

4.7 GEOLOGY AND SOILS

This section provides a discussion of the existing geology and soils setting and an analysis of the potential impacts of Project implementation related to geology and soils. This section also addresses potential impacts due to the local geology underlying the Project site, as well as slope stability, ground settlement, soil conditions, grading, and regional and local seismic conditions. This section also summarizes information provided in the *Preliminary Geotechnical Evaluation and Design Recommendations for the Proposed Approximately 580-Acre "Menifee Valley" Residential Development, City of Menifee, California* (Geotechnical Evaluation)¹ and *Addendum Report Regarding Geotechnical Recommendations for the Proposed Approximately 580-Acre "Menifee Valley" Residential and Commercial Development, City of Menifee* (Addendum Report Regarding Geotechnical Recommendations).² These reports are included as **Appendices G-1 and G-2** to this Environmental Impact Report (EIR).³

This section also evaluates potential impacts to paleontological resources and summarizes information provided in the Updated Paleontological Resource Study for the Menifee Valley Specific Plan Project, City of Menifee, Riverside County, California (Updated Paleontological Resource Study)⁴, Supplemental Paleontological Resource Study of Off-Site Improvement Areas for the Menifee Valley Specific Plan Project, City of Menifee, Riverside County, California (Supplemental Paleontological Resource Study),⁵ and Supplemental Paleontological Resource Study of Off-Site Improvement Areas #2 for the Menifee Valley Specific Plan Project, City of Menifee, Riverside County, California (Supplemental Paleontological Resource Study,⁶ which are included as **Appendices G-3, G-4, and G-5** to this EIR. The Updated Paleontological Resources Study is an update to the prior Paleontological Resource Assessment (PRA) conducted for the project site in 2019 by Applied Earthworks, Inc. The 2019 PRA is included as **Appendix G-6** to this EIR.

Data from the City of Menifee (City) General Plan, City of Menifee General Plan EIR (2013), City of Menifee Municipal Code, numerous State and federal studies of geologic and seismic hazards in the

¹ LGC Geotechnical, Inc. Preliminary Geotechnical Evaluation and Design Recommendations for the Proposed Approximately 580-Acre "Menifee Valley" Residential Development, City of Menifee, California. May 25, 2018. Appendix G-1.

² LGC Geotechnical, Inc. Addendum Report Regarding Geotechnical Recommendations for the Proposed Approximately 580-Acre "Menifee Valley" Residential and Commercial Development, City of Menifee, California. October 11, 2021. Appendix G-2.

³ Note: Impacts for off-site areas were evaluated using information from the City's Local Hazard Mitigation Plan, City of Menifee General Plan Safety Element, and the Project-specific Geotechnical Evaluation (Appendix G-1).

⁴ PaleoWest. Updated Paleontological Resource Study for the Menifee Valley Specific Plan Project, City of Menifee, Riverside County, California. May 5, 2022. Appendix G-3.

⁵ PaleoWest. Supplemental Paleontological Resource Study of Off-Site Improvement Areas for the Menifee Valley Specific Plan Project, City of Menifee, Riverside County, California. May 17, 2022. Appendix G-4.

⁶ PaleoWest. Supplemental Paleontological Resource Study of Off-Site Improvement Areas #2 for the Menifee Valley Specific Plan Project, City of Menifee, Riverside County, California. August 4, 2023. Appendix G-5.

vicinity of the city, site-specific investigations within the Project site, and field observations are also incorporated into this section.

4.7.1 Scoping

The City received ten comment letters during the public review period of the Notice of Preparation (NOP). For copies of the NOP comment letters, refer to **Appendix A-1** of this EIR. No comment letters were received that addressed geology and soils.

4.7.2 Methodology

To assess the impacts of the Project with respect to geological and soil conditions, LGC Geotechnical conducted a Geotechnical Evaluation and field explorations and reviewed previous geotechnical reports prepared by others with respect to the Project site. The discussion below describes the scope of the exploration, including methods used during site reconnaissance and the results of pertinent prior explorations, laboratory tests, and engineering analyses.

To assess the impacts of the Project with respect to paleontological resources, PaleoWest reviewed a Paleontological Resources Report (PRA) conducted by Applied Earthworks, Inc., in 2019 encompassing 598 acres, which included a paleontological resources record search and field surveys. PaleoWest also conducted an updated fossil locality search of the Project site, including 16.3 acres along the Project site's south-central border west of Briggs Road that were not included in the 2019 report.

4.7.2.1 Background Research and Data Review

In addition to preparation of a Geotechnical Evaluation and field explorations, LGC Geotechnical reviewed existing geologic literature (i.e., geologic maps, boring logs, and other applicable data).

The paleontological resources record search for the Project site was performed by the Western Science Center in Hemet, California and on the University of California Museum of Paleontology (UCMP) online database. The 2019PRA included a record search maintained by the Natural History Museum of Los Angeles County conducted on May 31, 2016, and field surveys performed on June 1-2, 2016 and May 24, 2018. A review of published and unpublished literature was also performed for potential paleontological resources that are known in the vicinity of the Project site.

4.7.2.2 Field Investigation and Laboratory Testing

The field exploration for the Geotechnical Evaluation consisted of mapping geologic site soil conditions and the excavation of 8 exploratory 8-inch-diameter borings in the southwestern portion of the Project site. In 2004, 37 borings were also excavated, logged, and sampled from the Project site. Logs of the exploratory borings from current and previous explorations are included as Appendix B of the Geotechnical Evaluation.

Laboratory testing was performed on representative samples to evaluate the in-situ moisture/density, sieve analysis, Atterberg limits,⁷ maximum density/optimum moisture, expansion potential, hydro-collapse potential, soluble sulfate content, pH, resistivity, and chloride content. The laboratory test data for this and previous Project site explorations are presented in the Geotechnical Evaluation, Appendix C.

As mentioned above, the 2019 PRA included two field surveys of the Project site. These field surveys did not document any paleontological resources in the Project site. According to the 2019 PRA, “nearly 100 percent of the survey area was obscured by vegetation, soil development, or anthropogenic disturbances, which limited surface visibility”⁸ during the field surveys. The 16.3 acres on the Project site that were not previously surveyed in the 2019 PRA exhibited similar ground conditions during the 2016 survey; therefore, the Updated Paleontological Resources Study did not include a new field survey of the entire Project site.

4.7.3 Existing Environmental Setting

4.7.3.1 Regional Geology

The Project site is located in the west-central portion of the San Bernardino Basin and is bounded by the San Gabriel Mountains and the Santa Ana Mountains. Menifee lies in the northern part of the Peninsular Ranges Geomorphic Province, which is characterized by northwest-trending mountains and valleys extending from the Los Angeles Basin into Baja California. The province is bounded by the San Andreas fault zone on the east and extends offshore to the west and is divided into three major fault-bounded blocks, including the Santa Ana Mountains block, the Perris block, and the San Jacinto Mountains block.

The Peninsular Ranges contain three major fault zones including the Elsinore Fault Zone, the San Jacinto Fault Zone, and the San Andreas Fault Zone. Movements along these fault zones have elevated the San Jacinto and Santa Ana Mountains blocks and dropped the Perris block (where Menifee is located). The nearest active fault zone to the Project site is the San Jacinto Fault Zone located approximately 9 miles northeast of the Project site.

4.7.3.2 Project Site

The Project site is an approximately 590.3-acre, irregular shaped parcel of land bounded by State Route 74 (SR-74) to the north, Heritage High School and Briggs Road to the east, Matthews Road to the south, and Southern California Edison (SCE) San Jacinto Valley Service Center and Menifee Road to the west. Topographically, Project site elevations range from a low elevation of approximately 1,465 feet above mean sea level (amsl) in the southwest corner of the Project site to a high elevation of approximately 1,625 feet amsl in the southeast corner of the Project site, which contains a granitic hill approximately 120 feet in height. With the exception of the granitic hill, the

⁷ Atterberg limits are a basic measure of the critical water contents of a fine-grained soil: its shrinkage limit, plastic limit, and liquid limit.

⁸ Applied EarthWorks, Inc. *Paleontological Resource Assessment for the Brookfield Menifee Valley Project, City of Menifee, Riverside County, California*. Page 17. April 2019 (Appendix G-5).

highest elevation on the Project site is approximately 1,520 feet amsl and occurs along the eastern boundary of the site near Briggs Road.

Overhead power lines are present along the Project site's southern boundary along Matthews Road and northern boundary along SR-74. Additionally, overhead power lines transverse the center of the Project site along McLaughlin Road from east to west. An existing Eastern Municipal Water District (EMWD) sewer line runs east to west along an existing dirt road (McLaughlin Road). The Project site also contains a surface water holding pond along the southern edge of the site adjacent to Matthews Road. Although no other significant structures were observed, some possible development associated with past and current agricultural use was observed. Buried remnants of irrigation lines and septic systems may exist on site.

The Geotechnical Evaluation and Supplemental Paleontological Resource Study found that the Project site and off-site improvement areas are underlain by older alluvium deposits variably incised with younger alluvium deposits. The southeast corner of the Project site contains a granitic hill that is underlain by granitic bedrock materials that are likely to underlie the site at depth. A brief description of each unit is as follows:

- **Quaternary Colluvium (Qcol):** Quaternary Colluvium deposits were observed at the base of the granitic hill located in the southeast corner of the Project site. The deposits are dark reddish brown, medium dense, moist silty sand.
- **Quaternary Alluvium (Qal):** Recent alluvial soils were generally encountered within the on-site drainage areas traversing the site from northeast to southwest. These soils were also present within a small portion of the off-site improvement area along Briggs Road. The alluvial soils are light brown, dry to very moist, loose to slightly dense, silty sand and sand.
- **Quaternary Old Alluvium (Qalo):** Older alluvial fan deposits were encountered throughout the Project site and off-site improvement areas along SR-74, Briggs Road, and Menifee Road and underlie the young alluvium at depth. As encountered in the exploratory excavations, these materials generally consist of variable layers of sand and silty sand that are moderate reddish brown, dense to very dense, and slightly moist.
- **Cretaceous Domenigoni Valley Granodiorite (Kdvg):** Cretaceous Domenigoni Valley Granodiorite Formation is exposed in the granitic hill located in the southeast corner of the Project site and off-site improvement area north of the Matthews Road and Briggs Road intersection. The material observed was yellowish brown, dry to moist, dense to very dense, fine to coarse grain size sand.

4.7.3.3 Seismicity and Faulting

The geologic structure of the entire Southern California area is dominated by northwest-trending faults associated with the San Andreas Fault system. While the Project site is in a seismically active region, no active or potentially active fault is known to exist at the Project site, nor is the site

situated within an “Alquist-Priolo” Earthquake Fault Zone.⁹ Given the relatively dense nature of the underlying soils and depth of groundwater (33 feet to 40 feet), the Project site possesses a very low potential for liquefaction.¹⁰ The City of Menifee General Plan identifies the granitic hill on the Project site as an area where local topographic and geological conditions have the potential for earthquake-induced landslides; however, the Geotechnical Evaluation’s review of a previous report for the Project site¹¹ determined the proposed development is not included in areas mapped as potentially susceptible to earthquake-induced landslides. Additionally, the developable area of the Project site, which does not include the granitic hill, consists of relatively flat alluvial deposits and is not susceptible to earthquake-induced landslides. As mentioned above, the nearest active fault zone to the Project site is the San Jacinto Fault Zone located approximately 9 miles northeast of the Project site.

4.7.3.4 Groundwater and Surface Water Conditions

Two primary east-west-trending drainages transect the northern portion of the Project site. The Project site also contains a surface water holding pond along the southern edge of the site adjacent to Matthews Road. The drainages appear to carry ephemeral flows from both on-site and off-site sources. Drainage from the Project site generally sheet flows toward Menifee Road and Matthews Road.

Groundwater was encountered during the on-site borings between approximately 33 feet and 40 feet below the ground surface of the Project site. Previous site explorations conducted in 2004 encountered groundwater between 37 feet and 68 feet below existing grade at the Project site. Groundwater in the Project area is monitored by the State via two off-site wells. Well-1 is located approximately 400 feet south of the Project site (950 feet east of Menifee Road), and Well-2 is located approximately 150 feet south of the Project site (2,300 feet east of Menifee Road). The shallowest recorded groundwater depths of the state-monitored wells recorded water depths of 47.5 feet and 52 feet below ground surface in March 2013 and June 1995, respectively.

Groundwater levels can be expected to fluctuate seasonally within the Project site. During the rainy season, groundwater and/or seepage may be prevalent in the drainage and pond areas on the Project site.

4.7.3.5 Liquefaction and Lateral Spreading

Liquefaction and dynamic settlement of soils can be caused by strong vibratory motion due to earthquakes. Both research and historical data indicate that loose, saturated, granular soils or soils of low plasticity are susceptible to liquefaction and dynamic settlement. Liquefaction is typified by a

⁹ California Department of Conservation (DOC). Fault Activity Map of California. 2010. <https://www.conservation.ca.gov/cgs/publications/fault-activity-map-of-california>. Accessed August 6, 2022.

¹⁰ LGC Geotechnical, Inc. *Preliminary Geotechnical Evaluation and Design Recommendations for the Proposed Approximately 580-Acre “Menifee Valley” Residential Development, City of Menifee, California*. Page 11. May 25, 2018. Appendix G-1.

¹¹ Urban Design Associates (UDA). *Minor Ranch Alt D (Maximum Density) Yield Study Map, Menifee, California*. April 2018.

loss of shear strength in the affected soil layer, thereby causing the soil to act as a viscous liquid. This effect may be manifested by excessive settlements and sand boils at the ground surface. Given the relatively dense nature of the underlying soils (Older Alluvium Fan deposit) and depth of groundwater (33 feet to 40 feet below ground surface), the Project site possesses a very low potential for liquefaction. Seismic densification, however, is possible on granular (greater than 50 percent sand) fills or native unconsolidated earth materials.

Lateral spreading typically occurs as a form of horizontal displacement of relatively flat-lying alluvial material toward an open or “unconfined” face such as an open body of water, channel, or excavation. In soils, this movement is generally due to failure along a weak plane and is often associated with liquefaction. Due to the low potential for liquefaction and lack of nearby open face areas, the Project site possesses a very low potential for lateral spreading.

4.7.3.6 Settlement and Collapse Potential

The underlying alluvial deposits encountered throughout the Project site were found to be dense to very dense and generally not considered to be susceptible to long-term consolidation settlement. According to the Project-specific Geotechnical Evaluation, the upper 10 feet of these native alluvial soils were found to possess collapse potential.

4.7.3.7 Expansion Potential

Expansive soils contain types of clay minerals that occupy considerably more volume when they are wet or hydrated than when they are dry or dehydrated. Volume changes associated with changes in the moisture content of near-surface expansive soils can cause uplift or heave of the ground when they become wet or, less commonly, cause settlement when they dry out. According to the Project-specific Geotechnical Evaluation, soils within the Project site are expected to have “low” to “very low” expansion potential.

4.7.3.8 Paleontological Resources

As discussed in **Section 4.7.2**, Applied Earthworks, Inc. conducted a PRA for 598 acres in 2019. PaleoWest reviewed this 2019 report and conducted a fossil locality search of the Project site, including 16.3 acres of the Project site that were not assessed in the 2019 PRA. Additionally, PaleoWest conducted a Supplemental Paleontological Resource Study, which evaluated approximately 60 acres identified for off-site improvements (including roadway improvements and subsurface utility line installations and connections).

At the Project site, Cretaceous granodiorite to tonalite (Kdvg) are exposed along the Project site’s southeastern boundary near the intersection of Matthews Road and Briggs Road. These granitic rocks do not contain fossils due to their high heat of formation below the Earth’s surface. Quaternary older alluvium (Qof) underlies the majority of the Project site. These sediments are assigned an age of late to middle Pleistocene (approximately 11,700 to 780,000 years ago) and have been found to yield significant paleontological resources throughout Southern California. Holocene-age alluvial fan deposits (Qyf) are present in the western portion of the Project site and overlie the Quaternary older alluvium deposits. These sediments are assigned Holocene to late Pleistocene age (present day to approximately 120,000 years ago) and are typically too young to contain fossilized

material; however, they may overlie older deposits containing sensitive material at unknown depths.

At the off-site improvement areas, cretaceous granodiorite to tonalite (Kdvg) is exposed along proposed off-site improvements north of the Matthews Road and Briggs Road intersection. The majority of off-site improvement areas are underlain by middle to later Pleistocene alluvial fan deposits (Qof). Holocene alluvial fan deposits (Qyf) are present in a small portion of the proposed off-site improvement area along Briggs Road and overlie older Quaternary alluvium deposits. As mentioned above, older alluvial fan deposits have been found to yield significant paleontological resources in the region.

The field surveys of the Project site conducted in 2016 and 2018 by Applied Earthworks found no paleontological resources on site. The results of the record search in the 2019 PRA and the Updated Paleontological Resources Study indicated that no fossil localities are known to exist within the Project site boundary. The record search conducted by PaleoWest for off-site improvement areas also indicated no fossil localities are known within improvement areas. However, the record search discussed in the aforementioned reports documented numerous localities within similarly mapped alluvial sediments throughout the region, including hundreds of fossil localities associated with the Diamond Valley Lake Project, which is located just over 1 mile southeast of the Project site. The Diamond Valley Lake Project produced hundreds of thousands of Pleistocene fossils, including those associated with Columbian mammoth (*Mammuthus columbi*), Pacific mastodon (*Mammut pacificus*), Sabertooth cat (*Smilodon fatalis*), Ancient horse (*Equus* sp.), and many other Pleistocene megafauna. Additionally, an online search of the UCMP database conducted by PaleoWest revealed 18 Pleistocene-age vertebrate fossil localities in Riverside County, several of which derived from unnamed Pleistocene-age deposits.

4.7.4 Regulatory Setting

4.7.4.1 Federal Regulations

There are no federal policies or regulations related to geology and soils that are applicable to the Project.

4.7.4.2 State Regulations

Alquist-Priolo Earthquake Fault Zoning Act (1972). The Alquist-Priolo Earthquake Fault Zoning Act of 1972 and updates (California Public Resources Code [PRC], Section 2621, et seq.) is the principal California State guidance to prevent the construction of habitable structures on the surface trace of active earthquake faults. If an active fault is found, a structure for human occupancy must be set back from the fault (generally a 50-foot setback). The Alquist-Priolo Earthquake Fault Zoning Act only addresses the hazard of surface fault rupture; it does not consider other earthquake hazards.

Seismic Hazard Mapping Act (1990). The Seismic Hazard Mapping Act (SHMA) was adopted by the State in 1990 to address the potential hazards posed by secondary effects of seismic activity, including strong ground shaking, soil liquefaction, and associated ground failure and seismically induced landslides. The California Geological Survey (CGS) 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 seismic hazard zones are referred to as “zones of required investigation” because site-specific geological investigations are required for construction projects located within these areas. Before a project can be permitted, a geologic investigation, evaluation, and written report must be prepared by a licensed geologist to demonstrate that the potential hazards can be successfully mitigated.

California Building Code. Current law states that every local agency enforcing building regulations, such as cities and counties, must adopt the provisions of the California Building Code (CBC) within 180 days of its publication. The publication date of the CBC is established by the California Building Standards Commission, and the code is also known as Title 24, Part 2, of the California Code of Regulations (CCR). Local jurisdictions often adopt local, more restrictive amendments that are based on local geographic, topographic, or climatic conditions. These codes provide minimum standards to protect property and public safety by regulating the design and construction of excavations, foundations, building frames, retaining walls, and other building elements to mitigate the effects of seismic shaking and adverse soil conditions. The CBC contains provisions for earthquake safety based on factors including occupancy type, the types of soil and rock on site, and the strength of ground shaking with a specified probability at a site. The 2019 CBC took effect on January 1, 2020.

Requirements for Geotechnical Investigations. Requirements for geotechnical investigations for subdivisions requiring tentative and final maps and for other types of structures are provided in California Health and Safety Code, Sections 17953 through 17955, and in Section 1802 of the CBC. Testing of samples from subsurface investigations is required, such as from borings or test pits. 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.

California Public Resources Code Section 5097.5. PRC Section 5097.5 protects nonrenewable resources including fossils, described as follows:

- 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 such lands.
- As used in this section, “public lands” means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

A violation of this section is a misdemeanor.

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

4.7.4.3 Local Regulations

City of Menifee Municipal Code. Building and construction in the city are subject to the regulations of the City of Menifee Municipal Code. CCR Title 24, Part 2, of the CBC (2019) provides minimum standards for building design in the State. Local codes are permitted to be more restrictive than Title 24, but not less restrictive. The procedures and limitations for the design of structures are based on site characteristics, occupancy type, configuration, structural system height, and seismic design category. The seismic ratings used in the CBC are derived from the International Building Code specifications. Most of Southern California, including the Project site, is located in Seismic Design Category D. Construction activities are subject to occupational safety standards for excavation, shoring, and trenching as specified in the California Occupational Safety and Health Administration (Cal/OSHA) regulations (CCR, Title 8). In addition, uses constructed as part of the Project would adhere to the seismic and building standards in the City's Building Code that have adopted the CBC with amendments and modifications.

The following provisions of the City's Municipal Code address geologic hazards and paleontological resources:

- **Chapter 8.04.10 (Building Code, Adoption by Reference):** Adopts the 2019 CBC including all of its chapters, tables, indices, addenda, footnotes, and appendices.
- **Chapter 8.26 (Grading Regulations):** Chapter 8.26 of the City's Municipal Code regulates the grading activities.
 - **Section 8.26.030:** Requires that a grading permit be obtained prior to grading or clearing, brushing, and grubbing on natural or existing grade that is preparatory to grading or land development.
 - **Section 8.26.040.B:** Any application for a grading permit shall demonstrate by providing sufficient information that either (1) the proposed grading will not cause a significant effect to the environment or (2) the environmental mitigation measures imposed through a prior and applicable California Environmental Quality Act (CEQA) review have been or will be completed as conditions to the grading permit, if applicable.
 - **Section 8.26.060:** Requires that all work requiring a grading permit or a grading plan shall be required to have an approved erosion control plan.
 - **Section 8.26.070:** Requires the preparation of a geotechnical report for every grading permit application or grading plan review.

City of Menifee General Plan, Safety Element. The Safety Element of the Menifee General Plan addresses potential natural and man-made hazards, including seismic and geologic hazards, within the city. The foremost goal of this Element is to protect the general health, safety, and welfare of Menifee from potential hazards. The following goals and policies related to seismic and geologic hazards would be applicable to the proposed Project.

- **Goal S-1:** A community that is minimally impacted by seismic shaking and earthquake-induced or other geologic hazards.
 - **Policy S-1.1:** Require all new habitable buildings and structures to be designed and built to be seismically resistant in accordance with the most recent California Building Code adopted by the City.
- **Goal S-2:** A community that has used engineering solutions to reduce or eliminate the potential for injury, loss of life, property damage, and economic and social disruption caused by geologic hazards such as slope instability; compressible, collapsible, expansive or corrosive soils; and subsidence due to groundwater withdrawal.
 - **Policy S-2.1:** Require all new developments to mitigate the geologic hazards that have the potential to impact habitable structures and other improvements.
 - **Policy S-2.2:** Monitor losses caused by geologic hazards to existing development and require studies to specifically address these issues, including the implementation of measures designed to mitigate these hazards, in all future developments in these areas.
 - **Policy S-2.3:** Minimize grading and modifications to the natural topography to prevent the potential for man-induced slope failures.
 - **Policy S-2.4:** Manage the groundwater resources in the area to prevent over-drafting of the aquifers, which in turn could result in regional subsidence.

City of Menifee General Plan, Open Space and Conservation Element. The Open Space and Conservation Element of the City’s General Plan describes paleontological and archaeological resources within the city. The following goals and policies apply to the proposed Project.¹²

- **Goal OSC-5:** Archaeological, historical, and cultural resources that are protected and integrated into the city’s built environment.
 - **Policy OSC-5.1:** Preserve and protect archaeological and historic resources and cultural sites, places, districts, structures, landforms, objects and native burial sites, traditional cultural landscapes and other features, consistent with state law and any laws, regulations, or policies which may be adopted by the City to implement this goal and associated policies.
 - **Policy OSC-5.4:** Establish clear and responsible policies and best practices to identify, evaluate, and protect previously unknown archaeological, historic, and cultural resources, following applicable CEQA and NEPA procedures and in consultation with the appropriate Native American tribes who have ancestral lands within the city.

¹² “Although paleontological resources are not discussed explicitly in the OSC-5 goal and associated policies, Rieboldt and Parham (2017:4) state that their inclusion can be inferred because paleontological resources are referenced in the section’s heading of the General Plan.” PaleoWest, *Updated Paleontological Resource Study*, Page 8 of pdf. (Appendix G-3).

- **Policy OSC-5.5:** Develop clear policies regarding the preservation and avoidance of cultural resources located within the city, in consultation with the appropriate Native American tribes who have ancestral lands within the city.

4.7.5 Thresholds of Significance

The thresholds for geology and soils impacts used in this analysis are consistent with Appendix G of the *State CEQA Guidelines*. The proposed Project may be deemed to have a significant impact with respect to geology and soils if it would:

- Threshold 4.7-1:** Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: (i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of 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?
- Threshold 4.7-2:** Result in substantial soil erosion or the loss of topsoil?
- Threshold 4.7-3:** Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse?
- Threshold 4.7-4:** Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating direct or indirect substantial risks to life or property?
- Threshold 4.7-5:** Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?
- Threshold 4.7-6:** Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

4.7.6 Project Impacts

4.7.6.1 Rupture of a Known Earthquake Fault

- Threshold 4.7-1(i):** Would the Project 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 known fault? (Refer to Division of Mines and Geology Special Publication 42.)

On-Site Improvements. The Project site is not located within an Earthquake Fault Zone as defined by the State of California in the Alquist-Priolo Earthquake Fault Zone Act of 1972 or as defined by

the City's Local Hazard Mitigation Plan.¹³ The San Jacinto Fault Zone (the nearest Alquist-Priolo earthquake fault zone) is approximately 9 miles to the northeast of the Project site.¹⁴ In addition, there is no evidence of any faults or faulting activity on the Project site.¹⁵ Therefore, the risk of ground rupture due to fault displacement beneath the site is low. Impacts would be **less than significant**. Mitigation is not required.

Off-Site Improvements. Implementation of the Project would result in physical disturbance to up to 59.0 acres for the installation of off-site improvements including roadway improvements to existing roadways (e.g. Menifee Road, SR-74, and Briggs Road), utility connections (e.g. water, sewer, stormwater, electricity, internet, and natural gas), landscaping, and construction of a non-vehicular bridge to connect the Specific Plan site to the Heritage Lake community to the south. The widening of these existing roadways would be in conformance with the City's General Plan Circulation Element. Similar to the Project site, off-site improvement areas are not located within an Earthquake Fault Zone as defined by the State of California in the Alquist-Priolo Earthquake Fault Zone Act of 1972 or as defined by the City's Local Hazard Mitigation Plan. Additionally, there is no evidence of any faults or faulting activity within the off-site improvement areas. Therefore, the risk of ground rupture due to fault displacement beneath off-site improvement areas is low, and impacts would be **less than significant**. Mitigation is not required.

Off-Site Roadway Improvements. Implementation of the Project would also result in off-site roadway improvements to address traffic impacts in conflict with the General Plan Circulation Element policies that strive to maintain desired LOS. These roadway improvements, which include widening and additional turn lanes as required, include Matthews Road/Case Road (between McLaughlin Road and Ethanac Road), McLaughlin Road (between Matthews Road/Case Road and Menifee Road), and McCall Boulevard (between Encanto Drive and Menifee Road). These roadway improvements were identified in the General Plan Circulation Element and included in the Final General Plan Environmental Impact Report (EIR) certified by the City on December 18, 2013 (Certified 2013 EIR).

The widening of these existing roadways would be in conformance with the City's Certified 2013 EIR and the General Plan Circulation Element. The Initial Study prepared for the City's Certified 2013 EIR found that as there are no Alquist-Priolo zones within the City planning area, implementation of the General Plan, which includes the off-site roadway improvements, would not result in hazards from surface rupture of a known active fault. Impacts would be **less than significant**, and no mitigation is required.

¹³ City of Menifee. 2021 Local Hazard Mitigation Plan. 2021 LHMP Fault Map. https://www.cityofmenifee.us/DocumentCenter/View/14009/Fault_Map_2021_LHMP?bidId=. Accessed August 8, 2022.

¹⁴ California State Geoportal. CGS Seismic Hazards Program: Alquist-Priolo Fault Hazard Zones. 2021. <https://gis.data.ca.gov/maps/ee92a5f9f4ee4ec5aa731d3245ed9f53/explore?location=33.782946%2C-117.120441%2C12.53>. Accessed August 8, 2022.

¹⁵ LGC Geotechnical, Inc. Preliminary Geotechnical Evaluation and Design Recommendations for the Proposed Approximately 580-Acre "Menifee Valley" Residential Development, City of Menifee, California. Page 16. May 25, 2018. Appendix G-1.

Level of Significance Prior to Mitigation: Less Than Significant.

Regulatory Compliance Measures and Mitigation Measures: No Regulatory Compliance Measures or Mitigation Measures are required.

Level of Significance After Mitigation: Less Than Significant.

4.7.6.2 Directly or Indirectly Cause Adverse Effects Involving Seismic Ground Shaking

Threshold 4.7-1(ii): **Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: Strong seismic ground shaking?**

On-Site Improvements. As with all of Southern California, the Project would be subject to strong ground motion resulting from earthquakes on nearby faults. There are several faults in the vicinity of the Project site that are capable of producing strong ground motion, including the San Jacinto, Elsinore, and San Andreas Fault Zones. During an earthquake along any of these faults or other faults in the region, seismically induced ground shaking would be expected to occur. However, seismic shaking is a risk throughout Southern California, and the Project site is not at greater risk of seismic activity or impacts than other areas of Southern California. The severity of the shaking would be influenced by the magnitude of the earthquake, the distance of the Project site to the seismic source, the soil conditions, the depth to groundwater, and the duration of the seismic event.

Peak ground acceleration (PGA) is a measure of earthquake acceleration on the ground and an important input parameter for earthquake engineering. Based on the Addendum Report Regarding Geotechnical Recommendations,¹⁶ a design-level PGA of 0.55 gravity (g) has been calculated for the Project. This acceleration is consistent with other areas in this region of California that are underlain by similar geologic materials and indicates that strong seismic ground shaking generated by seismic activity is considered a potentially significant impact that may affect Project people or structures.

State and local jurisdictions regulate development in California through a variety of tools that reduce hazards from earthquakes and other geologic hazards. For example, the State regulations protecting human-occupied structures from seismic hazards are provided in the most recent (2019) CBC (CCR Title 24, Part 2). The CBC Chapter 8.04 (Building Code) and Chapter 8.26 (Grading Regulations) of the City's Municipal Code contain provisions to safeguard against major structural failures or loss of life caused by earthquakes or other geologic hazards. The CBC contains provisions for earthquake safety based on factors including occupancy type, the types of soil and rock on site, and the strength of ground motion with specified probability of occurring at the Project site. The design and construction of Project uses would be required to adhere to the provisions of the CBC. Compliance with these State regulations would reduce hazards from strong seismic ground shaking.

Furthermore, proposed future development of Project structures would be required to have a site-specific geotechnical investigation report prepared by the Applicant's geotechnical consultant, in accordance with Appendix J Section J104 (Engineered Grading Requirements) of the CBC (see

¹⁶ LGC Geotechnical, Inc. Addendum Report Regarding Geotechnical Recommendations for the Proposed Approximately 580-Acre "Menifee Valley" Residential and Commercial Development, City of Menifee, California. Page 2. October 11, 2021. Appendix G-2.

Regulatory Compliance Measure [RCM] GEO-1 below); such investigation would determine seismic design parameters for the Project building types pursuant to CBC requirements. Compliance with the design parameters and recommendations of the geotechnical evaluation report would be required as a condition of a grading permit and/or building permit. Thus, with compliance with RCM GEO-1, impacts resulting from strong ground shaking are anticipated to be ***less than significant***.

Off-Site Improvements. Implementation of the Project would result in physical disturbance to up to 59.0 acres for the installation of off-site improvements including roadway improvements to existing roadways (e.g. Meniffee Road, SR-74, and Briggs Road), utility connections (e.g. water, sewer, stormwater, electricity, internet, and natural gas), landscaping, and construction of a non-vehicular bridge to connect the Specific Plan site to the Heritage Lake community to the south. The widening of these existing roadways would be in conformance with the City's General Plan Circulation Element. Off-site improvements are associated with existing roadways and do not include the construction of buildings. Additionally, improvements to these roadways would comply with City standards and recommendations of the geotechnical evaluation report related to asphalt concrete pavement sections. Therefore, impacts resulting from strong ground shaking within off-site improvement areas are anticipated to be ***less than significant***. No mitigation measures are required.

Off-Site Roadway Improvements. Implementation of the Project would also result in off-site roadway improvements to address traffic impacts in conflict with the General Plan Circulation Element policies that strive to maintain desired LOS. These roadway improvements, which include widening and additional turn lanes as required, include Matthews Road/Case Road (between McLaughlin Road and Ethanac Road), McLaughlin Road (between Matthews Road/Case Road and Meniffee Road), and McCall Boulevard (between Encanto Drive and Meniffee Road). These roadway improvements were identified in the General Plan Circulation Element and included in the Certified 2013 EIR.

The widening of these existing roadways would be in conformance with the City's General Plan Circulation Element and the Certified 2013 EIR. Off-site improvements are associated with existing roadways and do not include the construction of buildings. The City's Certified 2013 EIR found that upon implementation of seismic safety provisions of the CBC (Title 24, Part 2 of the California Code of Regulations) and adherence to the recommendations of project-specific geotechnical evaluation to asphalt concrete pavement sections, implementation of the General Plan, which includes the off-site roadway improvements, would not result in impacts resulting from strong ground shaking. Similar to the off-site improvements discussed above, off-site roadway improvements along Matthews Road (Case Road), McCall Boulevard, and McLaughlin Road would comply with City standards and recommendations of the geotechnical evaluation report related to asphalt concrete pavement sections. Therefore, impacts resulting from strong ground shaking within off-site improvement areas are anticipated to be ***less than significant***. No mitigation measures are required.

Level of Significance Prior to Mitigation: Less Than Significant.

Regulatory Compliance Measures and Mitigation Measures: No mitigation measures are required; however, **RCM GEO-1** identified below would be applicable and implemented by the Project. **RCM GEO-1** is required by state law as part of the Project and is not considered a mitigation measure.

RCM GEO-1 California Building Code Compliance Seismic Standards. All structures shall be designed in accordance with the seismic parameters presented in the Geotechnical Evaluations prepared for this Project (LGC Geotechnical, Inc., 2018, 2020, and 2021) and applicable sections of the most current California Building Code (CBC). Prior to the issuance of building permits for planned structures, the Soils Engineer and the City of Menifee Chief Building Official, or designee, shall review building plans to verify that the structural design conforms to the requirements of the Geotechnical Evaluations, the most current CBC, and the City’s Municipal Code.

Level of Significance After Mitigation: Less Than Significant.

4.7.6.3 Directly or Indirectly Cause Adverse Effects Involving Ground Failure, Including Liquefaction

Threshold 4.7-1(iii): Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: Seismic-related ground failure, including liquefaction?

On-Site Improvements. Liquefaction refers to loose, saturated sand or silt deposits that behave as a liquid and lose their load-supporting capability when strongly shaken. Loose granular soils and silts that are saturated by relatively shallow groundwater are susceptible to liquefaction. According to the City of Menifee General Plan, the Project site is not located within an area where local geological and groundwater conditions suggest a potential for liquefaction.¹⁷ The Project site is considered to have a low risk of liquefaction due to the relatively dense nature of the underlying soils (Older Alluvium Fan deposit) and groundwater depth; groundwater is expected to be approximately 33 feet to 40 feet below ground surface.¹⁸ Seismic densification, however, is possible on granular (greater than 50 percent sand) fills or native unconsolidated earth materials. Due to the proposed remedial grading and relatively homogenous subsurface soils between adjacent columns, the seismic differential settlement is expected to be less than 0.5 inch in a 40-foot horizontal distance within the Project site.¹⁹

Pursuant to Chapter 8.26 (Grading Regulations) of the City’s Municipal Code, the Project Applicant would be required to prepare and submit detailed grading plans for the site prior to the issuance of grading permits. Implementation of **RCM GEO-1** (compliance with the current edition of the CBC and recommendations in the project-specific Geotechnical Evaluations, **Appendix G-1 and Appendix G-2**) would ensure development under the proposed Project would be protected from seismic-related ground failure, including liquefaction. Impacts would be *less than significant*.

Off-Site Improvements. Implementation of the Project would result in physical disturbance to up to 59.0 acres for the installation of off-site improvements including roadway improvements to existing roadways (e.g. Menifee Road, SR-74, and Briggs Road), utility connections (e.g. water, sewer,

¹⁷ City of Menifee. City of Menifee General Plan, Safety Element. Exhibit S-3, Liquefaction and Landslides. 2012. <https://www.cityofmenifee.us/DocumentCenter/View/1030>. Accessed August 8, 2022.

¹⁸ LGC Geotechnical, Inc. Preliminary Geotechnical Evaluation and Design Recommendations for the Proposed Approximately 580-Acre “Menifee Valley” Residential Development, City of Menifee, California. Page 9. May 25, 2018. Appendix G-1.

¹⁹ Ibid. Page 11.

stormwater, electricity, internet, and natural gas), landscaping, and construction of a non-vehicular bridge to connect the Specific Plan site to the Heritage Lake community to the south. The widening of these existing roadways would be in conformance with the City's General Plan Circulation Element. Off-site improvements involve existing roadways and do not include the construction of buildings. Similar to the Project site, off-site improvement areas are not located within an area where local geological and groundwater conditions suggest a potential for liquefaction. Additionally, improvements to these roadways would comply with City standards and recommendations of the geotechnical evaluation report related to asphalt concrete pavement sections. Therefore, impacts resulting from strong seismic-related ground failure, including liquefaction, within off-site improvement areas are anticipated to be **less than significant**. No mitigation measures are required.

Off-Site Roadway Improvements. Implementation of the Project would also result in off-site roadway improvements to address traffic impacts in conflict with the General Plan Circulation Element policies that strive to maintain desired LOS. These roadway improvements, which include widening and additional turn lanes as required, include Matthews Road/Case Road (between McLaughlin Road and Ethanac Road), McLaughlin Road (between Matthews Road/Case Road and Menifee Road), and McCall Boulevard (between Encanto Drive and Menifee Road). These roadway improvements were identified in the General Plan Circulation Element and included in the Certified 2013 EIR.

The widening of these existing roadways would be in conformance with the City's General Plan Circulation Element. Off-site improvements involve existing roadways and do not include the construction of buildings. The Certified 2013 EIR concluded that portions of the City are located within areas of potential liquefaction. According to the Certified 2013 EIR, roadway improvements along Matthews Road (Case Road) and east of McLaughlin Road would not be located within an area where local geological and groundwater conditions suggest a potential for liquefaction. However, some roadway improvements along McCall Boulevard may cross areas of liquefaction potential. The Certified 2013 EIR found that with compliance with General Plan policies, City standards, and recommendations of a project-specific geotechnical evaluation, impacts resulting from strong seismic-related ground failure, including liquefaction, within off-site improvement areas are anticipated to be less than significant. Similar to the off-site improvements discussed above, off-site roadway improvements along Matthews Road (Case Road), McCall Boulevard, and McLaughlin Road would comply with City standards and recommendations of the geotechnical evaluation report related to asphalt concrete pavement sections. Therefore, impacts resulting from strong seismic-related ground failure, including liquefaction, within off-site improvement areas are anticipated to be **less than significant**. No mitigation measures are required.

Level of Significance Prior to Mitigation: Less Than Significant.

Regulatory Compliance Measures and Mitigation Measures: No mitigation measures are required; however, **RCM GEO-1** identified above would be applicable to the Project.

Level of Significance After Mitigation: Less Than Significant.

4.7.6.4 Directly or Indirectly Cause Adverse Effects Involving Ground Failure, Including Landslides

Threshold 4.7-1(iv): Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: Landslides?

On-Site Improvements. A landslide generally occurs on relatively steep slopes and/or on slopes underlain by weak materials. Factors that contribute to slope failure include slope height and steepness, shear strength and orientation of weak layers in the underlying geologic units, and pore water pressures. Except for the granitic hill located in the southeastern portion of the Project site near the intersection of Matthews Road and Briggs Road, the Project site and vicinity are relatively flat. The City of Menifee General Plan identifies the granitic hill on the Project site as an area where local topographic and geological conditions have the potential for earthquake-induced landslides;²⁰ however, the Geotechnical Evaluation's review of a previous report for the Project site²¹ determined the proposed development is not included in areas mapped as potentially susceptible to earthquake-induced landslides. Additionally, the developable area of the Project site, which does not include the granitic hill, consists of relatively flat alluvial deposits and is not susceptible to earthquake-induced landslides.²²

Any retaining walls proposed on site would be designed and constructed pursuant to the recommendations of the Project-specific Geotechnical Evaluations to protect against lateral spreading and landslides (**RCM GEO-1**). Additionally, any retaining walls greater than 6 feet tall would be designed for seismic lateral earth pressures pursuant to applicable provisions of the CBC. Construction contractors would adhere to recommendations of the Geotechnical Evaluations and the CBC for temporary slopes and for shoring or shielding for temporary excavations over 5 feet deep, as required by the City of Menifee. Therefore, implementation of the Project would result in **less than significant impacts** related to landslide hazards. No mitigation is required.

Off-Site Improvements. Implementation of the Project would result in physical disturbance to up to 59.0 acres for the installation of off-site improvements including roadway improvements to existing roadways (e.g. Menifee Road, SR-74, and Briggs Road), utility connections (e.g. water, sewer, stormwater, electricity, internet, and natural gas), landscaping, and construction of a non-vehicular bridge to connect the Specific Plan site to the Heritage Lake community to the south. The widening of these existing roadways would be in conformance with the City's General Plan Circulation Element. Off-site improvements involve existing roadways and utility connections and do not include the construction of buildings. Similar to the Project site, off-site improvement areas are not located within an area mapped as potentially susceptible to earthquake-induced landslides. Additionally, improvements to these roadways would comply with City standards and recommendations of the geotechnical evaluation report related to asphalt concrete pavement sections. Therefore, impacts resulting from strong seismic-related ground failure, including

²⁰ City of Menifee. City of Menifee General Plan, Safety Element. Exhibit S-3, Liquefaction and Landslides. 2012. <https://www.cityofmenifee.us/DocumentCenter/View/1030>. Accessed August 8, 2022.

²¹ Urban Design Associates (UDA). Minor Ranch Alt D (Maximum Density) Yield Study Map, Menifee, California. April 2018.

²² LGC Geotechnical, Inc. Preliminary Geotechnical Evaluation and Design Recommendations for the Proposed Approximately 580-Acre "Menifee Valley" Residential Development, City of Menifee, California. Page 16. May 25, 2018. Appendix G-1.

landslides, within off-site improvement areas are anticipated to be **less than significant**. Mitigation is not required.

Off-Site Roadway Improvements. Implementation of the Project would also result in off-site roadway improvements to address traffic impacts in conflict with the General Plan Circulation Element policies that strive to maintain desired LOS. These roadway improvements, which include widening and additional turn lanes as required, include Matthews Road/Case Road (between McLaughlin Road and Ethanac Road), McLaughlin Road (between Matthews Road/Case Road and Menifee Road), and McCall Boulevard (between Encanto Drive and Menifee Road). These roadway improvements were identified in the General Plan Circulation Element and included in the Certified 2013 EIR.

The Certified 2013 EIR found that upon required geotechnical investigations and required implementation of recommendations in geotechnical investigation reports, developments pursuant to the General Plan, including the off-site roadway improvements, would not create substantial hazards arising from earthquake-related slope failures. Impacts would be less than significant. Similar to the off-site improvements discussed above, off-site roadway improvements along Matthews Road (Case Road), McCall Boulevard, and McLaughlin Road would comply with City standards and recommendations of the geotechnical evaluation report related to asphalt concrete pavement sections. Therefore, impacts resulting from strong seismic-related ground failure, including landslides, within off-site improvement areas are anticipated to be **less than significant**. Mitigation is not required.

Level of Significance Prior to Mitigation: Less Than Significant.

Regulatory Compliance Measures and Mitigation Measures: No mitigation measures are required; however, RCM GEO-1 identified above would be applicable to the Project.

Level of Significance After Mitigation: Less Than Significant.

4.7.6.5 Substantial Soil Erosion or the Loss of Topsoil

Threshold 4.7-2: Would the Project result in substantial soil erosion or the loss of topsoil?

On-Site Improvements. Construction of the proposed Project would involve excavation, grading, and construction activities that disturb soil and leave exposed soil on the ground surface. Grading temporarily increases the potential for erosion by removing protective vegetation, changing natural drainage patterns, and constructing slopes. Common means of soil erosion from construction sites include water, wind, and being tracked off site by vehicles. These activities could result in soil erosion if effective erosion-control measures are not used. Additionally, due to the granular nature of the on-site soils, unprotected slopes may be subject to increased wind or water erosion.

All grading would be subject to local and State codes and requirements for erosion control and grading during construction. For example, construction of Project uses would be required to comply with standard regulations, including South Coast Air Quality Management District (SCAQMD) Rules 402 and 403, which would reduce construction erosion impacts. Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not

remain visible in the atmosphere beyond the property line of the emissions source. Rule 402 requires dust suppression techniques be implemented to prevent dust and soil erosion from creating a nuisance off site. Control measures to reduce erosion during grading and construction activities also include stabilizing backfilling materials when not actively handling soils, stabilizing soils during clearing and grubbing activities, and stabilizing soils during and after cut-and-fill activities. As required by **RCM GEO-2**, all recommendations presented in the Final Geotechnical Assessment for the Project shall be implemented to the satisfaction of the City's Building and Safety Director or designee to ensure reduced effects to geology and soils on the site during Project construction and operation.

Additionally, the Construction General Permit (CGP) issued by the State Water Resources Control Board (SWRCB) regulates construction activities to minimize water pollution, including sediment. The Project uses constructed would be subject to National Pollutant Discharge Elimination System (NPDES) permitting regulations, including the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) for each phase of the Project. The construction contractor would be required to prepare and implement an SWPPP and associated best management practices (BMPs) in compliance with the CGP during grading and construction as outlined in **RCMs WQ-1, WQ-2, and WQ-3** provided in **Section 4.10** of this EIR and presented below. Adherence to the BMPs in the SWPPP would reduce, prevent, or minimize soil erosion from future Project-related grading and construction activities. Additionally, development on the Project site would convert a majority of existing earthen and permeable surfaces to paved surfaces, which would generally reduce the potential for soil erosion from the site during project operation. Finally, developed areas on the Project site, including maintained landscaped and open space areas, would be required to adhere to BMPs identified in the Final Water Quality Management Plan (WQMP) pursuant to **RCM WQ-4** to minimize post-construction erosion impacts during project operation. Refer to **Section 4.10** for more information on BMPs.

Future Project-related grading activities would also be required to adhere to Chapter 8.26 (Grading Regulations) of the City's Municipal Code, requirements of the Geotechnical Evaluations prepared for the Project site, and CBC (**RCM GEO-1**). Therefore, impacts from soil erosion or loss of topsoil would be *less than significant*.

Off-Site Improvements. Implementation of the Project would result in physical disturbance to up to 59.0 acres for the installation of off-site improvements including roadway improvements to existing roadways (e.g. Menifee Road, SR-74, and Briggs Road), utility connections (e.g. water, sewer, stormwater, electricity, internet, and natural gas), landscaping, and construction of a non-vehicular bridge to connect the Specific Plan site to the Heritage Lake community to the south. Off-site improvements would involve excavation, grading, and construction activities that disturb soil and leave exposed soil on the ground surface, similar to on-site improvements. All grading would be subject to local and State codes and requirements for erosion control and grading during construction, including SCAQMD Rules 402 and 403, which would reduce construction erosion impacts. As required by **RCM GEO-2**, all recommendations presented in the Final Geotechnical Assessment for the Project shall be implemented to the satisfaction of the City's Building and Safety Director or designee to ensure reduced effects to geology and soils on the site during Project construction and operation.

Additionally, off-site improvements would be subject to NPDES permitting regulations, including the development and implementation of a SWPPP. The construction contractor would be required to prepare and implement an SWPPP and associated BMPs in compliance with the CGP during grading and construction as outlined in **RCMs WQ-1, WQ-2, and WQ-3** provided in **Section 4.10** of this EIR and presented below. Adherence to the BMPs in the SWPPP would reduce, prevent, or minimize soil erosion from future Project-related grading and construction activities. Future Project-related grading activities would also be required to adhere to Chapter 8.26 (Grading Regulations) of the City's Municipal Code, requirements of the Geotechnical Evaluations prepared for the Project site, and CBC (**RCM GEO-1**).

As previously discussed, development on the off-site improvement areas includes the widening of existing roadways. These improvements would increase the amount of paved surfaces within the off-site improvement area, which would generally reduce the potential for soil erosion during project operation. Additionally, developed areas within the off-site improvement areas, including maintained landscaping, would be required to adhere to BMPs identified in the Final Water Quality Management Plan (WQMP) pursuant to **RCM WQ-4** to minimize post-construction erosion impacts during project operation. Therefore, impacts from soil erosion or loss of topsoil during construction and operation of off-site improvement areas would be *less than significant*. No mitigation is required.

Off-Site Roadway Improvements. Implementation of the Project would also result in off-site roadway improvements to address traffic impacts in conflict with the General Plan Circulation Element policies that strive to maintain desired LOS. These roadway improvements, which include widening and additional turn lanes as required, include Matthews Road/Case Road (between McLaughlin Road and Ethanac Road), McLaughlin Road (between Matthews Road/Case Road and Menifee Road), and McCall Boulevard (between Encanto Drive and Menifee Road). These roadway improvements were identified in the General Plan Circulation Element and included in the Certified 2013 EIR.

The Certified 2013 EIR found upon compliance with local and State codes and requirements for erosion control and grading during construction, including SCAQMD Rules 402 and 403, best management practices (BMPs) for erosion control as required under National Pollutant Discharge Elimination System (NPDES) regulations pursuant to the federal Clean Water Act, implementation of the General Plan, which includes the off-site roadway improvements, would not result in substantial soil erosion or loss of topsoil. As outlined in **RCMs WQ-1, WQ-2, and WQ-3** provided in **Section 4.10** of this EIR and presented below, the construction contractor would be required to prepare and implement an SWPPP and associated BMPs in compliance with the CGP during grading and construction. Pursuant to **RCM GEO-1**, grading activities would also be required to adhere to Chapter 8.26 (Grading Regulations) of the City's Municipal Code, requirements of the Geotechnical Evaluations prepared for the Project site, and CBC.

As previously discussed, development on the off-site improvement areas includes the widening of existing roadways. These improvements would increase the amount of paved surfaces within the off-site improvement area, which would generally reduce the potential for soil erosion during project operation. Additionally, developed areas within the off-site improvement areas, including maintained landscaping, would be required to adhere to BMPs identified in the Final Water Quality

Management Plan (WQMP) pursuant to **RCM WQ-4** to minimize post-construction erosion impacts during project operation. Therefore, impacts from soil erosion or loss of topsoil during construction and operation of off-site improvement areas would be ***less than significant***. No mitigation is required.

Level of Significance Prior to Mitigation: Less Than Significant.

Regulatory Compliance Measures and Mitigation Measures: No mitigation measures are required; however, **RCM GEO-1** identified above, and **RCM GEO-2**, identified below, would be applicable to the Project. In addition, **RCMs WQ-1, WQ-2, WQ-3, and WQ-4** are existing regulations that are applicable to the Project and are considered in the analysis of potential impacts related to hydrology and water quality and are also applicable to soils and geology. These RCMs are required by state law as part of the Project and are not considered mitigation measures.

RCM GEO-2 Prior to the issuance of grading and/or building permits, the Applicant shall provide evidence to the City for review and approval that proposed structures, features, and facilities to be constructed on the Project site have been designed and will be constructed in conformance with applicable provisions of the most current edition of the California Building Code in effect at the time of development application submittal and that the Final Geotechnical Assessment's recommendations conform to the most current California Building Code. Additionally, the Applicant shall provide evidence to the City that the recommendations cited in the project-specific Final Geotechnical Assessment are incorporated into project plans and/or implemented as deemed appropriate by the City. The Final Geotechnical Assessment recommendations may include, but are not limited to, removal of existing vegetation, utilities, and any other surface and subsurface improvements that would not remain in place for use with the structures constructed on the Project site. Remedial earthwork, overexcavation, and ground improvement shall occur to depths specified in the Final Geotechnical Assessment to provide a sufficient layer of engineered fill or densified soil beneath structural footings/foundations, as well as proper surface drainage devices and erosion control. Retaining wall parameters shall be in accordance with the Final Geotechnical Assessment to protect against lateral spreading and on-site landslides. Construction of concrete structures in contact with subgrade soils determined to be corrosive shall include measures to protect concrete, steel, and other metals. Verification testing must be performed upon completion of ground improvements to confirm that the compressible soils have been sufficiently densified. The structural engineer must determine the ultimate thickness and reinforcement of the building floor slabs based on the imposed slab loading. The recommendations of the Final Geotechnical Assessment shall be implemented to the satisfaction of the City's Building and Safety Director or designee.

RCM WQ-1 Prior to commencement of construction activities, the Applicant shall obtain coverage under the *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land*

Disturbance Activities (Construction General Permit), NPDES No. CAS000002, Order No. 2009-0009-DWQ, as amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ, or any other subsequent permit. This shall include submission of Permit Registration Documents (PRDs), including permit application fees, a Notice of Intent (NOI), a risk assessment, a site plan, a Storm Water Pollution Prevention Plan (SWPPP), a signed certification statement, and any other compliance-related documents required by the permit, to the State Water Resources Control Board via the Stormwater Multiple Application and Report Tracking System (SMARTS). Construction activities shall not commence until a Waste Discharge Identification Number (WDID) is obtained for the proposed Project from the SMARTS and provided to the City Engineer/Public Works Director, or designee, to demonstrate that coverage under the Construction General Permit has been obtained. Project construction shall comply with all applicable requirements specified in the Construction General Permit, including but not limited to, preparation of a SWPPP and implementation of construction site Best Management Practices (BMPs) to address all construction-related activities, equipment, and materials that have the potential to impact water quality for the appropriate risk level identified for the proposed Project. The SWPPP shall identify the sources of pollutants that may affect the quality of storm water and shall include BMPs (e.g. soil binders, straw mulch, non-vegetative stabilization, fiber rolls, sandbag barrier, straw bale barrier, stabilized construction entrance/exit, stabilized construction roadway, and entrance/outlet tire wash) to control the pollutants in storm water runoff. Upon completion of construction activities and stabilization of the Project site, a Notice of Termination (NOT) shall be submitted via SMARTS.

RCM WQ-2 In compliance with City of Menifee Ordinance 2019-287 Grading Regulations, Section 8.26.060, the Project Applicant shall submit an Erosion Control Plan to the City Engineer/Public Works Director or designee, for review and approval concurrent with the grading permit application or with submittal of the grading plans for each individual development that would occur within the Specific Plan area. An approved erosion control plan from the previous year shall be updated and submitted for approval, if necessary, prior to the start of the rainy season each year, as determined by the City Engineer/Public Works Director.

RCM WQ-3 At least 45 days prior to any groundwater dewatering activities, the City of Menifee shall submit an NOI to the Santa Ana Regional Water Quality Control Board (RWQCB) to obtain coverage under the General Waste Discharge Requirements for Discharges to Surface Waters That Pose an Insignificant (De Minimis) Threat to Water Quality (Groundwater Discharge Permit), Order No. R8-2020-0006, NPDES No. CAG998001. The construction contractor shall comply with the requirements of Order No. R8-2020-0006, NPDES No. CAG998001. Groundwater dewatering activities shall comply with all applicable provisions in the Groundwater Discharge Permit, including water sampling, analysis, treatment (if required), and reporting of dewatering-related discharges. Upon completion of groundwater dewatering activities, an NOT shall be submitted to the Santa Ana RWQCB.

RCM WQ-4 Prior to issuance of a grading permit, the Applicant shall submit a Final Water Quality Management Plan (WQMP) to the City Engineer/Public Works Director or designee for review and approval. The Final WQMP shall specify the BMPs to be incorporated into the proposed Project design to target pollutants of concern in runoff from the Project Site. The Final WQMP shall also incorporate the results of the Final Hydrology and Hydraulic Analyses to demonstrate that the detention facilities meet the hydromodification requirements of the Riverside County Flood Control and Water Conservation District, the County of Riverside, and the Incorporated Cities of Riverside County Within the Santa Ana Region MS4 Permit. The City Engineer/Public Works Director, or designee, shall ensure that the BMPs specified in the Final WQMP are incorporated into the final Project design.

Level of Significance After Mitigation: Less Than Significant.

4.7.6.6 Unstable Soils

Threshold 4.7-3: **Would the Project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse?**

On-Site Improvements.

Landslides. Landslides and other forms of mass wasting, including mud flows, debris flows, and soil slips, occur as soil moves downslope under the influence of gravity. Landslides are frequently triggered by intense rainfall or seismic shaking. Except for the granitic hill located in the southeastern portion of the Project site near the intersection of Matthews Road and Briggs Road, the Project site and vicinity are relatively flat. As stated above in **Section 4.7.6.4**, the City of Menifee General Plan identifies the granitic hill on the Project site as an area where local topographic and geological conditions have the potential for earthquake-induced landslides;²³ however, the Geotechnical Evaluation's review of a previous report for the Project site²⁴ determined the proposed development is not included in areas mapped as potentially susceptible to earthquake-induced landslides. Additionally, the developable area of the Project site, which does not include the granitic hill, consists of relatively flat alluvial deposits and is not susceptible to earthquake-induced landslides.²⁵ Therefore, potential impacts related to landslides would be **less than significant**.

Lateral Spreading and Liquefaction. Lateral spreading may occur on very gentle slopes or flat terrain. The dominant mode of movement is lateral extension accompanied by shear or tensile fracture. This failure is caused by liquefaction and is usually triggered by rapid ground motion,

²³ City of Menifee. City of Menifee General Plan, Safety Element. Exhibit S-3, Liquefaction and Landslides. 2012. <https://www.cityofmenifee.us/DocumentCenter/View/1030>. Accessed August 8, 2022.

²⁴ Urban Design Associates (UDA). Minor Ranch Alt D (Maximum Density) Yield Study Map, Menifee, California. April 2018.

²⁵ LGC Geotechnical, Inc. Preliminary Geotechnical Evaluation and Design Recommendations for the Proposed Approximately 580-Acre "Menifee Valley" Residential Development, City of Menifee, California. Page 16. May 25, 2018. Appendix G-1.

such as that experienced during an earthquake, but can also be artificially induced. When coherent material, either bedrock or soil, rests on materials that liquefy, the upper units may undergo fracturing and extension and may then subside, translate, rotate, disintegrate, or liquefy and flow. As indicated above in **Section 4.7.6.3**, liquefaction potential at the site is considered low. Thus, impacts from lateral spreading and liquefaction would be ***less than significant***.

Subsidence and Collapsible Soils. Ground subsidence is a gradual settling or sinking of the ground surface that is typically associated with oil, gas, or groundwater extraction. There are no oil or gas fields within or near the Project site. Consequently, regional land subsidence due to the extraction of oil or gas is not a hazard to the Project.

Subsidence can also occur as an effect of soil shrinkage, which is the decrease in volume of soil upon removal and recompaction expressed as a percentage of the original in-place volume. Subsidence occurs as natural ground is densified to receive fill. In addition, shrinkage of surficial soils removed and recompacted during grading would be anticipated to be approximately 10 to 15 percent in the upper 10 feet, including from compression of surface material due to heavy equipment. The degree to which fill soils are compacted and variations in the density of existing soils will influence earth volume changes. Consequently, some adjustments in grades near the completion of grading could be required to balance the earthwork.

Young alluvium, topsoil, undocumented fill soils, colluvium, and weathered older alluvium on the Project site and off-site improvement areas are potentially compressible in their present state and may settle under the surcharge of fills or foundation loading. To address and avoid the potential for land subsidence, soils would be removed down to competent dense materials as determined by the geotechnical engineer during grading in accordance with the following recommendations:²⁶

- **Project Site (except for localized areas specified below):** The removal depth is expected to have a minimum depth of 5 feet below existing ground surface. In areas of design cut, removal depth shall extend a minimum of 5 feet below existing ground surface, or 3 feet below finished grade, or whichever is deeper.
- **Localized Areas:** Localized areas of undocumented fill, colluvium, and soft surface pond sediments were encountered at depths up to approximately 10, 12, and 5 feet below existing grade, respectively. The removal depth of these areas is anticipated to extend 10 feet below existing ground surface.
 - The majority of undocumented fill is located along dirt roads along the existing EMWD sewer line that transects the northern portion of the site from east to west.

²⁶ LGC Geotechnical, Inc. Preliminary Geotechnical Evaluation and Design Recommendations for the Proposed Approximately 580-Acre "Menifee Valley" Residential Development, City of Menifee, California. Page 20. May 25, 2018. Appendix G-1.

- Colluvial deposits are located at the base of the granitic hill in the southeastern corner of the site near the intersection of Matthews Road and Briggs Road.
- Soft surface pond deposits should be anticipated in the north central areas of the site and along the southern boundary of the site near Matthews Road.
- **Streets and Paved Areas (includes off-site improvement areas along SR-74, Menifee Road, and Briggs Road):** The removal depth is expected to be 2 feet below existing ground surface or 2 feet below design subgrade, or whichever is deeper.

Additionally, recommendations for soil removal would be planned in more detail by a certified geotechnical engineer or engineering geologist when grading plans for individual phases of the Project are prepared. Actual depths and limits of removals should be further verified by the geotechnical consultant during grading based on conditions encountered in the field or future studies. Subsequent detailed geotechnical investigation would be required, and the Project would be required to comply with a site-specific geotechnical investigation report prepared by a geotechnical consultant, in accordance with Appendix J Section J104 (Engineered Grading Requirements) of the CBC. Such investigation would assess hazardous soil conditions on site and would provide recommendations as needed to minimize these potential collapsible soil hazards, which may include overexcavation of certain soils and replacement with compacted fill. The Project would implement recommendations from the Final Geotechnical Assessment as required by **RCM GEO-2** to ensure compliance with the most current CBC requirements. Therefore, implementation of **RCM GEO-2** and compliance with existing regulations would ensure that a *less than significant impact* from collapsible soils would occur.

Off-Site Improvements. Implementation of the Project would result in physical disturbance to up to 59.0 acres for the installation of off-site improvements including roadway improvements to existing roadways (e.g. Menifee Road, SR-74, and Briggs Road), utility connections (e.g. water, sewer, stormwater, electricity, internet, and natural gas), landscaping, and construction of a non-vehicular bridge to connect the Specific Plan site to the Heritage Lake community to the south. Potential impacts related to landslides, lateral spreading, subsidence, liquefaction, and collapse are substantially similar for the off-site areas as for the on-site areas. The off-site areas are relatively flat and not susceptible to earthquake-induced landslides. Liquefaction potential at the off-site improvement areas is considered low. There are no oil or gas fields within or near the off-site improvement areas so land subsidence due to the extraction of oil or gas is not a hazard to the Project. To address and avoid the potential for land subsidence, soils would be removed down to competent dense materials as determined by the geotechnical engineer during grading in accordance with the recommendations listed above, including for off-site improvement areas where the removal depth is expected to be 2 feet below existing ground surface or 2 feet below design subgrade, or whichever is deeper. The Project would implement recommendations from the Final Geotechnical Assessment as required by **RCM GEO-2** to ensure compliance with the most current CBC requirements. Therefore, implementation of **RCM GEO-2** and compliance with existing regulations would ensure that a *less than significant impact* from collapsible soils would occur.

Off-Site Roadway Improvements. Implementation of the Project would also result in off-site roadway improvements to address traffic impacts in conflict with the General Plan Circulation

Element policies that strive to maintain desired LOS. These roadway improvements, which include widening and additional turn lanes as required, include Matthews Road/Case Road (between McLaughlin Road and Ethanac Road), McLaughlin Road (between Matthews Road/Case Road and Menifee Road), and McCall Boulevard (between Encanto Drive and Menifee Road). These roadway improvements were identified in the General Plan Circulation Element and included in the Certified 2013 EIR.

The Certified 2013 EIR found that with compliance with City standards and recommendations from a project-specific geotechnical investigation report, implementation of the General Plan, which includes the off-site roadway improvements, would result in less than significant impacts associated with collapsible soils. Similar to the off-site improvements discussed above, off-site roadway improvements along Matthews Road (Case Road), McCall Boulevard, and McLaughlin Road would comply with City standards and recommendations of the geotechnical evaluation report related to asphalt concrete pavement sections. The Project would implement recommendations from the Final Geotechnical Assessment as required by **RCM GEO-2** to ensure compliance with the most current CBC requirements. Therefore, implementation of **RCM GEO-2** and compliance with existing regulations would ensure that impacts from collapsible soils would be **less than significant**. No mitigation is required.

Level of Significance Prior to Mitigation: Less Than Significant.

Regulatory Compliance Measures and Mitigation Measures: No mitigation measures are required; however, **RCM GEO-2** identified above would be applicable to the Project.

Level of Significance After Mitigation: Less Than Significant.

4.7.6.7 Expansive Soils

Threshold 4.7-4: **Would the Project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating direct or indirect substantial risks to life or property?**

On-Site Improvements. Expansive soils are soils that experience volumetric changes in response to increases or decreases in moisture content. Older alluvial fan deposits were encountered throughout the property and underlie the young alluvium at depth. As encountered in the exploratory excavations, these materials generally consist of dense to very dense interbedded layers of sand and silty sand. Based on laboratory test results and review of the referenced reports, the predominate earth materials underlying the Project site are expected to possess a very low to low potential for expansive soil (E1 values of 3, 30, and 36).²⁷ Locally, higher expansive soils may be encountered in deeper excavations in the Older Alluvium. In the event that, following the completion of grading, it is determined that near-surface soils within building pad areas exhibit an elevated expansion potential, the potential impact of those expansive soils would be addressed through design of structural foundations and floor slabs in compliance with applicable requirements in the CBC, as adopted by the City of Menifee in its Municipal Code, and the recommendations in the Geotechnical Evaluations (**RCM GEO-1** and **RCM GEO-2**). Since the potential for expansive soils is low and any potential expansion would be addressed through compliance with applicable State and

²⁷ Ibid. Page 6.

local Code requirements, the Project would not create substantial potential risks to life or property, and there would be ***less than significant impacts***.

Off-Site Improvements. Implementation of the Project would result in physical disturbance to up to 59.0 acres for the installation of off-site improvements including roadway improvements to existing roadways (e.g. Menifee Road, SR-74, and Briggs Road), utility connections (e.g. water, sewer, stormwater, electricity, internet, and natural gas), landscaping, and construction of a non-vehicular bridge to connect the Specific Plan site to the Heritage Lake community to the south. Similar to the Project site, the potential for expansive soils within off-site improvement areas is low. Additionally, off-site improvements do not include the construction of buildings. Improvements to existing roadways would comply with City standards and recommendations of the geotechnical evaluation report related to asphalt concrete pavement sections. Since the potential for expansive soils is low and any potential expansion would be addressed through compliance with applicable State and local Code requirements, construction and operation of off-site improvements would not create substantial potential risks to life or property, and impacts would be ***less than significant***. No mitigation is required.

Off-Site Roadway Improvements. Implementation of the Project would also result in off-site roadway improvements to address traffic impacts in conflict with the General Plan Circulation Element policies that strive to maintain desired LOS. These roadway improvements, which include widening and additional turn lanes as required, include Matthews Road/Case Road (between McLaughlin Road and Ethanac Road), McLaughlin Road (between Matthews Road/Case Road and Menifee Road), and McCall Boulevard (between Encanto Drive and Menifee Road). These roadway improvements were identified in the General Plan Circulation Element and included in the Certified 2013 EIR.

The Certified 2013 EIR found that with compliance with City standards requiring subsurface geotechnical exploration and testing and recommendations from a project-specific geotechnical investigation report, implementation of the General Plan, which includes the off-site roadway improvements, would result in ***less than significant*** impacts associated with expansive soils. No mitigation is required.

Level of Significance Prior to Mitigation: Less Than Significant.

Regulatory Compliance Measures and Mitigation Measures: No mitigation measures are required; however, **RCM GEO-1** and **RCM GEO-2** identified above would be applicable to the Project. These RCMs are required by state law as part of the Project and are not considered mitigation measures.

Level of Significance After Mitigation: Less Than Significant.

4.7.6.8 Septic Tanks or Alternative Wastewater Disposal

Threshold 4.7-5: 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?

On-Site Improvements. The Project uses would not include the use of septic tanks or alternative wastewater disposal systems because sanitary sewer and wastewater facilities are available in the vicinity of the Project site. Project uses would be required to connect to City sanitary sewer and wastewater facilities in Menifee Road and Briggs Road in McLaughlin Road. Therefore, the Project would have **no impact** with respect to septic tanks or alternative wastewater disposal systems.

Off-Site Improvements. Implementation of the Project would result in physical disturbance to up to 59.0 acres for the installation of off-site improvements including roadway improvements to existing roadways (e.g. Menifee Road, SR-74, and Briggs Road), utility connections (e.g. water, sewer, stormwater, electricity, internet, and natural gas), landscaping, and construction of a non-vehicular bridge to connect the Specific Plan site to the Heritage Lake community to the south. Off-site improvements do not require or include the use of septic tanks or alternative wastewater disposal systems. Therefore, construction and operation of off-site improvement areas would have **no impact** with respect to septic tanks or alternative wastewater disposal systems.

Off-Site Roadway Improvements. Implementation of the Project would also result in off-site roadway improvements to address traffic impacts in conflict with the General Plan Circulation Element policies that strive to maintain desired LOS. These roadway improvements, which include widening and additional turn lanes as required, include Matthews Road/Case Road (between McLaughlin Road and Ethanac Road), McLaughlin Road (between Matthews Road/Case Road and Menifee Road), and McCall Boulevard (between Encanto Drive and Menifee Road). These roadway improvements were identified in the General Plan Circulation Element and included in the Certified 2013 EIR.

Off-site improvements are related to roadways and do not require or include the use of septic tanks or alternative wastewater disposal systems. Therefore, construction and operation of off-site improvement areas would have **no impact** with respect to septic tanks or alternative wastewater disposal systems.

Significance Determination Prior to Mitigation: No Impact.

Regulatory Compliance Measures and Mitigation Measures: No Regulatory Compliance Measures or Mitigation Measures are required.

Significance Determination After Mitigation: No Impact.

4.7.6.9 Paleontological Resources

Threshold 4.7-6: Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

On-Site Improvements. Paleontological resources are the remains of prehistoric life that have been preserved in geologic strata. These remains are called fossils and include bones, shells, teeth, and plant remains (including their impressions, casts, and molds) in the sedimentary matrix, as well as trace fossils such as footprints and burrows. Fossils are considered older than 5,000 years of age but may include younger remains (subfossils) when viewed in the context of local extinction of the organism or habitat, for example. Fossils are considered a nonrenewable resource under State and City guidelines.

As discussed in **Section 4.7.2**, a paleontological locality record search for the Project was performed by the Natural History Museum of Los Angeles County in 2016 as discussed in the 2019 PRA conducted for the Project site. As part of the Updated Paleontological Resource Study (2022), a paleontological locality record search for the Project was also performed by the Western Science Center (WSC) for the Project site, which included an additional 16.3 acres along the site's south-central border west of Briggs Road that was not evaluated in the 2019 PRA. The results of the record search indicated that no fossil localities are known from within the Project site, or within 1 mile of the Project's boundaries. Additionally, the field surveys of the Project site performed by Applied Earthworks in 2016 and 2018 found no paleontological localities in the Project area. However, just outside the 1-mile boundary of the Project site, hundreds of fossil localities associated with the Diamond Valley Lake Project were documented and included those associated with Columbian mammoth (*Mammuthus columbi*), Pacific mastodon (*Mammut pacificus*), Sabertooth cat (*Smilodon fatalis*), Ancient horse (*Equus sp.*), and many other Pleistocene megafauna.²⁸ Additionally, an online search of the UCMP database conducted by PaleoWest revealed 18 Pleistocene-age vertebrate fossil localities in Riverside County, several of which derived from unnamed Pleistocene-age deposits.

According to the City of Menifee General Plan EIR, the Project site is located within a high sensitivity area for paleontological resources.²⁹ Additionally, the 2019 PRA determined that the Quaternary older alluvial fan deposits within the Project site have a high potential for paleontological resources because similar deposits in the Project vicinity and region have yielded significant vertebrate fossils; however, these older alluvium deposits have been previously disturbed by agricultural activities on the Project site to a depth of 2 feet to 4 feet below ground surface. Therefore, the 2019 PRA concluded that the older alluvium deposits within the Project site have a low paleontological resource potential from the surface to 4 feet below ground surface and a high paleontological resource potential at depths greater than 4 feet below ground surface.³⁰

As mentioned in **Section 4.7.6.6**, soil excavation is anticipated to have a minimum depth of 5 feet below existing ground surface for the majority of the Project site, and excavation at localized areas within the Project site is expected to extend 10 feet below existing ground surface. Therefore, as excavation for construction gets under way, it is possible that unanticipated paleontological resources might be encountered at depths between 4 feet and 10 feet below ground surface, and possibly beyond. In accordance with State law, the proposed Project would be required to comply with Section 5097.5 of the California Public Resources Code and California Administrative Code, Title 14, Section 4307, which state that no person shall remove, injure, deface, or destroy any object of paleontological, archaeological, or historical interest or value. Penal Code Section 622.5 establishes as a misdemeanor the willful injury, disfiguration, defacement, or destruction of any object or thing of paleontological interest or value, whether situated on private or public lands.

²⁸ PaleoWest. Updated Paleontological Resource Study for the Menifee Valley Specific Plan Project, City of Menifee, Riverside County, California. Page 15 of pdf. May 5, 2022. Appendix G-3.

²⁹ City of Menifee. City of Menifee General Plan Draft Environmental Impact Report. State Clearinghouse #2012071033. Section 5 Environmental Analysis Cultural Resources. Figure 5.5-1. Paleontological Resources Sensitivity and Page 5.5-12. September 2013.

³⁰ PaleoWest. Updated Paleontological Resource Study for the Menifee Valley Specific Plan Project, City of Menifee, Riverside County, California. Page 9 of pdf. May 5, 2022. Appendix G-3.

Mitigation Measures (MM) GEO-1 through **GEO-3** are prescribed in accordance with recommendations identified in the 2019 PRA and confirmed in the Updated Paleontological Resource Study, which include worker’s environmental training; paleontological mitigation monitoring; and fossil preparation, curation, and reporting.³¹ Implementation of **MMs GEO-1** through **GEO-3** would ensure potential impacts to scientifically significant, nonrenewable paleontological resources would be reduced to *less than significant with mitigation incorporated* during Project construction.

Level of Significance Prior to Mitigation: Potentially Significant.

Regulatory Compliance Measures and Mitigation Measures: No regulatory compliance measures would be applicable to the Project. **MMs GEO-1** through **GEO-3** are required.

Level of Significance After Mitigation: Less Than Significant.

MM GEO-1 Prior to the start of construction, all field personnel shall be briefed regarding the types of fossils that could be found in the Project area and the procedures to follow should paleontological resources be encountered. This training shall be accomplished at the pre-grade kickoff meeting or morning tailboard meeting and shall be conducted by the Project Paleontologist or his/her representative. Specifically, the training shall provide a description of the fossil resources that may be encountered in the Project area, outline steps to follow in the event that a fossil discovery is made and provide contact information for the Project Paleontologist and on-site monitor(s). The training shall be developed by the Project Paleontologist and may be conducted concurrently with other environmental training (cultural and natural resources awareness training, safety training, etc.).

MM GEO-2 Prior to the commencement of ground-disturbing activities, a qualified professional paleontologist shall be retained to prepare and implement a Paleontological Resource Impact Mitigation Program (PRIMP) for the Project. Initially, full-time monitoring is recommended for grading and excavation activities 4 feet below ground surface that will disturb previously undisturbed Quaternary older alluvium (Qof) and very old fan deposits (Qvof). Due to soil development and previous agricultural disturbances, monitoring shall not be required in Project areas where construction activities disturb native sediments at depths less than 4 feet below ground surface. Spot-checking may occur in previously undisturbed young alluvial deposits (Qya) in order to determine if Project activities are impacting the underlying highly sensitive Pleistocene units. Monitoring shall not be required in Project areas underlain by geologic units with no paleontological resource potential (i.e., the granodiorite to tonalite, Kdvg).

Monitoring shall entail the visual inspection of excavated or graded areas and trench sidewalls. In the event that a paleontological resource is discovered, the monitor shall have the authority to divert temporarily the construction equipment around the find until it is assessed for scientific significance and collected. In areas

³¹ Ibid. Pages 2, 6, and 11 of pdf.

of high sensitivity, monitoring efforts can be reduced or eliminated at the discretion of the Project Paleontologist if no fossil resources are encountered after 50 percent of the excavations are completed.

MM GEO-3 Upon completion of fieldwork, all significant fossils collected shall be prepared in a properly equipped paleontology laboratory to a point ready for curation. Preparation shall include the careful removal of excess matrix from fossil materials and stabilizing and repairing specimens, as necessary. Following laboratory work, all fossil specimens shall be identified to the lowest taxonomic level, cataloged, analyzed, and delivered to the Western Science Center for permanent curation and storage. The cost of curation is assessed by the repository and is the responsibility of the Project owner.

At the conclusion of laboratory work and museum curation, a final report shall be prepared describing the results of the paleontological mitigation monitoring efforts associated with the Project. The report shall include a summary of the field and laboratory methods, an overview of the Project area geology and paleontology, a list of taxa recovered (if any), an analysis of fossils recovered (if any) and their scientific significance, and recommendations. If the monitoring efforts produced fossils, then a copy of the report shall also be submitted to the Western Science Center.

Off-Site Improvements. Implementation of the Project would result in physical disturbance to up to 59.0 acres for the installation of off-site improvements including roadway improvements to existing roadways (e.g. Menifee Road, SR-74, and Briggs Road), utility connections (e.g. water, sewer, stormwater, electricity, internet, and natural gas), landscaping, and construction of a non-vehicular bridge to connect the Specific Plan site to the Heritage Lake community to the south. The widening of these existing roadways would be in conformance with the City's General Plan Circulation Element.

PaleoWest conducted a Supplemental Paleontological Resource Study (**Appendix G-4**) to evaluate impacts to paleontological resources within off-site improvement areas. Soils within off-site improvement areas consist of cretaceous granodiorite to tonalite (Kdvg) north of the Matthews Road and Briggs Road intersection; old alluvial fan deposits (Qof), which underlay most of the off-site improvement areas; and young alluvial fan deposits (Qyf) along a small portion of Briggs Road. The Supplemental Paleontological Resource Study included a review of record search data previously obtained for the Project site from the 2019 PRA and 2022 Updated Paleontological Resource Study. The record search results indicated there are no known fossil localities in the proposed off-site improvement areas. However, results from the 2019 PRA indicate fossil remains from similar Quaternary older alluvium were found several miles southwest of off-site improvement areas, along the western margin of Menifee Valley near the Railroad Canyon Reservoir. Additionally, another vertebrate fossil locality was identified in the vicinity of Lake Elsinore that came from similar Pleistocene alluvial deposits. As discussed above, the record search also identified hundreds of fossil localities associated with the Diamond Valley Lake Project, located just over a mile southeast of off-site improvement areas, and included those associated with Columbian mammoth (*Mammuthus columbi*), Pacific mastodon (*Mammuthus pacificus*), Sabertooth cat (*Smilodon fatalis*), Ancient horse

(*Equus* sp.), and many other Pleistocene megafauna. Additionally, an online search of the UCMP database conducted by PaleoWest revealed numerous Pleistocene-age vertebrate fossil localities in Riverside County, several of which derived from unnamed Pleistocene-age deposits.

Given the underlying soils within the off-site improvement areas and results of the fossil locality record search, the off-site improvement areas are considered to have a low to high paleontological sensitivity. The Quaternary alluvial deposits that underlay the majority of off-site improvement areas have a high potential for paleontological resources because similar deposits in the vicinity and region have yielded significant vertebrate fossils; however, the upper 2 feet to 4 feet of these deposits have been disturbed by previous road construction and maintenance. Therefore, the Quaternary older alluvium deposits within off-site improvement areas have a low paleontological resource potential from the surface to 4 feet below ground surface and a high paleontological resource potential from 4 feet below ground surface and beyond. The younger Quaternary alluvial fan deposits along a small portion of Briggs Road have a low paleontological resource potential because they are too young to preserve fossilized remains; however, these deposits may overlie older intact Pleistocene alluvium that may contain sensitive paleontological resources. The Cretaceous igneous plutonic rock located in the off-site improvement area north of the Matthews Road and Briggs Road intersection has no paleontological resource potential due to the high heat formation process beneath the Earth's surface.

Soil excavation within off-site improvement areas is anticipated to have a removal depth of 2 feet below existing ground surface or 2 feet below design subgrade, or whichever is deeper. Therefore, it is possible that construction of off-site improvements would have the potential to encounter sensitive paleontological resources at depths of 4 feet below ground surface. In accordance with State law, the proposed Project would be required to comply with Section 5097.5 of the California Public Resources Code and California Administrative Code, Title 14, Section 4307, which state that no person shall remove, injure, deface, or destroy any object of paleontological, archaeological, or historical interest or value. Penal Code Section 622.5 establishes as a misdemeanor the willful injury, disfiguration, defacement, or destruction of any object or thing of paleontological interest or value, whether situated on private or public lands.

MMs GEO-1 through GEO-3 are prescribed in accordance with recommendations identified in the 2019 PRA and confirmed in the Updated Paleontological Resource Study, which include worker's environmental training; paleontological mitigation monitoring; and fossil preparation, curation, and reporting.³² Implementation of **MMs GEO-1 through GEO-3** would ensure potential impacts to scientifically significant, nonrenewable paleontological resources inadvertently discovered within off-site improvements would be reduced to ***less than significant with mitigation incorporated*** during Project construction.

Off-Site Roadway Improvements. Implementation of the Project would also result in off-site roadway improvements to address traffic impacts in conflict with the General Plan Circulation Element policies that strive to maintain desired LOS. These roadway improvements, which include widening and additional turn lanes as required, include Matthews Road/Case Road (between McLaughlin Road and Ethanac Road), McLaughlin Road (between Matthews Road/Case Road and

³² Ibid. Pages 2, 6, and 11 of pdf.

Menifee Road), and McCall Boulevard (between Encanto Drive and Menifee Road). These roadway improvements were identified in the General Plan Circulation Element and included in the Certified 2013 EIR. The Certified 2013 EIR indicated that the potential to uncover undiscovered paleontological resources in the City is high. Therefore, PaleoWest conducted a Supplemental Paleontological Resource Study (**Appendix G-5**) to evaluate impacts to paleontological resources within off-site roadway improvement areas. Based on the geological map review and museum records search results, the off-site improvement areas along Matthews Road (Case Road), McCall Boulevard, and McLaughlin Road are underlain by geologic units that have low to high paleontological sensitivity in accordance with criteria set forth by SVP (2010). The old alluvial fan deposits (Qof) and the very old fan deposits (Qvof) have a high potential for paleontological resources because similar deposits in the vicinity of the Project and throughout Riverside County have proven to yield significant vertebrate fossils. The upper extent of these deposits (2–4 feet [ft] below ground surface [bgs]) has been disturbed by previous road construction and maintenance. Therefore, the old alluvial fan deposits (Qof) and very old alluvial fan deposits (Qvof) in the off-site improvement areas have a low to high paleontological resource potential, dependent on depth. The Cretaceous granodiorite and tonalite (Kdvg) and the Mesozoic interlayered quartzite and phyllite (Mzi) have no paleontological resource potential because of the high heat and pressure formation processes associated with these rocks.

Soil excavation within off-site improvement areas is anticipated to have a removal depth of 2 feet below existing ground surface or 2 feet below design subgrade, or whichever is deeper. Therefore, it is possible that construction of off-site improvements would have the potential to encounter sensitive paleontological resources at depths of 4 feet below ground surface. In accordance with State law, the proposed Project would be required to comply with Section 5097.5 of the California Public Resources Code and California Administrative Code, Title 14, Section 4307, which state that no person shall remove, injure, deface, or destroy any object of paleontological, archaeological, or historical interest or value. Penal Code Section 622.5 establishes as a misdemeanor the willful injury, disfiguration, defacement, or destruction of any object or thing of paleontological interest or value, whether situated on private or public lands.

RCM CUL-1, RCM CUL-2, and RCM CUL-3 have been identified to reduce impacts to paleontological resources that may inadvertently be found during construction activities. In addition, **MMs GEO-1 through GEO-3** are prescribed in accordance with recommendations identified in the 2019 PRA and confirmed in the Updated Paleontological Resource Study, which include worker’s environmental training; paleontological mitigation monitoring; and fossil preparation, curation, and reporting.³³ Implementation of **MMs GEO-1 through GEO-3** would ensure potential impacts to scientifically significant, nonrenewable paleontological resources inadvertently discovered within off-site improvements would be reduced to *less than significant with mitigation incorporated* during Project construction.

³³ Ibid. Pages 2, 6, and 11 of pdf.

Level of Significance Prior to Mitigation: Potentially Significant.

Regulatory Compliance Measures and Mitigation Measures: No regulatory compliance measures would be applicable to the Project. **MMs GEO-1** through **GEO-3** are required, and are identified above.

Level of Significance After Mitigation: Less Than Significant.

4.7.7 Cumulative Impacts

Cumulative impacts are the incremental effects of an individual project when viewed in connection with the effects of past, current, and probable future projects within the cumulative impact area for geology and soils. Typically, cumulative geology and soils impacts are specific to a particular site and there is little, if any, cumulative relationship between the development of a proposed project and development within a larger cumulative area. Moreover, while seismic conditions are regional in nature, seismic impacts on a given project site are site-specific. For example, implementation of the Project would not alter geologic events or soil features/characteristics (such as ground shaking, seismic intensity, or soil expansion or compression). Therefore, the Project would not affect the level of intensity at which a seismic event on an adjacent site is experienced.

Preparation of geotechnical investigation reports and compliance with recommendations in such reports would also minimize other geologic hazards, such as ground subsidence, and expansive soils within the Specific Plan area. Compliance with a SWPPP would minimize topsoil erosion by ensuring BMPs are followed during Project construction. The Project would convert a majority of existing permeable surfaces to paved surfaces, which would generally reduce the potential for soil erosion from the site during Project operation. The proposed Project, as with all foreseeable projects, would be required to comply with the applicable state and local requirements, including the City of Menifee Building Code. Therefore, the Project's contribution to cumulative geotechnical and soil impacts is considered less than significant.

Potential impacts of the Project to unknown paleontological resources and unique geologic features, when combined with the impacts of past, present, and reasonably foreseeable projects in Menifee, could contribute to a cumulatively significant impact due to the overall loss of paleontological remains unique to the region. However, each discretionary development proposal received by the City is required to undergo environmental review pursuant to CEQA. If there were any potential for significant impacts to paleontological resources or unique geologic features, an investigation would be required to determine the nature and extent of the resources and identify appropriate mitigation measures. When resources are assessed and/or protected as they are discovered, impacts to these resources would be ***less than significant with mitigation incorporated***. As such, adherence to **MMs GEO-1** through **GEO-3** would ensure that the Project, together with cumulative projects, would not result in significant cumulative impacts to unique paleontological resources or unique geologic features.