4.6 GEOLOGY AND SOILS

This section describes the existing geological setting of the project site, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures as necessary related to implementation of the Cypress Point project (proposed project). The following analysis is based on the Geotechnical Investigation that was prepared for the proposed project by Leighton and Associates, Inc. in October 2020 and is incorporated by reference herein. The Geotechnical Report is included as Appendix F of this environmental impact report (EIR). A Slope Analysis prepared by Mega Engineering Consultants in January 2021 is also referenced herein and is included as Appendix P to this EIR.

4.6.1 Existing Conditions

4.6.1.1 Regional Geologic Setting

The project area is situated in the Peninsular Ranges Geomorphic Province of California. This geomorphic province encompasses an area that extends approximately 900 miles from the Transverse Ranges and the Los Angeles Basin south to the southern tip of Baja California and varies in width from approximately 30 to 100 miles. The province is characterized by mountainous terrain on the east composed mostly of Mesozoic igneous and metamorphic rocks, and relatively low-lying coastal terraces to the west underlain by late Cretaceous-age, Tertiary-age, and Quaternary-age sedimentary units. Most of the coastal region of the County of San Diego, including the site, occurs within this coastal region and are underlain by sedimentary units. More locally, the site generally consists of subdued landforms underlain by sedimentary bedrock.

4.6.1.2 Site Geology

Topography

The 7.3-acre project site is located in the northwestern portion of the City of Oceanside (City), which is within the northwestern portion of San Diego County (County) (Figure 2-1, Project Location). The project site is undeveloped but has been graded previously for adjacent developments, and contains isolated culverts and dirt pedestrian pathways throughout. The topography of the project site is generally flat and roughly rectangular with a gentle slope towards the southwest end of the project site. Elevations vary between approximately 48 feet above mean sea level to approximately 50 feet above mean sea level. The project site is bounded on the north and west by the San Luis Rey River corridor and on the south and east by existing residential properties.

Soil and Geologic Conditions

Geologist from Leighton and Associates, Inc. performed a subsurface exploration of the project site on July 21 and September 18, 2020 which consisted of excavating twelve (12) exploratory test pits and four (4) cone penetration tests (CTPs). The exploratory test pits (TP-1 through TP-12) were advanced with rubber tire backhoe to characterize the on site soils, including those likely to be encountered at and below the proposed foundation elevations for the proposed project. The 4 CPTs were also advanced to further characterize the onside soils for the purpose of evaluating liquefaction potential. A geologist from Leighton and Associates, Inc. visually logged the soil types encountered in accordance with ASTM D2488. Select soil samples were obtained for laboratory testing. The approximate locations for the test pits and CPTs, and the test pit logs and CPT profiles are included in Appendix F of this EIR.

Based on subsurface exploration, aerial photographic analysis, and review of pertinent geologic literature and maps, the geologic units underlying the site consists of localized undocumented artificial fill overlying alluvial floodplain deposits, specifically Quaternary-aged Young Alluvial Floodplain Deposits (Appendix F). A brief description of the geologic units encountered on the site are presented below. Refer to Figure 4.6-1, Geologic Map, for the locations of these geologic units on site.

Undocumented Fill Material (Afu)

The undocumented fill soils generally consist of loose to medium dense silty sands with gravels that are generally less than 1 to 3 feet in depth. The fill was placed during the site's initial disturbance, potentially associated with the construction of a levee, and deeper fills may exist that were not observed during the exploration. As encountered, the fill soils generally consisted of light gray, dry to moist, loose to medium dense, silty sand with gravels. Older fill to the west of the site were placed during construction of the San Luis Rey River Flood Control Project[1]. Based on review by Leighton and Associates, Inc., these fills were properly compacted up to the top of the levee.

Quaternary Young Alluvial Deposits (Qya)

Quaternary-aged Young Alluvial Deposits were observed to underlie the project site. As encountered, young alluvial flood-plain deposits underlay the fill, mentioned above, and consists

[1] As part of the Geotechnical Investigation prepared for the proposed project by Leighton and Associates, Inc. (Appendix F of this EIR), a limited review was performed of the various As-built plans related to the San Luis Rey River Flood Control Project by the United States Army Corps of Engineers (1994, 1999). Improvements related to that project consisted of construction of a grouted stone lined levee embankment, including placement of completed fill, aggregate base and asphaltic concrete pavement. The levee construction consisted of removing upper 5 feet of alluvial material and placing compacted fill at 92% relative compaction for levee 2:1 fill slopes.

of materials that range from silts and clays to sands and gravels. The materials are generally unconsolidated, loose to medium dense and soft to firm. The young alluvial generally consists of interbedded layers of medium to dark gray, friable, loose to medium dense, sandy silts to silty sands and silty clays.

Geologic Hazards

Faulting and Seismicity

The project site can be considered to lie within a seismically active region, as can all of Southern California. The California Mining and Geology Board defines an active fault as a fault which has had surface displacement within Holocene time (about the last 11,000 years). The state geologist has defined a pre-Holocene fault as any fault considered to have been active during Quaternary time (last 1,600,000 years). This definition is used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Earthquake Faulting Zones Act of 1972 (Alquist-Priolo Act) and as most recently revised in 2007. The intent of this act is to assure that unwise urban development and certain habitable structures do not occur across the traces of active faults.

The project site is not located within any Earthquake Fault Zone (EFZ) as documented by the Alquist-Priolo Act, and there are no known active or potentially active faults transecting or projecting toward the project site (Appendix F). The nearest active fault is the Rose Canyon Fault located approximately 7.5 miles west of the site.

Utilizing American Society of Civil Engineers (ASCE) Standard 7-10, the following additional parameters for the peak horizontal ground acceleration are associated with the Geometric Mean Maximum Considered Earthquake (MCEG). The mapped MCEG peak ground acceleration (PGA) is 0.41g for the project site. For a Site Class D, the FPGA is 1.19 and the mapped peak ground acceleration adjusted for Site Class effects (PGAM) is 0.488g for the project site. Ground rupture because of active faulting is not likely to occur on site due to the absence of known active faults. Cracking due to shaking from distant seismic events is not considered an existing significant hazard, although it is a possibility at any site in Southern California.

Liquefaction

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 are susceptible to liquefaction and dynamic settlement. Liquefaction is typified by a loss of shear strength in the affected soil layer, thereby causing the soil to behave as a viscous liquid. This effect may be manifested by excessive settlements and sand boils at the ground surface. Near surface soils are anticipated to have very low to low expansion potential; however, several discontinuous and variable thickness layers of saturated alluvial materials are located between a depth of

approximately 17 to 52 feet below ground surface. These layers are considered susceptible to liquefaction at the design earthquake ground motion, which is roughly estimated at between approximately 1.3 to 3.1 inches (Appendix F).

Landslides

Several formations within the San Diego region are particularly prone to landsliding. These formations generally have high clay content and mobilize when they become saturated with water. Other factors, such as steeply dipping bedding that project out of the face of the slope and/or the presence of fracture planes, will also increase the potential for landsliding. No landslides or indications of deep-seated landsliding were indicated at the site during the field exploration, or site reconnaissance.

Flood Hazard

According to a Federal Emergency Management Agency (FEMA) flood insurance rate map for the project site, the majority of the project site is located within a Zone X floodplain, and the southwestern portion of the project site is located in Zone AO (100-year) floodplain.

Surface Water and Ground Water

No indication of surface water or evidence of surface ponding was encountered within the limits of the proposed development during the geotechnical investigation performed at the site. It is expected that surface water drains as sheet flow across the site during rainy periods.

Groundwater was not observed in the test pit explorations performed at the project site. There is the possibility that perched ground water levels may develop and fluctuate during periods of precipitation. From the investigations performed, it is anticipated that any static ground water would be at a depth of approximately 17 feet below the existing ground surface (bgs), or an elevation of 31 feet msl. It is anticipated that the lowest site foundations and utilities associated with project implementation would be above the existing static ground water table at the project site (Appendix F).

4.6.1.3 Paleoenvironment

As described in the Phase I and II Cultural Resources Study prepared for the proposed project (Appendix E), at the end of the final period of glaciation, approximately 10,000 to 11,000 years before the present (YBP), the sea level was considerably lower than it is now; the coastline at that time would have been two to two and a half miles west of its present location. At approximately 7,000 YBP, the sea level rose rapidly, filling in many coastal canyons that had been dry during the glacial period. The period between 7,000 and 4,000 YBP was characterized by conditions that were drier and warmer than they were previously, followed by a cooler, moister environment similar to the present-day climate. Changes in sea level and coastal topography are often

manifested in archaeological sites through the types of shellfish that were utilized by prehistoric groups. Different species of shellfish prefer certain types of environments, and dated sites that contain shellfish remains reflect the setting that was exploited by the prehistoric occupants.

Based upon the Phase I survey results, potential for both historic and prehistoric deposits across the property was investigated through the implementation of a Phase II trench sampling program. The subject property has been previously disturbed and it is recognized that there is a possibility that any prehistoric or historic occupation deposits within the project could have resulted from previous land development on adjacent parcels, within the parcel, or as a result of secondary deposition from historic flooding episodes along the San Luis Rey River. During the field survey completed for the Phase I and II Cultural Resources Study, an unconsolidated scatter of prehistoric shell was identified in the northern quarter of the project site. The marine shell was observed within previously impacted soil brought up to the surface by the development of a drainage ditch that runs northwest to southeast across the northern portion of the parcel. The shell scatter was identified as fragments of *Ostrea* sp.*, Chione* sp.*, and Donax* sp., with the greatest concentration measuring 15 meters north to south by seven meters east to west. Additional shell fragments were identified north of the shell scatter, but this is likely the result of previous disturbance to the project site created by grading, which would have spread the shell scatter outward. The presence of the unconsolidated scatter of shell materials indicates a potential for subsurface deposits to also be present (Appendix E).

4.6.2 Regulatory Setting

Federal

International Building Code

The International Building Code (IBC) is a model building code developed by the International Code Council that provides the basis for the CBC. The purpose of the IBC is to provide minimum standards for building construction to ensure public safety, health, and welfare. Prior to the creation of the IBC, several different building codes were used; however, by the year 2000, the IBC had replaced these previous codes. The IBC is updated every 3 years.

Occupational Safety and Health Administration Regulations

Excavation and trenching are among the most hazardous construction activities. The Occupational Safety and Health Administration (OSHA) Excavation and Trenching standard, Title 29 of the Code of Federal Regulations, Part 1926.650 et seq., covers requirements for excavation and trenching operations. OSHA requires that excavations in which employees could potentially be exposed to cave-ins be protected by sloping or benching the sides of the excavation, supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area.

State

California Geologic Survey

The California Geologic Survey provides guidance with regard to seismic hazards. The California Geologic Survey's Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California (CGS 2008), provides guidance for evaluation and mitigation of earthquake-related hazards for projects within designated zones of required investigation.

State of California Division of Occupational Safety and Health, California Department of Industrial Relations

The State of California Division of Occupational Safety and Health (CalOSHA) Excavations Standard (Subchapter 4, Article 6) details requirements for excavation operations. CalOSHA requires that all excavations in which employees could potentially be exposed to cave-ins be protected by sloping or benching the sides of the excavation, supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area. Article 6 also includes a Tailgate/Toolbox Guide for Trenching Safety before and during excavation activities.

California Building Code

The CBC has been codified in the California Code of Regulations as Title 24, Part 2. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating building standards. Under state law, building standards must be centralized in Title 24 to be enforceable. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, and general stability by regulating and controlling the design, construction, quality of materials, use, occupancy, location, and maintenance of all building and structures within its jurisdiction. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California. The CBC describes requirements for engineering geologic reports, supplemental ground-response reports, and geotechnical reports (California Building Standards Commission 2016).

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act of 1972 (California Public Resources Code, Sections 2621–2630) regulates development and construction of buildings intended for human occupancy to avoid the hazard of surface fault rupture. The act helps define areas where fault rupture is most likely to occur. The act groups faults into categories of active, potentially active, and inactive. Historic and Holocene age faults are considered active. Late Quaternary and

Quaternary age faults are considered potentially active and pre-Quaternary age faults are considered inactive. These classifications are qualified by the conditions that a fault must be shown to be sufficiently active and well defined by detailed site-specific geologic explorations in order to determine whether building setbacks should be established. Cities and counties affected by the zones must regulate certain development projects within the zones. They must withhold development permits for sites within the zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting. The project site is not identified on an Alquist-Priolo Earthquake Fault Zoning Map.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act (California Public Resources Code, Sections 2690–2699.6) addresses earthquake hazards from non-surface fault rupture, including liquefaction, landslides, strong ground shaking, or other earthquake and geologic hazards. The Seismic Hazards Mapping Act also specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils. The project site is not identified on a seismic hazards map.

CEQA- Paleontological Resources

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under state (CEQA) laws and regulations. This study satisfies project requirements in accordance with CEQA (13 PRC, 2100 et seq.) and Public Resources Code Section 5097.5 (Stats 1965, c 1136, p. 2792). This analysis also complies with guidelines and significance criteria specified by the SVP (2010).

Paleontological resources are explicitly afforded protection by CEQA, specifically in Section VII(f) of CEQA Guidelines Appendix G, the "Environmental Checklist Form," which addresses the potential for adverse impacts to "unique paleontological resource[s] or site[s] or … unique geological feature[s]." This provision covers fossils of signal importance – remains of species or genera new to science, for example, or fossils exhibiting features not previously recognized for a given animal group – as well as localities that yield fossils significant in their abundance, diversity, preservation, and so forth. Further, CEQA provides that generally, a resource shall be considered "historically significant" if it has yielded or may be likely to yield information important in prehistory (PRC 15064.5 [a][3][D]). Paleontological resources would fall within this category. The PRC, Chapter 1.7, sections 5097.5 and 30244 also regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.

Local

City of Oceanside General Plan

Public Safety Element

State of California law requires that each city prepare and adopt an approved General Plan that provides comprehensive, long-term guidance for the City's future. General Plans are also required to contain specific elements regarding different areas of planning; relevant elements include land use, environmental resource management, and public safety. While each element outlines policies, plans, and goals that guide the City to maintaining and improving each area of development, the Public Safety Element specifically addresses seismic hazards and geologic conditions.

The Public Safety Element includes the following seismic and geologic hazard objectives:

1. Consider seismic and geologic hazards when making land use decisions particularly in regard to critical structures.
2. Minimize the risk of occupancy of all structures from seismic and geologic occurrences.
3. Provide to the public all available information about existing seismic and geologic conditions.

The Public Safety Element includes the Public Safety Plan that includes definitions, maps, and mitigation information for seismic and geologic hazards that exist within the City.

Environmental Resource Management Element

The Environmental Resource Management Element includes the following policy for soil, erosion, and drainage:

1. Consider appropriate engineering and land use planning techniques to mitigate rapid weathering of the rocks, soil erosion, and the siltation of the lagoons.

The Environmental Resource Management Element also provides a general map of soil types within the City (Figure ERM-3, Soil & Land Forms).

Land Use Element

The Land Use Element contains the following objectives and policies regarding geology and soils:

3.14 Grading and Excavations: To provide mitigation recommendations for grading and excavations in the City of Oceanside.

Policy 3.14A: Investigation and evaluation of currently affected areas will indicate the measures to be included, such as the following measures:

1. Keep grading to a minimum, leave vegetation and soils undisturbed wherever possible.
2. Plant bare slopes and cleared areas with appropriate vegetation immediately after grading.
3. Chemically treat soils to increase stability and resistance to erosion.
4. Install retaining structures where appropriate.
5. Construct drainage systems to direct and control rate of surface runoff.
6. Construct silt traps and settling basins in drainage systems.
7. Construct weirs and check dams on streams.

City of Oceanside Building Code

Chapter 6, Building Construction Regulations, of the City's Municipal Code outlines the regulations and requirements for construction of buildings within the City's jurisdiction, including seismic and geologic safety design standards. The City adopts the most recent CBC as the local building code and makes amendments as needed.

City of Oceanside Grading Ordinance

City of Oceanside Grading Ordinance (City of Oceanside 1992) requires that all grading, clearing, brushing, or grubbing on natural or existing grade must have a grading permit from the City Engineer. A Landscape and Irrigation Plan is required for developments such as but not limited to commercial, grading permits, grading slopes, industrial, parking lots, planned residential developments, remodeling which requires a permit, and subdivisions. Said plan shall include details regarding landscaping, erosion control, and irrigation features. Section 1501(d) of the City's Grading Ordinance details requirements and practices of the Erosion Control System to lessen the potential for sediment runoff and erosion.

4.6.3 Thresholds of Significance

The significance criteria used to evaluate the project impacts to geology and soils are based on Appendix G of the CEQA Guidelines. According to Appendix G of the CEQA Guidelines, a significant impact related to geology and soils would occur if the proposed project would (14 CCR 15000 et seq.):

1. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
    a. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on

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

b. Strong seismic ground shaking.

c. Seismic-related ground failure, including liquefaction.

d. Landslides.

2. Result in substantial soil erosion or the loss of topsoil.

3. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.

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

5. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

6. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

4.6.4 Impacts Analysis

Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: (a) 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 based on other substantial evidence of as known fault. (Refer to Division of Mines and Geology Special Publication 42); (b) strong seismic ground shaking; (c) seismic-related ground failure, including liquefaction; or (d) landslides?

(a) As described under Section 4.6.1.2 above, the project site can be considered to lie within a seismically active region, as can all of Southern California. However, the project site is not located within any Earthquake Fault Zone (EFZ) as documented by the Alquist-Priolo Act, and there are no known active or potentially active faults transecting or projecting toward the project site (Appendix F). The nearest active fault is the Rose Canyon Fault located approximately 7.5 miles west of the site. Therefore, ground rupture because of active faulting is not likely to occur on site due to the absence of known active faults. Cracking due to shaking from distant seismic events is not considered an existing significant hazard, although it is a possibility at any site in Southern California. Implementation of recommendations outlined in the Geotechnical Report (Section 6.0 of Appendix F to this EIR), and adherence to the California Building Code requiring specific performance standards to address geologic hazards, would ensure impacts related to faulting and seismicity would remain at a **less than significant** level.

(b) Due to regional proximity to major known active fault zones such as the Rose Canyon Fault, Newport-Inglewood Fault, Lake Elsinore Fault, and San Jacinto Fault, the project site lies in a seismically active region. The project site is likely to be subjected to strong ground motion from seismic activity similar to that of the rest of the San Diego County and Southern California, due to the seismic activity of the region as a whole. With adherence to the IBC and CBC requiring specific performance standards and implementation of the Geotechnical Report recommendations (Section 6.0 of Appendix F to this EIR), project impacts related to strong seismic ground shaking would be **less than significant**.

(c) As described in the Geotechnical Report (Appendix E), based on the results of the liquefaction analysis, several discontinuous and variable thickness layers of saturated alluvial materials are located between a depth of approximately 17 to 52 feet bgs. As encountered in the CPT explorations, these layers are considered susceptible to liquefaction. However, implementation of all recommendations outlined in Section 6.0 of the Geotechnical Report (Appendix F) would ensure potential impacts related to liquefaction would not be significant.

The susceptibility to earthquake-induced lateral spread is considered to be low for the project site because of the generally discontinuous nature of the underlying liquefiable layers, construction method of the fortified levee at the San Luis Rey River, and the nearest distance to an open slope face (approximately 150 feet to the San Luis Rey river), as shown in Appendix P, Slope Analysis.

As described above, majority of the project site is located within a Zone X floodplain, and the southwestern portion of the project site is located in Zone AO (100-year) floodplain. However, based on the site reconnaissance, the potential for flooding of the project site is considered low since the adjacent portion of the San Luis Rey River has been channelized. Furthermore, based on the site elevation of approximately 50 feet msl, the distance of the project site from the Pacific coastline, and the CGS Tsunami Inundation Map of the area, the potential for flood damage to occur at the project site from a tsunami or seiche is considered low.

For the reasons stated above, potential impacts related to seismic-related ground failure are considered to be **less than significant**.

(d) The Geotechnical Report prepared for the proposed project found no evidence of landslides or instability on-site or in the immediate area. The field reconnaissance and the local geologic maps indicate the project site is generally underlain by favorable oriented geologic structure, consisting of massively bedded silty to clayey sands and sandy to silty clays, and flat lying topographic conditions. Therefore, potential impacts associated with significant landslides or large-scale slope instability at the project site is considered to be **less than significant**.

Overall, the project would result in a **less than significant** impact related to risk of loss, injury, or death involving earthquake faults, seismic ground shaking and seismic-related ground failure with implementation of Geotechnical Report recommendations and IBC and CBC compliance.

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

The potential for erosion would increase during construction as a result of vehicles, heavy equipment, and general earth work accelerating the erosion process. Wind erosion could occur on bare soils or where vehicles and equipment cause dust. The project would be subject to compliance with the City's General Plan Grading and Excavations Objective and Policy 3.14A identified in Section 4.6.2, Regulatory Setting, above that requires measures during grading to reduce erosion. Refer to Section 4.9, Hydrology and Water Quality, for additional details. Additionally, all recommendations outlined in the Geotechnical Report (Appendix F) would be implemented, including recommendations related to grading activities. Additionally, potential erosion impacts would be avoided by adherence to the erosion control standards established by the City's Grading Ordinance and through implementation of best management practices required by the Stormwater Pollution Prevention Plan (SWPPP) (refer to Section 4.9, Hydrology and Water Quality, for more information). Furthermore, the proposed project would incorporate landscaping throughout the site and along the site boundary. The proposed landscaping features covering vacant land would inhibit erosion and proposed landscaping would stabilize soils thereby reducing erosion potential on the project site. Therefore, impacts related to soil erosion are determined to be **less than significant**.

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

Please refer to response to Threshold 1(c) above. With implementation of all recommendations outlined in the Geotechnical Report (Appendix F to this EIR), potential impacts related to liquefaction, spreading, subsidence, collapse, and unstable soils would be **less than significant**.

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

According to the Geotechnical Report, the on-site soil materials possess a very low to medium expansion potential. Although not anticipated, if an abundance of highly expansive materials is encountered, selective grading may need to be performed (Appendix F). In addition, to accommodate conventional foundation design, the upper five feet of materials within the building pad and five feet outside the limits of the building foundation should have a very low to low expansion potential (EI<50) (Appendix F). With implementation of the recommendations outlined

in Section 6.0 of the Geotechnical Report (Appendix F), impacts related to expansive soils would be **less than significant**.

Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

The proposed project would be provided sewer service through the City, as discussed in Section 4.17, Utilities and Service Systems. The project does not propose or require the use of septic tanks or alternative waste water disposal systems. Therefore, **no impact** would occur.

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

As discussed under the Section 4.6.1.3 above, the potential for both historic and prehistoric deposits across the property was investigated through the implementation of a Phase II trench sampling program. The subject property has been previously disturbed, and it is recognized that there is a possibility that any prehistoric or historic occupation deposits within the project could have resulted from previous land development on adjacent parcels, within the parcel, or as a result of secondary deposition from historic flooding episodes along the San Luis Rey River. During the field survey completed for the Phase I and II Cultural Resources Study, an unconsolidated scatter of prehistoric shell was identified in the northern quarter of the project site. The marine shell was observed within previously impacted soil brought up to the surface by the development of a drainage ditch that runs northwest to southeast across the northern portion of the parcel. The shell scatter was identified as fragments of *Ostrea* sp., *Chione* sp., *and Donax sp*., with the greatest concentration measuring 15 meters north to south by seven meters east to west. Additional shell fragments were identified north of the shell scatter, but this is likely the result of previous disturbance to the project site created by grading, which would have spread the shell scatter outward. The presence of the unconsolidated scatter of shell materials indicates a potential for subsurface deposits to also be present (Appendix E).

Because of this potential for subsurface deposits, a testing and significance evaluation program was conducted on October 14, 2020 as part of the Phase I and II Cultural Resources Report (Appendix E). The test program included the mechanical excavation of 13 test trenches across the project site, and test trenches measures approximately 150 centimeters in length and 45 centimeters in width, and each was excavated to approximately 150 centimeters in depth. Of the 13 trenches excavated, six produced only 20 fragments of marine shell and one piece of prehistoric ceramic. The majority of the materials were recovered between zero and 60 centimeters in depth, which corresponds to the stratigraphic observation for the trenches across the property. The subsurface

artifact concentration represents a semi-compacted, sandy loam with minimal artifact recovery that has been impacted by development over time and mixed across the property.

This previous disturbance within the project site appears to be the cause for the presence of marginal traces of marine shell within the project boundary. The Phase I and II Cultural Resources Study did not result in the observation of any significant artifact concentrations, cultural deposits, or other features related to the prehistoric or historic use within the project boundaries. The materials observed in the trenches are interpreted as potentially being a secondary deposition that resulted from historic flooding episodes along the San Luis Rey River. Although the trench results revealed that the property has been highly disturbed, due to the results of the archaeological testing and significance evaluation, there is still the potential to uncover unknown subsurface paleontological resources during project construction as the entire 7.3-acre site would be graded, including approximately 3,139 cubic yards of cut. Therefore, it is determined that project impacts to paleontological resources would be **potentially significant** (**Impact GEO-1**).

4.6.5 Mitigation Measures

MM-GEO-1 Prior to the issuance of a grading permit, the applicant shall submit a letter to the City of Oceanside (City) from a qualified professional paleontologist or a California Registered Professional Geologist with appropriate paleontological expertise, as defined by the Society of Vertebrate Paleontology's guidelines indicating that they have been retained by the applicant to prepare and implement a Paleontological Resources Impact Mitigation Program (PRIMP). The qualified paleontologist shall be available "on-call" to the City and the applicant throughout the duration of ground-disturbing activities. The PRIMP shall include preconstruction coordination; construction monitoring; emergency discovery procedures; sampling and data recovery, if needed; preparation, identification, and analysis of the significance of fossil specimens salvaged, if any; museum storage of any specimens and data recovered; and reporting. Earth-moving construction activities shall be monitored wherever these activities will disturb previously undisturbed sediment. Monitoring will not need to be conducted in areas where sediments have been previously disturbed or in areas where exposed sediments will be buried but not otherwise disturbed. In such cases, spot-checking of the excavation site is sufficient. This measure shall apply for all excavation activities within old paralic deposits that underlie the project.

MM-GEO-2 Prior to the issuance of a grading permit, the City of Oceanside (City) shall confirm the following measure is identified on the grading plan and will be implemented:

Grading activities are subject to a Paleontological Resources Impact Mitigation Program (PRIMP). If potential fossils are discovered by construction crews or during monitoring by a qualified paleontologist, all earthwork or other types of ground disturbance within 50 feet of the discovery shall stop immediately until the qualified professional paleontologist can assess the nature and importance of the discovery. If a fossil of scientific value or uniqueness is identified by the paleontologist, the paleontologist shall record the find and allow work to continue or recommend salvage and recovery of the fossil. If treatment and salvage is required, recommendations shall be consistent with Society of Vertebrate Paleontology guidelines and currently accepted scientific practice and shall be subject to review and approval by the City. Work in the affected area may resume once the fossil has been assessed and/or salvaged and the City, in consultation with the professional paleontologist, has provided written approval to resume work.

4.6.6 Level of Significance After Mitigation

With implementation of **MM-GEO-1** and **MM-GEO-2**, potential impacts related to paleontological resources would be less than significant, considering any fossils discovered would be properly excavated and the associated paleontological research information would be preserved to the extent feasible. No other mitigation related to geology and soils would be required.

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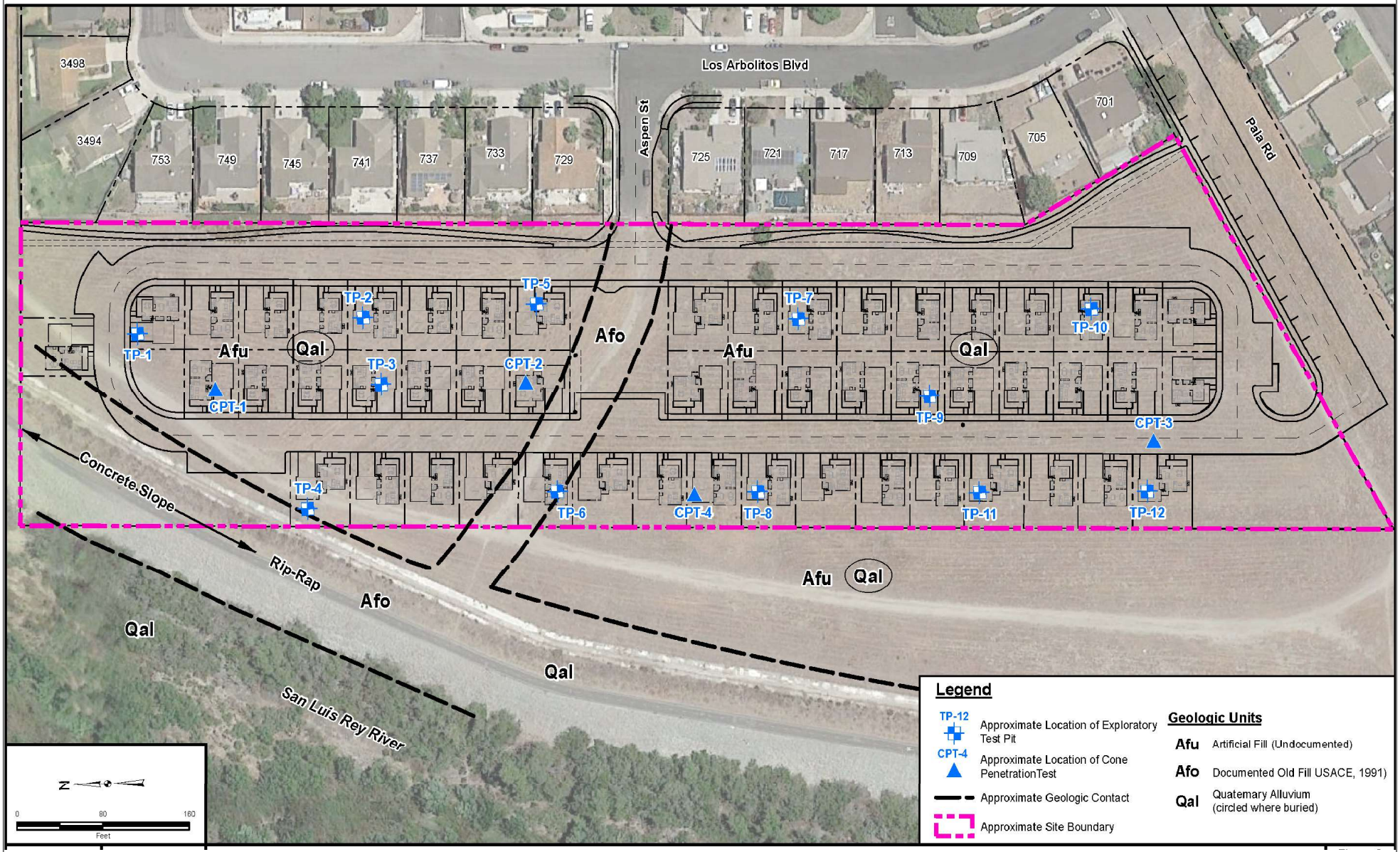

SOURCE: Omega Engineering 2020

FIGURE 4.6-1

Geologic Map

Cypress Point Project Draft Environmental Impact Report

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