IV. Environmental Impact Analysis

E. Geology and Soils

1. Introduction

This section evaluates potential existing geologic and soils hazards of the Project, including the potential for the Project to cause direct or indirect impacts associated with existing environmental conditions that could cause, in whole or in part, fault rupture, ground shaking, liquefaction of soils, expansion of soils, and/or landslide. Impacts regarding these topics are based on the Geotechnical Engineering Evaluation (Geotechnical Investigation),[1] which is included as Appendix E.1 of this Draft EIR. The Geotechnical Investigation was approved by the Los Angeles Department of Building and Safety (LADBS) on March 12, 2025.[2] This section also evaluates the potential for the Project to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. This component of the analysis is based on the Paleontological Resources Evaluation and Impact Assessment for the Buena Vista Project[3] (Paleontological Resources Assessment), which is included as Appendix E.3 of this Draft EIR.

2. Environmental Setting

a. Regulatory Framework

There are several plans, regulations, and programs that include policies, requirements, and guidelines regarding geology and soils at the federal, state, regional, and local levels. As described below, these plans, guidelines, and laws include the following:

- Earthquake Hazards Reduction Act
- National Pollutant Discharge Elimination System

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[1] Geotechnologies, Inc., Geotechnical Engineering Evaluation, Buena Vista Project, 1251 North Spring Street and 1030-1380 North Broadway, Los Angeles, California, January 2025. Refer to Appendix E.1 of this Draft EIR.

[2] City of Los Angeles, Department of Building and Safety, CEQA Report Approval Letter, March 12, 2025. Refer to Appendix E.2 of this Draft EIR.

[3] Statistical Research, Inc. Paleontological Resource Evaluation and Impact Assessment for the Buena Vista Project, January 2025. Refer to Appendix E.3 of this Draft EIR.

- Society for Vertebrate Paleontology Standard Guidelines
- Alquist-Priolo Earthquake Act
- Seismic Hazards Mapping Act
- California Building Code
- California Public Resources Code Section 5097.5
- Los Angeles General Plan Safety Element
- Los Angeles General Plan Conservation Element
- Los Angeles Municipal Code (LAMC)

(1) Federal

(a) Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act was enacted in 1977 to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the Earthquake Hazards Reduction Act established the National Earthquake Hazards Reduction Program (NEHRP). This program was substantially amended by the NEHRP Reauthorization Act of 2004 (Public Law 108-360).

NEHRP's mission includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improvement of building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improvement of mitigation capacity; and accelerated application of research results. The NEHRP designates the Federal Emergency Management Agency (FEMA) as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Programs under NEHRP help inform and guide local planning and building code requirements, such as emergency evacuation responsibilities, and seismic code standards, such as those to which a proposed project would be required to adhere.

(b) National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) Program has been responsible for substantial improvements to the water quality in the United States since 1972. The NPDES permit sets erosion control standards and requires implementation of nonpoint source control of surface drainage through the application of a number of Best Management Practices (BMPs). NPDES permits are required by Section 402 of the Clean Water Act.[4]

(c) Society for Vertebrate Paleontology Standard Guidelines

The Society for Vertebrate Paleontology (SVP) has established standard guidelines[5] that outline professional protocols and practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. The Paleontological Resources Preservation Act (PRPA) of 2009 calls for uniform policies and standards that apply to fossils on all federal public lands. All federal land management agencies are required to develop regulations that satisfy the stipulations of the PRPA. As defined by the SVP, significant paleontological resources are:

> *Fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years).*

This position is adhered to because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Therefore, every vertebrate fossil found has the potential to provide significant new information on the taxon it represents, its paleoenvironment, and/or its distribution. Furthermore, all geologic units in which vertebrate fossils have previously been found are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

(2) State

(a) Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (formerly the Alquist-Priolo Special Studies Zone Act) was signed into law on December 22, 1972 (revised in 1994), and codified

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4 *USEPA, Clean Water Act, Section 402: National Pollutant Discharge Elimination System, www.epa.gov/cwa-404/clean-water-act-section-402-national-pollutant-discharge-elimination-system, accessed September 25, 2024.*

5 *Society of Vertebrate Paleontology, Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources, 2010.*

into State law in the Public Resources Code (PRC) as Division 2, Chapter 7.5 to address hazards from earthquake fault zones. The purpose of this law is to mitigate the hazard of surface fault rupture by regulating development near active faults. As required by the Alquist-Priolo Earthquake Fault Zoning Act, the State has delineated Earthquake Fault Zones (formerly Special Studies Zones) along known active faults in California, which vary in width around the fault trace from about 200 to 500 feet on either side of the fault trace. Cities and counties affected by the zones must regulate certain development projects within the zones. The State Geologist is also required to issue appropriate maps to assist cities and counties in planning, zoning, and building regulation functions. Local agencies enforce the Alquist-Priolo Earthquake Fault Zoning Act in the development permit process, where applicable, and may be more restrictive than State law requires. According to the Alquist-Priolo Earthquake Fault Zoning Act, before a project that is within an Alquist-Priolo Earthquake Fault Zone can be permitted, cities and counties shall require a geologic investigation, prepared by a licensed geologist, to demonstrate that buildings will not be constructed across active faults. If an active fault is found, a structure for human occupancy cannot be placed over the trace of the fault and must be set back a distance to be established by a California Certified Engineering Geologist. Although setback distances may vary, a minimum 50-foot setback is typically required.

(b) Seismic Hazards Mapping Act

In order to address the effects of strong ground shaking, liquefaction, landslides, and other ground failures due to seismic events, the State of California passed the Seismic Hazards Mapping Act of 1990 (PRC Sections 2690–2699.6). Under the Seismic Hazards Mapping Act, the State Geologist is required to delineate "seismic hazard zones." Cities and counties must regulate certain development projects within these zones until the geologic and soil conditions of their project sites have been investigated and appropriate mitigation measures, if any, have been incorporated into development plans. The State Mining and Geology Board provides additional regulations and policies to assist municipalities in preparing the Safety Element of their General Plans and to encourage the adaptation of land use management policies and regulations to reduce and mitigate seismic hazards to protect public health and safety. Under PRC Section 2697, cities and counties must require, prior to the approval of a project located in a seismic hazard zone, submission of a geotechnical report defining and delineating any seismic hazard.

(c) California Building Code

The California Building Code (CBC), which is codified in Title 24 of the California Code of Regulations (CCR), Part 2, was promulgated to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, means of egress facilities, and general stability of buildings. The purpose of the CBC is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under State law, all building standards must be centralized in Title 24 or those standards are not enforceable. The provisions of the CBC apply to the construction, alteration, movement, replacement, location, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

The 2022 edition of the CBC is based on the 2021 International Building Code (IBC) published by the International Code Council. The code is updated triennially, and the 2022 edition of the CBC was published by the California Building Standards Commission on July 1, 2022, and became effective January 1, 2023. Every three years, the State adopts new codes (known collectively as the California Building Standards Code) to establish uniform standards for the construction and maintenance of buildings, electrical systems, plumbing systems, mechanical systems, and fire and life safety systems. Sections 17922, 17958, and 18941.5 of the California Health and Safety Code require that the latest edition of the California Building Standards Code apply to local construction 180 days after publication. The significant changes to Title 24 in the 2022 edition can be found at California Department of General Services website.[6]

(d) California PRC Section 5097.5

California PRC Section 5097.5 provides protection for paleontological resources on public lands, where PRC Section 5097.5(a) states, in part, that:

> *No person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over the lands.*

(3) Local

(a) City of Los Angeles General Plan

(i) Safety Element

The City's General Plan Safety Element, which was adopted in 1996 and updated in 2021, addresses public safety risks due to natural disasters, including seismic events and geologic conditions, and sets forth guidance for emergency response during such disasters.

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[6] *California Department of General Services, California Building Standards Code, www.dgs.ca.gov/BSC/ Codes#@ViewBag.JumpTo/, accessed January 9, 2024.*

The Safety Element also provides maps of designated areas within Los Angeles that are considered susceptible to earthquake-induced hazards, such as fault rupture and liquefaction.

(ii) Conservation Element

The City's General Plan Conservation Element, adopted in September 2001, recognizes paleontological resources in Section 3: "Archeological and Paleontological" and identifies site protection as important, stating, "Pursuant to CEQA, if a land development project is within a potentially significant paleontological area, the developer is required to contact a bona fide paleontologist to arrange for assessment of the potential impact and mitigation of potential disruption of or damage to the site. Section 3 of the Conservation Element includes policies for the protection of paleontological resources." As stated therein, it is the City's objective that paleontological resources be protected for historical, cultural research, and/or educational purposes. Section 3 sets as a policy to continue the identification and protection of significant paleontological sites and/or resources known to exist or that are identified during "land development, demolition, or property modification activities."

(b) Los Angeles Municipal Code

Chapter IX of the LAMC contains the City's Building Code, which incorporates by reference the CBC, with City amendments for additional requirements. LADBS is responsible for implementing the provisions of the LAMC. To that end, LADBS issues building and grading permits for construction projects. Building permits are required for any building or structure that is erected, constructed, enlarged, altered, repaired, moved, improved, removed, converted, or demolished. Grading permits are required for all grading projects other than those specifically exempted by the LAMC. LADBS has the authority to withhold building permit issuance if a project cannot mitigate potential hazards to the project or which are associated with the project. Throughout the permitting, design, and construction phases of a building project, LADBS engineers and inspectors confirm that the requirements of the LAMC pertaining specifically to geoseismic and soils conditions are being implemented by project architects, engineers, and contractors.

The function of the City's Building Code is to protect life safety and ensure compliance with the LAMC. Chapter IX addresses numerous topics, including earthwork and grading activities, import and export of soils, erosion and drainage control, and general construction requirements that address flood and mudflow protection, landslides, and unstable soils. Additionally, the LAMC includes specific requirements addressing seismic design, grading, foundation design, geologic investigations and reports, soil and rock testing, and groundwater.

Specifically, LAMC Section 91.1803 requires a Final Geotechnical Report with final design recommendations prepared by a California-registered geotechnical engineer and submitted to the LADBS for review prior to issuance of a grading permit. Final foundation design recommendations must be developed during final project design, and other deep foundation systems that may be suitable would be addressed in the Final Geotechnical Report. All earthwork (e.g., excavation, site preparation, any fill backfill placement, etc.) must be conducted with engineering control under observation and testing by a Geotechnical Engineer and in accordance with LADBS.

b. Existing Conditions

(1) Regional Geology

Regionally, the Project Site is located in the northern portion of the Peninsular Ranges Geomorphic Province (Peninsular Ranges) in the Los Angeles Basin. The Peninsular Ranges are characterized by northwest-trending blocks of mountain ridges and sediment-floored valleys. The dominant geologic structural features are northwest trending fault zones that either die out to the northwest or terminate at east-trending reverse faults that form the southern margin of the Transverse Ranges.

The Los Angeles Basin is located at the northern end of the Peninsular Ranges. The basin is bounded by the east and southeast by the Santa Ana Mountains and San Joaquin Hills, and to the northwest by the Santa Monica Mountains. Over 22 million years ago the Los Angeles Basin was a deep marine basin formed by tectonic forces between the North American and Pacific plates. Since that time, over five miles of marine and non-marine sedimentary rock as well as intrusive and extrusive igneous rocks have filled the basin. During the last two million years, defined by the Pleistocene and Holocene epochs, the Los Angeles Basin and surrounding mountain ranges have been uplifted to form the present-day landscape. Erosion of the surrounding mountains has resulted in deposition of unconsolidated sediments in low-lying areas by rivers such as the Los Angeles River. Areas that have experienced subtle uplift have been eroded with gullies.

(2) Regional Faulting and Seismicity

Based on criteria established by the California Geologic Survey (CGS), faults may be categorized as Holocene-active, Pre-Holocene faults, or Age-undetermined faults. Holocene-active faults are those which show evidence of surface displacement within the last 11,700 years; Pre-Holocene faults are those that have not moved in the past 11,700 years, although they have demonstrated surface displacement during Quaternary time (approximately the last 1.6 million years); and Age-undetermined faults are faults where the recency of fault movement has not been determined.

The Project Site is not located within a State-designated Alquist-Priolo Earthquake Fault Zone or City-designated Preliminary Fault Rupture Study Area for surface fault rupture hazards.[7] Based on research of available literature and results of Project Site reconnaissance, no Holocene-active or Pre-Holocene faults with the potential for surface fault rupture are known to pass directly beneath the Project Site. The active faults located nearest to the Project Site are discussed below. As set forth below, the nearest active fault zone to the Project Site is the Hollywood Fault, located approximately 3.48 miles to the north.

(a) Active Faults

The Geotechnical Investigation documents 12 faults with distances up to 33 miles away from the Project Site. The analysis below summarizes the faults that are within five miles of the Project Site in order from closest to farthest.

(i) Elysian Park Thrust and Puente Hills Thrust

The Elysian Park Thrust and Puente Hills Thrust are blind or buried thrust faults, which are faults without a surface expression that are a significant source of seismic activity. They are typically broadly defined based on the analysis of seismic wave recordings of hundreds of small and large earthquakes in the southern California area. Due to the buried nature of these thrust faults, their existence is sometimes not known until they produce an earthquake.

The Elysian Park thrust is mapped approximately 300 feet south of the southernmost corner of the Project Site but is not within an Alquist-Priolo Earthquake Zone of required investigation. The Elysian Park thrust has been estimated to cause an earthquake every 500 to 1,300 years in the magnitude range 6.2 to 6.7.

The Puente Hills thrust is located approximately 5.35 miles northeast of the Project Site, and is reported to have produced at least four large earthquakes in the last 11,000 years. The magnitude 5.9 Whittier Earthquake of 1987 has been attributed to the Puente Hills thrust in recent studies by many researchers. According to the Southern California Earthquake Data Center, the Puente Hills thrust is capable of producing a 7.5 magnitude earthquake.

The risk for surface rupture potential of these buried thrust faults is inferred to be low. However, the seismic risk of these buried faults in terms of recurrence and maximum potential magnitude is not well established.

(ii) Hollywood Fault

The Hollywood Fault is approximately 3.48 miles north of the Project Site, and trends along the base of the Hollywood Hills to the north, and is thought to connect with the Raymond

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[7] *City of Los Angeles Department of City Planning, ZIMAS, Parcel Profile Report for APN 5414-016-002, http://zimas.lacity.org, accessed September 25, 2024.*

Fault to the east and the Santa Monica Fault to the west. Based on charcoal samples from recent trenching, the most recent rupture along the Hollywood Fault occurred between a maximum of 20,000 years ago and as recently as 4,000 years ago. Based on recent work by several geotechnical engineering consultants and information compiled by the CGS, the Hollywood Fault has been found to be sufficiently-active and well-defined. The CGS published "Earthquake Zones of Required Investigation for the Los Angeles Quadrangle" (2017). According to the Southern California Earthquake Data Center, the Hollywood fault is capable of producing a 6.5 magnitude earthquake.

(iii) Raymond Fault

The Raymond fault is located approximately 3.71 miles northeast of the Project Site. The recurrence interval for the Raymond fault is probably slightly less than 3,000 years, with the most recent documented event occurring approximately 1,600 years ago. According to the Southern California Earthquake Data Center. The Raymond fault is capable of producing a 7.0 magnitude earthquake.

(iv) Malibu Coast–Santa Monica Fault

The Santa Monica fault is located approximately 4.14 miles west of the Project Site. The Santa Monica fault forms the onshore concealed extension of the Malibu Coast fault. Further to the east, the Santa Monica fault joins the Hollywood fault along the southern foothills of the Santa Monica Mountains. The Malibu Coast fault displays both reverse and left lateral displacement and forms a major tectonic boundary between the Transverse Ranges and the Peninsular Ranges provinces. Late Quaternary movement has been documented in excavations south of Pepperdine University, which is located approximately 30 miles to the west of the Project Site.

Based on offset alluvial sediments and geomorphic evidence, the Malibu Coast-Santa Monica fault system is judged to have been active during very late Quaternary time. CGS published "Earthquake Zones of Required Investigation for the Beverly Hills Quadrangle" (2018). According to the Southern California Earthquake Data Center the Malibu Coast-Santa Monica is capable of producing a 7.0 magnitude earthquake.

(3) Local Geology

The Project Site is located in the Elysian Park Hills which form the northeast border of the Los Angeles Basin. The Elysian Park Hills are composed primarily of upper Miocene and Pliocene-age sedimentary rocks. Structurally, the Elysian Park Hills are located on the southern limb of the Elysian Park Anticline. Bedding in the Project vicinity dips to the south and southwest at inclinations of 40 to 55 degrees.

The Los Angeles River is located approximately 600 feet to the east of the Project Site. Currently the river is constrained by a concrete walled channel. Prehistorically, the Los Angeles River meandered between the Elysian Park Hills on the west and the Repetto Hills on the east. An ancient meander edge was likely defined by North Broadway. The Los Angeles River is the source for the alluvium that underlies the site.

Three small canyons drain from the Elysian Park Hills, (on the west) into the Los Angeles River (to the east). The thalweg of one canyon is defined by Solano Avenue which is located near the center of the North Parcel. Another canyon thalweg is defined by Bishops Road, located near the center of the South Parcel. The third thalweg is at the southern edge of the South Parcel aligned with Bamboo Lane.

A description of the existing soil and groundwater conditions and potential geological hazards within the vicinity of the Project Site is provided below.

(a) Soil Conditions

Geotechnologies conducted 24 borings within the Project Site in 2007, three borings in 2015 and four borings in 2024. According to the Geotechnical Investigation, the geologic materials underlying the Project Site include fill soils, alluvium, and sedimentary bedrock of the Puente Formation, which are discussed in further detail below.

(i) Fill Soils

Fill soils within the Project Site consist of silty sand and some brick fragments. The fill is generally dark brown, reddish brown to light gray in color, dense to moderately dense, and moist. The fill was likely generated during construction or widening of North Broadway. On the South Parcel, the fill thickness is relatively consistent, varying from 2 to 8 feet. On the North Parcel, the fill varies in thickness from 0.5 to 30 feet. The fill on the North Parcel was deepest near the intersection of Solano Street and North Broadway, on the unpaved terrace. Two of the geotechnical excavations conducted for the Project were terminated due to obstructions within the fill materials and the base of the fill could not be established

(ii) Alluvium

The alluvium consists primarily of sand and gravelly sand; however, silty sand and clayey sand were also encountered. The alluvium ranges in color from dark brown to yellowish brown and grayish brown. The alluvium is also dense to very dense, and moist to wet. It is likely that the alluvium was deposited in the Holocene Epoch.

Two borings conducted for the Project were drilled on the South Parcel to a depth of 70 feet and no alluvial soils were encountered. On the North Parcel, the alluvium ranged in thickness from 0 to a maximum encountered depth of 37.5 feet.

(iii) Bedrock (Puente Formation)

Sedimentary bedrock of the Puente Formation consists of interbedded sandstone, siltstone and minor quantities of claystone. The bedrock is yellowish brown, yellow, olive brown and gray in color. The rock is moist and moderately hard to hard. The rock is well bedded; however, near the surface the bedding is obscured by weathering. As observed in the borings conducted for the Project, bedding dips to the southwest from 42 to 65 degrees. Bedding could be unsupported on cuts along North Broadway on the North Parcel. Fracturing and joints in the rock were not found to be common.

(b) Groundwater

Within the South Parcel, groundwater was encountered at depths of 30, 29, and 20 feet below ground surface. Water was identified in the coarse-grained alluvium, which transmit water readily. On the North Parcel, bedrock underlies most of the site. As such, finite zones of perched groundwater should be expected locally within the bedrock. According to the Seismic Hazard Zone Report of the Los Angeles 7.5-Minute Quadrangle, the historic-high groundwater level for the Project Site was 20 feet below the lowest site elevation, which is 292.

(c) Liquefaction

Liquefaction is a phenomenon in which saturated silty to cohesionless soils below the groundwater table are subject to a temporary loss of strength due to the buildup of excess pore pressure during cyclic loading conditions such as those induced by an earthquake. Liquefaction-related effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures. The Seismic Hazards Maps of the State of California classifies the Project Site as part of a potentially "Liquefiable" area. This determination is based on groundwater depth records, soil type, and distance to a fault capable of producing a substantial earthquake.

In order to address the liquefaction potential on the Project Site, site-specific liquefaction analyses were performed utilizing the Standard Penetration Test (SPT) data and the laboratory testing of the soil samples collected from the exploratory borings, and supplemented by the Cone Penetration Test (CPT) sounding data. The historic highest groundwater level was conservatively utilized in the analyses. In addition, based on USGS data, the liquefaction potential evaluations were performed utilizing a magnitude 6.83 earthquake, and a peak horizontal acceleration of 0.952 g (PGA_M). Based on CGS Special Publication 117A, a factor of safety against the occurrence of liquefaction greater than approximately 1.3 can be considered an acceptable level of risk where high-quality, site-specific penetration resistance and geotechnical laboratory data is collected.[8] Based on the SPTs, Borings B29, B30, and B31 had no potentially liquefiable layers based on the analysis. However, factors of safety against liquefaction are below 1.3 for some of the soil layers encountered in Boring B28. These potentially liquefiable layers occur between depths 21 to 22 feet below grade. Therefore, the SPTs indicate that soil layers and/or lenses within this portion of Project Site may liquefy in the event of an earthquake on a local or regional fault.

The liquefaction analyses of the CPTs summarized within the Geotechnical Investigation also indicate some of the soil layers and/or lenses at varying depths below the ground surface would be susceptible to liquefaction. Based on the CPTs, the majority of the liquefiable zones occur between 20 to 60 feet below the existing Project Site grade, with a few deeper thin layers. The calculated settlements using the SPT procedure is 0.45 inches for Boring B28 and 0.0 inches for Borings B29, B30 and B31. The supplemental CPT soundings in the vicinity of Boring B28 (CPT 1), Boring B29 (CPT-2A), Boring B30 (CPT-3A), and Boring B31 (CPT-4B) yielded a higher settlement than suggested by the borings. However, as discussed in the Geotechnical Investigation, the CPT liquefaction settlement should be given greater weight consideration due to the number of soundings performed as well as the nearly continuous sampling that is permitted with the use of the CPT Based on the CPTs, the existing differential settlement regardless of development within the Project Site is estimated to be 1.224 inches.

(d) Settlement

Based on the SPT liquefaction settlement analyses, total liquefaction settlement at the existing ground surface due to liquefaction could be expected to be 0.0 to 0.45 inches. Utilizing CPT data, liquefaction settlement between 0.191 and 1.224 inches could be anticipated.

(e) Surface Manifestation

As discussed in detail in the Geotechnical Investigation, within the Project Site, given the relatively deep groundwater level, the relative thickness of liquefiable soils to overlying non-liquefiable surface material fall well outside the bounds within which surface effects of liquefaction have been observed during past earthquakes. As a result, the likelihood that surface effects of liquefaction would occur on the Project Site would be considered very low to non-existent.

[8] *The factor of safety against liquefaction is defined as the ratio of the cyclic stress ratio to cause liquefaction to the earthquake-induced cyclic stress ratio.*

(f) Subsidence

Subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of groundwater, oil, or natural gas out of the ground by pumping, fracking or mining activities.

(g) Lateral Spreading

Lateral spreading is the most pervasive type of liquefaction-induced ground failure. During lateral spread, blocks of mostly intact, surficial soil displace downslope or towards a free face along a shear zone that has formed within the liquefied sediment. Based on the Geotechnical Investigation, the potentially liquefiable layer beneath the Project Site consists of a stratified layer, which is not expected to be continuous throughout the Project Site, and the potential for lateral spread is considered remote.

(h) Expansive Soils

Expansive soils are soils that experience significant change in volume associated with changes in water content.[9] Based on the Geotechnical Investigation, the upper geologic materials found in the Project Site typically are in the very low expansion range.

(i) Landslides

The Project Site is not located on or adjacent to a mapped landslide area based on a review of the "Earthquake Zones of Required Investigation Los Angeles Quadrangle" by the CGS. In addition, no indication of slope instability was noted during the subsurface exploration of the Project Site.

(4) Paleontological Resources

Paleontology is the study of fossils, which are the remains of ancient life forms. As discussed in detail in the Paleontological Resources Assessment, a pedestrian field survey of the Project Site was conducted on March 14, 2022, by two SRI paleontologists. All portions of the Project Site were surveyed and where possible, exposed native sediments were documented by the field crew. No paleontological resources were observed.

However, as discussed in the Paleontological Resources Assessment, the Project area is underlain by geologic units that are known to contain paleontological resources. Within sensitive geologic units, paleontological resources may be encountered at the surface and

[9] *Jones, Lee D., and Ian Jefferson, Institution of Civil Engineers Manuals series, Chapter C5—Expansive Soils, p. 1.*

below. The primary geologic units within the Project Site include the Miocene Puente Formation (Tpss), Unit 2 of the Young alluvium (Qya2), Unit 1 of the Young alluvial-fan deposits (Qyf1), and artificial-fill deposits. Both the Miocene Puente Formation (Tpss) and Unit 2 of the Young alluvium (Qya2), which are only present within the North Parcel, have high paleontological sensitivity. Although no localities have been identified within the Project Site, the known significant fossil finds from the Puente Formation and the richness of nearby localities with similar depositional regimes and geologic ages is indicative of the high fossil sensitivity for this unit. Alluvial deposits are known to produce remains of significant paleontological resources across the Los Angeles Basin. This unit combines both the potential to contain buried fossil remains and the requisite age to contain fossil materials.

Unit 1 of the Young alluvial-fan deposits (Qyf1) within the Project Site has a low paleontological-resource potential despite the potential for alluvial deposits, regionally, to produce significant paleontological resources. The low sensitivity is based on the Holocene age of the unit, which is too young to produce fossil remains. The Young alluvium is primarily present within the southwestern and central portions of the Project Site.

The artificial-fill deposits within the Project Site have no paleontological-resource sensitivity. Because of the nature of how artificial fill sediments are deposited, these units do not contain cultural or paleontological resources in their original context.

The Paleontological Resources Assessment also incorporates a records search at the Los Angeles County Natural History Museum (NHMLA) that was conducted on April 2, 2022, by staff of the Vertebrate Paleontology Collection. The records search found no previously recorded vertebrate fossil localities within the Project Site. However, multiple vertebrate fossil localities (LACM VP 1023, 1880, 2032, 3882, 6934, and 7507) were found within a 3-mile radius of the Project Site.[10] These localities are reported from multiple geologic units, such as the Monterey and Modelo Formations, as well as an unnamed Pleistocene deposit. These localities contained the remains of a baleen whale (*Mysticeti*), bony fish (*Thyrsocles kriegeri*). the holotype specimen of the baleen whale (*Mixocetus elysius*), and remains of bony fish (cf. *Osteichthyes*), sabertooth cat (*Smilodon*), horse (*Equus*), deer (*Odocoileus*), and turkey (*Meleagris*).

[10] *Campbell et al. (2014).*

3. Project Impacts

a. Thresholds of Significance

(1) State CEQA Guidelines Appendix G

In accordance with Appendix G of the CEQA Guidelines, a project would have a significant impact related to geology and soils if it would result in any of the following impacts:

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

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

ii. ***Strong seismic ground shaking***

iii. ***Seismic-related ground failure, including liquefaction***

iv. ***Landslides***

Threshold (b): ***Result in substantial soil erosion or the loss of topsoil.***

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

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

Threshold (e): ***Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater.***

Threshold (f): ***Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.***

(2) 2006 L.A. CEQA Thresholds Guide

The *2006 L.A. CEQA Thresholds Guide* identifies the following factors to evaluate geology and soils:

(a) Geologic Hazards

- Cause or accelerate geologic hazards, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

(b) Sedimentation and Erosion

- Constitute a geologic hazard to other properties by causing or accelerating instability from erosion; or
- Accelerate natural processes of wind and water erosion and sedimentation, resulting in sediment runoff or deposition which would not be contained or controlled on-site.

(c) Paleontological Resources

- Whether, or the degree to which, the project might result in the permanent loss of, or loss of access to, a paleontological resource; and
- Whether the paleontological resource is of regional or statewide significance.

In assessing impacts related to geology and soils in this section, the City uses Appendix G as the thresholds of significance. The criteria identified above from the *2006 L.A. CEQA Thresholds Guide* are used where applicable and relevant to assist in analyzing the Appendix G thresholds.

b. Methodology

To evaluate potential Project impacts relative to geology and soils, the Geotechnical Investigation included the excavation of exploratory borings, collection of representative samples, laboratory testing, engineering analysis, review of published geologic data, and review of available geotechnical engineering information.

To address potential impacts to paleontological resources, the Paleontological Resources Assessment included a formal records search by the NHMLA, background research by SRI, and a field survey by SRI. In addition, the geology of the Project Site and the anticipated depths of grading were considered to determine the potential for uncovering paleontological resources.

c. Project Design Features

The following Project Design Feature is proposed with regard to geology and soils:

Project Design Feature GEO-PDF-1: All development activities conducted on the Project Site will incorporate the professional recommendations contained in the Geotechnical Investigation and/or alternative recommendations set forth in site-specific, design-level geologic and geotechnical investigation(s) approved by the City Engineer, provided that such recommendations meet and/or surpass relevant State and City laws, ordinances, and code requirements, including California Geological Survey's Special Publication 117A and the City's Building Code. Such professional recommendations will include, but not limited to, the following and may be revised or superseded in accordance with an approved final geotechnical investigation(s):

- Removal of fill soils and/or use of structural slab-on-grade and pile systems where fill soils will remain;
- Use of cement types that address sulfate exposure, as applicable;
- Design and construction of buildings in accordance with CBC seismic parameters;
- Grading and fill activities, including compaction, in accordance with regulatory requirements;
- Use of mat foundations where the soils are subject to liquefaction or where a structure will be relatively heavy;
- Design of retaining walls to withstand seismic shaking;
- Use of shoring methods for vertical excavations exceeding five feet;
- Use of a temporary dewatering system should finite zones of perched water be encountered locally within the bedrock; and
- Implementation of proper drainage and stormwater disposal systems in accordance with regulatory requirements.

d. Analysis of Project Impacts

Threshold (a): Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

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

(1) Impact Analysis

Ground rupture is the visible breaking and displacement of the earth's surface along the trace of a fault during an earthquake. As previously discussed, based on a review of available literature and the findings of the Geotechnical Investigation, no known active faults underlie the Project Site. In addition, the Project Site is not located within a State-designated Alquist-Priolo Earthquake Fault Zone or a City-designated Preliminary Fault Rupture Study Area for surface rupture hazards.[11] The closest active fault and Alquist-Priolo Earthquake Fault Zone is the Hollywood Fault located approximately 3.48 miles north of the Project Site. In addition, the risk for surface rupture of the Elysian Park Thrust and Puente Hills Thrust faults are considered low. As such, the potential for surface ground rupture due to faulting occurring beneath the Project Site is considered low.

Therefore, the Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death related to fault rupture. Impacts associated with surface rupture from a known earthquake fault would be less than significant.

(2) Mitigation Measures

Project-level impacts related to fault rupture would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Project-level impacts related to fault rupture were determined to be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

Threshold (a): Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

ii. Strong seismic ground shaking?

(1) Impact Analysis

As described above, the Project Site is located within the seismically active region of Southern California and could potentially be subject to strong seismic ground shaking if a moderate to strong earthquake occurs on a local or regional fault. As discussed above, the closest active fault to the Project Site is the Hollywood Fault located approximately 3.48 miles north of the Project Site. In addition, the Elysian Park Thrust is located less than 300 feet from the Project Site. However, as discussed in the Regulatory Framework section above, State and local code requirements ensure that buildings are designed and constructed in a manner

[11] City of Los Angeles Department of City Planning, ZIMAS, Parcel Profile Report for APN 5414-016-002, http://zimas.lacity.org, accessed August 23, 2024.

that would reduce the risk of building collapse, although buildings may still sustain damage during a major earthquake. The State and City both mandate compliance with numerous regulations related to seismic safety, including the Alquist-Priolo Earthquake Fault Zoning Act, Seismic Safety Act, Seismic Hazards Mapping Act, the CBC, the City's General Plan Safety Element, and the Los Angeles Building Code. Accordingly, the Project's design and construction would comply with all applicable regulatory requirements, including applicable provisions of the Los Angeles Building Code relating to seismic safety, and accepted and proven construction engineering practices would be implemented, including the Project-specific geotechnical design recommendations set forth in the Geotechnical Investigation and in Project Design Feature GEO-PDF-1. As discussed above, the Los Angeles Building Code incorporates the current seismic design provisions of the 2022 California Building Code, with City amendments, to minimize seismic impacts. The 2022 California Building Code incorporates the latest seismic design standards for structural loads and materials, as well as provisions from the National Earthquake Hazards Reduction Program to mitigate losses from an earthquake and maximize earthquake safety. LADBS is responsible for implementing the provisions of the Los Angeles Building Code, and the Project would be required to comply with the plan review and permitting requirements of LADBS, including the recommendations provided in a final, site-specific geotechnical report subject to review and approval by LADBS. In accordance with these regulatory requirements, the Project would implement the recommendations prepared by the Geotechnical Investigation and approved by LADBS, which are included in Appendix E.1 of this Draft EIR, and its final recommendations would be enforced by the LADBS for the construction of the Project.

In addition, any potentially significant impacts related to seismic ground shaking at the Project Site would not be directly or indirectly caused by the Project given that no mining operations, exceptionally deep excavations, or boring of large areas creating unstable seismic conditions would occur. Furthermore, as discussed above, no active faults with the potential for surface fault rupture are known to pass directly beneath the Project Site. As such, the Project would not cause geologic hazards related to strong seismic ground shaking.

Through compliance with applicable regulatory requirements and site-specific geotechnical recommendations contained in a final design-level geotechnical engineering report, the Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death related to strong seismic ground shaking. Therefore, impacts related to strong seismic ground shaking would be less than significant.

(2) Mitigation Measures

Project-level impacts related to strong seismic ground shaking would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Project-level impacts related to strong seismic ground shaking were determined to be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

Threshold (a): Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

iii. Seismic-related ground failure, including liquefaction?

(1) Impact Analysis

As discussed above, the Project Site is classified by CGS as potentially liquefiable. As such, Geotechnologies performed liquefaction analyses that included both SPTs and CPTs. As discussed in the Geotechnical Investigation, one of the four borings where SPTs were conducted (Boring B28) had factors of safety below those considered acceptable by CGS. The potentially liquefiable layers at this boring occurred between depths 21 to 22 feet below grade. The remaining three borings (Borings B29, B30 and B31) had no potentially liquefiable layers based on the analysis. Therefore, analysis of the SPTs indicates that the Project Site includes soil layers and/or lenses that may liquefy in the event of an earthquake on a local or regional fault. As discussed above, the liquefaction analyses of the CPTs also indicate some of the soil layers and/or lenses at varying depths below the ground surface would be susceptible to liquefaction. The majority of the liquefiable zones occur between 20 to 60 feet below the existing site grade, with a few deeper thin layers. Utilizing the CPT data, liquefaction settlement between 0.191 and 1.224 inches could be anticipated. Excavation depths of up to 51 feet would occur as part of the Project.

As discussed above, the Project would be designed in accordance with the Los Angeles Building Code, which would require the implementation of engineering techniques to minimize hazards related to ground failure, including liquefaction, to acceptable levels. Additionally, the Project would implement Project Design Feature GEO-PDF-1, which would require the implementation of the recommendations of the Geotechnical Investigation regarding liquefaction and settlement. In particular, as discussed in the Geotechnical Investigation, a mat foundation system would be implemented where the soils are subject to liquefaction or where a structure would be relatively heavy. In addition, settlement estimates and specific regulatory design requirements would be finalized and included in a design-level geotechnical investigation report.

Therefore, with compliance with regulatory requirements, the Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death related to seismic-related ground failure, including liquefaction.

Impacts associated with seismic-related ground failure, including liquefaction, would be less than significant.

(2) Mitigation Measures

Project-level impacts related to liquefaction would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Project-level impacts related to liquefaction were determined to be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

Threshold (a): Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

iv. Landslides?

(1) Impact Analysis

As discussed in the Geotechnical Investigation, the Project Site is not mapped by CGS as being located within a landslide zone or in an area identified as having a potential for seismic slope instability.[12] In addition, no indication of slope instability was noted during the subsurface exploration of the Project Site. As part of the Project, the slopes in the building areas would be removed and replaced with the proposed structures. **Therefore, the Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death related to landslides. Impacts associated with landslides would be less than significant.**

(2) Mitigation Measures

Project-level impacts related to landslides would be less than significant. Therefore, no mitigation measures are required.

[12] *California Geological Survey, Regulatory Maps Geo Application, https://maps.conservation.ca.gov/cgs/ accessed September 25, 2024.*

(3) Level of Significance After Mitigation

Project-level impacts related to landslides were determined to be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

Threshold (b): Would the project result in substantial soil erosion or the loss of topsoil?

(1) Impact Analysis

Development of the Project would require grading, excavation, and other construction activities that have the potential to disturb existing soils within the Project Site, and expose these soils to rainfall and wind during construction, thereby potentially resulting in soil erosion. However, the potential for the Project to cause substantial soil erosion or the loss of topsoil would be reduced by the implementation of standard erosion controls imposed during site preparation and grading activities during Project construction. Specifically, all grading activities would require grading permits from LADBS, which would include requirements and standards designed to limit potential effects associated with erosion to acceptable levels. In particular, in accordance with LADBS requirements, an erosion control plan would be implemented. In addition, on-site grading and site preparation would comply with all applicable provisions of LAMC Chapter IX, Article 1, which addresses grading, excavations, and fills. Furthermore, the Project would be required to comply with the City's Low Impact Development (LID) Ordinance and implement standard erosion controls to limit stormwater runoff, which can contribute to erosion.

Therefore, with compliance with regulatory requirements, the Project would not result in substantial soil erosion or the loss of topsoil. As such, impacts with respect to soil erosion or the loss of topsoil would be less than significant.

(2) Mitigation Measures

Project-level impacts related to soil erosion or loss of topsoil would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Project-level impacts related to soil erosion and loss of topsoil were determined to be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

Threshold (c): 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?

(1) Impact Analysis

(a) Landslides

As summarized above and discussed in detail in the Geotechnical Investigation, the Project Site is not located on or adjacent to a mapped landslide area. Furthermore, as concluded in the Geotechnical Investigation, no indication of slope instability was noted during the subsurface exploration of the Project Site. As part of the proposed development, the slopes in the building areas would be removed and replaced with the proposed structures. As such, the Project would not be located on a geologic unit or soil that is unstable, which could potentially result in landsides. Therefore, impacts related to landslides would be less than significant.

(b) Lateral Spreading

As previously noted, liquefaction-related effects include lateral spreading. As discussed above, the potentially liquefiable layer below the Project Site consists of a stratified layer, which is not expected to be continuous throughout the Project Site. Thus, the potential for lateral spread is considered remote for the Project Site. As such, the Project would not be located on a geologic unit or soil that is unstable, which could potentially result in lateral spreading. Therefore, impacts related to lateral spreading would be less than significant.

(c) Subsidence

As previously discussed, subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of groundwater, oil, or natural gas. No permanent large-scale extraction of groundwater, gas, oil, or geothermal energy currently occurs or is planned to occur at the Project Site. In addition, as discussed above, the historically highest groundwater level is approximately 20 feet below the lowest site elevation. This elevation is below the base of the proposed buildings. As such permanent dewatering or substantial dewatering during construction is not anticipated. Furthermore, temporary dewatering associated with perched groundwater would be limited. As discussed in the Geotechnical Investigation, the surface effects such as subsidence from this minor dewatering are not expected due to the density of the bedrock. As such, the Project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, which could potentially result in subsidence. Therefore, impacts related to subsidence would be less than significant.

(d) Liquefaction

As discussed above, the Project Site is classified by CGS as potentially liquefiable and the liquefaction analysis, included as part of the Geotechnical Investigation indicates that some of the soil layers and/or lenses at varying depths below the ground surface would be susceptible to liquefaction. The majority of the liquefiable zones occur between 20 to 60 feet below the existing site grade, with a few deeper thin layers. Utilizing the CPT data, liquefaction settlement between 0.191 and 1.224 inches could be anticipated. As discussed above, the Project would be designed in accordance with the Los Angeles Building Code, which would require the implementation of engineering techniques to minimize hazards related liquefaction to acceptable levels. In particular, the Project would implement Project Design Feature GEO-PDF-1, which includes recommendations of the Geotechnical Investigation regarding liquefaction and settlement including the provision of a mat foundation system to be implemented where the soils are subject to liquefaction or where a structure would be relatively heavy. As such, the Project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, which could potentially result in liquefaction. Therefore, impacts associated with liquefaction would be less than significant.

(e) Collapse

As discussed in the Geotechnical Investigation, the Project Site is underlain by fill soils, alluvium, and sedimentary bedrock of the Puente Formation. These soils are not considered prone to sudden collapse or hydroconsolidation. In addition, the Project would be required to provide a final, site-specific geotechnical report that would include the preliminary recommendations from the Geotechnical Investigation. As such, the Project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, which could potentially result in collapse. Therefore, impacts associated with collapsible soils would be less than significant.

Overall, through compliance with regulatory requirements, including the implementation of the site-specific geotechnical recommendations contained in the Geotechnical Investigation, the Project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project and could potentially result in on- or off- site landslide, lateral spreading, subsidence, liquefaction, or collapse. Thus, such impacts would be less than significant.

(2) Mitigation Measures

Project-level impacts related to a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Project-level impacts related to a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, were determined to be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

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

(1) Impact Analysis

As discussed above, the upper geologic materials found in the Project Site typically range in the very low expansion range. Accordingly, due to the composition of the existing underlying soils, impacts related to expansive soils are not anticipated. **Therefore, potential impacts with regard to expansive soils would be less than significant.**

(2) Mitigation Measures

Project-level impacts related to expansive soil would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Project-level impacts related to expansive soil were determined to be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.

Threshold (e): 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 waste water?

As evaluated in the Initial Study prepared for the Project, included in Appendix A of this Draft EIR, the Project Site is served by existing sewage infrastructure. The Project's wastewater demand would be accommodated via connections to the existing wastewater infrastructure system. As such, the Project would not require the use of septic tanks or alternative wastewater disposal systems.

Therefore, as determined in the Initial Study, the Project would not result in impacts related to the ability of soils to support septic tanks or alternative wastewater disposal systems. No impacts with respect to soils incapable of adequately supporting

the use of septic tanks or alternative wastewater disposal systems would occur. No further analysis is required.

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

(1) Impact Analysis

As discussed above, the records search at the NHMLA indicated that no previously recorded vertebrate fossil localities found within the Project Site. However, six vertebrate fossil localities were found within a 3-mile radius of the Project Site. The localities were mapped within similar geologic units to the Project area. In particular, the Project area is underlain by the Miocene Puente Formation (Tpss) and Unit 2 of the Young alluvium (Qya2), which have a high paleontological sensitivity. Both of these units only outcrop within the northeastern portion of the Project Site on the North Parcel. Neither the Puente Formation nor the Young alluvium were noted within the South Parcel, according to the Geotechnical Investigation. Thus, there is a potential to encounter paleontologically significant remains during Project construction of the North Parcel, particularly at depths greater than a few feet below grade where Young alluvium and the Puente Formation may be encountered or where the Puente Formation out-crops at the surface. **Therefore, potential impacts to paleontological resources would be potentially significant.**

(2) Mitigation Measures

The following mitigation measures are proposed to reduce impacts to paleontological resources:

Mitigation Measure GEO-MM-1: The services of a Qualified Professional Paleontologist shall be retained prior to ground-disturbing activities associated with the Project, in order to develop a site-specific Paleontological Resource Mitigation and Treatment Plan. The plan shall specify the levels and types of measures to be implemented, based on the types, locations and depths of ground-disturbing activities. The Paleontological Resource Mitigation and Treatment Plan also shall include a description of the professional qualifications required of key staff, communication protocols to be followed during construction, fossil-recovery protocols, sampling protocols for microfossils (if required), laboratory procedures, reporting requirements, and curation provisions for any collected fossil specimens. The Paleontological Resource Mitigation Treatment Plan shall also include a Worker Environmental Awareness Program (WEAP).

Mitigation Measure GEO-MM-2: A Qualified Professional Paleontologist shall attend any preconstruction meetings, to consult with grading and excavation contractors concerning excavation schedules, paleontological field techniques, and safety issues. Communication protocols shall be established to ensure that all relevant ground-disturbing activities are monitored and assessed to comply with the paleontological resource mitigation and treatment plan. The WEAP shall be reviewed at a preconstruction meeting for the Project.

A paleontological monitor shall be on site at all times during the original cutting of previously undisturbed deposits of high paleontological-resource potential (e.g., Puente Formation and Unit 2 of the Young alluvium), to inspect exposures for contained fossils. The paleontological monitor shall work under the direction of a qualified professional paleontologist. As significant microfossil remains (e.g., isolated small-mammal teeth) are known from localities in the immediate vicinity of the Project area, screening of sediments may be required on site at the discretion of the paleontological monitor or qualified professional paleontologist. If artificial fill, significantly disturbed deposits, or younger deposits too recent to contain paleontological resources are encountered during construction, the Qualified Professional Paleontologist may reduce or curtail monitoring in the affected areas, after consultation with the Applicant and the City of Los Angeles.

If paleontological resources are discovered during construction, the paleontological monitor shall have the authority to temporarily divert or direct ground-disturbing activities in the immediate vicinity around the find until the find is assessed for scientific significance and recovered (i.e., collected). While recovery of paleontological resources is ongoing, ground-disturbing activities on other areas of the site outside of the recovery area may continue without interruption.

Mitigation Measure GEO-MM-3: Paleontological resources collected during monitoring shall be prepared in a properly equipped fossil-preparation laboratory. Preparation shall include the removal of rock matrix from fossil materials as well as the stabilization, consolidation, and repair of specimens, as necessary. Fossil preparation shall be done to the point that specimens are ready for curation. Specimens shall be identified to the finest taxonomic level that is reasonably possible before being sorted and cataloged as part of the mitigation program.

Once prepared, fossils shall be deposited (as a donation) with an appropriate public, nonprofit scientific institution with permanent paleontological collections (such as a natural-history museum), along with copies of all pertinent field notes, photographs, and maps. Any fossils shall be handled and deposited consistent with Paleontological Resource Mitigation and Treatment Plan prepared by the Qualified Professional Paleontologist.

(3) Level of Significance After Mitigation

With implementation of Mitigation Measures GEO-MM-1 through GEO-MM-3, Project-level impacts to unique paleontological resources would be reduced to a less-than-significant level.

e. Project Impacts with Long-Term Buildout

While Project buildout is anticipated as early as 2034, the Applicant is seeking a Development Agreement with a term of 20 years, which could extend the full buildout year to approximately 2047. The Mitigation Monitoring Program would continue to regulate development of the Project Site and provide for the implementation of all applicable Project Design Features and mitigation measures associated with any development activities during and beyond the term of the Development Agreement. Additionally, given that geological and paleontological conditions are site-specific and do not typically vary over the course of relatively short timeframes, a later buildout date would not affect the impacts or significance conclusions presented above.

f. Cumulative Impacts

(1) Impact Analysis

As discussed in Section III, Environmental Setting, of this Draft EIR, there are 25 related development projects that have been identified in the vicinity of the Project Site through 2034, the Project's anticipated buildout year.[13] Due to the site-specific nature of geological conditions (i.e., soils, geological features, subsurface features, seismic features, etc.), geological impacts are typically assessed on a project-by-project basis, rather than on a cumulative basis. Nonetheless, cumulative growth in the surrounding area (inclusive of the 25 related projects identified in Section III, Environmental Setting, of this Draft EIR) through 2034, the Project's earliest anticipated buildout year, would expose a greater number of people to seismic hazards.[14] However, as with the Project, related projects and other future development projects would be subject to established guidelines and regulations pertaining to building design and seismic safety, including those set forth in the California Building Code and Los Angeles Building Code, as well as site-specific geotechnical evaluations that would identify

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[13] *While Project buildout is anticipated in 2034, the Applicant is seeking a Development Agreement with a term of 20 years, which could extend the full buildout year to approximately 2045. A later buildout date would not affect the cumulative impact analysis related to geology and soils.*

[14] *Buildout of the Buena Vista Project could occur in two phases, with a total construction period of approximately 71 months which could begin in 2028 and be completed as early as 2034. However, the Project Applicant is seeking a Development Agreement with a term of 20 years, which could extend the full buildout year to approximately 2045.*

potential effects related to the underlying geologic and soil conditions for a particular related project site.

With adherence to applicable regulations and any site-specific recommendations set forth in a site-specific geotechnical evaluation, the Project and related projects would result in less than significant cumulative impacts related to geological and soil conditions.

With regard to potential cumulative impacts related to paleontological resources, the Project Site is located within an urbanized area that has been disturbed and developed over time. Accordingly, many subsurface paleontological resources in the area have likely been disturbed by present development. As with Project, as part of the environmental review processes for the related projects, it is expected that mitigation measures would be established as necessary to address potential impacts to paleontological resources.

Therefore, the Project and related projects would result in less than significant cumulative impacts to paleontological resources. As such, the Project's contribution would not be cumulatively considerable, and cumulative impacts would be less than significant.

(2) Mitigation Measures

Cumulative impacts related to geology and soils, including paleontological resources, would be less than significant. Therefore, no mitigation measures are required.

(3) Level of Significance After Mitigation

Cumulative impacts related to geology and soils, including paleontological resources, were determined to be less than significant without mitigation. Therefore, no mitigation measures were required or included, and the impact level remains less than significant.