturbing activity (and curation of fossils, if necessary) the qualified paleontologist should prepare a final mitigation and monitoring report outlining the results of the mitigation and monitoring program. The report should include discussion of the location, duration, and methods of the monitoring, stratigraphic sections, any recovered fossils, and the scientific significance of those fossils, and where fossils were curated.

3.6.5 CUMULATIVE IMPACTS

Southern California is a seismically active region with a range of geologic and soil conditions. These conditions can vary widely within a limited geographical area due to factors such as differences in landforms and proximity to fault zones, among others. Therefore, while geotechnical impacts may be associated with the cumulative development, by the very nature of the impacts (i.e., landslides and expansive and compressible soils), the constraints are typically site-specific and there is typically little, if any, cumulative relationship between the development of a proposed Project and development within a larger cumulative area, such as citywide development. Additionally, while seismic conditions are regional in nature, seismic impacts on a given project site are site-specific. For example, development within the site or surrounding area would not alter geologic events or soil features/characteristics (such as ground-shaking, seismic intensity, or soil expansion); therefore, the Project would not affect the level of intensity at which a seismic event on an adjacent site is experienced. However, Project development and future development in the area may expose more persons to seismic hazards.

In accordance with the thresholds of significance, impacts associated with seismic events and hazards would be considered significant if the effects of an earthquake on a property could not be mitigated by an engineered solution. The significance criteria do not require elimination of the potential for structural damage from seismic hazards. Instead, the criteria require an evaluation of whether the seismic conditions on a site can be overcome through engineering design solutions that would reduce to less than significant the substantial risk of exposing people or structures to loss, injury, or death.

State and local regulatory code requirements and their specific mandatory performance standards are designed to ensure the integrity of structures during maximum ground shaking and seismic events. The Project would be constructed in compliance with all applicable then current codes and in accordance with the mitigation measures set forth in this EIR, which are designed to reduce the exposure of people or structures to substantial risk of loss, injury, or death related to geological conditions or seismic events. Therefore, Project impacts would be mitigated to a less than significant level. Current building codes and regulations would apply to all present and reasonably foreseeable future projects, which could also be subject to even more rigorous requirements. Therefore, the Project—in combination with past, present, and reasonably foreseeable future projects—would not result in a cumulatively significant impact by exposing people or structures to risks related to geologic hazards, soils, or seismic conditions.

The Project's compliance with the then current CBSC, City building code requirements, and General Plan policies would ensure that geology and soil impacts would be less than significant. As such, potential impacts would be reduced to a less than significant level with implementation of applicable standard engineering practices and construction requirements. The Project's incremental contribution to cumulative geotechnical and seismic impacts would be less than significant. None of the Project characteristics would affect or influence the geotechnical hazards for off-site development. Similarly, the cumulative projects, which would be required to comply with the CBSC, City building code requirements, and General Plan policies, are not expected to have an adverse impact on the Project. For these reasons, no significant cumulative geotechnical impacts would occur for the Project.

3.6.6 SIGNIFICANT UNAVOIDABLE IMPACTS

The Project would not result in any significant unavoidable impacts. All impacts associated with geology and soils would either not occur, be considered less than significant, or be mitigated to less than significant levels.

3.6.7 REFERENCES

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